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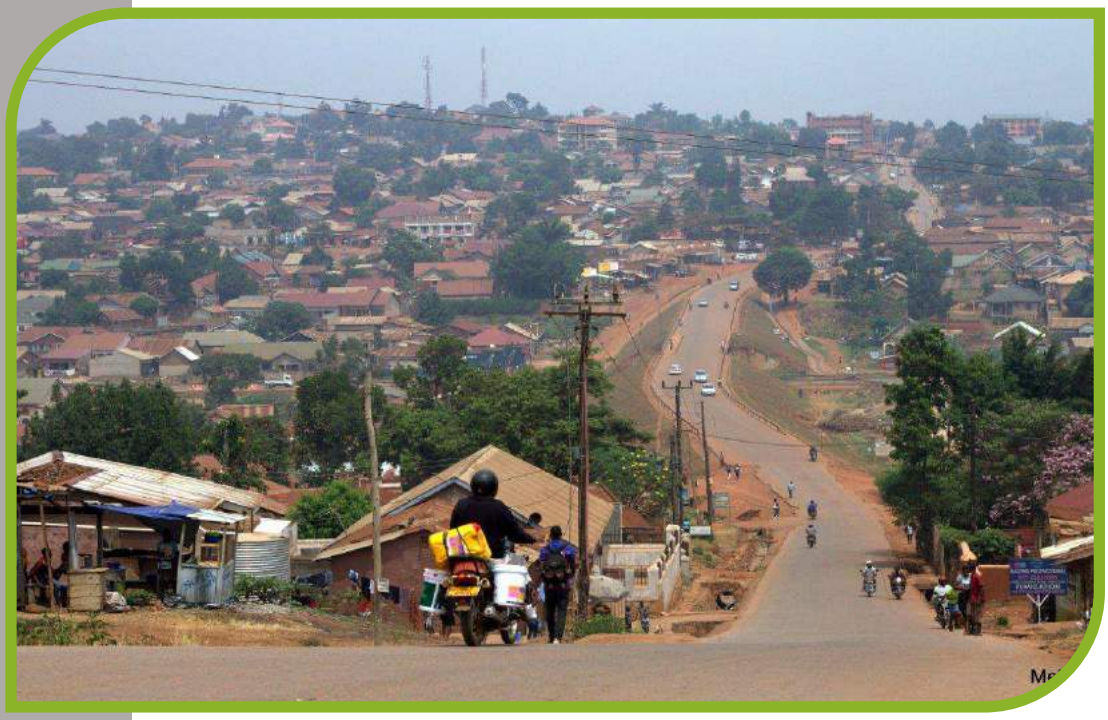
Baseline survey of past and current road sector research undertakings in Uganda and establishment of electronic document management system (EDMS)

Draft Final Report



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Abstract

The purpose of this project is to carry out a baseline survey of past and current research that has been undertaken on the roads sector in Uganda, and to establish a databank that enables access to such research. The study commenced on 22 November 2016.

This document presents the **Draft Final Report** for the study. This document incorporates survey (questionnaires, field investigations, consultations and research summaries) outcomes, proposals and recommendations.

The project entailed an evaluation of reports deemed to contain research from institutions in Uganda who are conducting roads research, as well as some international consultants who have done research for Ugandan institutions. Together with the reports, questionnaires were distributed to stakeholders to provide their perceptions of the state of roads research in Uganda. Selected field visits were conducted to evaluate sites where experiments have been conducted before. Finally, an Electronic Document Management System (EDMS) has been developed to contain the roads research information and be used in future as a repository for such research and a management support system to assist in the planning and coordination of new roads research in Uganda.

Key words

Baseline survey, road sector research, electronic document management system

Acronyms, Units and Currencies

AfCAP	Africa Community Access Programme
APT	Accelerated pavement testing
AsCAP	Asia Community Access Partnership
BCRRA	Bearing Capacity for Roads, Rail and Airfields
CML	Central Materials Laboratory
EDMS	Electronic document management system
ERRC	Ethiopian Road Research Centre
ISAP	International Society for Asphalt Pavements
ISCP	International Society for Concrete Pavements
KCCA	Kampala Capital City Authority
MELTC	Mt. Elgon Labour Based Training Centre
MoLG	Ministry of Local Government
MoWT	Ministry of Works and Transport
MoU	Memorandum of Understanding
NWSC	National Water and Sewage Corporation
PIARC	World Road Association
R&D	Research and development
ReCAP	Research for Community Access Partnership
REST	Representational State Transfer
RMS	Research Management System
ROI	Return on Investment
RPF	Road Pavements Forum
Sabita	South African Bitumen Association
SANRAL	South African National Roads Agency SOC Ltd
SARF	South African Road Federation
SATC	Southern African Transportation Conference
SPA	Single page application
TKIC	Transport Knowledge and Information Centre
TOR	Terms of Reference
TRB	Transportation Research Board
TT	Technology Tree
UIPE	Uganda Institution of Professional Engineers
UNCST	Uganda National Council for Science and Technology
UNRA	Uganda National Roads Authority
URF	Uganda Road Fund
US	United States
WCS	Web Coverage Service
WFS	Web Feature Service
WMS	Web Map Service

Contents

1 Executive summary

The purpose of this project is to carry out a baseline survey of past and current research that has been undertaken on the roads sector in Uganda, and to establish a databank that enables access to such research. The study commenced on 22 November 2016.

This document presents the **Draft Final Report** for the study. The document refers to best practices, and set the definitions of research to be used in the design of the system. The document explains the consultation process that was followed, and the outcomes of this process. The document then reviews the research that was collated. A structure for facilitating and coordinating research in future is then presented. Finally, the specifications for an Electronic Document Management System is presented. The document also contains in Appendixes all the questionnaire feedback from the consultation process, and research summaries collected from various institutions.

The project entailed an evaluation of reports deemed to contain research from institutions in Uganda who are conducting roads research, as well as some international consultants who have done research for Ugandan institutions. Together with the reports, questionnaires were distributed to stakeholders to provide their perceptions of the state of roads research in Uganda. Selected field visits were conducted to evaluate sites where experiments have been conducted before. Finally, an Electronic Document Management System (EDMS) has been developed to contain the roads research information and be used in future as a repository for such research and a management support system to assist in the planning and coordination of new roads research in Uganda.

The collected information was analysed and the following conclusions were drawn:

- There is a large volume of roads related work conducted in Uganda, although not all of these can be deemed to be research. The identified research is distributed throughout Uganda geographically, although the majority is focused close to Kampala and the location of the institutions that are conducting the work. The majority of the research focused on pavement materials, followed by design, management and construction (although most of the design category cannot clearly be defined as research, but more application of design methods) (Section 5.3.1);
- Laboratories are stocked mainly with equipment obtained through road construction contracts (UNRA) and old equipment (CML). The equipment is in varying degrees of functionality. Technicians / testers are trained but not certified for testing. There is a process underway to look at certification and quality control of the laboratories. Observation of some of the tests being conducted confirmed the requirement for certification, and These laboratories can probably not in the current state provide research-level test results (Section 5.3.4);
- It does not appear as if there is general implementation of research results for the majority of the research reports evaluated. Most of this research are reported without any indication of potential implementation or feeding into a system where implementation can be driven from (Section 5.5);
- There are clear cases where research has not been implemented as it was clearly reported that the specific research objectives were not met. This is the case with the various proprietary products evaluated by CML and reported during a meeting to have failed within a relatively short period after construction. Unfortunately these outcomes were not officially documented and therefore from the research reports on their own, it almost appears as if the research provided a positive outcome (Section 5.5);

- There are cases where research outcomes can be implemented and is being done so on a local basis, but where these results are not communicated nationally and implemented on a wider scale (Section 5.5);
- The difficulty with which outputs on international research conducted through donor countries and institutions on Ugandan roads was collected is a concern, as such investments should be publically available if they are to contribute to the improvement of the national roads infrastructure in Uganda (Section 5.5);
- In general the lack of an overall research entity in the country appears to be the biggest hindrance towards implementation of research. Most research are reported within a local institute without any sharing of the work conducted or the outcomes of the research, thereby hampering the discussion of outcomes, planning for new research and implementation of existing results (Section 5.6), and
- A lack of a central research entity or discussion body in the country is hampering research efforts most. There appears to be (based on the available research reports) active intentions of conducting good roads related research by a number of institutions. However, a lack of coordination is leading to duplication of efforts and a lack of implementation of the knowledge gained in the process. A regular gathering of active researchers to assist in the thorough identification of research needs, development of a research plan and monitoring of the execution of such a plan is required to ensure that the time, effort and funding spent on roads related research are not wasted (Section 5.6).

The following recommendations are made based on the analysis of the information. Some of these recommendations are based on specific discussions in the various subsections of the report, and others are more general. It is recommended that:

- UNRA need to develop a focused policy on the active and managed dissemination of research outputs to gain the most value for the investment made. This should consist of a combination of academic and practical dissemination that is open to all stakeholders and that can also expose the research done in the country to international scrutiny and visibility (Section 3.5.2);
- An appropriate process be developed for the evaluation of researcher competence in the Ugandan context, to provide an objective, transparent and open system for managing both new entrants and established roads researchers (Section 3.7);
- An evaluation be done regarding the availability of road survey equipment such as FWDs and profilometers available in Uganda at the various institutions (Section 5.2.4);
- A national effort should be launched to evaluate the condition of the various laboratories and develop a roadmap for accreditation of these to ensure that good research (and quality control) data can be generated form the various laboratories (Section 5.3.4);
- Training in research methodology be arranged for all entities involved in research planning, management and execution (Section 5.3.5);
- It appears that while much research has been conducted in the materials field, there are gaps in areas such as traffic, maintenance and rehabilitation and road safety;
- Implementation of the institutional structure and operational matters regarding roads research in Uganda takes cognisance of the outcome of current ReCAP research regarding institutional models to ensure that the most relevant application of the model is used for the situation (Section 6.5);
- The overall road research coordinating institution should link to the UNRA structure to ensure that coordination is done with a national focus, incorporating all relevant stakeholders (Section 6.6.1);

- The current efforts with establishing the Research and Development unit in UNRA should be strengthened as a first priority, with the following specific mandate (Section 6.6.1):
  - Develop a national coordination system of all roads related research needs in Uganda and arrange for a national forum (with all stakeholder involved) where such a coordinating body can officially be established and agreed on as the body that will steer roads related research in the country;
  - Establish a national roads research discussion forum that meets at a regular (i.e. annual) interval to discuss the current state and developments around roads related research in Uganda;
  - Conduct a thorough investigation of the roads related research needs in Uganda. This should be supported by a foresight study that indicates roads related needs for the next decade, based firstly on economical and socio-economical drivers in the country and region, followed by the technical requirements that will ensure that the country can receive and maintain the required roads related infrastructure to support the economic and socio-economic needs;
  - Mandate all roads related research and investigations by both local and international companies, research centres and governments, to be conducted through the Research and Development unit at UNRA, and ratified by the established national coordinating body to ensure that relevant research are conducted and that such research outcomes be nationally reported and implemented, and
  - Once the coordination of roads related research in Uganda has reached a level at which a national framework of priorities exists and national support for the UNRA unit, coordinating body and discussion forum exists, this body needs to determine the needs and requirements for an autonomous institution that can be operated along the lines of similar regional and international institutions to support roads related research in Uganda.

2 Introduction

2.1 Background

One of the challenges facing the roads sector in Uganda is the absence of consistent, continuous and coordinated research. Various national institutions and agencies have undertaken research in the road sector, including Makerere University, the Uganda National Roads Authority (UNRA), Mt. Elgon Labour Based Training Centre (MELTC), the Central Materials Laboratory, and individual researchers. However, there is currently no databank where research is consolidated and indexed, and accessible to all stakeholders.

The Africa Community Access Partnership (AfCAP) is a programme of research and knowledge dissemination funded by the UK government through the Department for International Development (DFID). Cardno Emerging Markets (UK) Ltd has been contracted to do the management of the AFCAP2 and Asia Community Access Partnership (AsCAP) under the Research for Community Access Partnership (ReCAP) umbrella. The AfCAP National Steering Committee has placed high priority on knowledge management as a tool to coordinate road research undertakings, and to avoid duplication of research. AfCAP accepted a request from UNRA for support to carry out a baseline survey of past and current road sector research undertakings in Uganda.

Cardno appointed Aurecon AMEI Limited to carry out the baseline survey of past and current road sector research undertakings in Uganda and to establish an electronic document management system ("databank") that is accessible to stakeholders. The study commenced on 22 November 2016.

This document presents the **Draft Final Report** for the study. This document incorporates survey (questionnaires, field investigations, consultations and research summaries) outcomes, analyses, proposals and recommendations.

2.2 Project objectives

The purpose of this project is to carry out a baseline survey of past and current research that has been undertaken on the roads sector in Uganda, and to establish a databank that enables access to such research. To achieve this purpose, the study comprises of the following main tasks:

1. Review and compile a listing of past and current research that has been undertaken on the roads sector in Uganda;
2. Analyse and categorise past and current research undertakings to outline items such as:
    a. Methodology/ approach followed;
    b. Controls exercised;
    c. Institutions involved;
    d. Competence of researchers;
    e. Research findings.
3. Comment on the reliability of research undertakings;
4. Undertake a gap analysis to identify and prioritise research knowledge gaps;
5. Assess the prevailing modes of knowledge management;
6. Develop an implementation plan for the establishment of a centralized knowledge base (databank) of research undertakings within the road sub-sector;

7. The target audience is a broad range of stakeholders including current and future researchers, practitioners, academia, road policy and decision makers, and the general public.

2.3 Project methodology

The methodology was structured around the objectives and specific tasks stipulated in the Terms of Reference (TOR). The study consists of three main components, namely:

1. A process of identifying and consulting with research institutions, organisations or individuals;
2. A process of gathering research material, ordering/ categorising it, evaluating it on the basis of a predetermined set of criteria, and drawing some conclusions;
3. Designing and implementing a databank.

The broad approach for conducting this study is illustrated in Figure 1.

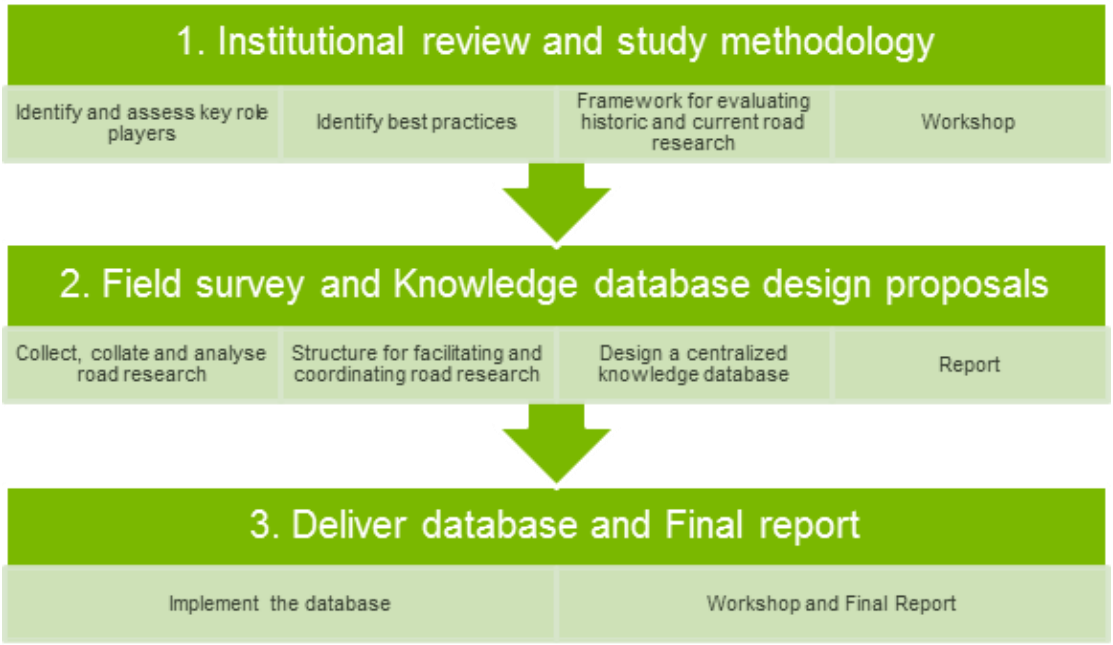

Figure 1: Broad approach to the study

2.4 Structure of the report

The report is structured as follows:

1. The Executive summary contains an overall summary of the report;
2. The Introduction (this section) contains the background, project objectives, project methodology, and structure of the report;
3. Best practices provides a summary of the best practices used as basis for the work conducted in this project;
4. The consultation process and findings summarise the processes followed in the project to collect the required data;
5. Research review discusses the collation of research from the various sources, field and laboratory visits that were conducted, and the process for collation of the collected research. It also provides analysis and discussion of the collated information;

6. In Structure for facilitating and coordinating road research the TT model used for the analysis of the research are discussed, and a structure and priorities of road research in Uganda developed, together with a structure for institutional issues and operational matters;
7. Specifications for EDMS contains the requirements set for the EDMS to be used after this project is successfully completed;
8. Appendix A contains copies of all the questionnaires collected from stakeholders, and
9. Appendix B contains a summary of the database of research report information collected from stakeholders.

The specific objectives and tasks as per the project brief are addressed in the following way:

- Review and compile a listing of past and current research that has been undertaken on the roads sector in Uganda - covered in Section 5.2;
- Analyse and categorise past and current research undertakings to outline items such as:
  - Methodology/ approach followed - covered in Section 5.3;
  - Controls exercised - covered in Section 5.3;
  - Institutions involved - covered in Section 4.3;
  - Competence of researchers - covered in Sections 3.7 and 5.4;
  - Research findings - covered in Sections 5.3, 5.5 and 5.6.
- Comment on the reliability of research undertakings - covered in Section 3.6, 3.8 and 5.4;
- Undertake a gap analysis to identify and prioritise research knowledge gaps - covered in Section 6.2;
- Assess the prevailing modes of knowledge management - covered in Section 7, and
- Develop an implementation plan for the establishment of a centralized knowledge base (databank) of research undertakings within the road sub-sector - covered in Section 7.

3 Best practices and definitions

This section focuses on a summary of the best practices that were identified in the inception report and workshop report to be used for this project. It further contains definitions of research and test sections that are used in the analysis of the projects contained in the EDMS and the report. Lastly it contains information on the evaluation of researcher competence, research reliability and quality.

3.1 Introduction

The process of managing transportation and specifically roads research needs to focus on ensuring that appropriate and cost-effective research is conducted to support the economic development of a country or region. Research planning needs to identify appropriate areas of research where the envisaged research outcomes will address current and expected challenges. This needs to be accomplished with the aim of ensuring that the road network can support economic and social growth and development.

This identified research should be conducted in such a way that the benefits can be quantified and expressed in terms of the costs and larger investment and asset value of the network, to demonstrate that a positive Return On Investment (ROI) is obtained. This positive ROI need not always be in terms of direct currency terms, but should be expressed in a way that can demonstrate that the country or region is better off economically and socially than without the research being conducted.

Various approaches exist to identify and manage research in general. These can include the Development stage models, market-pull models, Activity stage models, Systems frameworks etc. Each model typically focuses on aspects that are of importance to the industry where it has been developed. This report does not go into an in-depth evaluation of approaches, but rather focuses on a specific approach that has been applied successfully in South Africa, specifically in the roads sector over the last decade or so. Rust (2009) developed a systems approach for managing research and development in the road infrastructure area in South Africa, which in this document will be termed the Technology Tree (TT) model. Rust has refined aspects of the TT model for application in specific situations (such as the ReCAP project applications) and cognisance should be taken of these refinements once such documentation becomes publicly available. It is recommended (Section 6.5) that the implementation of the institutional structure and operational matters regarding roads research in Uganda takes cognisance of the outcome of such new research / studies when it is published to ensure that the most relevant application of the model is used for the situation. Specific aspects of this TT model are proposed for use in this project.

It is the objective of this project to review and compile a listing of past and current research that has been undertaken on the roads sector in Uganda. In order to do this in an objective way, a specific evaluation approach needs to be followed. The TT model discussed in Section 3.2 is proposed as such an approach. The TT model needs detail in terms of the focus areas in which research will be classified, and the focus areas identified in Section 3.3 are proposed to be used as the basis for inclusion of conducted and required research. In Section 7 the recommended framework that will be used in the analyses is briefly summarized, based on the Section 6 background.

3.2 Technology tree model

The complete technology tree consists of the following aspects provided in Figure 2:

- Key focus areas and their related identified needs;
- Key solutions to address the identified needs;
- A technology platform;
- Applied technologies or capabilities;
- Base technologies, and
- Basic science and infrastructure.

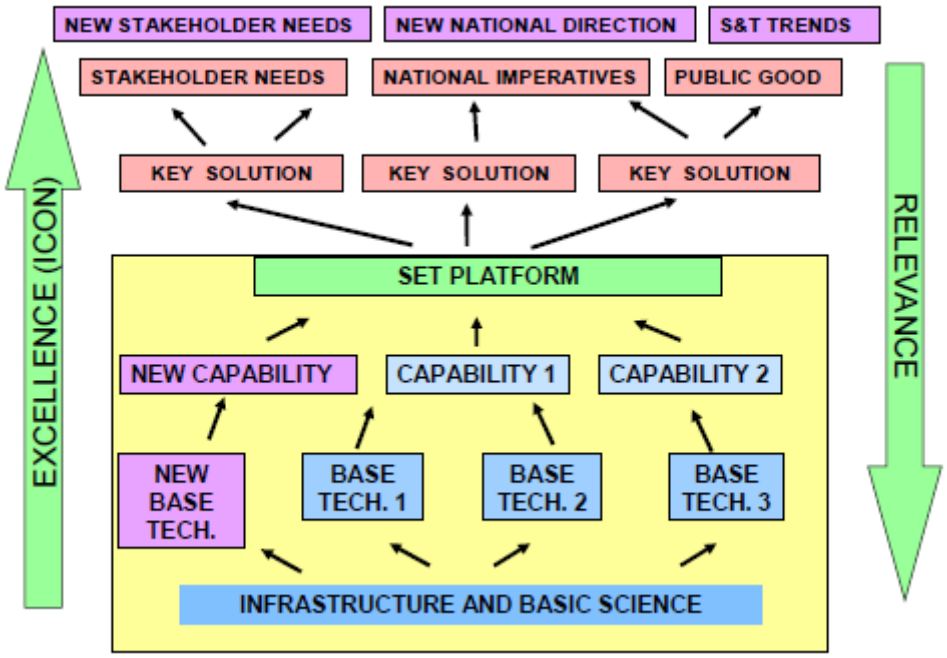

Figure 2: Schematic technology tree (Rust, 2009)

Key focus areas (e.g. Stakeholder Needs and National Imperatives in Figure 2) are developed from a needs-determination process (such as the one conducted in this project) and should address the strategic issues facing the roads industry. Key solutions are technology packages that address the identified needs. The technology platform forms the centre of the technology tree and is defined as an innovative process, methodology or product that facilitates the development of a family of solutions to fulfil identified needs. Technology platforms focus the research effort on significant developments that will have a significant impact on the industry. The technology platform therefore integrates the research activity at lower levels of the tree (Base Technology) and add commercialisation and delivery processes and systems to these activities to ensure effective solution development, technology transfer and impact. It is thus a conduit through which several key solutions can be delivered from the same science, engineering and technology base in a cost-effective manner.

An applied technology or capability consists of the compilation of a number of base technologies in order to form a certain capability or competency in an organisation. Development of applied technologies requires significant human resources critical mass with specialised expertise and knowledge. Base technologies comprise the basic tools and techniques that support the applied technologies. Infrastructure and basic science includes research infrastructure such as equipment, software, models, databanks and basic science.

In order to keep the research and development process functional and operational, it is important to also view the research as one aspect of the larger roads infrastructure management process. In Figure 3 an indication is provided of the typical elements of a research management model that can also be applicable to roads research (Rust, 2009). It

indicates that the research management is a continuous process that takes cognisance of strategic focus areas and the evaluation of previous research and its effectiveness to drive the process for new research. New research supports the development and implementation of new knowledge and technologies that needs to be conveyed to the users (roads engineers, technologists and technicians) after which the evaluation again identifies new areas of required refinement of research.

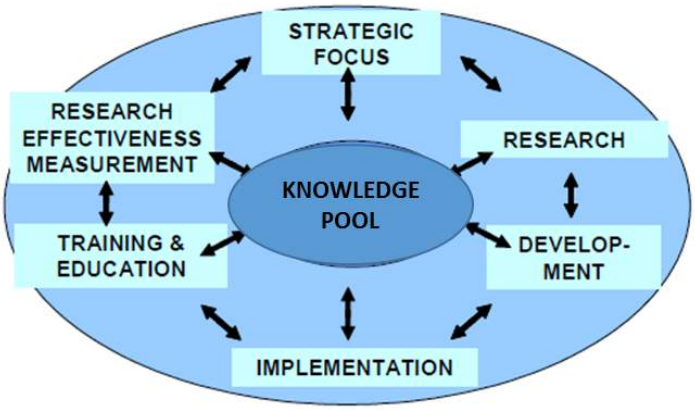

Figure 3: Main elements of the conceptual R&D management model

Important aspects of this model are the continuous engagement between parties to evaluate current technologies and identified gaps in the knowledge that leads to focused planning of new research. This is done in conjunction with all stakeholders to ensure that it is not only an academic exercise, but that practical field experiences and information from long term road studies and actual construction experience forms a major part of the inputs into new research development and management.

Implementation, training and education focuses on the important aspect of ensuring that the research do not remain academic outputs, but are actually put into practice and evaluated to ensure that the resultant ROI can be quantified. This is an important closing in the research management process, as it is the only time that the real benefit of the research can be determined and placed into context. If only the research cost is evaluated without this last important step, no research will be cost effective.

Du Plessis (2016) recently developed a system that evaluates the benefit cost evaluation of research in the roads environment (specifically focused on Accelerated Pavement Testing (APT)). This describes an engaged process of quantifying not only short-term benefits of research but also the medium and longer term benefits. Information on this system will be incorporated into the analysis procedures for this project to enable the client to develop an appropriate in-house system for such analysis.

In terms of initiating a research management system, as is the case for the Uganda roads research situation, it makes sense to start off with a simplified approach towards the technology tree effort to ensure that the system does not become so complicated that it drowns the efforts to coordinate and manage the research effort.

3.3 Research focus areas

The objective of this project is to review and compile a listing of past and current research that has been undertaken on the roads sector in Uganda. In this regard, the scope of the research focus areas needs to be defined to prevent the project just looking at a broad number of areas, or ignoring significant information.

Road or pavement engineering typically focus on the following components:

- Traffic – states the overall demand for the road and places all other decisions in context. Research should focus on development of appropriate quantification methods;
- Material – indicates the available resources to respond to the stated demand. Research should focus on a detailed understanding of the availability, properties and performance of available materials under the traffic demand, functioning in a specific environment in combination with other materials (structure);
- Environment – states the overall context under which the road has to function. Research should focus on a detailed understanding of the historic, current and future environmental weather patterns and the potential effect of these on the materials and structures provided;
- Pavement structure – ultimately states the combination of materials in a specific environment to address the specific traffic demand. Research should focus on optimal combinations of material types and thicknesses to ensure optimal lives and maintainability of the facility at an acceptable service level;

Further, the areas of interest may be defined as:

- Design – overall evaluation of all the relevant inputs (previous bullets) in a standardised and acceptable framework to enable objective outcomes for all input scenarios;
- Construction – application of the design with a major research focus on quality control;
- Management – long-term management of the life of the facility with detailed attention on options to extend the life under changing conditions to ensure increased ROI for the roads agency through prevention of premature failures, and
- Maintenance and rehabilitation – options for keeping the facility in a serviceable condition and extending the life of the facility through appropriate measures.

It is proposed that these eight areas be the focus areas for the scope of this project. In the development of the TT model, these aspects will be used as the basis for inclusion of conducted and required research.

Since initiating the project, and in response to the workshop discussions, it was decided to add Operations and Road safety as two additional focus areas:

- Operations – management of non-pavement aspects of road system, such as traffic planning and flow models, and
- Road safety – traditional road safety issues linked to keeping road users safe during use of infrastructure.

3.4 Institutional responsibility for research planning

The models discussed in Section 3.2 assume a central responsibility for managing and coordinating research in the country to ensure that scarce resources (human capacity, funding, materials and equipment) are used in a most effective manner. Attempts at such central management of research have been made in various countries, with varying levels of

success. Most researchers and research organizations value their independence in terms of research areas and focus, and also the ability to make independent findings based purely on the research outcomes and not the needs of specific funders that may seek for specific answers from research that will benefit their agendas. However, a managed approach in order to focus the national research effort on issues that are most pressing is of importance, and most rational researchers will take part in a process where research funding and efforts are managed in a responsible way.

The role of an institutional responsible body for guiding and managing research is played by various organizations in various countries to different levels. In South Africa the South African National Roads Agency SOC Ltd (SANRAL) typically takes the lead in this process, while organizations such as the Transportation Research Board (TRB) in the United States (US) and the various national roads departments / ministries in some European and Asian countries take the lead in this process. It is important to ensure that the institution taking on this role is trusted and viewed as being transparent and knowledgeable to be able to do this type of management, and that it is done with the inputs of all relevant stakeholders.

3.5 Consolidation, storage and dissemination of research outputs

Research outputs only become relevant and useful when it is disseminated to potential users that can implement the new knowledge into daily activities. In this regard it is important to have both a consolidation and storage, and a dissemination approach for the completed research.

3.5.1 Consolidation and storage

Consolidation and storage of research outputs has traditionally been one of the most important challenges in the research cycle. As indicated in Figure 3, the Intellectual Capacity pool sits at the centre of the Research and Development management model, and contains not only the human resource capacity but also the collective of research outputs. Typical issues with consolidation and storage of research outputs include:

- Intellectual property rights of the authors / funders;
- Output format (hard copy, electronic, software source, etc.);
- Long term commitment to storage, and
- Perceived cost of keeping and managing the database.

The traditional model for research output consolidation and storage is that the researchers will have a database (hard copy or electronic) of the raw data as well as the analysed and synthesized data and reports, while the research institution and funder's libraries will typically hold copies of the finally approved research reports and maybe publications. Further, reports that were published as dissertations and theses will be kept at a university library, and those reports that were published as conference or journal papers will be held in the final format as part of the repository of the specific conference or journal. Typically, the funder of the research will have copies of final reports in a central database, but this will only cover that research conducted for the specific funder. No country sampled for this investigation has one centralized databank for all research in the roads area.

Many attempts have been made over the years to develop such a central database of research outputs in various countries, but it typically runs into issues regarding storage space, budgets for human resources to manage the collection, the motivation for

researchers to submit the outputs to the central repository, intellectual property rights regarding copies of the research outputs, etc.

Some of the specific issues experienced with keeping such a central repository in hard copy format includes the space requirements and the management and upkeep of the collection over a number of years. For an electronic repository the issue is typically around the software used for the storage of the information (updates in licences, improvements in software, Human Resources to manage the process, replacement of computers and hard drives, backups etc.), the software used for producing the outputs (especially backward compatibility of software versions), etc.

An issue around the storage of original data and analyses is that old data are often discarded once the researcher leaves an organization due to space requirements. Therefore, it is important to have a system where such information can be effectively archived.

Overall, the one factor that typically prevents the operation of a centralized research output database is the cost and affordability of the process in times of austerity, where apparent unfruitful costs such as merely storing outputs is often viewed as a cost that can be saved. This line of reasoning overlooks the cost of originally collecting the data and collating it into valuable research outputs, as well as the beneficial effect that continued implementation of the outputs will have on the country.

Recent developments such as ResearchGate® has to an extent become an important repository of research outputs as the benefits to researchers of posting research outputs on this international database forces them to keep their records up to date, thereby improving the availability of a public repository of research outputs without an additional cost.

In terms of best practices for consolidation and storage of research outputs it can thus be stated that no one operational model really exists that can be copied and implemented. The consolidation and storage will need to happen at different levels in the country, and the important issue is to define the system to be used in such a way that important data and findings are not lost due to an inadequate system. It is probably an economical solution to keep track of the topics of research conducted and a summary of research output references (in a simplified database) with full datasets kept at the source of the research. The possibility of linking the repositories of respective institutions to a central database and enabling automatic synchronisation could also be investigated, depending on the sophistication of such repositories.

3.5.2 Dissemination

Dissemination of research outputs is important to ensure that the research funding was not used in vain. Often good research is conducted, but due to a lack of dissemination channels for the outputs, the information remains closed to most of the potential users (new researchers and implementers of the findings alike).

Typical research finding dissemination channels include academic dissertations and theses, conference proceedings and journal papers, and short courses and lectures. Due to the nature of road research and the possible implementers of the research outputs, a combination of these channels are required.

Researchers and academic users typically focus on the information disseminated through conferences, journals and academic publications, while the engineers and technologists that

need to implement the research depend on short courses and interventions to gain access to this information.

Examples of dissemination channels that are used in the road research area internationally are the following:

- Transportation Research Board Annual meeting – the TRB annual meeting in Washington DC is seen as a primary dissemination point for new research, through a combination of conferences, journals, committee meetings and webinars. This focuses on US processes, although in recent years the internationalization of research findings has received major attention;
- A range of other international road research organizations and conferences organized such as the International Society for Asphalt Pavements (ISAP), International Society for Concrete Pavements (ISCP), Bearing Capacity for Roads, World Road Association (PIARC), Rail and Airfields (BCRRA) conference and the likes;
- Organizations such as the Research for Community Access Partnership (ReCAP);
- The annual Southern African Transportation Conference (SATC), and Conference on Asphalt Pavements for southern Africa;
- Discussion forums such as the Road Pavements Forum (RPF) and Transport Forum, and
- Short courses and information sessions arranged by organizations such as the South African Road Federation (SARF), Southern African Bitumen Association (SABITA) and the likes.

It can be seen that a host of different options exists and are being used actively for dissemination of research outputs. The important factor is that most organizations do not have a specific policy on the use of these and related avenues for research output dissemination, and it often happens haphazardly as decided and planned by the individual researcher.

It is recommended that as part of the outputs of the project, a recommendation be made that the client develop a focused policy on the active and managed dissemination of research outputs to gain the most value for the investment made. This should consist of a combination of academic and practical dissemination that is open to all stakeholders and that can also expose the research done in the country to international scrutiny and visibility.

3.6 Definitions for research

Various sources use different definitions for research. Some of these include:

- The systematic investigation into and study of materials and sources in order to establish facts and reach new conclusions (Oxford, 2017);
- The strict definition of scientific research is performing a methodical study in order to prove a hypothesis or answer a specific question. Finding a definitive answer is the central goal of any experimental process. Research must be systematic and follow a series of steps and a rigid standard protocol. These rules are broadly similar but may vary slightly between the different fields of science. Scientific research must be organized and undergo planning, including performing literature reviews of past research and evaluating what questions need to be answered. Any type of 'real' research, whether scientific, economic or historical, requires some kind of interpretation and an opinion from the researcher. This opinion is the underlying principle, or question, that establishes the nature and type of experiment. The scientific definition of

research generally states that a variable must be manipulated, although case studies and purely observational science do not always comply with this norm (Explorable, 2017);
- The strict definition of scientific research is performing a methodical study in order to prove a hypothesis or answer a specific question. Finding a definitive answer is the central goal of any experimental process. Research must be systematic and follow a series of steps and a rigid standard protocol (Explorable, 2017);
- Research comprises "creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of humans, culture and society, and the use of this stock of knowledge to devise new applications" (OECD 2002);
- Frascati (OECD, 2015) indicates that research needs to be aimed at new findings (novel), based on original, not obvious, concepts and hypotheses (creative), be uncertain about the final outcome (uncertain), be planned and budgeted (systematic), lead to results that could be possibly reproduced (transferable and/or reproducible, and
- "studious inquiry or examination; especially : investigation or experimentation aimed at the discovery and interpretation of facts, revision of accepted theories or laws in the light of new facts, or practical application of such new or revised theories or laws" (Merriam-Webster, 2017).

Creswell (2008) indicates that three steps are required for research to be conducted:

- Pose a question / state a hypothesis;
- Collect data to answer the question or evaluate the hypothesis, and
- Present an answer to the question.

Cook et al (2001) describes the research chain (and definitions) to contain the following elements. They stated key reasons for potential failures of research to be the absence of uptake and embedment of the new information into normal practice:

- Research (undertaking of a defined programme within a framework of Terms of Reference and Quality Management);
- Reporting (compilation of research findings, analysis and conclusions);
- Dissemination (knowledge transfer or distribution of research outcomes to identified stakeholders);
- Demonstration (validation of outcomes through trials and monitoring);
- Training (instruction or guidance to key stakeholders or operatives concerned with wider application of the research);
- Uptake (use or application of research evidence at major project level by practitioners and/or policy makers), and
- Embedment (formal inclusion of research outcomes in Government policy, or mandatory standards, specifications and manuals).

Based on these definitions research may be defined as a process used to establish, verify or confirm facts, reaffirm results of previous work, solve novel or existing problems, support or develop theories. It therefore requires the collection of data / information in support of the confirmation of existing knowledge or development of new knowledge.

One of the objectives of the current study is to conduct field visits, to sites where trial / test sections were constructed. Caltrans (Bush et al, 2004) developed guidelines for the development and management of pavement test sections for road rehabilitation options. They indicated the purpose of a test section to be the evaluation of the performance of an existing or new rehabilitation alternative. Typically a control section is required in which standard maintenance techniques are applied to allow for the comparison between the

maintenance alternatives under evaluation and the control section. The following issues relevant to this study need to be established for the test sections to be evaluated:

- Type of maintenance / road construction alternative to be investigated need to be defined;
- Traffic information on the selected section road is required. This can include information on the distance to the nearest town or city to enable the effect of road use or population density to be evaluated on the section performance;
- Obstruction to vision and accessibility to test section that may cause safety issues;
- Road section's structure need to be as uniform as possible throughout the proposed test section length, in order to effectively compare the control section and the proposed test sections;
- Proposed maintenance alternative should be applicable to the existing conditions, and
- There should be a reasonable background research effort invested in the proposed maintenance alternative before funding is set aside for the project.

Another option for road sections to be constructed is when these are done as assessment sections to assess the competency of a newly trained contractor to construct the type of road / surfacing that they were instructed to do. This often is the case with labour intensive type projects, where it is required that the trainee should be able to practically demonstrate competency. It is important to appreciate that the purpose of such sections is not firstly to develop new knowledge or evaluate different options with each other, but rather for the trainee to demonstrate that all techniques are well-understood and that successful replication of the process covered during training is possible. Although such sections can be monitored for long-term behaviour, they will not necessarily be ideal due to possible errors in the construction process. If they are to be monitored, they need to be constructed under the same principles than those stated for test sections.

Frascati (OECD, 2015) states that demonstration projects can be defined as "user demonstration" (process when a prototype is operated at or near full scale in a realistic environment to aid the formulation of policy or the promotion of its use - not Research and Development action) and "technical demonstration" (development of "demonstration projects" and "demonstration models" - integral part of a research and development project). Technology demonstration is seen as a step in the process of evaluating implementation of new technologies, typically with the aim of demonstrating to potential customers the expected potential of a technology under development, and thus is not defined as research.

Apart from these mentioned activities that may be defined as research, there are also actions such as design reviews, road surveillance / monitoring projects, quality control and routine laboratory or field testing of materials and road structures. In the context of this project, these actions are not deemed to be research, as there is not an objective of developing or discovering novel information in these actions, but a mere quantification of the current status and a collection of data. Such collected data may be used in research at a later stage, however, then a research objective or hypothesis need to be stated and the data analysed in a manner that can prove or disprove such hypothesis.

Based on the information in this section, the following definitions are used in this project:

- Research - a process based on a stated research objective or hypothesis that is used to establish, verify or confirm facts, reaffirm results of previous work, solve novel or

existing problems, support or develop theories that require data / information collection and analysis and publication;
- Test section – a section of road constructed with the objective of evaluating a novel material or technique in comparison with a control section for which only the material or technique that is being evaluated differ;
- Demonstration section - a section of road constructed with the objective of demonstrating to stakeholders the process and viability of using a specific material or technique;
- Competency assessment section - a section of road constructed with the objective of demonstrating competency with a technique transferred to a contractor;
- Design review – process to evaluate whether a design for a road or infrastructure has been conducted correctly and effectively;
- Road surveillance / monitoring / routine testing – a process where regular surveillance of specific parameters (e.g. rut, fatigue, riding quality) on a road is conducted, and
- Quality control – regular planned testing of materials / field sections to establish whether or not construction or maintenance adhere to the required specifications.

Of these seven actions, the first two are deemed research, while outputs from the other actions may become part of a research programme if planned with specific research objectives or hypotheses.

3.7 Researcher competence

Researcher competence is important to establish as it is expected that a competent researcher would produce higher quality research outputs within a scientifically acceptable framework. Quantification of researcher competence is a complex and often subjective process, as approaches to research and experience may affect the perception of an observer regarding the competence of a specific researcher. Applicable literature could not be found on this topic, and therefore the approach suggested by the South African National Roads Agency SOC Ltd (SANRAL) is proposed as an option in this project.

SANRAL is managing a large research budget and needs to obtain an objective indication of the competency of researchers that are interested in conducting research as part of this programme. They developed a process (currently unpublished) whereby the following aspects of a potential researcher's capabilities and competencies are evaluated using an objective rating scale:

- Academic qualifications (rated from BSc to PhD);
- Professional registration (rated from candidate engineer to professional engineer);
- Years of research experience;
- Relevant recent publications in journals or conferences;
- Relevant contribution to industry guidelines and manuals;
- The h-score (an internationally accepted indication of the publication productivity and quality of research);
- Involvement in development of new inventions (methods, techniques or equipment), and
- Monetary value of research projects with significant participation.

It is recommended that a similar process be followed in the evaluation of road research in the Ugandan context, as it provides a basis to work from that is objective, transparent and open for new entrants into the research field.

In the evaluation of the competence of researchers conducting the work evaluated in this project, it is not possible to sue the system as yet, as most of this information is not available in the research outputs evaluated for the project.

3.8 Research quality and reliability

The quality of any research can be evaluated based on the impact that it has on practice. This impact can be through application of research outputs (a new construction technique, design method or use of a material) or through prevention of certain actions (e.g. prevention of the wide application of a certain stabilizer as the research proves it to be mostly ineffective). Both these outcomes serves the community as it endeavours to make optimum use of the limited resource available to the road engineering industry, without wasting resources on materials or techniques that are proven to be ineffective.

The reliability of research results is based on the assumption that the researcher and laboratories that were involved in the research are using internationally accepted scientific research principles in the research, also termed use of the scientific method. The scientific method can be described as a collection of techniques for conducting research where the method is based on measurable evidence subject to specific principles of reasoning. It requires systematic observation, measurement and experimentation with the objective of formulating, testing, and modifying a hypothesis. It includes the use of calibrated standard equipment and procedures, a comprehensive experimental matrix, production of replicable results and final scrutiny through peer review processed, before it is implemented.

In this project the quality of the research will be evaluated through a biased and subjective evaluation of the available outputs by the project team. Due to the nature of the project (collating road related research collected over a number of years and establishing a knowledge management database for future application in Uganda) not all information are available regarding the scientific methods used and the impact that specific research has had on practice in the Uganda roads industry. Rather than making statements that can be construed to be incorrect due to a lack of such evidence, a more general indication of the quality and reliability of the relevant research discussed in Sections 4 and 5 are provided. It is deemed more important at this stage to propose an objective system that can be applied to the available research by an entity who appreciates the background to specific research programmes and focus areas, than to merely rate research outputs.

4 Consultation process and findings

The consultation process for this project consisted of a combination of meetings, questionnaires and a workshop. Each of these served a specific purpose in the collection of data, information and an understanding of the research process in the Uganda roads sector.

4.1 Meetings

A range of meetings were scheduled and conducted with the client as well as stakeholders in the project. A summary of all stakeholders consulted, the type of consultation, and the main topics discussed during the consultation, is provided in Table 1.

The meetings mostly aimed at informing stakeholders of the project objectives, to obtain their buy-in, and to obtain their input into the project by discussing and completing a questionnaire. The questionnaires are further discussed in Section 4.2.

The meetings further aimed at identifying sources of historic road research, and where these are being stored. Once identified, the team would then make arrangements with the stakeholder to obtain the research, or to capture the research for inclusion into the EDMS. The identification of sources of historic road research is further discussed in Section 4.5.

The meetings and consultations also aimed at identifying any trial sections (or test sections) that were constructed in the past in Uganda, as well as the responsible authority and contact persons. Once any such trial sections have been identified the team would request a list or map of such sections (to determine its extent), and any project reports or data associated with the sections to determine the extent of research (if any) conducted on the trial sections. The trial sections and field visits are further discussed in Sections 5.2.3 and 5.3.3.

Other topics of meetings and consultations included the following:

- An understanding of the existing Transport Sector Data Management System operated by the Ministry of Works and Transport, whether there is any duplication of functions with the proposed EDMS, and the software platforms used, and
- Benchmarking and lessons learned on the structuring of research departments (consultations with the National Water and Sewage Corporation (NWSC) and the Ethiopia Research Centre). The outputs of these consultations were incorporated into the recommended structure for facilitating and coordinating road research, as further discussed in Section 6.5.

Table 1: Summary of consultations during the project

#	Organisation	Type of consultation	Main topics of consultation
1	Uganda National Roads Authority (UNRA)	Meeting	Discussion of questionnaire. Identification and discussion on test / trial sections
2	Makerere University	Meeting	Discussion of questionnaire, and collation of research
3	Ndejje University	Meeting	Discussion of questionnaire, and collation of research
4	Kyambogo University	Meeting	Discussion of questionnaire, and collation of research
5	Ministry of Works and Transport (MoWT)	Meeting	Discussion of questionnaire. Discussion on the Transport Sector Data Management System operated by the Ministry
6	Mount Elgon Labour Based Training Centre (MELTC)	Meeting	Discussion of questionnaire, and collation of research. Identification and discussion on test / trial sections
7	Central Materials Laboratory (CML)	Meeting	Discussion of questionnaire, identification and discussion on test / trail sections, and query on availability of any research
8	Kampala Capital City Authority (KCCA)	Meeting	Discussion of questionnaire
9	Uganda Road Fund (URF)	Meeting	Discussion of questionnaire, and collation of research
10	Ministry of Local Government (MoLG)	Meeting	Discussion of questionnaire
11	Uganda Institution of Professional Engineers (UIPE)	Meeting	Discussion of questionnaire
12	Kampala International University	Telephonic	Discussion of questionnaire, and collation of research
13	International University of East Africa	Telephonic	Discussion of questionnaire, and collation of research
14	Uganda Christian University	Telephonic	Discussion of questionnaire, and collation of research
15	Uganda National Council of Science and Technology	Telephonic	Discussion of questionnaire, and collation of research
16	Crossroads	Meeting	Collation of research (in process)
17	TRL	Electronic	Collation of research
18	Uganda National Bureau of Standards	Telephonic	Collation of research
19	Roads Industry Council	Telephonic	Collation of research
20	National Water and Sewage Corporation (NWSC)	Meeting	Benchmarking – structuring of a research department
21	Ethiopia Research Centre	Electronic	Benchmarking – structuring of a research department

4.2 Questionnaires

Questionnaires were prepared for distribution to stakeholders, to investigate the following aspects:

- The extent to which each stakeholder conducts road related research;
- Each stakeholder's level of interest in road related research;
- Stakeholders' views on road research in Uganda;
- Issues or challenges experienced by stakeholders with regards to coordination of road research;
- Stakeholders' requirements for a centralised knowledge database;
- Stakeholders' use of computer systems, applications, and internet.

Questionnaires were distributed to various stakeholders during middle December 2016. The consultancy team followed up with all stakeholders during January 2017, and also conducted meetings and follow up consultations (email, telephone calls) with stakeholders during end of January to April 2017, to discuss and complete the questionnaires.

A copy of the completed questionnaires is provided in Appendix A. The outcomes of the questionnaires are discussed in Section 5.2.1. Completed questionnaires were obtained for the following stakeholders:

- Uganda National Roads Authority (UNRA);
- Makerere University;
- Ndejje University;
- Kyambogo University;
- Mount Elgon Labour Based Training Centre (MELTC);
- Central Materials Laboratory (CML);
- Kampala Capital City Authority (KCCA);
- Uganda Road Fund (URF);
- Uganda Institution of Professional Engineers (UIPE);
- Ministry of Works and Transport (MoWT), and
- Ministry of Local Government (MoLG) - Consultations with MoLG indicated that they are not directly involved into roads research, but rather into road construction and maintenance, as this is their core function.

4.3 Information from Universities

The following universities that were involved in this project all indicated that they are conducting roads related research at some level in their institutions:

- Makerere University;
- Ndejje University;
- Kyambogo University;
- International University of East Africa;
- Uganda Christian University, and
- Kampala International University.

4.4 Workshop

A workshop was conducted with affected stakeholders as per the project brief. The workshop proceedings are discussed completely in a separate report (Moolman et al, 2017) and only highlights of the proceedings are summarised in this report.

4.4.1 Workshop summary

The Workshop was held on 9 February 2017 at the offices of UNRA and the Ministry of Works, at Kyambogo. The purpose of the workshop was as follows:

- To present the findings of Phase 1 of the study, specifically the institutional involvement in road sector research, the current levels of sharing and dissemination of research, and best practices with regards to structuring and managing road research;
- To obtain input from all stakeholders with regards to the requirements of an Electronic Document Management System (EDMS), and the appropriate platforms to share road sector research;
- To obtain buy-in from all stakeholders into the proposed Electronic Document Management System (EDMS), and
- To present study methodology and draft implementation programme going forward for stakeholder endorsement.

The following stakeholders were invited to the workshop – stakeholders that attended and participated in the workshop are indicated in *italics*:

1. *Uganda National Roads Authority (UNRA);*
2. Makerere University;
3. *Ndejje University;*
4. *Kyambogo University;*
5. *Ministry of Works and Transport (MoWT);*
6. *MoWT (MELTC) Mount Elgon Labour Based Training Centre;*
7. MoWT Central Materials Laboratory;
8. *Kampala Capital City Authority (KCCA);*
9. Uganda National Council of Science and Technology (UNCST);
10. *Uganda Road Fund (URF);*
11. Ministry of Water and Environment, Directorate of Water Resources Management;
12. *Ministry of Local Government (MoLG);*
13. *Uganda Institution of Professional Engineers (UIPE), and*
14. Uganda clearing industry and forwarding association.

The workshop programme is indicated in Table 2.

4.4.2 Presentations

Presentations were made by Dr. Mark Rubarenzya from UNRA (introduction of the project to the audience), and by Mr. Nkululeko Leta from the ReCAP Project Management Unit (describing the objectives of the AfCAP and ReCAP). This was followed by a presentation by the consultancy team consisting of Aurecon AMEI Limited and University of Pretoria (the presentations made during the workshop are provided in the Workshop report).

Table 2: Workshop programme

Agenda			
No	**Topic**	**Time**	**Responsible**
1	Arrival	08:30-09:00	-
2	Opening and Welcome	09:00-09:30	UNRA/Cardno
3	Project methodology and programme	09:30-10:00	Aurecon (A Moolman)
4	Current structure of road research in Uganda Best practices	10:00-10:30	Aurecon/University Pretoria (A Moolman and W Steyn)
5	TEA BREAK	10:30-10:50	
	Current structure of road research in Uganda Best practices (continued)	10:50-11:30	Aurecon/University Pretoria (A Moolman and W Steyn)
6	Framework for capturing research	11:30-12:00	University Pretoria (W Steyn)
7	Group discussion	12:00-13:00	All

4.4.3 Highlights from workshop

The following issues were raised by different attendants of the workshop:

- The current project needs to provide recommendations for further projects that will steer the research in Uganda, in line with the Terms of Reference for the project;
- A clear need exists to define in this project what is included within the scope of research, and what type of actions and outputs are defined as being outside of the scope of research;
- It was noted that universities provide a valuable role in road sector research, and will probably accommodate most of the existing road sector research in Uganda. Makerere and Kyambogo Universities have been involved in road sector research for quite some time as of date. The Ndejje University however only recently commenced research in the road sector;
- It was proposed that Aurecon needs to contact Crossroads or Uganda Road Fund to obtain all the research Crossroads has done in the past in the Uganda road sector (Dr. Mark Rubarenzya will provide the contact of the Crossroads contact person);
- It was noted that organisations such as the Uganda National Bureau of Standards, TRL, and the Roads Industry Council have been involved in research in the road sector previously and Aurecon was advised to reach out to these organisations to obtain information on this research;
- It was noted that the National Technology Conference is a conference organised annually by the Uganda Institution of Professional Engineers (UIPE) where research is presented and published as books that are shared with the participants. It appears that the research is not verified research;
- The Uganda Road Fund has a draft manual for financing research in road works. They indicated that this manual is an internal document on policies and procedures for financing research. The manual is yet to be approved by the Board, where after it may be shared to a wider audience;
- Aurecon was requested to demonstrate which other research models had been considered and what factors led to the disqualification of the other models before

settling for the Technology Tree (TT) model. It was discussed that the TT model incorporates most other models as it has been completed in the last 5 years as a comprehensive model. Other models addresses aspects of the complete model (e.g. only classification of research, only research or implementation, etc.);
- The client suggested that the consultancy team discuss the way forward, and what is required from the different stakeholders. Mr. Moolman presented the timeline, future deliverables and the immediate actions following the workshop;
- The need for field visits, specifically to trial sections around the country, was discussed. MELTC and UNRA gave feedback on trial sections implemented by them during recent years. It was suggested that the type of trial sections involved will be evaluated once information regarding these sections have been collected, and appropriate sections that can be defined as constituting research be included in field visits. Criteria for research field sections will be developed as part of the preparations for the visits to ensure that appropriate objective criteria be used for the evaluation of such sections in the study;
- Dr. Rubarenzya noted that the project consultant needs to recommend an institutional research structure that UNRA could implement to be able to successfully carry out research in Uganda. Dr. Rubarenzya will arrange for Aurecon to meet up with the National Water and Sewage Corporation (NWSC) to obtain their research structure, as it is deemed as one of the organisations in Uganda with a very good research structure;

During the workshop, plans regarding site visits were discussed. It was agreed that a need exists to make recommendations regarding the future of selected existing sections and work conducted on these sections, as the information obtained from appropriately designed and monitored field sections can contribute in a significant manner to the implementation of road research. The consultancy team will contact the relevant parties and plan specific visits to appropriate test sections. In preparation for these visits definitions will be developed for research in general, as well as different types of field sections to ensure that appropriate sites are visited and incorporated into the study. Possible field section designations may include training, demonstration, and research sections. The specific definitions will be developed before commencing on the specific site visits. Sections constructed as part of MELTC and UNRA projects will be included in possible sites for visits and evaluation. The project is not providing specific technical advice on specific research projects and rather needs to guide and steer the bigger picture around roads research, but through taking consideration of relevant research. UNRA also has pilot sections that need to be identified and visited (samples).

4.4.4 Feedback from group discussions

The following summary notes were collected from the two group discussions that were held as part of the workshop. A more detailed summary is provided in Appendix C:

- The EDMS should be hosted at UNRA or Uganda Road Fund;
- Possible challenges for implementation of the EDMS include access control, mandate and resources;
- Quality control should be performed by a pool of people/ ad-hoc committee suitably qualified;
- A subscription fee can be considered for hosting, operational resources and maintenance;
- Discussion, planning and dissemination of research information should be done through a consolidated working group consisting of all stakeholders;
- The main functions of the EDMS should be to manage research (in addition to the basic function of listing and directing you to research previously or currently conducted);

- The main categories of research included in the EDMS should be Traffic, Material, Natural environment, Pavement structure, Design, Construction, Management, Maintenance and rehabilitation, Road Safety and Operations, and
- The EDMS needs to be accessed by both the public and other stakeholders and registered stakeholders should be able to contribute towards the system, and manage own submitted research.

4.4.5 Outcomes

The major outcomes from the workshop and related discussions are summarised as follows:

- The workshop attendees voiced their general support for the project and the intended actions planned for the project;
- In-principle agreement was obtained from the attendees for selected experimental site visits to verify selected research;
- A simplified Technology Tree (TT) model as a basis for the research evaluation was agreed upon;
- The proposed focus areas for road research (Traffic, Material, Natural environment, Pavement structure, Design, Construction, Management, Maintenance & Rehabilitation) were acceptable to attendees;
- Attendees confirmed their ability and willingness to participate in the data / research output collection process;
- Attendees agreed on the data fields to be used in the database. Most of these had been proposed by the service provider;
- Attendees approved of the way forward, focusing on the collection of available research while attending to those matters arising in the workshop and group discussions.

A wrap-up meeting was held between UNRA, AfCAP and the consultancy team and the following were discussed and agreed on:

- The draft final report should have initial recommendations (including definitions of research and sites – normal construction versus training versus research sections etc. based on international definitions);
- Examples of the research process in support of the proposed definitions (e.g. planning, research, data analysis, review, publish - new knowledge) needs to be provided and clarity is needed in terms of outputs such as technical project reports and normal quality control test data that are outside the scope of research. It was noted that such data can become research if the required analysis, publication, and knowledge development takes place;
- A decision regarding appropriate sites to visit will be made once most data are received and analysed to ensure that appropriate and applicable sites are identified;
- The institutional structuring of the research function needs to be addressed and a proposal made to UNRA for their research department. Some examples of other research institutions should be considered. Examples such as the Ethiopia Research Centre, National Water and Sewage Corporation, IMC / Crossroads, and other relevant examples should be consulted for appropriate and applicable structure information.

4.5 Research project information

The meetings and consultations with stakeholders indicated that the following organisations (possibly) keep road related research:

- Makerere, Kyambogo, Ndejje, International University of East Africa, Kampala International and Uganda Christian Universities. The project team has since obtained the assistance from these universities to capture the research in the format explained below. Research obtained from these institutions are included in Appendix B;
- Crossroads. The project team has met with Crossroads and requested their road related research in Uganda. The data is however yet to be received. AfCAP and UNRA is assisting in obtaining the data;
- TRL. The project team has made contact with TRL and received a list of project reports that are listed in Appendix B;
- Central Materials Laboratory (CML). The project team consulted the CML, who indicated that they do not keep any specific road related research. The CML was involved in the past in some trial sections in Uganda. The trial sections in most cases were initiated by promotors of specific materials (such as soil stabilisers) to demonstrate the working of their products (Section 5.2.4);
- Uganda National Bureau of Standards. The project team has made contact with the Bureau, who indicated that they do not keep or has been involved in any road related research in Uganda;
- Roads Industry Council. The project team established that the Council was set up to guide Crossroads in their areas of study. The involvement of the Roads Industry Council is therefore covered through the research to be obtained from Crossroads;
- Uganda National Council of Science and Technology (UNCST). Discussions with the UNCST indicated that they had not been actively involved in any research in the road sector and could therefore not provide any historic road research.

A standard form was developed (Table 3) for the collection of research outputs from the various stakeholders to ensure that the same general information is collected and that this information can be collated into a database and analysed. The information in Table 3 is mostly self-explanatory. The information collected using Table 3 are discussed in Section 5.2.2.

Table 3: Standard format for research output data from stakeholders

Originating institution	Institution that conducted the research
Authors	Authors of research output
Year	Year of publication
Title	Title of project / research output
Funder (if relevant)	Funder details
Programme (if relevant)	Indication whether it is part of a larger research programme
Location of document	Location of archived copies of output
Contact person to locate document	Contact person at institution
Where it was published (if relevant)?	Relevant if published in journal or conference
Abstract	Abstract of the research output
Keywords	Keywords for research

Country	Country where conducted
Geographical area within the country	District [xx], Road [xx] km [xx]

5 Research review

5.1 Introduction

This section contains the review of the collected research for the project. It starts with a summary of the information that were collected (Section 5.2), and followed by an evaluation of each of the main bodies of information separately (research reports, questionnaires, field visits) (Section 5.3). It covers the process followed and the information sources. It is followed by a discussion of the reliability and quality of the research (Section 5.4) and the perceived levels of implementation of the research (Section 5.5). In Section 6 the data are analysed in terms of the Technology Tree model, the identified focus areas and the structure and priorities of road research as discussed in earlier reports and the brief of the project.

5.2 Collation of research

5.2.1 Questionnaires

The questionnaires were used to determine the views, perceptions, involvement and experience with road research of the identified stakeholders (Section 4.2). The individual questionnaire feedback are all provided in Appendix A, and a summary of the feedback is also provided.

Analysis of the questionnaires indicated the following:

- Definition of stakeholder and involvement in generating road related research:
  - National and municipal government departments, Universities, Training Centre;
  - Uganda Road Fund funded research;
  - Conduct research within department or university.
- Type of research conducted:
  - Post-graduate studies
  - Applied research (trial sections);
  - Materials, design, traffic management;
  - Low cost seals;
  - Pavement materials, pavement preservation and management;
  - Fundamental research and applied research (post graduate university programmes);
  - Low cost sealing options for low volume roads;
  - Community access research (stone arch bridges, ladders and steps).
- Research generally not published (maybe 10 per cent of some of the research), generally only reported in departmental reports;
- Research verification process:
  - Post graduate study reports verified by respective technical Institutions through lecturers and external examiners;
  - Papers and applied research reports presented to relevant stakeholder for review;
  - Research validated through the Sector Working Group ;
  - Testing and observation in the field.
- Research output storage:
  - Mostly kept by respective institutions (offices, library and laboratory);
  - Combination of personal computers and hard copies;

  - Some on the Transport Sector Data Management System at MoWT – access to members of the Sector Working Group.
- Research access process:
  - Mostly on request, complicated process involving manual searches for documents;
  - Some through university library systems.
- Frequency of requests for access:
  - Seldom to never.
- Meta-road data and information stored with research outputs:
  - Mostly PDF only with some data tables in the report;
  - Some chainages of research location / trial sections locations available.
- Data generally not confidential;
- Data need to be uploaded centrally for wider access and better coordination and synchronisation, and to avoid duplication;
- Interest in road related research:
  - Very high;
  - Need for students to have access to research;
  - Responsible for maintenance of municipal / city roads.
- Specific type /topics of research interested in:
  - Innovations in road construction materials (use of local materials);
  - Design aspects (structural and geometric);
  - Transportation, transport management, sustainability;
  - Low cost road seals (design, construction, performance);
  - Community access (stone arch bridges, ladders and steps);
  - Road maintenance unit costs;
  - Dust prevention strategies;
  - Cheaper maintenance strategies.
- Potential application of research data:
  - Disseminating to construction industry;
  - Advise government (central and local) - planning and maintenance strategies;
  - Student research (continuity of research / avoid duplication);
  - Better use of resources;
  - Identification of alternatives (materials).
- Current method for research access:
  - Piece meal dissemination of information to Agencies in road sector;
  - Memory;
  - Library;
  - Existing manuals;
  - Internet.
- To what extent does the research contribute to your work:
  - Estimated between < 25 per cent and > 60 per cent;
  - Significant – core to road construction and maintenance, effectiveness of programmes.
- Perception regarding current status of road research in Uganda:
  - High priority but very poorly resourced and coordinated;
  - Failure to replicate research, can save money and cover more areas of research;
  - Research duplicated for a specific proprietary product without consultation between users - application of research conducted in other countries without cognizance of local conditions;
  - Lack of publication and implementation;
  - Lack of funding.

- Current access to road research:
  - Collaborating with similar research institutions;
  - Online / Internet / Institute of Civil Engineers website;
  - Crossroads;
  - Library e-resources and previous reports accessible by students;
  - Journals;
  - Conference papers.
- Perception on entities generating research:
  - Universities;
  - Ministry of Works and Transport;
  - Local governments / municipalities and NGOs;
  - Academicians;
  - Companies;
  - Organizations.
- Typical research partners:
  - Universities;
  - Sector stakeholders;
  - Private sector / Consultants;
  - Government departments (local and national);
  - Collaborating academic institutions;
  - Labour based institutions.
- Existing platforms/ communication channels for interaction and coordination with key role players:
  - Sector working group;
  - Through MOUs with universities;
  - UIPE gatherings;
  - Technology conferences and exhibitions.
- Perception of current level of dissemination of research recommendations:
  - Very low to limited.
- Perception of current level of uptake of research recommendations:
  - Low to comparatively high;
  - Missing link between researchers and implementers.
- Perception of overall quality of road research:
  - Varies between bad, fair and average.
- Issues or challenges preventing coordination of research:
  - Funding;
  - Not organized / coordinated;
  - Implementation slow;
  - Inability to conduct local evaluation of international proprietary products;
  - Institutional and organizational challenges.
- Frustrations with available road data / research:
  - Lack of relevance, reliability, completeness;
  - Stagnation of research – field trials ;
  - Difficult to know what other agencies are doing;
  - Limited access to research at Uganda universities;
  - Most research purely academic.
- How should a centralised knowledge database support work:
  - Ease of access - one-stop-centre;
  - Save time;
  - Quality of research output;

  - Readily available information - updated regularly.
- Aspects that should be part of the data in a system:
  - Objective;
  - Methodology;
  - Gaps;
  - Title;
  - Author(s);
  - Region;
  - Publication citations;
  - Key words;
  - Abstract;
  - Full report;
  - Costs;
  - Environment;
  - Year;
  - Related projects;
  - References to previous research.
- Envisaged use of centralised knowledge database:
  - Providing easy and fast access to information;
  - Remember earlier searches;
  - Keyword based search;
  - Personal accounts.
- Interest in quality/trust rating for data/research:
  - Needed – provides confidence in data - should be vetted before uploading.
- Frequency and manner of use of computers / apps / internet:
  - Daily to monthly;
  - Laptops, desktops, tablets, mobile phones;
  - Some social media use.

In summary, it appears form the questionnaires that there exists a major demand for quality, relevant road research in Uganda, and that this needs to be disseminated and implemented once conducted. Currently, there is a concern regarding the coordination and availability of road research information.

5.2.2 Research reports

The research reports were collated through a process of contacting the various potential stakeholders (refer to Section 4.5) with the request to obtain a list of the available research conducted in the organization. The information indicated in Table 3 were collected through a process of meeting with the stakeholder and collating the information from the source documents. Due to the volume of documents, the fact that the majority of these were only available in hard copy format and the issue of copyright, only the information in Table 3 was collected (in case more information is required, the user can contact the specific institution and person referred to in the summary). In Table 4 an example of the information collated for each of the research reports is shown. The full database is shown in Appendix B.

The following general observations are made regarding the information in Appendix B (detailed analysis is done in Section 5.3.1):

- Most of the information is complete in terms of the major fields such as title, authors, abstract, district and keywords, although there is a level of uncertainty regarding the

names / surnames of some of the authors that requires clarification, specifically if the database is to be searched for specific authors;

- A major lack of information exists for fields such as funder, programme, citations and official number;
- The Focus areas, Pavement layer focus and TT level have been completed by the project team, based on the information provided in the research report titles and abstracts;
- There are quite a number of the reports that cannot clearly be classified as research reports. These reports are mainly done as part of undergraduate university studies and contain investigations for the upgrade/ design / feasibility of existing road structures without any clear research component included. These reports were kept as part of the database (Appendix B) at this stage to ensure that the database is complete with all reports received. The majority of these reports have been classified as Solution / Application in the TT model;
- Google Scholar Uganda Roads - A number of reports / papers were located through a Google Scholar search to see whether there are documents covering Uganda Roads research that were in the public domain. Nineteen papers were identified in this way, and their details have been added to the database in Appendix B. The topics cover the main focus areas of this study;
- TRL - Discussions with TRL provided a list of reports that were identified and supplied by them that were deemed to be linked to the project objective. These 16 reports are included in Appendix B, and date from 1958 to 2014, and
- CrossRoads – A list of Crossroads research data was obtained from the URF during January 2017. Further communication with a representative from Crossroads indicated that some additional items existed that were not shared with URF, and these were officially requested. Up to date the data were not released to the project team and thus these reports could not be included in this report. There are limited reports that were provided by UNRA that are part of the database.

5.2.3 Field visits

As per the project brief, a number of road sites where construction was done with the aim of monitoring the sections over time were identified and a selection of these visited. The definitions of test sections and demonstration sections in Section 3.6 was used to identify and shortlist those sites that were physically visited. In order for the field visits to be productive, information on the objectives, processes followed and collected data and outputs from each of the field sites were collected. In Table 5 a summary of these sites that were identified, including their location and an indication of the type of section and the data available to the team related to the section are summarised. The location of the field sites are indicated in Figure 4.

Table 4: Example of Research report information

#	ORIGINATING INSTITUTION	AUTHORS	YEAR	TITLE	FUNDER	PROGRAMME	LOCATION OF DOCUMENT	ABSTRACT	KEYWORDS	GEOGRAPHICAL AREA	FOCUS AREAS	PAVEMENT LAYER FOCUS	CITATION	OFFICIAL NUMBER	TT LEVEL
1	Ndejje University	Kawiso Bernard, Yaba Mark Yossa	2016	An Investigation of the Effect of Saw Dust on the Strength Properties of Lateritic Soils for Use as a Sub base	NA	NA	Ndejje University, Mr. Kato Simon Peter	Lateritic soils are used in the engineering industry in the construction of roads. The study was carried out to investigate the effect of saw dust on the strength properties of lateritic soils for use as sub base. The soil sample was obtained from Lady Irene Campus in Ndejje University and the laboratory tests were carried out at Ndejje University laboratory. The tests carried out included; sieve analysis, liquid limit, plastic limit, shrinkage, moisture density relation test and California Bearing Ratio (CBR) test. The saw dust was added to the sample at 0%, 2%, 4%, 6%, 8% and 10%. The Atterberg tests classified the soil sample as A-7-6 (4) according to AASHTO. The results showed the plasticity index decreased from 22.78% to 5.10% and the shrinkage limit increased from 12.1cm to 13.4cm with increasing percentage of saw dust. The results also showed the MDD of modified lateritic soil increased with addition of saw dust at 2% from 1.84mg/m3 to 1.86mg/m3 and then decreased with the increase in the saw dust content to 1.403mg/m3. The decrease could be attributed to the effect of pores created by saw dust. The CBR value of the soil decreased with increase in saw dust content from 34.5% to 4.5% and 44.9% to 6.2% from the top and bottom respectively.	lateritic soils, sub base, laboratory tests, saw dust content, pores	Luwero district	Material	Subbase			Solution
2	Ndejje University	Kisosonkole Fahad, Kugonza Robert	2016	Assessing the Most Realistic Productivity Task Rates for Routine Manual Maintenance Activities on Rural District Roads in Kayunga District.	NA	NA	Ndejje University, Mr. Kato Simon Peter	Roads are the backbone of the economy since all produce and merchandise in and out of a country like Uganda is mostly transported by road. The main use of any road is to facilitate access to people's areas of residence and to the numerous social services in the area. Good road network is key ingredient for national development; it supports effective industrial and agricultural activities as well as national and international trade. In Kyunga district Kitimbwa Sub County, there is a problem of road workers failing to complete the tasks given to them in time. The main objective of this report was to determine the most realistic productivity task rates for a road worker carrying routine manual maintenance works on the district road. The major content of this research was to identify the most realistic productivity task rates for the workers by assigning them different tasks on different roads depending on the urgency and also to determine the designed monthly salary. This included research design, sample selection, questionnaires, field observation, and data analysis. The data was interpreted and tabulated using statistical software, Microsoft Excel.	road, maintenance, statistical software, task rates, urgency	Kayunga district	Construction	N/A			Solution
3	Ndejje University	Tumwesige Vicent	2016	Investigating the Impact of Increasing Number of Vehicles on Traffic Flow and Parking in Masindi Municipality Township Area	NA	NA	Ndejje University, Mr. Kato Simon Peter	The increasing population due to available business opportunities within the municipality causes congestion. Accommodation around the town is increasing and parking is always observed. The increasing standard of living has increased the pressure on the existing road and parking facilities. Inadequate parking facilities has led to parking on walk ways and carriage way on some roads which reduces the traffic capacity of the roads in addition to damage on road elements. The main objective of this research was to develop an optimal scheme for traffic flow and parking by designing economic modification to the existing road and parking facilities. This included carrying out traffic volume, composition, direction of movement and the time vehicles are in town, carrying out traffic delay study, design an optimum system to the increasing vehicle traffic. Manual counting method was used as selected locations to determine variations in classified and directional traffic volume. The moving observer method was used to record the extent, location and cause of delays along the route and space inventory at prospective parking facilities for buses, was also done.	road, traffic flow, manual counting method, parking facilities, space inventory	Masindi district	Traffic	N/A			Solution
4	Ndejje University	Sebidde Jamada, Ssonko James	2016	Research for the Design of a Drainage Channel along Kabusu- Nalukolongo Road	NA	NA	Ndejje University, Mr. Kato Simon Peter	Nalukolongo stage junction is located in Rubaga division along old Masaka road lying in southern part of Kampala city neighbouring Rift Valley Railway Line and natural drains (swamps) leaving very small space for construction of drainage channel. Damaged drainage channels are expensive to repair and interfere with the safe and orderly movement of traffic. The main objective of this report was to design an adequate drainage channel to control and prevent flooding in the area. This entailed road assessment, data collection, analysing and designing an adequate channel with data needed included topographic survey, total runoff volume, effective rainfall, flow rate catchment area, rainfall intensity among others. This study could be useful to future researchers intending to carry out future research in the related field. It could also be used by civil engineers and construction managers to guide them in the process of designing a drainage channel. This research was also aimed at helping the government formulate policies related to construction of drainage channels and materials needed for the complete project	junction, drainage channel, rainfall intensity, effective rainfall	Kampala district, Kabusu-Nalukolongo Road	Environment	N/A			Solution

Feedback regarding the sites indicated in italics in Table 5 (during a visit to CML in April 2017) (Okello, 2017) indicated that most of these trials sections were located along major roads with relatively high traffic volumes. Most of these sections were defined as demonstration sections with the objective (based on guidance from the product suppliers who spearheaded the construction of the sections) of demonstrating that the products would work with Ugandan soils, and without appropriate control sections. Ugandan staff were mainly involved in identifying the sections, provision of logistical support and performance monitoring for compliance with relevant technical specifications. Observation and evaluation of the sections varied from a few days to about six months. Apart from a few instances where some soils parameters showed some marginal improvements, there was no outright demonstration that the products had value addition. All the trial sections have currently been redeveloped to keep the networks functional.

Field site visits were conducted with the objective of observing whether or not these sites can be of further use in the Uganda road research program. Evaluations were conducted in conjunction with evaluation of the reports on the planning, preparation, construction and monitoring to date of the sites where available. Detailed analysis of the field site visits are provided in Section 5.3.3.

Table 5: Summary of field sites evaluated

#	Location	Product	Report
1	*Muyebe-Kapchorwa*	*Conaid / RRP*	*No*
2	Mbale	MELTC	Partly
3	*Kiira-Kasangati*	*Landlock*	*Yes*
4	*Lweza-Kigo*	*AndorStroy*	*No*
5	*Seeta-Misindye*	*Zymplex*	*No*
6	*Busabala*	*GeoGrit*	*No*
7	Semuto-Kapeka	COWI	No
8	*Kampala*	*Laboratories*	*Not applicable*
9	*Akia-Aloi*	*Landlock*	*Yes*
10	*Laboratory*	*Dirtglue*	*No*
11	*Najjanakumbi-Busabal*	*Geoweb*	*No*
12	*Rakai*	*Terrazyme*	*No*
13	*Nyakahita-Kazo*	*Conaid / RRP*	*No*
14	*Kito*	*Probase*	*No*

Figure 4: Indication of location of field sites evaluated for possible visits

Field visits were conducted on 10 and 11 April 2017 to two selected sites identified by UNRA in earlier discussion. On 10 April 2017 MELTC was visited where their demonstration road was viewed. Before the visit, a presentation was provided by MELTC principle and engineers indicating their structure and the objectives of the training and the Low Volume Sealed Road project currently run at MELTC. The locations of the MELTC demonstration sections visited are shown in Figure 5. The following observation were made during the visit:

- The team at MELTC is dedicated and provide good training to attendees of the facility. The facility is in a good condition and it appears as if the work is of high quality;
- The demonstration road is in a generally good condition after around 6 years of use. This is partly due to relatively low traffic and also continued maintenance (MELTC trainees are doing maintenance training on the sections), and
- MELTC is monitoring (mainly visually) the sections on a 6-monthly basis. Typical data include visual condition and rut depth.

On 11 April 2017 a visit was made to the COWI test sections on the Semuto-Kapeka road. These sections consist of test section with a range of subbase, base and surfacing options. The locations of the COWI sections visited are shown in Figure 6. The following observations were made:

- It does not appear as if UNRA visits the sections often, although they know of the sections' existence and plan to do some monitoring on them;
- The sections are in a generally good condition, with limited localized failures. The block paving (Section 9) appears to be in the worst condition;
- Some of the section location boards have been removed and all sections are thus not clearly marked;
- It appears as if there were not monitoring performed on the sections since construction (mainly due to funding shortages apparent from discussions with UNRA engineers). This will be verified by access to a hard copy of a final report that should be available through UNRA, and

- If further monitoring is planned, it is essential that good research planning be conducted, as the topography for the different sections again differs, and also the supporting conditions (cut and fill).

- **Figure 5: MELTC centre and demonstration sections**

Figure 6: COWI demonstration sections

5.2.4 Laboratory visits

On 11 April 2017 a meeting was held with the Chief Materials Engineer at the Central Materials Laboratory (CML), Mr Wilfrod Okello. During this meeting the field sections shown in Table 5 were discussed and the information indicated in Section 5.2.3 regarding these sections and their failure confirmed. The discussion provided the following information regarding the laboratories:

- The CML facilities have previously been used for research. However, currently there is a need to update the equipment. Adequately trained staff are available with a complement of around 70 technicians and engineers available;
- The CML is currently involved in a Cement Proficiency Testing Scheme with the German BAM group, and
- It was suggested during the CML meeting that an evaluation be done regarding the availability of road survey equipment such as FWDs and profilometers available in Uganda at the various institutions. A perception exist that many of these devices are available but that they are not utilized efficiently. A request was made to staff of UNRA for a list of such equipment. However, as it may be scattered through a number of institutions, it may be a recommendations to do such a survey as a follow-up to this project.

On 11 April 2017 a visit was paid to the UNRA laboratories. A quick evaluation of the laboratories lead to the following observations:

- The laboratories are located in containers on an UNRA site;
- It is stocked mainly with equipment obtained through road construction contracts. The equipment is in varying degrees of functionality;
- Technicians / testers are trained but not certified for testing;
- There is a process underway to look at certification and quality control of the laboratories;
- Observation of some of the tests confirmed the requirement for certification;
- These laboratories can probably not in the current state provide research-level test results.

The locations of the UNRA laboratories and CML laboratories visited are shown in Figure 7.

5.2.5 Other Institutions

During the project and discussions with various stakeholders it became apparent that there are other institutions that should be consulted in order to cover the brief in more detail. These include the likes of the Ethiopian Road Research Centre (ERRC) and the National Water and Sewerage Corporation (NWSC). Information were obtained from these entities in terms of mostly their institutional models and the outcomes of these are incorporated into the discussion around institutional models in Section 6.5.

Figure 7: UNRA and CML laboratories

5.3 Analysis

The detailed analysis of the data attempts to place the collected data in a framework where it can be collated into one output, independent of the origin (questionnaire, research report or field visit) of the data. In the detailed analysis the inputs from these sources are firstly provided separately, and then collated into a summary of the current perception of roads research in Uganda based on the available sources (Section 5.6).

5.3.1 Research reports

The research reports detailed analysis focused on developing a clear indication of the focus areas and geographical areas that are covered with current research, quality of the research and a gap analysis. For the analysis the focus was on the following classifications:

- Technology Tree (Table 6)
  - Base – the least research reports could be classified as Base technologies. This level of the Technology Tree develops new competencies and knowledge that can be used to build research platforms on and provide solutions to research questions. The majority of the Base TT reports focused on Materials and innovative uses or characterisation of such materials;
  - Platform – almost a third of the reports focused on the Platform TT. The Platform TT reports again focused mainly on Materials, with Construction and Management focus areas also highly represented;
  - Solution / Application – the majority (55.6 per cent) of reports focused on this TT level. This is partly as a large number of reports focused on case studies, designs and feasibility studies where existing knowledge is applied and new basic research is not conducted in the solution of the problem.

Table 6: Technology tree reports statistics

Technology Tree level	Number of reports	Percentage of reports
Base	64	15.7%
Platform	117	28.7%
Solution / Application	226	55.5%

- Focus areas (Table 7 and Figure 8)
  - The Materials focus area had the highest proportion of reports as a major number of reports covered various types of roads material evaluations. These were spread over all thee TT levels and represented all the layers of the pavement structure;
  - Design had the second highest proportion of reports as the various designs and feasibility studies were mostly classified into this group;
  - The lowest proportion of reports focused on Pavement structure and Traffic, while the remaining focus areas were all similarly represented.

Table 7: Focus area reports statistics

Focus Area	Number of reports	Percentage of reports
Construction	40	9.7%
Design	63	15.2%
Environment	27	6.5%
Maintenance & Rehabilitation	27	6.5%
Management	51	12.3%
Material	141	34.1%
Operations	27	6.5%
Pavement structure	5	1.2%
Road safety	27	6.5%
Traffic	6	1.4%

Figure 8: Indication of Focus Area for which research cited in Appendix B were conducted

- Pavement layers (Table 8 and Figure 9)
  - Reports where aspects of the whole pavement were covered had the largest proportion of the pavement layer classifications, mainly because the Design and also Maintenance & Rehabilitation focus area were mostly classified in this group;
  - Gravel (research conducted on pavement materials in general and gravel roads) classified as the second largest group, with surfacings the third largest road layer group;
  - As the Road Safety, Operations and Environment (effects affecting pavement layers) focus areas were classified under Other, it made up a significant group;

- Non-road indicate those reports that covered material research (such as concrete for structures, bricks, etc.) rainfall patterns, economic aspects of transportation, etc.

Table 8: Pavement layers reports statistics

Pavement layer	Number of reports	Percentage of reports
Surfacing	34	8.4%
Base	16	3.9%
Subbase	7	1.7%
Subgrade	11	2.7%
Other	117	28.7%
Non-road	50	12.3%
Gravel	65	16.0%
Pavement	107	26.3%

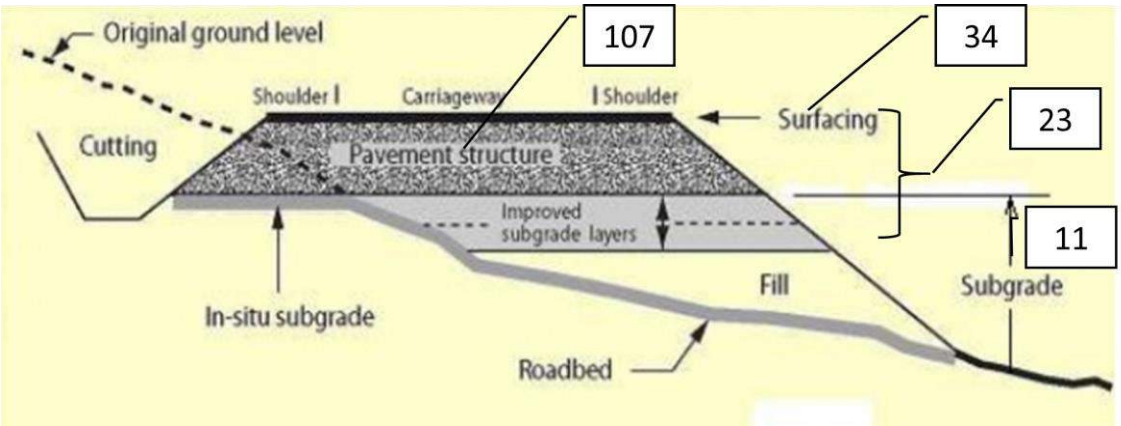

Figure 9: Cross-section of road reserve indicating relevant layers and locations for which research cited in Appendix B were conducted

- Geographical location (Figure 10)
  - The geographical location data are available in a .kmz file with a designator linking the location to the reports in the database;
  - The geographical locations were determined from the information in the titles and abstracts of the various reports. There are a number of locations that had more than one report linked to the location;
  - Based on the information shown in Figure 10 it is clear that the reports cover work spread over most of Uganda, although the Northern, Western and south-Central areas may have less locations than the Central and Eastern parts of Uganda;
  - There are a number of reports that specifically looked at work in the Kampala area;
  - Reports that focused on general Ugandan issues (not linked to a specific geographical area in Uganda) are shown in a specific location in Kampala.

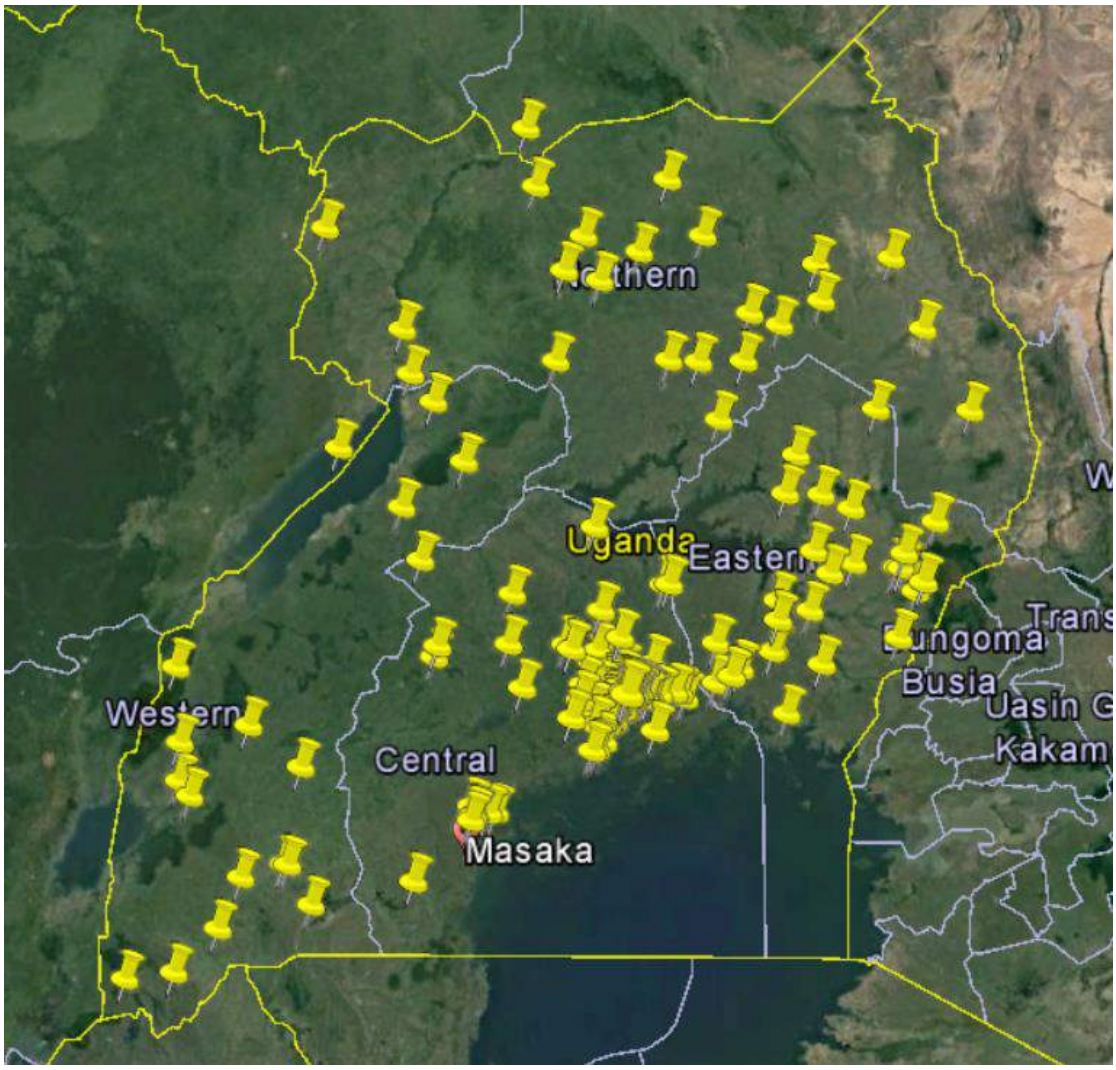

Figure 10: Geographical location of research report areas of study

Overall analysis of the reports lead to the following observations:

- It appears that there is a level of duplication within institutions and also between institutions. This is not necessarily a problem, as the majority of the reports are linked to undergraduate studies and the level of research conducted at this level is typically limited. A certain level of duplication can thus be accepted. A coordinated research programme for the country will assist in ensuring that no undue and costly duplication occurs;
- There appears to be a lack of overall coordinated research with longer term base, platform, and solution development. Very few reports focused on a bigger research programme and this may lead to a disjointed research approach. Coordination of research programmes through a centralised institution or body can assist in ensuring that a national research plan be followed through which national and regional research issues can be approached and solved;
- There is a clear lack of research output publication / marketing / distribution. By far the majority of the reports were obtained from institutions where these reports were stored in mostly hard copy format and therefore in an inaccessible format for modern literature searches. The Google Scholar search (Section 5.2.2) provided very limited (19) reports that were mostly non-Ugandan of origin. A lack of publication also leads to further

possibility of duplication as other researchers and practitioners will not know of available resources and research that have been completed;

- There is no clear evidence of implementation of research, except maybe for case studies and specific designs. However, even in these cases standard designs and methods are mostly sued and the linkages to new research that is implemented is not clear. This may link to the previous point regarding a lack of publishing of research results;
- Some of the research indicates a concerted effort to focus on a specific research topic (e.g. stabilization of gravel using various indigenous natural products such as sawdust, diatomite, sewage sludge ash etc.). There is typically not reference in the documentation that these efforts are coordinated. However, the typical origin from one institution of these reports do indicate that these institutions may have such programmes in selected cases;
- It appears that the focus of advanced studies (PhD) are mostly linked to base and platform TT levels, while undergraduate projects focuses more on solutions / applications. This is not necessarily a problem as long as a bigger coordinated plan is supporting the various efforts, and
- Industry funded projects (CrossRoads, TRL etc.) appear to be more focused on larger research issues such as stabilization of materials.

5.3.2 Questionnaires

Questionnaire detailed analysis focuses on developing a clear understanding of the perception of the Uganda road sector regarding the status, availability and needs for road research. In Section 5.2.1 a summary was provided of the range of questionnaire responses. Analysis indicates that there exists a major demand for quality, relevant road research in Uganda, and that this needs to be disseminated and implemented once conducted. Currently, there is a concern regarding the coordination and availability of road research information. This relates well to the analysis of the research reports in Section 5.3.1.

5.3.3 Field visits

Data from field visits were evaluated to establish whether value was gained from the field sections, and whether there are further possibilities for data collection and research questions regarding the specific technologies that can be addressed through continuous monitoring of the test sections.

Analysis of the field visit information indicated the following:

- MELTC is monitoring (mainly visually) the sections on a 6-monthly basis. Typical data include visual condition and rut depth. However, the monitoring is not reported as an analysed report, and only exists in terms of the monitoring sheets and collected data. It is thus difficult to extract conclusions from the current work. Major effort is required by the team to document the work done to ensure that it becomes part of the archives and be available for referral, use and application. This can also serve as a major marketing document for the Low Volume Seal project, if the data are correctly analysed and presented. The availability of a sociologist on their team strengthens the options to also do analysis regarding the effect of the road improvement on the lives of the community around the road (all-weather road, access for motorised transportation, reduced travel times, increase property values, etc.);
- The current lack of reporting on the work essentially makes the work inaccessible to everybody outside of MELTC;

- Although great effort is made in monitoring the sections, it would be difficult to extract direct comparisons between the test sections, as the topography differs significantly between the sections. Before general comparisons are made between sections' performance, detailed analysis of such issues will be required;
- Before the knowledge gained from the different types of seals used can be generally applied in Uganda, the potential effect of issues such as the topography, local materials, local environment and traffic will need to be factored;
- It was discussed that the availability of a local (Ugandan) emulsion plant would affect the cost of some of the seal beneficially, as it will allow the cost of bitumen emulsion for cold surfacings to decrease due to lower transportation costs;
- It appears as if the various field sections are generally not well monitored and only monitored during the project that established them (excluding the MELTC demonstration section);
- Research methodology training is required for all engineers and entities involved in potential research to ensure that basic research methodology (e.g. control sections, one variable difference between sections, comparative topography / traffic / materials for different sections, planning of monitoring programme, documenting of results, analysis and synthesis of results, etc.) are understood and followed. This will enable the value of the various available sections to be obtained without repeating work, duplicating work or sitting with situation where an abundance of variables that are not controlled affect the outcome and conclusions from the research;
- There appears to be a lack of coordination of research efforts with subsequent duplication. This is probably one of the reasons why this project was initiated, and
- The MELTC and COWI sections appear to have the best probability of being incorporated into a future field monitoring and research programme, and a detailed plan and budget for such monitoring is required.

5.3.4 Laboratories

The laboratory visit data were used to evaluate the competency of laboratories to conduct good research. It was found that:

- The laboratories are stocked mainly with equipment obtained through road construction contracts (UNRA) and old equipment (CML). The equipment is in varying degrees of functionality;
- Technicians / testers are trained but not certified for testing;
- There is a process underway to look at certification and quality control of the laboratories;
- Observation of some of the tests being conducted confirmed the requirement for certification, and
- These laboratories can probably not in the current state provide research-level test results.

Analysis of the requirements for a laboratory to be accredited to conduct quality work provided the following minimum requirements (SANAS, 2017):

- Technical competency of staff;
- Validity and appropriateness of methods;
- Traceability of measurements to national and international standards;
- Suitability, calibration and maintenance of equipment;
- Suitable environmental conditions;
- Handling of test / inspection calibration and verification items;

- Quality assurance processes, and
- Reporting of results.

These requirements appear to be generally not adhered to in the current operational laboratories and it is thus a recommendation that a national effort should be launched to evaluate the condition of the various laboratories and develop a roadmap for accreditation of these to ensure that good research (and quality control) data can be generated form the various laboratories.

5.3.5 Meetings and Observations

During the field and office visits a number of issues became clear that require attention and follow up as a result of this project. The following refers:

- There is a need for training in research methodology in most of the departments and entities that were visited. This is required to assist staff to appreciate the research process and to ensure that work that are planned as research are actually planned in a sustainable and appropriate way from the start in order for collected data to be of the required quality and format to serve as research data. It is thus recommended that such a course be conducted for various entities related to this project;
- The current state of laboratories and field equipment of the roads entities in Uganda is generally not sufficient to conduct high quality research with. Although most laboratories have ample equipment, a lot of this is not in a functional condition and most are not accredited. Staff are competent in basic operations but not accredited in terms of an official scheme;
- It appears as if most current and recent road research in Uganda was at least partially driven by external parties who fund research in Africa and incorporate the various departments and entities in this process. It does not appear from the available information and interactions that a formal research agenda exists that are regularly debated, agreed upon and updated to serve the country's road research needs. Such a platform needs to be established to ensure that Uganda can drive its own road research agenda, even if supported through donor funding;
- It is important for the roads research agenda to identify short, medium and long term goals and focus on each of these specifically to ensure that the roads research agenda becomes visible to all affected parties and that it can be driven with early successes and the promise of expected longer term outcomes;
- The roads research budget in Uganda needs to be benchmarked and approved along international guidelines in terms of the per cent of its GDP / budget that a country needs to spend on research to be competitive;
- It is important when evaluating research conducted by international agencies (e.g. DFID, DANIDA, TRL, USAID, etc.) that research is not confused with development projects.

5.4 Reliability and quality of research

Reliability evaluation of research should be based on an analysis of the research conducted and the implementation of such research findings. It can include an evaluation of the apparent rigour with which the research was planned, conducted and completed.

In this project the quality of the research is evaluated through a biased and subjective evaluation of the available outputs by the project team. Due to the nature of the project (collating road related research collected over a number of years and establishing a knowledge management database for future application in Uganda) not all information are

available regarding the scientific methods used and the impact that specific research has had on practice in the Uganda roads industry. Rather than making statements that can be construed to be incorrect due to a lack of such evidence, a more general indication of the quality and reliability of the relevant research discussed in Sections 4 and 5 is provided. It is deemed more important at this stage to propose an objective system that can be applied to the available research by an entity who appreciates the background to specific research programmes and focus areas, than to merely rate research outputs. The standard design and / or feasibility type reports cannot be included in research evaluation as they are focused on a different outcome than research reports.

Evaluation of the available research outputs do indicate that there are instances where there appear to be a more rigorous research plan on which the research was based. There are a number of cases where there appear to be a lack of control experiments / sections with which to compare research outcomes. It may be that such controls are just not reported in the specific context (i.e. undergraduate research where a number of similar studies are done by more than one student).

The scope of research reports do indicate that there is a real intention with the various institutions to conduct research. Reliability and quality issues are thus not a concern due to a lack of enthusiasm for conducting research, but probably more related to a lack of research methodology training with some of the entities. This was specifically identified in one entity that is collecting field data regularly over a number of years, but without any official documentation or reporting of this data.

There also appears not to exist an official review system of research conducted, except for the internal review system of examiners in the academic institutions that are involved in research. Such as national review system would improve the quality and reliability of the research outputs as it would place the outcomes in a national context and relate pockets of research to each other.

Research funded and conducted by international bodies appear to (in general) have better review systems and quality control systems used, mostly because of external pressures. The concern in most of these cases is the implementation and continuation of the research that appears to lack (as is the case with some of the experimental sites that were not monitored after the completion of the construction of the sections).

In summary, it thus appears as if an improved system of review of research will be beneficial to improvement of quality of research conducted as well as continuation and implementation of such research.

5.5 Implementation of research

Research only become valuable if the results are implemented. Implementation of research results can be in the form of active implementation of the findings (if they were found to be positive), a decision to not continue with the practice that was researched (if the results were negative) and / or a continuation of the research if the results were either inconclusive or it was found that the research needs to be broadened before it would be possible to implement it successfully.

In the analysis of the reports and field sites for this project, the following was observed in terms of implementation (again excluding design and feasibility studies reported on):

- It does not appear as if there is general implementation of research results for the majority of the research reports evaluated. Most of this research are reported without any indication of potential implementation or feeding into a system where implementation can be driven from;
- There are clear cases where research has not been implemented as it was clearly reported that the specific research objectives were not met. This is the case with the various proprietary products evaluated by CML and reported during a meeting to have failed within a relatively short period after construction. Unfortunately these outcomes were not officially documented and therefore from the research reports on their own, it almost appears as if the research provided a positive outcome;
- There are cases where research outcomes can be implemented and is being done so on a local basis, but where these results are not communicated nationally and implemented on a wider scale. This is apparently the case with most of the MELTC gravel road surfacing work;
- The difficulty with which outputs on international research conducted through donor countries and institutions on Ugandan roads was collected is a concern, as such investments should be publically available if they are to contribute to the improvement of the national roads infrastructure in Uganda, and
- In general the lack of an overall research entity in the country appears to be the biggest hindrance towards implementation of research. Most research are reported within a local institute without any sharing of the work conducted or the outcomes of the research, thereby hampering the discussion of outcomes, planning for new research and implementation of existing results.

5.6 Summary

This section focused on a review of the information gathered for the project. It focused on structuring the available information in a way from which the important aspects can be synthesized and extracted.

Based on the discussions in this section it appears that a lack of a central research entity or discussion body in the country is hampering research efforts the most. There appears to be (based on the available research reports) active intentions of conducting good roads related research by a number of institutions. However, a lack of coordination is leading to duplication of efforts and a lack of implementation of the knowledge gained in the process. A regular gathering of active researchers to assist in the thorough identification of research needs, development of a research plan and monitoring of the execution of such a plan is required to ensure that the time, effort and funding spent on roads related research are not wasted.

6 Structure for facilitating and coordinating road research / Knowledge management

6.1 Introduction

This section focuses on the application of the information collected and analysed in Sections 4 and 5 of the report through application of the TT model (Section 3.2) and identification of a structure and priorities of road research, based on a gap analysis of the currently available information. An institutional structure is also proposed to be used for managing road research in Uganda, based on experiences from other countries.

6.2 TT model

The Technology Tree (TT) model was discussed in Section 3.2, as well as its possible application to evaluate the strengths and weaknesses of the current Uganda road research situation, and identify priorities for road research. It was shown that in a simplified application for the TT model, research can be categorized as being on the base (fundamental research), platform (capabilities that support more general solutions as required) or solution level (specific solutions to actual problems based on the base and platform capabilities).

Application of the TT model using the Uganda road research data showed that there were research reports that could be classified under each of the three simplified classes (Section 5.3.1, Table 6). The least number of reports were classified under the Base level that indicates development of new competencies and knowledge that can be used to build research platforms on and provide solutions to research questions. The Platform level had about a third of the reports, focusing mainly on Materials, with Construction and Management focus areas also highly represented. Under the Solution / Application level the majority of reports focused on case studies, designs and feasibility studies.

It does appear from the analysis of the TT levels that there is a lack of coordination between the three levels of research. Following a typical Research and Development management model (Figure 3), it would be expected that needs lead to base level, platform level and solution level research. A more coordinated approach towards roads research should be able to address this need.

6.3 Structure and priorities of road research – Map analysis

In Section 3 it was indicated that the research conducted will be indicated in terms of the geographical areas where it was conducted to identify areas where a lack of research focus may be observed, as well as areas where the majority of this research is focused on. This analysis is affected by the type of data obtained in the research reports. Where no specific location for the origin of the materials or the site on which the research was focused is supplied, the report location was indicated as Uganda and a specific location in Kampala used for the designation.

Based on the information shown in Figure 10 it is clear that the reports cover work spread over most of Uganda, although the Northern, Western and south-Central areas may have less locations than the Central and Eastern parts of Uganda.

6.4 Structure and priorities of road research – Gap analysis

The Gap analysis of road research in Uganda focuses on an analysis of obvious gaps in the road research arena based on the available information collected throughout the project. The gap analysis is mainly based on the Focus Area and Pavement layer information.

Analysis of the information indicates that the majority of the research is focused on materials. This is a positive indication, as materials affects all properties and behaviour of a road. Whether the materials research has covered all possible aspects of material behaviour, as well as materials types in Uganda is not clear from the research reports, and it is the perception of the authors that there are gaps in this knowledge that will only be identified through detailed analysis of the reports by a materials engineer with thorough knowledge of the geology of Uganda.

Although Design had the second highest proportion of reports, this is due to the many design and feasibility studies that were provided as part of the research reports by the various entities. In the perception of the authors, the majority of these reports do not contribute to the engineering knowledge-base of pavement design as these are merely design implementation. There may thus exist a gap in the pavement design area.

The lowest proportion of reports focused on Pavement structure and Traffic, which is a concern and an obvious gap in the current research. Traffic constitutes the major demand on a pavement structure and as traffic conditions are unique for a specific country and region, more research is required in this area.

Work on gravel roads are included in the database, but it appears very small for a country such as Uganda.

Issues such as Maintenance & Rehabilitation, Road Safety, Operations and Environment, each made up smaller parts of the research database and appear to provide gaps in the current knowledge where more research should be focused. This is specifically in the light of current international drives on making roads safer and extending the life of existing pavements through appropriate maintenance techniques.

6.5 Institutional structure

In order to address issues such as the lack of coordination and management of the road research effort in Uganda, as identified through the first workshop (Section 4.4) the questionnaires (Section 5.2.1) and analysis of the research reports (Section 5.3.1), it is required to propose a potential institutional structure for the coordination and management of road research in Uganda. This institutional structure needs to address the following issues:

- Institutional setup, i.e. the different organisations involved (which may include government, academic institutions and private sector) and their respective responsibilities towards a coordinated road research effort;
- Hosting of the EDMS within the institutional structure, including aspects such as ownership of and responsibility for updating and maintenance of the EDMS;
- Communication channels and platforms for sharing knowledge. This may include technical conferences, circulars/ bulletins, workshops, and
- Platforms to interact with and share knowledge with the technical fraternity outside of Uganda.

A survey was conducted regarding other institutional structures used in Uganda and neighbouring areas for managing infrastructure research. In this regard, information was obtained from the Ethiopian Road Research Centre (ERRC) and the National Water and Sewerage Corporation (NWSC).

6.5.1 Ethiopian Road Research Centre (ERRC)

The Ethiopian Roads Authority have been undertaking construction and monitoring of a number of research and demonstration sections on unpaved roads. This research was part of the development process for a major expansion program for the rural road network at district and sub-district level. The aim with the establishment of the ERRC is to provide quality research services to the road industry in Ethiopia. Funding is provided through the World Bank and African Development Bank. The core operation of the ERRC is conducting and mainstreaming of road design, road construction and maintenance, road network management and safe road operation research and advances. It is anticipated that the ERRC will assist organizations with technology development and transfer and implementation into practice.

A Transport Knowledge and Information Centre (TKIC) is also planned in conjunction with the ERRC. It will facilitate the uptake of national, regional and international best practices and new technologies, starting with roads sector information and later expansion across the whole transport sector.

A research coordination steering committee has been established for coordination of the planned road research program. This committee will oversee planning and implementation of all road related research works and is chaired by the Ethiopian Roads Agency's Director General. Members include all relevant local and national roads related authorities, universities and the broader road sector.

6.5.2 National Water and Sewage Corporation (NWSC)

The National Water and Sewerage Corporation (NWSC) is a public utility company owned by the Government of Uganda. The NWSC is responsible to provide water and sewerage services in Uganda on a sound commercial and viable basis. The NWSC Department for Research and Development falls under the Directorate of Business and Scientific Services in the NWSC institutional structure, and conducts research and development as a key strategy in line with the corporation's core value of continuously developing and applying creative and innovative managerial and operational solutions.

NWSC research focuses on issues such as treatment of water and sewerage, water production, distribution, IT, customer satisfaction issues, etc. This is mainly done as internal projects utilizing staff from units within NWSC, although collaborative efforts with universities and institutions within and outside of Uganda are also undertaken. The department is mandated to promote research and knowledge sharing. Management, synthesis and analysis of research is conducted in-house. Research outputs are published widely in internationally peer reviewed journals as well as research reports.

The department is currently understaffed with 1 employee (Manager for Research and Development) and needs to appoint two Principal Officers and a further two senior officers in charge of co-ordination and documentation. Most research has been co-funded by NWSC and the relevant parties that require the research to be done, however, obtaining funding is an ongoing issue. It has been operational for 10 years.

Current challenges and issues experienced include:

- Research is not perceived as a core in most areas in Uganda and thus there is a serious problem of lack of funding and prioritisation;
- A need exists for NWSC to review their policies, external frameworks, and fees so as to be able to attract researchers and specialised technical people;
- A further need exists to increase awareness of the importance of research to top management to enable research to be perceived and managed as a core function in support of the smooth operation of the organisation;
- Organisations need to be careful with collaborations with institutions outside Uganda and ensure that the MoU's are properly prepared to avoid exploitation, and
- Well-trained and capacitated internal staff should be in a position to conduct the majority of the research that would result in monetary savings and capacity building of Ugandan technical staff.

6.6 Operational matters

The operation of the road research effort in Uganda needs guidance to ensure that it is modelled on effective institutional examples and effective in terms of guiding, coordinating and managing the road research effort in the country. This includes aspects such as resource requirements within the relevant UNRA departments to enable adequate and effective coordination. In this section attention is therefore given to the overall institution (probably linked to the UNRA structure) as well as industry bodies that can be utilized for research coordination, discussion and dissemination.

6.6.1 Institutional Structure

The overall road research coordinating institution should link to the UNRA structure to ensure that coordination is done with a national focus, incorporating all relevant stakeholders. The examples cited regarding other institutional models used in the country and neighbouring countries are indicative of possible solutions for an institutional structure that can be recommended and implemented to serve the Uganda roads research effort. However, analysis of these (and many other international models of such structures) indicates clearly that political will and funding are required as minimum support to ensure that such a structure will be viable and effective. In cases where these structures are active, there exists general support and active participation of the structure throughout the industry.

In reading the various reports, discussing issues during meetings and field visits and evaluating the history of the establishment of the Research and Development unit in UNRA, there appears to be a very uncertain view regarding the general support for such centralization of research planning and coordination. The current fragmented structure of research that is apparent in the sector and the lack of overall coordination of efforts and outputs will in the short term make it difficult to change to a more centralized model. Further, the number of entities involved in roads research, as well as each of their motivations to be involved in roads research, needs to be discussed on a national level to ensure that entities do not get the impression that their autonomy in terms of their own organizations' goals and output requirements are affected.

It is thus the recommendation that the current efforts with establishing the Research and Development unit in UNRA should be strengthened as a first priority, with the following specific mandate:

- Develop a national coordination system of all roads related research needs in Uganda and arrange for a national forum (with all stakeholder involved) where such a coordinating body can officially be established and agreed on as the body that will steer roads related research in the country;
- Establish a national roads research discussion forum that meets at a regular (i.e. annual) interval to discuss the current state and developments around roads related research in Uganda;
- Conduct a thorough investigation of the roads related research needs in Uganda. This should be supported by a foresight study that indicates roads related needs for the next decade, based firstly on economical and socio-economical drivers in the country and region, followed by the technical requirements that will ensure that the country can receive and maintain the required roads related infrastructure to support the economic and socio-economic needs;
- Mandate all roads related research and investigations by both local and international companies, research centres and governments, to be conducted through the Research and Development unit at UNRA, and ratified by the established national coordinating body to ensure that relevant research are conducted and that such research outcomes be nationally reported and implemented, and
- Once the coordination of roads related research in Uganda has reached a level at which a national framework of priorities exists and national support for the UNRA unit, coordinating body and discussion forum exists, this body needs to determine the needs and requirements for an autonomous institution that can be operated along the lines of similar regional and international institutions to support roads related research in Uganda.

6.6.2 Industry bodies

Industry bodies are required to provide support for the coordination of research (in terms of identifying important focus areas and research needs) to discuss and disseminate the research. For this to be done effectively it is important to form a body with a large participation of relevant parties from industry to ensure that all voices are incorporated in the direction of the road research agenda in Uganda. An example of such a body in South Africa is the Roads Pavement Forum (RPF) (RPF, 2017). The objectives of the RPF are to serve as a forum to share and exchange information and technologies and to discuss issues of strategic importance to the roads construction industry. Specific goals of the RPF include:

- Providing a perspective of overarching strategic issues as it affects pavement engineering;
- Promoting best practice;
- Co-ordination and linkage with other groupings;
- Establishment of task groups with specific national objectives;
- Provision of sufficient time for participation/discussion/advice and for social interactions;
- Dissemination of new technologies;
- Provision of a forum for acceptance of technological changes;
- Provision of a forum for interaction between theory and practice and for identification of technology development needs.

The RPF plays an important facilitating role as a catalyst for technology transfer in South and Southern Africa, and has been operational since 2000. Numerous research programmes

were initiated from within discussions conducted during the RPF, and it is viewed as vital for the support of the South African road research effort.

In this regard the formation of a similar entity in Uganda to assist in the planning and coordination of roads related issues, and specifically research, is recommended as one of the outputs of this project.

6.7 Overall recommendations

Based on the information obtained through the various interventions in this project, as described in Sections 2 to 6 of the report, the following overall recommendations are made regarding roads research in Uganda. Some of these recommendations are based on specific discussions in the various subsections of the report, and others are more general. It is recommended that:

- UNRA need to develop a focused policy on the active and managed dissemination of research outputs to gain the most value for the investment made. This should consist of a combination of academic and practical dissemination that is open to all stakeholders and that can also expose the research done in the country to international scrutiny and visibility (Section 3.5.2);
- An appropriate process be developed for the evaluation of researcher competence in the Ugandan context, to provide an objective, transparent and open system for managing both new entrants and established roads researchers (Section 3.7);
- An evaluation be done regarding the availability of road survey equipment such as FWDs and profilometers available in Uganda at the various institutions (Section 5.2.4);
- A national effort should be launched to evaluate the condition of the various laboratories and develop a roadmap for accreditation of these to ensure that good research (and quality control) data can be generated form the various laboratories (Section 5.3.4);
- Training in research methodology be arranged for all entities involved in research planning, management and execution (Section 5.3.5);
- Implementation of the institutional structure and operational matters regarding roads research in Uganda takes cognisance of the outcome of current ReCAP research regarding institutional models to ensure that the most relevant application of the model is used for the situation (Section 6.5);
- The overall road research coordinating institution should link to the UNRA structure to ensure that coordination is done with a national focus, incorporating all relevant stakeholders (Section 6.6.1);
- The current efforts with establishing the Research and Development unit in UNRA should be strengthened as a first priority, with the following specific mandate (Section 6.6.1):
  - Develop a national coordination system of all roads related research needs in Uganda and arrange for a national forum (with all stakeholder involved) where such a coordinating body can officially be established and agreed on as the body that will steer roads related research in the country;
  - Establish a national roads research discussion forum that meets at a regular (i.e. annual) interval to discuss the current state and developments around roads related research in Uganda;
  - Conduct a thorough investigation of the roads related research needs in Uganda. This should be supported by a foresight study that indicates roads related needs for the next decade, based firstly on economical and socio-economical drivers in the country and region, followed by the technical requirements that will ensure

that the country can receive and maintain the required roads related infrastructure to support the economic and socio-economic needs;

- Mandate all roads related research and investigations by both local and international companies, research centres and governments, to be conducted through the Research and Development unit at UNRA, and ratified by the established national coordinating body to ensure that relevant research are conducted and that such research outcomes be nationally reported and implemented, and
- Once the coordination of roads related research in Uganda has reached a level at which a national framework of priorities exists and national support for the UNRA unit, coordinating body and discussion forum exists, this body needs to determine the needs and requirements for an autonomous institution that can be operated along the lines of similar regional and international institutions to support roads related research in Uganda.

7 Specifications for EDMS

7.1 Overview

The Functional Specification can be viewed as the document which gives the logical representation, or model, of a system. The purpose of a logical model is to depict what a system is or does. It is implementation independent, which means that a logical model depicts the system independent of any technical implementation.

Therefore, the purpose of the Functional Specification of the UNRA EDMS (or RMS for Research Management System, as proposed during Workshop 1) is to illustrate the essence of the UNRA RMS and what the users will observe when they interact with the UNRA RMS, without paying any attention to how it is implemented.

Throughout this document, the focus will be on explaining the UNRA RMS and how the users interact with this module in order to achieve their goals.

7.2 Functional scope

The UNRA RMS is a system designed for the specific use to create a databank where research is consolidated and indexed, and made available to all stakeholders. There are many secondary interactions that form part of the RMS, but the primary goal is to give UNRA an overview of research that is currently available on the system (including its meta-data classification) and where this research has been conducted or to what spatial areas it contributes to.

Other functions of the RMS allow a wider stakeholder audience to interact with the system to find, manage and upload research done in competency areas they specialise in.

The system will be open to allow both public and registered users to interact with all research gathered.

The UNRA RMS system will be focused on research in the road sector which has undertakings in Uganda.

The system provides the user with the following functionality:

- View all research;
- Search the library via filters to find research;
- Search the library via spatial filters to find research;
- Download meta-data (documents) associated with research;
- Create and manage a research entries onto the system;
- Create and manage organisational profile associated with research entries;
- System administrators will be able to verify sources and research entries.

7.3 Technology stack

The system represented will be built for an online web environment. The system will be represented as a single page application (SPA) to ensure minimum load on required server infrastructure. SPA's are designed to optimise data usage by leveraging deep caching on unchanged views. This means that the client (user) does not spent unnecessary time and

bandwidth downloading view (webpages) that did not change from his previous visit. Server load is also reduced further by allowing the front end to leverage calculations and bindings. Only data committed is sent to the server for persistence.

The user experience is built around Google's material design. This ensures a rich user experience leveraging common design metaphors known to most users. Animations and other information experiences serves the purpose of informing the user of changes, which leads to a more engaged client experience.

The system is designed to be forgiving allowing users to change, and tweak the model without fear of breaking it. Reverting to default scenario's and persisting custom scenarios should be seamless and no functionality should be designed in such a way that it requires additional user training.

The system utilises rich interactions on a spatial overview hosted on GeoServer. GeoServer is an OGC compliant implementation of several open standards such as Web Feature Service (WFS), Web Map Service (WMS), and Web Coverage Service (WCS).

The system with utilise RESTful web services. Representational State Transfer (REST) is an architectural style that specifies constraints, such as the uniform interface, that if applied to a web service induce desirable properties, such as performance, scalability, and modifiability that enable services to work best on the Web.

The technologies with which the system will be built are:

- GeoServer 2.x
- Polymer 1.7.
- .NET Core 1.1
- Entity Framework.
- SQL Database 2016.

The minimum system requirements for supporting are:

- Intel Xeon E5-1620 3.5GHz
- 32 GB ECC RAM
- Java 8 environment (JRE)
- .net core 1.1
- 1TB Bandwidth

UNRA RMS will be hosted on Microsoft 2012 R2 server. The system should be compatible with Internet Explorer 11+, Chrome and Firefox. The complexity of the data representation in tables makes it difficult for the SPA to be designed as a responsive web system. The system will therefore not be designed with a mobile view.

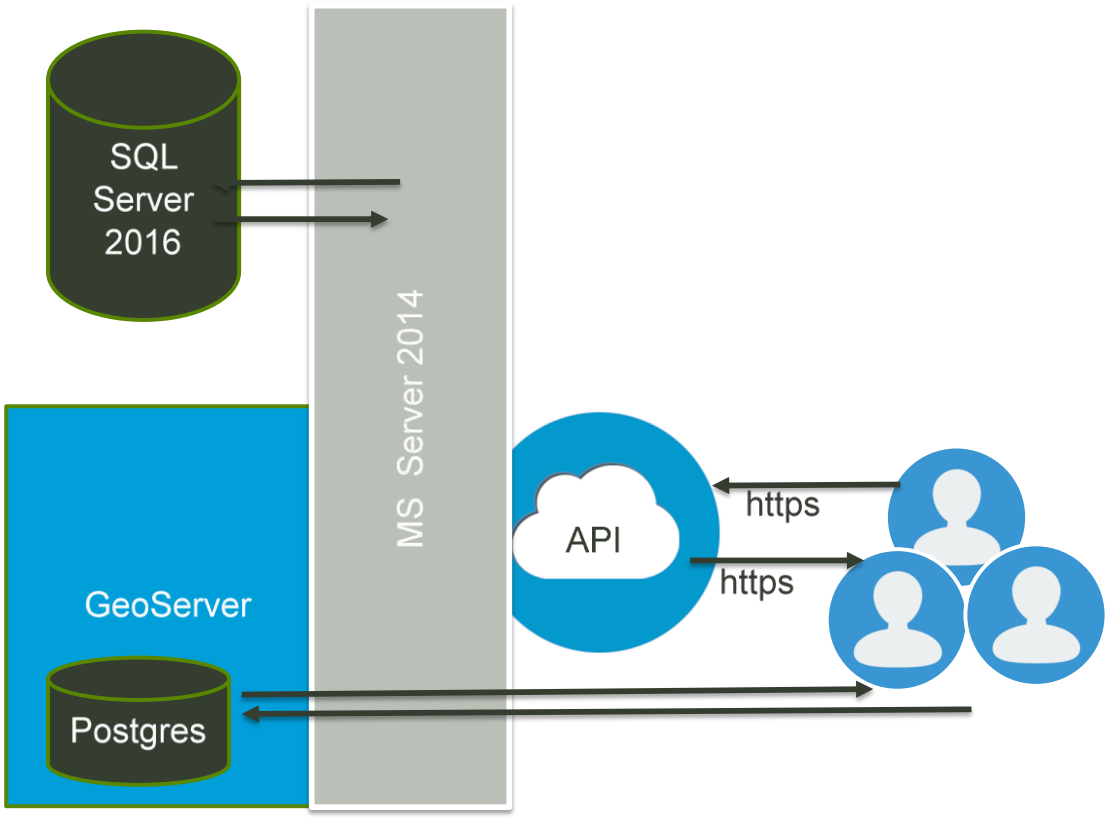

Figure 11: High level functional architecture

7.4 User roles

Functionality will be restricted based on user roles classified into the following fields:

- A public user;
- A researcher;
- An administrator.

A public user will have a read only view of the interface. This means that the user will not be able to edit or change anything related to research entries. The user will be able to search and view research entries, and can also download research meta-data if available.

A researcher contributes to the system. A researcher will be able to log into the system and manage his organisational profile. A researcher can upload documents to his organisational store as well as amend meta data for research entries. Researchers can also manage individual research entries.

An administrator will have full rights of the system. The admin user will be able to enable organisations to contribute to the system, as well as approve and decline research submitted to the RMS.

7.5 User interface functionalities

The user interface is divided into a master and detail view. The master list will always show the research and available research papers. The master view will expand into a further sub master definition view when appropriate selections are made to show additional information (as seen in Figure 12). The detail view is concerned with the spatial view of the

research and its category associations. The detail view will be a spatial representation for the current research being listed in the detail view. The spatial view will also be interactive and will allow for selection feedback to a detailed selection.

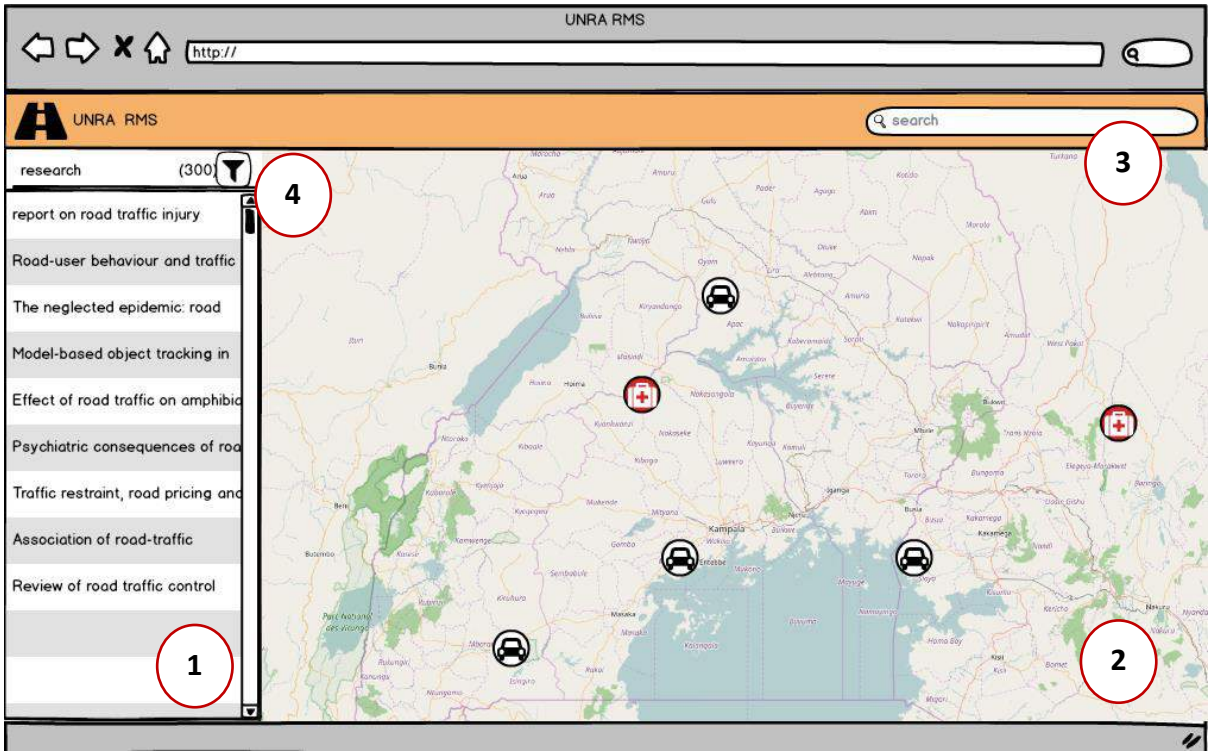

Figure 12: UNRA EMS - Landing page

There are four parts specified in the user interface:

1 1: The research pane (detailed page/view): The detailed view is responsible for showing all research as filtered by the user.

2 2: The spatial overview (master page/view): The spatial overview shows all the research as filtered by the user on a map (if the research has a location associated with the research).

3 3: The search: The search bar will serve as a quick way to filter down research results in a forgiving manner.

4 4: The filter view: The filter view will enable the user to apply specific research filters to the research pane.

7.5.1 User interactions for a user

The role of the user is to visit the site, find relevant research and be able to interact with the meta-data. When interacting with the filter view to find relevant research entries, the user can apply the following filters to narrow down the search:

- Authors;
- Year;
- Subject;
- Keywords;

- Organisation;
- Field (Category);
- Journal, and
- Spatial Filter.

The user can also choose to interact with the spatial filter. When interacting with the spatial filter the user will be able to select an area on the map (see Figure 13) and it will show all the research entries available in the selected area (if filters are applied, the filters will further narrow the search).

As the user interact with the filter view, the research pane will be adjusted accordingly.

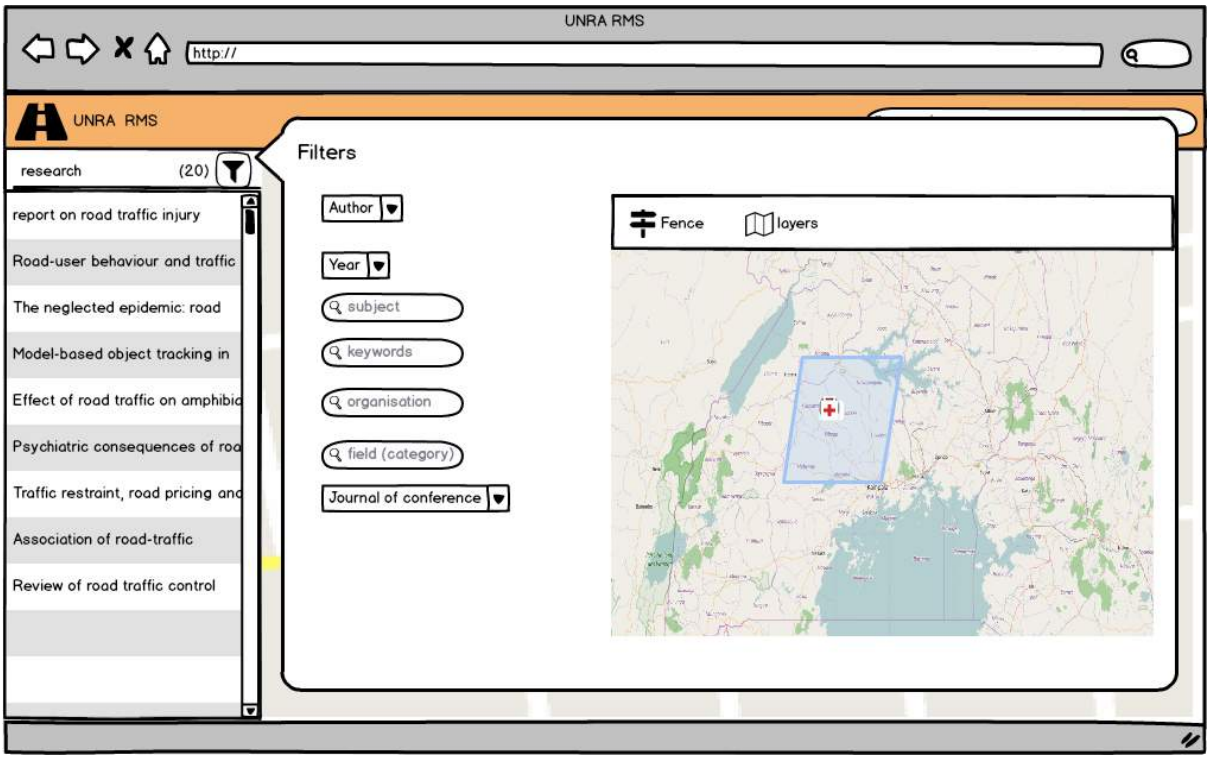

Figure 13: UNRA EMS - Filter View

Once a user selected (clicked) on the research entry, the sub-detail view will display the following information (see Figure 14):

- The title of the research;
- The author(s);
- The institution;
- Keywords associated to the research;
- Abstract / Summary of the research;
- Option to download associated data;
- Location of the research.

The map will also auto-zoom to the research entry.

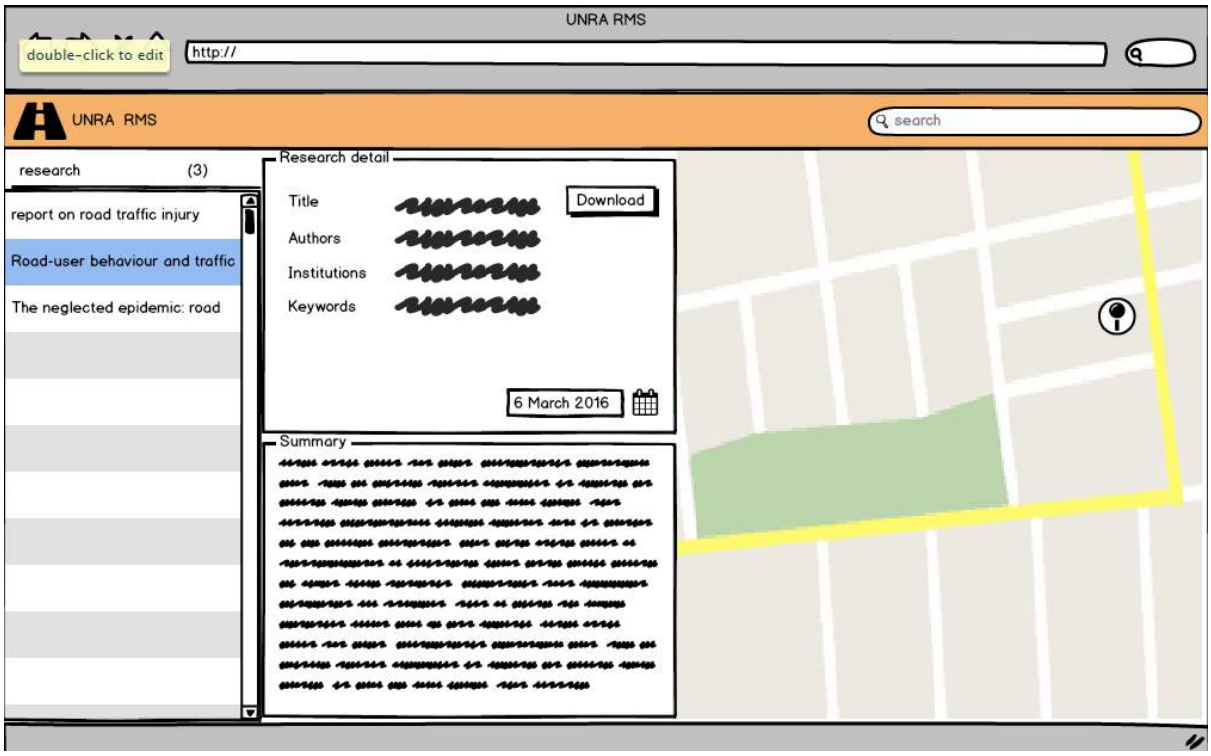

Figure 14: UNRA EMS - Filtered list

7.5.2 User interactions for a researcher

A researcher will be able to create a profile to manage and submit research entries against an associated organisation (see Figure 15). The management of research includes the ability to create, remove and update research (see Figure 16).

An organisation might need approval for upload and user registration from an administrator. In such a case, the necessary workflow steps will send out emails to inform the user of the current process. If the organisation does not require approval, the user would immediately be redirected to an organisational dashboard which will allow them to manage their research.

Updating research consists of tasks like adding additional keywords, changing publication dates, adding authors and managing other meta-data (see Figure 17).

Research entries have a location association. The research management pane allows the user to indicate a location where the research has been conducted. This might be in the form of a pin, a line or a polygon. The user might also make a selection based on WFS to indicate a pre-defined region.

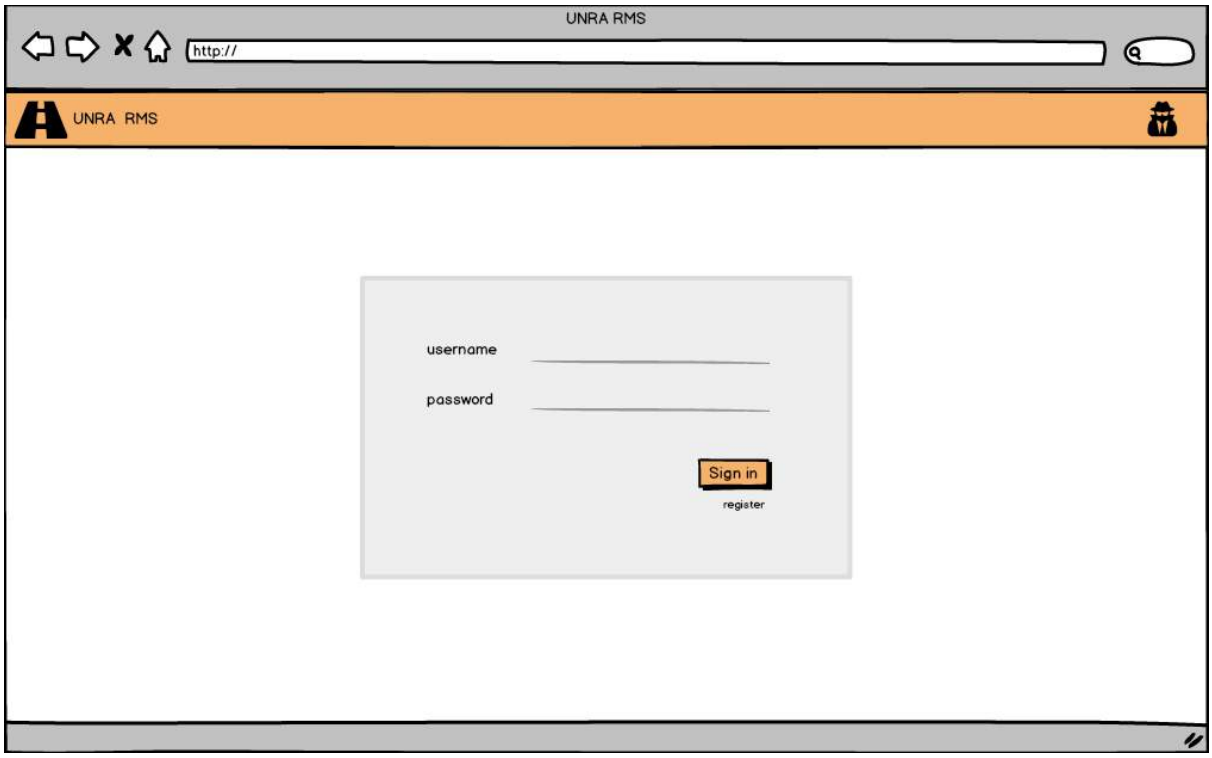

Figure 15: UNRA EMS - Login page

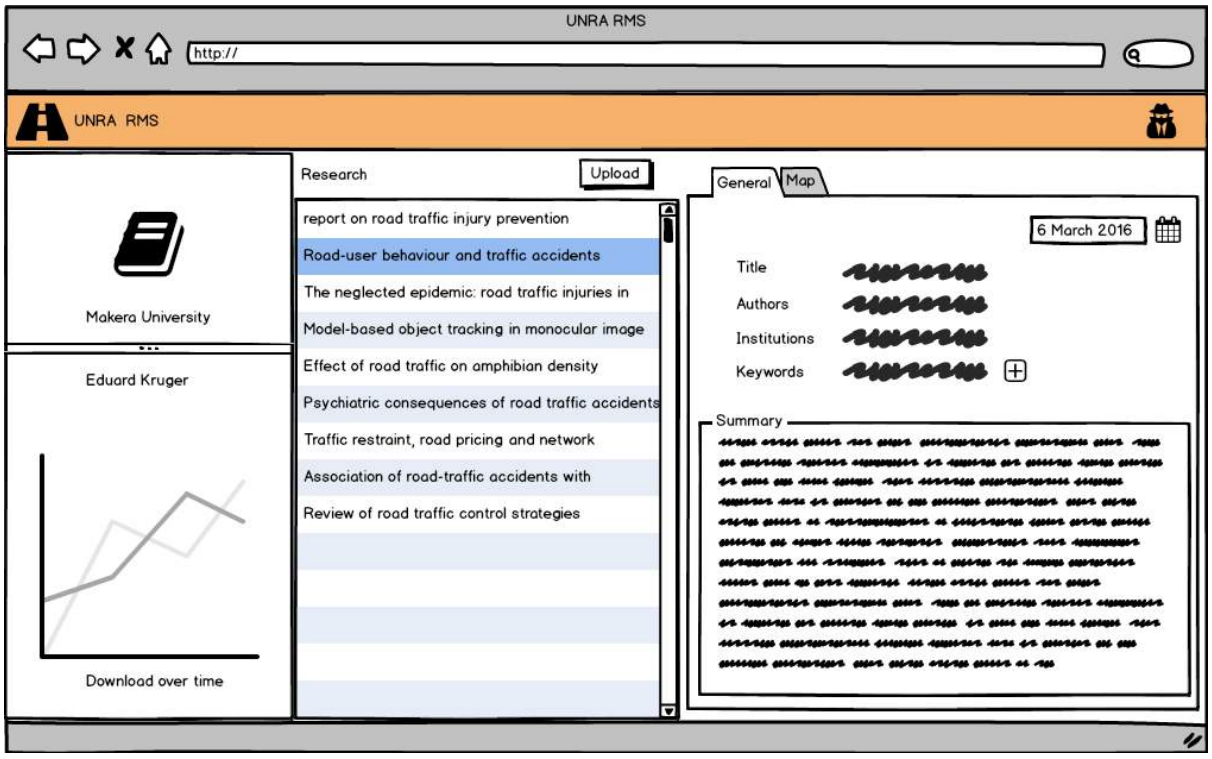

Figure 16: UNRA EMS - Researcher profile page

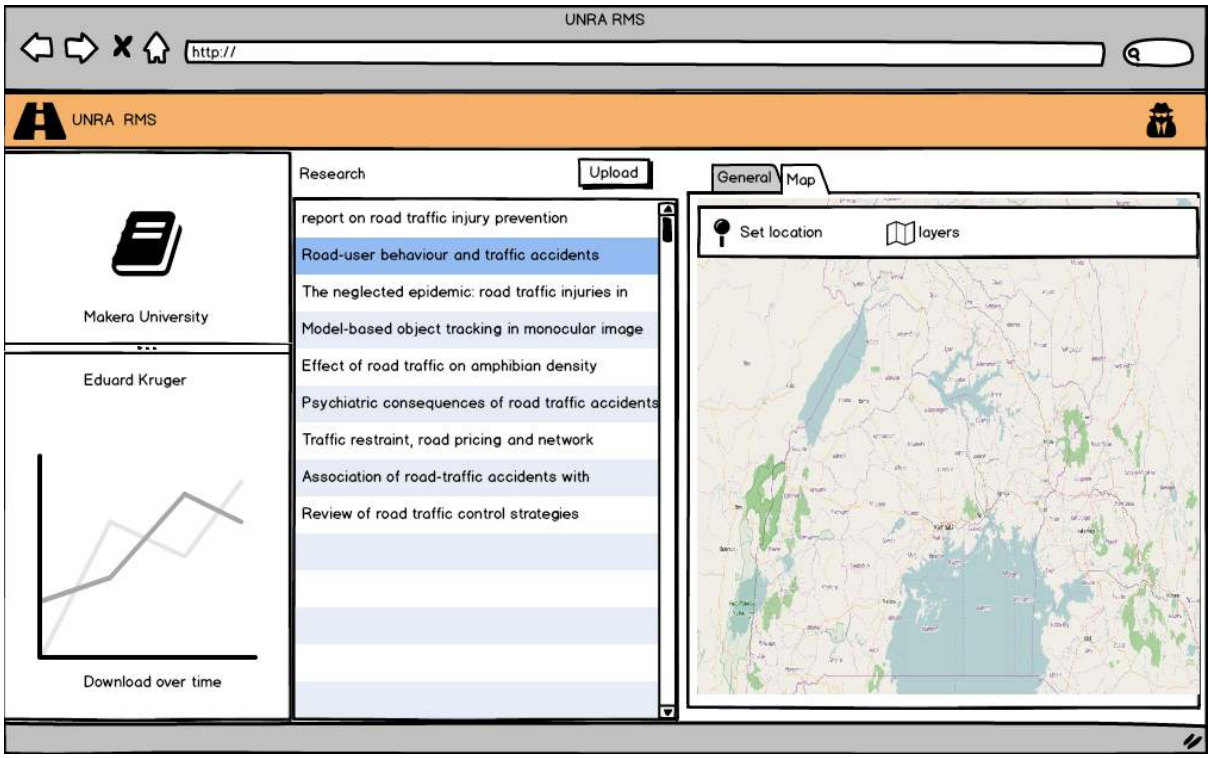

Figure 17: UNRA EMS - Researcher profile page (add a location)

7.5.3 User interactions for the Administrator

The administrator of the system can set the trust threshold of each organisation (institution). The trust threshold is a way of enabling what workflow steps are required on submission of research and registration of researchers.

The administrator can therefore approve or deny user registrations and document submissions for selected organisations/ sources, while others will bypass this step (see Figure 18).

The trust threshold protects the UNRA RMS from bots and other unverified public data sources which does not adhere to the strict standards of research classification. This feature will act as a quality stage gate into the system.

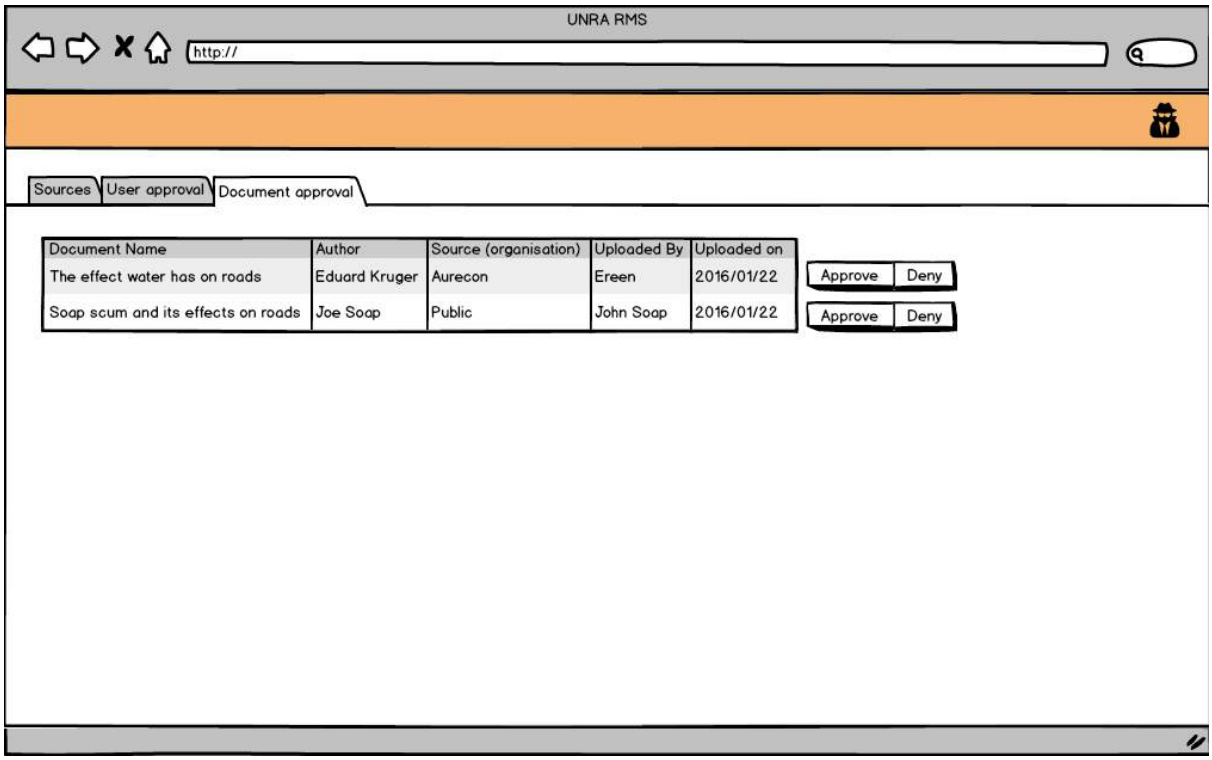

Figure 18: UNRA EMS - Document approval

8 Conclusions and Recommendations

The collected information was analysed and the following conclusions were drawn:

- There is a large volume of roads related work conducted in Uganda, although not all of these can be deemed to be research. The identified research is distributed throughout Uganda geographically, although the majority is focused close to Kampala and the location of the institutions that are conducting the work. The majority of the research focused on pavement materials, followed by design, management and construction (although most of the design category cannot clearly be defined as research, but more application of design methods) (Section 5.3.1);
- Laboratories are stocked mainly with equipment obtained through road construction contracts (UNRA) and old equipment (CML). The equipment is in varying degrees of functionality. Technicians / testers are trained but not certified for testing. There is a process underway to look at certification and quality control of the laboratories. Observation of some of the tests being conducted confirmed the requirement for certification, and these laboratories can probably not in the current state provide research-level test results (Section 5.3.4);
- It does not appear as if there is general implementation of research results for the majority of the research reports evaluated. Most of this research are reported without any indication of potential implementation or feeding into a system where implementation can be driven from (Section 5.5);
- There are clear cases where research has not been implemented as it was clearly reported that the specific research objectives were not met. This is the case with the various proprietary products evaluated by CML and reported during a meeting to have failed within a relatively short period after construction. Unfortunately these outcomes were not officially documented and therefore from the research reports on their own, it almost appears as if the research provided a positive outcome (Section 5.5);
- There are cases where research outcomes can be implemented and is being done so on a local basis, but where these results are not communicated nationally and implemented on a wider scale (Section 5.5);
- The difficulty with which outputs on international research conducted through donor countries and institutions on Ugandan roads was collected is a concern, as such investments should be publically available if they are to contribute to the improvement of the national roads infrastructure in Uganda (Section 5.5);
- In general the lack of an overall research entity in the country appears to be the biggest hindrance towards implementation of research. Most research are reported within a local institute without any sharing of the work conducted or the outcomes of the research, thereby hampering the discussion of outcomes, planning for new research and implementation of existing results (Section 5.6), and
- A lack of a central research entity or discussion body in the country is hampering research efforts most. There appears to be (based on the available research reports) active intentions of conducting good roads related research by a number of institutions. However, a lack of coordination is leading to duplication of efforts and a lack of implementation of the knowledge gained in the process. A regular gathering of active researchers to assist in the thorough identification of research needs, development of a research plan and monitoring of the execution of such a plan is required to ensure that the time, effort and funding spent on roads related research are not wasted (Section 5.6).

The following recommendations are made based on the analysis of the information. Some of these recommendations are based on specific discussions in the various subsections of the report, and others are more general. It is recommended that:

- UNRA need to develop a focused policy on the active and managed dissemination of research outputs to gain the most value for the investment made. This should consist of a combination of academic and practical dissemination that is open to all stakeholders and that can also expose the research done in the country to international scrutiny and visibility (Section 3.5.2);
- An appropriate process be developed for the evaluation of researcher competence in the Ugandan context, to provide an objective, transparent and open system for managing both new entrants and established roads researchers (Section 3.7);
- An evaluation be done regarding the availability of road survey equipment such as FWDs and profilometers available in Uganda at the various institutions (Section 5.2.4);
- A national effort should be launched to evaluate the condition of the various laboratories and develop a roadmap for accreditation of these to ensure that good research (and quality control) data can be generated form the various laboratories (Section 5.3.4);
- Training in research methodology be arranged for all entities involved in research planning, management and execution (Section 5.3.5);
- It appears that while much research has been conducted in the materials field, there are gaps in areas such as traffic, maintenance and rehabilitation and road safety;
- Implementation of the institutional structure and operational matters regarding roads research in Uganda takes cognisance of the outcome of current ReCAP research regarding institutional models to ensure that the most relevant application of the model is used for the situation (Section 6.5);
- The overall road research coordinating institution should link to the UNRA structure to ensure that coordination is done with a national focus, incorporating all relevant stakeholders (Section 6.6.1);
- The current efforts with establishing the Research and Development unit in UNRA should be strengthened as a first priority, with the following specific mandate (Section 6.6.1):
  - Develop a national coordination system of all roads related research needs in Uganda and arrange for a national forum (with all stakeholder involved) where such a coordinating body can officially be established and agreed on as the body that will steer roads related research in the country;
  - Establish a national roads research discussion forum that meets at a regular (i.e. annual) interval to discuss the current state and developments around roads related research in Uganda;
  - Conduct a thorough investigation of the roads related research needs in Uganda. This should be supported by a foresight study that indicates roads related needs for the next decade, based firstly on economical and socio-economical drivers in the country and region, followed by the technical requirements that will ensure that the country can receive and maintain the required roads related infrastructure to support the economic and socio-economic needs;
  - Mandate all roads related research and investigations by both local and international companies, research centres and governments, to be conducted through the Research and Development unit at UNRA, and ratified by the established national coordinating body to ensure that relevant research are conducted and that such research outcomes be nationally reported and implemented, and

- Once the coordination of roads related research in Uganda has reached a level at which a national framework of priorities exists and national support for the UNRA unit, coordinating body and discussion forum exists, this body needs to determine the needs and requirements for an autonomous institution that can be operated along the lines of similar regional and international institutions to support roads related research in Uganda.

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Appendix A – Questionnaires

Summary of all questionnaires received to date

1. Please name your organization. How would you describe your role and responsibilities in your organisation?

Summary of all Questionnaire participants

2. Does your organisation generate any road related research? Select your answer with a tick or 'X'

Yes	No

Who?

Government Department Students and staff Fund road research They provide the funds to their agencies (UNRA, Districts and Municipalities). The agents procure the research through research institutions, e.g. Universities). The agents enter into a MOU with the research institutions. They have placed research funding on hold while they are developing a research manual to set out the standards required of the research. Once in place URF provide funding for research again and also approve their own research projects as Board special projects. Students and staff Training Centre, Consultant (TRL), District Local Governments Plan, design and manage the construction, rehabilitation, upgrading and periodic maintenance of the City Roads including the Road marking and signage. Plan, design and manage the construction, rehabilitation and maintenance of the City drainage systems. Plan, design and manage the provision of traffic and street lighting for the City. Plan, design and manage the construction and maintenance of the City Authority Building Infrastructure, Monitor and propose areas for improvement of city traffic Plan, design and manage street parking space and other facilities in the City Plan, design and manage public transportation in the City Department of Research and Development

a. What type of research?

Papers presented at conferences Research conducted as part of post-graduate studies Applied research (trial sections) carried out by research organizations and other international consulting firms in the past years Materials, design, traffic management Low cost seals The question about what type is bound to be interpreted differently by the respondents. Whereas one colleague of mine in the area pointed out "pavement materials & pavement preservation and management" as types; Umaru preferred to look at it as either applied or fundamental/basic research. At the graduate level, we have 2 types of plans for masters students, Plan A students together with doctoral students are involved in fundamental research; Plan B students are involved in applied research. I'm open to further consultation if need be. Low cost sealing options for low volume roads Community access research (Stone arch bridges, ladders and steps) Student final year project research Road and transport research - Ongoing projects are in the fields of Asset Management, road safety, high-tech applications in roads and transport, and knowledge management. Several new projects are in the pipeline. Research in the past has primarily focussed on testing of new stabilisers and sealing materials Applied research by the UIPE members in the Consultancy industry

b. Is it published?

Yes	No

Seldom
No. Reports are available, but the follow up actions to conclude the studies are not always done
90% of the time No, 10%yes as conference papers etc.

c. How is research verified?

Post graduate study reports are verified by respective Technical Institutions; while Papers and Applied Research reports are usually presented to relevant stakeholder for a
Reviews of lecturers
Research are validated through the Sector Working Group that sits twice a year. If they approve the study it will be recommended for duplication and validation.
External examiner
Testing and observation
It is not clear that previous research was verified. However now there is a peer review process, both internal and external
There is no independent body/ authority to verify the said research

d. Where is it kept?

Reports are kept by respective Institutions; Individuals, and sometimes at the Laboratory;
In an office, hard copy
On his laptop. Example he sits with all the reports from Crossroads (pdf reports) on his laptop. Crossroads concluded their research. Ideally MORT should house the research. The ministry created an internet based Transport Sector Data Management System two years ago but is not active yet. This is available to members of the Sector Working Group. An EDMS could use this platform.
The Engineering department used to have their own library, but the libraries have been centralised...
Students are supposed to give three copies, one for the lecturer and one for the library. Recently a CD copy has been added.
In MELTC offices and Library
The Departments, which information is not yet centralised. The Research and Development Department is currently undertaking a study to establish an electronic system to store and manage research

e. How is it accessed?

On request
Ii is a hassle. Somebody will have to go a physically search for it.
Though him. By word of mouth others hear of it.
Through the central library. ? Each student is meant to produce a report , apparently with a CD; So one can either access this from the Library, from the directorate of research and graduate training and at college level
On request and retrieved by officers or the librarian at MELTC
There is no known (well established) mechanism of accessing such researches; except when the members involved volunteer to present such researches at the UIPE Annual Technology Conferences and only when the Conference theme relates to such researches

f. How often is your research accessed?

Seldom
UNRA sometimes asks
High level requests, for example was the research done and completed. Seldom that someone asked for details.
Not sure

g. What meta-road data/research is available with your research?

Pdf only – some tables at the back of the report. Storing electronically will be a good idea.
None.
Only pdfs of reports

Scanned reports, some electronically
Most studies have the meta-data stored in soft copy format

h. Is your data / research geo-tagged? (locations)

Yes | No

Only chainages that can be linked to GPS coordinates
No.
Chainages of trial sections are available and can be traced

i. Is your data/research confidential?

Yes | No

A small part of the dataset is confidential, but the larger part is accessible to the public on request

j. Would you be interested in uploading your data/research to a centralised databank? Why?

Yes | No

For wider access and better coordination
Yes, in order to synchronise research and avoid duplication.
Yes. For Easy access
For study learning purposes
It will allow for scholars to continually analyse this data with alternative or new procedures. This is likely to result in new insights emerging, which can only be to our benefit

k. Do you access your research on-site? Please describe your answer.

Yes | No

There is lack of a data base facility
Yes and no. No electronically. Have to search in an office. Library? Ndejje no not kept there. Some research is available online, but not on roads research, unless it was presented at a conference.
Yes on his computer, theoretically TSDMS too (anyone in the Sector)
Can find info from Vincent Ssozi – statistician from MORW – 02356 772320034, 0256700390415 ssoziv@gmail.com
Not at the desktop, since only abstracts have been captured. One could however walk to the library for access (if one is a student or member of staff); As to the public, I suspect one has to go through formal channels for this type of access.
No. It is not yet uploaded on the website

3. How would you describe your interest in road related research?

Very high
Immensely high; the majority of students currently undertaking Master's program (almost 70%) are all pursuing research in this field.
Very high interest
As the organisation which is responsible for maintenance of roads, KCCA has a huge road network which is overloaded and is dilapidated. KCCA in its bid to rid the city of dust, potholes and finally pave all the roads in the city has been met with many challenges which include: lack of funds, huge costs of maintenance and lack of technical expertise. Although, the greatest challenge KCCA is facing right now is its inadequate funds, research into low cost sealing solutions, dust prevention strategies and cheaper maintenance strategies and materials would benefit KCCA as it tries to fulfil its mandate.

a. What specific type of research, or topics are you interested in?

Innovations in road construction materials to improve on quality, performance, and reduce construction/maintenance costs;
Materials, design aspects (geometric design), transportation, transport management, sustainability
Low cost sealing of roads
Performance of sealed roads
Community access (stone arch bridges, ladders and steps)

Unit costs of road maintenance
Low cost sealing solutions,
Dust prevention strategies
Cheaper maintenance strategies
Use of locally sourced materials for surfacing
Traffic engineering & management
Safety engineering
Asset management
Road economics

b. How can you use it?

By disseminating the information to the Construction Industry;
Advise government, both central and local, designs, students for continuity of research
Useful to avoid duplication
Use resources better
Different alternatives to use, challenge to fund materials in Uganda.
Students for research
For planning maintenance strategies
Exploitation of the use of local materials
Store and manage research information, developed by all research groups making information will accessible to researchers around the world
Access research from the international community through linkage with research libraries
UIPE being the only recognised profession body for engineers; its perspective would be "final/ definitive" to the wider society concerns on road infrastructure

c. What do you use at the moment (in the absence of a consolidated database)?

Piece meal dissemination of information to respective Agencies in the Road Sector;
Memory, guessing
National policy – that they cannot introduce a technology by yourself, there needs to be a standard before you can use a new technology.
Library
Existing manuals
Literature on the internet
Hard copies
Information is stored on the organisation's system drives
External research is accessed directly from source by online subscription, internet searches, and requesting soft and hard copies of technical reports
UIPE currently depends on the technical capabilities of its identified individual members and or organisations that can volunteer their researches to the Institution

d. To what extent does the research contribute to your work? (in terms of outcomes)

Very substantial; more than 60%;
Research outputs (to be published) and quality of work – which is an integral part of the work of a university and lecturer.
Significant – core to road construction and maintenance, effectiveness of programmes. Whether URF money is well spent.
Students use for topics for research. Some are given topics from lecturers and others choose their own
Less than 25%
Research outcomes are central to the organisation as we have purposed to be a knowledge-driven organisation that makes evidence based decisions
It significantly constrains UIPE's authority as an Institution in commenting on certain topical matters since it is rarely with accurate/ dependable research findings – until through inquiries its members that may be better equipped volunteer the info

4. What is your view on road research in the country, currently?

A high priority but very poorly resourced;
Need more research, more organised, more findings and get it moving
Not organised in the way we do it.
Fail to replicate, can save money and cover more areas of research
For example ConAid comes to Uganda and approached different agencies and they all do research on Conaid but do not talk to each other.
Umaru's view is that it's fair.
Not well coordinated
Not rolled out
Little funds are allocated
Some findings are not published
Road research in this country is still lacking behind the developed countries. We have taken to adopt solutions that have been used elsewhere and never really taken the time to figure out what really works best for our country in terms of durability (taking into account the climate), cost and quality.
It is still at a tender stage
Road research in Uganda is very fragmented, uncoordinated, poorly documented, and largely inaccessible
quite low and is given minimal consideration – possibly due to financial constraints in reality and due to consideration of the "more important priorities" as determined by the policy makers

a. Do you have access to any road research? If yes, where and how?

Yes	No

By collaborating with similar Research Institutions;
Online and is restricted
Yes, Crossroads.
Yes. Library e-resources and previous reports can be accessed by the students
Through: The internet
Journals
Papers presented at conferences like the national technology conference
We mainly refer the Institute of Civil Engineers website since some of your KCCA engineers are members
Stakeholders like this information departments of interest
Online subscriptions, Internet searches, available databases like the AFCAP database, and internal technical reports

b. Do you know who generates research, and how to get it?

Yes	No

As in (a) above
Makerere University
Yes and no. sector working group have to approved research. Reviews are done 2x a year. Each agency have a window to present their findings of research. They give the Universities the opportunities to present.
Yes. Ministry of works and Transport; Local governments and Municipalities and some NGOs (like Crossroads...not sure I got it well...please follow this up)
Institutions
Academicians
Companies
Organizations
In Uganda, research is mainly done at the universities and access to it is through the University Students, lectures and other stakeholders like MoWT & UNRA

There is room to improve, especially in the ability to access research from the global community of road and transport researchers

c. Who do you normally partner with, if you need research?

Academic Institutions; Stakeholders in the Sector;
Makerere University
Students works in groups of 2
With their agencies who puts out the research, e.g. Univ.
Private sectors
Government ministries
& don't forget the collaborating academic institutions, through which many our staff have been supported to obtain doctoral degrees
Consultants
Sister Labour based institutions organizations
District Local Governments
Rely on MoWT & UNRA and UIPE
National and international academic institutions. In addition to internal resources we receive support from the Uganda Road Fund, AFCAP, and other emerging agencies

d. Do you have any existing platforms/ communication channels for interaction and coordination with other key role players, related to road research?

Yes	No

Yes, sector working group. TSDMS is a possible platform
Existing platforms for this interaction
Normally through an MOU apparently that has to be signed by the vice chancellor, legal director and the college principal.
UIPE gatherings
Technology conferences
Exhibitions
Through the National Research Steering Committee, hosted by UNRA. This is a formalised channel

e. Are you aware of any attempts in the past to formalise this? Can you provide details?

Yes	No

Exchange of letters; meetings; etc.;

f. What is your view on the level of dissemination of research recommendations currently, in Uganda?

The level is very low mostly due to poor resource allocations to facilitate the process;
Limited, through journals and conferences
Very low
Low

g. What is your view on the level of uptake of research recommendations currently, in Uganda?

The level of uptake is comparatively high;
Slow
Where they get stuck – in the process to approve by Ministry to roll out
Low
Whereas research might be available in certain circles, there is still a missing link between the researchers and the implementers. Research needs to be tested and then brought to the market for piloting.

h. How would you describe the overall quality of road research in Uganda?

The quality is fair in view of the challenges prevailing;
Varies on the level from undergraduate to Masters to Ph.D. All for qualification purposes
Average. As research are done under constrained conditions.
I'm getting many comments from fair to very bad. Umaru's view is that it's fair.
Requires improvement

Due to the absence of a relationship between researchers and the implementers, it is difficult to judge the quality of our research as regards to if it achieves its intended purpose
Quality of road and transport research in Uganda is poor
It is not taken seriously so far – and there have been few researches in that area to objectively rate its quality

5. Can you list any issues or challenges preventing coordination of research (e.g. institutional, organisational, technical, logistical or financial issues);

Mainly logistical/financial issues;
Lecturers are busy with academic workload
Funding
Do research to earn a degree
Approach not organized.
Approval of technologies – process is slow
Funding is a challenge
Products marketed in Uganda are from other countries. They do not trust the integrity of the products and companies (suppliers). Products are registered trademarks e.g. ConAid. Cannot test products and believe that they will receive the same contents in each drum supplied. Do not have the capacity to do quality testing
Too disconnected. Multiple sponsors. Need a centralized player to coordinate at a higher level
Lack of a coordinating body
Limited funding
Limited logistics
Institution and organizational challenges
Lack of the institutional arrangements to facilitate coordination. As such research is undertaken in institutional silos. Even within institutions, e.g. universities it is common that colleges will not pursue synergy in road and transport research
Absence of a champion agency/individual in the past
Absence of collaboration platforms, including the lack of a centralized database for research
Distributed sources of funding that do not emphasize collaborative research as a prerequisite before being accessed

a. What, if any, frustrations do you have with the available road data / research? (e.g. relevance, reliability, accuracy, completeness, complicated filters)

Most times they are incomplete!
Relevance, reliability, completeness
Stagnation of research, stagnant after trials are completed.
Whereas we can easily access our research outputs, it's very hard to know what other agencies are doing in road research unless we are in a direct partnership. (one for the access);
Frustration exists when there it is difficult to find a single research which satisfies the above
There is limited access to the research being carried out by the universities in Uganda.
Most of the research carried out in the country is purely academic as opposed to problem solving research
Reliability and accuracy of the data/research

b. Have you ever utilised a centralised knowledge database. If so, please describe your general experience with centralised knowledge databases. What works well and what does not?

Yes	No

Directly to bring the cost down of rural roads
Research done on the saliva of termites (reconstructed by biochemists and proven to be cost effective
Important to have a simple, intuitive Graphical User Interface. This must be complemented by a very versatile search engine

6. How should a centralised knowledge database enable your work?

By serving as a one-stop-centre!
Easier to obtain information – save time.
Quality of research output
Should be easy to access information
Try to scan for possible users and their needs
Fast access of relevant information of interest
Information being readily available on the website and updated regularly
It should help in curbing plagiarism
Provide access to the current status of knowledge, and point out areas to focus ongoing and planned research

a. When retrieving data from the system what would you like to see?

All the relevant data: the objective; what has been done; any gaps; etc.;
Title, author(s), where (region), published in a journal or conference
Multi-layered – key words. Location, abstract, full report. Types of materials. Kinds of tests carried out and tools used. Costs. Conditions (environment),
Field, year, key words, author, geographical area, related projects, abstract, objective, methodology,
Topic of research and when it was published
Referencing of any copied/borrowed information should be referenced with permission from the author using the Harvard system.
Any other papers citing that particular research should be indicated on the site and should show how many people have accessed or viewed the same topic
Clear, categorized results

b. How do you envisage using a centralised knowledge database? (e.g. remembering previous searches)

As being capable of providing easy and fast access to information any minimize duplication of efforts!
Remember previous searches
Information easy to access. Easy dissemination, easy to publish or forward to others.
Remember previous searches
Typing in key words and related research appears
Everyone should be able to create an account which they can log in and would have all their previous searches and favourites. The system should be able to update its users on related topics/searches of favourites.
We want to see a breakdown of the different research areas topics
Multiple search of different research data using keywords. It should be able to simultaneously access multiple external databases, not just the metadata contained within

c. What fields would you be interested in for searching data/research (e.g. author, organisation)

Author, Organization, Subject, Materials, Technology, etc.;
See (a)
Multi-layered – key words. Location, abstract, full report. Types of materials. Kinds of tests carried out and tools used. Costs. Conditions (environment)
Topic
In order of priority: Author, Title, Subject, Periodic title, Key words (general search box)
Author, Title, Thematic area, Organization, Publisher, Related research work, Source

d. Would you be interested in viewing a quality/trust rating for data/research? Why?

Yes	No

for faster choice of alternatives;
Yes, if Ministry approved, material for use

Gives confidence in the data but it should be vetted before uploading Yes. A quality rating for the data/research should be available Gives confidence when using the data/research

7. How often do you use computer systems / applications / internet?

Always Often Daily Monthly

a. How do you typically access the internet? (Desktop, mobile, tablet)?

Laptop Computer; Mobile phones; iPad; Desktop All three

b. On what type of platform would you access a database (desktop, mobile, tablet)?

As in (a) above;

c. How often do you use Facebook, Twitter, or other social media applications? And how do you access these?

Quite often! Yes

d. Would you be interested in a single sign on to the database?

Yes	No

Provided that it still retains some basic identity checks to verify that my identity has not been stolen and is being misused

Uganda National Roads Agency (UNRA)

1. Please name your organization. How would you describe your role and responsibilities in your organisation?

Name of organisation: Uganda National Roads Authority
Position: Head – Research and Development
I am responsible for development, management, and progressing the organisation's research agenda. This with the objective of supporting the organisation to implement its Strategic Plan. I am responsible for establishing research agenda and priorities, assuring the quality of outputs, and developing partnerships with external research institutions.

2. Does your organisation generate any road related research? Select your answer with a tick or 'X'

Yes	No

Yes

a. Who?

The Department of Research and Development

b. What type of research?

Road and transport research
Ongoing projects are in the fields of Asset Management, road safety, high-tech applications in roads and transport, and knowledge management. Several new projects are in the pipeline.
Research in the past has primarily focussed on testing of new stabilisers and sealing materials.

c. Is it published?

Yes	No

Yes, some research work is published in technical reports

d. How is research verified?

It is not clear that previous research was verified. However now there is a peer review process, both internal and external.

e. Where is it kept?

The Departments, which information is not yet centralised. The Research and Development Department is currently undertaking a study to establish an electronic system to store and manage research.

f. How is it accessed?

By request

g. How often is your research accessed?

Quite often.

h. What meta-road data/research is available with your research?

Most studies have the meta-data stored in soft copy format

i. Is your data / research geo-tagged? (locations)

Yes	No

Yes, by locality. However it is not common to find GPS readings of sites.

j. Is your data/research confidential?

Yes	No

A small part of the dataset is confidential, but the larger part is accessible to the public on request.

k. Would you be interested in uploading your data/research to a centralised databank? Why?

Yes	No

Yes we are interested. It will allow for scholars to continually analyse this data with alternative or new procedures. This is likely to result in new insights emerging, which can only be to our benefit

l. Do you access your research on-site? Please describe your answer.

Yes	No

3. How would you describe your interest in road related research?

Very high interested.

a. What specific type of research, or topics are you interested in?

Materials, pavements, asset management, dust suppression, road economics

b. How can you use it?

I assume this relates to a research database. I would use such a database to store and manage research information, developed by my group and by research groups across the country. This information will then be accessible to researchers around the world. We will also use the database to access research from the international community through linkage with research libraries.

c. What do you use at the moment (in the absence of a consolidated database)?

Information is stored on the organisation's system drives. External research is accessed directly from source by online subscription, internet searches, and requesting soft and hard copies of technical reports

d. To what extent does the research contribute to your work? (in terms of outcomes)

Research outcomes are central to the organisation as we have purposed to be a knowledge-driven organisation that makes evidence based decisions.

4. What is your view on road research in the country, currently?

Road research in Uganda is very fragmented, uncoordinated, poorly documented, and largely inaccessible.

a. Do you have access to any road research? If yes, where and how?

Yes	No

Online subscriptions, Internet searches, available databases like the AFCAP database, and internal technical reports

b. Do you know who generates research, and how to get it?

Yes	No

However there is room to improve, especially in the ability to access research from the global community of road and transport researchers

c. Who do you normally partner with, if you need research?

National and international academic institutions. In addition to internal resources we receive support from the Uganda Road Fund, AFCAP, and other emerging agencies

d. Do you have any existing platforms/ communication channels for interaction and coordination with other key role players, related to road research?

Yes	No

Through the National Research Steering Committee, hosted by UNRA. This is a formalised channel.

e. Are you aware of any attempts in the past to formalise this? Can you provide details?

Yes	No

No

f. What is your view on the level of dissemination of research recommendations currently, in Uganda?

Low

g. What is your view on the level of uptake of research recommendations currently, in Uganda?

Low

h. How would you describe the overall quality of road research in Uganda?

The quality of road and transport research in Uganda is poor.

5. Can you list any issues or challenges preventing coordination of research (e.g. institutional, organisational, technical, logistical or financial issues);

- Lack of the institutional arrangements to facilitate this coordination. As such research is undertaken in institutional silos. Even within institutions, e.g. universities it is common that colleges will not pursue synergy in road and transport research.
- Absence of a champion agency/individual in the past.
- Absence of collaboration platforms, including the lack of a centralized database for research
- Distributed sources of funding that do not emphasize collaborative research as a prerequisite before being accessed

a. What, if any, frustrations do you have with the available road data / research? (e.g. relevance, reliability, accuracy, completeness, complicated filters)

Reliability and accuracy of the data/research

b. Have you ever utilised a centralised knowledge database. If so, please describe your general experience with centralised knowledge databases. What works well and what does not?

Yes | No

It is important to have a simple, intuitive Graphical User Interface. This must be complemented by a very versatile search engine

6. How should a centralised knowledge database enable your work?

Provide access to the current status of knowledge, and point out areas to focus ongoing and planned research.

a. When retrieving data from the system what would you like to see?

Clear, categorized results

b. How do you envisage using a centralised knowledge database? (e.g. remembering previous searches)

Multiple search of different research data using keywords. It should be able to simultaneously access multiple external databases, not just the metadata contained within

c. What fields would you be interested in for searching data/research (e.g. author, organisation)

- Author
- Title
- Thematic area
- Organization
- Publisher
- Related research work
- Source

d. Would you be interested in viewing a quality/trust rating for data/research? Why?

Yes | No

Gives confidence when using the data/research

7. How often do you use computer systems / applications / internet?

daily

a. How do you typically access the internet? (Desktop, mobile, tablet)?

Desktop, tablet and mobile phone

b. On what type of platform would you access a database (desktop, mobile, tablet)?

Desktop, tablet and mobile phone

c. How often do you use Facebook, Twitter, or other social media applications? And how do you access these?

Daily, from Desktop, tablet and mobile phone

d. Would you be interested in a single sign on to the database?

Yes | No

Yes, provided that it still retains some basic identity checks to verify that my identity has not been

stolen and is being misused

Makerere University

1. Please name your organization. How would you describe your role and responsibilities in your organisation?

Dr Moses Matovu, Lecturer at Makerere University, and alternate contact person to Dr. Umaru Bagampadde.

2. Does your organisation generate any road related research? Select your answer with a tick or 'X'

Yes	No

Yes

a. Who?

Students and staff

b. What type of research?

The question about what type is bound to be interpreted differently by the respondents. Whereas one colleague of mine in the area pointed out "pavement materials & pavement preservation and management" as types; Umaru preferred to look at it as either applied or fundamental/basic research. At the graduate level, we have 2 types of plans for masters students, Plan A students together with doctoral students are involved in fundamental research; Plan B students are involved in applied research. I'm open to further consultation if need be.

c. Is it published?

Yes	No

90% of the time No, 10%yes as conference papers etc.

d. How is research verified?

External examiner

e. Where is it kept?

The Engineering department used to have their own library, but the libraries have been centralised. Students are supposed to give three copies, one for the lecturer and one for the library. Recently a CD copy has been added.

f. How is it accessed?

Through the central library. ? Each student is meant to produce a report , apparently with a CD; So one can either access this from the Library, from the directorate of research and graduate training and at college level

g. How often is your research accessed?

Not sure

h. What meta-road data/research is available with your research?

Scanned reports, some electronically

i. Is your data / research geo-tagged? (locations)

Yes	No

No

j. Is your data/research confidential?

Yes	No

No

k. Would you be interested in uploading your data/research to a centralised databank? Why?

Yes	No

Yes

l. Do you access your research on-site? Please describe your answer.

Yes	No

Not at the desktop, since only abstracts have been captured. One could however walk to the library for access (if one is a student or member of staff); As to the public, I suspect one has to go through

formal channels for this type of access.

3. How would you describe your interest in road related research?

Immensely high; the majority of students currently undertaking Master's program (almost 70%) are all pursuing research in this field.

a. What specific type of research, or topics are you interested in?

b. How can you use it?

Students for research

c. What do you use at the moment (in the absence of a consolidated database)?

Library

d. To what extent does the research contribute to your work? (in terms of outcomes)

Students use for topics for research. Some are given topics from lecturers and others choose their own.

4. What is your view on road research in the country, currently?

Umaru's view is that it's fair.

a. Do you have access to any road research? If yes, where and how?

Yes	No

Yes. Library e-resources and previous reports can be accessed by the students

b. Do you know who generates research, and how to get it?

Yes	No

Yes. Ministry of works and Transport; Local governments and Municipalities and some NGOs (like Crossroads...not sure I got it well...please follow this up)

c. Who do you normally partner with, if you need research?

Private sectors
Government ministries
& don't forget the collaborating academic institutions, through which many our staff have been supported to obtain doctoral degrees.

d. Do you have any existing platforms/ communication channels for interaction and coordination with other key role players, related to road research?

Yes	No

Existing platforms for this interaction
Normally through an MOU apparently that has to be signed by the vice chancellor, legal director and the college principal.

e. Are you aware of any attempts in the past to formalise this? Can you provide details?

Yes	No

No

f. What is your view on the level of dissemination of research recommendations currently, in Uganda?

Low

g. What is your view on the level of uptake of research recommendations currently, in Uganda?

Low. Disconnected activities

h. How would you describe the overall quality of road research in Uganda?

I'm getting many comments from fair to very bad. Umaru's view is that it's fair.

5. Can you list any issues or challenges preventing coordination of research (e.g. institutional, organisational, technical, logistical or financial issues);

Too disconnected. Multiple sponsors. Need a centralized player to coordinate at a higher level

a. What, if any, frustrations do you have with the available road data / research? (e.g. relevance, reliability, accuracy, completeness, complicated filters)

Whereas we can easily access our research outputs, it's very hard to know what other agencies are doing in road research unless we are in a direct partnership. (One for the access);

b. Have you ever utilised a centralised knowledge database. If so, please describe your general experience with centralised knowledge databases. What works well and what does not?

Yes	No	

	No

6. How should a centralised knowledge database enable your work?

Fast access of relevant information of interest

a. When retrieving data from the system what would you like to see?

Field, year, key words, author, geographical area, related projects, abstract, objective, methodology,

b. How do you envisage using a centralised knowledge database? (e.g. remembering previous searches)

Remember previous searches

c. What fields would you be interested in for searching data/research (e.g. author, organisation)

See (a)

d. Would you be interested in viewing a quality/trust rating for data/research? Why?

Yes	No

Yes

7. How often do you use computer systems / applications / internet?

Daily

a. How do you typically access the internet? (Desktop, mobile, tablet)?

Daily

b. On what type of platform would you access a database (desktop, mobile, tablet)?

All three

c. How often do you use Facebook, Twitter, or other social media applications? And how do you access these?

Yes

d. Would you be interested in a single sign on to the database?

Yes	No

Yes

Ndejje University

1. Please name your organization. How would you describe your role and responsibilities in your organisation?

Dr Albert Rugumayo. Lecturer and Dean of Ndejje University.

2. Does your organisation generate any road related research? Select your answer with a tick or 'X'

Yes	No

Yes

a. Who?

Students and staff

b. What type of research?

Materials, design, traffic management

c. Is it published?

Yes	No

Seldom

d. How is research verified?

Reviews of lecturers

e. Where is it kept?

In an office, hard copy

f. How is it accessed?

Ii is a hassle. Somebody will have to go a physically search for it.

g. How often is your research accessed?

Seldom. UNRA sometimes asks

h. What meta-road data/research is available with your research?

Pdf only – some tables at the back of the report. Storing electronically will be a good idea.

i. Is your data / research geo-tagged? (locations)

Yes	No

Only chainages that can be linked to GPS coordinates

j. Is your data/research confidential?

Yes	No

No

k. Would you be interested in uploading your data/research to a centralised databank? Why?

Yes	No

Yes

l. Do you access your research on-site? Please describe your answer.

Yes	No

Yes and no. No electronically. Have to search in an office. Library? Ndejje no not kept there. Some research is available online, but not on roads research, unless it was presented at a conference.

3. How would you describe your interest in road related research?

Very high.

a. What specific type of research, or topics are you interested in?

Materials, design aspects (geometric design), transportation, transport management, sustainability

b. How can you use it?

Advise government, both central and local, designs, students for continuity of research
Useful to avoid duplication
Use resources better

c. What do you use at the moment (in the absence of a consolidated database)?

Memory, guessing

d. To what extent does the research contribute to your work? (in terms of outcomes)

Research outputs (to be published) and quality of work – which is an integral part of the work of a university and lecturer.

4. What is your view on road research in the country, currently?

Need more research, more organised, more findings and get it moving

a. Do you have access to any road research? If yes, where and how?

Yes	No

Yes. Online and is restricted

b. Do you know who generates research, and how to get it?

Yes	No

Yes. Makerere University

c. Who do you normally partner with, if you need research?

Makerere University Students works in groups of 2

d. Do you have any existing platforms/ communication channels for interaction and coordination with other key role players, related to road research?

Yes	No

No

e. Are you aware of any attempts in the past to formalise this? Can you provide details?

Yes	No

No,

f. What is your view on the level of dissemination of research recommendations currently, in Uganda?

Limited, through journals and conferences

g. What is your view on the level of uptake of research recommendations currently, in Uganda?

Slow

h. How would you describe the overall quality of road research in Uganda?

Varies on the level from undergraduate to Masters to Ph.D. All for qualification purposes...

5. Can you list any issues or challenges preventing coordination of research (e.g. institutional, organisational, technical, logistical or financial issues);

Lecturers are busy with academic workload Funding Do research to earn a degree

a. What, if any, frustrations do you have with the available road data / research? (e.g. relevance, reliability, accuracy, completeness, complicated filters)

Relevance, reliability, completeness

b. Have you ever utilised a centralised knowledge database. If so, please describe your general experience with centralised knowledge databases. What works well and what does not?

Yes	No	

Yes	Directly to bring the cost down of rural roads Research done on the saliva of termites (reconstructed by biochemists and proven to be cost effective.

6. How should a centralised knowledge database enable your work?

Easier to obtain information – save time. Quality of research output

a. When retrieving data from the system what would you like to see?

Title, author(s), where (region), published in a journal or conference

b. How do you envisage using a centralised knowledge database? (e.g. remembering previous searches)

Remember previous searches

c. What fields would you be interested in for searching data/research (e.g. author, organisation)

See (a)

d. Would you be interested in viewing a quality/trust rating for data/research? Why?

Yes	No
Yes	

7. How often do you use computer systems / applications / internet?

Daily

a. How do you typically access the internet? (Desktop, mobile, tablet)?

Daily

b. On what type of platform would you access a database (desktop, mobile, tablet)?

All three

c. How often do you use Facebook, Twitter, or other social media applications? And how do you access these?

Yes

d. Would you be interested in a single sign on to the database?

Yes	No
Yes	

Kyambogo University

1. Please name your organization. How would you describe your role and responsibilities in your organisation?

Kyambogo University.
I am a lecturer and my responsibility is to guide undergraduate students in their final year research projects.

2. Does your organisation generate any road related research? Select your answer with a tick or 'X'

Yes	No

No?

a. Who?

Not Applicable

b. What type of research?

Student final year project research.

c. Is it published?

Yes	No

Yes

d. How is research verified?

Through supervisors (lecturers) of the different students.

e. Where is it kept?

At the department of council & Building Engineering library.

f. How is it accessed?

At the departmental library.

g. How often is your research accessed?

During working hours, through the head of department.

h. What meta-road data/research is available with your research?

No answer

i. Is your data / research geo-tagged? (locations)

Yes	No

No answer

j. Is your data/research confidential?

Yes	No✓

But learning process.

k. Would you be interested in uploading your data/research to a centralised databank? Why?

Yes✓	No

For study learning purposes.

l. Do you access your research on-site? Please describe your answer.

Yes✓	No

At the departmental library.

3. How would you describe your interest in road related research?

No answer

a. What specific type of research, or topics are you interested in?

Materials transportation, highways, traffic engineering & management, safety engineering.

b. How can you use it?

For study purposes.

c. What do you use at the moment (in the absence of a consolidated database)?

Use hand copies.

d. To what extent does the research contribute to your work? (in terms of outcomes)

No answer

4. What is your view on road research in the country, currently?

It is still at a tender stage.

a. Do you have access to any road research? If yes, where and how?

Yes✓	No
Stakeholders like this information departments of interest.	

b. Do you know who generates research, and how to get it?

Yes	No
Students, lectures and other stakeholders like MoWT & UNRA.	

c. Who do you normally partner with, if you need research?

We majorly rely on MoWT & UNRA and UIPE.

d. Do you have any existing platforms/ communication channels for interaction and coordination with other key role players, related to road research?

Yes✓	No
UIPE through technological conferences.	

e. Are you aware of any attempts in the past to formalise this? Can you provide details?

Yes✓	No
No details.	

f. What is your view on the level of dissemination of research recommendations currently, in Uganda?

Poor.

g. What is your view on the level of uptake of research recommendations currently, in Uganda?

Poor.

h. How would you describe the overall quality of road research in Uganda?

Average.

5. Can you list any issues or challenges preventing coordination of research (e.g. institutional, organisational, technical, logistical or financial issues);

It is majorly logistical & limited finance.

a. What, if any, frustrations do you have with the available road data / research? (e.g. relevance, reliability, accuracy, completeness, complicated filters)

Most research incomplete.

b. Have you ever utilised a centralised knowledge database. If so, please describe your general experience with centralised knowledge databases. What works well and what does not?

Yes	No
No answer	

6. How should a centralised knowledge database enable your work?

It should help in curbing plagiarism.

a. When retrieving data from the system what would you like to see?

Dashboard.

b. How do you envisage using a centralised knowledge database? (e.g. remembering previous searches)

We want to see a breakdown of the different research areas topics.

c. What fields would you be interested in for searching data/research (e.g. author, organisation)

No answer

d. Would you be interested in viewing a quality/trust rating for data/research? Why?

Yes✓	No

Yes

7. How often do you use computer systems / applications / internet?

Every day

a. How do you typically access the internet? (Desktop, mobile, tablet)?

We have Wi-Fi & use laptops.

b. On what type of platform would you access a database (desktop, mobile, tablet)?

Laptop.

c. How often do you use Facebook, Twitter, or other social media applications? And how do you access these?

Very often.

d. Would you be interested in a single sign on to the database?

Yes✓	No

Yes

Mt. Elgon Labour-based Training Centre

1. Please name your organization. How would you describe your role and responsibilities in your organisation?

Mt. Elgon Labour-based Training Centre
Management of the organizations activities:
- Training
- Outreach support
- Trial section

2. Does your organisation generate any road related research? Select your answer with a tick or 'X'

Yes	No
√	

a. Who?

Training Centre, Consultant (TRL), District Local Governments

b. What type of research?

Low cost sealing options for low volume roads
Community access research (Stone arch bridges, ladders and steps)

c. Is it published?

Yes	No
√	

d. How is research verified?

Testing and observation

e. Where is it kept?

In MELTC offices and Library

f. How is it accessed?

On request and retrieved by officers or the librarian at MELTC

g. How often is your research accessed?

h. What meta-road data/research is available with your research?

i. Is your data / research geo-tagged? (locations)

Yes	No
X	

j. Is your data/research confidential?

Yes	No
X	

k. Would you be interested in uploading your data/research to a centralised databank? Why?

Yes	No
Yes. For Easy access	

l. Do you access your research on-site? Please describe your answer.

Yes	No
No. It is not yet uploaded on the website	

3. How would you describe your interest in road related research?

Very high interest

a. What specific type of research, or topics are you interested in?
- Low cost sealing of roads
- Performance of sealed roads

- Community access (stone arch bridges, ladders and steps)
- Unit costs of road maintenance

b. How can you use it?

- For planning maintenance strategies
- Exploitation of the use of local materials

c. What do you use at the moment (in the absence of a consolidated database)?

- Existing manuals
- Literature on the internet

d. To what extent does the research contribute to your work? (in terms of outcomes)

Less than 25%

4. What is your view on road research in the country, currently?

- Not well coordinated
- Not rolled out
- Little funds are allocated
- Some findings are not published

a. Do you have access to any road research? If yes, where and how?

Yes	No

Yes.

- Through: The internet
- Journals
- Papers presented at conferences like the national technology conference

b. Do you know who generates research, and how to get it?

Yes	No

- Institutions
- Academicians
- Companies
- Organizations

c. Who do you normally partner with, if you need research?

- Consultants
- Sister Labour based institutions
- Organizations
- District Local Governments

d. Do you have any existing platforms/ communication channels for interaction and coordination with other key role players, related to road research?

Yes	No

Yes.

- UIPE gatherings
- Technology conferences
- Exhibitions

e. Are you aware of any attempts in the past to formalise this? Can you provide details?

Yes	No

NO

f. What is your view on the level of dissemination of research recommendations currently, in Uganda?

Low

g. What is your view on the level of uptake of research recommendations currently, in Uganda?

Low

h. How would you describe the overall quality of road research in Uganda?

Requires improvement

5. Can you list any issues or challenges preventing coordination of research (e.g. institutional, organisational, technical, logistical or financial issues);

- Luck of a coordinating body
- Limited funding
- Limited logistics

a. What, if any, frustrations do you have with the available road data / research? (e.g. relevance, reliability, accuracy, completeness, complicated filters)

Frustration exists when there it is difficult to find a single research which satisfies the above

b. Have you ever utilised a centralised knowledge database. If so, please describe your general experience with centralised knowledge databases. What works well and what does not?

Yes	No

No

6. How should a centralised knowledge database enable your work?

Information being readily available on the website and updated regularly

a. When retrieving data from the system what would you like to see?

Topic of research and when it was published

b. How do you envisage using a centralised knowledge database? (e.g. remembering previous searches)

Typing in key words and related research appears

c. What fields would you be interested in for searching data/research (e.g. author, organisation)

Topic

d. Would you be interested in viewing a quality/trust rating for data/research? Why?

Yes	No

Yes
Gives confidence in the data but it should be vetted before uploading

7. How often do you use computer systems / applications / internet?

Daily

a. How do you typically access the internet? (Desktop, mobile, tablet)?

- Desktop
- Laptop
- Mobile
- Tablets

b. On what type of platform would you access a database (desktop, mobile, tablet)?

- Desktop
- Laptop

c. How often do you use Facebook, Twitter, or other social media applications? And how do you access these?

- Daily.
- Desktop
- Laptop
- Mobile phone

d. Would you be interested in a single sign on to the database?

Yes	No

No.

Central Materials Laboratory

1. Please name your organization. How would you describe your role and responsibilities in your organisation?

The Central Materials Laboratory, Kireka, in the Department of Construction Standards and Quality Management, Ministry of Works and Transport, Kampala. I am the Head of the Department

2. Does your organisation generate any road related research? Select your answer with a tick or 'X'

Yes	No

Who?

Government Department

a. What type of research?

- Papers presented at conferences;
- Research conducted as part of post-graduate studies;
- Applied research (trial sections) carried out by research organisations and other international consulting firms in the past years;

b. Is it published?

Yes	No
x	

c. How is research verified?

Post graduate study reports are verified by respective Technical Institutions; while Papers and Applied Research reports are usually presented to relevant stakeholder for a;

d. Where is it kept?

Reports are kept by respective Institutions; Individuals, and sometimes at the Laboratory;

e. How is it accessed?

On request

f. How often is your research accessed?

g. What meta-road data/research is available with your research?

h. Is your data / research geo-tagged? (locations)

Yes	No
X	

i. Is your data/research confidential?

Yes	No
x	

j. Would you be interested in uploading your data/research to a centralised databank? Why?

Yes	No
✓ ; For wider access and better coordination	

k. Do you access your research on-site? Please describe your answer.

Yes	No
X; there is lack of a data base facility	

3. How would you describe your interest in road related research?

Very high!

a. What specific type of research, or topics are you interested in?

Innovations in road construction materials to improve on quality, performance, and reduce construction/maintenance costs;

b. How can you use it?

By disseminating the information to the Construction Industry;

c. What do you use at the moment (in the absence of a consolidated database)?

Piece meal dissemination of information to respective Agencies in the Road Sector;

d. To what extent does the research contribute to your work? (in terms of outcomes)

Very substantial; more than 60%;

4. What is your view on road research in the country, currently?

A high priority but very poorly resourced;

a. Do you have access to any road research? If yes, where and how?

Yes	No
✓ ; By collaborating with similar Research Institutions;	

b. Do you know who generates research, and how to get it?

Yes	No
✓ ; As in (a) above	

c. Who do you normally partner with, if you need research?

Academic Institutions; Stakeholders in the Sector;

d. Do you have any existing platforms/ communication channels for interaction and coordination with other key role players, related to road research?

Yes	No
	X

e. Are you aware of any attempts in the past to formalise this? Can you provide details?

Yes	No
✓ ; Exchange of letters; meetings; etc.;	

f. What is your view on the level of dissemination of research recommendations currently, in Uganda?

The level is very low mostly due to poor resource allocations to facilitate the process;

g. What is your view on the level of uptake of research recommendations currently, in Uganda?

The level of uptake is comparatively high;

h. How would you describe the overall quality of road research in Uganda?

The quality is fair in view of the challenges prevailing;

5. Can you list any issues or challenges preventing coordination of research (e.g. institutional, organisational, technical, logistical or financial issues);

Mainly logistical/financial issues;

a. What, if any, frustrations do you have with the available road data / research? (e.g. relevance, reliability, accuracy, completeness, complicated filters)

Most times they are incomplete!

b. Have you ever utilised a centralised knowledge database. If so, please describe your general experience with centralised knowledge databases. What works well and what does not?

Yes	No
	X

6. How should a centralised knowledge database enable your work?

By serving as a one-stop-centre!

a. When retrieving data from the system what would you like to see?

All the relevant data: the objective; what has been done; any gaps; etc.;

b. How do you envisage using a centralised knowledge database? (e.g. remembering previous searches)

As being capable of providing easy and fast access to information any minimize duplication of efforts!

c. What fields would you be interested in for searching data/research (e.g. author, organisation)

Author, Organization, Subject, Materials, Technology, etc.;

d. Would you be interested in viewing a quality/trust rating for data/research? Why?

Yes	No
✓	; for faster choice of alternatives;

7. How often do you use computer systems / applications / internet?

Always!

a. How do you typically access the internet? (Desktop, mobile, tablet)?

Laptop Computer; Mobile phones; iPad;

b. On what type of platform would you access a database (desktop, mobile, tablet)?

As in (a) above;

c. How often do you use Facebook, Twitter, or other social media applications? And how do you access these?

Quite often!

d. Would you be interested in a single sign on to the database?

Yes	No
✓	

Kampala Capital City Authority

1. Please name your organization. How would you describe your role and responsibilities in your organisation?

Kampala Capital City Authority
The Core Functions include the following:

1. Plan, design and manage the construction, rehabilitation, upgrading and periodic maintenance of the City Roads including the Road marking and signage.
2. Plan, design and manage the construction, rehabilitation and maintenance of the City drainage systems.
3. Plan, design and manage the provision of traffic and street lighting for the City.
4. Plan, design and manage the construction and maintenance of the City Authority Building Infrastructure,
5. Monitor and propose areas for improvement of city traffic
6. Plan, design and manage street parking space and other facilities in the City
7. Plan, design and manage public transportation in the City

2. Does your organisation generate any road related research? Select your answer with a tick or 'X'

Yes	No X

a. Who?

N/A

b. What type of research?

N/A

c. Is it published?

Yes	No

N/A

d. How is research verified?

N/A

e. Where is it kept?

N/A

f. How is it accessed?

N/A

g. How often is your research accessed?

N/A

h. What meta-road data/research is available with your research?

N/A

i. Is your data / research geo-tagged? (locations)

Yes	No

N/A

j. Is your data/research confidential?

Yes	No

N/A

k. Would you be interested in uploading your data/research to a centralised databank? Why?

Yes	No

N/A

l. Do you access your research on-site? Please describe your answer.

Yes	No

N/A

3. How would you describe your interest in road related research?

As the organisation which is responsible for maintenance of roads, KCCA has a huge road network which is overloaded and is dilapidated. KCCA in its bid to rid the city of dust, potholes and finally pave all the roads in the city has been met with many challenges which include: lack of funds, huge costs of maintenance and lack of technical expertise.
Although, the greatest challenge KCCA is facing right now is its inadequate funds, research into low cost sealing solutions, dust prevention strategies and cheaper maintenance strategies and materials would benefit KCCA as it tries to fulfil its mandate.

What specific type of research, or topics are you interested in?

low cost sealing solutions,
dust prevention strategies
cheaper maintenance strategies
Use of locally sourced materials for surfacing

a. How can you use it?

Not mentioned

b. What do you use at the moment (in the absence of a consolidated database)?

N/A

c. To what extent does the research contribute to your work? (in terms of outcomes)

Not mentioned

4. What is your view on road research in the country, currently?

Road research in this country is still lacking behind the developed countries. We have taken to adopt solutions that have been used elsewhere and never really taken the time to figure out what really works best for our country in terms of durability (taking into account the climate), cost and quality.

a. Do you have access to any road research? If yes, where and how?

Yes	No

Yes.
We mainly refer the Institute of Civil Engineers website since some of your KCCA engineers are members.

b. Do you know who generates research, and how to get it?

Yes	No

In Uganda, research is mainly done at the universities and access to it is through the University.

c. Who do you normally partner with, if you need research?

N/A

d. Do you have any existing platforms/ communication channels for interaction and coordination with other key role players, related to road research?

Yes	No

No

e. Are you aware of any attempts in the past to formalise this? Can you provide details?

Yes	No

No

f. What is your view on the level of dissemination of research recommendations currently, in Uganda?

Not mentioned

g. What is your view on the level of uptake of research recommendations currently, in Uganda?

Whereas research might be available in certain circles, there is still a missing link between the researchers and the implementers. Research needs to be tested and then brought to the market for piloting.

h. How would you describe the overall quality of road research in Uganda?

Due to the absence of a relationship between researchers and the implementers, it is difficult to

judge the quality of our research as regards to if it achieves its intended purpose

5. Can you list any issues or challenges preventing coordination of research (e.g. institutional, organisational, technical, logistical or financial issues);

Institution and organizational challenges.

a. What, if any, frustrations do you have with the available road data / research? (e.g. relevance, reliability, accuracy, completeness, complicated filters)

There is limited access to the research being carried out by the universities in Uganda. Most of the research carried out in the country is purely academic as opposed to problem solving research.

b. Have you ever utilised a centralised knowledge database. If so, please describe your general experience with centralised knowledge databases. What works well and what does not?

Yes	No

Yes

6. How should a centralised knowledge database enable your work?

Not mentioned

a. When retrieving data from the system what would you like to see?

Referencing of any copied/borrowed information should be referenced with permission from the author using the Harvard system. Any other papers citing that particular research should be indicated on the site and should show how many people have accessed or viewed the same topic.

b. How do you envisage using a centralised knowledge database? (e.g. remembering previous searches)

Everyone should be able to create an account which they can log in and would have all their previous searches and favourites. The system should be able to update its users on related topics/searches of favourites.

c. What fields would you be interested in for searching data/research (e.g. author, organisation)

In order of priority: • Author • Title • Subject • Periodic title • Key words (general search box)

d. Would you be interested in viewing a quality/trust rating for data/research? Why?

Yes	No

Yes. A quality rating for the data/research should be available.

7. How often do you use computer systems / applications / internet?

Often

a. How do you typically access the internet? (Desktop, mobile, tablet)?

In order of frequency: • Desktop • Tablet • Mobile

b. On what type of platform would you access a database (desktop, mobile, tablet)?

Desktop

c. How often do you use Facebook, Twitter, or other social media applications? And how do you access these?

Social media applications cannot be accessed through KCCA computers/network during working hours.

d. Would you be interested in a single sign on to the database?

Yes	No
Yes	

Uganda Road Fund

1. Please name your organization. How would you describe your role and responsibilities in your organisation?

Eng. Andrew Kagoda, Uganda Road Fund, Manager for Monitoring and Evaluation

2. Does your organisation generate any road related research? Select your answer with a tick or 'X'

Yes	No

Yes, they fund road research.

a. Who?

They provide the funds to their agencies (UNRA, Districts and Municipalities). The agents procure the research through research institutions, e.g. Universities). The agents enter into a MOU with the research institutions. They have placed research funding on hold while they are developing a research manual to set out the standards required of the research. Once in place URF provide funding for research again and also approve their own research projects as Board special projects.

b. What type of research?

Low cost seals

c. Is it published?

Yes	No

No. Reports are available, but the follow up actions to conclude the studies are not always done.

d. How is research verified?

Research are validated through the Sector Working Group that sits twice a year. If they approve the study it will be recommended for duplication and validation.

e. Where is it kept?

On his laptop. Example he sits with all the reports from Crossroads (pdf reports) on his laptop. Crossroads concluded their research. Ideally MORT should house the research. The ministry created an internet based Transport Sector Data Management System two years ago but is not active yet. This is available to members of the Sector Working Group. An EDMS could use this platform.

f. How is it accessed?

Though him. By word of mouth others hear of it.

g. How often is your research accessed?

Seldom. High level requests, for example was the research done and completed. Seldom that someone asked for details.

h. What meta-road data/research is available with your research?

None. Only pdf's of reports

i. Is your data / research geo-tagged? (locations)

Yes	No

No. but chainages of trial sections are available and can be traced.

j. Is your data/research confidential?

Yes	No

No

k. Would you be interested in uploading your data/research to a centralised databank? Why?

Yes	No

Yes, in order to synchronise research and avoid duplication.

l. Do you access your research on-site? Please describe your answer.

Yes	No

Yes on his computer, theoretically TSDMS too (anyone in the Sector) Can find info from Vincent Ssozi – statistician from MORW – 02356 772320034, 0256700390415 ssoziv@gmail.com

3. How would you describe your interest in road related research?

Very high

a. What specific type of research, or topics are you interested in?

Materials research

b. How can you use it?

Different alternatives to use, challenge to fund materials in Uganda.

c. What do you use at the moment (in the absence of a consolidated database)?

National policy – that they cannot introduce a technology by yourself, there needs to be a standard before you can use a new technology.

d. To what extent does the research contribute to your work? (in terms of outcomes)

Significant – core to road construction and maintenance, effectiveness of programmes. Whether URF money is well spent.

4. What is your view on road research in the country, currently?

Not organised in the way we do it. Fail to replicate, can save money and cover more areas of research For example ConAid comes to Uganda and approached different agencies and they all do research on Conaid but do not talk to each other.

a. Do you have access to any road research? If yes, where and how?

Yes	No

Yes, Crossroads.

b. Do you know who generates research, and how to get it?

Yes	No

Yes and no. sector working group have to approved research. Reviews are done 2x a year. Each agency have a window to present their findings of research. They give the Universities the opportunities to present.

c. Who do you normally partner with, if you need research?

With their agencies who puts out the research, e.g. Univ.

d. Do you have any existing platforms/ communication channels for interaction and coordination with other key role players, related to road research?

Yes	No

Yes, sector working group. TSDMS is a possible platform

e. Are you aware of any attempts in the past to formalise this? Can you provide details?

Yes	No

NO

f. What is your view on the level of dissemination of research recommendations currently, in Uganda?

Very low

g. What is your view on the level of uptake of research recommendations currently, in Uganda?

Where they get stuck – in the process to approve by Ministry to roll out

h. How would you describe the overall quality of road research in Uganda?

Average. As research are done under constrained conditions.

5. Can you list any issues or challenges preventing coordination of research (e.g. institutional, organisational, technical, logistical or financial issues);

Approach not organized. Approval of technologies – process is slow

Funding is a challenge Products marketed in Uganda are from other countries. They do not trust the integrity of the products and companies (suppliers). Products are registered trademarks e.g. ConAid. Cannot test products and believe that they will receive the same contents in each drum supplied. Do not have the capacity to do quality testing

a. What, if any, frustrations do you have with the available road data / research? (e.g. relevance, reliability, accuracy, completeness, complicated filters)

Stagnation of research, stagnant after trials are completed.

b. Have you ever utilised a centralised knowledge database. If so, please describe your general experience with centralised knowledge databases. What works well and what does not?

Yes	No
No	

6. How should a centralised knowledge database enable your work?

Should be easy to access information Try to scan for possible users and their needs

a. When retrieving data from the system what would you like to see?

Multi-layered – key words. Location, abstract, full report. Types of materials. Kinds of tests carried out and tools used. Costs. Conditions (environment),

b. How do you envisage using a centralised knowledge database? (e.g. remembering previous searches)

Information easy to access. Easy dissemination, easy to publish or forward to others.

c. What fields would you be interested in for searching data/research (e.g. author, organisation)

Multi-layered – key words. Location, abstract, full report. Types of materials. Kinds of tests carried out and tools used. Costs. Conditions (environment)

d. Would you be interested in viewing a quality/trust rating for data/research? Why?

Yes	No
Yes, if Ministry approved, material for use	

7. How often do you use computer systems / applications / internet?

Monthly

a. How do you typically access the internet? (Desktop, mobile, tablet)?

Daily

b. On what type of platform would you access a database (desktop, mobile, tablet)?

All three

c. How often do you use Facebook, Twitter, or other social media applications? And how do you access these?

Yes

d. Would you be interested in a single sign on to the database?

Yes	No
Yes	

Uganda Institution of Professional Engineers (UIPE)

1. Please name your organization. How would you describe your role and responsibilities in your organisation?

Uganda Institution of Professional Engineers where I am a Council Member holding a non-executive portfolio of Vice President Civil Division.

2. Does your organisation generate any road related research? Select your answer with a tick or 'X'

Yes	No
	X

Not directly as an Organisation, but some individual members of the UIPE do engage in road related research.

a. Who?

Occasionally, some individual members of the UIPE do engage in road related research.

b. What type of research?

Applied research by the UIPE members in the Consultancy industry

c. Is it published?

Yes	No
	X

d. How is research verified?

There is no independent body/ authority to verify the said research

e. Where is it kept?

By the individual members of the UIPE and or their employing organisations

f. How is it accessed?

There is no known (well established) mechanism of accessing such researches; except when the members involved volunteer to present such researches at the UIPE Annual Technology Conferences and only when the Conference theme relates to such researches

g. How often is your research accessed?

As stated earlier, UIPE in itself has not undertaken researches so far due to financial constraints, but is putting a mechanism in place to start undertaking certain researches which it will be publishing for use by the wider society.

h. What meta-road data/research is available with your research?

Not applicable

i. Is your data / research geo-tagged? (locations)

Yes	No
	X

Not applicable

j. Is your data/research confidential?

Yes	No

Not applicable currently but not all researches will be confidential when UIPE starts undertaking researches as it plans to.

k. Would you be interested in uploading your data/research to a centralised databank? Why?

Yes	No
X	

This notwithstanding, there may be instances when uploading certain researches is restricted

l. Do you access your research on-site? Please describe your answer.

Yes	No

Not applicable

3. How would you describe your interest in road related research?

Although presently UIPE is not undertaking any research due to financial constraints; its interest in road related research cab be described as high – given the many queries, that are frequently raised by the wider society in relation to road design, construction, operation and maintenance, that go unanswered when they would be answered ably by a centralised authority such as UIPE.

a. What specific type of research, or topics are you interested in?

Not applicable presently – However, topics on: Materials as Uganda's road materials such as gravel and aggregates are being depleted so rapidly; Hydrological researches given the impact of developments within wetlands along major highways; Unit cost development;

b. How can you use it?

UIPE being the only recognised profession body for engineers; its perspective (based on its own research and any other verified/ validated research) would be "final/ definitive" to the wider society concerns on road infrastructure.

c. What do you use at the moment (in the absence of a consolidated database)?

UIPE currently depends on the technical capabilities of its identified individual members and or organisations that can volunteer their researches to the Institution

d. To what extent does the research contribute to your work? (in terms of outcomes)

It significantly constrains UIPE's authority as an Institution in commenting on certain topical matters since it is rarely with accurate/ dependable research findings – until through inquiries its members that may be better equipped volunteer the info.

4. What is your view on road research in the country, currently?

It is quite low and is given minimal consideration – possibly due to financial constraints in reality and due to consideration of the "more important priorities" as determined by the policy makers

a. Do you have access to any road research? If yes, where and how?

Yes	No
	X

No

b. Do you know who generates research, and how to get it?

Yes	No
	X

Not at present but UIPE intends to start

c. Who do you normally partner with, if you need research?

Not applicable

d. Do you have any existing platforms/ communication channels for interaction and coordination with other key role players, related to road research?

Yes	No
	X

No

e. Are you aware of any attempts in the past to formalise this? Can you provide details?

Yes	No
	X

No

f. What is your view on the level of dissemination of research recommendations currently, in Uganda?

It is very low – actually almost non-existent

g. What is your view on the level of uptake of research recommendations currently, in Uganda?

Quite low – the attitude is that of risk averse to new knowledge especially locally generated

h. How would you describe the overall quality of road research in Uganda?

It is not taken seriously so far – and there have been few researches in that area to objectively rate

its quality

5. Can you list any issues or challenges preventing coordination of research (e.g. institutional, organisational, technical, logistical or financial issues);

Largely financial and institutional. UIPE believes there is sufficient technical capability.

a. What, if any, frustrations do you have with the available road data / research? (e.g. relevance, reliability, accuracy, completeness, complicated filters)

Not applicable

b. Have you ever utilised a centralised knowledge database. If so, please describe your general experience with centralised knowledge databases. What works well and what does not?

Yes	No
	X

No

6. How should a centralised knowledge database enable your work?

No answer

a. When retrieving data from the system what would you like to see?

No answer

b. How do you envisage using a centralised knowledge database? (e.g. remembering previous searches)

No answer

c. What fields would you be interested in for searching data/research (e.g. author, organisation)

Author, organization, subject/topic

d. Would you be interested in viewing a quality/trust rating for data/research? Why?

Yes	No
X	

It is one way of having referees

7. How often do you use computer systems / applications / internet?

Daily

a. How do you typically access the internet? (Desktop, mobile, tablet)?

Desktop, Mobile

b. On what type of platform would you access a database (desktop, mobile, tablet)?

Desktop, and Mobile

c. How often do you use Facebook, Twitter, or other social media applications? And how do you access these?

Frequently via mobile and tablets

d. Would you be interested in a single sign on to the database?

Yes	No
X	

Yes

Appendix B - Database of research report information

All research items collated by 23 May 2017:

#	ORIGINATING INSTITUTION	AUTHORS	YEAR	TITLE	LOCATION OF DOCUMENT	ABSTRACT	KEYWORDS	GEOGRAPHICAL AREA	FOCUS AREAS	PAVEMENT LAYER FOCUS	TT LEVEL	Google Earth number
1	Ndejje University	Kawiso Bernard, Yaba Mark Yossa	2016	An Investigation of the Effect of Saw Dust on the Strength Properties of Lateritic Soils for Use as a Sub base	Ndejje University, Mr. Kato Simon Peter	Lateritic soils are used in the engineering industry in the construction of roads. The study was carried out to investigate the effect of saw dust on the strength properties of lateritic soils for use as sub base. The soil sample was obtained from Lady Irene Campus in Ndejje University and the laboratory tests were carried out at Ndejje University laboratory. The tests carried out included; sieve analysis, liquid limit, plastic limit, shrinkage, moisture density relation test and California Bearing Ratio (CBR) test. The saw dust was added to the sample at 0%, 2%, 4%, 6%, 8% and 10%. The Atterberg tests classified the soil sample as A-7-6 (4) according to AASHTO. The results showed the plasticity index decreased from 22.78% to 5.10% and the shrinkage limit increased from 12.1cm to 13.4cm with increasing percentage of saw dust. The results also showed the MDD of modified lateritic soil increased with addition of saw dust at 2% from 1.84mg/m3 to 1.86mg/m3 and then decreased with the increase in the saw dust content to 1.403mg/m3. The decrease could be attributed to the effect of pores created by saw dust. The CBR value of the soil decreased with increase in saw dust content from 34.5% to 4.5% and 44.9% to 6.2% from the top and bottom respectively.	lateritic soils, sub base, laboratory tests, saw dust content, pores	Luwero district	Material	Subbase	Solution / Application	N1
2	Ndejje University	Kisosonkole Fahad, Kugonza Robert	2016	Assessing the Most Realistic Productivity Task Rates for Routine Manual Maintenance Activities on Rural District Roads in Kayunga District.	Ndejje University, Mr. Kato Simon Peter	Roads are the backbone of the economy since all produce and merchandise in and out of a country like Uganda is mostly transported by road. The main use of any road is to facilitate access to people's areas of residence and to the numerous social services in the area. Good road network is key ingredient for national development; it supports effective industrial and agricultural activities as well as national and international trade. In Kyunga district Kitimbwa Sub County, there is a problem of road workers failing to complete the tasks given to them in time. The main objective of this report was to determine the most realistic productivity task rates for a road worker carrying routine manual maintenance works on the district road. The major content of this research was to identify the most realistic productivity task rates for the workers by assigning them different tasks on different roads depending on the urgency and also to determine the designed monthly salary. This included research design, sample selection, questionnaires, field observation, and data analysis. The data was interpreted and tabulated using statistical software, Microsoft Excel.	road, maintenance, statistical software, task rates, urgency	Kayunga district	Construction	N/A	Solution / Application	N2
3	Ndejje University	Tumwesige Vicent	2016	Investigating the Impact of Increasing Number of Vehicles on Traffic Flow and Parking in Masindi Municipality Township Area	Ndejje University, Mr. Kato Simon Peter	The increasing population due to available business opportunities within the municipality causes congestion. Accommodation around the town is increasing and parking is always observed. The increasing standard of living has increased the pressure on the existing road and parking facilities. Inadequate parking facilities has led to parking on walk ways and carriage way on some roads which reduces the traffic capacity of the roads in addition to damage on road elements. The main objective of this research was to develop an optimal scheme for traffic flow and parking by designing economic modification to the existing road and parking facilities. This included carrying out traffic volume, composition, direction of movement and the time vehicles are in town, carrying out traffic delay study, design an optimum system to the increasing vehicle traffic. Manual counting method was used as selected locations to determine variations in classified and directional traffic volume. The moving observer method was used to record the extent, location and cause of delays along the route and space inventory at prospective parking facilities for buses, was also done.	road, traffic flow, manual counting method, parking facilities, space inventory	Masindi district	Traffic	N/A	Solution / Application	N3
4	Ndejje University	Sebidde Jamada, Ssonko James	2016	Research for the Design of a Drainage Channel along Kabusu- Nalukolongo Road	Ndejje University, Mr. Kato Simon Peter	Nalukolongo stage junction is located in Rubaga division along old Masaka road lying in southern part of Kampala city neighbouring Rift Valley Railway Line and natural drains (swamps) leaving very small space for construction of drainage channel. Damaged drainage channels are expensive to repair and interfere with the safe and orderly movement of traffic. The main objective of this report was to design an adequate drainage channel to control and prevent flooding in the area. This entailed road assessment, data collection, analysing and designing an adequate channel with data needed included topographic survey, total runoff volume, effective rainfall, flow rate catchment area, rainfall intensity among others. This study could be useful to future researchers intending to carry out future research in the related field. It could also be used by civil engineers and construction managers to guide them in the process of designing a drainage channel. This research was also aimed at helping the government formulate policies related to construction of drainage channels and materials needed for the complete project	junction, drainage channel, rainfall intensity, effective rainfall	Kampala district, Kabusu- Nalukolongo Road	Environment	N/A	Solution / Application	N4
5	Ndejje University	Bukenya Stuart, Kwebiiha Godfrey	2016	Investigating the Effects of Installation of Underground Utilities on Road Pavement Strength. Case Study Rubaga Division in KCCA	Ndejje University, Mr. Kato Simon Peter	Municipalities and cities have a duty to ensure that residents are availed with basic services power, communication and piped water. Installation and maintenance of underground utilities crossing a road section is done by excavating trenches in which the pipes and conduits are laid. This study was done on roads that have been cut during installation or maintenance of underground utilities and carried out on both gravel roads and surface finished roads in Rubaga division. The main objective of this research was to investigate and evaluate the effects of installation and maintenance of underground utilities on road pavement strength. This entailed assessment of surface damage like cracks, depressions, pot holes and bleeding; evaluate the practices of contractors when selecting materials for repair, establish the resultant effects of repaired utilities, cut distresses on road users and to recommend best practices that can be adopted to reduce repaired cut distresses on roads. This study was important in assessing whether the installation of water utility pipes, electrical conduits and telecommunication cables in the right of way, by cutting the road significantly affects the integrity and strength, and suggests lasting solutions to the problem with an aim of reducing the effects of this practice on road pavement	road section, excavating, pavement strength, distresses	Kampala district	Construction	Other	Solution / Application	N5
6	Ndejje University	Ochieng Hippolito, Yiki John	2016	Effect of Compaction Delay and Compaction Effort on the Mechanical Properties of Lime and Cement Stabilized Lateritic Soils	Ndejje University, Mr. Kato Simon Peter	This report covers the study of effect of compaction delay and compaction effort on the mechanical properties of lime and cement stabilized lateritic soil. This research aimed at seeking ways of how the cost of lime and cement could be minimized in many soil improvements in road construction projects. The specific objectives of this study were to; determine consistency, grading and strength characteristics of the soil for classification, determining the initial lime consumption, optimum cement dosage and the achieved soil strength after aging and compaction. The soil was blended to bring it back to the Ministry of Works and Transport (2010)'s gradation envelop, where it was separated through sieving into coarse, intermediate, and fine fractions. The percentages of cement used in this research were 1.5%, 2.5%, 3.5% and 4.5%. The soil sample was subjected to sieve analysis, compaction test, Atterberg limit test, CBR test and unconfined compressive strength test. From the results, the soil was classified as anA-2-7(3) soil on AASHTO classification and CH (clay of high plasticity) basing on the plasticity chart according to BS 5930:1999. From the Atterberg limits, the liquid limit and plastic limit increased, while the plasticity index and shrinkage decreased with increase in dosages. The maximum dry density values decreased with increase in cement dosage where the decrease was greater at higher dosages of 2.5% to 4.5% compared to low dosages of 0% to 1.5% of cement content while the OMC increased with increase in cement content. The UCS values increased with increase in compaction delay. A compaction delay of 4hours seemed to be the extreme limit for this lateritic soil stabilized with Portland pozzolana cement. However, compactive effort was more significant compared to aging period as seen in samples with low dosages of 0% to 1.5%.	compaction, stabilized lateritic soil, road construction, unconfined, plasticity index, cement content	Luwero district	Construction	Base, Subbase	Solution / Application	N6
7	Ndejje University	Okello Alex Taylor, Nabayaza Sumaiyah	2016	An Experimental Study on the Synergetic Effect of Rice Husk Ash Incorporated in Self Compacting Concrete as a Partial Replacement of Cement	Ndejje University, Mr. Kato Simon Peter	Self-compacting concrete, also referred to as self-consolidating concrete is concrete which is able to flow and consolidate under its own weight and be aerated almost completely while flowing in the formwork. In this project research, rice husk ash was used as mineral admixture to partially replace cement. The main objective of this research was to investigate the synergetic effect of Rice Husk Ash (RHA) on concrete strength. Initially, rice husks were collected, spread under the sun to dry and then converted into ash by burning using charcoal stove and village heap method at temperature ranging from 3000C to 4500C for two days. The ash produced was later pulverized or ground to the required fineness and mixed with cement that had been previously tested to produce synergetic effect which was used in the production of concrete. Other ingredients like the admixture, coarse and fine aggregates and water were also collected from their natural sources and tested in accordance to relevant standards. The mix design was then derived based on ACI standard. Four different mixes were produced containing 0%, 10%, 20% and 30% RHA. For all those mixes, all ingredients were kept constant while the cement was varied depending on the RHA percentage. Concrete was then mixed from a portable mixer; fresh tests were executed on it as quality control measures to check on its workability. The mix for 30% RHA failed to satisfy the requirements of fresh state properties and was therefore dropped. Concrete cubes were then tested which were used to determine strength at 7, 28, and 90 days. The following observations were observed after completion of the project; All materials used had parameters that were within the required envelop as per the standards. Workability diminished with increase in RHA percentage, slump increased with increase in RHA content. Strength also reduced as RHA percentage increased but was still within the allowable limits for concrete class C-30 i.e. even at 20% RHA, the ultimate strength of concrete was obtained. A number of challenges were faced however, and these included; difficulty in sourcing material, difficulty in burning rice husks and many others. The material (RHA) should be used for preparation of other construction materials like lime mortar and other low cost building materials like blocks and bricks.	self-compacting concrete, consolidate, rice husk ash, synergetic effect, synergetic effect, admixture, workability	Luwero district	Material	Other	Solution / Application	N7
8	Ndejje University	Mugula Julius, Gimui Johnson	2016	Evaluation of Resistance to Moisture Damage of	Ndejje University, Mr. Kato	Moisture induced damage is one of the most wide spread and severe form of pavement distress that leads to early pavement failure. The reduction on pavement integrity due to moisture damage plays an important role in development of other types of pavement distresses, such as rutting, fatigue cracking, ravelling and pot holes. There is severe early pavement deterioration in the country as a result of moisture ingression into pavements. This project entailed collection and preparation	pavement distress, moisture	Luwero district	Material	Surfacing	Solution / Application	N8

#	ORIGINATING INSTITUTION	AUTHORS	YEAR	TITLE	LOCATION OF DOCUMENT	ABSTRACT	KEYWORDS	GEOGRAPHICAL AREA	FOCUS AREAS	PAVEMENT LAYER FOCUS	TT LEVEL	Google Earth number
				Bituminous mixtures Modified with Waste Cooking Oil	Simon Peter	of materials for the tests, determination of Marshall properties of modified aggregates and bitumen mixture after mixing with different percentages of filtered waste cooking oil. The determination of the properties of asphalt concrete obtained from asphalt mixed with the different percentages of filtered waste cooking oil. This research would help to reduce early pavement deterioration that is induced by moisture ingression in bituminous wearing course using a cheaper and readily available anti stripping agent (Waste cooking oil) and also reduce on environmental pollution resulting from unnecessary harmful disposal of Waste cooking oil.	ingression, Marshall properties, asphalt concrete, waste cooking oil, bituminous					
9	Ndejje University	Namwirya Khadija, Emuron Moses	2016	Soil Stabilisation and Reinforcement Using Polypropylene Fiber	Ndejje University, Mr. Kato Simon Peter	Soil stabilization is the process of altering some properties by different methods, mechanical and chemical in order to produce an improved soil material which has all the desired engineering properties. In case the soil just below the ground surface is no good but a strong stratum exists at a great depth, deep foundation is suitable for this type of soil and it's quite expensive to excavate. Polypropylene fibre from waste material was mixed thoroughly with clay soil to improve its mechanical properties. The purpose of this research was to investigate the use of polypropylene fibre as soil reinforcement. Different soil tests were performed and these included; the liquid limit which was measured using the Casagrande's apparatus, the plastic limit was done in accordance with BS1377: Part 4: S1990 and the CBR test was performed according to BS1377 Part: 4: 1990 to determine the mechanical properties of soil.	Stabilization, engineering properties, clay soil, soil tests	Luwero district	Material	Other	Solution / Application	N9
10	Ndejje University	Bamwesigye Tom, Buculezi Ian	2016	Engineering Approach to Control Accidents along Kampala-Masaka Highway.	Ndejje University, Mr. Kato Simon Peter	The Kampala-Masaka high way is a route towards southwest of Uganda with different road section where the first section is Kibuye- Busega with length of 6.5km, carriageway width of 7m and shoulders of 2m wide. The second section is Busega- Masaka with length of 122 km, width is 6.8m and 2.2m shoulders. The highway has claimed a lot of people's lives in the last one year. Police has been deployed to reduce these accidents by putting different check points at different sections of the road but this has not been so effective since more accidents are still taking place along the same road. The purpose of this project was to ascertain the feasibility of low cost pyrolysis for control of accidents along the Kampala-Masaka highway. The research covered the identification of black spots along the highway, data collection regarding the existing identical black spots, ranking the identified spots in accordance to importance and suggestion of possible improvements. The identification of black spots was done using police annual reports and consultations from police, secondary data collection included the collection of required accident data for the past one year from concerned police department and the primary data collection included road inventory data collection, traffic volume count, speed study and spot speed survey from identified accident prone stretches from UNRA. A detailed road inventory survey was carried out on the entire black spots to measure the road way geometric parameters like road way width, footpath width, median, shoulders, surface type, surface condition, edge obstruction, road markings, road signs, drainage facilities, and adjoining land use. 12 hour traffic volume count was taken for all the spots and peak hour traffic in terms of passenger car units (PCU) was found. The top ranked five accident black spots were identified using Weighted Severity Index (WSI) by assigning scores based on the number and severity of accidents in the location. This analysis will help the government to put in place effective measures to reduce accidents on the Kampala- Masaka highway.	highway, carriageway, accidents, check points, black spots, traffic volume, road inventory survey, geometric parameters	Kampala and Masaka districts, Kampala-Masaka Highway	Road safety	N/A	Solution / Application	N10
11	Ndejje University	Magambe Arnold, Ainomugisha Brian	2016	De-congestion of cities using ITS	Ndejje University, Mr. Kato Simon Peter	Uganda since 2000 is experiencing astronomical increase in vehicle ownership especially in metropolitan Kampala, this coupled with the miniature road spaces, increasing road blocks and traffic jam have contributed in the city centre. The project was aimed at analysing the traffic congestion in the city centre, evaluating, analysing and integrating new technologies and concepts to achieve traffic efficiency. Traffic flow was determined using travel time and flow parameters. The travel time was determined using objective traffic counts while traffic flow was obtained by counting the number of vehicles passing a given point on the road in a specific time interval. The routes were assigned according to wardrop's equilibrium state.	astronomical increase, decongestion of cities, analysing, achieve traffic efficiency	Kampala	Traffic	N/A	Solution / Application	N11
12	Ndejje University	Tuhumwire Thecla Prosper, Tahigwomu Akiiki Stephen	2016	Investigating the Stabilization of Clay Soils Using Maize Cob ash for Foundation Construction	Ndejje University, Mr. Kato Simon Peter	Soil is one of the most abundant naturally occurring construction materials. However, before it can be used in any construction practice, an understanding of its properties is a must so that it does not lead to construction failures. The purpose of this research was to investigate the influence of maize cob ash on the strength of clay soil for foundation construction. Atterberg limit test was done to investigate the effects of maize cob as on the shear strength parameters of the soil samples. The maize cob ash and clay soil sample was obtained from the briquette production unit in Ndejje community in Nyimbwa sub-county. The clay soil sample was subsequently mixed with maize cob ash in varying percentages in order to determine the influence of maize cob ash on various soil parameters with respect to Atterberg limits and shear strength. The Atterberg tests classified the soil sample as A-7-6 (4) according to AASHTO. The results indicated a decrease in the plasticity index as the shrinkage limit increased with increasing percentage of maize cob ash. The results also showed the MDD of modified lateritic soil increased with addition of maize cob ash. The CBR value of the soil increased averagely with increase in maize cob ash content. This research would therefore provide scientific facts on the potential use of maize cob as for stabilization of clay soils	Soil, construction, construction failures, maize cob ash, foundation, clay soil, stabilization	Luwero district	Material	Other	Solution / Application	N12
13	Ndejje University	Bigirwamukama Ignitious, Mondo Barnet	2016	Investigating the Potential Replacement of Ordinary Portland Cement with Saw Dust Ash from Pine Trees in Concrete	Ndejje University, Mr. Kato Simon Peter	The purpose of this research was to investigate to what extent the saw dust ash from pine trees can partially replace ordinary Portland cement in concrete. The SDA was collected from Kapkwata saw mills and other materials such as course aggregate, fine aggregate and cement were obtained from Ndejje TC. The SDA was obtained through burning saw dust particles in the incinerator in Kajjansi clays factory and was mixed in different ratios in concrete to produce test samples. Some of the tests which were carried out included; the specific gravity of the SDA, the slump test and compressive strength. This research was aimed at producing cost effective concrete for the construction industry hence balancing the quality of concrete.	cost effective concrete, ordinary Portland cement, saw dust particles	Luwero district	Material	Other	Solution / Application	N13
14	Ndejje University	Ssetuba Daniel, Arinitwe Dickson	2016	A comparison study between geotechnical parameters derived from the direct shear and triaxial test (UU) on cohesive soils	Ndejje University, Mr. Kato Simon Peter	Every building on earth which imposes loads on the soil which supports the foundations. The shear strength of the soil is the most important consideration during the estimation of the bearing capacity slope stability and lateral pressure on earth retaining structure. The common laboratory techniques of determining shear strength in Uganda are by use of direct shear strength box test and triaxial test. A research has been carried out to establish the empirical relationship between shear box and triaxial (UU) test for cohesive soils. Triaxial shear is the most widely used and suitable test on cohesive soils compared to the direct shear box due to expenses although the direct shear box is cheapest of the two.	Loads, shear strength, bearing capacity, slope stability lateral pressure, direct shear strength box test, triaxial test, empirical relationship	Luwero district	Material	Other	Solution / Application	N14
15	Ndejje University	Kobere Henry, Mugoya Peterson	2016	Modification of Bitumen using plastics and polythene bags	Ndejje University, Mr. Kato Simon Peter	The report covers a study of modification of the Bitumen using plastics and polythene bags. Its major aim was to investigate the suitability of polythene plastic waste materials in modification of Bitumen. The plastics and polythene bags were mixed with bitumen and aggregates in varying proportions. Three different mixtures were made, including neat mixture, a mixture of 5% plastics and polythene bags and another one of 10% was also mixed and they were subjected to different laboratory tests to compare the variations. The research could be part of the solutions to the dangers that happen due to exposing or poor disposal of plastics and polythene bags to the environment. This has exposed people and environment to the catastrophic effects of the accumulation of polythene bags in the environment. Also the performance of the road pavement is strongly influenced by the properties of the bituminous binder as bitumen is the continuous phase and the only deformable component. The findings of the study aimed at providing precise technical information on the suitability of polythene bags for modification of bitumen and asphalt and preserve the environment while simultaneously enhancing the properties of bitumen.	polythene plastic, waste materials, bitumen, road pavement, environment	Masaka district	Material	Surfacing	Solution / Application	N15
16	Ndejje University	Onen Robison, Odiama James	2016	Evaluating the Relationship between the Dynamic Cone Penetrometer and the Light Weight Deflectometer test results	Ndejje University, Mr. Kato Simon Peter	Roads perform a very useful role in meeting the strategic and developmental requirements, accelerating all-round development. A large number of random samples were collected and tested because of the large variability of pavement and sub grade materials, care had to be taken to try to reproduce the same in-situ sample condition and environment such as boundary conditions in the laboratory and also a lot of time was spent in producing the required data. The main objective was to evaluate the relationship between LWD and DCP test results for the elimination of in-situ strength of flexibility pavement sub grades. In the elimination of sub grade strength, the laboratory CBR approach continues to be one of the most applied methods for pavement design and evaluation. However due to its major challenges regarding time, sample disturbance and in-situ soil condition variability, advances in technology have produced a new generation of in-situ testing devices. The LWD and DCP devices are capable of directly evaluating the soil stiffness without altering the in-situ soil conditions and will be potential substitute methods.	roads, sub grade materials, disturbance and in-situ soil condition variability	Luwero district	Design	Pavement	Platform / Solution	N16
1	Ndejje	Negesha	2016	Performance	Ndejje	The primary purpose of reinforcing soil mass is to improve its stability, to increase its bearing capacity and to reduce settlements and lateral deformation. Research	Reinforcing soil	Central Uganda	Material	Base,	Solution /	N17

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7	University	Tracy, Nangendo Sumaya		evaluation of soils stabilized using sisal fiber and lime	University, Mr. Kato Simon Peter	has shown that same areas in Uganda lack materials with adequate engineering properties for modification of the materials which has been achieved by using lime and Portland cement which materials are quite expensive due to high production costs. Therefore our main aim for this project was to evaluate the performance of soil stabilized using lime and sisal fiber. In this practice, the utilization of sisal fiber as stabilization agent for improvement of strength properties of soil would lead to a reduction in the cost of modification of weak sisal as naturally occurring material which is readily available. Furthermore stabilization with sisal fibres would lead to migration of the environmentally related problem such as dust and water contamination	mass, lime, Portland cement, sisal fiber, stabilization			Subbase	Application	
18	Ndejje University	Baira Bakasoro Kisto, Oponyo Alfred	2016	An Investigation to Determine the Structural Performance of Non-biodegradable Material in Concrete Block (Thermoplastic Bottles as Attires): Bombo town	Ndejje University, Mr. Kato Simon Peter	The accumulation and mismanagement of non-biodegradable waste materials by burning has contributed to air pollution, and diseases spread by scavengers as these bottles are fetched for re-use. Therefore due to existing problems above, the primary objectives for carrying out this research was to obtain solution in the prevention of the environment from pollution and minimize waste pilling. The aim of this research was to completely eradicated non-biodegradable plastic bottles from the environment without causing damage or pollution to the surrounding population by using them as additives to concrete and then analyse its strength on concrete in construction works and then provide final recommendations on the mix proportions of these non-biodegradable materials in the manufacture of concrete blocks.	accumulation and miss management, wastes, thermoplastic as additives in concrete	Luwero district	Material	Other	Solution / Application	N18
19	Ndejje University	Munene Peter, Mugisha Simon	2016	An Investigation of the Effect of Coffee Husks on the Strength Properties of the Lateritic soils for Use as a Sub base.	Ndejje University, Mr. Kato Simon Peter	Most roads fail due to construction quality; failure to obtain proper compaction, improper moisture conditions during construction, quality of materials and in accurate layer thickness (after compaction). Currently lateritic soil is stabilized during using decomposed granite, crushed gravel, crushed stone or lime stone but these are expensive ways of dealing with problems .the use of coffee husks will provide cheap yet efficient stabilizing material for the job . The source of material that was used for carrying out the study was Ndejje university main campus (lateritic soils at Bombo town (coffee husks). This report consists of the detailed proposal of an investigation on the effect of coffee husks on the strength properties of lateritic soil for use as sub base and the objectives of this project were; to determine how coffee husks affect the strength of lateritic soils, determine the effect of coffee husks on the plasticity of lateritic soils and also determining the effect of the coffee husks on the particle size distribution of lateritic soils. Different soil tests were performed and these included; the liquid limit which was measured using Casagrande's apparatus, the plastic limit was done in accordance with BS 1377: PART 4:S1990 and CBR test was performed according to BS: 1377 part4: 1990 to determine the mechanical properties of soil.	Effect, coffee husks, lateritic soils, proper compaction ,efficient stabilizing	Luwero district	Material	Subbase	Solution / Application	N19
20	Ndejje University	Kambasu Exevior, Senkungu Reagan	2016	Use of Pineapple Leaf Fibers to Improve Engineering Properties of Concrete	Ndejje University, Mr. Kato Simon Peter	Fiber reinforced concrete is a material whose additional reinforcement usually consist of hair like strands taken from plants, materials like wood increasing its structural capability, addition of fibres can increase strength and also reduce plastic shrinkage and drying shrinkage by arresting the propagation of crack and hence reduce admixture for concrete mix design. The Portland concrete cement which is currently being used is a brittle material and therefore possess a very low tensile strength, limited ductility and little resistance to cracking, internal micro cracks are present in concrete and its poor tensile is due to propagation of such micro cracks which develop even before the concrete sets leading to drying shrinkage and other causes when load is applied and internal cracks propagate and open up due to stress thus causing additional cracks. The development of this crack is the cause of inelastic deformation in concrete. There is need to improve the concrete properties so as to reduce on these defects hence increasing the structural performance and serviceability of the concrete structures by using pineapple leaf fibres. The main objective of the project was to access the structural performance of pineapple leaf fibres in concrete in relation to plain concrete. In this project research, pineapple leaf fibres were used as an admixture in the concrete mixture. Pineapple leaf fibres were collected and other ingredients like cement, the coarse and fine aggregates and water were also collected from their natural sources and tested in accordance to relevant standards. Three different mixes were produced containing 0%, 5% and 10% of the pine leaf fibres and the mix design was then derived based on ACI standard. Concrete was then mixed from a portable mixer; fresh tests were executed on it as quality control measures to check on its workability. Concrete cubes were then tested which were used to determine the strength at 7 and 28 days. All materials used had parameters that were within the required envelop as per the standards	reinforcement, concrete, pineapple leaf fibres , structural performance, concrete cubes	Luwero district	Material	Other	Solution / Application	N20
21	Ndejje University	Asimwe Godwin, Byamugisha Damson	2016	Comparison Study of Using Bamboo Wood as Reinforcement in concrete	Ndejje University, Mr. Kato Simon Peter	During this study much concern was put on bamboo due to the fact that the standard strength and other properties of steel are well known by engineers unlike bamboo wood. The main objectives of this project was to investigate the capacity of bamboo as reinforcement material in concrete. This came as a result of tensile capacity flexural strength, mechanical stress of bamboo being unknown, engineers cannot design appropriate structures out of it. Therefore its structural potential under tension and compression when documented will act as an aid for the structural engineers designing .concrete with bamboo as reinforcement. The bamboo wood was prepared by cutting and then stripping, the strips were flattened and pre-shaped and then boiled in a tank full of chemicals for 3hrs to decolorize them and guard them against pests. Three Bamboo samples of 600mm length each were subjected to tensile test and the relevant stress strain graphs were developed. Other tests done included; the modulus of elasticity test, compressive strength test and the shear strength test. The research concluded that bamboo wood can be mixed with steel for the reinforcement of concrete. The project will encourage environmental conservation through planting of bamboo thus encouraging afforestation.	Bamboo, capacity of bamboo, reinforcement material	Luwero district	Material	Other	Solution / Application	N21
22	Ndejje University	Kahirita Joshua, Kawekwa Douglas	2016	Investigation on Reduction of Traffic Congestion at Garden City junction	Ndejje University, Mr. Kato Simon Peter	Traffic congestion is generally caused by four broad factors which are; the micro level factors which are related to traffic on the roadway, macro level factors which are related the demand for the road use, exogenous factors which relate to patterns and volumes of trips made by the traffic and random variables which include weather and visibility. The main objective of the project was to investigate on the ways of reducing the traffic congestion at garden city junction Kampala Uganda, to determine all the possible causes and also the solutions of traffic congestion at garden city and their solution. This makes the project unique in such a way that the works obtained and achieved will greatly help in improvement of traffic flow at the junction. The sample consisted of correspondents who were randomly taken from a population of road users connected by the junction, traffic police and decision makers, the data collection methods used consisted mainly of questionnaire survey which consisted of a set of question objectives that were handed over to the respondents who answered by ticking where appropriate to express their views. The data analysis consisted of the quantitative and qualitative data analyses where the data was organized and edited. The study would contribute to the scholastic material for study purposes of other individuals to obtain more information or prospects to aid curb the traffic congestion problem. It would also enhance in obtaining and proving more information about the are like the different transactions its experiences since the country is still developing at large which will become available to the whole globe at large .This too will contribute to the future.	Traffic congestion, reducing the traffic congestion, in improvement of traffic flow, sampling, questionnaire survey	Kampala district	Traffic	N/A	Solution / Application	N22
23	Ndejje University	Kinyera Lenny Tumwebaze Shadrack	2016	Investigation of Natural stone powder and Rice husk ash in Stabilization of Clayey soils	Ndejje University, Mr. Kato Simon Peter	Expansive soils have a tendency of expanding when wet and shrinking when dry which makes them undesirable for construction of road sub grades. This is desired to ensure stabilization of sub grade with expansive soils which is so important in achieving the stability of roads and also requirement of durability. The study was carried out to investigate the effect of natural stone powder and rice husk ashon the strength properties of clayey soils for use as sub base. The soil sample was obtained from Lady Irene Campus in Ndejje University and the laboratory tests were carried out at Ndejje University laboratory. The tests carried out included; sieve analysis, liquid limit, plastic limit, shrinkage, moisture density relation test and California Bearing Ratio (CBR) test. A mixture of natural stone powder and rice husk ash was added to the sample at 0%, 10%, 20% and 30%. The Atterberg tests classified the soil sample as A-7-6 (4) according to AASHTO. The results showed the plasticity index decreased from 25.5% to 10.1% and the shrinkage limit increased from 14.1cm to 16.4cm with increasing percentage of natural stone powder and rice husk ash. The results also showed the MDD of modified clayey soil increased with addition of natural stone powder and rice husk ash by15% and then decreased with the increase in the mixture of natural stone powder and rice husk ash content. The decrease could be attributed to the effect of pores created by the mixture. The CBR value of the soil decreased with increase in the mixture of natural stone powder and rice husk ash content.	natural stone powder, rice husks ash, stabilization, clay soils, sub grade, road	Luwero district	Material	Subbase	Base	N23
24	Ndejje University	Nilima Sharon WaniayeJalilu	2016	Low Cost Sealing of Lugazi- Buikwe Road Using Labor Based Technology.	Ndejje University, Mr. Kato Simon Peter	The government of Uganda is promoting LCs of DUCARs through the ministry of works and transport as a way of reducing the maintenance burden of unpaved roads which is being supported by DANIDA mainstreamed under the RTI component of the Uganda Growth Program and the government of Uganda's NDP. There is increasing deterioration of the existing gravel road surface due to changes in traffic volume and climate resulting into gravel loss, pot holes, slipperiness and dustiness. The purpose of this research was to suggest a sustainable low cost seal option for Lugazi- Buikwe road. Traffic counts were carried out for 16 years for seven consecutive days and this data was used to determine annual average daily traffic. The rainfall data was used to determine the mean annual rainfall of the area. CBR test was carried out to assess the strength of the sub grade in order to determine whether it's suitable for the road design. The location of LCS depended on different factors including traffic volume, gradient, climate (mean annual rainfall), pavement base quality and suitability for LBM and all these factors were investigated to give	unpaved roads, traffic volume, traffic counts, road design, pavement base quality	Jinja district, Lugazi-Buikwe Road	Construction	Surfacing	Base	N24

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						conclusions. This research would help the government to reduce on the cost of construction and design of roads in Uganda.						
25	Ndejje University	Ojok Santo Coopil Loke Raymond Okello	2016	A Comparative Analysis of Different Low Cost seal Option in Maintenance of Low Volume Roads. A Case Study of Opit-Awoo Trial, Omoro District	Ndejje University, Mr. Kato Simon Peter	Low volume roads are faced with the problem of seasonal accessibility and high maintenance costs, thus the surfacing of gravel roads is not a suitable solution to restore the riding quality for all weather access due to high loss of gravel base surface material estimated at 30-50mm per annum at standardized traffic flow of 100vehicles/day. Currently, the low volume roads are maintained by carrying out routine and periodic maintenance which are not sufficient enough to restore the riding quality due to the high costs of maintenance and inadequate fund allocation for it by the government. The purpose of this research was to assess the performance of various low cost seal options on Opit-Awoo trial road and give recommendation for their applications to sustainable all weather rural access infrastructure using labour enhancement methods as an alternative to gravel surfaced roads. A reconnaissance survey was conducted to determine the grades crown height and curve alignment using necessary equipment. The road assessment was carried out to identify the technical data input for improvement including environmental assessment. The analytical design of surface drainage was done using the rational method and hydraulic design was done using the Manning's equation to determine the discharge of the open channels. The Dynamic Cone Penetrometer test was used to assess the strength of the sub grade in terms of CBR to represent the realistic strength conditions for pavement design. Traffic surveys were carried out using the ROAD NOTE 40 and design manual of the ministry of works and environment, 2004.this research would help the government by providing cheaper road sealing which are more sustainable than unpaved roads.	low volume roads, riding quality, low cost seal, labour enhancement methods, gravel surfaced roads, reconnaissance survey, analytical design, pavement design, traffic surveys	Omoro District, Opit-Awoo Trial road	Maintenance & Rehabilitation	Surfacing	Solution / Application	N25
26	Ndejje University	AkampuriOnesmus Shopi Ezekiel	2016	Performance of Culverts in Kirinya-Namataba road.	Ndejje University, Mr. Kato Simon Peter	This project was conducted from Kirinya- Namataba road in Wakiso district. The research in this project covers mainly the serviceability, performance and strength of different culverts which were designed along Kirinya- Namataba road as one of the main components of road drainage system. This road is frequently affected by floods, high traffic and poor road maintenance thus affecting the entire strength and durability of the road. The main objective of this research was to analyse the culvert serviceability and workability that affect the entire road section of Kinya- Namataba road and thereafter give suitable recommendations measures. This research is also aimed at finding suitable methods to improve the drainage system to combat flood effects on the road, improve the state of the roads thus improving mobility, access to potentially productive areas social and economic centres.	road, serviceability, culverts, durability, workability, drainage system, flood effects	Wakiso district, Kirinya- Namataba road	Management	Other	Solution / Application	N26
27	Ndejje University	Niwamanya TumwineDismas Angeret Paul Godfrey	2015	Design of Section 1.2km, Bunya- Iganga Road	Ndejje University, Mr. Kato Simon Peter	The design to improve 1.2km section of Bunya- Iganga road from gravel to bituminous standard is paramount for the safety and health of the public around and beautification of Iganga town. This road section has failed with pot holes that spread up throughout the entire longitudinal and transverse sections of the road, corrugation and galleys automatically reduce the speed of motorists to as low as even 10km/hr, hence making the travel time on the road to be abnormally longer than expected. The main objective of this study was to design flexible pavement and proper geometry for section1.2km of Bunya- Iganga road from chainage 0+000 to 1+200. This entailed carrying out reconnaissance, topographic survey, analysis of the survey data and hence geometric design for the road section. Traffic counts were carried out and the data was analysed to determine the ESALs and design of pavement layers for the road components based on field findings and available road manual. The design report was worked out indicating all the aspects of the design for the section 1.2km on Bunya-Iganga road. This project was aimed at reducing the rate of accidents and the section therefore, should be upgraded from lass II gravel to class 1b paved bituminous surfacing.	gravel road, bituminous, travel time, flexible pavement, chainage, road section, accidents, pavement layers	Iganga district, Bunya- Iganga Road	Design	Pavement	Solution / Application	N27
28	Ndejje University	Okello Emmanuel Nalubowa Oliver	2015	Investigating the potential of pozzolanic ash and lime in the stabilization of gravel road material.	Ndejje University, Mr. Kato Simon Peter	Soil stabilization has been practiced for quite some time by mixing additives, such as addition of cement lime and fly ash to the soil to increase its strength. However, there is lack of investigations on the use of natural pozzolanic alone or combined with lime for road based improvement applications. Our research study was therefore undertaken to study the effects of lime, natural pozzolanic and combination of both on the geotechnical characteristics of soil. Natural pozzolanic and lime were added to murrum at range of 0-8% and 0-4%, respectively. In additional combinations of lime – natural pozzolana were added to murrum at the same ranges. Test specimens were subjected to compaction tests, classification and strength tests. Specimens were curved for 4days, after which they were tested for CBR. Based on the favourable results obtained, it can be concluded that the soil can be successfully stabilized by the combined action of lime and natural pozzolana.	Soil stabilization, additives, test specimens, cement lime, natural pozzolana	Central Uganda	Material	Gravel	Base	N28
29	Ndejje University	Mbaziira Yahaya Mugisa Irene	2015	Re-designing of Ganda-Kyebando road (Wakiso district; 500m)	Ndejje University, Mr. Kato Simon Peter	The report consists of a detailed proposed design for upgrading of Ganda- Kyebando road from gravel to paved road standards. The main objective of the research is to design a flexible pavement with respect to the traffic geometry, drainage and pavement. This was done by assessing the current traffic that is operational on the road, existing geometry, and the current drainage conditions and pavement structure through the field and laboratory tests, field surveys, consultations and observations. Traffic congestion, narrow carriage way, sharp curvatures flooding, pot holes, and other road defects have been characteristic features on this road. According to the results obtained the average daily traffic was 300vehicles per day, with motorcycles taking up the greatest percentage of traffic (56 %), the personal cars followed with 14% of the traffic. The horizontal curves of the most curvatures were found to be less than 100m. The sub grade strength was S2. Considered the ministry of works and transport criterion for upgrading a road in an urban setting with more than 300vehicles/day, ADT on the project road showed it was due for upgrading. Thus the road has been upgraded to have a carriage was of 7.6m. Are- alignment has been proposed for the curves with a minimum horizontal radius of less than 100m. A trapezoidal channel section (with average bed width of 500mm, average depth of 600mm and a side slope of 1:1.5) and culverts (900mm diameter at a slope of 2%) have been designed to cater for the drainage. Double surface processing has been proposed with shipping being sprayed at a rate of 10.912kg/m2 and 9.821kg/m2for the first and second layer respectively and the binder being sprayed at 1.0522kg/m2 and 0.8332kg/m2 for the first and second layer respectively. Quality control materials in accordance with the specifications should be ensured, during construction. Humps should be constructed and road signs should also be positioned to improve the road users' information systems. Continuous maintenance involving the de-silting drains is recommended. With a proper settlement plan drawn, little or no compensation can be involved to the land owners where there is a necessity of an increase in road carriage way width.	Upgrading, flexible pavement, current traffic, Traffic congestion, Double surface processing, Quality control materials,	Wakiso district, Ganda-Kyebando road (500m)	Maintenance & Rehabilitation	Pavement	Solution / Application	N29
30	Ndejje University	Murungi William Asaba Patrick	2015	Comparison of quarry dust and lime stabilization of natural gravel (lateritic material) in road bases.	Ndejje University, Mr. Kato Simon Peter	The study was carried out to compare the use of quarry dust and lime stabilizing agents for lateritic gravel for 1km along Entebbe express highway and rock quarry and lime from Tororo were used in this study lateritic was stabilized with 1%, 3% and 5% lime and 10%, 20%, 30% and 50% quarry dust by weight of dry soil. Soil samples were subjected to particle size distribution, consistency and a California Bearing Ratio (CBR) tests using the British standards for testing materials results showed that the plasticity index of lateritic from both sources decreased with increasing lime content in all quarry dust proportions used. It was observed that the CBR increased by 7.9% and 7.5% for Bulenga lateritic respectively when 3% lime was used as stabilizing agent. The CBR value increased by 79% and 24% for Bulenga hill lateritic at 10% quarry dust when it was used as an independent stabilizing agent. However, the difference in the CBR values for lateritic from the two different areas was small when stabilization was done at 10% quarry dust and 3% lime combination (i.e. 83% and 79% increase of Bulenga hill lateritic respectively. Analysis of the results showed that the quarry dust and lime can be used to improve the plasticity and strength properties of gravel irrespective of the source of gravel.	quarry dust and lime stabilizing agents, quarry dust proportions, plasticity and strength,	Wakiso district, Entebbe express highway,1km	Material	Base, Subbase	Base	N30
31	Ndejje University	Karuhanga Kenneth Kanyomozi Robert	2015	Investigation on early Asphalt paved road distresses.	Ndejje University, Mr. Kato Simon Peter	The reconstruction of Kampala- Masaka highway is part of the Northern Corridor which spans Malaba at Kenya-Uganda boarder to Katuna at Uganda-Rwanda boarder. It has been identified that during the reconstruction of this road, there was less traffic intensity and limited business activities because the roads were not convenient for users. The main aim of this study was to investigate the early pavement distresses on Kampala-Masaka highway due to the evident number of accidents that have occurred along the project road especially during rainy seasons which we think is attributed to, which reduces skidding resistances especially on wet surfaces. The study project would suggest and help engineers to design and maintain HMA pavements that can provide many years of services. Its specific objectives include; carrying out road condition assessment, studying possible causes of these distresses, and finally developing a maintenance plan for this road during the design life.	Reconstruction, the early pavement distresses, accidents, reduces skidding resistances,	Masaka district ,Kampala-Masaka highway	Management	Surfacing	Solution / Application	N31
32	Ndejje University	Tumwebaze Grace Mutesa Justus	2015	Pavement and drainage design for upgrading of Biafra road (1km) from gravel to Bituminous standard.	Ndejje University, Mr. Kato Simon Peter	Transport is a vital infrastructure for speedy economic growth of a developing country. Road transport is one of the most important modes of transport having many desirable characteristics such as flexibility, door to door services and accessibility to remote areas (Kadiyali, 2000). The main objective of this project was to carry out a design for upgrading of Baifra road (1km) from gravel to a bituminous paved surface. This is due to poor drainage which leads to stagnation of water forming ponds which act as breeding places for diseases causing organisms and bad odours during rainy season. Therefore it is better to upgrade the road since it reduces on frequency of maintenance. In this, floods will be controlled since a drainage system will be put in place which will be able to convey all the runoff from the road.	Upgrading, gravel, bituminous paved surface, diseases, floods, drainage	Western	Maintenance & Rehabilitation	Pavement	Solution / Application	N32
3	Ndejje	Mukeh	2015	Hydrological and	Ndejje	The report herein contains of a Hydrological and Geotechnical Investigation on block 230.The scope of this research was to establish the soil profile, classify the soils	Soil profile, tests,	Central Uganda.	Material	Other	Platform /	N33

#	ORIGINATING INSTITUTION	AUTHORS	YEAR	TITLE	LOCATION OF DOCUMENT	ABSTRACT	KEYWORDS	GEOGRAPHICAL AREA	FOCUS AREAS	PAVEMENT LAYER FOCUS	TT LEVEL	Google Earth number
3	University	Nathan Dushimiyimana		Geotechnical Investigation for foundation design.	University, Mr. Kato Simon Peter	and assess the soil parameters, assess the ground water characteristics and assess the strength properties of the soils, accompanied by sketches. The literature was about how and why the tests are carried out for the success of any project like exploration tests. Consistency tests, stiffness and strength tests were carried out in accordance with the codes of practices (standards). The methodology adopted included; Desk study/ reconnaissance survey, site exploration, laboratory testing and hydrological study methods, Data collection and classification, analysis of results and design. The soils were saturated and this gave a strong justification for the hydrological and technical investigation for foundation designs of these projections into the depth at a minimum of 0.9m and 1.2m wide. The results and tests of the study were to achieve the objectives of the project are all contained in this report. It involved the analysis of the results to come up with design parameters. It also contained the recommendations which were based on the findings.	hydrological and technical investigation for foundation designs.				Solution	
34	Ndejje University	Semikole David Nazziwa Violet	2015	Comparison of chemical stabilization (cement) with mechanical stabilization (quarry dust) as sub base material for roads.	Ndejje University, Mr. Kato Simon Peter	According to the observation, the soil sub base together with the layers should bear all generated stresses transmitted by traffic loads. Most soils are often weak and they do not have enough stability in heavy loading. In this regards, it is necessary to reinforce and (or) stabilize the soils. Thousands of dollars are attributed to expensive soils in Uganda each year. Geotechnical design and analysis in/ with / on expansive soils may involve adding complications that otherwise would not have to be dealt with if expansive soils were not present. Traditional methods for chemical stabilization of expansive soils include the techniques aimed at reducing the potential swell pressure and swell percentage of the expansive soil without altering the soil chemistry. The report covers the study of chemical stabilization with mechanical stabilization as sub base material for roads. This research was aimed at finding effective ways of how quarry dust can be used as stabilizing agent as compared to cement in sub base lateritic gravel for plasticity and strength. The specific objective of this study was to characterize the properties of the natural soils, quarry dust and cement in order to determine the amount of stabilizer to be added, also the changes in plasticity and strength using CBR and plasticity index and then provide effects of mechanical and chemical stabilization to the soils on the project. Laboratory tests were carried out on un stabilized material including plasticity, linear shrinkage, gradation, CBR test, proctor tests and moisture content determination. The proctor, CBR and Atterberg limits tests were conducted on stabilized material. The California Bearing Ratio test (CBR) was done in accordance to BS1377: Part 4:1990, the Atterberg limit test was conducted according to AASHTO T248 while maximum dry density was obtained according to BS1377: Part 4: 1990. This research would help to increase the strength of gravel material of soil samples and also improve on the CBR value of the road base material.	chemical stabilization, mechanical stabilization, sub base material, road stabilizing agent, plasticity and strength, expansive soils, laboratory test	Central Uganda	Material	Subbase	Base	N34
35	Ndejje University	Kimomi Jackson Kaggwa Joseph	2015	Pavement and drainage design of Nanfubambi road in MakerereKikoni, Kawempe division	Ndejje University, Mr. Kato Simon Peter	Road transport is now the dominant form of transport throughout the world. Most economies rely heavily on road transport for passengers and freight movement. In response to the need, countries have expanded their road networks considerably constructing new or upgrading old ones. Nanfubambi is faced with drainage and pavement defects which have led to poor riding surface, dust nuisance and pot holes. The objective of this project was to upgrade the road with respect to the pavement and the drainage, in order to ensure the safety, speed, comfort and convenience of all road users, in order to achieve the main objective. The following tasks were carried out; Pavement (estimating traffic, measurement of sub grade strength, selection of pavement layer (thickness). Drainage (hydrology study, hydraulic design, design of drainage structures), and consultation. Laboratory tests were carried out to assess the strength of the existing sub grade layer which included; California Bearing Ratio (CBR) test, Dynamic Cone Penetrometer (DCP) test and Waterberg tests;, design and simulation (design was done by use of standards such as TRL, AASHTO), analysis which was carried out using Auto CAD programmable calculators, tables and chats. The findings were: And ADT of 5262veh/day which gave a traffic class of T7. The sub grade class of the road was found to be S5 with a critical CBR of 27%. Granular sub base of 150mm thick, granular base of 175 and surface dressing of 125mm thick will be used. A longitudinal side of the drain of 600mm base width, 630mm depth and 1:1.5 side slope was found to be adequate. Four number barrels of 600mm diameter culverts were adopted in the design. It is recommended that studies on cost benefit analysis should be carried out.	Road transport, dominant, upgrade the road, to ensure the safety, speed, comfort and convenience, tasks carried out;	Kampala district, Nanfubambi road	Design	Pavement	Solution / Application	N35
36	Ndejje University	Olowo Ezra Owino Lugalambi Ferro Thaddeus	2015	Flexible pavement and drainage design of Kawaala road.	Ndejje University, Mr. Kato Simon Peter	Kawaala-Bwaise road is experiencing flooding and amongst the worst roads in Kampala City. The road was purposely selected for evaluation, designing and improvement of motor able conditions, safety, operational comfort, capacity and economy in the community. This in return would substantially reduce time delay, air pollution, flooding fuel consumption, and environmental effects and increase the country's income due to the reduced time loss. The report also consists of the activities undertaking the flexible pavement design of Kawaala-Bwaise road. A total of 1.250m of the road length has been identified covering the whole project road. This entailed carrying out reconnaissance, topographic survey, analysis of the survey data and hence geometric design for the road section. Traffic counts were carried out and the data was analysed to determine the ESALs and design of pavement layers for the road components based on field findings and available road manual.	flooding, flexible pavement design, road	Kampala district, Kawaala road	Design	Pavement	Solution / Application	N36
37	Ndejje University	Arube Charles Lwanga	2015	Transforming generated solid wastes into raw materials for housing units.	Ndejje University, Mr. Kato Simon Peter	Generally, solid wastes management is a challenge to most developing countries, Uganda inclusive. Abim town council and other fast developing counties in Uganda have experienced rural urban migration and changes in consumption pattern and the outcome of urbanization, which calls for proper planning for management of all proportion. Generated solid wastes by the community in relation to environmental conservation and public health are the materials. Effective management of solid wastes generated by the community calls for a comprehensive and objective design of solid waste collection, treatment, recycling and disposal system. Treatment and disposal system must be in a way that will not have adverse effect. Environment emphasizing on recycling is the major focus of this proposal. In designing this waste water management and treatment system, care was taken in attempting to follow the guiding principles, some of which were; Local condition, population, solid waste sources and potential per capita solid waste disposal of community and institutions within Abim town council. Scientific in relation to the theoretical aspect of the solid waste recycling system, with constant guidance from the project supervisor and other professionals that have informed ideas and knowledge about the solid waste recycling option. The major objective of this project was to collect data on the various forms of solid wastes generated in Abim town council, analyse the best ways of managing and transforming them into raw materials at a low cost. Field visits and the physical plan were conducted at the town council which provided space for management of solid wastes (setting up small silos and plants for recycling wastes). The treatment of the entire project research subject was kept exhaustive, simple, economical and environmentally compatible with the project study area. Engineering analysis and judgment of the data that was collected during the field survey was conducted in consideration of the National requirements and regulatory standards to ensure compatibility of the proposed project with the environment.	solid wastes management, experienced rural urban migration, environmental conservation and public health,	Central Uganda	Material	Non-roads	Base	N37
38	Ndejje University	Biira Jennifer Ntwirenabo Caleb	2015	Design for upgrading of Kakyeka Road (1.4km) from Grave to Bituminous paved surface.	Ndejje University, Mr. Kato Simon Peter	This report consists of proposed design of Kakyeka road (1.4km) from gravel to paved standard. To carry out a flexible pavement design by collecting data on traffic, hydrology, topography, geotechnical, environmental impact assessment and socioeconomic activities, to carry out drainage design, to provide cost estimate and economic analysis, to operate and maintain .From the results obtained, the Average Daily Traffic was 926veh/day, an equivalent of 613PCUs/day. This therefore necessitated an upgrade of this road. Saloon cars had the largest percentage of 75%, followed by pick-ups and vans with 13%, mini and medium buses with 6%, light trucks with 4.7%, medium trucks with 0.6% while large trucks and heavy trucks with at least 0.5%. Sub-grade strength was found to be S4 and traffic class of T4 with CBR ranging from 8-14%. The pavement, geometric and drainage design of Kakyeka road was undertaken through traffic counts ,in-situ sub-grade tests, topographic survey and hydrologic analysis, the design period of 15years was considered based on reliability of design data and importance of the road. The combination of sub-grade strength class and traffic class of the road was used to obtain the required carriage-way, lane and shoulder widths and thickness of the pavement layers. The ADT showed that the road was due for upgrading considering the ministry of Works' and Transports' criterion for upgrading a road in an urban setting, with more than 300 vehicles/day. Using the data obtained above as outlined and recommended methodology, the final design of the pavement was accomplished. The pavement design had to fulfil the desired attributes providing the required comfort and safety to the road users. The thicknesses designed for the pavement layers were; double surface dressing (1st seal 20mm aggregates and 2nd seal 14mm), 150mm granular road based and granular sub base of 175mm. The road section is to have a 6m carriage-way and 1m shoulder widths while the drainage system consisted of 300mm base width trapezoidal subsurface channels and 2.5m wide by 0.9m height box concrete culverts.	gravel road, flexible pavement, Average Daily Traffic, upgrade, sub-grade tests, comfort and safety, road users.	Western Uganda	Maintenance & Rehabilitation	Pavement	Solution / Application	N38
39	Ndejje University	Ojambo Lydia	2015	Upgrading Rwizi road from gravel to bituminous standards from Buremba road to Mwizi-Isingiro road.	Ndejje University, Mr. Kato Simon Peter	This project was about upgrading Rwizi road from Gravel to Bituminous standards from Buremba road to Mwizi-Isingiro road which stretches a distance of 3.100km. The main objective was to design a flexible pavement with respect to the route, geometry drainage. This was done by assessing the current traffic using the road and existing geometric. The road project is characterized by a broken back curve, reverse, pot holes, which cause discomfort and delay on the road. Traffic surveys were done for seven consecutive days from 7:00 am to 7:00 pm, ESALs were obtained and then multiplied by the design life and growth factor to obtain the ESAL. The traffic count data was then used to get a traffic class of T2. The dynamic Cone Penetrometer test was done on the sub grade and the data was analysed to get the minimum CBR of 26% giving a sub grade class of S5. From the structural catalogue in the Uganda road design manual, S5 and T1 gave the layer thickness for the base and was determined to be 200mm. Wet sieving was carried out on the borrow pit material and this indicated that it was a well graded gravel soil therefore suitable for the	From Gravel to Bituminous standards, a flexible pavement, geometry drainage, broken	Western Uganda	Maintenance & Rehabilitation	Pavement	Solution / Application	N39

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						base and sub base layers. Heavy compaction done on the material gave optimum moisture content of 5.5%. The material had CBR of 45.1% which was less than the one recommended for the base by the Uganda road design manual therefore stabilization was recommended for the material. Both tests were carried out in accordance with BS1377: PART 4:1990. The Rational Method was used to determine the discharge and the concentration time was then got using Kirpch's equation for the catchment which was used to get the critical rainfall intensity from the IDF curves.	back curve, pot holes, discomfort and delay, upgrading.					
40	Ndejje University	Ssempijja Samuel Kasumba Mugejjera Abel	2015	Investigating the Potential of Pozzolanic Ash Mixed with Lime in the Stabilization of Gravel Road Base Material	Ndejje University, Mr. Kato Simon Peter	Lateritic gravel has been widely used in the sub Saharan Africa in the construction of road bases, embankments and foundations. In Uganda the need for lateritic soils as a road construction material is continuously increasing and yet there is high rate of depletion of the available lateritic soil. All treated fine grained soils exhibit a decreased plasticity, poor workability and reduced volume change characteristics. In addition, soils with high sulphate contents, stabilization with traditional, calcium rich chemicals have led to excessive swelling and heaving. The dwindling stocks of road construction materials country wide calls for innovation research into the use of existing and locally available materials. The main objective of this study was to investigate the potential of pozzolanic ash and lime in improving the performance of gravel materials to be used as a road construction material. Laboratory tests were carried out on un stabilized material including plasticity, linear shrinkage, gradation, CBR test, proctor tests and moisture content determination. The proctor, CBR and Atterberg limits tests were conducted on stabilized material. The California Bearing Ratio test (CBR) was done in accordance to BS1377: Part 4:1990, the Atterberg limit test was conducted according to AASTO T248 while maximum dry density was obtained according to BS1377: Part 4: 1990. This research would help to reduce dust nuisance on the roads that are constructed using stabilized gravel material, increase the strength of gravel material of soil samples and also improve on the CBR value of the road base material.	Lateritic gravel, sulphate contents, stabilization, road construction, laboratory tests, road base material	Luwero District	Material	Base, Subbase	Base	N40
41	Ndejje University	Bwire Alex Adhola Derrick	2015	Determining Pedestrian Walking Speed Characteristics at Signalized Junctions in Kampala.	Ndejje University, Mr. Kato Simon Peter	Pedestrian walking speed at signalized intersections is an important traffic engineering design parameter. The level of exposure of pedestrians to vehicle traffic depends on their walking speeds. Thus the safe design and operation of traffic signals must allow adequate time for pedestrians to cross safely. Growth in population has led to a high occupancy rate of buildings in Kampala and has resulted into tremendous concentration of people with different walking characteristics and a great deal of conflict between the needs of pedestrians and vehicles. Due to this conflict, the safety of pedestrians at signalized junctions has been compromised, thus the need to review the recommended value of 1.2m/s. This research entailed collection of pedestrian walking characteristic data and analysis of this data using statistical methods by; use of video cameras to record various pedestrian walking characteristics. The data was analysed using descriptive statistics and simple graphical representations of the walking speeds for each of the pedestrian characteristics. Traffic signals are timed to accommodate pedestrian base on the recommended walking speed of 1.2m/s. This assumption was not suitable for all pedestrians including old and disabled persons, children, and large groups thus investigation was needed to determine appropriate walking speeds for signal timing basing on pedestrian characteristics.	Pedestrian, signalized intersections, vehicle traffic, traffic signals, walking characteristic	Kampala district	Road safety	Other	Base	N41
42	Ndejje University	Negesha Tracy Nangendo Sumaya	2015	Performance Evaluation of Soils Stabilized Using Sisal Fiber and Lime	Ndejje University, Mr. Kato Simon Peter	The concept of soil reinforcement is used for the improvement of certain desired properties of soil like bearing capacity. Observation (UNRA, 2009, pp. 340) has revealed that some areas in Uganda lack engineering materials with adequate engineering properties for the construction of roads. This has rendered stabilization of road base materials necessary and has been achieved using lime and Portland cement which render the exercise quite expensive. Lime is a good stabilizing agent which is extensively applied in soil stabilization. However the cost associated with using lime as a stabilizer is high and therefore hinders its use as a stabilizing agent when an attempt is made to improve soils with poor geotechnical properties. The objective of this research was to evaluate the performance of soils stabilized using lime and fiber. Soil samples were got from two different borrow pits along Butobere- Muyumbu-Rwamucucu at chainages of 11+500 and 18+500. Sisal fibres of percentages of 0.25%, 0.50%, 0.75%, and 1.00% by weight of soil were soil as the reinforcement material whose strength were compared that of lime at percentages of 2.5%, 3.0%, 3.5% and 4.0% by weight of soil. The utilization of sisal fibres as stabilization agent for improvement of strength properties of soil would lead to a reduction in the cost of stabilization of weak soils since sisal is naturally occurring material which is readily available and would further lead to mitigation of the environmental related problems such as dust and water contamination.	soil reinforcement, bearing capacity, stabilization, road base materials, borrow pits, sisal fibres	Butobere- Muyumbu-Rwamucucu	Material	Gravel	Base	N42
43	Ndejje University	Irene Nankunda Julius EonyaElolu	2015	Investigation into the Causes of Early Failure on BweyogereButto (Kyobe) Road in Kiira Town Council, Wakiso District	Ndejje University, Mr. Kato Simon Peter	The major aim of this project was to investigate into early failure of flexible pavement roads of which Bweyogerere-Butto road was taken as a case study. To achieve this, field surveys were conducted to assess the road defects, traffic counts to determine the traffic loading on the road, DCP field test was conducted to determine the strength of the existing sub grade. The findings signified that the existing road surface had a lot of defects like pot holes, ravelling, bleeding, silted drains to mention but a few. The sub grade soil was classified as S3 along the section of 1km under study. The traffic counts conducted yielded a traffic class of T5 as per the Uganda roads design manual. The laboratory tests conducted on the soils used for the base construction revealed that the soils were well graded granular soils that conformed to the required specifications of the soils for road construction. In overall, the findings show that the heavy traffic that accrued from the neighbouring Namanve Industrial park and from traffic load caused by the trailers were earlier not anticipated during the design of the road and thus the existing pavement was found inadequate to accommodate the amount of traffic on the road. The recommendation therefore, is to rehabilitate the road with a new pavement that is able to accommodate the current traffic.	flexible pavement, road defects, traffic counts, sub grade, traffic class, laboratory tests, granular soils, rehabilitate	Wakiso district, Bweyogerere-Butto road	Management	Pavement	Solution / Application	N43
44	Ndejje University	Bizimana Charles Kwijuka Deus	2015	Design of Low Cost Mortar Using Wood Ash.	Ndejje University, Mr. Kato Simon Peter	The use of supplementary cementing materials has become an integral part of high strength and high performance in concrete/ mortar mix design. Research has revealed that mortars and concrete produced with a 5-20% replacement of ordinary Portland cement (OPC) with mineral additives yields strength comparable to when only OPC is used in the production. In this study, various combinations of wood ash were used in replacement of ordinary Portland cement to produce high strength mortar. The mortar produced was subjected to setting time and compressive strength test with blended OPC. Wood ash used in the study was obtained from burning different species of trees in Uganda. Compressive strength characteristics of mortar were determined at different ages of 7 and 28 days using a mix ratio of 1:3. OPC was replaced with different percentages of 0, 5, 10, 20, 30 and 40%of wood ash and compressive strength determined at different age of curing. The results show an increase in the initial and final setting time of the binder paste. The results also show a decrease in compressive strength with an increase in wood ash content with curing age.	mortar mix design, mineral additives, wood ash, compressive strength, setting time	Luwero district	Material	Non-roads	Base	N44
45	Ndejje University	Luwunga Robert	2015	Investigating the Suitability of Volcanic Ash to Increase Bonding between Bitumen and Aggregates.	Ndejje University, Mr. Kato Simon Peter	Construction and maintenance of roads is becoming an ever increasing challenge worldwide especially in the third world countries where there is shortage of funds yet road construction is very expensive. Innovativeness by improving use of cheap materials like volcanic ash in road construction can reduce the costs of construction and maintenance. The main purpose of this study was to test whether volcanic ash can suitably be used together with bitumen as a binding material in road construction. Volcanic ash is a material that is in huge quantities around many rocks in Uganda. Volcanic ash specimen were obtained from Mt. Elgon Toweli range, Mbale district and taken to Stirling Engineering Laboratory in Mukono district for investigation. An indirect tensile strength test was chosen for testing the tensile strength of samples to ascertain moisture susceptibility. The volcanic ash was mixed with bitumen and aggregates in varying proportions. Three different mixtures were made, including neat mixture (one without volcanic ash), a mixture of 5% volcanic ash and another one of 10% was also mixed. Each of the above mixtures was heated while mixing until homogeneous mixtures were obtained. For each of the heated mixture, two samples (one for dry sample another for wet sample) were made by compacting. The mixtures in moulds using 75 blows and allowed to cool for 72hours. Dry samples for each of the above three mixtures were made by getting them out of the moulds and drying them in air at room temperature for 24 hours. Wet samples were made by soaking sample in water at temperature of 1600C for 24hours once removed from the moulds. Indirect tensile strength for each of the sample of every mixture was obtained in k Pa by crushing using testing machine. Results for each mixture were obtained by computing averages from both dry and wet samples. Results showed that dry samples of 5% volcanic ash had the highest indirect tensile strength of 712.4kPa and dry/ wet indirect tensile strength at 80%. Wet samples with 10% volcanic ash had the lowest indirect tensile strength of 496kPa and the overall dry /wet indirect tensile strength was at 73%. It is concluded that volcanic ash when used in lower quantities of about 5% and given proper drainage can suitably meet acceptable construction standards or give acceptable tensile strength. It is recommended that Ugandan contractors who can gain confidence in using volcanic ash in the mixture together with bitumen can save on the cost of road construction.	Roads, volcanic ash, moisture, road construction, drainage	Mbale district	Material	Surfacing	Base	N45
46	Ndejje University	Nakanjako Rawya Rukekemya Haidar	2015	Selection of the Pavement Type Using the Whole Life Cycle Cost Analysis.	Ndejje University, Mr. Kato Simon Peter	Many countries are seeking ways to more efficiently manage budgets and improve road way performance. While there are many pavement types available, the most common alternatives have historically been asphalt and concrete pavements. The recently released mechanistic empirical pavement design guide and pavement design procedure and associated software application has provided pavement designers with a very comprehensive procedure to develop specific pavement designs that will suit the purpose of the urgency while minimizing costs. More design inputs have led to improvements in the design of the asphalt and concrete pavements based on long term pavement performance. Pavement type selection is one of the more challenging engineering decisions facing road way administrators. The process out lined in this report included a variety of engineering factors such as materials and structural performance which were weighed against the initial and life	road way performance, concrete pavements, pavement designs,	Luwero district	Management	Pavement	Solution / Application	N46

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						cycle costs as well as sustainable benefits. The technical part of the evaluation included an analysis of pavement lifecycle strategies including initial and future costs for construction and maintenance activities.	construction					
47	Ndejje University	Bongomin Robert Donald Ocen Robert	2015	Design of Low Cost Seal on Pader-Latanya Road	Ndejje University, Mr. Kato Simon Peter	Roads are the only form of access to rural communities. Effective transportation plays a crucial role in rural socio-economic development and in reducing poverty. Development of good rural road networks in an affordable and sustainable way using local resources provide cost effective transport infrastructure. Lack of proper maintenance works on Pader- Latanya road is an economic, social, health and environmental problem for the communities along the road. This report involved the design for upgrading (renovation) 1km section of Pader- Latanya road to bituminous surface. The objective of this report was to design a low cost wearing surface on Pader- Latanya road. This involved traffic surveys, material assessment, drainage design, geometric design, environmental impact assessment and maintenance plan. The traffic survey data shows that small personal cars and light trucks use the road frequently, the traffic class was adopted as T1 from the design traffic and sub grade class of S4 with 3 pavement layers, 150mm base layer, 125mm sub base, and 150mm of improved sub grade layer including 50mm Otta seal wearing course. Otta seal is an appropriate low cost sealing option which provides a satisfactory and low cost effective surfacing that most types of hot mixed bituminous surfacing.	Roads, transportation, renovation, wearing surface, traffic survey, drainage design, pavement layers, sealing	Arua district, Pader-Latanya road,1km	Design	Surfacing	Solution / Application	N47
48	Ndejje University	Kiige Geoffrey Sekandi Benon	2015	Design of Low Cost Sealing for Busamaga- Bumuluya Road (1km)	Ndejje University, Mr. Kato Simon Peter	Transport is central to the economic and social development of any country. Its primary role is to facilitate people's access to goods and services and information to enable them live economic and socially productive lives. Unsealed roads have continuously become a nuisance in the road industry both in the wet and dry seasons. Gravel losses have become enormous and the sources are being depleted at a very high rate. Available road sealing methods are very expensive and priority is given to high volume roads especially national roads. The overall objective of this project was to design a low cost seal for a 1km road of 5.4m carriage way width. Laboratory tests were carried out to determine the specific gravity of the sealant, sieve analysis and optimum primer. The gradation and size test were used to determine aggregate particle size distribution which was essential for determining the most important aggregate control. Sieve analysis was carried out in accordance with AASHTO T7 and the specific gravity of compacted bituminous mixture was done using AASHTOT275 standard. The low cost seal would cut down the high rate of gravel loss due to weather effects and traffic flow, reduce frequency of maintenance, provide smooth road surface to users and provide precise technical information on the design and implementation of low cost seals in Uganda.	Unsealed roads, gravel losses, road sealing methods, sealant, optimum primer, bituminous mixture	Mbale district, Busamaga-Bumuluya Road(1km)	Design	Surfacing	Solution / Application	N48
49	Ndejje University	Kazibwe Boaz Kimbagaya Yovan	2014	Investigation on the Construction and Maintenance Materials on UNRA, Masaka District Gravel Roads. (Case study: Masaka-Bukakata Road)	Ndejje University, Mr. Kato Simon Peter	Road transport system is the dominant mode of movement from one destination to another in Uganda with many desirable characteristics such as flexibility, door to door services and greater accessibility to remote areas for example Masaka- Bukakata road. Currently the road surface of Masaka- Bukakata road has adversely deteriorated due to development of pot holes, deep gullies and total breakdown of the already poor drainage system in some sections. This has in turn led to high vehicle operation costs and travel times as well as continuous road accidents. These rampant premature gravel road failures have led to high cost of maintaining the road. Therefore this project involved carrying out an investigation on the construction and maintenance materials on this road in order to solve the existing pavement problems and hence provide comfort to its users. The study area was toured and surveyed by the authors between December 2013 and March 2014 as the prime step in assessing the existing road conditions and identifying active borrow pits (material sources) along the road corridor. Laboratory test results carried out on five existing active borrow pits revealed that material from only 3 pits satisfied the requirement of a CBR value greater than 80% (BS1377: Part 4) at 98% MDD as required by the specification in the ministry of Works, Housing and Communication, "General Specification for Road and Bridge Works Manual" Republic of Uganda, January 2005. Sieve analysis and Atterberg limit test results for all the 3 borrow pits that satisfied the CBR requirement revealed a poorly graded gravel material with clay of intermediate plasticity (GP- GCI).Laboratory test results for the existing road base (0+00024+000km, (about 60% of the total road length)) material revealed that 42% satisfied the CBR requirement and 58% failed. Since the research study has investigated the construction and maintenance materials on UNRA-Masaka gravel roads with Masaka- Bukakata road as the case study, the project's success will save on the cost of constructing and maintaining gravel roads on Masaka district.	Road transport, flexibility, road surface, deteriorated, gravel road failures, construction, graded gravel material	Masaka district, Masaka-Bukakata Road	Construction	Gravel	Solution / Application	N49
50	Ndejje University	Elijah Chol Ayiik	2014	Highway risk Hazard Assessment. Case Study: Nimule-Juba Highway (Gordon Hill) South Sudan	Ndejje University, Mr. Kato Simon Peter	The project report titled "Highway Risk Hazard Assessment" was conducted along Nimule-Juba highway with the aim of identifying dangers faced by motorists and pedestrians on Nimule Gordon Hill Highway. Since the study findings confirmed that there are numerous road risks and hazards along the highway with destructive effects to the road users and their properties, the researcher concluded that injuries, accidents, destruction of property and deaths are the major effects of the hazards. Thus the researcher concluded that the consequences of the hazard were more frequent than other highway risks. The findings indicated that road safety equipment had an important role to play in preventing road transport accident hence reducing the likelihood of injuries in the event of an accident, the use of helmets for mortar cycles, seat belts for vehicle drivers and passengers were recommended and this would help to reduce the risk of road traffic injury and fatality. The traffic police and government should monitor the laws concerning the use road safety equipment and fines should be increased in order to force all road users to abide by these laws.	highway, accidents, hazard assessment, road safety equipment, road traffic injury, fatality, traffic laws	Nimule-Juba Highway	Road safety	Other	Solution / Application	N50
51	Ndejje University	Adonga Celsa Kyomuhendo Wyclief	2014	An Investigation into the Causes of Rapid Failures of Bombo Ndejje Road.	Ndejje University, Mr. Kato Simon Peter	Ndejje-Bombo road is a gravel road which is 8km off Kampala- Gulu highway; it is a major road which leads to major schools and other places for example Ndejje Trading Centre, the main Campus of Ndejje University and Ndejje health centre which provides health facilities to the entire Ndejje community and university students at large. The road is experiencing a number of road distresses and the major task in this project was to investigate the causes of these distresses. The main objective was to investigate causes of rapid deterioration of the road surface even after routine maintenance being done. The specific objectives were to identify the different distresses on the road and their causes, to carry out traffic counts and establish the Annual Average Daily Traffic, to determine the strength of the layers of the road and to propose a solution so that the road can be able to serve for long time without failure. To achieve the main objective of this study, a reconnaissance survey was carried out to find out the current conditions of the road, laboratory tests which involved sieve analysis for soil grading, proctor test aimed at finding the optimum moisture content and maximum dry density, the California Bearing Ratio test which helps in determining the sub grade strength and class determination. Traffic counts were also conducted using manual method for 12 hours in 7 days using traffic count form. The traffic count data was used to determine the Average Annual Daily Traffic (AADT) which was used to determine the extent of loading. The findings from reconnaissance survey showed that the road had distresses throughout and these included pot holes, rutting, corrugation, silting in the drainage channels and also roughness. From sieve analysis test, it was found out that soil was gap graded while the CBR test showed the sub grade was class S7. Traffic count analysis gave an AADT of 6205veh/day which was beyond maximum according to appendix 4 from the ministry of works and transport road design manual, volume 3 part III (2010). In conclusion, the road is overloaded and poor quality materials are being used which affects its performance, therefore, upgrading this road to a flexible pavement, improving the drainage system and close supervision to enhance quality management is recommended.	gravel road, road distresses, routine maintenance, traffic count, Annual Average Daily Traffic, reconnaissance survey, laboratory tests, gap graded, sub grade, road design manual, flexible pavement, drainage system	Luwero district, Bombo-Ndejje Road	Management	Pavement	Solution / Application	N51
52	Ndejje University	Kiranda Denis Kizza Herbert	2014	Modifying Asphalt Concrete Used in Road Construction	Ndejje University, Mr. Kato Simon Peter	This study was aimed at determining ways of improving the properties of asphalt while reducing the waste plastics in the environment. By improving the properties of asphalt used in road construction, it will help to reduce on defects, need for maintenance and attaining road design life. Road transport is one of the most affordable means of transport in Uganda covering 20,000km with 3,500km paved according to Uganda National Roads Authority (UNRA) report of 2011-2012. However, these roads are deteriorating at a very first rate due to increasing traffic loads, poor workmanship, poor maintenance strategies, poor quality of construction materials, environmental factors and many others. This project report is centred on the quality of construction materials used in roads with asphalt in particular since it is the most the expensive material in construction. Therefore, modifying it using waste plastics will reduce on the costs required for construction and maintenance; improve on rheological and engineering properties of bitumen, creating employment opportunities and many others. Waste plastics are non-biodegradable meaning that they can't be decomposed. Incinerating plastics leads to production of poisonous gases like carbon dioxide and sulphur dioxide which are hazardous to the environment. Adding waste plastics to will greatly conserve the environment. This project report represents the steps undertaken to complete the research on how waste plastics can be used as a modifier in bitumen to improve on the quality of our roads. In this research, impacts of waste plastics, simple tests like water test, finger nail test and hot copper wire test were performed to identify suitable plastics used as modifying materials. These simple tests were conducted according to Vogler and John 1984. Comparison laboratory tests for both rheological and engineering properties of bitumen were carried out on both modified and ordinary bitumen. Tests carried out on bitumen included; penetration testing accordance to AASHTO T49 (ASTM D5), Marshall stability and flow test according to ASTM D1559, ductility test according to ASTM D113-86 and softening point test according to ASTMD36-70 in Central Materials Laboratory testing manual 2000. Graphs and tables were adopted in the analysis of the results. In the findings, rheological properties like penetration test and ductility tests registered great decrease and softening point increased after adding waste plastics. Engineering properties like Marshall Stability also increased with increasing percentage of waste plastics. In conclusion, by adding plastics to the	Asphalt, waste plastics, road construction, road design life, rheological and engineering properties of bitumen, non-biodegradable, laboratory tests, Marshall Stability, conserve environment	Luwero district	Material	Surfacing	Base	N52

#	ORIGINATING INSTITUTION	AUTHORS	YEAR	TITLE	LOCATION OF DOCUMENT	ABSTRACT	KEYWORDS	GEOGRAPHICAL AREA	FOCUS AREAS	PAVEMENT LAYER FOCUS	TT LEVEL	Google Earth number
						ordinary bitumen, the rheological properties can be improved. As there was a great increase in the softening point, decrease in penetration and ductility values; a decrease in penetration value indicates sufficient hardness of bitumen. By increasing the percentage of plastics, the stability values were increased and required quantities of binder contents (bitumen) were reduced. This report also presents that addition of waste plastics to bitumen will significantly conserve our environment from non-biodegradable plastics, save costs incurred in road construction and maintenance due to improved strength and durability thus improving on the national economy.						
53	Ndejje University	Peter Bol Matiop	2014	Performance Evaluation of Clay Soil Stabilized with Lime and Sand as Base Pavement Material in Jonglei South Sudan	Ndejje University, Mr. Kato Simon Peter	Road transport in the whole world serves as the most common means of in land transport accounting for the biggest portion of freight and passenger movement. In road construction, utilization of local resources should be more emphasized in human resource participation and construction of material used especially for low volume unpaved gravel roads. Many parts of the country lack materials that meet the ministry of Works, Housing and Public Utilities, General Specification for roads and bridges, 2006. In order to proceed with construction under such conditions, some techniques are needed to improve mechanical properties of such soils and the common practice is to stabilize the existing materials. Road construction on problematic engineering soils like clayey soils is making some progress in Jonglei state largely due to rapid and continuous growth in the construction industry after two decades of civil war. In this study, the performance of clay soils stabilized with lime and sand as base and sub base pavement material in Jonglei will be evaluated. The main objective of this study was to evaluate the performance of clay soil stabilized with lime and sand as base and sub base pavement material. The specific objectives were to characterize soil samples to be used in the study, to determine the MDD and the OMC of clay soil, to investigate the effects of stabilizing clayey soils with different concentration of lime and sand on its strength properties and to analyse the results and recommend optimum amounts of lime and sand for stabilization of clayey soils in Jonglei. Laboratory tests were carried out to determine the soil properties and to control the moisture conditions in the soil properties which were compared before and after stabilization. The main test relating to the nature of particles and the relationship with water were performed in the ministry of roads and bridges of South Sudan laboratory in Juba and some tests were carried out in Ndejje University Civil Engineering Laboratory. Modified compaction test was carried out in accordance with ASTM D698 to establish the moisture- density relationship of samples, it was noticed that the dry density increases with the amount of hydrated lime added. In conclusion, different clay-sand combinations can be used for different engineering applications as recommended, however, it can be noticed that the dry density increased by 8% with the amount of hydrated lime added. Sufficient sand is therefore recommended for a stable base and sub base pavement in and around Kongor, Jonglei state of South Sudan.	Road transport, road construction, problematic engineering soils, stabilizing clayey soils, compaction	Jonglei(South Sudan)	Material	Base, Subbase	Base	N53
54	Ndejje University	Odongo Edward Eyak	2014	Assessing the Performance and Sustainability of Rural Community Access Road (Bar Sub county- Lira District)	Ndejje University, Mr. Kato Simon Peter	Performance and sustainability have become a key concern of successful rural development projects where it starts right from project conception, design, implementation and operation and maintenance. This study examined the performance and sustainability of rural community access road in relationship of community participation of the two parishes of Ayamo and Ayira in Bar Sub county in Lira District. The specific objective included to: determine the role of the local community in operation and maintenance of the access roads, assess the performance of rural community access roads, and determine the challenges in the operation and maintenance of the access roads within the district, and establish the relationship between the community involvement in and sustainability of rural access road projects within sub county. Descriptive Correlation Study Design was used and data drawn from 46 questionnaires from Ayira and Ayamo parishes. Quantitative results showed that there was statistically weak positive significant correlation between community involvement in decision making, community involvement in establishing management, performance and sustainability of rural of rural access road projects in Bar Sub county, statistically significant positive relationship between community involvement in contributing in kind and performance sustainability of rural access road project in Bar sub county. In review of these findings therefore, the study concluded that: community involvement in decision making about the rural access roads maintenance are cosmetic; local communities contributed in kind by offering voluntary labour, tools and land, communities do have weak functional established rural access roads management structures in Bar sub county. The recommendations are that: different stakeholders should bring on board and their role clearly defined as per the operation and sustainability of the rural community access road, more sensitization of the local members on the importance of maintenance and the contribution in kind towards operation and maintenance of the access road. Local government and nongovernment organization should fully involve local communities in decision making, establishing the road management committee, and setting up the operation and maintenance plan to ensure performance and sustainability of these assets. The researcher pointed out areas where further research could be carried out; to establish the impact of monetary rewards on labour provision as far as operation and sustainability of rural access are concerned, to examine the factors affecting sustainability of access roads in rural areas.	Road, Descriptive Correlation Study Design, rural access road, maintenance plan, sustainability	Lira district	Management	Gravel	Solution / Application	N54
55	Ndejje University	Ochieng Saviour Francis	2014	Storm water Management at Kyambogo Junction	Ndejje University, Mr. Kato Simon Peter	Kyambogo Junction lies along Jinja Road at approximately 6kmfrom Kampala City. It is a low lying area which experiences flooding during heavy rains. This hampers traffic flow during rainy season and a result increases travel time and costs. Therefore, the aim this project is to design a sustainable drainage improvement to mitigate flooding at the junction. To achieve this objective, the scope of works involved data collection, hydrological study, hydraulic assessment to ascertain the performance of the existing and proposed structures in undertaking the various stages of design, various publications and references were utilized for guidance. Two approaches were looked at in detail to identify a viable solution. These included attenuation of peak flows and diversion of flows upstream the junction. Conclusively, the study established that when 2 wet ponds are constructed the peak flow would be delayed by 26 minutes. This would ideally address the problem of flooding at the junction due to the fact that peak flow is greatly reduced of the junction.	Junction, flooding, hydrological study, hydraulic assessment, proposed structures, attenuation of peak flows	Kampala district, Kyambogo junction	Environment	Other	Solution / Application	N55
56	Ndejje University	Odong Denis, Lomoro Alex Manase	2014	The Use of Sewage Sludge Ash in the Stabilization of Expansive Clay Soil Properties in Uganda. Case Study Atiak sub count	Ndejje University, Mr. Kato Simon Peter	The study was carried out to investigate the use of sewage sludge ash (SSA) in improving the engineering properties of expansive clay soil in Atiak Sub County particularly along Gulu-Nimule highway in Atiak- Bibia border post. These road section experiences high accidents, slippery road surface, vehicle stuck, warping during the rainy season due to the poor soil conditions. It is, therefore, necessary to mitigate the problems posed by this expansive clay soils and prevent further cracking of the road. The study was conducted according to British Standards; BS 1377, AASHTO classification of clay soils and Uganda design manual for highways and bridges. The performance of expansive clay soils with sewage sludge ash was investigated with respect to compaction characteristics, California Bearing Ratio (CBR) and Atterberg limits. The properties of untreated clay soil were first investigated and then the SSA was added in proportion of 5%, 15%, and 25% respectively in the clay. The results of the investigation indicates a reduction in plasticity index from 25% for untreated clay soil to 18% and 10% when 5% and 15% of SSA were added in the clay soil. The OMC increases with increase in SSA from 22.3% to 24.5% and 29.5% when 5% and 15% SSA were added in the clay soil respectively and the MDD decreases with increase of SSA from 1.52g/cm3 to 1.24g/cm3 and 1.02g/cm3 when 5% and 15% of SSA were added in the clay soil. The CBR increased from 5% for untreated clay soil to 16%. 32% and 34% when 5%, 15% and 25% SSA was added in the clay soil. The conclusion drawn from this study was that SSA improves the strength of the clay soils, the plastic and elastic properties of the clay soil. Further studies were recommended on environmental impact of SSA, the durability and workability of SSA and variation of CBR of stabilized clay soil with soaking days. Many challenges including lack of standards for SSA specification, finance, limited laboratory facilities and many others were faced in executing this study.	sewage sludge ash, high accidents, clay soils, workability, durability	Atiak district, Gulu-Nimule highway	Material	Gravel	Base	N56
57	Ndejje University	Mujugumbya Wallace Rodney Namakula Sandra	2014	An Investigation on Whether Steel Fibers Extracted from Post Consumer Tires can Improve Mechanical Properties of Concrete.	Ndejje University, Mr. Kato Simon Peter	The road transport sector has over the years recorded a tremendous growth in the number of vehicles registered and those on road. However analysis shows that although the number of registered vehicles on the road has been increasing over the years since 2005, this trend reversed in 2009 with approximately 1% decrease in the number of newly registered vehicles. It is in Uganda where postconsumer tires are re-grooved with treads and re-distributed to ignorant consumers and this poses a high death rate to the public because these tire are not efficient on the road. The increase accumulation rate of post-consumer tires as wastes poses a great problem to the environment and economic sector of our country. When tires are dumped, they cause great financial strain in the country especially to the environment since they are impervious; they limit infiltration and air circulation into the ground. They also pose an elevated health risk if not properly handled for example cause incurable diseases like cancer if an option of burning is chosen. Thus there is need to create higher and useful demand for some of the components of post-consumer tires which might be economical in the long run and a ticket to a non-polluted environment. The main objective of this report was to investigate the enhancement of the mechanical properties of concrete if reinforced with steel fibres from post-consumer tires. Three mechanical properties of concrete were looked at namely; workability, bending and compressive strength. Comparing these properties of plain concrete with those of fiber reinforced concrete. This involved casting of plain concrete cubes and beams as well as those of fiber reinforced concrete with fibres varying in percentage by mass and then comparing the mechanical properties of plain concrete those of fiber reinforced. Different laboratory tests were carried out for example slump test, compressive strength test and flexural strength test. The	Road, reinforced with steel fibres, workability, plain concrete, laboratory tests, flexural strength	Luwero district	Material	Non-roads	Base	N57

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						slump test indicated a decreasing trend when the percentage of fiber increased. The compressive strength test results showed that the compressive strength increased with increase in fiber dosage and flexural strength trend on all fibres varied when the percentage of fiber was increased. Therefore, for steel fiber reinforced concrete, the workability results were indirectly proportional to the compressive and flexural strength tests. In conclusion, the research showed that the use of short fibres in structural concrete alters the mechanical properties of concrete, the strength of plain concrete decreased on addition of short steel fibres.						
58	Ndejje University	Nanyombi Sharon and Namulindwa Winnie	2014	Investigating the Quality of Sand used for Building Construction Nyimbwa sub county, Luwero District.	Ndejje University, Mr. Kato Simon Peter	This report is a document of findings under a topic "investigating the Quality of Sand used for Building Construction Nyimbwa sub county, Luwero District." It comprises of physical and chemical properties of sand samples from the borrow pits within Nyimbwa sub county, the strength properties of mortar and concrete mix designs, characteristics of the selected sand sources, results obtained and suitable recommendations to the menace that underlies use of poor quality construction materials. The work undertaken during this research mainly involved inspection, site visits and quality control of materials (laboratory tests). The laboratory tests particularized in this report were carried out with reference to the British Standards, AASHTO and approved by the technical team in Ndejje University material laboratory. The report also explicates the previous research done by various scholars and technicians in relation to sand samples from different borrow pits, testing its suitability mainly for construction.	chemical properties, construction, concrete mix designs, laboratory tests, borrow pits	Luwero district	Material	Non-roads	Solution / Application	N58
59	Ndejje University	Salakani Robert Dhaira Abbey	2014	Design for the Upgrade of Kaliro-Buwenge Road from Unpaved to a Flexible Paved Road	Ndejje University, Mr. Kato Simon Peter	Kaliro- Buwenge road was a project undertaken in order to meet the needs of the community, mostly transport system. At present the road is facing problems of pot holes, edge breaks, dust and muddy defects during dry and wet season respectively; and many more which have resulted to water logging, narrowing of the road width and slippery of the road. As an approach to solving these problems, a need of assessment study was carried out to ascertain the required facilities. From the survey which was made, it was deemed necessary to design a flexible paved road in order to meet the standards of its services. This can solve the problems mentioned above when designed for its upgrade to district standard levels of service as it is in the project. This road connects four districts namely; Kaliro, Iganga, Luuka and Jinja. Thus this project aimed at designing a sound pavement structure with materials of appropriate thickness which could effectively support the axle loading applied by the prevailing traffic condition for 1.2km of stretch of the 47km long.	Road, flexible paved road, upgrade, pavement structure	Iganga district, Kaliro-Buwenge road	Maintenance & Rehabilitation	Pavement	Solution / Application	N59
60	Ndejje University	Ayuen John Bogere Ronald	2014	Re-design of Namasuba- Ndejje Road	Ndejje University, Mr. Kato Simon Peter		proposed design, paved road standard, traffic, drainage conditions, laboratory test, carriageway, trapezoidal channel	Central	Design	Pavement	Solution / Application	N60
61	Ndejje University	Kiirya Emmanuel	2014	Re-designing of Kaliro-Iganga Road	Ndejje University, Mr. Kato Simon Peter	The purpose of this project was to design Kaliro- Iganga Road to a standard level in order to handle the increasing traffic loading for a design period of 20 years. Kaliro-Iganga Road is a tarmac road stretching from Kaliro district to Iganga. It's approximately 33km long; there has been an increase in the socio-economic activities in both districts. Traffic surveys were done for three days from 6:00am to 10:00pm. The ESALs data was then used to get traffic class of T2. The Direct Cone Penetrometer test was conducted at intervals of 100m on the sub grade and the data was analysed to get a minimum CBR of 18% giving a sub grade class of S5. From the design manual for S5 and T2, the layer thicknesses were cemented sub base and base were determined to be 150mm and 100mm respectively. Double seal surface dressing of thickness 20mm was chosen as recommended from road note 31. Wet sieving carried out on the borrow pit material indicated that it was a well graded gravel soil. Therefore suitable material for base and sub base layers since a high dry density could be achieved on compaction. The soil was found to be plastic with a plasticity index of 22% obtained from the plastic limit of 21% and liquid limit of 43% at chainage of 20+500 as determined from the Atterberg limit test. Both tests were carried out in accordance with BS1377: PART 2: 1990. Heavy compaction done on the material indicated a maximum dry density was 2.08MMg/m3 and optimum moisture content was 12%. The material had a soaked CBR of 30% which was less than the recommended therefore cement stabilization was opted for. Both tests were carried out in accordance with BS1377: PART 4: 1990. The Rational Method was used to determine the design discharge. The IDF curves were developed from the 10 years rainfall from National Teachers College Kaliro (NTC) department of Geography for a return period of 20 years using the Watkins and Fiddle's method. The catchment determined from topographic maps was derived from two sub catchments A1=42,500m2 and A2= 36250m2. The concentration time was then got from Kirpich equation for both sub catchments which was 5minutes and it was used to get the critical rainfall intensity of 206mm/hr from the IDF curves. The weighted runoff coefficient of 0.461 was got from the topographic map basing on land use. The discharge was calculated as Q1=1.132m3/s and Q2=1.502m3/s and then used to determine the culverts sizes of 600mm and drainage channels with side slopes of 1H:3V and depth varying between 700mm and 900mm (base width 300mm), the entire project was estimated to cost around 55,837,200Ug.shs.	tarmac road, traffic surveys, sub grade, double seal surface, well graded gravel soil, borrow pit material, compaction, cement stabilization catchment,	Iganga district, Kaliro-Iganga road	Design	Pavement	Solution / Application	N61
62	Ndejje University	Habumuremyi Bernard	2013	An Investigation of the Causes and Impact of Pavement Distresses on the Riding Surface. Case Study Sir Apollo Kaggwa Road	Ndejje University, Mr. Kato Simon Peter	Currently, roads in Uganda are generally in poor conditions characterized by carriageway failures and wide spread traffic congestion. These have resulted in exceedingly low levels of service evidenced by breakdown of traffic flow across the road network for most of the day. The standard of working and living in the city continue to degenerate especially in light of increasing urbanization. A systematic forensic study was carried out on Sir Apollo Kaggwa Road which included; conducting a visual pavement survey, performing a traffic study, conducting formal and informal interviews, reviewing data and reports made on earlier studies, and analysing this data to develop causation and repair recommendations. The primary causes of the pavement distresses at the project site included; misuse of pavement structures (dumping of garbage in drainage facilities and vehicles stopping in unappropriated places), surface and sub-surface drainage inadequacies (no side drains and road camber to drain water to side drains), excessive amount of expansion joints and poor sealant conditions. The presence of dust (sand and silt), and insufficient pavement thickness were also noted.	Roads, carriageway failures, traffic congestion, traffic flow, pavement distresses, sub-surface drainage	Kampala district, Sir Apollo Kaggwa Road	Management	Pavement	Base	N62
63	Ndejje University	Lubira Daniel	2013	Design of low cost sealing for Busamaga-Bumuluya Road (1.0km).	Ndejje University, Mr. Kato Simon Peter	The purpose of this project was to design a low cost seal for a 1km road of 5.4m carriageway width; this included determining the physical and mechanical properties of aggregates to be used, determining the optimum binder and aggregate contents, determining the stability of the sealant and also estimate the cost the sealant to seal a 1km of 5.4m wide low volume traffic road. The samples of aggregates MBQ and KQ were collected and tested according to BS, ASTM and AASHTO standards. The tests included sieve analysis, density and water absorption, aggregate impact and crushing values, Marshall mix designs, stability and flow. The binder used in the mix design was K1-60. The average aggregate crushing value was 25.5%, the average specific gravity was 0.894g/ml and the average stability was 0.93kN while the average flow value was 0.31mm. The aggregate content in the optimum binder was calculated as 90.8%. the application rate was as follows; the intended thickness was 25mm, volume was 0.025m3/m2, the rates and quantities of materials to be applied were; binder =2.3l/m2:12420 litres, aggregate =22.7l/m2:129m3 and stability was 9.12. The optimum binder content calculated at maximum stability, density, voids and optimum binder content is higher than the standard value. The estimated cost of the sealant was obtained from the current market rates and it was shs.381, 092,800. All the comparative standards which were used were based on hot asphalt concrete.	road, carriageway, aggregate content, hot asphalt concrete, low volume traffic road	Mbale district	Design	Surfacing	Solution / Application	N63
64	Ndejje University	Kakulu Erias Jjuuko Kirenzi Yahaya	2013	Improvement of Nankuwadde Swamp Crossing Along Bira-Bujjuuko Road in Wakiso District	Ndejje University, Mr. Kato Simon Peter	This report consist of a detailed proposed design for the feasibility study for the improvement of Nankuwade- Bujjuuko swamp crossing which stretches a distance of 500m. The main objective of this study was to design the pavement along the swamp including drainage. It was based in Wakiso district bordering Rubaga Division along the Lubiri Wetland. It has the population of about 50000 people as per the statistics from UBOS population census of 2002. During the rainy season, it's almost impassable as storm water virtually cuts it off. This was done by assessing the current traffic using the road, existing geometry, pavement structure and designing an appropriate drainage system for the swamp crossing. Laboratory and field tests, surveys, consultations and observations were some of the methods were used to collect data. Form the results obtained, the Average Daily Traffic was 1,116vehicles/day, with motor cycles taking up the greatest percentage of traffic (43%). The ADT showed that the road was due for upgrading considering the ministry of works and transport's criterion for upgrading a road in an urban setting with more than 300vehicles/day. It was discovered that flooding is caused by a small sized culvert of 600mm which can't contain the substantial volume of storm water during the rainy season. The use of hydrologic and hydraulic assessment data were taken into consideration in the design of a better cross drainage structure by use of Kirpich and Rational formulae and IDF curves for the peak flood discharge which was obtained as 18.65m3/s. from this discharge, it was concluded that use of box culverts of	proposed design, drainage, current traffic, laboratory and field tests, upgrading a road, flooding, box culverts	Wakiso district, Nankuwade-Bujjuuko road	Maintenance & Rehabilitation	Other	Solution / Application	N64

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						2.6x 1.2m would suffice as an alternative method that could be implemented to significantly improve on the drainage problem.						
65	Ndejje University	Emma Lawino Waihenya	2012	Road Accident Analysis in Luwero Municipality	Ndejje University, Mr. Kato Simon Peter	Luwero Municipality has been developing at a fast pace in the recent years therefore, travel demand arises as a result of development. This first development pace increases the number of vehicles used on roads. With the unrestricted mixing of several classes of road users, road traffic accidents have become a common occurrence in the area, hence a need to analyse the current safety situation using available crash records and suggest measures to enhance road safety in the network. The report covers traffic crash records for the years 2009, 2010 and 2011. The main objectives of this study is to classify road accidents according to their locations and the level of severity, to determine black spots in the network, to recommend appropriate designs and finally provide a cost estimate. Crash severity method was used to analyse the obtained data. However, manual traffic counts and field observations at some particular hours and weather conditions of the day was carried out to give an over view of the current operating condition of the road network in the municipality. From the findings, 28% of the crashes involved vehicles and motor cycles and 25% occurred between motorcycles and bicycles/ pedestrians which were the highest. Crashes involving vehicles with pedestrians were 13%, 10% for vehicles and motor cycles, 9% for motor cycles and motor cycles, crashes involving vehicle and property were 8% while that between vehicles and vehicles represent 7% of the total recorded crashes for the last 3 years. Poor maintenance of road network surfaces, inadequate road furniture and/ or their poor maintenance, negative attitudes by the road users among other factors contribute greatly to the occurrences of these crashes. However, the following recommendations were made: road surface maintenance, improvement of road furniture, routine checking of vehicles and road safety sensitization among the road users can go a long way to reduce the road traffic crash occurrence in Luwero Municipality.	road traffic accidents, crash records, road safety, road network, Crash severity method, traffic counts, maintenance, road furniture	Luwero district	Road safety	Other	Solution / Application	N65
66	Ndejje University	Hakizimana Venust	2012	Structural Performance of Rammed Earth Verses Burnt Clay Masonry Construction in Uganda. A case study of Domestic Buildings	Ndejje University, Mr. Kato Simon Peter	To meet the requirements of domestic buildings and to assess their sustainability, a life cycle of rammed earth and fired clay bricks were looked at in this report. This report include the results of laboratory tests, models and life cycle assessment. From the test results, it was found out that all samples obtained from the existing fired clay brick manufacturing site have much content of fine particles. The compressive test gave an indication of the ability to withstand crushing forces applied to the wall by the weight placed on it. Rammed earth should be compacted at its optimum moisture content keeping the soil dry during wet weather is a very important consideration. Formwork should also have sufficient strength and stiffness.	Sustainability, fired clay bricks, laboratory tests, rammed earth, formwork, life cycle assessment	Luwero district	Material	Non-roads	Solution / Application	N66
67	Ndejje University	Uriga Akasa Daudi	2012	Investigation on the Structural Quality of Locally Manufactured Clay Bricks in Uganda. A Case Study of Luwero District.	Ndejje University, Mr. Kato Simon Peter	Clay bricks are very crucial building materials in the construction industry and their quality determines the quality of the structure though there are other factors such as quality of mortar, workmanship and others. In this study, attempts have been made to find out the basic parameters such as dimension, compressive strength and water absorption rates. The samples were collected from the selected site and tests were carried out and the results were analysed. The analysis showed that all the bricks had low compressive strength of less than 5n/mm, while the dimensions were good for the length of the bricks in all the sites which were nearer to 215mm and the width of the bricks were fairly good which was about 50% of the samples. The average water absorption rate obtained was 17.1%. These results were compared with the required BS 3921 (1985). The results showed that the bricks did not meet the required standards.	construction industry, quality of mortar, workmanship, low compressive strength	Luwero district	Material	Non-roads	Base	N67
68	Ndejje University	Sembatya Andrew	2011	Hydraulic Design of a Reinforced Pre-cast Box Culvert. A case study of Nakivubo Channel, Kampala District	Ndejje University, Mr. Kato Simon Peter	For the past several years, Kampala which is an urban area has experienced numerous development ranging from commercial and business centres, residential and industrial growths. These developments have led to increased impervious surfaces such as roofs, paths, roads and so many others and decreased pervious surfaces such as bare soils, lawns, grasses and others. As a result, the impervious surfaces have reduced the rate of infiltration of the storm water and hence have increased the runoff volumes reducing the catchment travel time. The end results have increased and delayed traffic. The main objective of this study was to design box culvert to convey storm water across Namirembe Road under the most severe flooding conditions, and to move highway traffic freely over Nakivubo Channel. The specific objectives were to estimate the peak flow in the catchment area around Namirembe road, to estimate the loading due to traffic flow over Nakivubo Channel, to design a box culvert taking the above into consideration and to provide cost estimates. The procedure comprised of data collection, drainage area estimation, determining the critical rainfall intensity of specific return period, determining the time of concentration, the design discharge and the design load. The information provided an input to the design of the box culvert after which the cost was estimated to be UGX450, 376,155.	impervious surfaces, design box culvert, convey storm water, delayed traffic, highway traffic, critical rainfall intensity, time of concentration, design discharge	Kampala district, Nakivubo channel	Environment	Other	Solution / Application	N68
69	Ndejje University	Sengendo Michael	2011	Evaluation of the Performance of Drainage Structures on Gravel Roads in Luwero District. A Case Study of Culvert Structures Along Bombo- Ndejje Road.	Ndejje University, Mr. Kato Simon Peter	This research project aimed at evaluating the performance of culvert drainage structures on Bombo-Ndejje gravel road in Luwero district. The objectives of the study were: to evaluate the general performance of culverts and to compare the performance of the concrete culverts with that of Armco culverts under different road conditions so as to propose replacement of concrete with Armco culvert where necessary. These objectives were achieved carrying out literature review, collection of data with the help of the inventory and field condition surveys, carrying out a hydraulic design check to assess the hydraulic capacity of the culverts, and performing strength test on concrete culverts established their structural capacity. The data was analysed and solutions proposed. It was established that the root causes of poor performance of culvert structures on Bombo-Ndejje road were: inadequate cover, poor compaction of back fill material; where the bed was prepared with hard core, it caused cracking and crumbling, unstable and/ or soft bed material caused differential settlement, excavation made were very big, poor compaction of side support and back fill material, and absence of mortared joints caused wobbling, and finally lack of maintenance caused silting of the culvert pipes. The existing 450mm diameter concrete culverts were found hydraulically inadequate. It was suggested to; use adequate cover material on the culver crossings at least half the diameter of the culvert pipe (rule of thumb); the excavation for installing culvert should not be made too big (the recommended diameter should be equal to D+600), the bed to be prepared with good borrow material, the side support and cover material should be well compacted. Regular maintenance should be carried out. It is recommended to sensitize the community on proper disposal of both solid and liquid wastes. Local leaders and the population should be sensitized about their roles in the maintenance of feeder roads. It is also recommended; to have extra care during design to accurately forecast the design capacity so that culverts function effectively during their design life.	culverts, culvert drainage structures, inventory surveys, hydraulic design, compaction of back fill material, differential settlement, compaction, regular maintenance	Luwero district, Bombo-Ndejje gravel road	Environment	Gravel	Solution / Application	N69
70	Ndejje University	Sembatya George	2011	Improvement of the Design Properties of Fibre Concrete Tiles.	Ndejje University, Mr. Kato Simon Peter	Housing is one of the major problems facing developing countries. Many people especially in rural and slum areas of towns live in dirty and dilapidated structures. One way this problem can be overcome is by introduction of low cost housing programs. Given the limited resources available for low cost housing, it is important that building costs be kept to a minimum by the use of appropriate materials and techniques. This can achieved through research on our locally available materials to check whether they conform to acceptable standards. The fiber concrete roofing (FCR) tile is one such material. FCR technology has been used in many parts of the world and it has proved to provide economical and affordable roof covers for the low income class. It has contributed to the attainment of several development objectives namely: employment creation through material extraction and labour in production units; improvement of the balance of payments through import reduction; creation of rural industries; it's simple and can easily be understood. In Uganda, FCR technology was introduced around 1987 by producers N.K. TILES LTD and other non- governmental organizations. However all has not been well with the FCR tile its inception in Uganda, leakage and development of black patches due to fungi attack and dust clogging has been very rampant. These have led to a tremendous drop in demand for the product, to a level that only a few individuals are now interested in using the product for roofing. This book focused on the various causes and possible solutions to the problems experienced when using FCR tiles as mentioned above. The description of the technology was dealt with the materials used, the equipment, and the production and quality control process. Also the causes of leakages and fungi attack were identified. In addition, the design properties of the various types of tiles available on the Uganda market were recorded and comparison made. In order to eliminate leakages, a redesign of the FCR tile was conducted. The various factors that affect the marketing of the improved tile was identified and dealt with accordingly. It was identified that the problems facing the FCR tiles were due to lack of proper quality control during the production and installation processes, lack of knowledge on dissemination to the various organizations that need it and poor quality roof structures. Fungi attack was also identified as the other problem facing the FCR tiles in Uganda. It was discovered that most of the above problems can be overcome by: appropriate training of the labour, use of good quality equipment and materials, and also setting standards that are appropriate for Uganda's conditions.	appropriate materials, affordable roof covers, labour in production unit, fungi attack	Luwero district	Material	Non-roads	Base	N70
71	Ndejje University	Kibanda Swaibu	2011	Investigation of the Structural Properties	Ndejje University,	To me there is no data on the structural properties of our widely used local "musizi" timber on the Uganda market. Due to the growing construction industry in this country, investigation of the structural properties of this timber species has special importance and it therefore a necessity. The research involved collecting samples	structural properties,	Kampala district	Material	Non-roads	Base	N71

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				of Maesopsis Emini ("Musizi") Timber Currently used Widely in Uganda.	Mr. Kato Simon Peter	from two regions of Uganda namely; Eastern (Jinja) and Central (Kampala). The timber was sampled from the timber yards in these two locations and reduced to recommended test specimens from the local markets and carpentry workshops. Tests on the structural properties included the following: compression parallel to the grain, compression perpendicular to the grain, tension parallel to the grain and static bending and modulus of elasticity. These were carried out from materials laboratory located at the Uganda National Bureau of Standards, Kampala. Statistical analysis was done; the level of significance was assessed for comparison to determine the characteristic strength (minimum) value and the results obtained were compared with those given in BS 5268 of 2002 table 8. Determination of basic density of samples was carried out using the oven dry methods.	investigation, test specimens, statistical analysis, compression					
72	Ndejje University	Mwaka John Karama	2010	Road Design for Post Bank-Water Pump Road Section in Bombo Town	Ndejje University, Mr. Kato Simon Peter	This project contains the steps that will be undertaken to produce the design of drainage system from Post Bank junction to Water Pump station road section in Bombo town, these included reconnaissance survey of the proposed road, carrying out hydrological analysis, estimation of runoff, carrying out the drainage design (hydraulic design of culverts and open channels), formulating maintenance plan, preparation of BOQs and cost estimation. The anticipated prospects for the proposed project were; time saving, reduced silting and blockage of culverts, reduced maintenance costs, reduced accidents, reduced flooding and reduced malaria infection with the good drainage of the road hence increasing productivity. It is therefore upon this background that will be re-designing drainage system for Bank-Water Pump road section in Bombo town.	drainage system, junction, reconnaissance survey, cost estimation, maintenance plan, reduced flooding	Luwero district	Environment	Other	Solution / Application	N72
73	Ndejje University	Dr. Umaru Bagampadde Dr. Albert Rugumayo Mr. David Kaddu	2014	Development of Termite Saliva as a Potential Stabilizer for Gravel Road Layers	Dean's Office Ndejje University and Dean's Office Makerere University	This research employed an innovative approach of stabilizing in-situ / existing road materials using termite saliva concept and has been largely funded by the CrossRoads Challenge Fund (CCF) and Makerere University. It arose out of the need to develop a friendlier alternative stabilizer/ soil bonding agent to be applied specifically to the existing natural soil materials so as to overcome the costly and time intensive haulage of new gravel from borrow pits and reduce the unit road construction cost and preservation of the natural scenery. The team therefore, set out to establish the properties of the termite mounds and the special ingredients making up the termite saliva in a bid to mimic the saliva by constituting a model compound with properties similar to those of the saliva. This would later be used to stabilize soils, construct pavement layers using this compound to provide / enhance the strength of the constituent layer materials. The research objectives were to: chemically characterise the termite mound soils and the surrounding soils; chemically analyse the termite saliva extracts from both the abdomen and the head of live worker termites; determine the key engineering properties of soils treated with the termite extracts from head and abdomen and develop a model compound similar to termite saliva. Termite mound soils were collected from different administrative regions of the Uganda National Roads Authority along major national road corridors namely Northern, Western, West Nile, Southern and Central regions. Soil samples were picked from the top of the mound, middle and bottom. Control samples were picked from the 3m and 6m offsets from the anthill. The live work termite samples were collected from Masulita in Wakiso district and from active termitarium near the School of Food Technology, Makerere University. The study road was Lubowa - Ndejje road in Wakiso district from which in situ soils were sampled and tested with the model termite saliva compound. Both chemical and strength tests were carried out on these samples. The composition of termite saliva was analysed; the different components in the termite saliva that were anticipated to enhance strength were obtained in synthetic form and optimized using soils from Lubowa-Ndejje road. From the chemical characterization tests using the Atomic Absorption Spectrometer (AAS), iron was found to be the most dominant for both the mound and surrounding soils; all values obtained were over 18,000ppm compared to other mineral elements such as carbon, nitrogen and Potassium. Carbon and Nitrogen were also found to be present in larger quantities in mound soils as compared to surrounding soils. All soils were finer than the acceptable specification range for gravel wearing course and sub grade layers. The PI for all the soils were between 10 and 25%, Light compaction was used to determine OMC and MDD and subsequently CBR was determined at three levels of compaction (10, 25 and 55 blows). Extracts from the surrounding soils, termite heads and abdomen were analysed for presence and activity of cellulose enzyme and mucopolysacharides. The results confirmed the presence of enzyme cellulose in the termite saliva. The specific cellulose activity in termite abdomens was higher than that in worker heads by 62%. It was therefore concluded that termites increase enzyme cellulose concentration in mound soil and hence the enzyme plays a role in the nest structural stability. The presence of mucopolysacharides in the mound soil confirmed that they play a role in the structural strength of the termitarium. Consistency tests were carried out on in situ soils from Lubowa road treated with the above mucopolysacharides. The treatment of soil with the extract led to a reduction of both PI and LS which is an indication of improved performance. The MoWT (2005) specification states that a material to be used for sub-base layers of G30 materials should have a Maximum linear shrinkage value of 8% which was closely found in the head extracts. The soil modification theories were tested as follows: the action of oligosaccharides was investigated by reacting cellulose with cellulose and optimising time, for the production of the most suitable solution for strength and plasticity improvement. The optimisation of time was carried out by reacting 200 units of enzyme cellulose per ml of buffer. The CBR value increased on treatment with oligosaccharide solutions while the plasticity Index of in-situ soils reduced at 1hour of enzyme- substrate reaction implying increased strength of soil. The best supernatant of oligosaccharides was supplemented with 100mg of mucopolysacharides in reference to theory 3 of soil modification by termites for strength improvement. From this study, it's highly recommended that the results should be verified by constructing test sections using the TERMABOND road system and results compared with the conventional / traditional road construction systems.	soil bonding agent, pavement layers, termite saliva, soil stabilization, in situ soils, plasticity improvement, consistence tests, sub grade layers, termite mound soils	Lubowa-Ndejje road, Wakiso district	Material	Gravel	Base	N73
74	Ndejje University	George Otim Hilary M. Alinaitwe	2014	Factors Affecting the Performance of Pavement Road Construction Project in Uganda.	Central Library, Makerere University	This paper is intended to identify the factors affecting road construction projects performance in Uganda through review of literature. Many road construction projects in Uganda and in many countries are never completed within the estimated time and cost in addition to the numerous quality problems. Other issues of concern include: change of scope, health and safety issues, functionality and environmental anxiety. It is rational to determine the most significant factors affecting paved road project performance and decisively deal with so that the scarce resources are directed where they are most needed. Findings have revealed that poor project planning and poor management of the implementation have remained the major factors affecting paved road project performance. The solution to the road construction project performance problem will not only help in the tackling of Uganda National Development Plan of strengthening the country's underdeveloped physical infrastructure, but will also help in dealing with the Millennium Development Goals (MDGs) 1, 7 and 8 of: eradication of extreme poverty, ensuring environmental sustainability and developing a global partnership for development respectively. The academicians, policy makers, construction parties and all other stakeholders will benefit from this information with consequences of better road networks that will spur social-economic transformation and development across Uganda, Africa and globally.	Construction, Paved Roads, Performance, Uganda	Kampala district	Construction	Pavement	Base	N74
1	Makerere University	ABENAITWE T. ASAPH (2006/HD16 /6711U)	2012	Force Account in Maintenance Management of Public Roads	Central library at Makerere University, CEDAT library	There are about 30,000 km of national roads under the Uganda National Roads Authority (UNRA), which is mandated to develop and maintain the National Road Network, through planning, design, construction and mentoring of the road links, bridges and drainage structures on the network. This is done through either direct intervention by Force Account Units or by use of private sector contractors and consultations. There has been considerable pressure from donor agencies and other stakeholders to reduce on force account operations and to step up the use of private sector contractors citing the use of force account every time consuming, lack of proper equipment, inadequate planning, low levels of staffing and poor quality control among others. This study set out to assess the performance of force account operations. With specific objectives of assessing its relevancy, viability and sustainability, evaluating the capacity of UNRA stations involved in the management of road maintenance activities including weaknesses and to compare the performance operations of force account with contracting. A sample of 36 respondents was selected from 22 UNRA upcountry stations and UNRA headquarters. From the study, on the scale of 1-5 (strongly agree to strongly disagree) respondents perceptions about force account were that it is a good method of national roads maintenance in Uganda (mean = 1.56 and coefficient of variation = 35.8%). That force account based management of national road maintenance brings all stakeholders into participation (mean = 2.22 and coefficient of variation = 32.2%). Lastly, there is sufficient budget for roads maintenance activities at UNRA stations (men = 21.4 and coefficient of variation = 37.3%). Furthermore from the study, lack of road equipment; lack of planning and coordination roads maintenance; lengthy procurement guidelines, and lack of logistical support to field staffs as well as political interference affect the effectiveness of force account implementation in Uganda. Lastly, from the study factors that favour contracting to force account identified are: poor supervision (85.4%), cost savings due to less rework (62.7%); planning and schedule management (56.6%) and limited	Roads, road maintenance, UNRA, effectiveness of force, National roads, force account, contracting.	Uganda	Management	Pavement	Solution / Application	M1

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						knowledge on advances in technology (44.3%) strongly influenced the use contracting the force account. It was also found out that 57.4% of contracts awarded in the last four years were not completed in time. From the research, it was concluded that using force account in maintenance of National Roads is viable, UNRA has the capacity to implement national roads maintenance using force account, and that with strengthening of the capacity of force account units country-wide, force account can do well alongside contracting in the implementation of national roads in Uganda. Lastly from the research, it was recommended that government should adequately equip all UNRA up-country stations with modern equipment for the maintenance of national roads so as to bridge the gap created by weak contractors. It was also recommended that government should encourage the co-existence of force account and contracting in the maintenance of national roads in Uganda rather than completely phase it out.						
2	Makerere University	MUGENYI RICHARD TONNY (2009/HD16 /16140U)	2014	Evaluation of Direct and Indirect Cost Proportions and Risk Factors for Road Maintenance Unit Rates in Uganda	Central Library at Makerere University, CEDAT Library	The costs of road maintenance remain high and viable thus affecting the effectiveness and efficient delivery of public roads maintenance in Uganda. Globally, cost engineering practice applies scientific principles and techniques to solve problems of cost estimating, cost control and risk analysis. In Uganda, cost proportioning practices of contractors have not been systematically analysed in order to develop tools which together with expert judgement, can be applied towards cost estimation and control. The objective of the study was to analyse the indirect and direct costs components in the unit rates of cost significant items in order to provide suitable ranges for estimation purposes and improve the competitiveness of the bids. Using questionnaires, the study analysed the indirect and direct cost proportioning practices of contactors, and the frequency and severity of risk factors during estimation, works execution and certification. The risk factors were identified from literature review, discussions with contractors and engineers. The risk factors were rated using a 5 point Likert scale. 90 out of 167 contractors responded to the questionnaire. From the study, the average values of the costs as 30% for mark up further broken down into 16% for profit, 8% for risk and 6% for head office overheads. The mark ups were variable and higher for the bigger firms. Indirect costs reduction can be achieved through avoiding restrictive tendering practice, reducing contractors' overhead expenses and risk management. The 10 key risk factors or sources identified in road maintenance contracting are: delayed payment, limited access to credit, high costs for imports such as fuel and bitumen, scarcity of local materials such as gravel, limited work continuity, actual quantities of work for exceeding estimated quantities in the bills of quantities, corruption, theft of materials, breakdown of equipment, and under measurement of descending order of importance. Most of the risk factors were identified at execution stage. The major recommendations for minimizing risk factors are that clients should be educated to avoid paying contractors late, government should avail cheaper sources of finance for contractors, research into improvement and sustainable use of locally available materials, corruption should be minimized. The findings are important to all stakeholders in the construction industry including contractors, clients, consultant, policy makers and academia.	Unit rates, direct costs, mark-up, risk factors, road maintenance contractors, Uganda.	Uganda	Management	Pavement	Solution / Application	M2
3	Makerere University	SSEMBATYA CHARLES (2006/HD16 /8045U)	2010	Evaluation of Damage Caused to Road Structural Pavements by Utility Service Providers: A case Study of Kampala	Makerere Central Library at Makerere University, CEDAT Library	The research is an evaluation into the damage caused to road structural pavements by service providers in Uganda. Majority of utility service provider's infrastructure lies underground often partly or wholly beneath road pavements. Kampala road structural pavements are getting dilapidated by the activities of utility service providers and cuts not repaired in time and those repaired fail prematurely despite provision of specifications to contractors. The study aimed at assessing road surface damage (cracks, depressions, potholes and bleeding) caused by utility cutting and their progressions overtime. Evaluating the practices of contractors when selecting materials for repair of utility cuts and compacting pavement layers, establishing the resultant effects of repaired cut distresses and recommend best practices to reduce repaired cut distresses on road pavements. Methodology comprised of literature review, questionnaire survey to technical staff of utility companies (telecommunication, electricity, water and sewerage), contractors and road authorities. Forms of distresses on repaired utility cuts were usually identified, monitored, measured and recorded on observation sheets. Their variations over 3-month period were monitored. Field tests (Dynamic Cone Penetrometer DCP) was used for establishing soil structural strength and properties on repaired utility cuts and a sand replacement method for moisture content test. For laboratory tests, soil samples were subjected to BS Heavy compaction Test to establish the degree of compaction. The resultant effects like road service life, distresses on five traffic junctions were identified and observed. With respect to traffic jams, vehicles were timed, recorded at a pothole(s), and results presented on graphs. The study showed road surface damage (distresses) in form of cracks, bleeding, depressions and potholes and their progression overtime. Contractors flout set standards during selection of materials and compacting pavement layers during repair of utility cuts. The effects of utility cut distresses were reduction in road service life and serviceability, increased maintenance costs and unnecessary traffic jams. The recommendations were involvement of utility service companies at all stages of road construction projects, best remedial measures as trenchless technology, core boring and design based on sound engineering fundamentals. Area of further research, evaluation of impact of road drainage on the utility workability was proposed.	Road surface damage, utility service providers, heavy compaction test, evaluation of damage	Kampala road	Maintenance & Rehabilitation	Pavement	Solution / Application	M3
4	Makerere University	MUKASA DDDUNGU CHARLES (2008/HD16 /13372U)	2012	Assessment of Physio-chemical Stabilization of In-situ Gravel Roads Materials Using Landlock Technology: A Case Study of Uganda	Makerere Central Library at Makerere University , CEDAT Library	This research involved an assessment of physio-chemical stabilization of in –situ gravel roads materials using landlock technology. It uses a polymer based-stabilizer and its utilization is unique because previous alternative technologies used for gravel road stabilization in Uganda are based on cementations treatments. The cementitious treatments have over the ears essentially exhibited cracking problems and their use largely depends on the need to borrow gravel materials from rapidly depleting source. In order to establish Landlock's effect on in-situ gravel materials and hence its performance, the California Bearing Ratio and Unconfined Compressive Strength of stabilized materials and hence its performance, the California Bearing Ratio and Unconfined Compressive Strength of stabilized materials obtained at 50m length intervals from a test section of about 250m length along Muteesa II Road, Rubaga Division, using 0%, 2%, 4% and 6% landlock stabilizer by weight were determined in accordance with British standards. The stabilizer's ability to control dust on gravel roads was also ascertained mainly considering the depth at which it penetrated the road pavement and visual inspection. It was established that strength development of about 150% within the wheel paths in the base layer was realized within 3 months of stabilization. This was partly because of Landlock stabilisation's creation of a hydrophobic soil matrix between the larger stones. This matrix reduced permeability and so limited water ingress (external waterproofing), which attracts the polymer to clay particles thus displacing water from the clay. On the other hand; secondary compaction from traffic might also increase strength. Laboratory tests further revealed that CBR and Unconfined Compressive Strength increased with increasing addition of Landlock stabilizer up to an optimum content of 4% beyond which amount, these parameters reduced. It is proposed that 4% Landlock by weight is an ideal matrix for stabilization of gravel materials. It was also discovered that the stabilizer has a wetting action which affectively seals areas of penetration resulting into dust prevention.	Gravel roads, Landlock /Technology, Stabilization, California Bearing Ratio, Unconfined Compressive Strength	Muteesa II Road, Rubaga	Materials	Gravel	Base	M4
5	Makerere University	MUKIIBI JOSEPH KIWANUKA	2012	Assessment of Adequacy of the Existing Access of Entebbe International Airport for Long term Operations	Makerere Central Library at Makerere University, CEDAT Library	By 2025, about 7 billion people and 170 million cargo tons will annually use civil airports globally. Studies on increased airport capacity of access and other facilities are necessary. This study assessed adequacy of the existing access to Entebbe International Airport (EIA) for future long term operations. The objective was achieved through determining capacity and functional efficiency of the access parking lots, studying the organization of the available access modes, and determining capacity and functional efficiency of the access parking lots, studying the organization of the available access modes, and determining capability of parking facilities to handle future traffic flows. Geometric characteristics and capacity of existing access components were compared to standards. The qualitative approach employed entailed a cross-sectional survey involving a sample of respondents from Immigration Department, Planning, Road Toll, Taxi Drivers, CAA Employees and supervisors, workers as well as managers of different Departments in EIA. Questionnaires and interview guides were administered to a random sample of 168 out of a population of 271 employees in the relevant departments and 148 air passengers. Condition surveys and traffic studies were done on the parking facilities and roads. The results show that the only access method available for the airport is road via either private or public means. Traffic by private means is usually uninterrupted from origin only making a stopover at the check point and ticket issuing station. Motorists can pay for parking easily and conveniently using automated facilities making parking a smooth experience. Security checking takes long (3-15minutes) with attendant delays. The access trip from Kampala to the airport takes a long time (lasting between 1 to 3 hours). This access road is majorly a two lane road and handles other traffic. It is prudent to open other access modes (rail and water) for the future, as well as, widen the existing road to 4-way divided equally in both directions. The exact access modes at EIA are taxicab, automobile, urban bus (staff bus) and charter bus. Entebbe Airport Cargo Transporters operates cargo to and from the airport. Most of the car parks are rectangular and can accommodate double loaded aisles. Parks for short and long term parking are provided to the south and east of the terminal building. Parking for employees and spectators is catered for with short-term parks. The available parking supply does not meet the future demand after 15 years. This inadequacy of access poses severe constraints on demand for air transport. Access facilities require improvement and increase in capacity to handle projected operations. It is proposed that sophisticated security checks be installed to reduce on time and	Assessment of Adequacy, Entebbe International Airport, Long-term operations, Immigration Department, Road Toll, Motorists, Increase in Capacity	Entebbe	Operations	Other	Solution / Application	M5

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						improvement in the parking ticketing as well as expanding and redesigning the parking.						
6	Makerere University	SSENTAMU JULIUS	2010	Investigation of Labour Effects on Production in Labour Based Road Works Through a Safe and Healthy Working Environment: A Case Study of Mbale District.	Makerere Central Library at Makerere University, CEDAT Library	In LBRWs labour based road works, occupational health issues can be experienced when undertaking district road works especially in these areas of Routine Maintenance, periodic maintenance rehabilitation and spot repairs. The nature of work involved in these activities may expose workers to occupational accidents or hazards that usually are major cause of occupational health issues at workplace. There are different stakeholders including donors, central and local governments, professionals and non-professionals that may have concern for the safety and health of workers on sites. It was against this background that his study was undertaken so that the results can be used to improve on the efficiency and effectiveness of managing the contracts for road rehabilitation and maintenance works. The district of Mbale was selected as a study area because this is where labour based road works methods are demonstrated most in Uganda. The study used quantitative descriptive methods and was evaluative in nature. It reviewed ways in which various stakeholders like contractors, clients, consultant etc. took concern over health and safety issues during execution of labour based road works in Mbale from 1995 to 2004 by looking at incentive and reward systems, sensitization of the workers on AIDS/AIDS and its transmission, various variables and their impact on productivity. Data was collected by administering questionnaires and through use of interview guides, and analysed using SPSS 10.0 for windows. From the study, it was established that among many factors which can affect the work outputs include knowledge of using labour based methods and health and safety issues. The later factor being that by imposing safety and health risks to the workers, it leads to reduction of the workforce and waste of time and hence less production. It is therefore recommended that, the contract managers should address contract management gaps in mainstreaming of crosscutting issues especially safety and health issues if they are to improve on production during implementation of labour based road works.	Road works, routine maintenance, rehabilitation, professionals, contractors, clients, consultant, stakeholders, safety and health risks of workers, central and local governments	Mbale	Construction	Gravel	Base	M6
7	Makerere University	OKIROR FRANCIS OJUR	2013	Analysis of Safety at Black spots in Horizontal Curves: A Case of Kampala-Jinja Highway	Makerere Central Library at Makerere University, CEDAT Library	The global record of accident related death and injuries indicate very high figures. The situation in Uganda is not any different owing to several factors like narrow roads, inappropriate designs in cures and poor driver behaviour. Black spots are very common on many inter-city highways in Uganda. If no efforts through dedicated research and implementation of findings are put in place, death and injuries are bound to increase on the Uganda roads. The study was undertaken to assess black spots in horizontal curves on one of the busiest highways in Uganda namely Kampala-Jinja highway. The main objectives were to study the behavioural suspects of drivers at black spots, assess the geometric parameters at these sites and design a safety scheme to abate accident occurrence. The study employed use of field physical measurements through surveys, traffic counts, questionnaire surveys to taxi and bus drivers and use of speed measurement and observations on driver behaviour at the study curves. The findings from this study indicate that generally over speeding and careless driving were the rampant at all curves irrespective of the presence or absence of black spots. The figures got indicated 138 out of 229 cases and 135 out of 150 cases, respectively, in horizontal curves without black spots. The ones with black spots indicted 190 out of 208 and 171 out of 177 for the two behavioural parameters, respectively in horizontal curves with black spot. It further revealed that some road design factors fell below the minimum specifications such as the width of all horizontal curves with black spots, which needed to be widened. The other factor was super elevation which was inadequate in all the 10 horizontal curves studies. However, the radii of curvature of all curves were adequate in all the 10 horizontal curves were adequate for most of the curves. What featured in most of the curves was the inadequacy of warning signs which was only found in 3 out of 10 curves studied, but the speed limit signs were lacking in all the 10 curves, thought he centre lines and edge lines were properly marked. Based on the above findings, appropriate recommendations like installing of rumble strips and widening of horizontal curves with black spots by at least 0.3m on the inner lanes be done. It was also recommended that, installation of warning and speed limit signs which are expected to reduce accidents in horizontal curves with black spots be done. Further research to find out the relationship between poor drainage and accident on Ugandan roads. Similar studies should include finding the impact of narrow roads and road safety, the finding out whether marking road pavements on black spot locations which chevrons or peripheral lines on Ugandan roads has an effect in reducing vehicle speeds.	Black spots, Horizontal curves, radii of curvature, safety	Kampala-Jinja Highway	Road safety	Pavement	Solution / Application	M7
8	Makerere University	SSEMYALO CHRISTOPHER	2012	Analysis of the Causes of Financial Loss to Contractors in the Construction Industry in Uganda	Makerere Central Library at Makerere University, CEDAT Library	The world over, the construction industry comprises mainly of small and medium size enterprises. However, the contractors in the construction industry suffer loss to the extent that the majority of them do not survive over a number of years. The losses incurred are of various nature, frequency and severity. However, the industry in Uganda and possibly other developing countries suffers from lack of information on the causes of financial loss. The objective of this research was to identify and analyse the sources of financial losses experienced by local contractors during the execution of construction contracts. The factors were mainly identified through a literature review. The factors were rated by contractors using a Likert scale. The mean rating of the factors, their importance index and the correlation between frequency and severity were determined. It was found out that the most frequent, severe and important factors were corruption, inflation, high interest rates of borrowing, and delay in payment. It was further found out that there is a strong correlation with a coefficient of 0.862 on the frequency and severity of the factors. This implies that the factors should be taken seriously. The major recommendations are the clients should pay the contractors as stipulated in the conditions to avoid loss or else be penalized and that government should try to the extent possible minimize corruption in the construction industry and inflation. The government should also avail funds to contractors at rates that are affordable by the contractors and do not hurt the stakeholders but facilitate carrying out business in the industry. The findings are important to all the stakeholders in the construction industry including the contractors, clients, consultants, policy makers and the academia.	Construction industry, financial loss, contractors, factors	Uganda	Construction	Other	Solution / Application	M8
9	Makerere University	NGABIRANO JULIUS	2014	Effect of Traffic Signals on Vehicle Delays in Close Proximity to Signalized Intersections in Kampala City	Makerere Central Library at Makerere University, CEDAT Library	Traffic signals play a very important role in streamlining vehicular flow at signalized intersections. However, there are still some significant situational issues that cause intersection vehicle delays in Kampala City and these include traffic flow patterns and interlane behaviours. Other factors that can also lead to delays re linked to road defects and geometric characteristics. Approaches to major signalized intersection in Kampala City usually experience traffic congestion with very long queues. The study was on the effect of traffic signals in close proximity to signalised intersections in Kampala city and was primarily centred on the development of a model for vehicle delay prediction at signalized intersections as a function of traffic flows and vehicle queue lengths. Three signalized intersections were selected in Kampala City. The study involved collecting data on traffic flows, vehicle queues and travel times during peak and off-peak periods when traffic signals were operational. The control was when traffic signals were not operational. A statistical approach was used to develop delay model (multiple linear regression model at 95% confidence interval). The statistical analysis indicates that both traffic flows, queues have a significant effect on delay time. It has been noted that, generally, traffic signals reduce delays at junctions as and when compared with the situation when the junction is manned by traffic wardens/police or even left without any external assistance to vehicular movement. It was noted that when traffic signals become non-operational, the day can increase from the average minimum delay values of 104 second by up to 156%. It was therefore established that the operation of traffic signals plays a very vital role in reducing intersection vehicle delays and hence the interruption of the operation of these signals need to greatly be minimized.	Traffic signals, vehicle days, close proximity, signalized intersections, traffic	Kampala City	Road safety	Other	Solution / Application	M9
10	Makerere University	BUHANDA BRIAN	2015	Stabilization of Heavily Trafficked Gravel Roads Using Waster Steel slag	Makerere Central Library at Makerere University, CEDAT Library	Enormous quantities of waste materials, both domestic and industrial are generated every year in Uganda's steel making factories which include among others Roofing Rolling Mills Ltd, Steel Rolling Mills, Modern Steel International, Tian Tiang, Pramuk Steel and Tembo Steels. Many of these materials are not biodegradable, they remain and cause a waste disposal crisis. The increasing cost of road construction materials to make roads durable in all seasons and all conditions including increase in traffic loads. In this research, index properties such as moisture content, Atterberg's limit and particle size together with strength characteristics (Unconfined Compressive Strength – UCS, and California Bearing Ratio – CBR) of lateritic gravels from Mukono District stabilized using waste steel slag were investigated. Waste slag was first used in incremental dosages with reducing percentages of lateritic gravel. A general increase in CBR and UCS values was recorded with addition of waste slag, resulting into a significant reduction in the quantity of gravel materials. The UCS values were all within the range of 0.75-1.5, recommended by MoWT, (2005). A dosage combination of 90% gravel, 10% slag resulted into a CBR above 30% recommended by MoWT, (2005) for gravel use on wearing courses. Also, there was a general reduction in plasticity index (PI) with Namanve borrow pit exhibiting a PI of 12.2% for a combination of 75% gravel: 25% steel slag which is within the range of 10-15% specified in guidelines by MoWT (2005). PI results for Mukono and Namugongo were all above the 10-15% recommended MoWT (2005) range hence the need to introduce lime. The above properties were also investigated when using a stabilizer combination of lime and steel slag. There was a general reduction in PI for all laterite sources with Mukono laterites showing the best response to additive formulations. Lime: slag formulations of 5.40%/5.11% for Namanve, 7.56%/5.53% for Mukono and 7.14%/4.16% for Namugongo were taken as optimum lime/slag combinations for enhancement of plasticity, since their PI values were within 10%-15%, a range specified by MoWT (2005). Similarly, combinations of 3.85%/4.38% for Namanve,	Heavily Trafficked Gravel Roads , Waste Steel slag	Mukono, Namanve and Namugongo	Materials	Gravel	Base	M10

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						5.40%/5.53% for Mukono and 5.10%/4.16% for Namugongo gave UCS values that were in the range (0.7-1.5MPa), hence identified as stabilizer combinations for optimization of UCS. A cost comparison was carried out and for every one ton of laterite, at least a saving of Uganda shillings 34,000/- and 20,000/- is realized if slag is used in combination with lime instead of lime only in the optimization of UCS and PI of laterites, respectively.						
11	Makerere University	GIRUKWISHAKA REMEGIE	2013	Mechanical Recycling of an Aged Pavement using Crusher Run Rock and Cement	Central Library at Makerere University, CEDAT Library	This research was focused on the evaluation of the mechanical strength of an existing pavement base recycled with crusher run rock (CRR) and cement on Kafu-Karuma Road (90km) located in Masindi District in Uganda. The Specific objectives of this research were: to characterize the existing base/tarmac mix materials based on mechanical properties, to evaluate the mechanical behaviour of the existing base/tarmac mix materials blended with CRR in various proportions and to assess the mechanical properties of the mixtures of the existing base/tarmac mix blended with CRR and cement. Mechanical strength of pavement materials expressed in various terms such as California Bearing Ratio (CBR) or Unconfined Compressive Strength (UCS) and Resilient Modulus (RM) is one of the major input parameter used in design of a pavement structure either for new roads or rehabilitation/reconstructed roads. A good range of data and correlation models related to mechanical strength of various pavement materials have been established by renowned individual researchers and government institutions. However, there exists little date related to recycled pavement base mixtures made of lateritic gravels, tarmac (bituminous double seal surface dressing) and CRR. The methods used during the research were literature review, sampling materials from the field and conducting experiments. The general experimental approach of the research was carried out in three sets. The first two sets were made of existing pavement base with or without tarmac with addition of CRR in proportions ranging from 0% to 50% and were tested for indicator tests (Grading and Atterberg Limits) and CBR. The third set which was made of existing pavement base with tarmac with addition of CRR (from 0% to 50%) and cement (0%, 1.5%, 3% 4.5% and 6%) was tested for indicator tests, CBR and UCS. From the study, the relationship between CBR and weighted plasticity index for recycled materials with CRR was established and discussed in similar fashion as the one adopted by NCHRP – 37A. Typical values of resilient modulus and layer strength coefficients that could be adopted by URDM for the recycled materials were herein given. Models relating UCS to CBR for recycled and cement stabilized materials were given and discussed. Typical values of resilient modulus and layer strength coefficients that could be adopted by URDM for these cement stabilized and recycled materials were herein provided and discussed. The research found out that a targeted UCS adding CRR to existing pavement base materials would reduce the cement content and reduce the cost to 9%. It is highly recommended that further researches and testing be pursued by government institutions to consolidate and enrich the outcome of this study.	Mechanical recycling, aged pavement, crusher run rock, cement, recycled materials	Kafu-Karuma	Maintenance & Rehabilitation	Pavement	Solution / Application	M11
12	Makerere University	BENNICE KIGANDA	2012	Evaluation of the Condition of the Drainage System on Rural Roads in Uganda: A Case Study of Busoga Region	Central Library at Makerere University, CEDAT Library	An often repeated adage in the road construction and maintenance business is that "the three most important things to understand in building and maintaining roads are drainage, drainage and drainage". This critical issue is however ignored when building and maintaining rural roads. The main objective was thus to evaluate the condition of the drainage system of rural roads in Uganda and specifically to: locate and map the critical drainage sections and determine the maintenance needs of the drainage system of rural roads in the Busoga sub-region, assess the impact of the drainage system on the environment and to develop a sustainable framework on how the drainage system can be well maintained. The research design was both qualitative and quantitt8ive in nature and the research was largely descriptive. The instrument used included; questionnaires, interview guides as well as physical inspections and observations. It was established that regular cleaning of the drainage structures coupled with increased funding for road maintenance activities were some of them most important ways of maintaining a good gravel road way. The Critical drainage sections on the roads in the Busoga sub-region were identified and have been clearly documented in this study	Evaluation, road maintenance, drainage system, rural roads, building	Busoga Region	Environment	Other	Solution / Application	M12
13	Makerere University	TUMWESIGE ROBERT	2013	An Investigation of the Relationship between Standard Penetration Test and Shear Wave Velocity for Unsaturated Soils: A Case study of the Earthquake prone area of the Albertine Graben)	Central Library at Makerere University, CEDAT Library	Prediction of ground shaking at soil sites require knowledge of the soil, expressed in terms of shear wave velocity (Vs). It is preferable to measure Vs by in situ waver propagation tests, however it is often not economically feasible to conduct these tests at all locations. On the other hand the Standard Penetration Test (SPT) is the most common in situ site geotechnical test which is carried out in most site investigations. Hence the reliable correlation between Vs and SPT would be of considerable advantage, reducing the cost of site investigations. This study presents therefore the development of an empirical relationship between Vs and SPT-N Value for the soils of Kasemene Oil exploration areas located in Buliisa District in Uganda. As part of an attempt to mitigate earthquakes in the area, this relationship is needed to predict Vs required for site response analysis. The effect of correcting Vs and SPT-N value on the relationship was evaluated and the relationship was compared with published relationships. The process involved correlating 273 data pairs of Vs and SPT N-value which were measured at the same depth. The extensive Vs measurement was carried out using the Multichannel Analysis of Surface Waves (MASW) technique. The SPT N-value data was measured from boreholes drilled within the boundaries of the MASW survey lines. Results show that the relationship between Vs and SPT N-value depends on the effective overburden stress, since Vs and SPT N-value normalize differently with overburden stress. Ignoring the influence of effective overburden stress created bias in the relationship. It was also found out that none of the published relationships fitted the data well and there is tremendous difference in the Vs values predicted by thee relationships. The developed relationship can be used to predict shear wave velocity for soils within the study area or for areas with a similar soil type.	Correlation, effective overburden stress, MASW, shear wave velocity; SPT N-value	Buliisa district	Materials	Non-road	Platform	M13
14	Makerere University	MUSUMBAIVAN (2012/HD08/1050U)	2016	Estimation of In-situ Strength of Flexible Pavement Subgrade from both Field and Laboratory measured Data	Central Library at Makerere University, CEDAT Library	Over the past few decades, numerous correlations have been developed between CBR and PFWD and DCP test data in an attempt to avoid CBR testing in the estimation of subgrade soil strength for its limitations in coping with the paradigm shift from purely empirical to mechanistic empirical design of pavements however, to date there seems to be no single correlation that is reliable without the requisite rigorous calibration employing extensive laboratory testing that in itself is prohibitive. In almost all the previous attempts, authors have focused on establishing a direct one to one model without incorporating other influential physical properties of soil. In this study, the main objective was to develop mode(s) using the data obtained from the PFWD, DCP and laboratory CBR tests with specific emphasis on accounting of the effect of the relevant index properties, void ratio in-situ water content and density as the influential soil properties of soil. In this study, the main objective was to develop model(s) using the data obtained from the PFWD, DCP and laboratory CBR tests with specific emphasis on accounting for the effect of the relevant index properties, void ratio, in-situ water content and density as the influential soil properties. A total of 55 PFWD tests, 55 DCP tests and 55 field density tests using sand replacement method were respectively carried out following the TERRATEST manual, ASTM D6951 and BS 1377 on both coarse and fine grained in-situ sub-grade soils of 3 flexible pavement roads in Kampala. At the same time, 55 disturbed soil samples retrieved from the in-situ test locations were tested for CBR, natural moisture content, soil classification, MDD and OMC. For independent validation of the developed correlations, the same tests were repeated on four carefully selected soils prepared at 5 varying moisture contents in a physical test model under controlled laboratory environment and different test conditions. Based on the test results, and consistent with performance of existing models, the direct one to one models are relatively weaker than the ones incorporating other influential factors. Whereas the R2 value between CBR and PFWD data and between CBR and DCP data was 0.888 and 0.762 respectively, it improved to 0.925 and 0.870 when the other influential factors of density ratio, in-situ moisture content, grading modulus, liquid limit, and void ratio, that significantly affect strength were introduced. The validity of the developed models were found to be excellent using independent data from physical model tests. This study has therefore developed improved CBR prediction models using PFWD and DCP by incorporating other pertinent soil parameters.	In-situ strength, estimation, flexible pavement subgrade, field and laboratory, pavement roads	Kampala	Materials	Subgrade	Base	M14
15	Makerere University	ODONGKARA BILLY BRIAN	2013	Application of Road Investment Software for the Programming and Prioritization of the Road Network in Uganda.	Central Library at Makerere University, CEDAT Library	The Highway Development and Management Tools (HDM – 4) is a decision support tool for road maintenance and improvement whose predictive ability is improved by inputting data that best reflects the existing environment in which it will be used. The study sought to carry out a level one calibration of the HDM -4 model to suit the conditions in Uganda and then applied the model to prioritize the roads in Uganda using commonly used maintenance interventions and strategies. This was done by inputting appropriate Road Deterioration and World Effects (RD & WE); and Road User Effects (RUE) data. The study was limited to the National Road Network and the District, Urban and Community Access Roads (DUCAR) network. Most of the data used to calibrate the model was got from different vehicle manufacture manuals as well as Ministry of Works and Transport (MoWT) reports on Vehicle Opiating Costs for Uganda, traffic survey reports from the Uganda National Roads Authority (UNRA) and discount rates from Bank of Uganda (BoU. The cost of the road sector over the next 10 years was determined to be US $ 5.1 billion of which US $ 3.8 billion (77.37%) is to be spent in the first five years so as to maintain and improve the state of the existing network by varying the unit costs of maintenance and improvement interventions. The Annual Maintenance Budget Requirement was found to be the most sensitive and the Total Transport cost and last sensitive. The annual Maintenance Budget was found to be 35 times and 47 times more sensitive than the Total Transport Cost for the variation of unit costs for all roads (Paved and unpaved and for only gravel road maintenance respectively).	Maintenance and improvement, national Road Network, Sensitivity Analysis	Uganda	Operations	Other	Platform	M15
1	Makerere	SSEBUGWA	2012	Investigation of	Central	The global economic situation that has affected all sectors of economies has seen widespread variations in prices of many sectors including construction. In Uganda,	Contractors' unit	Uganda	Construction	Pavement	Solution /	M16

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6	University	WO ATHANASIUS (2009/HD16/16099U)		Variations in Paved Road Construction Unit Rates – A Case study of Uganda	Library at Makerere University, CEDAT Library	the road sector has seen an upward trend in the prices of construction and maintenance over the past years. The trend has caused concern not only to the GoU but also to the public which has attributed it to corruption, inefficiency of government departments handling procurements and non-competitive procurement practices. Escalating costs of road construction undermine the Government's efforts to improve roads, reduce the amount of infrastructure that can be provided from a given funding commitment in addition to creating adversarial relationships between parties. There has been in-depth analysis of what causes road work construction cost escalation and its trend. This study was meant to derive pavement construction unit rates and to investigate the relationship between derived rates and actual contractors bid rates. It was also meant to find out why contractors operating in the same environment have far different rates and also to establish cost trends. The methodology involved the use of checklists, interviews and case studies. This entailed derivation of unit rates for individual inputs of pavement layers based on recommendations of the MoWT specifications. The resultant unit rates were as a result of the prevailing market prices. Contractors' rates were as a result of the prevailing market prices. Contractors' rates were obtained from the leading implementer of both development and rehabilitation road projects and were stratified into two groups of regional and international contractors. A comparative analysis was done to establish whether there were significant differences between the derived and contractors'' rates for the different classifications of contractors. In addition, construction cost trends were determined from previous projects while putting into consideration the financial indices. Data analysis showed that there were strong correlations between contractors' rates and derived rates with coefficients of 0.915 and 0.745 for international and regional contractors respectively. For both classes of contractors, the probability value (p) $p < a/2$ thus at 95% confidence level, the null hypothesis was rejected. Trend analysis showed that rates for G15, gravel and surfacing were increasing hence responsible for the current high costs of road construction. Future studies should be carried out to derive unit rates for other road construction activities such as drainage, structures and ancillary works. In addition, future studies should focus on packaging projects according to type, size, duration of construction and location in order to provide insights that influence the bid prices.	rates, cost escalation, derived unit rates, paved roads, Uganda				Application	
17	Makerere University	LIIKI SAMUEL (2007/HD16/10073U)	2013	Evaluation of Moisture Damage of Bituminous Mixtures Modified with Crumb Rubber and Lime.	Central Library at Makerere University, CEDAT Library	Increasing pressure on environment conservation lead to significant reduction of the amount of materials to be exploited from materials quarries. This matter coupled with limited availability of land filled site adds further needs to utilize waste materials from constructions including road asphalt pavement. Hot aluminous mixes for roads/pavements provide an ideal opportunity to recycle these waste materials. Materials such as c rushed glass, steel slag, coal fly ash and waste vehicle tires can be incorporated in hot asphalt mixes to improve on the durability of flexible pavements. The study aimed at evaluating the water damage resistance of bituminous mixtures modified with selected admixtures namely lime and carbon black from burnt old vehicle tires using 60/70 and 80/100 penetration grade asphalts. Marshall Mix design was used to firs obtain the optimum asphalt contents and then further to test the modified mixture properties. The optimum asphalt contents were 4.86 and 5.00 for 60/70 and 80/100 respectively. A total of 132 modified specimens were prepared at additive contents of 0, 0.5, 1.0, 1.5, 2.0, 2.5, 3.0, 3.5, 4.0, 4.5 and 5.0%. the optimum additive contents that can be used for asphalt modification were reported as 2.5%and 2.0% for lime and rubber contents respectively for 60/70 mixes and 2.0% for both lime and rubber in 80/100 mixes. Moisture susceptibility tests namely the boiling water test and the indirect tensile strength test were carried out on both conventional and modified at the above optimum additive contents modified mixtures were 80% resistant owing to the percentage of aggregates that remained more coated than conventional mixtures. Similar, higher values of indirect tensile strength ratios were reported for modified compared to conventional mixtures. Therefore the use of both lime and rubber increases or enhances the moisture damage resistance of bituminous mixtures given that all values obtained were above the 70% value specified by the Ugandan Ministry of Works and Transport. However, enhanced moisture damage resistance were reported for mixtures modified with waste tires compared to those modified using lime.	Evaluation of moisture damage, bituminous mixtures, crumb rubber and lime, percentage of aggregates	Uganda	Materials	Surfacings	Base	M17
18	Makerere University	KALULE PATRICK (2006/HD16/6693U)	2012	Evaluation of Challenges to Small and Medium Enterprise Contractors: A Case Study of Kampala Uganda.	Central Library at Makerere University, CEDAT Library	Small and Medium Enterprises (SME) both in building and Civil Engineering are facing challenges in construction business whereby some have not managed to sustain their operations and eventually close down. The main objective of this study was to evaluate challenges SMEs face that deter continuity in operation of the construction business in Uganda. In undertaking the study, a comprehensive literature review was conducted and primary date collection was made. Simple random sampling was applied in selecting the pre-determined number of firms to be considered for detailed quantitative analysis. Questionnaires were sent to 44 SMEs registered with UNABCEC that are located in Kampala district and 42 questionnaires where returned. The analysis was done using frequency distribution and Pearson chi-square coefficient statistical test. The major findings of the research were that continuity of SMEs should be triggered by proper planning, good management, well-motivated personnel, financial accessibility and prompt payments by clients. The findings would make an invaluable contribution to issues that can counteract the challenges SMEs face in Uganda. The research concluded that indeed the challenges that SMEs face are lack of capital assets, difficulty in accessing funds from financial institutions, poor management of cash flows just to mention a few. The study therefore recommended that proper planning, financial accessibility, well - motivated personnel, and good management practices should be some of the factors to be adopted by SMEs. On the other hand government should put in place policies that address issues like delayed payment and favourable financial policies that favour SMEs.	Small and medium enterprises, challenges, construction business	Kampala	Construction	Other	Solution / Application	M18
19	Makerere University	ODONGO MICHAEL MOSES (99/HD16/299U)	2002	An Investigation into the Mechanical Stabilisation of Lateritic Gravel for use in the Maintenance of classified unpaved Roads in Northern Uganda.	Central Library at Makerere University, CEDAT Library	The research is an investigation into the mechanical stabilization of lateritic gravel for the maintenance of classified roads in Northern Uganda. It aimed to proceed by identifying the existing deposits of various types of soil material in the region, establish their engineering properties and recommend, using specification guide, their usage on gravel roads. The study has been justified on the need for improved accessibility in the region. This is to be achieved by better road material selection and application practices based specifically on non-constrained accessibility to and workability of sources and also their environmental friendliness. The study methodology proceeded by using existing soils and geological maps of the region to identify eight roads that yielded twenty-eight soils. Various field and laboratory tests (two-stage) were done to aid soil categorization and establishment of engineering properties. The Kenya Ministry of Transport specification (widely used in Uganda based on its relevance to local soils) and Microsoft Excel computer package were used to aid the qualification of the soils. The study was able to show that het engineering characteristics of the existing natural lateritic soils in the region do not comply fully with specification requirements but blending with one or two clayey or sandy soils and compacting had remarkable positive impact in improving their engineering properties. The study has recognized the need for a local soil specification and a regional soils laboratory as being central to actualizing the recommended practice in the region. Due to cost, time and insecurity constraints, no field trails of the method were done. The emerging problem of land shortage in the region was also recognized as having major implications in the future on sources of gravel soils. Areas of further research have been proposed to aid in refining the recommended practice in the region. In particular, the study has recognized the need for research into a cheap and economic means of sealing low volume roads to lessen the need to over exploit existing deposits of gravel and save such resources for bases of paved roads as has been done in Kenya and Malawi. This recommendation is based on the recognition that, as the economy of the region picks up and improves, traffic levels shall equally register growth leading to greater wasting rate for road surface gravel hence calling for a greater need for exploitation of existing deposits to replace lost material. With other economic activities competing for land, constrained access to gravel sources shall likely ensue to climax into an outright crisis.	Mechanical stabilization, lateritic gravel, maintenance, unpaved roads	Northern Uganda	Materials	Gravel	Platform	M19
20	Makerere University	MULOLO FRANCIS (2010/HD16/2183U)	2013	Developing an Analytical framework for the Choice of Alternative Dispute Resolution Processes in Uganda's Construction Industry.	Central Library at Makerere University, CEDAT Library	The study provides a framework for the choice of Alternative Dispute Resolution (ADR) based on the project risks. Based on the research findings, this report presents a comprehensive analysis of attributes of ADR and the risks associated with construction projects in Uganda's construction industry. Construction disputes are one of the obstacles of successful project execution world over usually leading to increase in project cost and, in worst cases stalling or suspension of the project may occur. The ability, therefore, to resolve quickly and effectively contract disputes is the difference between a project that is completed on time and a failed capital investment that is completed only after many years of delay. Whereas this has been so there has been no well laid criterion for the choice of the dispute resolution strategy. Cluster sampling was performed on contractors, consultants and clients in the Uganda construction industry to come up with the sample. The questionnaire survey results indicated that benefits resulting from a successful ADR process, ability of ADR to produce creative solutions, nature of the proceedings and the settlement agreements in that order are the factors affecting the choice of ADR. The survey also identified a total of seven project risk which are significant enablers of disputes in constructing and these are; excessive variations schedule delays, cost overruns, design and construction issues, foreign exchange rates and different cultures and local customs followed by the corresponding dispute resolution methods for those situations. The study also analysed the suitability of the Alternative Dispute Resolution Methods (ADRMs) to settle disputes arising from the above mentioned risks and this is presented in form of a Risk-DRM matrix. It is hereby recommended that the construction industry in Uganda should put more emphasis on the suitability of DRM to settle disputes right from the onset of contract design. In addition, the government legal system in partnership with the Uganda Institution of Professional Engineers (UIPE) should introduce construction	Analytical framework, alternative dispute resolution process, construction industry	Uganda	Construction	Other	Platform	M20

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						arbitration boards and Dispute Adjudication Boars in order to overcome the lengthy and costly litigation procedures.						
21	Makerere University	MUKASA DDUNGU CHARLES	2012	Assessment of Physiochemical Stabilization of In-Situ Gravel Roads Materials using Landlock Technology: A Case Study of Uganda	Central Library at Makerere University, CEDAT Library	The research involved an assessment of physiochemical stabilization of in-situ gravel roads materials using landlock technology. It uses a polymer based stabilizer and its utilization is unique because previous alternative technologies used for gravel road stabilization in Uganda are based on cementitious treatments. The cementitious treatments have over the years essentially exhibited cracking problems and their use largely depends on the need to borrow gravel materials from rapidly depleting sources. In order to establish landlock's effect on in-situ gravel materials and hence its performance, the California Bearing Ratio and Unconfined Compressive Strength of stabilized materials obtained at 50m length intervals from a test section of abut 250m length along Muteesa II Road, Rubaga Division using 0%, 2%, 4% and 6% landlock stabilizer by weight were determined in accordance with British Standards. The stabilizer's ability to control dust on gravel roads was also ascertained mainly considering the depth at which it penetrated the road pavement and visual inspection. It was established that strength development of about 150% within the wheel paths in the base layer was realized within 3 months of stabilization. This was partly because of landlock stabilization's creation of a hydrophobic soil matrix between the larger stones. This matrix reduced permeability and so limited water ingress (External waterproofing), which attracts the polymer to clay particles thus displacing water from the clay. On the other hand, secondary compaction from traffic might also increase strength. Laboratory tests further revealed that CBR and Unconfined Compressive Strength increased with increasing addition of landlock stabilizer up to an optimum content of 4% beyond which amount, these parameters reduced it is proposed that 4% landlock by weight is an ideal matrix for stabilization of gravel materials. It was also discovered that he stabilizer has a wetting action which effectively seals areas of penetration resulting into dust prevention.	Cementitious treatments, physiochemical stabilization, in-situ gravel roads, landlock technology	Uganda	Materials	Gravel	Base	M21
22	Makerere University	OKETAYOT PATRICK (2006/HD16/6704U)	2011	Comparison of District Roads Geometric and Pavement Structural Elements Integrity Attained Independently During Road Construction by Equipment-Based and Labour-Based Technology: A Case of Eastern Uganda.	Central Library at Makerere University, CEDAT Library	This research compared district roads geometric and pavement structural elements integrity attained independently by equipment-based on labour-based technology during road construction. By labour-based technology, hand tools such as hoes, spades, pickaxes, and axes among others are used in road construction. However, by equipment based technology, road works equipment such as motor grader, wheel loader, roller, and compactor among others, are used in road construction. This research was to determine which of labour-based and equipment-based technology in road construction best suit the integrity of district roads geometric and pavement structural elements. This research specific objective was to develop a comparative assessment of the effectiveness of equipment-based and labour-based technology in attaining the integrity of district roads geometric and pavement structural elements. This research was limited to district class II district road and was done in Kapchorwa, Mbale, Sironko, Kumi, Soroti and katakwi Districts. The Class II district road geometric and pavement structural elements including the procedures and instruments used to measure their integrity was confirmed by documentary and descriptive research design. In descriptive research design, data was obtained using pre-tested self-administered questionnaires. The respondents were district engineers, supervisors of works, and country engineering assistants. The class II district road geometric and pavement structural elements confirmed were considered the research dependent variables. Percentage analysis technique was applied to analyse data obtained by questionnaires. To compare the technologies, Katero-Kapkoc and Kapchorwa-Kawai road in Kapchorwa district were selected among the road sunder construction as the study sample elements by stratified random sampling method. Those roads were under construction by labour-based and equipment-based technology respectively. Road geometric and pavement structural elements data was obtained by carrying quality assurance. The data obtained was described using histogram, analysed based on computerised statistical parameters and compared using limit of agreement methods. GenSta 2003 statistical software was used in data analysis. Based on the standards road design specifications provided by Ministry of Works and Transport, it was found that other than vertical and horizontal alignment, labour-based technology suit all district roads geometric and pavement structural elements more than equipment-based technology. It was recommended that to ensure conformity of dependent variable to specifications in use, control of road work activities need to be adopted. Further study be carried to determine cost effectiveness of the technologies in road construction.	District roads, geometric and pavement structural elements, equipment based, labour based technology	Katero-Kapkoc and Kapchorwa-Kawai road in Kapchorwa district	Construction	Pavement	Solution / Application	M22
23	Makerere University	OKELLO WILFRED	2013	Adequacy of Stone Aggregates in Concrete Mixes in Kampala.	Central Library at Makerere University, CEDAT Library	Cement concrete constitutes the bulk of construction materials used at most of the construction sites in Uganda. The Majority of the structural elements such as beams, columns, staircases and slabs are often constructed of reinforced concrete. Despite the relatively well established concrete technology/practice in the country, there are still frequent incidents of structural failures at construction sites resulting into heavy loss of lives and property. Most of the causes of the structural failures are usually traced to poor workmanship, inadequate site-works supervision, and deficiencies in the quality of the materials used, among others. The main objective of the study was to probe the adequacy of stone aggregates (the main constituent material for concrete production) commonly used for concrete production in and around the industrial hub of the country, Kampala City/District. Suitable samples of stone aggregates were obtained from some active stone quarries which are the major suppliers to construction sites with and around Kampala District the samples were appropriately characterized and tested for any inadequacy in quality (physical & chemical properties) for concrete production. Specifically, concrete cubes were cast in accordance with typical prescribed design mixes and their strength developments/performances were observed; cement, fine aggregates and water of known properties were used to cost the test cubes. The major rock types were established as comprising quartz, amphibolites, and potassium feldspar granite respectively from Mbalala, Nakasajja and Seyani quarries, all in Mukono District. Based on the prescribed concrete mix designs adopted, the quality of the stone aggregates from all the three sources were found to be adequate for production of normal weight concrete.	Stone aggregates, concrete mixtures, cement concrete	Mukono district	Materials	Non-road	Base	M23
24	Makerere University	DICK KIBUUKA SSENKAABA (2007/HD16/10037U)	2012	Investigation of Benefits Derived and Challenges Faced by National Contractors Associating with Foreign Contractors	Central Library at Makerere University, CEDAT Library	Most of the major contracts both in building and civil engineering are undertaken by foreign contractors, leaving their National contractors to compete for minor works. There are several argument on the demerits and otherwise on the benefits local contractors derive from the operations of these foreign firms in Uganda. The main objective of this study was to evaluate the benefits derived and challenges faced by National contractors from the operations of their foreign counterparts in Uganda. In undertaking the study, a comprehensive literature review was conducted. Then primary data collected was made. Simple random sampling was applied in selecting the pre-determined number of firms to be considered for interviewing, this was done to eliminate bias during selection of sampling units and in the results, thereafter. Questionnaires were sent out to 111 local firms in Kampala District registered with UNABCEC, and 97 questionnaires were returned. The analysis was done using frequency distributions, Kruskall-Wallis test and the multiple linear regressions. The major findings of the research were that National contractors that collaborated with their foreign counter parts through joint ventures and sub-contracts reported higher levels of benefits. The findings make an invaluable contribution of the search for solutions to the challenges faced by National contractors in Uganda and provide an insight for future research in institutional weaknesses and policy issues. The research concluded that whereas National contractors slightly benefited from the operations of their foreign counterparts, these few benefits were not deliberate and well structured. The study therefore, recommended that, the Uganda government being the largest consumer of the services provided by both local and foreign contractors, to put in place policies that could address the issue of benefits and challenges local firms experience such as delayed payment, lack of equipment and limited job opportunities just to mention a few.	National contractors, foreign contractors, benefits, operations, challenges.	Uganda	Construction	Other	Solution / Application	M24
25	Makerere University	NDIZAALA TOM	2011	Evaluation of Optimum use of Pozzolan Aggregates in Road Bituminous Mixtures using the Marshall Mix Design Method	Central Library at Makerere University, CEDAT Library	The research documents an extensive study on the optimization of pozzolan and granitic aggregates in road bituminous mixes using the Marshall Mix design methods. The Marshall parameters formed the basis for evaluation of the various resultant mixtures using both individual aggregates in road bituminous mixtures using Marshall method. The two aggregate types (pozzolan and conventional granite type) were mixed with one bitumen type (80/100pen). The materials were characterized to determine their properties. The tests conducted on aggregates included toughness, water absorption, specific gravity and graduation. Those conducted on the bitumen were: penetration, softening point and flash and fire point tests. The Marshall mix design was then carried out on the test specimens in accordance with ASTM 1559-89. Results obtained for bituminous mixtures comprising of conventional aggregates, namely stability, flow, and VFA all conformed to the specification ranges for suitability of use in HMA construction. Those obtained for mixtures comprising of only the pozzolanic type of aggregates (with mean stability of 1360lbf and VFA value of 85%) did not confirm to the specification requirements of minimum stability 1500lbf and VFA range of 70-80%). However, mixes having a combination of pozzolan aggregates with conventional aggregates in the filler produced acceptable results of stability 1617lbf), though the voids filed with asphalt (VFA) value (86%) still fell outside the specification range. The fineness of the pozzolanic powder (filler) probably makes it unsuitable for use in bituminous mixtures as they rendered the mixtures unsuitable. On the contrary, the granitic dust (filler) was suitable for use in preparing mixtures and it improved the stability and other Marshall properties of pozzolan aggregates used in the study. High optimum asphalt contents were obtained for mixes that comprised of pozzolans especially in the coarse portion unlike the conventional granitic types.	Pozzolan aggregates, road bituminous mixtures, Marshall mix design method	Kampala	Materials	Surfacings	Platform	M25
2	Makerere	SSEKAYING	2013	Modelling the	Central	A number of road construction authorities employ the traditional approach to pavement evaluation using the California Bearing Ratio (CBR) which is time consuming,	Lateritic gravel,	Mutundwe, Kazinga,	Materials	Other	Base	M26

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6	University	O STEPHEN (2009/HD16 /16133U)		Dependency of Lateritic Gravel, Performance on its Grain Size Distribution	Library at Makerere University, CEDAT Library	labour intensive and cumbersome. Maximum particle size of lateritic gravel has significant influence on the material stiffness. On that note, a correlation study of the CBR to grain size distribution was seen as benefit to pavement technology. The main objective of this study was to ascertain whether there was a causal relationship between particle size distribution and mechanical strength of lateritic gravels based on California Bearing Ratio (CBR) as a performance indicator. Lateritic soils ranging from neat samples, 75%, 50%, 25% and 0% of the respective material components (viz, gravel, sand and fines – silt/clay) were tested. A total of seven borrow pits were considered for this study namely; Mutundwe, Kazinga, Busukuma, Misindye, Kitemu, Kanyanaya and Kyanja. Test results generally indicated that the lateritic gravel studied was of medium plasticity and that though it was possible to achieve adequate strengths for pavement construction with natural lateritic gravel in the study area; it was limited by relatively high levels of plasticity and fines content. It was also noted that eh variation of gravel percentages viz; 75%, 50%, 25% and 0% of gravel, resulted into a decrease in MDD, CBR and the corresponding increase in OMC for all the borrow pits. Furthermore, for sand and find variations, the MDD and CBR were observed to increase up to a peak value and thereafter decreased. Significant increase was observed at different optimum percentages i.e. 75% (Mutundwe), 50% (Busukuma, Kazinga and Kyanja) and 25% (Kanyanya, Masindye and Kitemu) for sand variations while for fines variation was at 75% (Mutundwe), 50% (Busukuma, Kanyanya), 25% (MIsindye, Kyanja) and 0% (Kazinga, Kitemu) of the fines. The OMC for both sand and fines variation was observed to decrease as the constituent materials reduced in the test samples. Multiple linear regression analysis was also carried out and models were developed considering of the fines. The OMC for both sand and fines variation was observed to decrease as the constituent materials reduced in the test samples. Multiple linear regression analysis was also carried out and models were developed considering different independent parameters namely percentages passing sieves 37.5, 20.0, 5.0 and 2.36mm, grading modulus and maximum dry density. It was found that a combination of soil properties vis P37.5, P20, P5, and P2.36 correlated well with strength characteristic (CBR at 95% Mod. AASHTO) of the soil samples and that model 1 (CBR95 = 283.451-1.6`p37.5 -0.936p20- 1.008p5.0 + 1.51p2.36) was selected to represent the data set within the study area.	grain size distribution, pavement technology	Busukuma, Misindye, Kitemu, Kanyanya and Kyanja				
27	Makerere University	KYASANKU MUWANGA RAYMOND (2008/HD16 /13358U)	2011	An Assessment of the Impact of Total Quality Management on the Construction Company's' Performance in Uganda.	Central Library at Makerere University, CEDAT Library	The liberalized economy of Uganda since 1990 has led to development in a variety of sectors bringing with it an upswing in the building and construction industry. However, the construction industry has been associated with construction accidents, poor workmanship, reworking, project time overrun and lack of proper construction procedures in place. This has increased demand for higher standards by clients especially, now that building projects are getting larger and more complex. In order to achieve higher standards of performance, Uganda's Construction Industry needs to borrow a lead from other countries where implementation of Total Quality Management (TQM) has been recognized as a successful management philosophy and have thus embraced it. The objective of this research was to establish the effect of TQM on the performance of construction companies in Uganda. In fulfilling this objectives, the barriers to TQM implementation and was to mitigate them were established, the impact of TQM on different performance parameters was assessed and ways to promote TQM were identified and recommended. This research studied the performance trend of construction companies in Uganda who have adopted the philosophy of TQM to assess the impact as well as establishing the benefits and barriers of implementing TQM. In addition, a corresponding number of construction companies which are non TQM certified was also studied to establish why they have not adopted TQM and how they handle quality management. From the study, the results showed that implementing TQM had a significant impact in enhancing performance. A number of barriers and benefits of TQM implementation were also identified. A factor analysis was done, which grouped the barriers into four namely; barriers due to workers, management and administrative barriers, company's structure related barriers, resource and external related barriers, and grouped the benefits into three namely, workers benefits, performance benefits and operational benefits. In order to promote TQM the study recommended awarding best bidders based on quality practices rather than on lowest price, in addition to sensitizing contractors on TQM to better understand the practice. Based on the research findings and the subsequent analysis, the implementation of TQM was found to have enhanced the different performance parameters. It was therefore recommended for practice by construction companies.	Total quality management, construction company's' performance, Total Quality Management (TQM)	Uganda	Construction	Other	Solution / Application	M27
28	Makerere University	MUHOOZI SAMUEL	2013	Influence of Chemical Composition of Compaction Water on the Performance of Soil Sub-grades and Fills	Central Library at Makerere University, CEDAT Library	Construction projects use various types of materials including among others gravel, additives, aggregates, water, soils and bituminous materials for different purposes. Water being the most common is obtained from various sources including ponds, lakes, wells, natural springs and swamps. This study sets out to establish the influence of physical and chemical composition of compaction water on the performance of soil sub-grades and fills. Different types of compaction water used were swamp water, borehole water, brine water and distilled water which was used as the control. From the tests carried out, the maximum dry density was 1987kg/m3 for gravel treated with borehole water at an optimum moisture content of 14.73% while the lowest dry density was recorded as 1813kg/m3 at an optimum moisture content of 9.37% with distilled water. For mica soils, the maximum dry density was obtained as 1995 kg/m3 at 8.56% while the lowest was 1862kg/m3 at 12.77% water content. For clay soils 1826kg/m3 was obtained at 14.43% water content for brine water and the lowest dry density was recorded as 1633kg/m3 at 16.77%. The maximum plastic limit value was recorded as 60% for brine water in mica while the lowest was at 0% for all types of water used in this study in mica. Soil dispensability was addressed in two ways i.e. by Sodium Adsorption Ratio (SAR) and by Hydrometer Test. Most of the SAR values were quite high i.e. 14.5, 16.8 and 14.1 for Gravel, clay and mica soils respectively. Gravel soils treated with all construction water simulations recorded zero dispersion. Results from expansion index tests on soils after treatment with brine water did not follow any defined pattern. None of the soils posed any shrinkage problems since they had bar linear shrinkage values of more than 2. The highest strength values in terms of CBR recorded are 130%, 110%, 80% and 35% for borehole water, swamp water, distilled water and brine water, all for above the value specified by Ministry of Works and Transport (MoWT), 2005 of 30% for use as a subgrade materials. From the Unconfined Compression Strength (UCS) test, gravel treated with distilled water had UCS value closest to the range recommended by MoWT (2005) of 0.7 – 1.5MPa. Varied results have been obtained that would lead to various conclusions. It was observed that event the worst sources of alternative water would have no significant effect on engineered soils.	Chemical composition, compaction water, soil sub-grades and fills	Uganda	Materials	Subgrade	Base	M28
29	Makerere University	MWESIGWA SAMUEL DAMULIRA	2012	An Investigation into the Benefits of Labour Intensive Based Road Works Rehabilitation Programme; A Case Study of Central Region, UGANDA.	Central Library at Makerere University, CEDAT Library	A lot of money is disbursed from both the Central Government thought the Uganda Road Fund and non-Governmental Organisations (NGOs) to the Uganda National Roads Authority (UNRA) and district local governments for road maintenance and rehabilitation programmes. This is to find the maintenance and rehabilitation of both national, district and community access roads who plan for the maintenance of roads by either machine or labour based. The use of machines in road rehabilitation has left the labour based program and labourers at the districts redundant, hence creating unemployment. It is a government policy to keep district and feeder roads in good passable condition at all times while reducing the unemployment rate through the use of local labour force. This study investigated the benefits of the use of labour based road rehabilitation programme with a focus on the central region of Uganda, in the districts of Wakiso, Mukono and Mpigi. Specifically, the study examined the sustainability of the labour based road rehabilitation programme, its relevancy in road rehabilitation, as well as establishing and documenting the problems/challenges experienced in the programme implementation. Areas for policy review and interventions were also documented. Cross-sectional and quantitative in nature, the study involved a detailed literature review, use of observation sheets, interview guides and self-structured administered questionnaires to contractors involved in the Labour Based Construction (LBC), Ministry of Works and District technical staff, labourers and road sector stakeholders in the region. The findings suggest that the programme provides employment 65.1% of the respondents, improved road life (27.9%) and boost in local businesses (7.0%). Sustainability was measured in terms of the availability of local work force, training and funding 27.9% of the local workforce and 37.7% of the technical staff received training at every stage of project implementation. Low levels of training were thus observed. It was also 80% of the funds for implementation of LBC are budgeted from central government releases while 20% are from donations and 0% from local collection. Districts have therefore no control on the central and donor funding in terms of amounts and timely disbursement of funds. There is also a general lack of project ownership due to the absence of local participation in terms of revenue collection. All the above affect the sustainability of the program. User agencies have instead opted for routine maintenance approaches (56.3%) to the LBC methods of periodic maintenance method, thus rendering the programme less relevant. Among key problems and challenges facing the programme included delayed payments (50%), low funding (16.7%), lack of labour supply (10.3%) and lack of work continuity (6.3%). Areas requiring policy review were identified as an inadequate flow of funding (67.4%), development of design standards (8.1%), enhancement of labour laws (8.1%) and improvement the funding process (16.3%). The study recommends that a clear and specific policy in support of LBC, advocacy for better instructional framework, continuous skill development and streamlining of conditional budgetary provision be instituted for better sustainability of the programme.	Labour intensive, road works rehabilitation program, NGOs, UNRA,	Wakiso, Mukono and Mpigi	Construction	Other	Solution / Application	M29

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30	Makerere University	BWAMBALE BARNABAS	2013	Seismic Hazard Analysis for the Albertine Region - A Probabilistic Approach	Central Library at Makerere University, CEDAT Library	The Albertine region of Uganda has experienced severe earthquakes with magnitude M>6 in recent times. The largest earthquake on record, which occurred in Tooro on the 20th March 1966 had a magnitude of Ms = 6.6 and killed 160 people. The most recent significant earthquake occurred on 5th February, 1994 was magnitude Ms = 6.0 at Kisomoro, whereas 8 people were killed. Though there is evidence of seismic activity in the region, very little work has been done to evaluate the associated potential hazards. The aim of this research was to assess the potential hazard accruing from earthquakes. In this work, the probabilistic approach was used to assess the seismic hazard for Hoima and Buliisa districts in the Albertine region. The input parameters for the hazard computations were obtained using the earthquake catalogue compiled for the period 1900 to 2012, including earthquakes within an area bounded by latitudes 1.50S to 40N and longitudes 290E to 330E. All magnitudes were homogenized according to the surface wave magnitude scale. The study areas was divided into 4 seismic source zones based on seismotectonics, each of which contributes to seismic hazard of the region. The attenuation relations previously developed for the Western Ridge Valley of Africa were used in the computations. Seismic hazard maps in terms of the Peak Ground Acceleration (PGA) and Spectral Acceleration (SA) at natural periods of 0.005, 0.15 and 0.30 seconds for 10, 5 and 2% probabilities of exceedance in 50 years were prepared using CRISIS 2007 software. The results show that the PGA values for Hoima and Buliisa districts fall in the ranges of 0.131 – 0.217g, 0.172- 0.285g and 0.235 – 0.387g, corresponding to return periods of 475,975 and 2475 years, respectively. The highest levels of seismic hazard were found to be in the Southwestern part of Hoima district, where PGA values were in excess of 0.217g, 0.285g and 0.389g (or 2.13m/s2, 2.80m/s2 and 3.82m/s2) with 10, 5 and 2% chances of exceedance in 50 years, respectively. The highest spectral acceleration of the ground motion derived from the moderate natural period for stiff structures (0.15 second) was in the range of 0.339 – 0.0571g, 0.455-0.763g, and 0.644-1.077g for the return periods of 475,975 and 2475 respectively. It is concluded that in the Albertine region, the return period for an earthquake capable of causing damage to engineering structures is an average 25 years. The study therefore recommends that all important engineering structures in the region should be designed for earthquake resistance.	Seismic hazard, albertine region, probabilistic approach, earthquake, rift valley	Hoima and Buliisa	Management	Non-road	Solution / Application	M30
31	Makerere University	OLWENY LAMU	2000	Structural Evaluation of Select Highway Pavement	Central Library at Makerere University, CEDAT Library	In this text is a structural evaluation of two pavement sections under the Ministry of Works., Housing and Communications. The analysis relied on deflection measurements done mainly using the Benkelman Beam Test. The two pavements deal with here the Entebbe Road ad Kawempe – Wobulenzi Road. The evaluation was mainly focused on establishing the road carrying capabilities of the pavement and service life of the pavements under the prevailing traffic conditions. It provides a review of the major structural and performance related pavement distress and the associated criteria for maintenance and rehabilitation. This book also highlights on a pavement management system that can be used to improve the planning, design, construction, maintenance and rehabilitation of pavements to enhance pavement performance and investment output. The results indicate that the pavements under study were structurally adequate.	Structural Evaluation, highway pavements	Entebbe, Kawempe	Management	Pavement	Solution / Application	M31
32	Makerere University	AMAYO JOHNSON	1999	Highway Design Improvement of Mawanda Road	Central Library at Makerere University, CEDAT Library	Mawanda Road, connecting Kalerwe with Kamwokya is about 2.1 km long. It was formerly under Mistry of Works but later transferred to City council in 1968. No road provision was made for it by the planners of Kampala, hence it passes through private land. The road was initially bitumen surfaced but it has undergone tremendous failure due to lack of maintenance in the past years. The major cause of failure of this road has been poor drainage. The existing drainage facilities have been blocked by deposits of fine soils. Ditches have been clogged by vegetation and thereby reducing their water carrying capacity. The lateral drains have been basically triangular cross-section type. This kind of channels normally have lower capacities than trapezoidal channels.	Highway design, bitumen surfaced	Mawanda Road	Design	Pavement	Solution / Application	M32
33	Makerere University	ASHABA PRICE (11/U/9953/ PSA) & KATONGOLE HASSAN (11/U/482)	2015	Effect of variation of the Air Voids Content on the Stability of Asphalt Concrete Mixtures	Central Library at Makerere University, CEDAT Library	A significant amount of investment in Uganda is directed to construction of asphalt paved roads. However, frequent failures attributed to several causes, such as, improper mix design, poor workmanship, increased traffic volume, tire pressure, axle loading and deficiency in specifications are noticed on majority of the paved roads. A precise design may therefore save the considerable amount of investment as well as a reliable performance of the in-service highway. The emphasis of this research was therefore based on considerations involved in the concept of mix design, particularly air voids content and stability of the asphalt mixtures. Establishment of this correlation is to be used to curb the economic losses incurred in asphalt pavement restoration to a god riding state. This was executed with employment of the marshal Mix design method. This was conducted using aggregate from Kakiri stone quarry where three different samples, AC – 14/20, 10/14 AND 6/10 IN 25KG BAGS. 10Kg of quarry dust were also obtained and bitumen of penetration grade type 80/100 from the central materials laboratory. These materials were then subjected to suitability tests and performance tests to ensure use of material that met the requirements. Preliminary tests were then carried out according to the Marshall procedures as stipulated in design code; ASTM 1559 (2004) with specimen preparation by way of varying the binder content in steps of 0.5% around. These specimens were then subjected to flow and stability analyses. After analysis of all the results, the Optimum Binder Content (OBC) was found to be 5.3%. The effect of air voids content on stability was then represented graphically upon analysis in Microsoft Excel.	Variation, air voids content, asphalt concrete mixtures	Kakiri	Materials	Surfacings	Platform	M33
34	Makerere University	GOFREY SSAMBWA	1986	A Design Proposal for the Reconstruction of Hoima Road from Bakuli to Nakulabye	Central Library at Makerere University, CEDAT Library	The roads of Kampala were designed and constructed about 40 years ago. It is likely that the design method then used in Britain was employed, irrespective of whether or not this method was appropriate to the Ugandan climate and traffic conditions. In addition, the commercial traffic on the road sin Uganda has since then become more advanced and varied, achieving greater load carrying capacities. However, in recent development, a modified Britain structural design procedure for bitumen-surfaced roads in tropical countries has been evolved. In this project, use is made of this design procedure in an attempt to achieve a more rational and economical approach to the problem of the reconstruction of urban roads in Uganda, with special reference to the Nakulabye-Bakuli road stretch.	Reconstruction, road stretch, design	Nakulabye-Bakuli-	Maintenance & Rehabilitation	Pavement	Solution / Application	M34
35	Makerere University	KABANDA HERMAN	2003	Evaluation of Feeder road Projects in Mbale District	Central Library at Makerere University, CEDAT Library	This project presents the proposed upgrading of the two gravel roads linking Nakivubo Road to Makerere road through Makerere Kivulu. The project was undertaken as a result of growing concern about traffic congestion on many roads in Kampala city and the high costs involved in maintenance of the highly trafficked gravel roads as a measure to ameliorate this situation. Discussed in this project are the comprehensive laboratory tests carried out on sub-grade materials and assessment of their suitability, topographic survey results, traffic survey results and rainfall intensity results. Furthermore, the project makes a structural design of the road pavement on both roads, design of road drainage structures and improves the alignment geometry of the roads. Drawing possible conclusions and recommendations in form of remedies based on the design conclude the project.	Upgrading, gravel roads	Makerere	Management	Gravel	Solution / Application	M35
36	Makerere University	EMMANUEL BAKKABULI NDI	1988	A design Proposal for the Reconstruction of Gayaza road from Mulago Hill Round about to Kyebando	Central Library at Makerere University, CEDAT Library	Most of the roads in Uganda were designed and constructed many years ago. It is likely that the design methods then used in foreign countries, like Britain, were employed, irrespective of whether or not these methods were appropriate to the Uganda climate and traffic conditions. However, in recent development, a modified British structural design procedure for bitumen-surfaced roads in tropical countries has been evolved. In this project, use is made of this design procedure in an attempt to achieve a more rational and economical approach to the problem in Uganda, with special reference to Gayaza Road.	Reconstruction, roads, climate, traffic conditions	Gayaza	Maintenance & Rehabilitation	Pavement	Solution / Application	M36
37	Makerere University	MUWANGA RASHIDAH BAYIGGA (00/U/3423/ PSA)	2004	Signalization of Nakulabye Junction	Central Library at Makerere University, CEDAT Library	This project is aimed at coming up with an appropriate signalized junction at Nakulabye and in addition, an appropriate traffic management system for the approach roads. This report gives an introduction, a background to the project, problem statement, objectives, and the scope of the study, all these embedded in chapter one. Chapter two then gives the literature adopted during the course of the study. Major definitions and terms are explained in detail in this chapter. Chapter three then lays down the activities undertaken and how they were to be undertaken by the researcher. Chapter four then gives the presentation of the data that was collected from the field. Tables that indicate the traffic counts are drawn for the different approaches at the study areas. The data collected is then analysed and discussed in chapter five. Formulae and graphs are used in the analysis. Conclusions and recommendations are written in chapter six, basing on the results and analysis from chapter five and four. A recommended layout is drawn that summarizes the finding s of the researcher.	Signalization, junction	Nakulabye	Road safety	Other	Solution / Application	M37
38	Makerere University	GUMA GERALD (97/U/760)	2001	Comparison of the Performance of Hot-Mix Asphalt With Surface Dressing on Busega-Mpigi Road	Central Library at Makerere University, CEDAT Library	This study deals with comparison of the performance of Hot Mix Asphalt (HMA) on Busega-Nsangi section and surface dressing on the remaining Nsangi-Mpigi stretch of the highway. Pavement performance was addressed qualitatively by visual inspection. This effort aimed at identifying pavement distresses were discussed kilometre by kilometre for the HMA section and in general when it comes to surface dressing. Present serviceability rating and traffic and axle load counts were also discussed. Results obtained from the analysis indicate that the surface dressing section performed better than the HMA overlay section. Recommendations and the conclusions clearly put emphasis on the need to carry out frequent repairs.	Hot mix, Present Serviceability Rating, Traffic	Mpigi district	Materials	Surfacings	Solution / Application	M38
39	Makerere University	WASIKE FREDRICK	2013	Redesign of the Drainage System for	Central Library at	Uncontrolled surface water runoff has caused serious problems in urban areas. Drainage problems in Kampala have been accentuated by the construction of buildings, roads and other surfaced areas, which have restricted the drainage pattern and significantly increased the rate and amount of run off.	Redesign, drainage system,	Kampala	Environment	Other	Solution / Application	M39

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				Kabega Road	Makerere University, CEDAT Library	Improvement to the drainage system have then become a necessity in the past few years for a variety of reasons of which avoidance of nuisance, mitigation of flooding, removal of health risks, control of pollution and protection of potable water supplies from contamination have been paramount. Nuisance has often arisen from standing water on roads with accompanying mud and deterioration of the surface. An economic disbenefit has then resulted due to the temporary disruption of freedom of movement and this has further been enhanced in case of flooding with damage to property, goods ad in severe cases loss of life. Standing water has also frequently enhanced mosquito breeding and caused more direct health and environmental hazards arising from the spillage on the road surfaces.	health risks, runoff				
40	Makerere University	MUTIKANGA HARRISON	1993	The Performance and failures of Flexible Pavements in Kampala City: A Case Study of Burton Street.	Central Library at Makerere University, CEDAT Library	The project presents an evaluation of the performance and failure of city roads. The project was undertaken as a result of the deterioration of most city roads, even after maintenance and rehabilitation. One wonders why and how such a situation continue to exist on Kampala City roads. It is therefore under this background that the project was undertaken. The project examines the common causes of failure of Kampala City roads with special reference to Burton Street. Discussed in the project are the failure types and their corrections. Comprehensive laboratory tests are carried out and the suitability of pavement materials assessed. Furthermore, the project makes a structural design of a typical section of the pavement on Burton street. The study reveals that flexible pavements can fall because of:- i) Weak subgrade, ii) Lack of regular and routine maintenance, ii) Poor drainage, v) Poor pavement procedures, v) Poor workmanship and construction methods, vi) High stresses due to high axle loads, vii) Repetitive traffic loads, viii) Edge loading, ix) Very compressible soils such as peat, x) Very old pavements that have outlived their design lives. The project is concluded by making the possible recommendations in form of remedies base on the findings.	Performance, failures, flexible pavements, burton street	Burton street – Kampala	Management	Pavement	Solution / Application	M40
41	Makerere University	OLINGA RICHARD ORIONO (02/U/4379/PSA)	2006	Traffic Flow Analysis and Speed Zoning for Makerere University main Roads	Central Library at Makerere University, CEDAT Library	Due to a big population and also quite a big number of motorists entering and moving around the university, and yet in some spots in the campus, there if not a good sight distance for the drivers because of obstacles such as buildings, trees, parked vehicles and corners or bends, there is need to improve the safety of both the pedestrians and those riding or driving within the campus. The University has tried to achieve this by sign speed humps. However, speed humps other than reducing road use comfort, also reduce the aesthetics of the roads. This project aims to achieve both road use comfort an aesthetics of the roads by eliminating the use of speed humps and instead use speed limits. The project aims mainly the three major roads in University i.e. Mary Stuart roads, University Road and pool Road. Traffic flow or traffic volume can be understood as the way vehicles (current traffic) distribute on roads as they move from different origins to different destinations. Traffic flow analysis is a study that involves counting the number of vehicles using a given route, thus coming up with results indicating the hourly, daily, monthly, yearly and seasonal traffic volume variations, also the direction to which the traffic flow takes. The volumes will be attained using manual counts. Speed zoning involves studies done on speed used by the drivers as they use the roads. It aims at getting the present spot speeds and running speed over the roads hence come up with the upper and lower speeds for motorists using the roads. The traffic flow analysis and speed zoning of Makerere University major routes, is a research project that by the end of the Academic year, would have got the traffic using the routes, their current speeds on roads and thus come up with a minimum and maximum speeds for the campus routes. And secondly, using the hourly, daily, monthly, yearly and seasonal traffic volume data that will be collected, the project will also come up with the traffic maximum and minimum densities.	Traffic, maximum and minimum densities,	Makerere University	Operations	Other	Solution / Application	M41
42	Makerere University	RUTAAGI J.G.	1994	A Study of the Methods of Soil stabilization Applied in Highway Construction in Uganda	Central Library at Makerere University, CEDAT Library	More often than not there is a lot more to be learnt from failures than successes. The truth behind this old maxim is fully revealed when an attempt is made to rationalize the findings from the failures of a road pavement. For one thing, these results not only enable one to know the causes of the failures but also help in suggesting remedial measures. It is hardly possible in this country to move along any road for more than 200m without noticing a pavement failure of any sort. It is in light of this, that a study of the methods of soil stabilization used in the construction of roads in Uganda was undertaken. The majority of highways are public facilities constructed using funds either raised through tax or from foreign loans. Therefore, the main challenge to the highway engineer is to design a pavement to handle the anticipated traffic within the economic limitations available. It should be emphasized that economic analysis form a basis upon which the engineer makes the final judgment, but economic justification certainly is not the only factor that is considered. In other words it's a necessary but insufficient factor. Therefore, there is dire need to consider soils stabilization techniques and methods which have been used with success in other parts of the world but not yet in Uganda. This project highlights on some of these methods and techniques. It is the author's conceived view that an attempt should be made to adopt them, where appropriate, for road works in Uganda.	Soil stabilization, highway construction, road pavement	Uganda	Materials	Pavement	Platform	M42
43	Makerere University	RWAKISEETA PATRICIA S.	1992	An Investigation of Properties of Bitumen used in Road Construction (1991/92) in Uganda	Central Library at Makerere University, CEDAT Library	Properties of bitumen and uses for construction are investigated in the study. A review of recently published literature indicates that there is a growing concern in the industry over changes in properties of bitumen. The origin, manufacture and constitution of bitumen are presented to give a better understanding of the material. The types and origin of bitumen used in Uganda are also given. Bitumen for road construction in Uganda is used for two main types of construction: Hot mix asphalt and surface dressing, these two methods are discussed and various failures in bituminous surfacing and their causes presented. The investigation involved a laboratory testing programme. Materials from various organizations were sampled and various tests described in the text were carried out. The results are presented and these generally indicate variabilities in bitumen properties different from what specifications require. Some samples met specifications while others were out of specifications. Two of the samples that were out of specification exhibited unique properties. A discussion of results is presented. A field evaluation of on pavements constructed with materials tested was made to provide a correlation between tested properties and performance in-service. The observations indicate poor performance and further investigation showed this to be done to aggregate. Recommendations are forwarded from observations made from the study.	Bitumen, road construction, investigations	Uganda	Materials	Surfacings	Base	M43
44	Makerere University	SSEVVUME STANLEY	2008	A Strategy of Solving the Flooding Problem in a Flat Stretch along Nyendo-Bukakata Road	Central Library at Makerere University, CEDAT Library	Nyendo-Bukakata road is found in Masaka District. It branches off the Masaka-Kampala road at Nyendo just 2km from Masaka town. A section of this road from Kigo swamp tow where Mazigo usually floods rendering the almost impassable. A case in point was from 28th April, 2008 to May 2008 when this road was completely cut off by floods. The project tries to solve the flooding problem along this relatively flat section of the Nyendo-Bukakata road. Chapter one gives a brief background, states the problem, justification for the study, the scope of the study and the objectives of the study. Chapter two is the literature review compiled from different text books, manuals, and research projects related to this study, internet, and so many other sources. Chapter three is the methodology. It describes the various methods that are used to obtain the required data. The methods were chosen basing on the type of data required and the intended use. Chapter four shows the analysis and design of the different data collected and drainage structures respectively. Chapter five has the recommendations and conclusions drawn from this project and lastly a list of references is provided for further reading. It has been observed that apart from the road being in a flood prone area, the flooding is also due to lack of design for the road and drainage facilities as well as lack of proper maintenance for both the road and drainage facility. It is therefore in my interest that this design is adopted for the better performance and functioning of this road section. This design solves the flooding problem and is economical.	Strategy, flooding problem, flat stretch, roads	Nyendo-Bukakata (Masaka district)	Environment	Other	Platform	M44
45	Makerere University	TWIJUKYE JOSHUA	2006	Influence of Utility cuts on Pavement Performance: Case Study of Mary Stuart Road	Central Library at Makerere University, CEDAT Library	Kampala is a growing city and it is in need of increasing supply of utilities to its population. New utilities are being introduced and the old ones being expanded. This has created the inevitable necessity to cut through roads in an attempt to reach the whole population of Kampala with the services. The act of cutting through the road has consequences that need to be found out and catered for while billing the companies that install their service infrastructure under the roads. The project was aimed at investigating the effect of the utility cuts on the performance of a pavement and the case study was Mary Stuart road in Makerere University. A Surface distress survey was done on areas of the road that had been cut through and had been patched. A structural adequacy survey of the patched areas was done to investigate the effect of patches on the structural strength of the pavement. A survey for the relative deflection between the cut points on the road pavement and the original uncut pavement was done. It was found out that the pavement loses to as much as 10% of its strength at the point of the utility cut. The readability of the pavement was also found to decrease significantly because of the presence of the utility patches. Potholes were found on 80% of the utility cut points analysed signifying a high rate of failure of the pavement at these points. Cracking on the other hand was found on only 25% of the patches analysed. This was attributed to lack of overlay application ever since the road had been cut through and cracking is expected when overlays are placed on the pavement.	Influence of utility cuts, pavement performance, Mary Stuart	Kampala	Management	Other	Solution / Application	M45
4	Makerere	TUMUSIIME	2003	An Investigation into	Central	This research was aimed at establishing the causes of bad condition of gravel roads in Kabale district and more specifically Kabale Municipality in the hope that this	Gravel road	Kabale Municipality -	Maintenance	Gravel	Solution /	M46

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6	University	MOSES		Gravel Road Maintenance in Kabale district: A Case Study of Kabale Municipality	Library at Makerere University, CEDAT Library	would help highlight the problems facing the neighbouring areas with similar topography and therefore similar problems. Despite the efforts of Ministry of Local Government to try and standardize the maintenance procedure, problems still exist, so a number of problems were identified and investigated among which are drainage, poor gravel, mudslides and landslides. Literature was gathered from available sources including the internet, technical specifications documents, textbooks and through interviewing technical people in the district. A road condition assessment was then carried out to establish the type and extent to which the deterioration has occurred. The drainage condition was also assessed, and the rainfall data was also collected for the severest period, which was 1996-1999 when precipitation was severest since 1957. Laboratory tests were carried out on gravel sampled from a gravel pit, which was being used for maintenance to determine the suitability of the gravel used. Gradation tests and consistency tests were carried out and gradation curve was plotted for sieve analysis, plasticity index determined from the plastic and liquid limit. Recommendations were then made basing on the data collected and the observations made, for example it was observed that it is not possible to change funding in the short run and therefore quality of gravel is not easy to improve in the short run. It would therefore benefit everyone it focus is changed towards drainage improvement instead since it is easier to construct and maintain.	maintenance, gradation tests	Kabale district	& Rehabilitation		Application	
47	Makerere University	NAMPERA ROBINAL (10/U/6770) & RAMADHAN OMAR RAJAB (10/K/3103/ PSA)	2014	Development of Economic Seasonal Adjustment Factors for Road Pavements in Uganda.	Central Library at Makerere University, CEDAT Library	This research was undertaken to establish how economic activities impact results of traffic assessment conducted during different times of the year. Traffic counts and origin destination surveys were conducted on Kampala-Masaka road as the case study road of this thesis report. Pneumatic tube methods were used to obtain the traffic data volumes and classification by axle and per vehicle. Centurion CC software was used in extraction of this data from the counters directly into Excel, which was used in data analysis together with sigmaplots software. Hourly and daily variations of traffic were established following the procedure from the overseas road note 40. The different economic activities identified on this road included agriculture, tourism, trade, both home and international were identified using the origin and destination surveys. For purposes of comparison the surveys were conducted for 3 months, March, April and May. The ADT, AADTs were obtained by use of expansion factors. HEFs, DEFs, and MEFs were applied in adjusting 12 hour to 24 hour volumes. The raw data of both surveys is presented in the Appendices whereas the summarized data in chapter 4 of the report. Economic seasonal factors were determined according to economic activities already mentioned above. In a nut shell, it is recommended that since traffic varies hourly, daily and monthly depending on the different economic activities, seasonal adjustment to traffic volume be done to harmonize the results.	Economic seasonal adjustment, road pavement, Origin and Destination surveys	Makerere University	Operations	Other	Platform	M47
48	Makerere University	RWAKAFUNJO GODFREY (11/U/462) & TWAIBU SHAFIC (11/U/23196/PSA)	2015	Assessing Effectiveness of Speed Humps as a Traffic Calming Measure on National Roads in-built up areas.	Central Library at Makerere University, CEDAT Library	This report presents findings of a study to evaluate effectiveness of speed humps as a speed calming measure in built-up areas on Uganda National Roads. The objective was to assess the impact of both the speed hump configuration and geometric design on speed reduction. To achieve this objective two categories of hump and rumble strip configuration was assessed, speeds were collected at selected areas of Lukaya, Kamengo, and Kyabadaza on Kampala-Masaka road for configuration 1 and Zigot, Buyala, Bujjuko situated on Kampala-Mityana road for configuration. 2. Speed data was collected using video cameras following a designed field set up. Speeds were computed based on time taken to traverse a known distance in the video, speeds for vehicles were determined for the approach, middle and exist study sections. These speeds were statistically analysed to determine the significance between measured speeds at different reference points, the mean speeds were found to be statistically significant for different hump and rumble strip configuration, however, configuration 1 proved to be the most effective in speed reduction. The height, width and spacing of existing humps and rumble strips were measured using standard steel and fibre tape measures and the results compared with the Ugandan Ministry of Works and Transport standards for consistence, 100% of rumble strips and humps' height were below the standards whereas only 17% of interval distances between successive rumble strips were consistence with the standards. However, further related studies are recommended on all the national roads in built up areas.	Speed humps, traffic calming measure, roads, Uganda National Roads	Masaka district	Road safety	Other	Solution / Application	M48
49	Makerere University	OKELLO DOMINIC (10/U/681) & MUKIIBI S. PETER (10/U/9964/ PSA)	2014	A Prediction Model for Vibrations of Roadside Structures Emanating from Road Construction Operations	Central Library at Makerere University, CEDAT Library	Earth borne vibrations from vibratory compactors can be described as single-frequency continuous vibration. Human perception of ground vibration is subjective and depends upon a number of factors. Damage of structures caused by earth borne vibrations can be categorized as either architectural or structural damage. Architectural damage is superficial damage such as hairline cracks in plaster walls or ceilings. While catastrophic damage to buildings from construction operations are extremely rare, some structural damage such as separation of masonry blocks and cracking in foundation, and other sensitive structures may occur in cases here the earth borne vibrations exceed threshold levels. Various federal, state and foreign agencies have proposed vibration limit criteria, some intended to mitigate damage to structures while others re based upon limiting human annoyance. One of these existing criteria was selected to form the basis of the recommendations documented herein. This criteria gives guidelines for vibration limits on buildings represented as a graphical relation between the PPVa and frequency. The standards gives limits for 3 categories of buildings with increasing levels of protection for commercial, residential and sensitive structures. A prediction model based on a frequency-dependent ground attenuation formula is used for elating vibration propagation with distance. The frequency values are got from the infiltec QM – 4.5LV Seismograph data through the AmaSeis software. Detailed knowledge of the layering of the pavement structure is not required although the type of soil within the surrounding area is required as waves travel differently in different types of soils. It is demonstrated that he prediction model can be used to restrict vibratory compaction near sensitive infrastructure.	Prediction model , roadside structures, road construction	Uganda	Construction	Other	Platform	M49
50	Makerere University	ADOKO DENIS ABONGO	2004	Appraisal of Road Maintenance Management System of the District Roads in Uganda: A Case study of Lira District	Central Library at Makerere University, CEDAT Library	With the commencement of transport rehabilitation project, as well as other rural infrastructure improvement initiatives, the Government through its Ministry of Works, Housing and Communication, is now in the process of building up its own capacity to rehabilitate and maintain District road network. The research is aimed at the District technical staff who are directly involved in District road maintenance works. In addition, the research attempts to document the maintenance management system for the District road maintenance and rehabilitation. It defines the various components of road maintenance requirements of District roads in Uganda. It also give a brief description of planning, implementation and reporting cycle required in an effective road maintenance management system. The purpose of this research is to provide technical staff with appropriate guidelines on the effective management of district road maintenance works. Hopefully, the combination of these documents should provide sufficient guidelines to technical staff in carrying out maintenance of district roads in Uganda.	Road maintenance, district roads, Uganda	Lira district	Maintenance & Rehabilitation	Gravel	Solution / Application	M50
51	Makerere University	TUSIIME J.K.A.	1990	An Appraisal of Pavement problems in Kampala	Central Library at Makerere University, CEDAT Library	The sole objective of the project is to analyse and evaluate the problems faced by the road pavement in Kampala. The report aims at describing in practical detail the measures which are necessary both in the design and field construction to successfully control and supervise road maintenance and construction works. The project area is centred on those pavements under Kampala City Council (KCC), excluding concreted pavements. In preparing the report therefore, efforts have been made to identify the problems, their causes and to give remedies. The task has been accomplished by: i) Personal contact, more especially with the city council engineers acknowledged, ii) My own observations as I moved around the city, iii) Literature, textbooks, specifications and reports of Kampala City council This study deals with background information on present conditions of city roads and materials used in the flexible pavements especially the importance of Bituminous surfacings and how their performance can be improved. The second part, the gist of the project has been dedicated to the problems of city roads. For convenience, these problems were categorized under surface, subsurface, and material and construction problems. During the study, I have found out that actually some of these problems were identified by the concerned bodies. Due to financial constraints and failure to implement routine maintenance work, much has not been done to rectify the situation. Thus deterioration continued up to the present state of affairs. To me, the study has been exhaustive. What remains to be done is the implementation of maintenance, supervision and control methods i.e. the recommendations should be put into place. Further, watch should be kept to any problem that might crop up.	Appraisal, pavement problems, Kampala City Council (KCC)	Kampala	Management	Pavement	Platform	M51
52	Makerere University	MUYAMBI K. ANTHONY	2002	A Study of Gravel Surfaces Laid by dry Compaction Technology	Central Library at Makerere University, CEDAT Library	This research was conducted to explore the option or alternative to the traditional approach or technique of achieving the specified compaction in the course of executing road projects. When an employer gives out or lets a road contract, they usually specify that the soil must be compacted to some pre-determined dry unit weight. This specification is usually that a certain percentage of the maximum dry density, as found from a laboratory test must be achieved. For example the specification could be that field densities must be greater than 95% of the maximum dry unit weight as determined from the Standard Compaction Test. It is then up to the contractor to select machinery, the thickness of each lift (layer of soil added) and to control moisture contents in order to achieve the	Gravel surfaces, dry compaction technology, contractor, steel machinery	Karamoja	Construction	Surfacings	Base	M52

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						specified amount of compaction. Traditionally, contractors have taken the obvious choice of watering to a determined optimum moisture content at which the specified compaction is achievable. This of course makes good engineering an economic sense if water is readily available and he cost of its delivery to the site is not prohibitive. The research however, envisages ad situation where water for road works is not readily available. This is the case in fairly semi-arid and arid areas. The solutions being explored include compacting at whatever moisture content the soil (murram) is at naturally i.e. as dumped on the road section straight from the borrow pit. Advantage may especially be taken of that period immediately after the short rainy season usually associated with such areas when the in situ moisture content is considerable. Also under consideration is the view point of transferring the cost of accessing and delivering water to increasing compactive energy invested in the compaction process. The research considers the case of the semi-arid North Eastern Uganda (Karamoja), which is in much need of an adequate road system. Comprehensive laboratory work with a number of soil samples from the region formed a central part of the research and so did data form the few companies that have dared confront the hardships it presents to execute road works there. Finally a scrutiny of the findings of the research was comprehensively done. An exhaustive discussion of the findings and well-informed conclusions derived from the findings are presented. These conclusions in turn have imposed a number of matter-of-fact recommendations, which are also presented herein.						
53	Makerere University	MAKANGA DAVID STEPHEN	1990	Construction and Maintenance of Rural Roads in Uganda	Central Library at Makerere University, CEDAT Library	This project report is prepared for submission in partial fulfilment of the requirement for the award of the degree of bachelor of Science in Civil Engineering of Makerere University. The report deals with the construction and maintenance of small rural earth roads in Uganda. These roads do not have a government body responsible for constructing as well as maintaining them. The report will be found useful not only by academicians and professionals, but also by the authorities who are engaged in the organization of the rural residents for constructing and maintaining the small rural roads. It has been attempted to recommend various stages in the management, planning and implementation of the road project. Techniques carried out are described. Various measures, which may be taken in order to ensure that the appropriate techniques will be given due consideration, are proposed. The proposals should be seriously considered and adopted, whenever such technologies are proven to be technically and economically feasible. Chapter one deals with the explanation of the importance of rural earth roads in Uganda the analysis of the problems faced by the rural earth roads and what the whole project aims to achieve. Chapter two reports the situations in which the rural roads are, with special reference given to the road joining Lubya and Namirembe villages, by the name of Nabulagala road. Chapter three deals with the management, organization and implementation of construction techniques on rural earth roads with special reference given to Mulago-Kyebando road. Chapter four reports the management, organization and implementation of maintenance techniques on rural earth roads with special reference given to Masiro-Nakulabye road. Chapter five recommend or proposes better methods for effective and efficient performance in both construction and maintenance of rural earth roads in Uganda. Appendix explains some techniques which should be used in surveying as well as the equipment used. An example of a damage catalogue is given also.	Prediction model , roadside structures, road construction	Lubya and Namirembe villages, by the name of Nabulagala road. Mulago-Kyebando road. Masiro-Nakulabye	Construction	Gravel	Solution / Application	M53
55	Makerere University	AGIK ALFRED (00/U/3430/ PSA	2004	Design of a safe Pedestrian and Cycle way System for Kampala City: A Case Study Namirembe Road	Central Library at Makerere University, CEDAT Library	Namirembe road is among the routes experiencing chronic traffic congestion and the most occurrences of accident in Kampala City. On that basis, the route has been considered for a case study and a range of pedestrian cycle way facilities have been developed aimed at mitigating such nuisance. Due to increased level of economic growth of the country, vehicle and motorcycle ownership in the city has greatly increased with resultant negative impacts of traffic growth congestion is widespread throughout the day, especially at peak hours, together with an increased rate of road traffic accidents. Currently, there is a need for developing suitable pedestrian and cycle way facilities to alleviate accidents and congestion level in the heart of Kampala City, the country's main centre of administration, business and commerce. It was very important that every citizen of this country travels with reasonable comfort, speed and safety, as this is an essential aspect in a wide variety of most economic activities in urban centres or areas. The public should therefore be able to enjoy a long-established right to pass to gain access from public highway to adjacent property with sufficient ease. This was the main objective of this project. The problems on Namirembe road are mainly found to be emerging from a mixture of interrelated set of factors, the major issues being the high demand for road space, lack of adequate road crossing facilities for pedestrians. In most cases accidents, congestions, poor road user behaviour and government institutional weaknesses have been noticed. It is yet expected that, with continual growth in the Uganda's economy, traffic volumes will increase simultaneously with the associated problems. In conclusion, the main objective of this project has been achieved however, few recommendations have been made since engineering alone cannot solve the problems on the Namirembe road.	Congestion, interrelated factors, accidents, pedestrian, cycleway, Namirembe road	Kampala - Namirembe	Road safety	Other	Solution / Application	M55
56	Makerere University	MUNGI MARTIN (11/U/9982/ PS) & WOYEYA C. (11/U/9969)	2015	Investigating Effectiveness of Stabilizing Natural Gravel with Sand in Comparison with Lime in Base Construction of Low Volume Roads.	Central Library at Makerere University, CEDAT Library	This study was carried out to investigate the effectiveness of mechanically stabilizing natural gravel by blending it with lake sand as compared to chemically stabilizing natural gravel using lime. The study area used was Wakiso district where two main gravel solid are used for road base construction, namely Kowologoma gravel and Bweyogerere gravel soils whose names correspond to the locations of their respective borrow pits. Laboratory tests, such as Sieve analysis, Atterberg limits, Modified Proctor Compaction and California Bearing Ratio tests, were carried out on the gravel soils and their blends with sand and lime. The results of the tests were then analysed and the necessary conclusions and recommendations were made. Both Kiwologoma and Bweyogerere gravel soils were found to be dense graded clayey-gravel soils with neat CBR values of 42.6% and 5.9% respectively and stabilized CBR values of 14.3% and 15.6% respectively for 50% by volume of sand added to the gravel solid implying that the CBR values generally decreased with addition of higher percentages of sand to Bweyogerere gravel soil. Therefore, mechanical stabilization of the Bweyogerere gravel soil was suitable for use as a subgrade material as compared to the same unstabilised gravel by method was unsuccessful for the Kiwologoma Gravel soil. Mechanical stabilization of gravel using lime by 15.8% according to cost comparison that were made basing on the total costs of the blended materials.	Natural gravel, sand, lime, base construction, low volume roads, Kiwologoma, Bweyogerere, gravel soils	Kiwologoma, Bweyogerere, Wakiso district	Materials	Base	Base	M56
57	Makerere University	BARYAHABWA M. ISAAC	1994	An Appraisal of Structural Pavement Failures on Makerere University Main Campus Roads	Central Library at Makerere University, CEDAT Library	The sole purpose of this project is to analyse and evaluate surface problems due to structural failure faced by the road pavements of Makerere University. The report aims at describing in practical detail the measures which are necessary both in design and field construction to successful control and supervise road maintenance and construction works. The project is centred on those pavements under estates department, Makerere University Kampala. In preparing the report therefore, efforts have been made to identify the problems, their causes and to give practical solutions. The task has been accomplished by: i) Personal contact more especially with the estates department ii) My observation as |I move around campus iii) Literature; textbooks, specifications and reports of Ministry of Works, transport and telecommunications This study deals with background information on present conditions of campus roads. Materials use dint he flexible pavements especially the importance of bituminous surfacings and how their performance can be improved. The second part of this project deals with the surface problems due to structural failure. The third part deals with how well these problems can be rectified. During the study, I have found out that actually some of these problems were identified by concern bodies. Due to financial constraints, and failure to implement routine maintenance work, much has not been done to rectify the situation. Thus deterioration continued up to the present state of affairs. It was recommended that another project be carried out implementing the results of the present study.	Structural pavement, Makerere main campus, Ministry of Works Transport and telecommunications	Makerere University	Management	Pavement	Solution / Application	M57
5	Makerere	SEMPEBWA	1998	A Study of the	Central	This research is about the relationships between the strength properties of road base materials. A better understanding of these properties can lead to better quality	Strength	Uganda	Materials	Base	Platform	M58

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8	University	SAMALLIE		Relationships between the Strength Properties of Stabilized and Unstabalised Lateritic Gravel used for Road Base Construction	Library at Makerere University, CEDAT Library	of these materials. A road base is an important component of a pavement and the materials used to construct it should be of sufficient strength to ensure that it supports the loads imposed on it. It includes a literature review on the common road based materials and their required properties. A methodology on how to go about the selection of a suitable road base material on the basis of specifications is also included. This material was then subjected to several tests to develop a new specification to replace an existing one that has been found unsuitable for our local soils. Results from this testing were then used to develop the desired relationships and a new specification, going a long way in improving the quality control in construction projects.	properties, lateritic gravel, road base construction					
59	Makerere University	BIYOMOTHO J.	2001	Evaluation of the Technical Performance of Labour-based method of Road Rehabilitation: A Case Study of Uganda Transport Rehabilitation Project (UTRP) – Mbale	Central Library at Makerere University, CEDAT Library	The Government of Uganda has adopted a deliberate policy of increasing the use of labour based contractors for road works, promoting the development of a local contracting industry. Research indicates that labour can execute all but 10-20% of direct cost on bitumen and concrete roads and all but 2 -15% of direct costs on earth and gravel road. The first chapter of the report presents the background information about labour-based technology identifies the project problem and states the objectives and the methodology to be followed. The next chapter is about the relevant literature concerning the evaluation of the Technical Performance of Labour-Based Methods. Much attention was given to the compaction requirements, which can be achieved, especially the Maximum Dry Density (MDD) and the Optimum Moisture Content (OMC). The methodology to be followed was adopted to facilitate easy data collection. For purposes of evaluating the technical performance the in-situ density determination using the sand replacement apparatus was employed, Dynamic Cone Penetrometer (DCP) test were equally conducted at the specified chainages. The results were presented and analysed using software support programmes especially MS-Excel and MS-Word. The Statistical analysis and formulas for data analysis was used.	Labour based, road rehabilitation, Uganda Transport Rehabilitation Project (UTRP)	Mbale	Construction	Gravel	Solution / Application	M59
60	Makerere University	BIRYAHABWE PATRICK MBOOGA	2005	Construction of the Northern By-Pass	Central Library at Makerere University, CEDAT Library	This report was written from not only the activities I undertook during industrial training but also from the various literature that I read as I endeavoured to understand the procedures and methods of construction as work progressed on the Northern by-pass. This report is divided into two sections which I was exposed to i.e. road works, bridge and fly-over sections as described. On the road section, a reasonable length passes through soft ground or swamp whereby geo-grid followed by rockfill were used for the subbase construction and the compaction of the asphaltic concrete to the carriage way and double bituminous surface treatment to the shoulders. On the fly over section, a new technology called the reinforced earth is being used to raise the abutments up. This technology has been successful in other countries like Canada, India, and South Africa I where it is being imported to Uganda. Photographs have also been included in the report to explain some activities that were interesting.	Construction, Northern by-pass, rockfill, geo-grid	Kampala	Construction	Pavement	Solution / Application	M60
61	Makerere University	KITONSA STEPHEN	1991	Survivability of Premix Road Patches in Kampala.	Central Library at Makerere University, CEDAT Library	This project report is prepared for submission in partial fulfilment of the requirements for the award of the degree of bachelor of science in civil engineering of Makerere University August 1991. The report deals with the survivability of premix road patches in Kampala. Roads are important prerequisites for social and economic development of a community. Throughout their service lives, roads suffer from a number of localized structural failures. These failures are usually repaired by patching. This script considers the patching techniques and the performance of premix patches. This report will be found useful not only by academicians but also by practicing engineers and authorities who are engaged in patching works. Various patching techniques are described, field performances observed, conclusions and proposals made. The proposals made should be adopted whenever they are viable. Chapter one deals with the importance of patching and the objectives of the study. Chapters two and three describes premix theory and a survey of a paved road respectively. The survey is done to obtain the type and causes of road failures in the field. Chapters four and five describe the patching techniques. In the former chapter the management and organization of patching works is considered in the latter chapter, patching methods are considered. Chapter five, seven and eight describe the performance of premix patches, conclusions drawn from the study and proposals or recommendations.	Premix road patches,	Kampala	Maintenance & Rehabilitation	Surfacings	Solution / Application	M61
62	Makerere University	SENGENDO GODFREY ISAAC (97/U/780)	2000	Upgrading Road project Mityana-Mubende-Kyenjojo	Central Library at Makerere University, CEDAT Library	This is an industrial training report on the Mubende-Kyenjojo Road reconstruction project. Much of the report concentrates on the works as done and perceived by the reporting student. A deep insight has been acquired in the technical and management aspect on a big project entailing a lot of civil works, socio-economic considerations, and intricate networks of knowledge and technology. To come to full appreciation, however, would have required much more time.	Mubende-Kyenjojo, road reconstruction, socio-economic considerations	Mubende-Kyenjojo, NA	Maintenance & Rehabilitation	Pavement	Solution / Application	M62
63	Makerere University	CHEBET FARIDAH CHEMISTO (01/U/15613/PS)	2004	Maintenance of Mambule-Kawaala Road – Kawempe Division (KCC)	Central Library at Makerere University, CEDAT Library	As part of its annual training activities for the Bachelor of Science Degree in Civil Engineering, the Faculty of technology in Makerere University attaches its undergraduate student to the outside world for industrial training for 10 weeks in the months of July up to September. This report describes the civil engineering activities and works I took part in during this period of July-September 2004 while training with Multiplex Ltd, a local contractor that was contracted to execute the project Maintenance of the Mambule-Kawaala Road that runs from Mambule through Bwaise trading centre Kawaala up to Kasubi trading centre located in Kawampe Division Local Government.	Maintenance, Mambule-Kawala Road	Kampala – Mambule-Kawala Road	Maintenance & Rehabilitation	Pavement	Solution / Application	M63
64	Makerere University	MULONDO HERBERT (02/U/4600/PS)	2006	Investigation into the causes of Defects on Kampala – Jinja Road.	Central Library at Makerere University, CEDAT Library	This report was prepared from the study conducted on Jinja road, between the Game Mall, Lugogo and the Nakawa – Ntinda Junction about the causes of the existing road failures on this road, since its rehabilitation in 1990. Potholes, stripped surfaces, cracks, edge failure, ravelled surfaces and ruts were realized on this road. In addition, utilities like manholes, trenches for water pipes and cables were discovered. The growing influence of those defects on ride quality and subsequent complaints from the traveling public prompted the researcher to perform the investigation reported here, as his final year project. A summary of the projects construction background, methods and findings of the investigation, conclusions regarding the causes of the distresses, and recommendations for remedial action are presented. The study involved the finding out of the designed for conditions (traffic and drainage) and those that were currently in use. This was accomplished by the conducting of a Visual Condition Survey, Non Destructive Testing, Traffic counts and the reviewing of records; planning, programming, budgeting and maintenance arraignments through having interviews with different Ministry of Works Departments. Results of this work demonstrate that the causes of these defects are attributed to the negligence of maintenance on this road in a long time. Recommendations for remedial action include; rehabilitation of the Nakawa market areas, patching of potholes, repairing of cracked surfaces, edge failure, removal of utilities situated on the roadway among others.	Defects,	Kampala – Jinja Road	Management	Pavement	Platform	M64
65	Makerere University	KIBIRANGO JOSEPH	2004	Development of a Pavement Management Programme for Makerere University Main Campus Road Network	Central Library at Makerere University, CEDAT Library	Anything built with construction materials with deteriorate with the passage of time. Roads are no exception. Roads deteriorate relatively slowly during the early years of their design life, but as they approach the end of their design life, this rate accelerates. Proper maintenance will significantly lengthen the life of a pavement system but eventually rehabilitation and reconstruction is required. In many cases, more than one technique or combination of techniques can be used to solve a specific road surface distress. The techniques selected should be based on a thorough engineering analysis of the pavement's proposed application and an economic analysis of costs and benefits. This study aimed at developing a Pavement Management Programme for Makerere University Main Campus Road Network that can assist decision makers to provide and maintain the roads in a serviceable condition.	Pavement management programme, Makerere University, Main campus, road network	Kampala	Management	Pavement	Solution / Application	M65
66	Makerere University	LUMU STEPHEN	1991	Developing a Strategy for Community Access Roads in Uganda	Central Library at Makerere University, CEDAT Library	There is a general public outcry that the Rural Access Road Network is in a poor condition. Yet there is no elaborate strategy to cater for this increasingly important network countrywide. Amid this impasse, there is little or no available information about the state, usage, extent and needs of the Community Access Roads in Uganda. This study goes a long way in addressing the above salient issues. Information necessary for this study was gathered by carrying out condition assessment and inventory surveys on community roads for three pilot districts. This information has been extrapolated to build a community access road network model for Uganda. The model clearly shows that the network has deteriorated to a point where no normal routine maintenance is feasible. Hence different rehabilitation solutions are postulated and this cost estimates developed. Through economic evaluation the various strategy scenarios incorporating the different rehabilitation scenarios are evaluated. Taking into account the economic evaluation of the different strategy scenarios and the social –political findings during the survey, an elaborate strategy to cater for network has been developed.	Community access roads, Uganda	Uganda	Management	Gravel	Platform	M66
6	Makerere	DRICI LOUIS	1995	The Application of	Central	In this project, the application of the FWD techniques to planning and designing periodic maintenance strategies has been researched in an attempt to find a method	Falling weight	Uganda	Management	Pavement	Platform	M67

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7	University	IBIYA		the Falling Weight Deflectometer (FWD) Technique to Planning and Designing Periodic Maintenance Strategies for Roads in Kampala: Case Study Kampala City Roads	Library at Makerere University, CEDAT Library	of alleviating the poor conditions of Uganda roads and thereby enhance national development. A Method of measurement, calculations and evaluation of pavement structural performance is described in this report. A case study was done on selected Kampala City roads in order to explain a practical application of the method and to show a typical situation of road maintenance systems in Uganda. The result from the evaluation of these road pavements show the practice of maintenance of decay which practically requires total rehabilitation. This situation necessitates a change in maintenance strategy. Strategies for periodic road maintenance have been formulated along with a description of a payment management system.	deflectometer, planning and designing, maintenance strategies, roads, Uganda					
68	Makerere University	BAGUMA A. KAYOMBA	1990	Analysis of Impact and Dynamic loads of the Transient Nature on Recently Repaired Roads in Kampala City with Special Reference to Kitante Road.	Central Library at Makerere University, CEDAT Library	The project examines the common causes of failure on Kampala City roads with special reference to Kitante Road and hence makes possible recommendations in form of remedies. Discussed in the project are the failure types and their corrections. Comprehensive laboratory tests are carried out and the suitability of the subgrade as a pavement foundation assessed. Furthermore, the project makes a structural design of a typical section of the pavement which is compared with the existing section (for structural adequacy) got from the original working drawings.	Dynamic loads, transient nature, repaired roads, Kampala city	Uganda – Kitante Road	Management	Pavement	Solution / Application	M68
69	Makerere University	BAHATI .T. ALEXANDER	2003	Assessment of the Performance of Kimera Road	Central Library at Makerere University, CEDAT Library	This study was conducted on Kimera road, which was rehabilitated between July and September of 2001. The road surface was regravelled and trapezoidal drainage channels constructed on either side of the road. After one year of service, the road surface and the drainage system started deteriorating. This project was undertaken to investigate the causes of failure and review the maintenance practices in place. The project involved reviewing relevant literature, site visits, conducting visual condition survey to evaluate the condition of the road surface and the drainage system, and field and laboratory tests to find out the quality of the road materials. From the data obtained it was found that the road materials were good. Many defects like corrugations, gullies, potholes, rutting had developed on the road surface. The drainage system was also affected by scouring, silting, vegetation in the channel, and loss of camber. The maintenance practices were found to be wanting. It was therefore recommended that the road be stabilized with liquid bitumen or calcium chloride solution on the surface, or be upgraded to tarmac if funds can allow. The maintenance practices should be improved or preferably computerized.	Performance, kimera road, maintenance	Uganda – Kimera road	Management	Pavement	Solution / Application	M69
70	Makerere University	SSEGUYA JAMES	1991	Investigation of the Suitability of Kakerenga Road In situ soils for Pavement Placing	Central Library at Makerere University, CEDAT Library	Kakerenge road is found in Luweero district. It branches off Bombo road at 17km from Kampala. It covers a distance of abut 26km and has never been attended to by district authorities. The project investigates the adequacy of the in situ soils for pavement placing. It establishes the properties of the soils since it is the foundation for all roads therefore it is imperative that the engineer has a thorough understanding of in situ soils and engineering behaviour before any road works commence. Insufficient earthworks contribute partly to pavement failures. The explorations are made for the purpose of obtain information regarding types, location and extent in plan of the soil profile. This ensures an adequate and economic deign to be prepared for both temporary and permanent works, and the planning of the best method of construction.	Kakerenge road, in situ soils, pavement placing	Luweero district – Kakerenge road	Materials	Pavement	Solution / Application	M70
71	Makerere University	BAKKABULINDI EMMANUEL	1988	A Design proposal for the Reconstruction of Gayaza Road from Mulago Hill Roundabout to Kyebando	Central Library at Makerere University, CEDAT Library	Most of roads in Uganda were designed and constructed many years ago. It is likely that the design methods then used in foreign countries, like Britain, were employed, irrespective of whether or not these methods were appropriate to the Ugandan climate and traffic conditions. However in recent development, a modified Britain structural design procedure for bitumen-surfaced roads in tropical countries has been involved. In this project, use is made of this design procedure in an attempt to achieve a more rational and economical approach to the problem of the reconstruction of urban and sub-urban roads in Uganda, with special reference to Gayaza road.	Reconstruction, Gayaza Road, Mulago Hill roundabout	Uganda – Gayaza Road, Mulago Hill roundabout	Maintenance & Rehabilitation	Pavement	Solution / Application	M71
72	Makerere University	NTANYUNGURA DENNIS	2001	An Investigation into the Strategic and Tactical Management Requirements in Gravel Road Maintenance Projects Executed in Remote Areas of Uganda	Central Library at Makerere University, CEDAT Library	The management of gravel road maintenance projects executed in remote areas in Uganda, places great emphasis on the ability to plan and execute these projects successfully. In contrast a similar emphasis on the strategic management has received less attention in the implementation of these projects. This has resulted into among others, problems of high prices, unexpected breakdown of machines, shortage of natural material (murram), insecure working environment, and lack of co-operation by local communities in which these projects are executed. In this project, literature about strategic management was reviewed and the current strategic management practices undertaken by contractors to support onsite security, reduce uncertainties such as absence of natural materials, maintain machinery, develop relationships with local communities, and reduce the impact of inaccessibility on these projects were assessed by use of questionnaires and informal interviews. Conclusions and thereafter recommendations addressing the areas contractors must put great emphasis for the successful implementation of such projects are made.	Strategic and tactical management, gravel road, maintenance	Uganda	Management	Gravel	Platform	M72
73	Makerere University	BIGABWA B. MOSES (97/u/7927/PSA)	2001	Comparison of the performance of Hot-mix Asphalt with Surface Dressing on Busega-Mpigi Road	Central Library at Makerere University, CEDAT Library	This study involved a performance comparison between Hot Mix Asphalt and Surface dressing as wearing courses on Busega – Mpigi road pavement. It is worth noting that from Busega to Nsangi, the surface was overlain with Hot Mix Asphalt and that between Nsangi and Mpigi with Surface dressing. Condition surveys were made on the whole section, noting the various distresses on the pavement. These included, rutting, cracks, upheavals, shoving and many other deformations. Traffic counts were obtained to ascertain the level of traffic growth in respect to the design values. Present serviceably index values were obtained to get a subjective riding quality of the two sections under study. In comparison, the Hot Mix Asphalt section was found to be much more distressed than the surface dressed one, which had the biggest problem of edge wearing. The section with surface dressing was better than Asphalt Concrete basing on the present serviceably index value obtained. The distresses were attributed to the increase in traffic and to have the pavement last long, it has been suggested that; proper and well equipped maintenance teamwork be put in place.	Asphalt concrete, Hot mix asphalt, mpigi road	Mpigi district - Busega	Materials	Surfacings	Solution / Application	M73
74	Makerere University	OKANA BENEDICT	1989	The Effect of Drainage on the Foundation of the Newly Repaired Roads in Kampala	Central Library at Makerere University, CEDAT Library	In this discussion about the effect of moisture on the foundation of roads, I have attempted to impress on readers the importance of a well-designed and maintained drainage system in relation to the serviceability the roads and their economics. Relevant experiments were conducted to illustrate the effect of moisture on the road structure. The relationship between the moisture content of the subgrade soil and its strength was one of the facts established through the experiments. Only a few simple equation and calculations have been used as they proved sufficient in the explanation of the basic principles involved. A maintenance programme, the categories of hands employed and the qualities required of them have been suggested. Also alternative design of the drainage system have been suggested. This has been in anticipation that if adopted they will function better even under a greater drainage of negligence than that which has resulted in the determination of the roads.	Roads, foundation, drainage, moisture	Kampala	Environment	Other	Platform	M74
75	Makerere University	NAITA CHARLES	1990	Quality Control Procedures in Bituminous Road Construction in Uganda	Central Library at Makerere University, CEDAT Library	Roads are quite important prerequisites of social and economic development of a community. These are some of the subjects of physical planning of a region or country. Highway engineering deals with the planning, design, construction, operation, evaluation and maintenance of the highways. The design of roads or highways involves two major categories, structural design a geometric design. Structural design is intended to ensure that the established roads and rods networks perform well the intended purpose(s) under the expected adverse static and dynamic traffic loads and weather conditions. Geometric design is concerned with relating the physical elements of the highway to the requirements of the driver, the vehicle and the road users. Since the materials and the factors that affect the structural design of roads are subject to variation, care has to be taken to establish the requirements of the material and the construction method needed to meet the design. This is catered for under the quality control measures.	Bituminous road, construction, Uganda	Uganda	Construction	Surfacings	Platform	M75

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						In Uganda there are two classes of roads with reference to the materials used i.e. bituminous and gravel roads. In this script emphasis will be laid on the quality control procedures in bituminous road construction in Uganda. The research is intended to survey the properties of bituminous road construction in Uganda. The research is intended to survey the properties of bituminous road materials of significance in the performance of the road together with current construction practice in Uganda.						
76	Makerere University	NAKAMYA .F.	2004	Laboratory Evaluation of the Effect of Filler Type on Bituminous Mix Performance	Central Library at Makerere University, CEDAT Library	Road transport is by far the most dominant mode of transport and plays a pivotal role in supporting economic and social development all over the world. It is therefore important that he road constructed can provide a smooth, comfortable and safe ride. This report is a summary of a study carried out to determine the effect of filler type on the performance of bituminous mix. The methodology employed, findings and conclusions drawn are all presented.	Road transport, bituminous mix,	Uganda	Materials	Surfacings	Base	M76
77	Makerere University	MUKHWANA H.A.	1999	Geometric Design of Kevina Road	Central Library at Makerere University, CEDAT Library	Accessibility is a vital infrastructure for the speedy economic growth of a developing country. Road transport is one of the most important and mode of transportation system in Uganda due to its many desirable advantages such as flexibility, door-to-door service and accessibility to remote areas. Low geometric standard roads have often resulted into increased delays, discomfort, efficiency, high road-user costs and high accident rates. This in turn has inhibit the social and economic growth of the country. Therefore, there is need to put into consideration the geometric improvement of roads in Uganda. The project thus aims at designing the geometry of Kevina road to meet the Ministry of Works, Housing and Communications' recommendations as part of the future upgrading of the road. A systematic approach to achieve the above goal has been made by careful assessment, analysis, design and recommendation in this report. The report is divided into five chapters. Chapter one is over view of the existing situation, giving the methodology and justification of the project. Chapter two presents the required literature review pertinent to the subject. Data generation and analysis is then covered in chapter three. Chapters four and five deal with the vertical and horizontal alignment design respectively. Some recommendations in the construction phase and lastly a brief conclusion are chapter six. It is recommended that further research and structural design of the pavement will be done sine time constraint and the limited financial resource allocation have been the major hindrances for the later to be considered in this project.	Geometric design, road, approach	Kampala – Kevina Road	Design	Other	Solution / Application	M77
78	Makerere University	KAYONDO CHARLES	2005	Evaluation of subgrade condition of a Proposed Western Access Road to Makerere University, Kampala	Central Library at Makerere University, CEDAT Library	The main objective of this study was to assess the condition of the existing subgrade and the alignment of the proposed western access road to Makerere University Kampala. Tests carried out on two carefully chosen points on the road included; particle size distribution, consistency limits, proctor test, California bearing ratio test and dynamic cone penetrometer test. The results showed that the subgrade in the section between CH0 + 00 and CH 0 + 120 (measured from just ion with Mary Stuart road to junction with Sir Apollo Kaggwa Road) was dense (MDD = 2.3G/CM2), reddish-brown, silty SAND with high plasticity (LL = 56% & PI = 25%) and well graded. The subgrade in the remaining section (CH 0 + 120 to CH 0 + 160) was loose (MDD = 1.7G/CM3), reddish –brown, silty CLAY with high plasticity (LL = 61% & PI = 30%) and well graded. The above findings meant that in order to have a good foundation for the road, soil from the section (CH 0 + 120 to CH 0 + 160) had to be cut to a depth of about 350mm and replaced with soil that met the desired quality.	Subgrade condition, access roads,	Kampala – Makerere University	Materials	Subgrade	Solution / Application	M78
79	Makerere University	MWIDU GEORGE MAKIIKA	2006	Evaluation of Feeder Road Projects in Mbale District	Central Library at Makerere University, CEDAT Library	This research was to evaluate to performance of completed feeder roads in Mbale district local government with the hope that it would help the district establish whether the completed roads satisfy the objectives thus, improvement of accessibility to social services, reduce on time of travel from one area to another, reduce on vehicle operation costs, boost household income and poverty reduction. Despite the government's and donor efforts to fund road projects through their support to LGDP, PAF and conditional grants, there has been no report to establish whether the objectives above have been fulfilled. The evaluation was based on five evaluation criteria these were efficiency (in terms of cost, time and quality), effectiveness (in terms of extent of goal achievement), relevance (in forms of needs and priorities), impact (negative and positive) and sustainability (operations and maintenance). Fiver roads executed in the financial year 2002/2003, 2003/2004 and 2004/2005 were randomly selected funded by, DANIDA, LGDP or PAF for the evaluation of projects. These were Nalufutu-Shanzou, Busiu-Lukhonge, Lwaboba-Kangole, Bumbo-oono, Mutoto-Bulujere roads. Information regarding the efficiency criterion was obtained from the records of the district engineer, Mbale DLG office. The data regarding the other criteria thus, effectiveness, relevancy, impact, and sustainability, was collected by aid of questionnaires. The respondents for the questionnaire were the district administrators, local council members at all levels and the road users. The data collected was analysed as given in the relevant chapter. Recommendations were made basing on the data collected from the district records and observations from information obtained from the questionnaires survey and analysis. In conclusion, generally of the five roads evaluated, 40% of the roads were executed at the planned cost, time frame and quantity, 60% were established to have attained the intended objective. All of the roads were needs satisfaction of the stakeholders and the maintenance mechanisms in place are inadequate. The key recommendations includes, enhancement of appraisal, community participation and sensitization during the planning of the project and maintenance be given a sufficient budget and priority.	Feeder roads, projects	Mbale district	Operations	Other	Solution / Application	M79
80	Makerere University	SSEBIRUMBI RONALD	2002	Assessment of the characteristics of the Fill Material used in the Upgrading of the Ntungamo – Kagamba Road in Southwestern Uganda.	Central Library at Makerere University, CEDAT Library	The purpose of this research was to try and ascertain whether the soil samples used in the study conformed to the set specifications and to check and see if good quality soils were being used on site for the various construction activities. The principle objective of the study was to check the fitness for purpose of the soils by carrying out tests on them in order to understand their suitability. On some Civil Engineering projects poor quality materials, which do not meet set standards, are used illegally leading to the collapse of new constructed structures in a very short period before the design lives have elapsed. This normally causes government to lose a lot of money in trying to pay for reconstruction activities. Money that would have otherwise been on providing other social services. The desire to use poor quality material by some parties on sites normally leads to conflict between contractors and consultants. This as the backbone on which this study was based as the site from which the soils used in the study was facing the same problem. Three soil samples were used in the study simply because of the transportation problems encountered since Ntungamo district is quite far away from Kampala city where the soils were tested. The research involved reviewing relevant literature, sampling, testing and reporting of the results, drawing recommendations and conclusions basing on the soil characteristics. The tests carried out on the soil were categorized in three different types namely classification tests, compaction test and strength tests. All the tests were carried out according to BS 1377" 1990. Results were analysed with the help; of mainly graphs and tables. From the generated test results, which were checked using the specification from the Central materials laboratory in Kireka, conclusions and recommendations as regards the soil quality were made. The materials used in the study were got from areas that had been carefully designated as potential fill material providing areas. A comparison between results obtained in the soil mechanics laboratory at Makerere University and those obtained by the contractor at the site in Ntungamo was made. Possible causes of difference between the two sets of results were sought and documented for future reference.	Fill material, upgrading, roads, Classification tests, compaction tests and strength tests.	Ntungamo district	Materials	Subgrade	Solution / Application	M80
81	Makerere University	KAGODA FESTUS ANDREW	2005	Potential of Public-Private Partnerships in Road Infrastructure Development in Uganda	Central Library at Makerere University, CEDAT Library	Lack of sufficient public funding to adequately develop and maintain the country's road network is one reason why the government of Uganda is studying the prospect of using private finance initiatives as a way of bridging the funding gap. Several forms of Public-Private Partnerships (PPPs) already exist in other sectors within the country but no such initiatives are yet in place in the roads sub-sector in Uganda. Benefits attributed to the sue of PPPs include acceleration of infrastructure provision, faster implementation, reduced whole life costs, better allocation of risk, better incentives to perform, improved quality of service, generation of additional revenues and enhanced public management. The objective of this study was to delineate the concept of PPPs, identify prerequisites for their successful implementation in the road sector in Uganda, analyse the extent to which the success factors are in place, and to make recommendations for the successful implementation of the PPP framework in the road sub-sector performance, the private sector capacity and the country framework/attractiveness to the private sector using interviews with selected experts and official reports available at government ministries and departments. A case study of a hypothetical project, Kampala (Kibuye) – Entebbe (Airport) Roads II, was also used to investigate the financial viability of the PP framework from a Project Finance point of view, using a toolkit developed by World Bank. The study identified five success	PPPs road infrastructure, project finance, success factors, potential	Uganda	Management	Other	Platform	M81

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						prerequisites for a PPP policy and scored their existence in Uganda at 72% on a measurement scale developed. The case study showed a positive project Net present Value (NPV) and acceptable project economics ratios, from which could be concluded therefore, that some roads within the national road network have relatively high potential for success as Design, Build, Finance and Operate (DBFO) projects. Recommendations made from the study included: broadening of private sector participation in road infrastructure maintenance and development towards the PPP framework; deliberate domestic private sector capacity building, establishment of PPP policy and concession specific laws; creation of a government department for PPPs, and conducting appropriate personnel training and fact-finding tours.						
82	Makerere University	KIWANUKA FRANK	2012	Causes and impacts of Construction Disputes in the Uganda road Construction Sector	Central Library at Makerere University, CEDAT Library	Civil works, Worldwide, have the tendency to create strong differences in opinion between even the best intended parties, which can quickly degenerate into acrimonious disputes and become difficult to result. Like all other developing countries, Uganda is rapidly increasing its capital spending, the efficiency of which will be determined by the government's ability to manage infrastructural spending effectively. Construction disputes are one of the obstacles to successful project execution usually leading to increase in project cost, and in worst cases stalling or suspension of the project may occur. This may be devastating and stressing to parties involved, especially if it is a major infrastructural project like a road project. The ability, therefore, to resolve contract disputes quickly and effectively is the difference between a project that is completed on time and a failed capital investment that is completed only after many years of delay. Based on the research findings, this report presents a comprehensive analysis of the occurrence of construction disputes, specifically in a Ugandan road construction sector. In order to determine the sample population, cluster sampling was used. Cluster sampling was performance on contractors, consultant and clients organization in the Uganda construction sector and these are, for contractors, inadequate contract management supervision and coordination, for consultant, inadequate open and factual information, and for client's discrepancies and ambiguities in contract documents are the most significant causes of construction disputes in the road construction sector. The result of this research will help construction practitioners and researchers, in preventing and managing of disputes. The researcher identified negotiation as the most preferred method of dispute resolution. It is recommended that the construction industry in Uganda should put more emphasis on adopting alternative dispute resolution methods. In addition, the researcher recommended that all parties to the construction contracts should ensure that they play their roles effectively in order to prevent professional negligence, which may result into costly disputes.	Construction disputes, road construction sector, cluster sampling	Uganda	Construction	Other	Platform	M82
84	Makerere University	NTANYUNGURA DENNIS	2001	An Investigation into the Strategic and Tactical Management Requirements in Gravel Road Maintenance Projects Executed in Remote Areas of Uganda	Central Library at Makerere University, CEDAT Library	NO ABSTRACT	Strategic and tactical management, gravel road, maintenance	Uganda	Management	Gravel	Platform	M84
85	Makerere University	NANSASI ERINAH	2015	Redesign of the Bombo road Drainage System from Makerere Eastern Gate Towards "Kubbiri" Round about	University Main Library, CEDAT Library	In the recent past, floods have been a common occurrence in Kampala City. These have been caused by heavy rains which led to the opposition of silt at the outlet and making the outflow less than inflow therefore causing floods and damages to property, displacement of many people and even loss of lives. It has been caused by unplanned settlement around the drainage areas. This study was undertaken to improve the drainage system along the Bombo road in order to cater for the unplanned settlement. The methodology used in this study involved the analysis of drainage capacity, road embankments test these include *(sieve analysis and permeability tests), field survey which involved establishment of source of runoff, drainage, rainfall data collected and the road itself, reviewing the literature and documentation. Other methodologies involved consulting the relevant literature and documentation. Other methodologies involved consulting the relevant literature of the study. Field visits were made and evaluation was done through demarcation of rainfall catchments for the drainage of the points studied, water levels were observed during peak down pours and interrogation of area residents. The solutions and recommendations can be used in solving similar problems around Kampala City.	Road drainage system, round about, redesign	Kubbiri round about	Environment	Other	Solution / Application	M85
86	Makerere University	KOMAKECH DICK	2003	Developing a Road Maintenance Management Guide for Gulu Municipality	University Main Library, CEDAT Library	Traditionally, the core of engineering activity in the roads sub-sector has consisted of the design and construction of new roads. Increasingly, however, road networks have been substantially completed in many parts of the municipality and the district as well. The focus of attention is now moving away from building new roads to maintaining existing roads. However, road maintenance is a fundamentally different process from that of building new roads. Construction activity usually involves projects with a defined start and finish; conversely, maintenance is continuous. Whereas design and construction are dominated by engineering issues, maintenance is both a management and design problem. The purpose of this project study is to develop a road maintenance management guide for Gulu Municipality. It is a field of rapidly growing importance, and one in which many engineers, and managers from other backgrounds, are increasingly becoming involved. The maintenance guide has been developed through a tireless research of relevant documents, fieldwork, abstracting useful related information. This eventually led to the analysis and evaluation of the data obtained. Ultimately, the evaluation provided and maintenance management guide as per the selection analysed, which subsequently represents the whole network in the municipality.	Roads, road maintenance	Gulu Municipality	Management	Pavement	Solution / Application	M86
87	Makerere University	MUNAAWA PHILIP	2002	Design of an Appropriate Access to Buwesswa, Mbale District	University Main Library, CEDAT Library	This is a design report for an access to Buwesswa, Mbale, which is the only link connecting the largely agricultural community of Buwesswa to the main Mbale – Bubulo road, crossing River Manafwa along the route. The report outlines the Geometric Design of the road, which was done with the aid of computer software Professional Design System (PDS). It also involves the design of a long stringer bridge, with Gabion abutments and a steel pier at the river crossing. It includes details of a topographic survey, which was done to aid in the Road design, as well as Geotechnical investigations used in the design of the bridge substructure. Design drawings which include Plans and Profiles for the road are included in the Appendix, together with the elevations of the bridge.	Roads, road maintenance, UNRA, effectiveness of force, National roads, force account, contracting.	Buwesswa, Mbale	Design	Other	Solution / Application	M87
88	Makerere University	OPIO PATRICK	1999	An Investigation into Construction of Roads Across Swamps: An Assessment of Mpambire Swamp Embankment	University Main Library, CEDAT Library	As stated in the title of project, this report describes the content of this study. This can be summarized in the context below. Chapter one gives a brief background, defines the case study areas, the objective of this study, and the methodology applied in attaining the objective of this study. Chapter two is the literature review to enable one appreciate the technical aspects involved in this study. This has been compiled from various sources, text books, manuals and pamphlets. Chapter three describes the case study areas, gives results of visual site inspection, field tests and the analysis derived from these. Chapter four describes the laboratory tests carried out on samples from the case study site. Chapter five is a detailed analysis of the results obtained so to obtain the objective of this study. Chapter six gives conclusions and recommendations.	Roads, road maintenance, construction of roads	Uganda	Construction	Pavement	Solution / Application	M88
89	Makerere University	SEMPEBWA SAMALLIE	1998	A Study of the relationships between the strength properties of stabilized and unstabilised lateritic gravel used for road base construction.	University Main Library, CEDAT Library	This research is about the relationships between the strength properties of road base materials. A better understanding of these properties can lead to better quality of these materials. A road base is an important component of a placement and the materials used to construct it should be of sufficient strength to ensure that it supports the loads imposed on it. It includes a literature review on the common road base materials and their required properties. A methodology on how to go about the selection of a suitable road base material on the basis of specifications is also included. This material was then subjected to several tests to establish relationships between its strength properties and to develop a new specification to replace an existing one that has been found unsuitable for our local soils. Results from this testing were then used to develop the desired relationships and the new specification, going along way in improving the quality control in construction projects.	Roads, construction, unstabilised lateritic gravel, strength properties	Uganda	Materials	Base	Platform	M89
9	Makerere	MOLONDO	2006	Investigation into the	University	This report was prepared from the study conducted on Jinja Road, between the Game Mall, Lugogo and Nakawa-Ntinda junction about the causes of the existing road	Roads, road	Kampala-Jinja road	Management	Pavement	Solution /	M90

#	ORIGINATING INSTITUTION	AUTHORS	YEAR	TITLE	LOCATION OF DOCUMENT	ABSTRACT	KEYWORDS	GEOGRAPHICAL AREA	FOCUS AREAS	PAVEMENT LAYER FOCUS	TT LEVEL	Google Earth number
0	University	HERBERT		Cases of Defects on Kampala – Jinja Road.	Main Library, CEDAT Library	failures on this road, since its rehabilitation in 1990. Potholes, stripped surfaces, cracks, edge failure, ravelled surfaces and ruts were realized on this road. In addition, utilities like manholes, trenches for water pipes and cables were discovered. The growing influence of those defects on ride quality and subsequent complaints from the traveling public prompted the researcher to perform the investigation reported here, as his final year project. A summary of the projects construction background, methods and findings of the investigation, conclusions regarding the causes of the distresses, and recommendations for remedial action are presented. The study involved the finding out of the designed for conditions (traffic and drainage) and those that were currently in use. This was accomplished by the conducting of a Visual Condition Survey, Non-Destructive Testing, Traffic counts and the reviewing of records; planning, programming, budgeting and maintenance arrangements through having interviews with different Ministry of Works Department. Results of this work demonstrate that the causes of these defects are attributed to the negligence of maintenance on this road in a long time. Recommendations for remedial action include; rehabilitation of the Nakawa market areas, patching of potholes, repairing of cracked surfaces, edge failure, removal of utilities situated on the roadway among others.	maintenance				Application	
91	Makerere University	BAGAMPADE UMARU	1994	An Appraisal of Inadequate Surface Drainage: A Causes of Surface Distresses on the Makerere University Main Campus Road Networks	University Main Library, CEDAT Library	The purpose of this project was to investigate whether distress occurrence on Makerere University Roads is due to inadequate drainage. A reconnaissance survey carried out on all the roads enabled the identification and classification of distresses. Analysis was carried out from a scientific point of view using empirical formulas. Logical inference was reached using the probability concepts or statistics. Rainfall parameter data collection was done from the available source. The catchment area was established with the help of topographical maps and field visits. Supported by the principles of hydrology, analysis of the adequacy of the present drainage facilities was made. The said facilities included side ditches (channels), gutters, culverts and open kerb inlets. These hydraulic facilities had adequate capacities to handle storm discharges. It is therefore clear that maintenance on the roads of Makerere University campus is very poor. This lack of maintenance causes undesirable distresses. Logistics available did not permit the establishment of the water table levels. It was therefore recommended that a follow up research project be funded such that a thorough underground water investigation is made.	Inadequate surface drainage, surface distresses, campus road networks	Makerere University	Environment	Surfacings	Solution / Application	M91
92	Makerere University	KAHANGIRE MOSES	2005	Improvement of Jinja Road-Kyambogo Junction	University Main Library, CEDAT Library	Kyambogo junction is located along Kampala Jinja Road highway 6 kilometres to the east of Kampala City centre in Uganda. The project involves redesigning of the junction to increase safety and flow of traffic along the arms of the junction. It involved carrying out traffic counts, taking physical measurements of the intersecting roads and areas available for expansion. The data obtained from above activities was used together with the design requirements of junctions as stated in the Designers' Manual of Ministry of Works, Housing and Communications – Uganda to come up with a channelized Tee-junction which was considered the most appropriate. The project has been finalized by making a new design of the junction, conclusions and recommendations which when implemented will bring most of the problems at the junction to end. This report therefore gives a detailed discussion of the design stages undertaken to come up with the final layout of the junction appended.	Roads, Kyambogo junction	Jinja Road-Kyambogo	Maintenance & Rehabilitation	Other	Solution / Application	M92
93	Makerere University	ODONGO JOSEPH	2002	An Investigation into the Characteristics of Accident prone Locations on Kampala-Masaka Road	University Main Library, CEDAT Library	Roads in Uganda and other developing countries faces frequent occurrence of accidents. This research was concentrated on assessing the characteristic of accident prone areas on Kampala-Masaka road. During the last few years' accident occurred on various arrears on this road some of which have been fatal. This has made this road one of the high risk roads in Uganda regarding the safety of people and property, yet there is increasing number of vehicle country wide. In view of this state of events, the need to develop strategies to abate accident and hence minimize re-occurrence was warranted. This research was conducted in three selected districts and the findings reflect views expressed by several people directly or indirectly using this road. Major causes of accidents identified in this research include; the road environment, road user and vehicle characteristic though our main concern is the road environment. Among the recommendation made for minimizing and/or avoiding re-occurrence of accident are review of existing regulations, enforcement, sensitization etc.	Roads, accidents, safety, enforcement	Kampala-Masaka road	Road safety	Other	Solution / Application	M93
94	Makerere University	RWAKISEETA P.S.	1992	An Investigation of Properties of Bitumens Used in Road Construction (1991-1992) in Uganda	University Main Library, CEDAT Library	Properties of bitumen and uses for construction are investigated in this study. A review of recently published literature indicates that there is a growing concern in the industry over changes in properties of bitumen. The Origin, manufacture and constitution of bitumen are presented to give a better understanding of the material. The type and origin of bitumen used in Uganda are also given. Bitumen for road construction in Uganda is used for two main types of construction; Hot mix Asphalt and surface dressing, these two methods are discussed and various failures in bituminous surfacings and their cases presented. The investigation involved a laboratory testing programme. Materials from various organizations were sampled and various tests described in the text were carried out. The results are presented and these generally indicate viabilities in bitumen properties different from what specifications required some samples met specifications while others were out of specifications. Two of the samples that were out of specification exhibited unique properties. A discussion of results is presented. A field evaluation on pavements constructed with materials tested was made to provide a correlation between tested properties and performance in-service. The observations indicate poor performance and further investigation showed this to be due to aggregate. Recommendations are forwarded from observations made from the study.	Roads, bitumen, construction	Uganda	Materials	Surfacings	Platform	M94
95	Makerere University	KANSIIME T. LEVI	2003	Assessing the Effects of Water Table Fluctuations on the Performance of a Highway Pavement case study of Mbarara-Ntungamo Road	University Main Library, CEDAT Library	Mbarara-Ntungamo Road is one of the roads routed through undulating formations and thus experiences water table fluctuations as land levels and climatic season change. This project was carried out to assess the effects of water table fluctuations on the performance of the road. The research was particularly carried out at Chainage 10 + 060 and chainage 11 + 020, Omurukyekye along the road. Initially, the research anticipated several causes of failure of the road including poor pavement materials, harsh climate, traffic loading, poor maintenance, poor design or construction methods and poor drainage. The research therefore proceeded to find the truth about these causes. To achieve this, a reconnaissance survey was conducted. This was followed by a pavement condition survey to assess the level of damage. Then two road sections were chosen and their soil properties evaluated in the laboratory. Field tests were also carried out. During the reconnaissance survey and pavement condition survey, it was observed that road sections having too high table poses severed failures and usually tend to fail very fast shortly after maintenances in comparison with sections having too low water table from field tests and laboratory tests, it was observed that road sections prone too high water table are weak compared to sections with low water table. Basing on the findings of this research, it was revealed that water table fluctuations is the major cause of the poor performance of the road. It is recommended that better construction methods like placement of geotextiles or drainage layer of aggregate be adopted at sections with high water table. It is also recommended that Ministry of Works, Housing and Communication follows up the project in order to exhaust the findings of the study by carrying out field evaluation both in the rainy and dry season. The research period was mainly concentrated in the dry season.	Roads, water table fluctuations, highway pavement	Mbarara-Ntungamo Road	Environment	Pavement	Solution / Application	M95
96	Makerere University	KOMAKECH CHARLES	1999	Modelling Stresses and Strains in Flexible Pavements	University Main Library, CEDAT Library	The purpose of this project was to determine the stresses and strains developed in flexible pavement in response to traffic loads and to assess whether the materials put in place can support them. In-depth literature search and programme development was done to enable the determination of these stresses and strains. The programme >>ELPS<< developed may be used to calculate stresses and strains in an elastic layered pavement structure and CONS for consolidation analysis. Both programmes were written in turbo pascal programming language. Attempt has been made in >>ELPS<< programme to utilize a series of appropriate algorithms, partly on Boussinesq's equations and a modified version of the method of equivalent thicknesses, so as to best approximate parallel solutions obtainable through the numerous computer programs presently available. The >>ELPS<< programme is capable of performing calculations on two, three, and four layer systems, provision is also there for up to ten layers. One uniformly distributed, circular load may be imposed. However, due to the inherent theoretical limitations of the methods of calculation employed in the >>ELPS<< program, certain constraints in its use are recommended. Analysis using the developed programs was done and basing on the output results, logical conclusions were drawn. The result indicated that the material put in place	Roads, >>ELPS<<programme, pavement, stretch	Kampala-Entebbe Road	Design	Pavement	Platform	M96

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						for the base cannot support the actual traffic load and that by the end of its design life the clay layer underlying the pavement section will have fully consolidated. Lastly, the method of pavement analysis using the analytical-empirical method more so the programme developed should be viewed as a hopeful strategy in providing good quality pavement to the society. I hope this report will contribute much in increasing knowledge in this method of pavement analysis.						
97	Makerere University	OLINGA RICHARD ORIONO	2006	An Investigation into the Characteristics of Accident prone Locations on Kampala-Masaka Road	University Main Library, CEDAT Library	Due to a big population and also quite a big number of motorists entering and moving around the University, and yet in some spots in the campus, there is not a good sight distance for the drivers because of obstacles such as buildings, trees, parked vehicles and corners or bends, there is a need to improve the safety of bot the pedestrians an those riding or driving within the campus. The University has tried to achieve this by using speed humps. However, speed humps other than reducing road user comfort, also reduce aesthetics of the roads. This project, aims to achieve both road user comfort and aesthetics of the roads, by eliminating the use of speed humps and instead use speed limits. The project aims mainly the three major roads in the University i.e. Mary Stuart Road, University Road and Pool Road. Traffic flow or traffic volume can be understood as the way vehicles (current traffic) distribute on roads as they move from different origins to different destinations. Traffic flow analysis is a study that involves counting the number of vehicles using a given route, thus coming up with results indicating the hourly, daily, monthly, yearly and seasonal traffic volume variations, also the direction to which the traffic flow takes. The volumes will be attained using manual counts. Speed zoning involves studies done on speed used by the drivers as they use the roads. It aims at getting the present spot speed and running speed over the roads hence come up with the upper and lower speed for motorists using the roads. The traffic flow analysis and speed zoning of Makerere University major routes, is a research project that by the need of the academic year, would have got the traffic using the routes, their current speed on roads and thus come up with a minimum and maximum speed for the campus routes. And secondly, using the hourly, daily, weekly, traffic volume data will be collected, the project will also come up with the traffic maximum and minimum densities.	Roads, zoning, speed humps, traffic flow	Makerere University	Road safety	Other	Solution / Application	M97
98	Makerere University	OBARA GEOFFREY	?	Characterization and improvement of Gravels for Enhanced Pavement Performance in Hoima District	University Main Library, CEDAT Library	Soils exhibit varying characteristics which affect their performance when used as road construction material which is the reason why their characteristics have to be investigated and determined so as to predict their behaviour when used in road construction. This is why characterization and improvement to wearing course gravel for enhance performance in Hoima District is the topic of research. Material quality plays a major role in determining the rate of deterioration of gravel roads. Material characteristics affect the manner in which the gravel can resist the early onset of gravel pavement distresses like rutting, ravelling, deformation of surface, dustiness and so on and the performance of gravel can be predicted through material testing and consideration of prevailing climate and traffic conditions. The three material characteristics upon which acceptance of performance depend are grading, plasticity and CBR. The laboratory tests from the above including compaction were carried out then compared with relevant specifications obtained from previous research findings to make an overall assessment about the suitability of sampled gravel material from existing borrow pits for road surfacing in Hoima district. To characterize the soil classification, which is concerned with placing a soil within a limited number of soil groups on the basis of their grading and plasticity characteristics was consequently determined. Materials that did not meet the required specifications were targeted for improvement through mechanical stabilization (granular stabilization) using a guide for granular stabilization to reduce the PI (O'Flaherty, 2002, pp.164). Proportions of sampled material and sand were mixed through trial and error and tested for plasticity and CBR values after blending and the preferred proportions were those within specification limits. The economic consideration and the practicability of blending existing poor performing gravels with sand mechanical/granular stabilization, dictated the choice of the method over other stabilization options say cement or lime stabilization. Consideration of the skills, resources and construction equipment available in the district were the other factors considered. The research demonstrated that there could be improved performance of road surfaces as a result of applying tested and approved gravel material resulting in savings on maintenance, low vehicle operating costs and environmental benefits through optimal use of gravel resources. The results of the research should help change the current attitude of contractors and district authorities about the importance of carrying out material testing that it is indeed cost effective and good practice for quality control.	?	?	Materials	Gravel	Solution / Application	M98
99	Makerere University	JOLABA JAMES	2014	Effectiveness of Applied Routine Maintenance Intervention in Management of Road Performance: A Case of Wakiso District Local Government	University Main Library, CEDAT Library	This study investigated the effectiveness of applied road routine maintenance in management of road performance with emphasis on Wakiso district. The major objectives involved studying the road infrastructure performance, evaluating effectiveness of applied routine maintenance intervention and development of a strategy for maintenance implementation. The study was guided by the use of questionnaires and interview guides distributed to respondents to express their views on the issues being studied. Local governments in Uganda received funds from Central Government through Uganda Road Fund for road maintenance. The principle purpose of maintaining roads is to provide continuous acceptable conditions for undisrupted, safe and economic travel. Roads are expensive to construct, therefore well planned and timely maintenance interventions are required. For the last 15 years, district and urban roads maintenance has been carried out through contracting small scale labour based contractors. It was revealed that lack of training, absence of current road condition assessment data and unreliable road maintenance equipment have contributed to ineffective routine road maintenance in the district. An improved strategy for routine maintenance has been developed whereby for effective routine road maintenance to be achieved, training for both staff and labour gangs should be emphasized every three years for a sustainable skills development and hence better outputs. In addition to that, selection of roads for routine maintenance should be based on vehicles per day and road condition for a particular road. When this is adhered to, value for money for routine road maintenance shall be achieved and hence better management of road performance.	Roads, maintenance, performance, local government	Wakiso district	Maintenance & Rehabilitation	Pavement	Solution / Application	M99
100	Makerere University	PATRICK ETOKO	2015	Comparison of three Performance Prediction Methods for Bituminous Road Infrastructure	University Main Library, CEDAT Library	Prediction of pavement condition or performance is one of the most important issues in pavement management systems. Pavement performance is defined as the evaluation for how pavement change their condition or serve their intended function with continuous use. Although the maintenance strategies for highway pavements also depend on human experience, data interpretation and agency's policies, a reliable tool capable of predicting pavement serviceability and performance is also a desirable feature that can further support implementation of maintenance and budgeting plans. This study examines three methods that are commonly used to predict flexible bituminous road infrastructure performance. The methods are used for both short term and long term predictions that cover the entire road project life cycle. For this purpose, three methods consisting of measurement of traffic loading using a manual approach (tally sheets); international roughness index using a reference profiler, and pavement subgrade CBR determination using Dynamic Cone Penetrometer were considered. Results indicate that IRI method predicts the current and future condition of pavement with higher degree of certainty in the short and long terms compared to DCP-CBR; while the cumulative traffic loading computed 9 years into the design life of 20 years surpassed 50% expected during the 10th year of the design traffic. The study also found out that in practice, weak and poor quality subgrades with CBR values less than 15% and low lying areas are usually provided with embankments to increase the thickness of pavement by capping in order to compensate or the quality or to raise it above the natural level by an amount that is normally beyond the reach of the DCP rod even when it is extended to a maximum length of 1.5m and thereby rendering the use of DCP-CBR method ineffective. The study suggested that the performance prediction method using IRI provides a more realistic forecast than the other methods. In addition, it can be adopted by road agencies as a decision support tool to predict performance of bituminous roads infrastructure in Uganda in order to enhance decision-making process in pavement management.	Roads, pavement, bituminous, infrastructure	Uganda	Management	Surfacings	Platform	M100
101	Makerere University	BANGA VICTOR JOSEPH	2016	A Comparative Assessment of the Efficiency and Effectiveness of Local and Foreign Road Contractors in Project Management in Uganda	University Main Library, CEDAT Library	Over the last 15 years, the Uganda Government has prioritized infrastructure development in the Roads, Railways and Energy sectors. With the increased level of prioritization and investment in Uganda's road construction industry, there has been an influx of foreign road contractors in the country. As a result, there is an apparent competition that exists between the local and foreign road contractors for the available road contractors. The aim of this study was to assess and compare the level of efficiency and effectiveness of the local and foreign road contractors in project management and to determine the critical factors that would foster a symbiotic relationship between these two categories of road contractors in Uganda. The study involved a comprehensive questionnaire survey that was administered to 101 road construction professionals composed of Uganda National Roads Authority Project engineers, consultant and the local and foreign road contractors. The results showed that the foreign road contractors were 49.3% more efficient than their local counterparts with respect to the average mean value of the respondents' assessment of both contractors' efficiency in project cost, quality and time management in Uganda. The results showed also that the foreign road contactors were 58.2% more effective than their local counterpart with respect to the average mean value of the respondents' assessment of both contractors' effectiveness in project scope, human resource and risk management in Uganda. This study also revealed an 89% majority performance of the local and foreign road contractor joint working arrangement and the critical factors that would help foster a mutually beneficial relation between these two categories were highlighted in this study as; the technical capacity of both contractors, clear definition of	Roads, contractors, project management	Uganda	Construction	Other	Platform	M101

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						responsibilities, top management support, time management practices, commitment to a win-win attitude and government policy emphasizing joint venturing. Hence, this study reveals a need for a similar study to be conducted in the other East African countries and for further study to be carried out into the impact of specified demographics on the management of different project parameters.						
102	Makerere University	HAMBA INRAHIM	2014	Time overruns for road Infrastructure Projects in Uganda	University Main Library, CEDAT Library	This research investigated the time overruns in road construction projects in Uganda. It studied the severity and frequency of occurrence of the causes, effects or delays and also sought for ways of mitigating the problem. Several causes and effects of delay were identified through literature review and consultations with professionals. Fifty two causes were identified and classified by responsibility into eight groups. A field survey was conducted through a questionnaire including 31 contractors, 13 consultant and 7 engineers working with Uganda National Roads Authority (UNRA). Data collected was analysed using statistical software SPSS. The study established that the most significant causes of delay related to client were change orders, unrealistic contract periods set by the client and late payment of project bills. The major causes related to the consultant included; delay to issue instructions and take decision, poor communication of decision, incomplete designs, poor working relations with other project teams, incomplete conceptualization of client needs and delay to deliver complete designs. The main problems related to contractors were lack of adequate experience, lack of technical capacity, poor financial based and using incompetent workers. Other factors leading to delays in road construction included, quality of material, shortage of good quality material, low productivity level of local workers, unforeseen site conditions, delay in utility diversions and adverse weather conditions. On the other hand, major delay effects recorded were extension of project time and cost overruns being ranked the most significant effects of days in road workers. The study also suggested that comprehensive planning, risk management plans, timely payments, proper selection of firms, preparation of comprehensive project designs and bills of quantities as well as securing critical project materials and construction equipment were very critical to minimizing the problems and effects of delays in road construction projects.	Roads, overruns, infrastructure	Uganda	Construction	Other	Platform	M102
103	Makerere University	LEPI BOSCO	2014	A GIS Integrated Asset Management System for Urban Roads in Uganda	University Main Library, CEDAT Library	This research focused on developing a GIS integrated asset management system for both urban roads in Uganda with a case study on Lira Town, which is one of the 22 municipalities that have changed face in the last 10 years. The main objective of this study was to analyse effectiveness of the GIS integrated asset management system for urban roads infrastructure and develop improvement strategies. The research examined the level of institutional involvement in urban roads asset management, the available policies and regulations in the sub sector with identification of major constraints. Assessment of the asset condition and management system in Lira municipality was made. The research undertook a triangulated approach by using both qualitative and quantitative designs. Questionnaires, interview and personal observations were used to collect data which were thereafter analysed using the SPSS software. The key challenges in urban roads asset management were found to be, poor funding, political interference, lack of institutional awareness and capacity, in appropriate asset management system among others. Aging assets, poor condition of drainage and pavement were common with no clear plan to immediately revamp them. It was recommended that, capacity building of the technical staff and contractors in GIS integrated asset management and contract management respectively should be done to improve on asset lifecycle delivery. The research unveiled that, there was urgent need to improve asset condition in Lira right from physical planning, pavement design, drainage design and road furniture replacement. It was suggested that, revamping of these assets could be better done through the formation of an authority, "Urban Re-Development Authority". A GIS integrated asset management framework model was suggested for roads asset management. Further research was proposed to be conducted in other municipalities to ascertain their asset management status.	Urban Roads, GIS, Asset management	Lira Municipality	Management	Other	Platform	M103
104	Makerere University	ONGWARA MICHAEL	2016	Optimization of Technical Human Resource in Management of road Maintenance Projects A Case study of Paliisa District	University Main Library, CEDAT Library	The research study focused on examining an optimized use of technical human resources in management of road maintenance projects for Paliisa District. Technical human resource capacity deployed in a project is sought to be key factor leading o poorly maintained road networks. Their specific objectives set were toe amine the human resources capacity in relation to the gravel road network, assess the deficit in Human resource utilization requirement and to develop an optimized plan to utilize and enhance human resource capacity for Pallisa district. The study explored the specific objectives for ascertaining the skills that will be required in the management of gravel roads and how they will be acquired such that all members of the staff would be able to make effective contrition to the management of road maintenance projects. In addition the strategies generated for the optimized plan would be adopted for improving quality of roads, minimize costs and reduce work time spans. A cross-sectional survey research design that employed both quantitative and qualitative approaches for data collection and analysis were used. The data was collected using questionnaires, interviews, document reviews and analysed using the descriptive statistics of SPSSS computer programme. Analysis of variance (ANOVA) was used to assess the significance of the dependent and independent variables the findings revealed that human capacity and deficit of human resource requirement has a positive significant effect on the management of roads maintenance project in Paliisa. Technical human resource had a calculated p value of 0.035 ($p = 0.035$) and human resource requirement deficit has a calculated p value of 0.02 ($p = 0.02$). In contrast, development optimized plan had a weaker significant effect on the management of roads maintenance projects with p value of 0.035 ($p = 0.035$) probably due to intervening variables. The set value of p was 0.05 and any p-value less than this value results in significant effects, while any value greater than this value result in insignificant effects. For effective and efficient optimization performance, the study concluded that improvement in human resources capacity positively affects management of roads maintenance projects in Paliisa district. This study therefore, recommends improvement of human resource capacity in terms of relevant training on management of roads maintenance projects for optimization performance to realized.	Roads, Human resource, maintenance projects	Pallisa district	Management	Other	Solution / Application	M104
105	Makerere University	KIVUMA HERBERT SAMSON (2012/HD06 /1481)	2014	Examining the Policies and Planning for Non-motorized Transport Infrastructure	University Main Library, CEDAT Library	The research was conducted to examine why Non-Motorized Transport (NMT) has been neglected in policy formulation and planning yet it is a valuable component of the transport system. The study was aimed at developing guidance in planning and implementation of relevant policies including NMT which is normally neglected. NMT includes all forms of movement that do not rely on an engine or motor for mobility. It is recognized as a valuable component of the transportation system and the environment due to the various benefits it holds. It can address a large range of transportation needs ranging from regional mobility to neighbourhood access. Unfortunately many times this very important component of infrastructure development is often neglected either deliberately or due to lack of awareness of its importance. The study took a qualitative research technique based on case study approach. Data were collected using research tools, which included questionnaires and interview guides. 70 respondents were chosen using systematic random and purposive sampling techniques. The Town Clerk, Planner, Engineer, pedestrians and cyclists were used as respondents in the study. The findings in this research show that policy makers do not provide for cyclist and pedestrian facilities in the planning and designing of transport infrastructure. The study has shown that lack of a NMT Policy for Non-motorized Transport (still in a draft form "Non-motorized Transport Policy 2012"), leaves a lot of loopholes for the actors to consider the importance of this sector in its implementation. The draft policy is also silent about NMT facilities like pedestrians crossings, walk ways, street lights and cyclist lanes are often neglected. The transport infrastructure master plan of Nansana Town Council provides limited space for expansion of rods, which affects the designing of better pedestrians and cyclist facilities in most rods of Uganda. It is recommended that, the draft non-motorized transport policy of October 2012 should be reviewed to include NMT aspects so as to give enforcement guidance to the implementers. The Urban Local Authority should also develop a network of cycle and pedestrian lanes to ease mobility along the road. Designated separate cycle and pedestrian lanes/paths from motorized lanes, are essential on roads with high volumes traffic.	Roads, pedestrians, non-motorized Transport (NMT)	Uganda	Operations	Other	Platform	M105
106	Makerere University	IVAN MASUBA	2016	Estimation of in-situ Strength of Flexible Pavement Subgrade from both field and Laboratory Measured Data	University Main Library, CEDAT Library	Over the past few decades, numerous correlations have been developed between CBR and PFWD and DCP test data in an attempt to avoid CBR testing in the estimation of subgrade soil strength for its limitations in coping with the paradigm shift from purely empirical to mechanistic empirical design of pavements. However, to date, there seems to be no single correlation that is reliable without the requisite rigorous calibration employing extensive laboratory testing that in itself is prohibitive. In almost all the previous attempts, authors have focused on establishing a direct one to one model without incorporating other influential physical properties of soil. In this study, the main objective was to develop mode(s) using the data obtained from the PFWD, DCP and laboratory CBR test with specific emphasis on accounting for the effect of the relevant index properties, void ratio, in-situ water content and density as the influential soil properties. A total of 55 PFWD tests, 55DCP tests and 55 field density tests using sand replacement method were respectively carried out following the TERRATEST manual, ASTM D6951 and BS 1377 on both coarse and fine grained in-situ subgrade soils of 3 flexible pavement roads in Kampala. At the same time, 55 disturbed soil samples retrieved from the in-situ test locations were tested for CBR, natural moisture content, soil classification, MDD and OMC. For independent validation of the developed of the developed correlations, the same test were repeated on four carefully selected soils prepared at 5 varying moisture contents in a physical test model under controlled laboratory environment and different test conditions.	Roads, testing, in-situ strength, pavement, laboratory	Uganda	Materials	Subgrade	Platform	M106

#	ORIGINATING INSTITUTION	AUTHORS	YEAR	TITLE	LOCATION OF DOCUMENT	ABSTRACT	KEYWORDS	GEOGRAPHICAL AREA	FOCUS AREAS	PAVEMENT LAYER FOCUS	TT LEVEL	Google Earth number
						Based on the test results, and consistent with performance of existing models, the direct one to one models are relatively weaker than the ones incorporating other influential factors whereas the R2 value between CBR and PFWD data and between CBR and DCP data was 0.888 and 0.762 respectively, it improved to 0.925 and 0.870 when the other influential factors of density ratio, in-situ moisture content, grading modules, liquid limit, and void ratio, that significantly affect strength were introduced. The validity of the developed models was found to be excellent using independent data from physical model tests. This study has therefore developed improved CBR prediction models using PFWD and DCP by incorporating other pertinent soil parameters.						
107	Makerere University	May Namutebi, U. Bagampadde and U.Isacsson	2009	Stabilization of Road Construction materials using Foamed Bitumen. *State of the art review*	Central Library at Makerere University, CEDAT Library	Stabilisation is one of the techniques employed in improving properties of road constraints materials like strength, moisture damage resistance, compressibility, plasticity etc. Various stabilisation agents such as cement, lime, bitumen cutbacks, and others, have been applied to road construction materials globally. The importance of aforementioned agents notwithstanding, this state of art specifically explores literature on stabilising agent. Foamed bitumen consist of hot liquid penetration grade bitumen through contact with pre-wetted moist aggregates, it combines with the fine fraction (e.g. aggregate fraction whose size is less than 75µm or µm) forming a mastic that binds the rest of the aggregate particles into a composite mass. In this way, the foamed bitumen water proofs the aggregate particles and or imparts cohesive strength to the aggregate. It has been observed that foamed bitumen can be used with a wide variety of road construction materials provided that the material being treated contains adequate fines (a minimum of 3-5% has been proposed). A review and synthesis of literature on foamed bitumen has been undertaken in order to gain understanding of the foamed bitumen technology. In this report, stabilisation using bituminous binders is briefly dealt with, but emphasis is put on foamed bitumen. Further, characteristics, applications, mechanism of foamed bitumen are covered. Also mix design, properties, types, performance modelling and advantages and disadvantages of foamed bitumen mixtures are dealt with. Test methods for foamed bitumen mixes and case studies where the foamed bitumen technology has been applied in stabilisation are also included.	Stabilisation, bituminous stabilisation, foamed bitumen and foamed bitumen mixes	Uganda	Materials	Base	Platform	M107
108	Makerere University	Godfrey Mwesige	2015	A Methodology for Operations-Based Safety Appraisal of Two-Lane rural Highways	Central Library at Makerere University, CEDAT Library	The majority of the road infrastructure in developing countries consists of two-lane highways with one lane in each travel direction. Operational efficiency of these highways is derived from intermittent passing zones where fact vehicles are permitted by design to pass slow vehicles using the opposite traffic lane. Passing zones contribute to reduction of travel delay and queuing of fast vehicles behind slow vehicles. This however, increases crash risks between passing and opposite vehicles especially at high traffic volumes due to reduction of passing opportunities. Reduction of passing-related crash risks is therefore a primary concern of policy makers, planners, and highway design engineers. Despite the wide application of passing zones on two-lane highways, there is limited knowledge on the underlying causal mechanisms that exacerbate crash risks, and the essential tools to assess safety of the passing zones. This thesis presents a methodology to appraise safety of two-lane rural highways based on observed operation of passing zones. The proposed methodology takes into account the impact of traffic and geometric factors on the rate passing manoeuvres end inside passing zones and in the no-passing zones, adequacy of the design passing sight distance, and time-to-collision at the end of passing manoeuvres. The thesis is comprised of five papers addressing capacity and safety aspects of passing zones on two-lane rural highways. Paper I presents a review of the literature on capacity and safety of passing zones. Paper II discusses adequacy of the design passing sight distance based on the sight distance required to complete and passing manoeuvre using observed data. Paper III discusses formulation, estimation, and application of a model to predict the passing rate using geometric and traffic factors, and applications. Paper IV discusses risk appraisal of the passing process based on the probability to complete passing manoeuvres with time-to-collision less than 3.0 seconds taking into account the accepted gap in the opposite direction and the passing duration. Paper V discusses formulation and estimation of models to predict the probability and the rate at which passing manoeuvres end in a no-passing zone, and applications. Results show that passing zones of lengths between 1.30 and 2.50km are good for both operational efficiency and safety. Passing zones of lengths between 0.50 and 1.30km exhibit increasing crash risks resulting from delayed passing manoeuvres that end in the no-passing zone where the sight distance is limited to evade potential collisions. Safety of these passing zones could be enhanced with additional signage to indicate the farthest point along a passing zone that manoeuvres can be initiated so as not to end in a no-passing zone. Passing zones less than 0.50km compel drivers to commence passing manoeuvres close to the beginning of the passing zone, and should be avoided during design for safety reasons. The results further show that the passing rate depends on the length of the passing zone, absolute vertical grade, traffic volume in two travel directions, directional split, 85th percentile speed of free flow vehicles, and percent of heavy vehicles in the subject direction. The peak-passing rate also known as the passing capacity occurs at 200, 220 and 240vph in the subject direction for 50/55, 55/45 and 60/40 directional splits, respectively. The rate at which passing manoeuvres end in a no-passing zone increase with traffic volume and unequal distribution of traffic in two directions, absolute vertical grade, and percent of heavy vehicles in the subject direction. The thesis further discusses practical applications of the study findings in highway planning and design to enhance safety and improve operational efficiency of two-lane rural highways.	Passing zones, passing rate, collision risk, accepted gap, time-to-time collision, passing distance, two lane rural highways, Uganda	Uganda	Road safety	Other	Platform	M108
109	Makerere University	Umaru Bagampadde	?	An investigation of stripping Propensity of Bituminous Mixtures	Central Library at Makerere University, CEDAT Library	In this study, an experimental programme was designed to establish a relationship between bituminous mixture constituent material properties and their propensity to moisture induced damage in form of stripping. Six bitumen types (3 from Uganda and 3 from Sweden) with presumably varying characteristics were evaluated basing on rheology and chemistry. Eleven aggregates were used in this study. Seven were sourced from active quarries in Uganda and four were from Sweden. Bitumen rheology was established basing on penetration, softening point, viscosity, ductility and viscoelastic parameters obtained from dynamic mechanical analysis. Bitumen chemistry was studied using Fourier Transform Infrared Spectroscopy, Gel Permeation Chromatography (GPC) and Thin Layer Chromatography (TLC). Bituminous mixtures were reconstituted from the bitumen and aggregate combination basing on the Swedish mix design procedure ROAD 94 using dense graded mixtures with 16mm maximum aggregate size (AG16). Mixture sensitivity to moisture was evaluated basing on Swedish FAS 446-98 specifications closely related to the modified Lottman procedure. The investigation was done in two phases namely, (a) the effect of aggregate properties on mixture moisture sensitivity, and (b) the influence of cross effects of bitumen and aggregates on mixture moisture sensitivity. The results reveal chemical compositional differences in bitumens that would be considered similar basing on classical rheological properties like penetration and viscosity. Results of dynamic mechanical analysis show that binders have similar viscoelastic response around 00C. This could be a potential phenomenon to serve as a grading scheme for bitumen as is the case with penetration and viscosity grading systems. The results from phase I of the study show that presence of Ca-feldspars and ferromagnesian minerals without alkali earth metals in aggregates largely relates to improved resistance of mixtures to moisture damage. In addition, mixtures from aggregates with high concentration of acid insoluble (SiO_2 and Al_2O_3) are sensitive to moisture damage. The results from phase II of this study show that the choice of aggregate type is the dominant factor affecting moisture sensitivity of the resulting mixtures. Bitumen type seems not to be an important factor in determining moisture sensitivity of bituminous mixtures. Aggregates with Ca-feldspars and ferromagnesian minerals seemed to be the most resistant to moisture damage irrespective of the bitumen type. Assessment of moisture sensitivity basing on absolute stiffness values of water treated mixtures seems not to be reliable. Results from this study show that mixtures with similar wet resilient moduli had varying tensile strength ratios, hence varying moisture sensitivity tendencies. Modules of resilience ratio (MRR) and tensile strength ratio (TST) parameters show similar trends in comparing moisture sensitivity of different mixtures. However, MRR values are generally lower than TSR values for the same mixture.	Bitumen, bitumen rheology, resilient moduli, tensile strength ratio	Uganda	Materials	Surfacings	Platform	M109
110	Makerere University	May Namutebi	2011	Some aspects of foamed bitumen technology	Central Library at Makerere University, CEDAT Library	Although foamed bitumen has been widely applied in pavement construction some of its aspects are still not yet understood. In this study, some of these aspects including: effects of the foaming process on binder chemistry, characterization of foamed bitumen and development of a rational method to optimize foam characteristics, evaluation of aggregate particle coating within foamed bitumen treated materials and development of a gyratory compaction procedure for laterite gravels treated with foamed bitumen were addressed. The effects of the foaming process on bitumen chemistry were investigated using Fourier transform infrared spectroscopy techniques. Also foam characteristics proposed of three binders were established and a rational method to optimize foam characteristics proposed. Aggregate particle coating with foamed bitumen was studied using the concepts of surface energy and rice density. In addition a gyratory laboratory compaction procedure for laterite gravels treated with foamed bitumen was established using the modified locking concept. Infrared techniques have shown that foaming does not causes any changes in the binder chemistry, suggesting that foaming may be a physical process. Further, foam characteristics are realty influenced by binder viscosity. Also, the equiviscous temperature seems to produce foam with optimum foam characteristics. Rice density results showed that aggregate size fraction, binder expansion ratio and viscosity influenced aggregate particle coating. Surface energy results revealed that foamed bitumen exhibited better coating attributes than neat bitumen. A new compaction procedure for laterite gravels treated with foamed bitumen based on the modified locking point was developed.	Foamed bitumen, aggregate coating, rice density, foam characteristics, surface energy, locking concept, gyratory, compaction, optimum moisture content	Uganda	Materials	Base	Base	M110
1	Makerere	Umaru	2005	Investigation on	Central	This doctoral thesis presents results of literature review on classical and contemporary aspects of stripping as well as experimental investigations on moisture damage	Moisture	Uganda	Environment	Surfacings	Base	M111

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111	University	Bagampadde		Moisture Damage-Related Behaviour of Bituminous Materials	Library at Makerere University, CEDAT Library	as influenced by bituminous materials. Previous research in this area of moisture damage was reviewed and synthesized into a state-of-art. Important parameters linked to moisture sensitivity, like bituminous material characteristics, dynamic loads from heavy vehicles, environmental factors, construction practice and nature of anti-stripping additives, are presented. The state-of-art in current test methods is summarised and given. The experimental work involved investigations of the influence of bitumen and aggregate composition on water susceptibility. The influence of aggregate mineralogy and chemistry was evaluated using eleven aggregates and one bitumen, followed by studying the interactive effect of four bitumens and for aggregates. Moisture sensitivity was evaluated in accordance with (EN 12697-12:2003) for conditioning, ESTMD 4123 for resilient modulus determination, and (EN 12697-23:2003) for indirect tensile strength testing. Furthermore, thermal stability of two liquid amine anti-stripping additives mixed with two bitumens of varied acidity was investigated using potentiometric titration and Fourier Transform Infrared (ATIR) Spectroscopy. Lastly, a technique based on Fourier transmission infrared spectroscopy-attenuated total reflectance (FTIR-ATR) was developed and used for studying transport of water across thin bitumen films, as well as stripping at bitumen/substrate interfaces, bitumens from different sources and three substrates (silicon, germanium and zinc selenide crystals) were used. Based on the results obtained, it was concluded that aggregates containing sodium and potassium in alkali feldspars generally showed high moisture sensitivity. In contrast, presence of calcium, magnesium and iron was associated with aggregates with low moisture sensitivity. Contrary to several previous findings, one aggregate with practically 100% quartz exhibited low moisture sensitivity. No linear relationship between moisture sensitivity and the contents of Si02 and Al202 in the aggregates studied was established. Results of the interactive influence of bitumen and aggregate composition showed that high acid and low penetration bitumens exhibited high dry strength for all the aggregates studied. On the other hand, for a given bitumen, the wet strengths were found to be aggregate specific. The results of tests on thermal stability of amine additives showed that usefulness of these additives reduces considerably, when the more alkaline additive was mixed with the high acid bitumen, followed by storing the blends under pronounced conditions of time and temperature (24 hours and 1400C, or more in this study). Much less interaction occurred when the less alkaline additive was blended with the low acid bitumen. Even if a correlation was found between the results of potentiometric titration and Fourier Transform Infrared spectroscopy, the later was not considered good enough at detecting amine additives, especially at low dosages. The technique based on FTIR-ATR developed in this study distinguished between good and bad bitumens with regard to stripping. The effectiveness of amine-based additives in reducing stripping was also shown by the method. Three likely processes occur during the test, namely water diffusion, film break, and displacement | (stripping) of bitumen from the substrate surface. The results also indicated that the diffusion process of water into the bitumen/substrate interface does not obey Fick's law.	damage, state-of-the-art, stripping, moisture sensitivity, bituminous materials, bitumen, aggregate, mineralogy, chemistry, resilient modulus, indirect tensile strength, strength ratio, thermal stability, anti-stripping additive, acid number, spectroscopy, potentiometric titration, substrate, diffusion, interface.					
112	Makerere University	MAY NAMUTEBI	?	An investigation into some aspects for foamed bitumen technology	Central Library at Makerere University, CEDAT Library	Despite applications of foamed bitumen technology in pavement construction in various places around the world, there are still several aspects about this technology that are not clear. In addition, knowledge on foamed bitumen technology is mainly empirical and lacks scientific basis. This study addresses some of the aspects for foamed bitumen technology such as investigation of any effects in binder composition during the production process for foamed bitumen, assessment of the effect of bitumen source on foamed bitumen characteristics, development of a rational method to optimize foamed bitumen characteristic and conditions, evaluation of aggregate particle coating within foamed bitumen mixes, further improvements in the mix design procedure specifically the method of compaction and optimum bitumen content determination stages are suggested. Fourier transform infrared spectroscopy techniques were used to investigate any changes in bitumen composition after the production process of foamed bitumen. Fourier transform infrared testes were done on foamed bitumen and neat bitumen specimens for two bitumens with similar producing foamed bitumen at temperatures of 1500%C up to 1800C and formant water contents of penetration grades. Foamed bitumen characteristics of three bitumens were established by 1,2,3,4 and 5%. From the analysis of variation of foamed bitumen characteristics (maximum expansion ratio and half-life) at different temperatures a new method base on the equi-viscous bitumen temperature to optimize foamed bitumen conditions and characteristics was proposed. Rice density and surface energy concepts were used to evaluate aggregate particle coating with foamed bitumen. A granite aggregate divided into three different sizes fractions and three sets of foamed bitumen produced from three bitumen penetration grades were used. A gyratory laboratory compaction procedure for laterite gravels treated with foamed bitumen was established using them modified locking concept. Three lateritic gravels with different chemical composition were mixed with foamed bitumen produced from one penetration bitumen grade. The resulting mixes were compacted up to 200 gyrations and the corresponding compaction curve defined in terms of height versus number of gyrations and the corresponding compaction curve defined in terms of height versus number of gyrations noted. In addition, the optimum curve moisture content requirements at the modified locking point were determined. 3D packing theory concepts, primary aggregate structure porosity and an indirect tensile strength criterion were employed to determine optimum bitumen content for foamed bitumen mixes. Fourier infrared techniques revealed that foaming did not cause any changes in the bitumen chemistry, implying that the foamed bitumen production process may possibly be a physical process. Characterisation of foamed bitumen produced from three bitumen penetration grades showed that foamed bitumen characteristic (maximum expansion ratio and half-life) were mainly influenced by binder viscosity rather than the sourced. The equi-viscous temperature seemed to provide a suitable criterion at which foamed bitumen with optimum characteristics could be produced. Rice density results showed that aggregate size fraction, binder expansion ratio and viscosity influenced aggregate particle coating. For the coarser aggregate fraction, results revealed that the binder coating seemed to be mainly influenced by temperature. Whilst for fine aggregate fraction the coating was mainly influenced any surface area. Surface energy results revealed that foamed bitumen exhibited better coating attributes than neat bitumen. A new laboratory compaction procedure for laterite gravels treated with foamed bitumen based on the modified locking point was developed. The modified locking point represents the state at which maximum aggregate particle interlock occurs when mixes are compacted in the field. It is based on the analysis of the rate of change for the gyratory compaction curve. The compaction curve in this case is defined in terms of compaction height versus number of gyrations. Gradation analysis beyond the modified locking pint showed that aggregate particle breakdown occurred. Analysis of the optimum moisture at the modified locking point revealed that the moisture conditions were less than the aggregate optimum moisture conditions. It is recommended that this point be used to determine the optimal compact ion characteristics of foamed bitumen mixes. Aggregate structure porosity and an indirect tensile strength criteria can be used to determine the bitumen content that could be used in design of foamed bitumen mixes. This would reduce the amount of resources required since the bitumen content could be estimated prior to carrying out the actual laboratory work given that the aggregate grading is known. The aggregate structure can be divided (based on 3D packing theory) into oversize, primary and secondary structures. The primary structure is mostly responsible for carrying loads whilst the secondary structure fills the voids within the primary structure and provides support to the primary structure. The aggregate size particles constituting of primary structure are deduced as a function of standard sieve sizes using the packing theory concepts. The minimum sieve size for the primary structure. The secondary structure consists of aggregate particles whose size is below the minimum size for the primary structure. The primary aggregate structure porosity can be used to establish the starting bitumen content, the bitumen content at which this porosity is 50% is chosen as the initial bitumen content. Indirect tensile strength values corresponding to 50% primary porosity are determined as well as the bitumen contents and compared against the recommended minimum values.	Stabilisation, bituminous stabilisation, foamed bitumen and foamed bitumen mixes	Uganda	Materials	Base	Base	M112
1	Kyambogo University	Asiimwe Brian	2015	INVESTIGATING THE EFFECTIVENESS OF CALCIUM CHLORIDE ON REDUCING DUST ON GRAVEL ROADS	Library - Department of Civil and Building Engineering	This research focused on a study and evaluates the effectiveness of calcium chloride on reducing the rate of dust development on gravel roads. The construction of the test sections was carried out with assistance of construction equipment from M/S Efra construction ltd and the road surface material that was used was obtained from a local gravel pit. The laboratory tests that were carried out for this evaluation of effectiveness were: moisture content, grading test(Particle size distribution),Atterberg's limits (liquid limit, plastic limit, shrinkage limit, plasticity index and hence the shrinkage product) and the proctor test (light compaction)	.Calcium chloride, Moisture Content, Modulus Grading, Reduced Level, Linear Shrinkage, Optimum	District Kiboga , Road Bukomero-Dwaniro-Kyankwazi km [CH.52+000-CH.52+300,CH.55+200-CH.55+500]	Materials	Gravel	Base	K1

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							Moisture Content, Liquid Limit, Fore sight					
2	Kyambogo University	Kerpou Collins	2014	PAVEMENT DESIGN REVIEW OF FAILED SECTION OF NEBBI PAKWACH ROAD	Library Department of Civil and Building Engineering	This project report contains detail of activities that where conducted during the pavement design review of failed section (km 8+000 to km 10+800) of Nebbi- pakwach Road between February and May 2014.	Average Daily Traffic, Design hour volume, Peak hour factor, Millions of standard axle, California Bearing Ratio, Number of Average Daily Traffic, Maximum Dry Density, California Bearing Ratio.	District Nebbi , Road Nebbi-Pakwach road km (Km 8+000 to Km 10+800)	Maintenance & Rehabilitation	Pavement	Solution / Application	K2
3	Kyambogo University	Fanon Francis Kashamba	2015	SECTION BETWEEN MOGAS FUEL DEPOT AND HASS PETROL STATION ON JINJA HIGHWAY,BANDA STAGE	Library Department of Civil and Building Engineering	Several footbridges have been proposed and designed at the section connecting Kasenyi from MOGAS fuel station to HASS petro which has been observed to be the major crossing point for students, school pupils and the people conducting business within Banda and out. Many a time these designs have not taken into account the physically incapacitated people who face a big challenge while trying to cross the ever busy Kampala-Jinja road. This report presents a thorough and detailed design of a reinforced concrete footbridge having a ramp with a design slope of one in twelve as stated in the American Disability Act with 1.5m width to enable pedestrians move freely and a 1.5m wide staircase with two intermediate landings of 1.5 by 1.5m to enable one have a rest after completing a flight. The footbridge is supported on 6m high circular columns of 300mm diameter giving a minimum vertical clearance for all types of vehicle heights.	Characteristic dead load, Second moment of area, Ultimate area, Distribution factor, Carry over, Breadth of web or rib, Width of section, A constant, Thickness of the flange, Ultimate bending moment, Moment about the major axis, lever arm, Reduction factor, Ultimate shear stress in concrete	Banda Stage 11 km East of Kampala city between HASS petro station and MOGAS fuel depot along Jinja Road	Operations	Other	Solution / Application	K3
4	Kyambogo University	Sengoye Samuel	2014	COMPARISON STUDY IN THE USE OF SISAL FIBER IN RELATION TO LIME IN STABILIZATION OF SOILS FOR STRENGTH IMPROVEMENT	Library Department of Civil and Building Engineering	Construction of building and other civil engineering structures on weak or soft soil is highly risky on geo-technical grounds because such soil is susceptible to differential settlements, poor shear strength and high compressibility. Improvement of load bearing capacity of the soil may be undertaken by variety of ground improvement techniques like stabilisation of soil, therefore, in my presentation, sisal fiber was used as a reinforcement material and it was included into the soil at four different percentages of fiber content, i.e. 0.25,0.5,0.75 and 1% by weight of raw soil and also lime was used as a reinforcement material and it was included into the soil at four different percentages of lime content, i.e. 0.25,0.5,0.75 and 1% by weight of raw soil. The main objective of this investigation is the strength behaviour of the soil reinforced with sisal fiber and lime.	Sisal plant, Labelled samples	Central Materials Laboratory, Kireka	Materials	Gravel	Platform	K4
6	Kyambogo University	Monday Landus	2016	OPTIMUM PROBASE STABILIZED IN-SITU AND BORROW PIT MATERIAL BLENDS FOR UNPAVED ROADS	Library Department of Civil and Building Engineering	In-situ roads materials can be used in the construction and maintenance of unpaved roads when modified and stabilised with chemical stabilisers such as probase and physically by blending. This study was carried out to optimize probase stabilized in-situ and borrow pit material blends to be used on unpaved roads. In situ soils from Buto road in kisaasi were blended with 0,10,20 and 40% borrow pit material from kanyanya and treated with varying percentages (0,2,4 and 8%) of probase stabiliser in powder(SH-85) and liquid (TX-85)form. Classification tests including sieve analysis and Atterberg limits in conjunction with strength tests including standard proctor and California bearing ratio were carried out on samples. The results revealed that in-situ soils were finely graded while the borrow pit material was coarse graded. Blending with borrow pit material improved the suitability of in situ soils as pavement material. There was a general decrease in plasticity with increasing percentages of probase for both TX-85 and SH-85. MDD and OMC for all the blended soils was decreasing with increasing dosage.SH-85 was found to perform better on these soils compared to TX-85.in-situ soils blended with 20% borrow pit material were found to give optimum results on stabilisation. I recommend a trail section to be constructed using the blend and monitored to compare its performance against results obtained from the laboratory, a thorough chemical analysis of kisaasi soils to be done to ascertain why TX-85 does not perform satisfactorily, the study should be extended to soils from other parts of Uganda to find out how probase performs on varied Ugandan soils. Investigations on the effect of curing of probase stabilised soils should be done and other geotechnical parameters like unconfined compressive strength and shear strength that were not covered in this study should be investigated.	Annual average traffic, Average daily traffic, Maximum dry density, Plastic limit, Shrinkage product, Plasticity index, Liquid limit, grading modulus	Unpaved road in Kisaasi Kawempe Division, Kampala district, the road connects Bukoto to Kyanja and samples were collected from Ch.1+000km	Materials	Gravel	Platform	K6
7	Kyambogo University	Mugisha Nelson	2014	A STUDY INTO THE CAUSES OF FAILURE OF KAMULI ROAD	Library Department of Civil and Building Engineering	This study deals with the investigation of the causes of failure of Kamuli road, located in Kiira Town Council linking Naalya road to Kireka-Namugongo road. Information from several sources in general about the causes of pavement failure was obtained for example from the internet and engineering literature by different authors and defects resulting from these causes helped me when carrying out the investigation. By visual observation, defects like rutting, ravelling, pot holes, fatigue cracking showed possible subgrade settlement, rapid increase in traffic, poor road usage and poor drainage. These led to further investigations like traffic assessment, subgrade strength assessment, material suitability and level of drainage maintenance. These assessments showed that some of the causes of pavement failure of Kamuli road are weak subgrade strength, increase in axle loading beyond the design traffic, poor maintenance of drainage structures and poor road surface treatment	Annual Average Daily Traffic, Millions of equivalent standard axle, Transport Road Research Laboratory, Equivalent standard axle, California Bearing Ratio, Dynamic Cone	Kamuli road is located in Kiira town council, Wakiso district. It connects Naalya Road to Kireka-Namugongo road. Kamuli road is a 2.7 km relatively high volume, single seal surfaced road.	Management	Pavement	Solution / Application	K7

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							Penetrometer, Design Hourly Volume, Peak Hourly Factor, Plastic Limit, Overseas Road Note.					
8	Kyambogo University	Atukunda Spiridon	2014	UPGRADING MUKO-RUBUGURI-NKURINGO ROAD FROM CLASS C GRAVEL ROAD TO CLASS 111 BITUMINOUS SURFACED STANDARD	Library Department of Civil and Building Engineering	This project aims at designing a sound pavement structure with materials of appropriate thickness which can effectively support the axle loading applied by the prevailing traffic conditions for 1km stretch of 41km long ,gravel unpaved Muko Via Rubuguri To Nkuringo road .The main design step will be Traffic Assessment ,Sub grade Strength Assessment, Selection of Materials and Layer thickness to provide satisfactory services over the design life of the pavement using URDM (2010), and the TRL overseas road notes as design Standards. Feasibility study carried out on the road reveals presence of heavy goods commercial vehicles ,reduced riding surface (gravel) ,route guidance for bad road geometry sections ,longitudinal cracks approximately 0.5 meter long, broken road edges approximately 0.5km long ,potholes of approximately 0.14m3 in size dust pollution from silting and road edges with lack of and poor drainage at some sections The current ADT is approximately 314veh/day compared to the minimum 300veh/day required by MOW&T before a road can be considered for upgrade. With the new mines, tourism centres, services and facilities in the area, increased traffic has been observed for the past 5years hence wide vehicles using the road now require traffic lane width wider than 4m available now with wider horizontal curves. The benefits of upgrading will be realized in saving in vehicle operating costs, reduction in road, maintenance costs, reduced travel time, reduction in road accidents and improvement of the economy facilitating increased accessibility which can enhance trade along the route .also this will be connecting Uganda to DRC through Nkuringo /Kirundo boarder	Number of Average Daily Traffic, Dynamic Cone Penetrometer, Growth Factor, Cumulative Standard Axles, Growth Rate, Projected Traffic Flow, Environmental Impact Assessment, Passenger Unit Car, Intensity Duration Curves, Uganda Road Design Manual.	Muko-Rubuguri-Nkuringo road is located in the south-western corner of Uganda in the districts of Kabale and Kisoro. This road is 41km long starting from Y-junction at Muko sub-county in Kabale district connects to Rubuguri in Kisoro district and onwards to the border with the Democratic Republic of Congo (DRC) at Nkuringo. At y-junction, the right hand turn leads to Rubuguri while the left hand turn leads to Kisoro and traverses a rolling, hilly and mountainous terrain. .The road is currently a gravel road of Class c standard. It connects Uganda to the DRC at Kirundo boarder in Kisoro District, and is under management of UNRA since 2009.	Maintenance & Rehabilitation	Pavement	Solution / Application	K8
9	Kyambogo University	Khaukha Anthony	2014	DESIGN OF SINGLE SPAN REINFORCED CONCRETE BRIDGE ALONG RIVER MANAFWA IN BUBWAYA WARD	Library Department of Civil and Building Engineering	Bubwaya Bridge is along River Manafwa in Manafwa Town Council, Manafwa District. This Bridge used to provide motorable accessibility to Bubway community but however collapsed in 1970 due to the eminent floods. The existing structure at the bridge only permits accessibility to pedestrians and it's at the verge of collapsing due to deteriorating timber. Motorable accessibility used to be key to this community in terms of social economic links with other parts of the district and the country as a whole. Therefore the community urgently needs a motorable bridge and this project in the attempt to provide a solution focused on the designing of the Bridge. In arriving at the design the following were done; geotechnical investigation to determine the bearing capacity of the soil, hydraulic survey to determine hydraulic design of bridge that will adequately discharge the design flood without damaging the bridge structure and embankment and structural design of bridge where; live loadings were obtained from BS 5400 pt.2 and design of bridge members based on BS 8110 and BS 5400 pt.4 Specifications and drawings of Bridge Deck, Abutment together with Base slab were produced.	Bridge location, Bridge materials	Bubwaya ward, Manafwa Town Council in Manafwa District	Design	Other	Solution / Application	K9
10	Kyambogo University	Aguma Tom Edward	2015	INVESTIGATION OF CAUSES OF SEVERE DETERIORATION OF UNPAVED ROADS CASE STUDY: DOKOLO-NAMASALE ROAD (2.5 KM)	Library Department of Civil and Building Engineering	This project focused on the investigation of causes of severe deteriorations of unpaved road roads, a case study on 2.5Km section of Dokolo – Namasale road. The project site is located at Amolatar Town Council. The main objective was to identify the causes of severe deterioration of unpaved roads and make necessary recommendations to remedy them. To achieve the above objective, the following tasks were carried out; traffic assessment to determine the volume of traffic flow and assign traffic classes, subgrade strength assessment to determine whether the right pavement design was used, soil classification tests, gravel test to determine their suitability and compaction tests. The methodology used included data collection (traffic count, site investigation, road condition survey, sample collection, and interactions), data analysis (manual calculations and laboratory tests), storage, retrieval and distribution of the report. It was found that the average daily traffic flow is over 300 vehicles per day, gravels are well graded but have high plasticity indices requiring stabilization, inadequate compaction was achieved during construction, the terrain of the area is very flat causing water logging either on the road surface and side drains hence severe deterioration of the road.	Pavement design life selection guidance, subgrade classification, traffic counts, manual counts, automatic counts, traffic flow, traffic volume, traffic composition, design flexibility, route location surveys	The research was limited to only 2.5km section of Dokolo – Namasale road and the scope comprised of conducting road condition surveys, carrying out traffic counts and selecting traffic category of the project road, carrying out site investigation, testing and classifying soil properties, assessing subgrade strength of the underlying in-situ soil using DCP machine, laboratory testing of	Management	Gravel	Solution / Application	K10

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								pavement compaction, laboratory testing of existing pavement materials to identify possible causes of severe deteriorations of the road. The project is the investigation of the causes of severe deterioration of unpaved roads (Dokolo – Namasale Road). This is an 88km road under the jurisdiction of Uganda National Roads Authority. It begins at Dokolo Town Council in Dokolo District and ends at Namasale Town Council, Amolatar District.				
1 1	Kyambogo University	Otto Peter	2015	INVESTIGATING THE CHALLENGES AND POTENTIAL TO NON MOTORISED TRANSPORT IN URBAN AREAS (A Case study on a section of Greater Kampala Metropolitan Area)	Library Department of Civil and Building Engineering	The main purpose of this research was to investigate the challenges and potential to non-motorised transport in urban areas, case study on a section of Greater Kampala Metropolitan Area (GKMA). The research data was collected through personal interview survey, walkability audit, bikeability audit, and review of relevant literature on Non-Motorised Transport (NMT). The personal interview survey collected data from 300 respondents, stratified into 60 respondents per zone. This data was analysed using SPSS 16.0 and excel sheets and the results were expressed inform of graph, charts, and cross tables. Based on the findings, it was observed that NMT comprised 33% of the main travel mode and 37% of occasional travel mode, mainly dominated by walking. NMT users were dominated by people below 36yrs, while those above than age bracket prefers to used motorised modes mainly private cars. It was also observed that men tend to use NMT more than women, and only 1.4% of women using bicycles as their main travel mode. In addition to that, NMT is mainly used by single and unemployed people. The major reason for choice of a particular travel mode varied among the respondents but private cars were mainly used because of personal safety, comfort and for dropping/collecting children, public means were used because they are cheap, motorcycle were used because they are quicker and essential to perform jobs, bicycles were used to perform job (commercial use), while walking was mainly employed when work place is near resident. In addition to the above, most users of motorised modes did not prefer using NMT modes, with more than 51% of respondents found to have no interest in using NMT either daily or occasionally. The other proportion uses NMT (mainly walking) basically for exercise, going to school/work and visiting friends. They also reported that their major problem was poor NMT facilities, and they desired improvement in cycle/walk paths and separate cycle/walking route. Majority of roads within the study area had moderate bikeability and walkability index. Roads with high walkability and bikeability index were mainly of shorter stretch and located in residential areas while roads of long stretches were found to have the low bikeability and walkability index. The study identified several challenges to NMT within the study area which includes infrastructural challenges, attitudes and perceptions, scattered land use, lack of NMT promotional programmes, poor driver's behaviour, steep grades and encroachment on NMT space by street vendors and other motorised users. However, the respondents were interested in using NMT on condition that improvements can be made to the existing facilities. Based on the NMT potential established, it was observed that more than 35% of the respondents reported of being willing to cycle daily as oppose to the current 17.4%. In addition to that, only 20.9% reported of not interested in cycling even though improvements are made as oppose to the current 51.2% who are not interested in bicycling. It was also observed that majority of the respondents are willing to walk daily provided that the improvements are in place. The study further recommended the following measures to be taken to achieve the above potential:- • Establishing a well maintained NMT network within the study area. • Establishing a well maintained NMT support infrastructures. • Instituting NMT promotional programmes • Enforcement of strict regulatory measures to offenders of NMT policies • Implementation of NMT policies, strategies and projects • Need for planners to appreciate pyramid of transportation need In conclusion, the researcher believes that if the above measures are taken, there shall be a dramatic change in the present travel scenario within the study area, with most people shifting from their present travel mode to NMT modes. The main purpose of this research was to investigate the challenges and potential to non-motorised transport in urban areas, case study on a section of Greater Kampala Metropolitan Area (GKMA). 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						However, the respondents were interested in using NMT on condition that improvements can be made to the existing facilities. Based on the NMT potential established, it was observed that more than 35% of the respondents reported of being willing to cycle daily as oppose to the current 17.4%. In addition to that, only 20.9% reported of not interested in cycling even though improvements are made as oppose to the current 51.2% who are not interested in bicycling. It was also observed that majority of the respondents are willing to walk daily provided that the improvements are in place. The study further recommended the following measures to be taken to achieve the above potential:- • Establishing a well maintained NMT network within the study area. • Establishing a well maintained NMT support infrastructures. • Instituting NMT promotional programmes • Enforcement of strict regulatory measures to offenders of NMT policies • Implementation of NMT policies, strategies and projects • Need for planners to appreciate pyramid of transportation need In conclusion, the researcher believes that if the above measures are taken, there shall be a dramatic change in the present travel scenario within the study area, with most people shifting from their present travel mode to NMT modes.					
12	Kyambogo University	Kabiito Patrick Basajjansolo	2014	EVALUATION OF PAVEMENTS IN RELATION TO TRAFFIC AXLE LOADS AND ITS CONTROL IN UGANDA (A CASE STUDY OF A SECTION ON KAMPALA – MASAKA ROAD)	Library Department of Civil and Building Engineering	This project is to evaluation of pavements in relation to traffic axle loads and its control in Uganda, taking a cause study of a section on Buwama – Masaka road. This is due to the many roads have failed within a short while after commissioning, this is attributed to the heavy vehicles carrying goods way over the right load they supposed to carry and yet the pavement structure is designed basing on the required load of those vehicles. This is evident on Buwama – Masaka road which was designed on the assumption that the legal axle load requirements would be adhered to, but developed distresses at an early stage, in the form of premature settlements, localized failures in the DBM, rutting and longitudinal rutting. Therefore in this project an investigation into whether Uganda roads design should realistically follow legal axle limits or actual axle loading and propose appropriate design criteria that can be adopted. It was found that the most economic design method for road susceptible to high levels of overload is the Kenya Road Design manual. It is followed by the TRL, 1993 method. The most generous method is the Uganda Road Design manual.	Visual condition survey, axle load survey, pavement evaluation using Benkelman's test, axle loads used for design of the road	axle road survey and establishing control measures a section along Kampala – Masaka Road	Traffic	Other	Platform	K12
13	Kyambogo University	Komugisha Brenda	2014	ASSESSMENT OF VIABILITY TO IMPROVE THE NTINDA STRETCHER ROAD	Library Department of Civil and Building Engineering	The Project aimed at assessing the viability to improve the road with respect to geometric design, drainage design and pavement design each accompanied with Environmental and Social-economic impact assessment. Geometric design includes; the definition of basic parameter (road width, carriageway width, shoulders and the road reserve), Drainage design includes; designs for both longitudinal and Culvert drainages and Pavement design includes; assessment of traffic, measurement of subgrade strength, selection of pavement material and pavement structure. The methodology used is grouped under five categories .i.e. Data collection and Classification, Modelling and Analysis, Design and Simulation, Storage and Retrieval and finally Publication and Dissemination. The Project is strongly viable for improvement because of the high traffic volume of about 3596veh/day, narrow road width of about 5.6m, several potholes and rutting. After the implementation of the project the anticipated benefits are; maximum time saving for road users, potholes & rutting free and widened road width. Geometric design includes; road width 8.6m, carriageway width 5.6m, shoulders 1.5m and road reserve 25m. Drainage design includes; Longitudinal drains with a bed width of 500mm, total depth of 410mm, side slope of 1 in 1.5 and a stone masonry bed. Cross drainage (Culvert) with two number circular culverts of diameter 900mm. Pavement design includes; two uniform sections are established, a Traffic class T5 giving a subgrade strength class of S4 and S5, pavement thickness obtained from the structure catalogue are as follows (Road base of 225mm &sub base 150mm for section 1 and road base of 200mm &sub base 250mm for section 2). Materials used are 80/100 pen grade bitumen, 20/10 aggregate for surface dressing and naturally occurring granular material for both Road base GB1 and Sub base CB2.	Full overtaking sight distance, horizontal curve, highway cross falls, climbing lane outside the ordinary lane, typical vertical curves, simple symmetrical parabolic curve, single carriageway cross section elements.	The study will cover about 1.5km road section of the Ntinda stretcher, Kampala Uganda. Nakawa is located on the eastern edge of the city of Kampala. It is bordered by Ntinda to the north, Kyambogo to the northeast, Banda and Kireka to the east Bugolobi to the south, Kololo in Kampala central to the west and Naguru to the northwest .the road distance between Kampala's central business district and Nakawa is approximately 9.5 kilometres (5.9 miles). Ntinda on the other hand is bordered by Kyambogo to the east, Nakawa to the south, Naguru to the west, Bukoto to the northwest, Kigoowa to the north and Kiwatule to the northeast. Ntinda is approximately 8.0kilometres (5.0miles). The project Road is managed by Kampala City Council	Maintenance & Rehabilitation	Pavement	Solution / Application	K13
14	Kyambogo University	Kiyimba Simon	2016	A COMPARATIVE STUDY BETWEEN THE SAND CONE METHOD AND THE NUCLEAR MOISTURE-DENSITY GAUGE METHOD IN COMPACTION QUALITY CONTROL OF SOIL	Library Department of Civil and Building Engineering	This research study presents some comparative test results of surface nuclear density gauge against sand replacement method obtained by carrying out field density parallel testing, whereby the density readings were determined first using nuclear density gauge followed by sand replacement. The test results presented in this paper were carried out during the construction of the Kampala Northern Bypass, Uganda. A total of 50 tests strategically selected so as to assess density and moisture content variation for soils having different mineralogical composition were conducted on six soils used to construct the roadbed, subgrade, and subbase. The soils were then separated into corresponding USCS classifications showing the variety of soils types that consisted of: one clayey silt in Phase 1, two clayey gravels and two silty gravels in Phase 2, and one well graded gravel with silt in Phase 3. This data was analysed using SPSS 16.0 and excel sheets and the results were expressed in form of graphs, charts and histograms. It was observed that Phase 3 nuclear gauge moisture and density test readings gave consistently lower values of moisture content in comparison to the oven dry method and this phenomenon was attributed to compounds which absorb slow neutrons before they can get to the detector tube and be counted e.g. Cadmium., lithium	Quality control, soil compaction, rubber balloon method, nuclear gauge, calibration of the sand cone device.	Kampala Northern Bypass project	Construction	Pavement	Platform	K14

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						Test results given in phase 1 and 2 indicated that the nuclear gauge gave higher moisture content compared to the oven dry method and the accuracy of the nuclear gauge in determination of moisture content decreased as the moisture content increases. Whereas a small clay fraction will materially assist compaction by providing interparticle lubrication, a material consisting predominantly of clay is usually troublesome, because of its high cohesion and adsorbed water and this would seem that more neutrons would be thermalized for a clay than a silt at the same moisture content thus leading to higher moisture content readings. This phenomenon explains the bigger dispersion for phase 1 roadbed material and clayey gravels' readings in phase 2. Appropriate correction to moisture and wet density measurements were then made using both single shift and multiple shift coefficients. Through the test results presented in this paper it has been established that although, the accuracy of the gauge in determining both water content and density is largely depending upon the chemical composition of the soil, the nuclear gauge gives reliable results particularly if its readings are validated against sand replacement method and corrected using multiple shift coefficients						
15	Kyambogo University	Mpaata Steven	2014	BITUMEN EMULSION AS A REPLACEMENT FOR LIME, CEMENT, AND AGGREGATES IN GRAVEL BASE STABILISATION FOR THE CONSTRUCTION OF ROADS IN UGANDA	Library Department of Civil and Building Engineering	This report presents in detail the research about bitumen emulsion as a soil stabiliser to be incorporated in gravel road base. The project was titled "Bitumen emulsion as a replacement for cement, aggregates and lime in gravel road base stabilisation for construction of roads in Uganda." Stabilisers, neat and stabilised materials are discussed in detail. This report was compiled using information and knowledge from the road design manuals, specifications for road and bridge works with the theoretical knowledge as explained in the literature review. The background of the research, its significance and justification are well documented in the first chapter. The research was commenced from identifying a suitable road link that was close to the testing laboratory to cut down transportation costs. It was commenced by sourcing and sampling gravel for neat and stabilised testing. The stabilisers were also obtained, tested and recommended for the research project. The neat materials were tested and only those observed to comply with specification requirements before stabilisation were considered. The stabilisers were also tested for the materials whose compliance certificates were not available. The stabilised materials were then compared in relation to strength and classification requirements. The materials stabilised with bitumen emulsion were found to reach strength which was not satisfactory for heavily loaded road sections (> 250 vehicles per day). The maximum CBR value obtained was 73% at Modified AASHTO density with a plasticity index of 13%. The plasticity index was however above the maximum specified of 12% for cemented layers of low volume traffic roads. The research was however recommended to low volume traffic road sections using gravels with a less clay content. Materials with a clay content less than 20% would be most satisfactory. Prior small quantities of lime of approximately 1.0% would greatly improve plasticity characteristics of materials whose clay content are greater than 20% for bitumen emulsion to be applied.	California Bearing Ratio, Liquid Limit, Dynamic Cone Penetrometer, Overseas Road Note, Transport and Road Research Laboratory, Sieve Analysis.	Kahunga to Kiyoora PTC road in Southern Ankole but in Northern Ntungamo district, a section of 14.3 kilometres	Materials	Base	Platform	K15
16	Kyambogo University	Arike Kelvin	2016	ASSESSMENT OF THE TECHNOLOGY CHOICES USED IN RURAL ROAD CONSTRUCTION (A CASE OF OTUKE AND ALEBTONG DISTRICTS)	Library Department of Civil and Building Engineering	Rural roads constitute about 65% of the Uganda road network providing a critical link in a road transport network, facilitating access to and development of the rural areas. Traffic volume on rural roads in Uganda is very low, 90 % of the rural road network has an Average Annual Daily Traffic (AADT) less than 200, with an average road width of about 5.0 meters. The main problem facing the development of rural roads lies in the method of construction. Common methods used include EBT and LBT. However, there are inevitable doubts, as to the feasibility of the labour-based methods. Whereas EBT is acknowledged to be able to deliver quick results, it is also very frustrating, inefficient and unproductive for constraints such as specialized and dedicated function and inter-linked equipment. This report describes a comparative study of the use of labour-based and equipment-based methods for feeder road rehabilitation. The study examined the performance of the two technologies used in the construction and maintenance of rural road. When financial costs were compared, the overall average cost per kilometre for EBT was (Ug. Shs 12.7 millions) which is 30% cheaper than LBT (Ug. Shs 18.1 millions) for full rehabilitation. The average cost per kilometre for spot rehabilitation using EBT is (Ug. shs11.9millions). An economic cost comparison revealed that, a greater cost reduction in average cost per kilometre for LBT from Ug. Shs 18.1m to Ug. Shs 12.9 million and for EBT reduces from Ug. Shs 12.7 million to Ug. Shs9.8 million. The study revealed a great benefit in favour of LBT compared to EBT. However, result shows that both technologies can be implanted and that the quality of the finished roads for both methods is relatively the same. The study concludes that EBT is cheaper than LBT in both financial and economic terms. However, LBT has greater positive impact on the community such as employment creation. The study recommends the use of LBT under normal condition and EBT for emergency cases since there was an overlap between the two technologies.	Calcium-alumina hydrates, curing temperature, lime content, maximum dry density, plastic limit, plasticity index, optimum moisture content.	District of Otuke and Alebtong. These are the only two out of the seven districts within Lango sub region in Northern Uganda	Construction	Gravel	Platform	K16
17	Kyambogo University	Daniel Tseggai Ghebremedhin	2014	INTELLIGENT TRANSPORTATION SYSTEM AS A CONGESTION MITIGATION STRATEGY A Case of Kitgum House Intersection, Kampala-Jinja Road	Library Department of Civil and Building Engineering	Intelligent transportation systems (ITS) provide a proven set of strategies for addressing the Challenge of reducing congestion, while accommodating the growth in transit ridership and freight movement. ITS improve transportation mobility through the use of advanced Communications and information processing technologies encompassing a broad range of wireless and wireline communications-based information and electronics. When integrated into the transportation system's infrastructure, these technologies relieve congestion. This report presents information on the key characteristics of Kampala-Jinja road, as well as information on the number of vehicles, accidents, and ITS strategies that can be deployed to mitigate the congestion. The report which has been developed by the researcher to support informed decision making regarding ITS strategies to be deployed considered a case of Kitgum House Intersection along Kampala-Jinja road. To support the deployment of ITS and to address the challenge facing the Kampala Transportation system, the researcher has developed a suite of knowledge resources. This collection of knowledge resources provides ready access to information supporting informed decision making regarding deployment and operation of ITS to improve transportation system performance. Information presented in these knowledge resources is the basis for this document. The knowledge resources are in the references.	Dynamic Message Signs, Dynamic Multiple User Class Models, First-in First-Out, Non-Motorised Transport, Origin-Destination, Time-Dependent System Optimal, Time-Dependent User Equilibrium, Advanced Traveller Information Systems.	Intersection situated next to Kitgum House on Kampala- Jinja road.	Operations	Other	Solution / Application	K17
18	Kyambogo University	Kibanyi Aiden	2014	IMPROVEMENT OF DRAINAGE ON A SECTION BETWEEN BANDA T-JUNCTION AND SHELL ALONG JINJA ROAD (CH 0+500-1+300)	Library Department of Civil and Building Engineering	The purpose of this project was to design an enhanced, sustainable and improved drainage for a section between Banda T-junction and the Global Paints factory along Jinja road (CH 0+500-1+300). The analysis was carried out with the use of empirical formulae. With the help of condition survey, the current drainage state of the road was established and its hydraulic capacity. Rainfall data and topographical maps were obtained to aid in delineation of catchment area. Through hydraulics and hydrological principles, run off volumes were estimated and these prompted the inadequacy of functionality of the existing side drains and cross drainage(culverts) hence concentration was put on design of checking the hydraulic capacities of the existing drainage facilities (side ditches & cross culverts) and this was compared to the hydraulic capacity of the new facilities. It was also recommended that the government should incorporate sustainable urban drainage structures in its new developments in order to restrict the increase in runoff volumes as a result of the expanding built-up areas. The report is presented in six chapters with references and an appendix at the end. A brief summary of each chapter is presented below: Chapter One introduces the subject matter with a brief background, objectives, scope of study and a brief methodology. Chapter Two is a presentation of literature reviewed which was obtained from different sources including books, manuals, and internet sources. The material presented here follows a careful and detailed research of all applicable information to this project.	The land use factor, Gumbel extreme-value Type 1 distribution, Gravel A Gravel Road of grade A (Geometric Design Category 1), hectare, runoff curve number,	Section between Banda T-junction and Global Paints Factory along Jinja road.	Environment	Other	Solution / Application	K18

#	ORIGINATING INSTITUTION	AUTHORS	YEAR	TITLE	LOCATION OF DOCUMENT	ABSTRACT	KEYWORDS	GEOGRAPHICAL AREA	FOCUS AREAS	PAVEMENT LAYER FOCUS	TT LEVEL	Google Earth number
						Chapter Three gives a detailed narrative of the methodology used to realize the objectives of the study. Chapter Four presents the analysis of the collected field data. It contains hydrologic analysis followed by the hydraulic analysis of the necessary drainage elements. Chapter Five gives a discussion of the results from the analysis and a successive formulation of a Pavement Management Program. Chapter Six gives the conclusion of the project report and it finally ends in recommendations on possible maintenance practices and sustainable urban drainage structures that could be used.	Bitumen III (Geometric Design Category), Areal Reduction Factor, standardize skew, Gravel C Gravel Road of grade C (Geometric Design Category 3), flood wave attenuation, Average Recurrence Interval, yrs, Manning's roughness coefficient					
19	Kyambogo University	Gala Emmanuel	2014	UPGRADING OF GILI-GILI ROAD FROM GRAVEL TO BITUMINOUS STANDARDS	Library Department of Civil and Building Engineering	This report is about a research that required carrying out studies, producing preliminary designs and detailed designs of upgrading Gili road in Arua town council, Arua district after it deteriorated to a state where it could no longer properly serve its purpose. Gili Gili road is a stretch of 2.5km which is unpaved, very dusty with pot holes and poor road surface with limited road width yet with high levels of traffic. This study also included interviews, laboratory tests, observations and reading related literature to collect data which was used for geometric designs and pavement structural analysis. Data collected was in the following categories: Traffic assessment, road geometry, geotechnical investigations, road performance, historical data survey and maintenance policy and environment All the above was presented in both written form and those which could not, be is in a tabulation form. Basing on this data, the geometric and structural designs were carried out from which conclusions and recommendations were made. In order to come up with a solution to those problems, surveying was done and a road profile was drawn to be used in earth works; traffic counts (traffic survey) were also done to determine traffic loading of which the sub grade strength class (related to CBR of the sub grade material) were determined and used in design thickness of the different pavement layers to support the traffic loads. The research revealed that the road is class B gravel, 2.5km long, 5.5m wide with no shoulders and no well-defined side drains. It also revealed that the road is of traffic class T4; a CBR of 52% with a subgrade strength class of S6. [Key to structural catalogue, road note 31, TRL 1993]. The parameters were then used with the design charts [road note 31, TRL 1993] to design the pavement layers as 200mm granular sub base GB1-GB3, 100mm road base and a double surface dressing thickness of 20mm with the first layer having chipping size of 14mm and second seal of 10mm chippings. Soil tests were carried out to determine the engineering properties of the sub grade material and the material from borrowed pit (Located in Gili Gili sub county about 3.7km from the project road) was also examined. The tests included: Compaction tests, Atterberg limit tests and Sieve analysis tests. The existing sub grade was found to be adequate. The services along the road include overhead power lines, telephone lines, and water main pipe line. The policy is that maintenance is done by the UNRA depending on the condition as assessed and availability of fund. It was concluded from the research finding that: The road should be upgraded to a bituminous standards as per the new pavement design, borrowed pit material be stabilized with lime pozolan and compacted to a density of 95% of maximum dry density [BS heavy compaction test], road width be widened to7.5m to cater for all kinds of traffic and the drainage system be improved with base width of 300mm and 870mm deep.	Road Annual maintenance Planning System, Equivalent Standard Axles, Transport Research Laboratory, road maintenance, highway capacity, binder spray rate. ,	Gili Gili road in Arua town council, Arua District. The road links Arua Town council with other neighbouring districts such as Nebbi, Zombo and Democratic Republic of Congo. It's being maintained by UNRA with funds from the Central Government (Ministry of finance).	Maintenance & Rehabilitation	Pavement	Solution / Application	K19
20	Kyambogo University	Nansukusa Mirembe Sarah	2015	AN INVESTIGATION INTO THE GEOTECHNICAL CHARACTERISTICS OF SOILS AT WANSEKO LANDING SITE, BULIISA DISTRICT	Library Department of Civil and Building Engineering	The focus of this study is on the geotechnical characteristics of the soils with respect to their shear strength in Wanseko region, in the Albertine Graben, Uganda. Since most of the affected buildings are founded on the alluvial soils, a clear understanding of the soil behaviour with respect to structures mainly those with shallow foundations has been of interest to the study. Two site, representatives in Wanseko was selected for geotechnical tests. Geotechnical site investigation consisted of open trial pits, profile description and collection of both disturbed and undisturbed samples. The collected samples were submitted for laboratory tests and the results indicate that the soil in Wanseko has layers of clayey sand and sandy clay. The shear strength parameters of the soil ranged, friction angle from 14-20 degrees, and cohesion factors from 8-16 kPa. Finally, conclusions and recommendations were drawn for the study.	Cohesion Factor, Friction angle, Liquid Limit, Plastic Index, Total unit weight of soil, Plastic Index	Wanseko located at 20191 North of the Equator and longitude 310321 East of Greenwich of Buliisa district is located in the Mid-western part of Uganda. The district is mainly in the rift valley floor in lowland with the highest point at 1800 metres above sea level. The laboratory tests were conducted from the Materials Laboratory, Department of Building and Civil Engineering, Kyambogo University.	Materials	Non-road	Solution / Application	K20
21	Kyambogo University	Kajumba Edward	2015	DETERMINATION OF PLASTICITY INDEX OF SOILS USING ELECTRICAL RESISTIVITY	Library Department of Civil and Building Engineering	In order to establish the empirical equations relating soil resistance with geotechnical parameters for engineering site characterization geotechnical tests such as Atterberg limit tests were conducted on disturbed samples obtained at different clay soils. The soils mainly in the study include silt clays from different areas including Kyambogo campus west end, clays from Kajjansi and Kisubi-Kawuku Entebbe road Wakiso district. This report includes laboratory methods of determining of plastic limit, liquid limit and plasticity index, after soil classification process. Attention was drawn to further relating of electrical resistance of the soil to plasticity index of the soil as an alternative to geotechnical methods of determining the engineering properties of soil. Atterberg limit test were conducted on disturbed samples in the laboratory. The geo-electrical and geotechnical parameters were subsequently correlated	Plasticity Index, Plastic Limit, Liquid Limit	Kyambogo University premises, in particular west end grounds	Materials	Gravel	Base	K21
22	Kyambogo University	Mugyenyi Jackson	2015	STABILIZING EXPANSIVE BLACK COTTON SOILS IN	Library Department of Civil and	This report presents the stabilization of black cotton soils using blast furnace slag. The research put in consideration the effect of both mechanical and chemical stabilisation by varying particle sizes and identifying the chemical content of the slag that can otherwise enhance chemical reactions respectively. Black cotton soil exhibiting low to medium percent swelling potential from Kagata-Lomorimor	Black Cotton Soil, shrinkage Limit, California	Soil samples on a community access Kagata-Lomorimor	Materials	Gravel	Base	K22

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				ROAD CONSTRUCTION USING BLAST FURNACE SLAG	Building Engineering	low traffic gravel road in Nakapiripiti district was used for determining the basic engineering properties of the soil. Blast furnace slag exhibiting non plasticity from Roofing Roll Mill, Namave, was used to blend the Black cotton soil. The slag was also tested for its chemical composition especially metal content and compounds responsible for binding property like CaO, SiO2, Al2O3, and MgO. Laboratory soil tests, that is, Liquid limit, Plastic Limit, Shrinkage limit, Maximum Dry Density, Optimum Moisture Content, and California Bearing Ratio were determined on the soil in its natural state and on blending it with different percentages of Ground granulated blast furnace slag.	Bearing Ratio, Unconfined Compressive Strength, Central Materials Laboratory, Ground Granulated blast furnace Slag, Black cotton soil (BCS), Blast furnace slag (BFS), and stabilization.	road in Nakapiripiriti district in Northern Uganda. This is because it one of the districts whose bigger part is covered by the black cotton soils and Engineers always get construction problems in the area				
23	Kyambogo University	Okello Deogracious	2014	UPGRADING OF OCAPA-NGORA GRAVEL ROAD TO A BITUMINOUS ROAD SURFACE	Library Department of Civil and Building Engineering	Ocapa-Ngora road is a class B gravel road, located in Serere and Ngora districts in eastern Uganda supervised by UNRA office Mbale. It is the only road linking Serere District to Soroti-Mbale highway (National road).This road becomes impassable especially during rainy seasons. According to the UNRA, MoW &T there was an increase of 12% of the number of various types of vehicles from 1991 to 2012 .This increase therefore shows the growing need of good quality roads for efficient conveyance of people and goods. Ocapa-Ngora road is a very important road in connecting Serere District to Mbale the regional business hub and to Kampala the capital city of Uganda and yet it is faced with the following problems; ¦ Increased traffic volume with no increase in the road capacity. ¦ Narrow carriage way causing difficulty in vehicle overtaking. ¦ Deterioration of road giving rise to potholes, corrugation and ruts, some potholes developed into gullies running along the road carriageway. ¦ Stagnant water during rainy season which also soften the road foundation. ¦ Dust formation during dry season causing environmental hazard like pollution of water sources near the road, flu, and cough. ¦ High frequency of routine maintenance. Upgrading this road will aid in having a safe road with smooth riding characteristics, reduced accident impacts , reduced vehicle operation costs, maintenance costs and saving on the time spent by road users. As a result, o Passenger comfort will increase. o Flooding problems will be harmonised. o Nuisance on the road will be handled. o Economic activities will be boasted. o Transport costs will reduce. o Time saving on road. o Vehicle operation costs will reduce. Objective The main Objective is to come up with a structurally sound and economic design for the upgrading of the existing road from gravel (unpaved) road to a bituminous paved road surface so as to provide a safe and smooth riding road surface. Through; 1. Traffic assessment o Carrying out Traffic counts. o Determination of Traffic class. 2. Geometrical Design o Determination of cross section elements-road profile surveys. o Determination of vertical & Horizontal alignments 3. Pavement design o Carrying out Sub grade Strength assessment o Material selection o Selection of Pavement structure. 4. Drainage Design o Determination of Hydrological parameters. o Carrying out Hydraulics design of the system elements. o Selection of the Drainage structures The methodology used was as below; 1. Data Collection and Classification Surveys, documents review, Field & Lab tests, Interviews, Consultations, Traffic counts, Observations 2. Modelling & Analysis Micro soft office, Civil Card, UK DCP software, Excel spread sheet. 3. Simulation & Design TRL, UDRM, Civil Card, BS 4. Storage and Retrieval o Storage - Hard disk, Flash disk, Compact disk, Networked computers o Retrieval – Printing & keeping hard copies. 5. Publication and Dissemination o To Kyambogo University, Works Department-Pallisa. The results are; i. Traffic composition ADT = 377 Veh/day ii. Cumulative Design Traffic, from a) Vehicle growth rate = 1.57msa b) Economic growth rate =1.29 msa iii. Traffic class T2 from the above cumulative design traffic results and was taken as the design traffic class.	California Bearing Ratio, Average Least Dimension, Allowable Headwater depth, Plasticity Index & Plastic Limit, Millions of equivalent standard axle, Liquid Limit & Linear Shrinkage, Kampala Urban Transportation plan	Ocapa – Ngora road is a Class B gravel road, passing through two districts, Serere District and Ngora district, in the eastern region of Uganda and is supervised by Uganda National Road Authority (UNRA) office Mbale. This is the only major road linking Serere District to Mbale-Soroti highway (National road) then to Kampala City. So it is a category B, described as a secondary road (Source: Uganda Road Manual, 2004)	Design	Pavement	Solution / Application	K23

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24	Kyambogo University	Ssekayingo Stephen	2015	AN INVESTIGATION INTO THE EFFICIENCY OF BAGHOUSE FINES IN IMPROVING THE ENGINEERING PERFORMANCE OF MARGINAL SUBBASE MATERIALS	Library Department of Civil and Building Engineering	Performance of flexible pavements depend on component layers (Base, Sub base and Subgrade) mostly constructed of natural soils like gravel or a modification of gravel materials coherent to the standards and specification of MoWT. Availability of such material within the GKMA is limited due to depletion of natural resources and this has resulted in project cost escalation. Most natural soils are of marginal quality not complying with the existing standards and specifications of MoWT. On the other hand, due to rapid industrialization, there exists a challenge of waste accumulation, subsequent problem of disposal and effects of waste to the environment. One of the problematic wastes generated today in the construction industry are baghouse fines. Recycling of such industrial waste in sub base soils of marginal quality was viewed as one of the ideal solutions for its challenges. The main objective of this study was to investigate the efficiency of baghouse fines in improving engineering performance of marginal sub base materials. The study covered GKMA, parts of Mukono and Wakiso districts. Borrow pit materials, material modified (with 10%, 20%, -------, 50% baghouse fines), and CRR modified sub base material optimized with 10%, ---------, 50% baghouse fines were tested. It was found that the borrow pit material studied was Reddish Yellow moist, coarse grained and classified as SC of intermediate plasticity CI. The strength and consistency limits of the borrow pit material, complied with the requirements of G15 based on MoWT specification for Uganda. The effect of baghouse fines on properties of the borrow pit material was also found to be significant. Results showed that the GM reduced, the MDD and corresponding CBR increased up to an optimum value (at 30% baghouse fines) and thereafter reduced while the LL, PL and PI decreased with increase in baghouse proportions. This implied that baghouse fines offered a potential for modification of the gravel material. It was also established that the baghouse fines were efficient in optimizing the CRR modified sub base material. An optimum value of 20% baghouse fines caused a 20% reduction in CRR which led to a 26% and 9% reduction in cost of CRR modified sub base layer for haulage distances of baghouse fines within 20Km and 130Km respectively.	Optimum Moisture Content, Plastic Limit, Slag Bound Mixture, Unconfined Compressive Strength,	Greater Kampala Metropolitan area, parts of Mukono and Wakiso districts with major emphasis in Kiira town council. The study was limited to sub-base materials. The study on the material included laboratory tests on the neat borrow pit samples, test on existing mechanically modified material with crushed run rock (CRR) and modifying the neat borrow pit materials with baghouse fines to evaluate its influence on the engineering performance of sub-base layers. The study also considered the economic viability of baghouse fines in optimizing the designed CRR modified sub-base materials with Namanve Project as a case study.	Materials	Subbase	Platform	K24
25	Kyambogo University	Ekou David Ekanya	2015	ASSESSMENT OF THE IMPACT OF PROJECT MANAGEMENT ON CONSTRUCTION COST ESCALATIONS AND SCHEDULE OVERRUNS IN UGANDA	Library Department of Civil and Building Engineering	The Construction Industry globally faces a wide range of challenges, one of which is the frequent occurrence of cost escalations together with schedule overruns on construction projects. This paper presents results of a research that concentrated on assessing the impact that project management can have on cost escalation and schedule overruns on construction projects in Kampala Uganda. KAMPALA Location: Kampala District is situated in the heart of Kampala. It is bordered by Mukono District in the East and Wakiso to the south, north and west. Population: the district has a total human population of close to 1.2 million. Kampala is a modernized city and the capital of Uganda covering an expanse of 197 sq. kilometres comprising of land and vegetation with 8.6% of it open water, 0.04% forest and 8.3% wetland. During the last few years cost escalations and schedule overruns have occurred on various construction projects all over Kampala, and the trend still continues to date. This has made the construction industry one of the costly ventures to undertake in Uganda regarding the cost and time aspects, yet there is increasing need for the construction of infrastructure country-wide. In view of this spate of events, the need to assess cost and time overruns on construction projects so as to minimize frequent occurrence was warranted. This research was conducted in the five divisions of Kampala District, and the findings reflect views expressed by several people directly or indirectly involved in the construction process. Major causes of cost and time overruns identified in this research associated with construction projects include inadequate planning and supervision, and use of inappropriate construction techniques. Among the recommendations made for minimizing and/or avoiding frequent occurrence of cost escalations and schedule overruns are; Ø The roles and/or tasks of the different professionals and project teams should be assigned basing on the SMART principle. That is to say, the roles/tasks should be Specific, Measurable, Achievable, Reliable and Time bound. Ø In order to improve upon resource planning, the following is recommended; § Exercise Expert Judgment, § Carry out Alternatives Identification Ø In order to improve upon the project controls, the following are recommended: § Exercise Performance Reporting which includes: ü Performance reviews, ü Variance analysis, etc.	Gross Domestic Product, Growth Fixed Capital Formation, Construction Management Techniques, Procurement of Public Assets and Disposal Authority, Project Management Body Of Knowledge	The stake holders in the construction sector that are based within Kampala	Construction	Other	Platform	K25
26	Kyambogo University	Arinaitwe Baldo Kinigah	2015	GEOMETRIC IMPROVEMENT OF NYENDO-KITOVU-VILLA ROAD INTERSECTION	Library Department of Civil and Building Engineering	Nyendo-Kitovu-Villa road junction is located within the periphery of Masaka town, about 4km from the centre of Masaka town towards Kampala. The junction has two opposite arms of Kitovu and Villa staggered by a distance of 21.70m which is below the minimum of 50m recommended by URGDM. Further to that, the junction has been prone to accidents over the years and Police records indicate an annual average value of 8.75 accidents for the last four years. An objective and comprehensive geometric study of this intersection was carried out with an aim of assessing and carrying out a geometric improvement that would address the issues of poor geometrics and safety. The methodology to achieve the above involved data collection, tools and equipment and procedures, data interpretation and limitations. Major data collected were; topographic data which indicated that the terrain had a slope less than 5% implying that the site have a flat terrain. Classified traffic counts and surveys were also carried out which gave an ADT of 5016 and 2903veh/day on Masaka and Villa arms which are heavily and least trafficked arms respectively and a DV-5 (interstate semi-trailer) was adopted as the design vehicle. The geometry of existing junction was compared with Road Geometric Design Manuals and its parameters were largely found to be faulty, that is inadequate stagger length (21.70m) which is less than 50m. Other faulty geometrics included approach roads carriageway of 4-6m which is less than 7.0m, turning radii of 2.5-7m which is less than 14m and inadequate visibility splays of 24-61m at 20m approach which far less than 110m that is recommended. Consequently, due to the increased volume of traffic on major and minor approach roads, it was required to upgrade and design a roundabout type of control intersection. A design life of 10 years was selected and the roundabout was designed to URGDM with complements from TRL with the following features: a central island radius of 10m, flare length ranging from 44-64m, entry radius of 15m, entry width of 6.5m, exit widths of 5.5m, approach roads carriageway widths of 7.0m, and	Passenger Car Units, Average Daily Traffic, traffic forecasting, roundabouts	Nyendo-Kitovu-Villa Intersection is located within Ssenyange Parish, Nyendo Sub County within Masaka Municipality, along Kampala road, approximately 4km from Masaka town. The coordinates of the junction are N=361975.83, E=9964896.97 and	Operations	Other	Solution / Application	K26

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						one entry and exit lanes because traffic was less than 750veh/day. Finally, the roundabout was designed for a weaving capacity of 2567pcu/hr. and can handle up to 8763, 8262, 6159 and 5103 veh/day on Masaka, Kampala, Kitovu and Villa arms respectively in the design year (2025). However, it was recommended that before the implementation of the project, the following should be done; carrying out of repeatedtraffic counts and analyses, drainage design and carrying out environmental impact assessment.		according to Uganda Bureau of Statistics [6], Nyendo-Ssenyange division has a population of 43,883 inhabitants				
27	Kyambogo University	Echatu Andrew	2014	COST- BENEFIT ANALYSIS ON LOW COST SEAL ROADS (Case Study: Katakwi-Toroma Road in Katakwi District)	Library Department of Civil and Building Engineering	This project focused on the Cost- benefit analysis of a proposed road project on Low cost sealing of Katakwi-Toroma road in Katakwi District. This is a valuable tool for decision making for investment projects. It is most useful because it provides a starting point from which to begin evaluation of a project. The scope of the project has been to carry out the cost- benefit analysis on the proposed low cost sealing of Katakwi-Toroma road in conformity to institutional policy procedure, standards, guidelines and good engineering standards as the ministry of works and transport has accustomed for low volume roads. The methodology involved: Data collection, Carrying out unit rate analysis (URA), Analysis of the options using the appropriate Economic techniques. This approach of Cost-benefit analysis of roads has far reaching impacts to the economic development of the country. The technology choice of using Cost- benefit analysis in the construction process would ensure the viability of the project. In totality government is encouraged to uphold carrying out Cost-benefit analysis as a strategy of making the best decision in coming up with a road investments proposal	Bitumen Distributer Tank, cub.m = cubic meter, Transport Research Laboratory., Vehicle per day	Katakwi District (a case study on Katakwi-Toroma Low cost seal road project).	Management	Surfacing	Solution / Application	K27
28	Kyambogo University	Okia Emmanuel	2014	INVESTIGATING THE CAUSES OF FAILURE OF AN EMBANKMENT AND TO DETERMINE THE REHABILITATION COSTS OF OJAMA VALLEY DAM, OJAMA VILLAGE, SERERE DISTRICT	Library Department of Civil and Building Engineering	This report contains an account of the project research work carried out in Serere District, "To Investigate the causes of failure of an Embankment and Rehabilitation costs of Ojama valley Dam, Ojama Village, Serere District as a reservoir of Water for Livestock." It has been presented in chapters and subsections each of which highlights the information on Institutional, Technical and Audit collected from the field and other desk studies in regard to the establishment of valley Dam "As conservation of water for Livestock Watering''. Chapter one presents a brief introduction and background on the area of study, Points out the problem statement, significance of the study, the Project scope, Main Objective and the specific objectives of this research. Chapter Two is a Literature Review carried out on Dams; more literature has been presented on the Earthen Dam which is the type of construction of valley tanks. Reasons for the choice of this type of dam construction have also been elaborated in this very chapter. Chapter Three presents the Methodology, which is a discussion of the methods that were used in collecting and processing the required information for this research. Chapter Four looks at the presentation of the findings obtained from the field and desk studies, its analysis, and finally the discussion of the results arrived at. The findings have been presented in form of tables, graphs and charts to elaborate the findings. Chapter Five is the final chapter in this report which presents the challenges encountered in carrying out the research; conclusions, recommendations that have been put forward. References and the Appendices contain the sample guiding questionnaires used for data collection, the research time schedule and budget together with some photos taken in the field have also been presented.	Millennium Development Goals, Water for Production, Environmental Impact Assessment, Valley Tank, Operation and Maintenance	Serere District is situated in the Eastern Region of Uganda. It borders Ngora in the East, L. Kyoga in the West, Buyende and Pallisa in the South and South East respectively, Kaberamaido in the North - West and Soroti in the North East. The project is located in the sub counties of Olio, Kyere, and Atiira. In the parishes of Oburin, Asilang and Kangodo. Benefiting the villages such as Obit, Asilang, Olumoi, and odokai, Sapir, Aminit, Ojama, Odungura, Idupa, Omuriakori and Jejel.	Management	Other	Solution / Application	K28
29	Kyambogo University	Kintu Julius	2014	COST COMPARISON OF DIFFERENT WEARING COURSES CONSTRUCTION FOR LOW VOLUME BITUMEN ROADS	Library Department of Civil and Building Engineering	This final year project entitled "Cost comparison of different wearing courses construction for low volume bitumen roads" was undertaken on Busamaga – Bufumbo road in Mbale district as a case study. The study consisted of comparing costs of four low cost seals (LCS), namely; Otta seal, single surface dressing (SSD) with sand capping, premix seal and penetration macadam. This was done by sequentially obtaining the basic cost data on labour, equipment and materials; developing unit rates; estimating cost of each LCS option, by developing Bills of quantities (B.O.Q), and hence the present value of costs; calculation of present value of benefits; and finally obtaining the Net Present Value (NPV) of each LCS option in order to come up with the most cost effective option. The costs of constructing one kilometre using the LCS options were as follows; Otta seal, (UgShs 127, 894, 396), SSD with quarry sand capping (UgShs 129,401,896), premix seal (UgShs 188,185,396) and penetration macadam (UgShs 206,131,396). The cost of maintenance was considered to be the same for all LCS options and hence for comparison purposes it was neglected. The discounted value of benefits was UgShs 127,387,222. Otta seal with NPV at just over UgShs 20.8 million was strongly positive and hence the most economical LCS option. This was followed by SSD with sand capping having NPV at just over UgShs 19.5 million, which was also strongly positive. The other two LCS options; premix seal and penetration macadam, had negative NPVs and hence not economically viable. The study therefore revealed that Otta seal was the most economically viable LCS option. In addition, it is easy to construct compared to SSD with sand capping, and would therefore be recommended as the most cost effective surfacing option for low volume roads.	Bill of Quantities, Discounted Cash Flow, First Year Rate of Return, Litres per Square Meter, Net Present Value, Accident Rate of existing Road, Accident rate of upgraded road, Unit Rate analysis Sheet, Vehicle Equivalent Factor	Busamaga - Bufumbo road in Mbale district.	Management	Surfacing	Solution / Application	K29
30	Kyambogo University	Luvunia Samuel	2014	A FEASIBILITY STUDY TO UPGRADE BUNGA – KAWUKU ROAD FROM A GRAVEL ROAD TO A RIGID CONCRETE PAVEMENT FROM THE BUNGA T – JUNCTION OFF GGABA ROAD	Library Department of Civil and Building Engineering	Bunga – Kawuku road is located in Makindye Division of the Metropolitan Kampala District and links parts of Ggaba, Bunga and Buziga to Muyenga through Kawuku and serves a very big inter-land but unfortunately it is in very bad state. The problems faced on this road are blocked drains due to lack of routine maintenance and poor solid waste disposal in the area. As far as the authorities in these two divisions are concerned plans to upgrade this road are there but not immediate and the only intervention that was carried out on this road is gravelling. The increasing traffic volume and the numerous economic activities taking place along Bunga – Kawuku road present health, safety and economic risk of the population that uses this road and those that reside/work around it. The road is dusty during the dry seasons and muddy during wet season and sometimes impassable. A research was thus carried out with the objective of assessing the road condition, its subgrade strength, the average daily traffic using the road and to come up with a proposal of determining the type of structural design for the road pavement which would reduce dust pollution, environment degradation and improve safety and comfort of road users as well as reducing road user costs. The method used was by conducting a traffic counting exercise to ascertain the traffic volume currently using the road which formed the basis of the design and the DCP tests to determine the in situ CBR and laboratory tests to determine the soil properties of the existing pavement. Literature from relevant books, magazines and lecture notes were reviewed for the purpose of comparing the roads' characteristics and existing information to enable appropriate design. Analysis of the data collected was used to design the pavement layers as solutions to the aforementioned objectives and I came up with the following proposals: The sections from 1 +200 and 2 + 200 have subgrade strength of S6 and sections 1 + 700, 2 + 700, 3 + 200 were found to have subgrade strength of S5.The average	Average daily traffic, Average annual daily traffic, average daily traffic count, natural moisture, joint sealing	Bunga – kawuku road from chainage 0 + 100 to chainage 1+ 100 from the Bunga T – junction off Ggaba road. The climate of the project area is mostly tropical with heavy rainfall and hot sunshine. The terrain around this area is a level terrain. Bunga – Kawuku road is located in Makindye Division about 12 Km	Design	Pavement	Solution / Application	K30

#	ORIGINATING INSTITUTION	AUTHORS	YEAR	TITLE	LOCATION OF DOCUMENT	ABSTRACT	KEYWORDS	GEOGRAPHICAL AREA	FOCUS AREAS	PAVEMENT LAYER FOCUS	TT LEVEL	Google Earth number
						daily classified traffic counts to be projected for 30 years at an annual growth rate of 6.0% resulted into 3891 vehicles which qualify the road to be upgraded to concrete pavement; the pavement thickness is 9 inches (228.6), sub-base thickness is 6 inches laid on an embankment of modulus of subgrade reaction 200pci. Chippings of sizes 14 – 20mm in conjunction with 10 – 14mm will be used.		from Kampala Central. The road breaks off the T – junction at Bunga trading centre off Ggaba road. This road t has been in existence since 1980's. Therefore the Bunga – Kawuku road is one of the District roads being maintained and managed by KCCA under Makindye division of the Kampala Metropolitan district. It is categorized under category C collectors. It is classified under District class II roads (Gravel roads) and located in Makindye division Kampala district having a total length of 8km with a fair gravel surface. It is a minor link between Bunga and Muyenga.				
31	Kyambogo University	Nduhura Nicholus	2014	Up grading of mukono-Katosi road from class C gravel to class III paved road.	Library Department of Civil and Building Engineering	This report consists of a detailed proposed design for upgrading Mukono-Katosi road to a bituminous paved surface which stretches a distance of 74 km from Jinja road to Katosi landing site. The main objective was to a design flexible pavement with respect to the route, geometry, drainage and pavement. This was done by assessing the current traffic using the road, existing geometry, pavement structure and designing an appropriate drainage system. The project road was characterized by sharp small carriage way, undulating surface, which brought about so many delays. Lab and field tests, surveys, consultations, and observations were some of the methods that were used to collect data. From the results obtained, the Average Daily Traffic was 373Vehicles/day; Motorcycles taking up the greatest percentage of traffic (48%), cars taxis (11%), small bus (7%), and 2-axles single rear tyre truck (8%), the subgrade at section 0+250 was found unsuitable having a CBR of 21%. A trapezoidal channel section, culverts were designed to cater for drainage. A double surface dressing was proposed with chippings being sprayed at 10.00kg/m2and 7.502kg/m2 for the first and second layer and binder being sprayed at 1.147kg/m2and 0.889kg/m2 for first and second layer. The ADT showed that the road was due for upgrading considering the Ministry of Works and transports" criterion for upgrading a road with more than 300Vehicles/day.	California Bearing Ratio, Transport Research Laboratory (UK), Average Least Dimension, Equivalent Standard Axle, Granular Base-material type 3, Allowable Headwater depth, Linear Shrinkage, Plasticity Index, Granular Base-material type 3	South west of Mukono town stretching from Jinja road Mukono Wantoni to Katosi landing site .Mukono Town is bordered by Kalagi to the north, Kira Town to the west, Lake Victoria to the south and Lugazi to the east. It lies 27 kilometres east of the central business district of Kampala, Uganda's capital and largest city. The town occupies approximately 31.4 square kilometres (12.1 sq. miles) of land area. The coordinates of the town of Mukono are: 00o 21" 36""N, 32o 45" 00 „"E (Latitude: 0.3600; Longitude: 32.7500).	Design	Pavement	Solution / Application	K31
32	Kyambogo University	Ssenkumba Eddy	2014	DESIGN OF THE BOX CULVERT AT BATA STAGE IN NAMASUBA ALONG KAMPALA – ENTEBBE HIGHWAY	Library Department of Civil and Building Engineering	The prevailing conditions of the existing drainage system were observed and studied and it was found they are blocked and clogged. The project has entirely focused on the different drainage systems and their designs, the contribution of the catchment area towards the flooding of the area, the soil characteristics, materials used in the lining of the drainage system and the their design procedures. Basing on the information obtained the catchment area of the area was also obtained using the topographical map obtained from the water sector in the course of knowing the contributing areas to the storm. The time of concentration was also obtained using the rainfall data obtained from the rainfall totals got from the meteorological Centre Kampala Uganda and this was used to design the drainage facilities in the area. Different books were referred to in design procedures that were used to obtain the different sections of the area as this was as sufficient as a guide for the whole report Bata Bata side drains has a discharge of 3.531 m3/s yet the current discharge is 5.8 m3/s / so this renders the existing side drains inadequate to serve the purpose, these should be replaced with the designed side drains of the following design details .Base width of 1500 mm.	Kilo Newton meter, Geographical Information System, Area of Reduction Factor, Head water, Permissible velocity	Namasuba along Kampala-Entebbe Highway in Wakiso District. Bata-Bata Namasuba is located in Wakiso district along Kampala-Entebbe Highway, in Ndejje Sissa sub county. It is next to Muko Investments and Express Hotel	Design	Other	Solution / Application	K32

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						Effective depth of 1100mm and a working slope of 1 in 56 as illustrated below. The above open drainage facility should discharge off its storm water into a cross drain of depth greater than 1.569 m. So this called for the design of a box culvert of V m, which gives a discharge capacity of /s. In the box culvert 12T16 @ 200 mm c/c should be provided vertically and 24T12 @ 300mm c/c in the midspan.		before Zana round about all these were built in the swampy area.				
33	Kyambogo University	Odong John Paul	2014	IMPROVEMENT OF PERFORMANCE OF KIREKA JUNCTION'.	Library Department of Civil and Building Engineering	The Kireka junction experiences one of the most traffic congestion in Wakiso District as a result of intersection sight distance; radii of turning roadways; intersection layout and fewer number of lanes which has led to traffic cueing and conflicting situations. The immediate areas served by this junction include, Kireka Parish, Bwogerere Parish, Banda Parish and Kinawataka Parish. Currently the traffic at the junction is controlled by a few police officers and traffic wardens. The delays, conflicts and accumulation of exhaust gas fumes to the surrounding areas come with an idea of improving the junction to overcome the problems faced and enhance the easy and quick traffic flow. Satisfactory facts about the current junction situation were from the following sources. • Literature review • Use of Questionnaires • Observations • Carrying out topographical Survey. • Traffic counting and assessing the existing Junction capacity. The findings/results showed that the capacity of the junction has been exceeded more especially at the peak hours and therefore selected for evaluation on its performance and improvement. The proposed improvement of the existing junction is a self- controlling measure that need to be adhered to by the road user for better performance of the junction thus solving the above mentioned problems for the next 15 years.	Annual Average Daily Traffic, Equivalent Standard Axle, Millions of equivalent standard axle, Safe Stopping Distance, Passenger Car Unit,	Kireka Trading Centre along the Kampala - Jinja high way about 600m Eastwards of Banda Junction leading to Kyambogo University in Wakiso district with coordinates E 460875.056, N 38328.901	Operations	Other	Solution / Application	K33
34	Kyambogo University	Musinguzi Kenneth	2014	PROPOSED UPGRADING KASANGATI - KIRA ROAD FROM GRAVEL TO FLEXIBLE PAVEMENT (BITUMEN CLASS III)	Library Department of Civil and Building Engineering	This report herein contains a detailed design of the upgrading of Kasangati –Kira road from unpaved gravel standard to a class III Bituminous standard. The main objective was to design a flexible pavement with respect to geometry, drainage and pavement structural capacity, accompanied by the production of working drawings and bills of Quantities (BOQ). The methodology adapted included; Data collection and classification, Analysis and modelling, Design and simulation, Storage and retrieval and finally publication and Dissemination of the report. One traffic survey station was considered due to lack of financial resources in this report and the Average Daily Traffic (ADT) obtained was1305veh/day .this showed a justification for the upgrading of the road as the traffic volume was away beyond the minimum of 300veh/day as recommended by the MoW&T. This upon projection into the design life of the project road gave to T4 traffic class used in the design of the pavement layers. DCP tests to determine the subgrade strength of the pavement was carried out at different sections /chainages of the road. The results showed, S5, S4, S5, S5 at chainages 0+000,0+500,1+000,1+500 respectively the results further showed that the subgrade at section 0+500 to 1+000 was poor having CBR value less than 15% as recommended by TRL and therefore should be removed and replaced with imported gravel with a CBR greater than 15% at 93% MDD. For section 0+000 to 0+500 and 1+00 to 1+500 with traffic class of T4 and subgrade strength class S5, the pavement structure of 125mm sub-base, 200mm road- base and double surface dressing was adopted from the TRL structural catalogues. And for section 0+500 to 1+000 with traffic class of T4 and subgrade strength S4 the pavement structure of double surface dressing, 200mm road -base and 200mm sub- base was also adopted. The surface dressing will consist of20mm chippings (First seal/layer) sprayed at 16.71kg/m2 and10-14mm chippings (second seal/layer) sprayed at 12.28kg/m2, bonded with penetration grade 80/100 bitumen at spray rates of 1.3kgm2 and0.963kg/m2 for first and second layers respectively. The road is to be upgraded from class A gravel to class III bituminous standard having a cross sectional elements of 2.8m traffic lanes with 2.5% gradient and shoulders of 1.5m with a gradient of4%. Trapezoidal side drains with dimensions of depth 0.352m,breadth 0.400m,freeboard 0.1m,side slopes 1:1.5 is found to be adequate to take up the design discharge.1NO .culverts of diameter 1200mm at chainages 1+000 ,2+250, 3+000 and 3+750 are to be provided.	Number of Average Daily Traffic, California bearing ratio, Growth Factor, Dynamic cone penetrometer, Cumulative Standard Axles, Wear Factor, Design Life	Wakiso district connecting Kira town and Kasangati trading Centre. Kasangati – Kira road is a 4.7km long road spacing from Kasangati trading Centre through the Buwate valley to Kira town council. The road passes through a developing place that is acquiring schools and good residential houses. Like Green hill primary schools and secondary school. Kasangati – Kira road is also often used by heavy trucks ferrying construction materials such as aggregates, gravel, and sand, bricks etc. the road also served as a short cut from Jinja road to Bombo road or Gulu road.	Design	Pavement	Solution / Application	K34
35	Kyambogo University	Echatu Paul	2014	THE CAUSES OF FAILURES OF ROAD PAVEMENTS ALONG THE JINJA-KAMPALA HIGHWAY: A CASE STUDY OF MUKONO-MBALALA SECTION	Library Department of Civil and Building Engineering	This report contains a detailed study of the causes of failures to pavements along the Kampala-Jinja Highway and the case study section is the 5km stretch from Mukono to Mbalala Trading Centre. The main objective of the study was to determine the causes of pavement failures in respect to the traffic, weather, pavement materials, design, construction and maintenance methods and to suggest possible remedies for future use. The methodology adopted included; Data Collection and Classification, Analysis and Discussion of Results, Storage and retrieval and finally Publication and Dissemination of the report. Two traffic survey stations (A and B) were considered in this respect and the Average Daily Traffic (ADTs) obtained from the MoWT Report(2011) indicated Daily Traffic Flow rates of 4,161 vehicles/day and 7,595vehicles/day for the years 2001 and 2008 respectively. This showed a strong justification for the study of the road since it was realized that the traffic volume was far beyond the maximum of 750vehicles/day recommended by the MoW&T (2002). These projections determine the design life of the pavements and the project road at the time of design is classified at T5 traffic classes used in the design of the pavement layers. DCP tests to determine the sub grade strength of the pavement were carried-out at different sections of the road. The results showed two sub grade strength classes, S5 andS4. And for subgrade strength of S4, the pavement structure of 250mm sub-base, 200mm Roadbase and double surface dressing was discovered (TRL structural catalogue).Similarly, shallow drains, flattened camber and defects (pot holes, cracks, depressions, etc.) were discovered within he road carriageway which justified this study.	Annual Average Daily Traffic, Number of average daily traffic, Aggregate Impact Value, Beginning of Vertical Curve, Cumulative Equivalent Standard Axles, Central Material Laboratory, Dynamic Cone Penetration, Granular Capping Layer Material, Millions of equivalent standard axle Liquid Limit	Distance of 5km from Ch.6+000 to Ch.11+000 between Mukono (Colline Hotel) and Mbalala Mosque (Nakisunga) in Mukono District	Management	Pavement	Solution / Application	K35
3	Kyambogo		2014	ENVIRONMENTAL	Library	The study was carried out to predict and assess the potential impacts of the project on the well-being of the natural environment and identify alternatives through	Environmental	Lira District in the	Environment	Other	Solution /	K36

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6	University	Akello Charlotte		IMPACT ASSESSMENT OF A ROAD PROJECT Case study: Nyeko rac road	Department of Civil and Building Engineering	recommending the implementation of appropriate modifications / actions that integrate economic, social and environmental concerns. It was guided by the following objectives: To identify impacts to the biophysical and human environment, To gain public views, concerns and value in regards to the proposed project by consulting communities living in close proximity to the proposed project sites. To determine the significance levels of the identified impacts, To recommend preventive, and mitigation measures for the significant negative impacts of the project on human and biophysical environment. Data was collected by use of a checklist during field visits, and public consultations. Consultations were carried out with relevant authorities and the community within the project area. Evaluation of impacts was based on the following criteria: extent, duration, magnitude, irreversibility, and significance. The baseline conditions include biological environment (flora, fauna) with the predominant plant species being sedges and papyrus (Cyperus papyrus). The area has continental type of climate with convectional rainfall having a bimodal peak. Impact prediction and analysis utilized a project lifecycle approach: identifying and analysing impacts from design, construction, through operation (post-construction) phases. Impact analysis aimed at developing recommendations that maximize benefits and avoid/reduce/minimize adverse environmental and social impacts. Several possible negative impacts of improving the road are not significant, while others will be less severe when recommended mitigation measures are implemented. Some land and structures will be permanently lost during road upgrade; however, the municipal intends to convince the affected people to donate their land. Considerable quantities of gravel, rock and embankment fill material will be required during road upgrade. Borrow pits and quarries might have a variety of impacts including temporary land take, access road requirements, dust and noise as well as operational effects of blasting, haul road traffic, and visual impact Traffic that will be generated by road construction will be significant, particularly close to borrow areas. This will give rise to increased noise and dust nuisance and possibly increased road accident risk, especially through settlements and trading centres. Women, children and elderly people will particularly be at risk to construction traffic accidents. In addition, without proper control, construction vehicles may destroy crops while travelling off road to borrow areas. Compared to socio-economic benefits of the road project, many of the negative impacts will be insignificant as long as fair compensation and mitigation actions are implemented.	Impact Assessment, Environmental and Social Impact Assessment, National Environment Statute, Second hand smoke, Bill Of Quantities	northern part of Uganda. This project commences at the Cecilia Ogwal road, passing through Bar Ogero and Cathedral villages and finally joining Independent road.			Application	
37	Kyambogo University	Kajumba Edward	2015	DETERMINATION OF PLASTICITY INDEX OF SOILS USING ELECTRICAL RESISTIVITY	Library Department of Civil and Building Engineering	In order to establish the empirical equations relating soil resistance with geotechnical parameters for engineering site characterization geotechnical tests such as atterberg limit tests were conducted on disturbed samples obtained at different clay soils. The soils mainly in the study include silt clays from different areas including Kyambogo campus west end, clays from Kajjansi and Kisubi-Kawuku Entebbe road Wakiso district. This report includes laboratory methods of determining of plastic limit, liquid limit and plasticity index, after soil classification process. Attention was drawn to further relating of electrical resistance of the soil to plasticity index of the soil as an alternative to geotechnical methods of determining the engineering properties of soil. Atterberg limit test were conducted on disturbed samples in the laboratory. The geo-electrical and geotechnical parameters were subsequently correlated	Liquid Limit, Plastic Limit, Plasticity Index	Kyambogo University premises, in particular west end grounds	Materials	Gravel	Platform	K37
38	Kyambogo University	Kigozi Timothy	2014	STUDY OF ENGINEERING PROPERTIES OF GRAVEL FROM DIFFERENT SOURCES FOR ROAD CONSTRUCTION AND THEIR EFFECT ON BLENDABILITY	Library Department of Civil and Building Engineering	The study is aimed at preliminary study of the engineering characteristics of gravel sources in Masaka district for road construction and the effect of blending on the properties. A literature review in soil and its characteristics, the different types of stabilization as done. Laboratory tests were carried out in four selected gravel sources in Masaka district that is Katwadde, Kiwaala, Kako and Lugya borrow pits. Tests that were carried out on the neat soil samples revealed that not all gravel sources have the gravel that meets the engineering specifications hence the need for blending on their properties in this case stabilisation. According to the test results on the blended samples, it was realized that there was a considerable reduction in the plasticity and an increase in the California bearing ratio (CBR) The various tests carried on the neat soil samples, the blended samples and the right types of stabilisers have been shown in this report.	Plasticity Index, Plastic Limit, California Bearing Ratio, Liquid Limit, Transport Road Research Laboratory	four selected gravel sources in Masaka district that is Katwadde, Kiwaala, Kako and Lugya borrow pits.	Materials	Gravel	Platform	K38
39	Kyambogo University	Tibenderana Isaac	2014	FEASIBILITY STUDY FOR THE IMPROVEMENT OF SSEBOWA ROAD A CASE STUDY OF SECTION(Km 0+000 to 1+000)	Library Department of Civil and Building Engineering	This report consists of a detailed feasibility study for upgrading Ssebowa road and a proposed design. The main objective was to Cary out an empirical study that will establish the most suitable improvement of the road with respect to the route, geometry, drainage and pavement. This was done by assessing the current traffic using the road, existing geometry, pavement structure and designing an appropriate drainage system. Laboratory and field tests, surveys, consultations, and observations were some of the methods that were used to collect data. From the results obtained, the Average Daily Traffic was 317.57 Vehicles/day, Motorcycles taking up the greatest percentage of traffic (49%), the sub-grade was found unsuitable having a CBR of 19%, and most of the curves were substandard having a radius of less than 100m. A trapezoidal channel section, culverts were designed to cater for drainage. A double surface dressing has been proposed with chippings being sprayed at 13.367kg/m2 and 9.548kg/m2 for the first and second layer and binder being sprayed at 1.229kg/m2 and 0.949kg/m2 for first and second layer. The ADT showed that the road was due for upgrading considering the Ministry of Works and transports' criterion for upgrading a road in an urban setting with more than 300Vehicles/day. Realignment has been proposed with curves having a minimum radius of 100m, continuous maintenance of the drains is necessary so as to prevent silting. Quality control should be ensured for materials in accordance with the specifications as stipulated.	California Bearing Ratio, Average Annual Daily Traffic, Equivalent Standard Axles, Cumulative Design Traffic, Social Impact Assessment, Gross Domestic Product, Mean Annual Precipitation	The Ssebowa road is located in Nakawa division at the boarder of Kiwatule. Kiwatule is a township within the city of Kampala, Uganda's capital in the Central Region. Kiwatule is boarded be Najjera to the north, Naalya to the east, Banda to the south, Ntinda to the southwest, Kigoowa to the west and Kulambiro to the northwest (Wikipedia). Kiwatule is mainly a middle class residential neighbourhood with growing commercial outfits. The northern bypass passes through it, from Naalya towards Kulambiro and Kigoowa. It is divided into three zones; Balituma, Sebowa and Kazinga. The location is approximately 12 kilometres (7.5 mi) by road northeast of Kampala's central business district. The	Design	Pavement	Solution / Application	K39

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								coordinates of Kiwatule are: 00021'56"N, 32037'30"E (Latitude: 0.3655; Longitude: 32.6250).				
40	Kyambogo University	Arinaitwe Baldo Kinigah	2015	GEOMETRIC IMPROVEMENT OF NYENDO-KITOVU-VILLA ROAD INTERSECTION	Library Department of Civil and Building Engineering	Nyendo-Kitovu-Villa road junction is located within the periphery of Masaka town, about 4km from the centre of Masaka town towards Kampala. The junction has two opposite arms of Kitovu and Villa staggered by a distance of 21.70m which is below the minimum of 50m recommended by URGDM. Further to that, the junction has been prone to accidents over the years and Police records indicate an annual average value of 8.75 accidents for the last four years. An objective and comprehensive geometric study of this intersection was carried out with an aim of assessing and carrying out a geometric improvement that would address the issues of poor geometrics and safety. The methodology to achieve the above involved data collection, tools and equipment and procedures, data interpretation and limitations. Major data collected were; topographic data which indicated that the terrain had a slope less than 5% implying that the site have a flat terrain. Classified traffic counts and surveys were also carried out which gave an ADT of 5016 and 2903veh/day on Masaka and Villa arms which are heavily and least trafficked arms respectively and a DV-5 (interstate semi-trailer) was adopted as the design vehicle. The geometry of existing junction was compared with Road Geometric Design Manuals and its parameters were largely found to be faulty, that is inadequate stagger length (21.70m) which is less than 50m. Other faulty geometrics included approach roads carriageway of 4-6m which is less than 7.0m, turning radii of 2.5-7m which is less than 14m and inadequate visibility splays of 24-61m at 20m approach which far less than 110m that is recommended. Consequently, due to the increased volume of traffic on major and minor approach roads, it was required to upgrade and design a roundabout type of control intersection. A design life of 10 years was selected and the roundabout was designed to URGDM with complements from TRL with the following features: a central island radius of 10m, flare length ranging from 44-64m, entry radius of 15m, entry width of 6.5m, exit widths of 5.5m, approach roads carriageway widths of 7.0m, and one entry and exit lanes because traffic was less than 750veh/day. Finally, the roundabout was designed for a weaving capacity of 2567pcu/hr. and can handle up to 8763, 8262, 6159 and 5103 veh/day on Masaka, Kampala, Kitovu and Villa arms respectively in the design year (2025). However, it was recommended that before the implementation of the project, the following should be done; carrying out of repeated traffic counts and analyses, drainage design and carrying out environmental impact assessment.	Annual Average Daily Traffic, Average Daily Traffic, Department of Transport, Passenger Car Units, Transport Research Laboratory, Uganda Road Geometric Design Manual	Nyendo-Kitovu-Villa Intersection is located within Ssenyange Parish, Nyendo Sub County within Masaka Municipality, along Kampala road, approximately 4km from Masaka town. The coordinates of the junction are N=361975.83, E=9964896.97 and according to Uganda Bureau of Statistics [6], Nyendo-Ssenyange division has a population of 43,883 inhabitants.	Operations	Other	Solution / Application	K40
41	Kyambogo University	Otai Emmanuel	2015	GEOMETRICAL IMPROVEMENT OF STATION ROAD (Soroti Municipality) (Case Study Km 0+000 - Km 1+000)	Library Department of Civil and Building Engineering	Station road is located in Soroti Municipality, connecting Central and Western Divisions with the Municipality. The problems faced on this road are increasing accidents rates due to sharp Geometrically safe, efficient curves and damaged shoulders. The projected increase in traffic volume due to the numerous economic activities taking place along the Station road, presents safety risk to the population that uses this road. A research was thus carried out with the objective of assessing the road condition, topographic surveys, and the average daily traffic using the road and to come up with a and comfortable design while ensuring little environmental Impact. The method used was by conducting Manual Traffic Counts to ascertain the traffic volume currently using the road and Topographical surveys which formed the basis of design. Literature from relevant books, magazines and lecture notes were reviewed for the purpose of comparing the roads" characteristics and existing information to enable appropriate design. Analysis of the data collected was used to carry of the Geometric design as solutions to the aforementioned objectives, thus giving the following proposals: Curves with a radius of 110m were introduced as opposed to the existing ones with radii of 86, 68 and 78m. The two consecutive curves 0+600 – 0+860 were replaced by one large radius (110m) curve thus resulting into the realignment of the above section. 0.9m curve widening was applied to the inside of both curves. The average daily classified traffic counts were projected for 15years at an annual growth rate of 6.5% resulting into 3536 vehicles.	Annual Average Daily Traffic, Design Vehicle, Full Overtaking Sight Distance, Stopping Sight Distance, End of Vertical Curve Elevation, Beginning of Vertical Curve Station, Spiral to Tangent, Radius of Vertical Curve, Point of Vertical Intersection	Eastern part of Uganda and is presently paved. The terrain through which the road passes is flat with gentle gradients and sharp horizontal curves at three locations along the route. It forms part of the National Road that links Soroti Municipality to the Station road	Operations	Other	Solution / Application	K41
42	Kyambogo University	Wantono Francis	2015	AN INVESTIGATION INTO THE USE OF RICE HUSK ASH AS A PARTIAL REPLACEMENT FOR CEMENT IN MORTAR AND CONCRETE	Library Department of Civil and Building Engineering	Pallisa, Namutumba, and Budaka districts in Eastern Uganda produce rice on a large scale leading to an increase in production of rice husks which are residue obtained from milling the rice. The only disposal method available for these husks is uncontrolled burning which leaves huge hips of ash around rice milling machines and residential areas. The content of this project therefore focused on the possibility of using RHA as a supplementary cementitious material in the production of concrete and mortar. This work further investigated the variation of OPC – RHA composites strength with percentage of RHA. Class 25 concrete with a specified strength of 25N/mm2 (BS 8110, 1997) was used and a ratio of 1:4 from EC6 Table NA2 for strength class M4 and mortar designation iii (4N/mm2) was used for mortar. M4 and mortar designation iii (4N/mm2) was used for mortar. Sixty four (64) concrete cubes and thirty six (36) mortar cubes were produced at percentages of OPC replacement with RHA of 0% (control), 5%, 10%, 15%, 20%, 25% and 30% for concrete and 0% (control), 10%, 20%, 30%, 40% and 50% for mortar. The concrete cubes were crushed to obtain their compressive strength at 7, 14 and 28 days while the mortar cubes were crushed to obtain their compressive strength at 14 and 28 days. The results of the compressive strength of concrete cubes showed that the compressive strengths reduced as the percentage of RHA increased. At 5% addition of RHA, there was a reduction in strength by 7%, 17% reduction at 10% addition of RHA, 26% reduction at 15% and 20% addition of RHA, 37% reduction at 25% addition of RHA and 44% reduction at 30%. However, At all the cement replacement levels with Rice husk ash, there was a gradual increase in compressive strength from 7 days to 14 days and a significant increase in compressive strength from 14 days to 28 days compared to the control concrete. The results therefore showed that RHA addition tends to retard the initial setting time and accelerate the final setting time of concrete and that with good quality control of combustion of Rice Husks, 5% - 20% replacement with RHA could be suitable for reinforced concrete works with heavy weight aggregates while 25% - 30% could be suitable for minor works in concrete (plain concrete) like blinding and for reinforced concrete works with light weight aggregates. In mortar, the results of the compressive strength of the cubes showed that the compressive strengths reduced as the percentage of RHA increased. However like in concrete, the increment in strength was higher in mortar cubes containing RHA compared to the control cubes. From the results obtained after crushing mortar cubes, up to 50% replacement of cement with RHA could be suitable for mortar works since the strength obtained was greater than 2N/mm2 which is the minimum strength set by EC6 for mortar designation iv. From the research it was recommended that durability studies be carried out on RHA concrete and mortar to obtain the strength at 56 and 90 days and further studies be carried out to gather more facts about the suitability of partial replacement of OPC with RHA in concrete.	Rice Husk Ash, Rice Husks, Ordinary Portland Cement, Rice Straw Ash, Silica Fume, Ground Granulated Blast Furnace Slag	Districts of Pallisa, Kibuku, Namutumba, and Budaka all in Eastern Uganda.	Materials	Non-road	Platform	K42
43	Kyambogo University	Awoii Ahmad Okwir	2014	FEASIBILITY STUDY FOR IMPROVEMENT OF SEETA-NAKIYANJA ROAD IN MUKONO MUNICIPALITY FROM CLASS A GRAVEL ROAD TO CLASS 11 BITUMINOUS PAVED SURFACE Section 4+200 -	Library Department of Civil and Building Engineering	Road transport is now the dominant form of transport throughout the world. Most economies rely heavily on road transport for passenger and freight movement. In response to that need countries have expanded their road networks considerably by constructing new, upgrading or rehabilitating existing roads. All roads paved or gravel will experience defects at some point in their design life. Seeta - Nakiyanja road is an alternative route from Mukono through Namogongo, Kireka in Kira Town Council to Kampala, or Naalya to Northern Bypass. However its performance is characterised by too much dust in the dry seasons, potholes, Poor drainage and slippery surface during heavy rains there by making Traffic move with a lot of difficulties. The main objective of this project is to carryout feasibility study to improve the existing gravel road to a paved surface considering current and projected traffic, geometry, drainage and environment for safe, economical and environmentally compatible movements of Traffic. In order to achieve the main objective the following tasks have to be carried: Carry out road profile survey, Drainage (hydrology study, hydraulic design, design of drainage structures): Pavement design (estimating traffic, measurement of sub grade strength, selection of pavement materials and layer thicknesses): Environment Impact Assessment. The project was limited to Drainage design, Geometry and Pavement design accompanied with an Environmental Impact Assessment. The methodology used included:	Average Daily Traffic, Vehicle operating costs, Stopping sight distance, Uganda Road Design manual, Nebraska Department of roads	Mukono Municipality	Design	Pavement	Solution / Application	K43

#	ORIGINATING INSTITUTION	AUTHORS	YEAR	TITLE	LOCATION OF DOCUMENT	ABSTRACT	KEYWORDS	GEOGRAPHICAL AREA	FOCUS AREAS	PAVEMENT LAYER FOCUS	TT LEVEL	Google Earth number
				6+240		data collection and classification (laboratory tests), manual traffic counts, surveys reviews and consultation); design and simulation (design was done by use of standards such as TRL, URDM, AASHTO); analysis which was carried out using Auto CAD land development, Programmable calculators, tables and charts. The findings were: An ADT of 579 Veh/hour which gave a traffic class of T5. Sub grade strength class of S6 was found between chainage 4+200 to 5+950 and S3 between chainage 5+950 to 6+240. From chainage 4+200 to 5+950, the road base is 225mm thick without sub base, Granular material will be used. From chainage 5+950 to 6+240, the road base is 150mm thick and the sub base is 225mm thick and capping layer of 150mm thick. Granular material will be used for both the road base, sub base and capping layer. The surfacing will be of a double surface dressing. The road will be upgraded from gravel class A to class II bituminous road. A longitudinal side drain of 300mm base width, 300mm depth, 100mm free board and 1:1.5 side slopes was found to be adequate. Six number barrels of 1500mm diameter culverts were adopted in the design. It is recommended that studies on cost benefit analysis should be carried out and further studies on environmental impact assessment done.						
44	Kyambogo University	Opio Albert	2015	EVALUATING THE OPERATIONAL CAPACITY AND LEVEL OF SERVICE OF URBAN COLLECTOR ROADS (Case study: Kiwatule-Banda-Kyambogo Road)	Library Department of Civil and Building Engineering	The main purpose of this research was to investigate the operational capacity and level of service of urban collector roads, case study on a section of Kiwatule-Banda-Kyambogo road The research data were collected through topographic survey and manual traffic count. The topographic survey collected data on as built levels, carriage way width, shoulder width, and other cross sectional and longitudinal parameters. Manual traffic count collected data on hourly traffic variation and quarter hour traffic volume for all classes of vehicle using the facility. The manual traffic count was employed for a duration of one week to study the variation in the traffic pattern, from which the data was used to gauge the peak travel hours, and later used to collect data for peak 15-minutes traffic volume. This data was then analysed in two ways as follows:- The topographic data was used then determine the slope between different longitudinal sections (chainage) which was then used to determine the average slope of the road. This average slope was then used in determination of the method of analysis for the road capacity/level of service. The traffic data was used to study the traffic pattern (daily traffic variation and hourly traffic variation) and then later used in conjunction with the topographic data to determine the capacity and level of service of the road. Based on the findings, it was observed that there is a significant variation in the hourly traffic volume, with peak traffic observe in the morning and evening peak hour, and low traffic volume are always recorded in the off peak hours It was also further observed that the road is operating at level of service C and below its capacity. It was also estimated that the road will continue operating below its capacity for the next ten years. However, its level of service will keep decreasing up to LOS F after 10years	Passenger car equivalent for trucks, Average Daily Traffic, Average Travel Speed, Height of collimation, demand volume for entire peak car, Vehicle Classification, Vehicle Miles Travel	Kiwatule-Banda-Kyambogo road as shown in the figure below. The findings of these research can be used in other roads provided that a clear relationship can be established between topography, and traffic flow between the roads	Operations	Pavement	Solution / Application	K44
45	Kyambogo University	Kirabo Isaac	2014	DESIGN OF FLYOVER AT BWEYOGERERE JUNCTION	Library Department of Civil and Building Engineering	The report presents the Structural Design Project that was done by me a fourth year students of Bachelor of Engineering in Civil and Building Engineering at Kyambogo University The project was titled —structural design of a flyover at Bweyogerere junction. The report comprises of eight chapters according to the order in which the tasks were carried out. Chapter one is an introductory chapter containing the Background, Problem statement, Aim, Specific objectives and Scope of the project. Chapter two is the Literature Review, where existing information concerning the type of the structure, the design philosophy and safety measures are reviewed. A number of Literatures were consulted as Referenced. Chapter three covers Methodology. Here the steps taken to achieve the desired aim and objectives have been included. It covers the Topographic Survey, the soil Investigations, Loading computations, Choice of materials and Structural analysis. Chapter four covers analysis and design of slabs. Chapter six covers analysis and design of girders Chapter seven is about the column design. Chapter eight deals with the design of foundations and abutment After the above mentioned chapters, the Challenges, Conclusion and recommendations follow. At the end of the report, references and appendices are listed.	Cross-sectional area of tension/compression reinforcement, Cross-sectional area of shear reinforcement in the form of Links, Area of tension/compression reinforcement required, Carry over, Characteristic strength of Concrete, Second moment of area, Characteristic imposed load, Characteristic wind load, Reduction factor	Jinja-Kampala road and is located in Bweyogerere. The coordinates of the town are 00o 22o 01oN, 32o 40o 01E (Latitude:0.3670; Longitude:32.6670)	Design	Other	Solution / Application	K45
46	Kyambogo University	Kaggwa Asuman	2014	ANALYSIS OF RISKS ASSOCIATED WITH ROAD USERS ALONG KAMPALA-ENTEBBE HIGHWAY	Library Department of Civil and Building Engineering	The growing concern for safety regulation enforcement is attributed to the increasing carnage of road injuries and deaths from road accidents in Uganda. With bad driver behaviours accounting for 80% to 95% road crashes, this research will carry out an in depth insight of the road safety a long Kampala-Entebbe highway. A systematic review and data-analysis of studies that have assessed the risk of accident associated with the road users when driving is presented. The data analysis included aspects of hazardous events, traffic flow pattern of the road and risk assessment of highway. For most of the hazardous events, small, moderate or big increases in accident risk associated with road users were found and according to SEMCOG 1997, the risk index (RI) is categorized as LOW (RI ≤ 3), MEDIUM (3 ≤ RI ≤ 6) and HIGH (RI > 6) to whether the risk index is close to 9.5, 3.5 or 1 respectively. Information about the number of pedestrian crossings, speed zones, major junctions, pedestrian hot spots and black spots are presented. Most studies that have evaluated road risk assessment confirm that risk is product of the likelihood of a hazard and severity levels associated with hazard occurrence. High speed overtaking in opposing direction, overtaking in the subject vehicle direction, motorcycles crossing the road in front of the subject vehicle, vehicles merging/crossing from access roads and parked vehicles close to the lane in travel direction tends to have a larger effect on the risk of fatal and serious injury accidents than on the risk of less serious accidents (usually minor injury and property-damage-only accidents). The quality of the studies that have assessed road risk accidents varied greatly. There was a tendency for the estimated effects of road risks accidents to be smaller in the well-controlled section than in poorly controlled section of the road.	Risk assessment process, elevation and speed process, accident distribution, nature of road traffic	Kampala-Entebbe high way	Road safety	Other	Solution / Application	K46
47	Kyambogo University	Ssenkumba Eddy	2014	DESIGN OF THE BOX CULVERT AT BATA BATA STAGE IN NAMASUBA ALONG KAMPALA – ENTEBBE HIGHWAY	Library Department of Civil and Building Engineering	The prevailing conditions of the existing drainage system were observed and studied and it was found they are blocked and clogged. The project has entirely focused on the different drainage systems and their designs, the contribution of the catchment area towards the flooding of the area, the soil characteristics, materials used in the lining of the drainage system and the their design procedures. Basing on the information obtained the catchment area of the area was also obtained using the topographical map obtained from the water sector in the course of knowing the contributing areas to the storm. The time of concentration was also obtained using the rainfall data obtained from the rainfall totals got from the meteorological Centre Kampala Uganda and this was used to design the drainage facilities in the area. Different books were referred to in design procedures that were used to obtain the different sections of the area as this was as sufficient as a guide for the whole report	Geographical Information System, Time of concentration, Land Coefficient, Head water, Permissible velocity, Discharge	Namasuba along Kampala-Entebbe Highway in Wakiso District	Design	Other	Solution / Application	K47

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						Bata Bata side drains has a discharge of 3.531 m3/s yet the current discharge is 5.8 m3/s / so this renders the existing side drains inadequate to serve the purpose, these should be replaced with the designed side drains of the following design details. Base width of 1500 mm. Effective depth of 1100mm and a working slope of 1 in 56 as illustrated below. The above open drainage facility should discharge off its storm water into a cross drain of depth greater than1.569 m. So this called for the design of a box culvert of V m, that gives a discharge capacity of /s.In the box culvert 12T16 @ 200 mm c/c should be provided vertically and 24T12 @ 300mm c/c in the midspan.						
48	Kyambogo University	Mukabya Robert	2014	FEASIBILITY STUDY TO DECONGEST NAKAWA-NTINDA JUNCTION (CASE STUDY: SPEAR MOTORS	Library Department of Civil and Building Engineering	The project is a feasibility study on how to decongest the Nakawa-Ntinda junction along Kampala-Jinja road and This report examines the management of Traffic at Nakawa – Ntinda junction commonly known as the Spear Motors junction as one of the most effective junctions across the GKMA. The objective of this project was to contribute to the road infrastructure rehabilitation challenge in Uganda by identifying suitable solution to the holdups due to the heavy traffic using the junction above. The research investigated and classified the Traffic using the junction, The growth of vehicle ownership, use, together with a rise in population in Kampala city has resulted into jams at intersections particularly at the project area. This section of the road experiences severe jams during peak hours with long queue build ups, it was therefore necessary to find a solution to this problem. A survey was carried out at the intersections to establish the existing layout and condition of the intersections. Traffic counts were carried out at the intersections for two working days to determine the peak day, peak hour and the traffic demand. The demand was then compared with the capacity of the intersections. It was established that Jinja road was operating as the Critical lane, followed by Kampala road. It was therefore necessary to propose improvements in traffic flow at the intersections. Among the proposals, is upgrading the control type to signal other than using the traffic police which are inefficient. This report presents the details of the above process.	Annual Average Daily Traffic, Average Least Dimension, Equivalent Standard Axle, Graphical Information Systems, Kampala Urban Transportation plan, Overseas Road Note, Highway Capacity Manual, Vehicles per hour, Peak Hour Factor, Environmental Impact Assessment, Transport Research Laboratory, Passenger Car Units	Nakawa-Ntinda junction (spear motors) along Jinja road with emphasis on un necessary delays due to traffic hold ups	Operations	Other	Solution / Application	K48
49	Kyambogo University	Sseggujja Stephen	2014	INVESTIGATING THE USE OF BLAST FURNACE SLAG AS PARTIAL REPLACEMENT OF CEMENT IN CONCRETE	Library Department of Civil and Building Engineering	This research investigates the use of blast furnace slag (BFS) as partial replacement of cement in concrete, in order to reduce environmental problems due to manufacturing of cement and waste disposal. Portland cement, is a very expensive construction material and constitutes a substantial part of the total construction cost of any project and the situation has further been aggravated by the energy crisis, which has further increased the cost of production of cement. Therefore, it is currently important for the country to explore and develop cementing materials cheaper than cement. Due to growing environmental awareness, as well as stricter regulations on managing industrial waste, the world is increasingly turning to researching properties of industrial waste and finding solutions on using its valuable components so that those might be used as secondary raw material in other industrial branches. Although iron and steel slag is still today considered waste and is categorized in industrial waste catalogues in most countries in the world, it is most definitely not waste, neither by its physical and chemical properties nor according to data on its use as valuable material for different purposes. In this research, blast furnace Slag (BFS) was collected from Roofing's steel manufacturing plant in Namanve and Tembo industries Iganga and pulverized to a very fine degree from Entebbe geological Centre. Physical properties and chemical composition of blast furnace slag were investigated and comparison was made with the relevant standards. The concrete class that was used in the study was C25 with a mix ratio of 1:2:4 and a constant water cement ratio of 0.58. For fresh concrete, only workability was tested. Ninety nine (99) cubes were cast from Kyambogo materials laboratory using the hand method with BFS percentage replacements of 0% (control), 10%, 20%, 30%, 40%, 50%, and 60% for the slag from Roofing's and 10%, 20%, 30% and 40% for the slag from Tembo industries. The cubes were cured for 7, 14 and 28 days after which the compressive strength for the hardened concrete was tested from Kireka central materials laboratory. From the test results, it was observed that for both slags the workability of fresh concrete increased as the percentage of slag was increased. It was also observed that strength increases with the increase of slag (slag from Tembo industries) up to an optimum value of 20%, beyond which, strength values start decreasing with further addition of slag. For the slag from roofing's, the strength was decreasing with increased addition of slag. From the research, it was concluded that slag is not good for partial replacement of cement in concrete but further research was recommended on the use of BFS in concrete	Ground Granulated Blast Furnace Slag, Ordinary Portland cement, Air-cooled blast furnace slag, Alkali-Aggregate Reaction, Flame atomic absorption spectrometry, Alkali-silica reaction	blast furnace slag from steel industries in Kampala, Namanve and Iganga.	Materials	Non-road	Platform	K49
50	Kyambogo University	Isabirye Arnold	2015	SELECTION OF THE PAVEMENT TYPE USING THE WHOLE LIFE CYCLE COST ANALYSIS	Library Department of Civil and Building Engineering	Many countries are seeking ways to more efficiently manage budgets and improve roadway performance. While there are many pavement types available, the most common alternatives have historically been asphalt and concrete pavements. The recently released mechanistic empirical pavement design guide pavement design procedure and associated software application has provided pavement designers with a very comprehensive procedure to develop specific pavement designs that will suite the purpose of the agency while minimizing costs. More robust design inputs have led to improvements in the design of both asphalt and concrete pavements based on long term pavement performance. Pavement type selection is one of the more challenging engineering decisions facing roadway administrators. The process outlined in this report includes a variety of engineering factors such as materials and structural performance which must be weighed against the initial and life-cycle costs, as well as, sustainable benefits. The technical part of the evaluation includes an analysis of pavement lifecycle strategies including initial and future costs for construction and maintenance activities	Hot Mild Asphalt, Life Cycle Cost Analysis, Net Present Value, Uniformly Distributed load, Whole Life Cycle Cost.	1km of each of the two pavements (Rigid pavement and flexible) in terms of evaluating the overall costs during their designed life. For the rigid pavements I considered the Moyo road and the Kampala road was considered for the flexible pavements.	Management	Other	Platform	K50
51	Kyambogo University	Nyuma Charles Lwanga	2014	UPGRADING OF NKUMBA- KASENYI ROAD TO A FLEXIBLE BITUMINOUS STANDARD	Library Department of Civil and Building Engineering	This project aims at carrying out Geometric, Pavement and Drainage design in order to provide a road which is safe, economical, efficient and environmentally friendly. Data for the project was collected by survey, document reviews, group discussion, laboratory tests and were classified as qualitative and quantitative data. Conceptual, logical and physical modelling design was used for modelling and analysis was done using Microsoft office. Computer hard disk and external storage devices were used for storage and retrieval was done by using portable storage devices like flash disks. The project came out with the following findings:-	Subgrade Strength Class, Average Least Dimension, Traffic Class, Liquid Limit,	section of 1KM from Kasenyi stage off the Entebbe highway but within Nkumba, geometric, pavement and drainage design	Design	Pavement	Solution / Application	K51

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						ADT for the project road is 4141pcu/d with over 80% of the traffic composed of two- wheelers. The design adequately catered for this traffic category by providing a 1.5m wide cycle lane in both directions. The road is a class C gravel category B. It's to be upgraded to class II Bitumen of category B. Road way adopted was 9.0m carriageway width of 6.0m, reserve width of 30m and camber of 2.5%, maximum capacity of 518pcu/h, maximum design speed of 80km/hr and the existing alignment is maintained. The pavement was designed to last 15years, the surfacing was made of double surface dressing, and 200mm thick Granular road base GB1-GB3 was used for the whole road, 125mm and 275mm thick Granular sub base GS for chainage 0+500 to 1+000 and 1+000 to 1+500 respectively. Naturally occurring granular gravel was used for road base, sub base and subgrade fill from Nkumba Bukolwa. 80/100 pen grade Bitumen was use as binder from Kenya oils, 14/10mm aggregate from Kasenyi site was used. At chainage 0+250, which floods due to heavy down pours, one line of 1200mm concrete culvert pipes were provided across the road and the side drains had a base width of 0.32m, total depth of 0.46m including 100mm freeboard, side slope of 1 in2, bed slope of 1 in 9 and top width of 1.76m	Moisture Content, Passenger Car Unit, Plastic Limit, Aggregate Impact Value, Aggregate Crushing Value	shall only be considered for this project. The project design is to run from August 2013 to May 2014.				
52	Kyambogo University	Odoki francis	2014	ANALYSIS OF CONSTRUCTION SITE ACCIDENTS AND THEIR PREVENTION MEASURES IN KAMPALA DISTRICT	Library Department of Civil and Building Engineering	This report is a summation of the project work carried out on the assessment of Safety and welfare of workers at the construction site. Activities carried out included physical assessment and asking questions from all teams involved in construction works in Kampala (Uganda). Uganda has experienced a high economic growth of over 8% p.a as result of liberalization of the economy. This has positively impacted the construction industry which has growth at an industry has greatly influenced the gross national product and directly provided employment to many Ugandans. However ,the construction industry has the most hazardous industry in this country and the world over by presenting more accidents, injuries ,ill health and occupational diseases than any other industry .examples of the widely published common accidents include collapsing of structures , caving in of excavation ,falls from heights, machine hazards ,electrocution ,moving vehicles at the points, dropping objects striking workers etc. This research reveals that these hazards emanate from poor safety culture due to lack of awareness of safety requirements, inadequate site management, poor supervision and land inspection, insufficient soil investigation, use of incompetent personnel ,use of faulty designs, poor material for construction, weakness in legislation and enforcement organs. The occupational accidents, diseases and illness in building construction sites can be more effectively mitigated by matching the technological advancement in the industry with re-engineering of OSH strategies and ideas and by using proactive approaches that focus on OSH comprehensive programs other than merely on giving employer directives that on dissemination of information on safety to the workers and public through awareness campaigns, safety education and training in addition to provision of adequate site management, supervision and inspections.	Growth domestic products, Gross national product. Occupational safety and health.	Kampala and around city area	Road safety	Other	Solution / Application	K52
53	Kyambogo University	Namutebi Lillian	2015	EVALUATING THE OPERATIONAL CAPACITY AND LEVEL OF SERVICE OF URBAN COLLECTOR ROADS	Library Department of Civil and Building Engineering	The main purpose of this research was to investigate the operational capacity and level of service of urban collector roads, case study on a section of Kiwatule-Band-Kyambogo road. The research data were collected through topographic survey and manual traffic count. The topographic survey collected data on as built levels, carriage way width, shoulder width, and other cross sectional and longitudinal parameters. Manual traffic count collected data on hourly traffic variation and quarter hour traffic volume for all classes of vehicle using the facility. The manual traffic count was employed for a duration of one week to study the variation in the traffic pattern, from which the data was used to gauge the peak travel hours, and later used to collect data for peak 15-minutes traffic volume. This data was then analysed in two ways as follows:- The topographic data was used then determine the slope between different longitudinal sections (chainage) which was then used to determine the average slope of the road. This average slope was then used in determination of the method of analysis for the road capacity/level of service. The traffic data was used to study the traffic pattern (daily traffic variation and hourly traffic variation) and then later used in conjunction with the topographic data to determine the capacity and level of service of the road. Based on the findings, it was observed that there is a significant variation in the hourly traffic volume, with peak traffic observe in the morning and evening peak hour, and low traffic volume are always recorded in the off peak hours It was also further observed that the road is operating at level of service C and below its capacity. It was also estimated that the road will continue operating below its capacity for the next ten years. However, its level of service will keep decreasing up to LOS F after 10years	Passenger car equivalent for RVs, Passenger car equivalent for trucks, Grade adjustment factor for level or rolling terrain, Average Annual Daily Traffic, Base Percent Time Spent Following, Vehicle Classification, Vehicle Miles Travel	Kiwatule-Banda-Kyambogo road as shown in the figure below. The findings of these research can be used in other roads provided that a clear relationship can be established between topography, and traffic flow between the roads.	Operations	Other	Platform	K53
54	Kyambogo University	Afayo Nick	2014	DESIGN FOR THE UPGRADING OF ADUMI ROAD FROM CLASS B GRAVEL TO CLASS II BITUMINOUS SURFACE IN ARUA DISTRICT (Section 0+000 – 1+000)	Library Department of Civil and Building Engineering	This project is to upgrade Adumi road from class B gravel to class (II) bituminous surface with the aim of providing a safe, rapid, convenient, economical and environmentally compatible movement of people and goods. Adumi road stretches right from Arua town to the Uganda Congo border, for the locals, the network opens up opportunities for accessing employments, markets, education and health facilities as well as contributing to social inclusion and security. The road surface is uneven caused by potholes, poor road alignment which increases the travel time, accidents and vehicular operating costs. The project aims at upgrading Adumi road from the present class B gravel to class (II) Bitumen standard to ensure efficient and effective movement of traffic. In order to provide this facility, the various elements of the road such as the geometry, pavement structure and the drainage had to be designed. This project also includes computer subroutines to analyse and design road geometry and interpretation of subgrade strength classes. The average daily traffic was 886 veh\day with motorcycles taking the highest percentage and minibuses the lowest percentage giving a traffic class of T3, the subgrade class obtained was S5. From the structural catalogue the wearing course will be of double surface dressing with 175mm G80 of road base material and 100mm G30 sub-base material. From the hydrologic analysis and using the rational method the discharge of 0.93m3/s was obtained thus a longitudinal side drain of 0.5m base width 0.5m and 1:1.5 side slope was found to be adequate. The main challenge faced in the course of the project was financial constraints; Project needs money for data collection, transportation and documentation and also the project time was not sufficient to produce a wholesome project inclusive of costing. Nevertheless, I have learnt that whatever the odds one still needs to give his very best, avoidance of last minutes preparation, to be a practical Engineer and appreciate practical participation. Technically, Priming should be done using MC-30 with a penetration depth of about 3-10mm the subgrade should be scarified to such a depth as will give a layer thickness after compaction of not less than 100mm	Arua Municipal Council, Average Daily Traffic, Average Annual Daily Traffic, Vehicle operating costs, Stopping sight distance, Overtaking sight distance, Transport Research Laboratory.	Located in North West of the countryside popularly known as the west Nile, the terrain is fairly flat with seasonal rivers (River Enyau).Adumi road is about 17km but the study is limited to 1.0km from Ch. (0+000-1+000)	Design	Pavement	Solution / Application	K54
55	Kyambogo University	SSENTONGO AHMED	2014	Assessing the role of safety awareness in reducing accidents on building construction projects in Uganda-case study, Entebbe municipality	Library Department of Civil and Building Engineering	Safety is one of the most fundamental aspects on building construction projects both locally and internationally. Of recent it is being given extra attention by clients, consultants as well as contractors in the industry. Several measures are being taken at all levels, that is, project perception/inception by the clients, project design and procurement by the consultants and during project construction by the contractor. The construction stage however, is the most challenging as it involves many people who may not be aware of the risks involved. Thus creating safety awareness within the project construction team is perhaps the best way of passing on information about the risks involved in the works and how to work safely. As such, an assessment of the role of safety awareness with an aim of reducing accidents on building construction projects in Uganda-case study, Entebbe Municipality was carried out. This report therefore, presents the findings of the project. The project was intended to determine the main causes of accidents, identify the potential safety hazards, analyse the safety measures used on construction projects and propose remedies for the challenges. In the findings, 78% of the respondents say accidents have been happening on building construction projects and the main causes were; inadequate supervision (21%), poor work execution methods (16%), unsafe working environment(22%), inadequate information on safety (19%) and to some to extent, fatigue (10%). 55% of the respondents were aware of the risks involved in the daily construction operations and that the awareness was created by holding tool box talks (39%),	Personal protective equipment, Health safety and environment	Entebbe Municipality Compared to other areas in the country, it has more building construction projects. Both private and public projects were targeted for the study.	Road safety	Non-road	Platform	K55

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						general meetings (50%) and through other ways (28%) like pre task briefing, signs and posters. It was also noted from the survey that the main safety challenges during the project daily operations include; uncooperative workers, low safety morale from workers, lack of awareness on safety requirements in construction, language barrier while passing on information inadequate protective gear, vandalism of signs and posters, theft of personal protective wear, financial constraints. As a result, the proposed recommendations include; review of the existing safety regulations, continuous sensitization of the professionals, hiring of qualified and competent personnel, good site organizational habits, and insurance of construction projects as well as carrying out more researches related to site safety.						
56	Kyambogo University	Owomugisha Noah	2014	Upgrade of Nateete - Nakawuka - Kisubi gravel Road to flexible Bituminous Surface Class 2	Library Department of Civil and Building Engineering	This report consists of a detailed proposed design for Upgrading Nateete-Nakawuka-Kisubi gravel road to a bituminous paved surface which stretches a distance of 1km. The project design was started after field studies showed that travel time was greatly reduced, inadequate cross section and drainage, high maintenance costs which were not reflected on the existing road. To design, existing traffic was obtained by manual counts to give ADT on the road, geometry was captured by use of existing travel speeds and surveying using theodolite, pavement investigation was by observation and field tests like the DCP machines. From the results obtained, traffic class was T4, the Average Daily Traffic was 3310Vehicles/day, and Motorcycles taking up the greatest percentage of traffic (34%), the sub grade strength class was found to be S5 A trapezoidal channel section, culverts were designed to cater for drainage. A double surface dressing has been proposed with chippings being sprayed at 10.9kg/m2 and 7.5kg/m2 for the first and second layer and binder being sprayed at 1.1158kg/m2 and 0.625kg/m2 for first and second layers respectively. The ADT showed that the road was due for upgrading considering the Ministry of Works and transports' criterion for upgrading a road in an urban setting with more than 300Vehicles/day, TRL was predominantly used compared to AASHTO and URDM standards for analysis and design due to its economic conservation for projects in the developing tropical countries. This report is organized in chapters with chapter one as Introduction, two Literature review, three Methodology, four Analysis and design, five Findings, Reflections including observations made, challenges and lessons learnt, Conclusion and Recommendations to government, Kyambogo University and students. References follow before Appendices. The report is prepared for the partial fulfilment of the requirements for the award of Bachelor of Engineering in Civil and Building Engineering of Kyambogo University	Average Annual Daily Traffic, Average daily Traffic, Maximum Dry Density, Annual Average Daily Traffic, Average Least Dimension, Liquid Limit, Linear Shrinkage, Millions of equivalent standard axle, Moisture Content, Plasticity Index, Plastic Limit	Central Uganda in the districts of Kampala and Wakiso. The area has level terrain and receives annual average rainfall between 800mm and 1500mm	Design	Pavement	Solution / Application	K56
57	Kyambogo University	Lomoyi David Charles	2015	THE EFFECT OF SUPERVISION ON THE PRODUCTIVITY OF CONSTRUCTION WORKERS ON CONSTRUCTION SITES (CASE STUDY KAMPALA &WAKISO)	Library Department of Civil and Building Engineering	In today's world, the construction industry faces challenges with regard to problems associated with workers' productivity and the problems are usually associated with performance of labour due to inadequate supervision, delays in materials delivery and motivation. But it plays a key role in the economy, of any country and employment rate. Since 2008 to date construction projects have been extremely important to Uganda because they increase the employment rate, improve the economy, bring foreign investment, and help in the development of the country. The purpose of this research is to study the effect of supervision on the productivity of construction workers (masons) on construction sites and the role of manager to improve the productivity of masons by highlighting the techniques that can be used and applied to achieve a noticeable difference in the productivity. The research looks at how the productivity of workers would be influenced by the different levels of supervision on the site. The productivity of the masons was assessed in terms of the amount of work done by a masons in a day, the quality of the works done and the amount of time that the masons spend working in a day. All this was assessed in relation to when the supervisor is on site and when he is not on site. The research design and data collection method used in this study was administering questionnaires; conducting interviews and physical observation were used, where masons and supervisor were engaged on their experiences in the construction industry. The targeted sample size was 60 masons and 30 Engineers/foremen in Kampala while 48 masons and 20 Engineers/foremen were targeted in Wakiso. 60 questionnaires were distributed to 60 masons in Kampala on 15 sites while 48 questionnaires to 48 masons in Wakiso were distributed to 12 sites representing 100% and 83% respectively. During the study, the participants were asked to assess the factors that affect their productivity on construction sites. The data obtained from the field was quantitatively analysed using Statistical Package for Social Sciences (SPSS) and Microsoft Excel software. The study established that paying workers well, Training, adequacy of supervision and motivation of workers, are the most important factors affecting labour productivity. However, the study also highlights how the project manager can intervene in order to improve the productivity of his workers through; supervisor and workers should be sent for further training to attain more knowledge and skills, proper communication and coordination, and motivation of workers as measure to improve the productivity of construction workers (Masons).	Work done in absence of supervisors, work done in absence of supervisors, quality of work in absence of supervisors, quality of work in presence of supervisors	construction sites in Kampala and Wakiso	Construction	Other	Solution / Application	K57
58	Kyambogo University	Awico Francis	2014	APPLICATION OF A DYNAMIC CONE PENETROMETER IN CORRELATION WITH SAND REPLACEMENT & LAB. CBR IN EVALUATION OF PAVEMENT LAYER CASE STUDY: NTINDA ROAD IN KCCA	Library Department of Civil and Building Engineering	This report explains an in-situ and laboratory test carried out to develop some useful correlations in the application of a DCP in evaluating pavement layers in correlation with sand replacement method and lab CBR, specifically road base. The test aimed at evaluating recommended test methods to achieve speedy and timely Geotechnical engineering results of the pavement materials to ensure a timely infrastructure rehabilitations by institutions, analyse the relationship between laboratory CBR, DCP, and the sand replacement methods. Kampala City Council Authority is one of the most affected cities authorities in Africa with bad road structures, case study of Ntinda road in Nakawa Division, constructed of two lanes with a flexible pavements of nature, the road is currently experiencing continued failures on its shoulders and encountering poor operations in its drainage system, hence there is need to find an appropriate soil test method of evaluating existing pavement structures. The study of the application of a Dynamic Cone Penetrometer in correlation with sand replacement and lab CBR in evaluation of pavement layers, which involved the carrying out a comprehensive literature review in review both the primary and secondary data, test pit location, sampling for laboratory and in-situ tests at various chainage points authorised by KCCA Nakawa Division. For a timely and experiments laboratory test were carried out at Soil and concrete laboratory, Kyambogo University. Computer aided programs like UKDCP, micro soft spread sheets were used, and tabulated solution package for summaries, produced graphs and bar chart. Geotechnical investigations in both large and small construction projects using a preferred test method must always be evaluated alongside many other test methods available, to act as a check.	Disturbed samples, Undisturbed samples, Liquid Limit, Dry Density, Natural Moisture Content, California Bearing Ratio	The study was done along Ntinda road in Nakawa Division, Kampala. Ntinda road is next to Naguru and is located in Central Region, Nakawa Division in Kampala. Ntinda road by length is 2.68 Kilometres, and the road is currently having a heavy traffic flow of approximately over 5000veh/day. The road is constructed of two lanes with flexible pavements of nature. The road is currently experiencing continued failures on its shoulders and encountering poor operations in its drainage system. Ntinda is located in	Pavement structure	Pavement	Platform	K58

#	ORIGINATING INSTITUTION	AUTHORS	YEAR	TITLE	LOCATION OF DOCUMENT	ABSTRACT	KEYWORDS	GEOGRAPHICAL AREA	FOCUS AREAS	PAVEMENT LAYER FOCUS	TT LEVEL	Google Earth number
								north-eastern Kampala, the capital city of Uganda and is bordered by Kyambogo to the east, Nakawa to the south, Naguru to the west, Bukoto to the northwest, Kigoowa to the north and Kiwaatule to the northeast. This location is approximately 8 kilometres by road, northeast of Kampala's central business district				
59	Kyambogo University	Muyimba Josephine	2015	A STUDY TO ASSESS THE MANAGEMENT OF CONSTRUCTION MATERIALS ON BUILDING CONSTRUCTION SITES BY CONTRACTORS IN UGANDA (Case study of Kampala District)	Library Department of Civil and Building Engineering	Research has shown that materials contribute 70% of the building construction project. Poor management of this single resource can lead to cost overruns, reduced efficiency in the construction industry and an impact on the economy of the country. This study aims at solving the problem of poor materials management on building construction sites through, assessment of the factors that cause material wastage, effects of material wastage and how material wastage can be minimized on building construction sites. Data for the study was obtained through a structured questionnaire administered to respondents on different building construction projects and head offices of the construction companies, consultants and also engineering officials and bodies like UIPE and UNABCEC in Kampala district. The findings of this study revealed that most of the respondents had a working experience in building construction projects of more than ten years; this gave more confidence in the quality of answers got from the respondents. The findings revealed that poor workmanship, level of supervision, wrong handling of materials, poor storage of materials, and wastage due to uneconomical shapes and re-work due to non-compliance with drawings and specifications were the major causes of material wastage on building construction sites. The findings further revealed that timber and steel were the key materials that had the highest level of wastage on building sites. The findings also revealed that material wastage effects are felt more by the client as he/she has to incur more costs in order to compensate for the materials wasted Re-using some of the surplus materials and recycling of the materials were the main methods that were used to reduce material wastage on construction sites. Based on these findings, appropriate recommendations were made in order to reduce material wastage which will later improve on material management on construction sites hence improving on profitability of contractors and increased productivity.	Environmental Protection Agency, Statistical Package for Social Sciences, Content Validity Index	twenty five building construction sites within Kampala district	Management	Non-road	Platform	K59
60	Kyambogo University	Nalutaayaa Phiona	2015	STUDY ON THE USE OF PLASTIC WASTE TO IMPROVE ON THE SOIL STRENGTH PROPERTIES FOR PAVEMENT CONSTRUCTION	Library Department of Civil and Building Engineering	The annual population growth rate of 3.03% (Uganda National Household Survey Report, 2009/2010), industrialization, consumerism and technological development have led to the uncontrolled accumulation of plastic wastes by 1.6% (KCCA report 2014). Proper waste disposal is of great importance in both rural and urban areas. The study discussed the suitability of plastic waste material for pavement construction. Soil stabilization is any process which improves the physical properties of a soil such as increasing the shear strength, bearing capacity, which can be done by controlled compaction or addition of suitable admixtures. The soil sample was obtained from Kasanje village using the trial pit method and the shredded plastics (PET) were got Rwenzori Bottling Company. This report presents the various tests conducted on reinforced soil with varying fibre content (0%. 0.25%, 0.5%, 0.75% and1%) and the results are analysed. In this report plastics (PET) were used as a reinforcement to perform CBR studies while mixing with soil for improving the engineering performance of sub grade soil. Plastic pieces obtained from plastic wastes were mixed randomly with soil and a series of CBR tests were carried out with varying percentages of plastics. Results of the CBR tests demonstrated that inclusion waste plastic pieces in soil with appropriate amount improved strength and deformation behaviour of the sub grade soils. The CBR value increased from 2.0 for neat soil to 10.0 for 0.75% plastic pieces used. Therefore the proposed technique can be used to an advantage in embankment/ road construction.	Polyethylene Terephthalate, Liquid Limit, California Bearing Ratio, Optimum Moisture Content,	Mpigi-Kasanje-Buwaya road at chainage 12+500 and then took to the laboratory for testing. The shredded plastics were got from Rwenzori Bottling Company recycle plant located Spear Motors - Kinawataka link.	Materials	Gravel	Platform	K60
61	Kyambogo University	Kigula Frank	2015	UPGRADING OF NAMANVE – INDUSTRIAL PARK ROAD FROM NATURE GRAVEL (A) TO BITUMINOUS STANDARD (III) CHAINAGE (0 + 000 - 1 + 500)	Library Department of Civil and Building Engineering	Project title is "Upgrading of Namanve – Industrial Park to Bituminous standard III. This study is aimed at providing an economically flexible pavement that will provide an efficient traffic flow to the park and its surroundings and Engineering approach to produce and maintain a good roadway facility that can safely handle the increased traffic volume and specifically the institutional, geometrical, pavement, drainage and environmental problems on this road. Road improvement and management across the globe are not matching with the rate of car ownership and more especially in Uganda. And yet well maintained road network couple with high rate of vehicle ownership defines a country's level of prosperity. Namanve – industrial park is a Class A gravel road located in Kira town council; support from Central Government through Uganda Road Fund, Its current ADT is 2259veh/day. The present state of the road is characterized by increasing traffic, irregular alignment and width, ruts, gullies, corrugation, erosion and lack of drainage structures all these due to over loading on the pavement, poor maintenance mechanisms. Improvements of the road to Class III Bitumen will no doubt attract several benefits including but not limited to increased capacity, level of service, reduced transportation costs, reduced vehicle maintenance costs, controlled flow of storm water, increased road network, reduced noise and dust pollution etc. The study involved; Traffic assessments on Road, Carrying out road survey, Obtaining axial loads from the available survey data, Obtaining Rainfall data from the Metrological Department, Soil tests, Selection of locally available base materials, Comprehensive design of the flexible pavement structure of Namanve – Industrial park Road, Production of technical drawings.	Number of Average Daily Traffic, Average Least Dimension, California Bearing Ratio, Allowable Headwater depth, Linear Shrinkage Moisture Content Level of Service.	Wakiso District, Kira Town council in Bweyogerere town off Jinja road	Design	Pavement	Solution / Application	K61
62	Kyambogo University	Kasibante Stewart Elvis	2014	DESIGN OF A REINFORCED RIGID PAVEMENT ROAD THROUGH A SWAMP NAMUWONGO, KAMPALA DISTRICT, UGANDA:	Library Department of Civil and Building Engineering	Highway pavement in Engineering terms is a horizontal structure consisting of super imposed layers of selected and processed materials supported by in-situ natural material. They are road structures used to separate the tires of traffic from underlying foundation material. Rigid pavement is where the top wearing layer is made of Portland cement concrete. A reinforced rigid pavement road is one that has steel bars to improve its performance usually with steel content ranging from 0.6% to 1% of the area. This project will concentrate on design of reinforced rigid pavements for swamp sections. Wetlands/ Swamps are land areas that are saturated with water, either permanently or seasonally. Choice of reinforced rigid pavement is because of their structural performance in soft grounds, their durability, and environmentally friendly as well as readily available materials. The purpose of this research is to come up with a design of a reinforced rigid pavement for this road stretch that is safe, strong durable, sound and relevant to the community. To understand the related problems of rigid pavement in swamps an analysis and critical examination of the past work related to this project is important. The literature review comprises of information from published text books from libraries, the internet and any other publications on similar projects. This study comprised of questionnaires to the local community, assessment of Sub-grade strength, traffic analysis, topography and drainage of the project road. The study is seeking to provide suitable improvements to road network in area through designs of pavement, geometric and drainage elements as well as assessing its	Average Daily Traffic, Vehicle operating costs, Federal Highway Administration, Central Intelligence Agency, Stopping sight distance, Overtaking sight distance, Uganda Road Design manual	lower Namuwongo parish from Kanyogoga police post to Bugolobi near Ambrossoli international school. The study area is familiar and the location can easily be accessed to obtaining field data.	Design	Pavement	Solution / Application	K62

#	ORIGINATING INSTITUTION	AUTHORS	YEAR	TITLE	LOCATION OF DOCUMENT	ABSTRACT	KEYWORDS	GEOGRAPHICAL AREA	FOCUS AREAS	PAVEMENT LAYER FOCUS	TT LEVEL	Google Earth number
						economic and social viability through questionnaires. Some of the existing projects in Uganda are the Busia border post and Roko concrete roads, and in the world the famous 161km road in Texas as well as other projects all over the globe						
63	Kyambogo University	Kuluudhi Ziraba Rogers	2015	PROVISION OF ROAD FURNITURE IN UGANDA AND ITS EFFECT ON ROAD SAFETY	Library Department of Civil and Building Engineering	Death and injuries from road traffic crashes are a major and growing public health epidemic all over the world where over 1.0 million people are estimated to die in road crashes and as many as 50 million injured. Many of the death and injuries are known to be preventable. Roads in Uganda have become a threat to users due to the rampant traffic accidents. Uganda is rated to be among the countries with the highest accident rate with over 20,000 accidents annually and healthy losses from the accidents are projected to rank only second to those of HIV/AIDS. The cost of accidents in Uganda is about 2.7% of the country's GDP. 5% of the accidents are due to road condition including inadequate road furniture because not all road signs and traffic safety facilities are being maintained at all times which would result in accidents as drivers come across obstacles and changed road priorities without prior warning. Because of the poor state of roads including inadequate road furniture being a contributor to the disaster, a research was done to assess provision of road furniture and its effect on road safety on selected streets in Kampala. Various issues pertaining road furniture and road safety were investigated including level of road safety, adequacy of road furniture, effectiveness and maintenance of the furniture. The investigation did not leave out determining the major cause of road furniture related accidents, and how important the furniture is as far as road safety is concerned including assessing the levels of awareness and compliance by the road users with respect to the furniture. Using standard methods of data analysis, the research revealed challenges in the provision of road furniture which when addressed will result in safer roads. It was discovered that most roads are without markings, and road signs are vandalized and stolen. In addition, road safety is unsatisfactory, road furniture is inadequate, and its effectiveness and maintenance are generally low. Also road user awareness and compliance to the furniture are low. These issues need to be addressed urgently in order to realize elevated safety on our roads. In this study there are recommendations on how to improve provision of road furniture, though, I call upon further research toward improved road furniture provision.	Speed management principles, gate designs, traffic crashes, time of accidents, level of maintenance, fatalities by road user groups	This study will be carried out within the boundaries of provision of road furniture in Uganda and its effect on road safety. Kampala city has been selected as the case study because it has a wide road network and therefore can serve as a representative of the country's road infrastructure. The study is to be done on 25 streets in the city	Road safety	Other	Platform	K63
64	Kyambogo University	Kyomukama Sam	2014	FEASIBILITY STUDY ON THE IMPROVEMENT OF ISINGIRO-NTANTAMUKYE CLASS B GRAVEL ROAD TO CLASS 11 BITUMINOUS	Library Department of Civil and Building Engineering	This report consists of a detailed proposed engineering design study for the improvement of 1 km road section along the existing Isingiro-Ntantamukye road from class B unpaved to class 11 bituminous paved surface. The main objective was to design flexible pavement with respect to the route, geometry, drainage and pavement. This was done by assessing the current traffic using the road, existing geometry, pavement structure and designing an appropriate drainage system. Laboratory and field tests, surveys, consultations, and observations were some of the methods that were used to collect data. From the results obtained, the Average Daily Traffic was 942vehicles/day, with two wheeled vehicles taking up the greatest percentage (41% - 42%) of traffic. From chainage 0+000 to 0+500 a pavement structure of 150mm Granular Road Base (GB3) with a granular sub-base of 175mm was obtained according to design as a cheap option. From chainage 0+500 to 1+000 only 150mm Granular road base was desirable. From material tests carried out on the Sub-base material at a nearby borrow pit (chainage 1+000), the material met the required standards. An open channel drain was designed which gave a bottom width of 0.5m, total height of 1.1m and free board of 0.1m. The Average Daily Traffic showed that the road was due for upgrading considering the Ministry of Works and Transport's criterion of more than 300vehicles/day for upgrading a road in an urban setting. Circular curves having a minimum radius of 100m have been proposed. Continuous maintenance of the drains is necessary so as to prevent silting. Quality control should be ensured for materials in accordance with the specifications as stipulated	British Standard, California Bearing Ratio, Environmental Impact Assessment, Gross Domestic Product, Mean Annual Precipitation, Social Impact Assessment	ISINGIRO-NTANTAMUKYE	Design	Pavement	Solution / Application	K64
65	Kyambogo University	Mutabazi John	2015	COMPARATIVE STUDY OF THE TENSILE STRENGTH PROPERTIES OF SOIL STABILIZED WITH LIME AND REINFORCED WITH SISAL	Library Department of Civil and Building Engineering	The concept of soil reinforcement has been used for the improvement of certain desired properties of soil like tensile strength. For many years, soil reinforcement has been carried out using pulverised limestone, natural fibrous material and many other substances. The primary purpose of reinforcing soil mass is to improve its stability, to increase its bearing capacity, and to reduce settlements and lateral deformation. For Uganda in particular, lime has been the most commonly used material for most stabilization works throughout the country. However the use of lime has its shortfalls like cost, dust and other health associated problems when inhaled. For the purpose of making up for these deficiencies of lime while at the same time improving the strength and bearing capacity of weak soils, a study was undertaken to mix sisal fibre into soil to improve its mechanical behaviour as an alternative to lime. The objectives of this study were to: determine the basic properties of the native weak soil, determine the strength properties of soil reinforced with both lime and sisal and to determine the effect of varying percentages of the stabilizing agents by weight on strength of soil. In this study, compaction tests, particle size distribution and atterberg limits tests were carried out on unestablished soil. Part of this soil was then replaced with lime and sisal fibres in varying percentages of 0.25, 0.5, 0.75 and 1.0 by mass. These specimens were then tested for tensile strength and elongation. Tensile strength was observed to increase with increasing proportions of both Lime and Sisal contents. However, greater values were achieved with sisal as compared to lime. Similar results were observed for the test of elongation with addition of Sisal fibres in the soil. However, there was no marked difference in the elongation of the soil, at all proportions, when Lime was added to the soil. This clearly shows that addition of Sisal fibres greatly enhances the tensile strength and elongation of soil compared to addition of Lime. It is expected that an increase in tensile strength and elongation of the sisal stabilized sub-bases leads to better rutting resistance and ensures good performance of the pavement leading to reduction in maintenance cost. It was therefore concluded that addition of Sisal fibres greatly improves the tensile properties of previously weak soil and therefore should be considered as an alternative stabilizing material for poor soils.	Unconfined Compressive Strength, British Standard, Moisture Content, Liquid Limit, Plasticity Index, Plasticity Index, Optimum Moisture Content	Materials Laboratory, Faculty of Technology, Makerere University.	Materials	Gravel	Platform	K65
66	Kyambogo University	Baweireyo Emmaanuel	2014	UPGRADING OF OLD JINJA ROAD FROM CLASS II GRAVEL TO CLASS 1B PAVED BITUMINOUS FROM CHAINAGE 0+000 (JOKAS HOTEL) TO 2+000 (NAMANVE TREE PLANTATION)	Library Department of Civil and Building Engineering	The upgrade was carried out in Wakiso district (Kampala industrial and Business Park) on the improvement of old Jinja road from gravel to a bituminous flexible pavement. The report comprises three chapters. The report has the first chapter that contains the introduction, background, problem statement, general objective, specific objectives etc. Chapter two has the literature review and contents of literature review and chapter three contains the methodology. The report also covers the Challenges and recommendations of the study. The purpose of the study was mainly to improve the road service capacity with good drainage system and good pavement characteristics that require low maintenance costs. The study sought to come up with the relevant data to be used in the designing of the road which data can be used in the implementation. The research problems encountered in brief include; Language barrier between the research team and the local people, too much sunshine during the working hours hence too much dust, time was always against the research team, acquiring details from the right authorities was not easy and most data acquired wasn't recent data and last but not least there was insufficient funds to run the project. The upgrade of the old Jinja road from class ii gravel to class 1b paved bituminous consisted of the following main activities; surveying the road, assessment of the Sub-grade strength of the existing road, traffic assessment and design of pavement, geometric and drainage design. All these activities were carried out from November 2013 up to May 2014. Information for my research was obtained from text books, magazines, organizations, internet and last but not least from experienced workers who have been in the field for more than ten years. The old Jinja road was broad but limited to topographic survey of the road, Subgrade strength assessment, material selection and drainage design. A summary of the finding of the whole study is as follows; the road falls in a rolling terrain, the traffic on this road is heterogeneous in character with a cumulative design traffic of 3.976msa corresponding to a traffic class of T5. The climatic regime of the road subgrade is category 2 and the subgrade class of the design section is S6 throughout with a design CBR of 42%. The adopted Culvert size is 900mm in diameter and adopted ditch size is; Top width-1230mm, bottom width-320mm, depth + free board of 120mm-420mm. A traffic class T5 and Subgrade strength class S6 recommends a double surface dressing on a granular roadbase GB3 of 200mm thickness. The road will have a design life of 15yrs, design speed of 80km/hr and the class 1B bituminous pavement will have a roadway width 9.0m, Carriageway	California Bearing Ratio, Dynamic Cone penetration, Average Annual Daily Traffic, Overseas Road Note, Global Positioning System, Environmental Impact Assessment	Kira Town Council and government institutions such as UBOS, URA and Department of Metrological Survey (Entebbe and Kampala) where some data collection and consultation shall be made.	Design	Pavement	Solution / Application	K66

#	ORIGINATING INSTITUTION	AUTHORS	YEAR	TITLE	LOCATION OF DOCUMENT	ABSTRACT	KEYWORDS	GEOGRAPHICAL AREA	FOCUS AREAS	PAVEMENT LAYER FOCUS	TT LEVEL	Google Earth number
						width 6.0m and reserve width of 30m. Therefore study recommends that the sub-grade is strong enough; the road should be widened, double surfaced and be given a proper drainage system.						
67	Kyambogo University	Mugabe Rodgers	2015	BRIDGE CONDITION ASSESSMENT AND IMPROVEMENT STRATEGIES CASE STUDY OF WAMIIKA BRIDGE	Library Department of Civil and Building Engineering	This study deals with a bridge condition assessment study of the Wamika Bridge, located in Luweero, using non-destructive condition assessment techniques. These were visual inspection, half-cell potential tests, rebound hammer survey and in situ depth of carbonation measurement. Information from several sources in general about the different bridge defects and causes of bridge deterioration was obtained from the internet and engineering literature by different authors and this was of great help when carrying out the investigation. By visual observation, defects like cracking, exposed reinforcement, spalling, scaling, honey combing were identified. These led to further investigations like carbonation depth assessment, determination of corrosion potential of the bridge deck using the electrochemical half-cell potential measurements and a rebound hammer survey. These assessments showed that despite the apparent defects, the bridge is still in a good functioning state and the major cause of the bridge deterioration is poor maintenance. This is because none of the defects identified has reached to such an extent as to affect the structural integrity or load bearing capacity of the bridge. As a result of this study, six improvement strategies were identified which led to the development of the proposed bridge management system for the improvement of the condition and management of bridges in Uganda.	American Society of Testing and Materials, Copper Sulphate Electrode, Latex Modified Concrete, Portland Cement Association, Reinforced Cement Concrete, Hot-Mix Asphalt Concrete with a preformed Membrane	Wamika Bridge, located in Luweero,	Management	Other	Solution / Application	K67
68	Kyambogo University	Sserubidde Thaddeo Jude	2014	AN INVESTIGATION INTO THE QUALITY OF PAVEMENT MATERIALS USED ON KAWEMPE-KAFU ROAD PROJECT.	Library Department of Civil and Building Engineering	This Individual Project report contains only tasks I got involved in during the course of the investigative study. The major importance of this Project was to gain practical experience in the civil engineering field, most especially qualitative investigations on materials used in road construction. This was possible leading to this study being successfully done, however this study exposed me to a variety of road construction works which were under implementation by the time this investigative study was executed .Works exposed to included; Surveying, Culvert construction, Roadbed, Subgrade and Sub base construction works	Aggregate Crushing Value, Crushed Rock Stone, Flakiness Index, Grading Modulus, Maximum Dry Density, Plasticity Index, Shrinkage Limit, Ten percent Fines Value	1km section of Kawempe – Kafu road project. These investigations were done in line with the Project specifications as the major centreline for the Project quality control. Kawempe-Kafu Road Project was 166 Km of length as per the design with a number of cited quality defects in some of the completed sections	Materials	Pavement	Solution / Application	K68
69	Kyambogo University	Apenyo Morris Victor	2014	UPGRADING FOR THE IMPROVEMENT OF LIRA-ALEBTONG ROAD. FROM GRAVEL CLASS C TO GRAVEL CLASS A CHAINAGE (0+000-1+000)	Library Department of Civil and Building Engineering	This project aimed at improving the current deteriorating state of Lira-Alebtong road which has lost capacity and reduced level of service due to increased number of traffic and it impassable during rainy season. In order to address this, the road was designed in accordance to institutional, technical and appraisal requirements. The project was justified by ADT of 414veh/day, blocked existing drainage structures like culverts, Narrow road width of 5.2 m, No define camber and other related features, high surface roughness and huge amount of dust during dry season. Upon completing the project, the road user shall enjoy the following benefits; Travel time shall be reduced, increased user comfort, there will be no stagnant water on the road and the cost of vehicles operation and maintenance shall be reduced. The procedures used in this project include; Data collection, Data classification, Data analysis, Modelling, Simulation and publication of report. The Literature review was limited to only core elements of the project. The sub-grade strength assessment was determined by use of Dynamic Cone Penetrometer (DCP) test which gave the CBR results. The drainage is to be laid having a dimension of 300mm bottom width, 600mm depth and 1:1 side slope.	Average Daily Traffic, Aggregate Crushing Value, Dynamic Cone Penetrometer, Granular Sub-base material, International Roughness Index, Moisture Content, Plastic Limit, Transport Research Laboratory Modulus Grading	lira-Alebtong road would be limited to site Aloi sub-county, Uganda revenue authority, Uganda bureau of statistics, metrological survey (Entebbe). This would be limit to road surveying, assessing traffic, sub-grade strength assessment and designing pavement.	Design	Pavement	Solution / Application	K69
70	Kyambogo University	Ayekundiire Dickson	2015	ASSESSING THE DESIGN CRITERIA FOR LABOUR BASED TECHNOLOGIES IN THE CONSTRUCTION OF RURAL ROADS IN MBALE REGION	Library Department of Civil and Building Engineering	This report consists of a detailed criteria assessment in design of Labour based technology rural roads in Mbale region represented by a section of 2.8km Ayer p/s – Kole District HQR. The project started after field studies which showed that LBT roads fail in a short period of time, poor drainage, and high maintenance costs which are not reflected on these roads. To assess, existing design standards obtained and compared with the designs of Ayer p/s road as an existing facility, geometry was examined by use of travel speeds and surveying, pavement investigation was by observation and field tests like the DCP results. From the results obtained, the geometry of the roads did not reflect the design standards, traffic class LV4, the Average Daily Traffic of 98Vehicles/day, and Bicycles took the greatest percentage of traffic (45%), and the subgrade strength class of S5 satisfies this section for low cost sealing road. A trapezoidal channel section, culverts were designed to cater for drainage. A single surface dressing has been proposed for a single layer and the average daily traffic for this road showed that the road was a class iii gravel road considering the Ministry of Works and transports' criterion for road classification in an urban setting with less than300Vehicles/day, TRL was predominantly used compared to AASHTO due to its economic conservation for projects in the developing tropical countries. This report is organized in chapters with chapter one as Introduction, two Literature review, three Methodology, four Analysis, findings and discussions, five Reflections including, challenges and lessons learnt, Conclusions and Recommendations, References and Appendices. The report is prepared for the partial fulfilment of the requirements for the award of Bachelor of Engineering in Civil and Building Engineering of Kyambogo University.	Average Annual Daily Traffic, Average daily Traffic, Equipped Based Technology, Liquid Limit, Moisture Content, Optimum Moisture Content, Road Agency Fund Unit, Maximum Dry Density	Mbale region. Mbale region was chosen as a study area because it is the LBT training centre under MoWT in Uganda, the place is a mountainous area with a lot of water as its origin which affects gravel roads in the region hence a need to ensure smooth designs followed in construction	Construction	Pavement	Solution / Application	K70
71	Kyambogo University	Alany Jmmy Max	2015	DESIGN OF A REINFORCED CONCRETE BRIDGE ALONG OMORO – ORUM ROAD ON	Library Department of Civil and Building Engineering	The designed Bridge is found in Alebtong District, Lango Sub-region, located along Omoro – Orum Road link. The road link offers trade opportunities to the local people with other communities and neighbouring Districts of Otuke and Amuria. It promotes communication, transportation of agricultural products, marketing, accessibility to Medical services and schools. It also facilitates humanitarian assistance and security interventions in case of insurgencies. The bridge structure comprises of concrete decking supported on reinforced concrete abutments that in turn sit on foundations.	Time of Rainfall Concentration, Variable loads, Required Area of Reinforcement,	Alololo parish along Omoro - Orum Road Crossing River Moroto stream in Omoro Sub County	Design	Other	Solution / Application	K71

#	ORIGINATING INSTITUTION	AUTHORS	YEAR	TITLE	LOCATION OF DOCUMENT	ABSTRACT	KEYWORDS	GEOGRAPHICAL AREA	FOCUS AREAS	PAVEMENT LAYER FOCUS	TT LEVEL	Google Earth number
				RIVER MOROTO STREAM ALOLOLO PARISH - OMORO SUB-COUNTY, ALEBTONG DISTRICT		The problems associated with this bridge location are quite adverse. There is urgent need to construct this priority bridge in this area using the available resources that can be directed, so as to have an effective and efficient intervention to transport, and communication related problems. This project was based on geo-soil properties of the proposed bridge location, determining the flood levels at the water crossings, carrying out the hydraulic design that will minimize scouring, determining the significant loads for analysis of the substructure and the superstructure and designing the decking of the bridge, the abutments as technically necessary. Finally detailed drawings and appropriate recommendations will be made.	Ultimate Bearing Capacity	Alebtong District.				
72	Kyambogo University	Bosa Joel Samuel	2014	COST COMPARISON OF ROADBASE SURFACING USING OTTA SEAL IN RELATION TO TRADITIONAL METHODS OF SURFACE DRESSING (CHIP SEALS) IN UGANDA	Library Department of Civil and Building Engineering	This project brought forth a cost comparison of road base surfacing using Otta seals in relation to traditional methods of surface dressing in Uganda. Since there are monetary constraints in developing countries and Uganda being one of the developing countries, engineers need to come up with new methods of sealing roads at low costs. Recent research shows that Otta seals favour the use of low cost seals by use of a wide range of local materials. Otta seal is a bituminous surfacing that is got by adding well grade aggregate / gravel to a cutback. Chip seals are the normal type of surface dressing in Uganda consisting of single size aggregates and a high viscosity binder. There are high costs incurred in acquiring crusher run stones and high viscosity binders. This project evaluated the costs of the materials used in both seals. The project also compared the properties of the surfacing material against standard specifications. Reference was made to several sources including writers, Design manuals and engineers as well. This project enabled us to choose on a more cost effective option. The methods of attaining the core goals involved data collection in the field, laboratory and from local contractors. The data was analysed and later stored ending up to this report. All the activities that enabled this project to be done were scheduled between May and August 2014 in Mukono district. The findings of this project were discussed in terms of Materials required for each of the two seals, material costs. This came along with the individual material tests but most of all was the comparison of the initial cost of construction, Maintenance costs, and overall lifecycle costs for each of the surfacing options. In the end, Otta seals were found to be cheaper to construct than Chip seals (73,126,974Ugshsper Km < 82,390, 905Ugshsper Km) and was recommended as the better choice of surfacing since it was found to be cost effective.	Aggregate Crushing Value, Aggregate Impact Value, California Bearing Ratio, Chainage, Labour Based Method, Medium Curing, Transport and Road Research Laboratory, Ten Percent Fines Value Plasticity Index, Overseas Road Note.	Mbalala, Katosi, and Nabuti in Mukono district. This also included Government institutions such as UNRA, Mukono Municipality.	Management	Surfacing	Platform	K72
73	Kyambogo University	Nsubuga George	2014	DESIGN OF A PEDESTRIAN OVERPASS BRIDGE ACROSS JINJA ROAD AT BANDA STAGE	Library Department of Civil and Building Engineering	In its struggle for economic development, Uganda is still challenged with lack of appropriate infrastructures such as the road network, lack of safety measures for huge pedestrian volumes using busy roads especially in its urban highly populated areas etc. Due to the ever increasing population of Uganda and especially in its capital city Kampala, the number of pedestrians has risen coupled with an increase in the average daily traffic using roads in Kampala. This has increased the probability of vehicle pedestrian conflicts on most busy roads in Kampala especially near busy centres which has put pedestrian safety at risk especially those crossing. Jinja road is one of the busiest highways in Uganda as it connects Kampala through the eastern districts and also provides a link to Kenya and due to this reason, the traffic volume is much which is a major obstacle for pedestrians crossing this road especially at the most busy centres. This project thus explored structural design solutions for a steel truss bridge to come up with a strong, stable, durable and aesthetic pedestrian overpass structure to enable pedestrians cross the road safely at Banda stage. In an attempt to archive the desired objective, a site reconnaissance was done by a walk to site to determine the nature hence suitability of the site for the proposed work. Soil investigations including soil sampling and laboratory testing were carried out to determine the nature and strength of soil. A steel truss bridge consisting of steel frames was designed to consist of mainly steel I-sections and hollow steel sections. Results from laboratory testing of soil indicated that the soil is inorganic silts and organic clays of high compressibility with PI of 10.43 and bearing capacity of 189.07KN/m2 computed using Terzaghi formulae. From the bearing capacity result, an individual square pad footing (1mx1m and 0.4m thick) of depth 1.5m from the ground level was designed to safely transfer loads from the columns to the supporting strata. The super structure was designed to consist of laterally braced steel I columns 152x152x37Kg/m UC supporting a truss system of 406x178x67Kg/m UB bottom longitudinal beams, 90x50x8.15Kg/m RHS floor beams, 90x90x20.1Kg/m SHS diagonal members, 90x90x20.1Kg/m SHS top longitudinal members, 406x140x39Kg/m UB stringer beams and chequered galvanized steel plate deck2.44mx1.22mx4mm thickness of weight 96.15Kg. An access ramp consisting of four flights with a slope of 1in 8 was incorporated to enable pedestrians access the overpass safely from the ground. In conclusion, the implementation of this project by concerned authorities will help reduce on accident incidences involving pedestrian crossing by eliminating vehicle – pedestrian conflicts and by so doing, the service level of the road will be increased.	Road traffic injuries, Euro code, Rectangular hollow section, Square hollow section.	Banda stage between Nabisunsa stage and the access road to Kyambogo University east end gate. Banda a Kampala suburb is located 10Kms by road east of Kampala business Centre along Kampala-Jinja highway in Nakawa division and lies on coordinates 00021'18" N and 32037'53"	Operations	Other	Solution / Application	K73
74	Kyambogo University	Katoloogo Charles	2014	A FEASIBILITY STUDY TO UPGRADE SALIM BEY ROAD FROM A GRAVEL ROAD TO A RIGID CONCRETE PAVEMENT	Library Department of Civil and Building Engineering	Salim bey road dis located in Nakawa division of the Metropolitan Kampala District and links parts of Kyambogo to Ntinda through Minister's village and serves a very big inter-land but unfortunately it is in very bad state. The problems faced on this road are blocked drains due to lack of routine maintenance and poor solid waste disposal in the area. As far as the authorities in the division are concerned, plans to upgrade this road are there but not immediate and the only intervention that was carried out on this road is gravelling. The increasing traffic volume and the numerous economic activities taking place the along present health, safety and economic risk of the population that uses this road and those that reside/work around it. The road is dusty during the dry seasons and muddy during wet season and sometimes impassable. A research was thus carried out with the objective of assessing the road condition, its subgrade strength, the average daily traffic using the road and to come up with a proposal of determining the type of structural design for the road pavement which would reduce dust pollution, environment degradation and improve safety and comfort of road users as well as reducing road user costs. The method used was by conducting a traffic counting exercise to ascertain the traffic volume currently using the road which formed the basis of the design and the DCP tests to determine the in situ CBR and laboratory tests to determine the soil properties of the existing pavement. Literature from relevant books, magazines and lecture notes were reviewed for the purpose of comparing the roads' characteristics and existing information to enable appropriate design. Analysis of the data collected was used to design the pavement layers as solutions to the aforementioned objectives and I came up with the following proposals: The sections from 1 +200 and 2 + 200 have subgrade strength of S6 and sections 1 + 700, 2 + 700, 3 + 200 were found to have subgrade strength of S5.The average daily classified traffic counts to be projected for 30 years at an annual growth rate of 6.0% resulted into 3891 vehicles which qualify the road to be upgraded to concrete pavement; the pavement thickness is 9 inches (228.6), sub-base thickness is 6 inches laid on an embankment of modulus of subgrade reaction 200pci. Chippings of sizes 14 – 20mm in conjunction with 10 – 14mm will be used.	Average annual daily traffic, Average daily traffic, maximum grades, soil classification	Salim bey road from chainage 0 + 000 to chainage 1+ 000 terminating from Megha industries to Ntinda new market from the Bunga T – junction off Ggaba road.	Design	Pavement	Solution / Application	K74
75	Kyambogo University	Awoii Ahmad Okwir	2014	FEASIBILITY STUDY FOR IMPROVEMENT OF SEETA-NAKIYANJA ROAD IN MUKONO MUNICIPALITY FROM CLASS A GRAVEL ROAD TO CLASS 11 BITUMININOUS PAVED SURFACE Section 4+200 - 6+240	Library Department of Civil and Building Engineering	Road transport is now the dominant form of transport throughout the world. Most economies rely heavily on road transport for passenger and freight movement. In response to that need countries have expanded their road networks considerably by constructing new, upgrading or rehabilitating existing roads. All roads paved or gravel will experience defects at some point in their design life. Seeta - Nakiyanja road is an alternative route from Mukono through Namogongo, Kireka in Kira Town Council to Kampala, or Naalya to Northern Bypass. However its performance is characterised by too much dust in the dry seasons, potholes, Poor drainage and slippery surface during heavy rains there by making Traffic move with a lot of difficulties. The main objective of this project is to carryout feasibility study to improve the existing gravel road to a paved surface considering current and projected traffic, geometry, drainage and environment for safe, economical and environmentally compatible movements of Traffic. In order to achieve the main objective the following tasks have to be carried: Carry out road profile survey, Drainage (hydrology study, hydraulic design, design of drainage structures): Pavement design (estimating traffic, measurement of sub grade strength, selection of pavement materials and layer thicknesses): Environment Impact Assessment. The project was limited to Drainage design, Geometry and Pavement design accompanied with an Environmental Impact Assessment. The methodology used included: data collection and classification (laboratory tests), manual traffic counts, surveys reviews and consultation); design and simulation (design was done by use of standards such as TRL, URDM, AASHTO); analysis which was carried out using Auto CAD land development, Programmable calculators, tables and charts. The findings	Average Daily Traffic , Average Annual Daily Traffic, Stopping sight distance, Overtaking sight distance, Uganda Road Design manual	within Mukono Municipality. Traffic assessments on Seeta – Nakiyanja Road.	Design	Pavement	Solution / Application	K75

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						were: An ADT of 579 Veh/hour which gave a traffic class of T5. Sub grade strength class of S6 was found between chainage 4+200 to 5+950 and S3 between chainage 5+950 to 6+240. From chainage 4+200 to 5+950, the road base is 225mm thick without sub base, Granular material will be used. From chainage 5+950 to 6+240, the road base is 150mm thick and the sub base is 225mm thick and capping layer of 150mm thick. Granular material will be used for both the road base, sub base and capping layer. The surfacing will be of a double surface dressing. The road will be upgraded from gravel class A to class II bituminous road. A longitudinal side drain of 300mm base width, 300mm depth, 100mm free board and 1:1.5 side slopes was found to be adequate. Six number barrels of 1500mm diameter culverts were adopted in the design. It is recommended that studies on cost benefit analysis should be carried out and further studies on environmental impact assessment done.						
76	Kyambogo University	Mukiibi Isaac	2014	A FEASIBILITY STUDY TO IMPROVE NTINDA FACTORY CLOSE FROM GRAVEL CLASS C TO BITUMINOUS STANDARDS (ASPHALT CONCRETE)	Library Department of Civil and Building Engineering	This report consists of a detailed proposed design for upgrading Ntinda Factory Close from Gravel class 3 to an Asphalt Concrete road which stretches a distance of 1.6km. The main objective was to design a flexible pavement with respect to the route, Geometry, Drainage and Pavement design using the American Association of State Highway and Transportation Officials. This was done by assessing the current traffic using the road, existing geometry, pavement structure and designing an appropriate drainage system The project link was characterised by thin gravel layers with very poor drainage, the carriageway was narrow caused as a result of eroded sides as a result of struggling runoff. Besides, the road had a very rough surface with big potholes and gullies. Field and Laboratory tests were carried out on the subgrade material and results were combined with results from surveys, consultations and observations. From the results obtained, the road had Average Annual Daily Traffic (AADT) of 1,151 vehicles per day. With motor bikes predominantly leading with 33% of the total traffic but of the 908 daily commercial vehicles, 23% were 3 – Axle trucks, 22% were 4 – Axle trucks, 20% were Matatus/ Mini buses, 19% were 5 – Axle trucks, 10% were 2 – Axle trucks and 6% carrying Pickups. This ADT showed that the road was due for upgrading considering the Ministry of Works and Transport criterion for upgrading a road in an urban setting with more than 300 vehicles/ day. A two lane 7.0m carriageway road section with 1m wide shoulders at both sides was designed. Structurally comprising of an asphalt concrete wearing course, a granular road base, cement stabilized subbase and subgrade with California Bearing Ratio of 30 were provided to serve for a service life of 15years. A longitudinal trapezoidal channel section has been provided to cater for the drainage challenges. Re-alignment has been proposed with curves having a minimum radius of 100m, continuous maintenance of the drainage system is necessary so as to prevent silting. Quality control should be ensured for materials in accordance with the specifications as stipulated	Average Annual Daily Traffic, Average Daily Traffic, Cumulative Design Traffic, Gross Domestic Product, Equivalent Standard Axles, Social Impact Assessment	Kampala district but with emphasis on Ntinda Factory Close in Nakawa Division	Design	Pavement	Solution / Application	K76
77	Kyambogo University	Namuyiga Irene Elizabeth	2014	ASSESSMENT OF TRAFFIC FLOW SOLUTION AT THE SPRING ROAD /PORTBEL JUNCTION IN NAKAWA DIVISION (Case Study: Junction)	Library Department of Civil and Building Engineering	As mandated by the University for Final Year Students to carry out research projects for the award of Bachelors of Engineering Degree, the Author conducted his final year project in the Investigation of the performance of city roads. A case study of Nakawa division was taken where, one of the major junctions in the city was considered. The investigations were conducted from February 2014 to May 2014. The scope of the investigation comprised of the institutional, Technical and appraisal contributions to the performance of the road. The researcher aimed at finding out how the growing traffic at this junction should be catered for in relation to the current flow. The institution was looked at in the context of; funding where inadequacy in funding was sighted yet it is centre around which every activity is run, planning where it was found out that plans are made but are always overdue due to the bureaucracy involved, administration and management where administration structures were in place and operational but with some overlaps and collusions like the Lord Mayor and Executive director and her executives. The investigations were accordance with BS 5930:1981 Code of practice for site investigations. The overall design of a section of Springroad/ portbel road junction road designs were based on the TRL, AASHTO, and Uganda Road Design Manual (URDM). It was established that the project road was a Class II bituminous road (URDM 1994), with existing traffic of 11,675 pcu's that had outweighed the limits of (8-4)103pcu/d recommended by URDM 1994, the geometry in terms of Width had also narrowed to 4m average less than 6m recommended by URDM 1994, the road structure was also undergoing challenges like edge of matt failure, pot holes of up to 0.25m deep among other defects. During the appraisal section aspects like Social, Economic, Environmental and Political were looked at to so as to ascertain on how they had affected the project or on how they have been affected and finally projecting the outcome after the improvements. The report there for constitutes the key output of the whole exercise carried out. It documents the field activities, desk studies, reviewed information and recommendations. The information has been presented under chapters that is to say Preliminaries, Introduction, Methodology, Review, Analysis, Design, Findings, Reflections, Conclusion, Recommendation and Appendix	Average Daily Traffic, Overtaking sight distance, Stopping sight distance, Vehicle operating costs	Nakawa Division, one of the five divisions that make up Kampala, the capital city of Uganda located in the Eastern part of Africa	Traffic	Other	Solution / Application	K77
78	Kyambogo University	Mwase Charles	2015	DESIGN OF A PERVIOUS CONCRETE PAVEMENT CASE STUDY: PROPOSED KYAMBOGO UNIVERSITY MAIN PARKING LOT	Library Department of Civil and Building Engineering	Pervious concrete is being used more frequently in the developed countries today due to its benefits in reducing the quantity of runoff water, improving water quality, skid resistance during storm events by rapid drainage of water, and reducing pavement noise. However, pervious concrete has not yet been utilized in most developing countries to date. With the proposed construction of new buildings and pavements in Kyambogo University, there will definitely be an increase in impervious surfaces and hence an increase in runoff generation during storm events. A study was therefore undertaken to design a pervious concrete pavement for a parking lot proposed to be constructed at Kyambogo University with the aim of reducing on the surface runoff that would be generated within the University during storm events. The objectives of this study were to: identify a design storm, carryout tests on the subgrade soil, prepare a pervious concrete mix design, and carry out a pavement thickness design. In this study, a 24 hour 10 year design storm for Kampala was identified. DCP tests, infiltration tests and other classification tests were also carried out on the subgrade soil at the study site. Ten pervious concrete mixes were prepared with 5 having no fines and the other 5 having 8% fines. Samples from these mixes were tested for their exfiltration rates and compressive strength, and also a pervious concrete thickness design carried out for each of the mixes. A design storm of 86mm was used in this study, and the subgrade soil was found to be silty sand with a penetration index of 16.1 mm/blow, a design infiltration rate of 14.6 mm/hr., and a drawdown time of 6 hours. Concrete compressive strength test results ranged from 6.6 MPa to 16.6 MPa, while the exfiltration rate test results ranged from 6 mm/s to 18 mm/s, with the mixes containing fines giving higher compressive strengths and lower exfiltration rates as compared to those with no fines. Results from thickness design ranged from 185 mm to 230 mm with the mixes containing fines giving smaller thickness values as compared to those with no fines because of the greater compressive strength of the concrete with fines. From this study, the pervious concrete pavements developed were able to drain all storm water resulting from the design storm without allowing any surface runoff to occur. With the increasing cases of flooding occurring most especially in Kampala due to the increasing use of dense pavements for roads, walk ways, compounds, parking areas and many others, there is a need to check on the surface runoff generation that comes with these developments during storm events. With the ability to eliminate surface runoff and still serve as a pavement, the use of pervious concrete should be embraced in these areas that a exposed to low traffic applications	Storage capacity, allowable ponding time, axle equivalency, liquid limit, plastic limit	proposed Kyambogo University Main Parking Lot at Kyambogo University as indicated by Kyambogo University's master plan for 2030 as shown in Figure A.1 in the Appendix. The site is bordered by the White Head Rise road to the East, Carvers Crescent to the West, Mackay Ring to the South and the University farm to the North.	Design	Pavement	Solution / Application	K78
79	Kyambogo University	Mugyenyi Jackson	2015	STABILIZING EXPANSIVE BLACK COTTON SOILS IN ROAD CONSTRUCTION USING BLAST FURNACE SLAG	Library Department of Civil and Building Engineering	This report presents the stabilisation of black cotton soils using blast furnace slag. The research put in consideration the effect of both mechanical and chemical stabilisation by varying particle sizes and identifying the chemical content of the slag that can otherwise enhance chemical reactions respectively. Black cotton soil exhibiting low to medium percent swelling potential from Kagata-Lomorimor low traffic gravel road in Nakapiripiriti district was used for determining the basic engineering properties of the soil. Blast furnace slag exhibiting non plasticity from Roofing Roll Mill, Namave, was used to blend the Black cotton soil. The slag was also tested for its chemical composition Especially metal content and compounds responsible for binding property like CaO, SiO2, Al2O3, and MgO. Laboratory soil tests, that is, Liquid limit, Plastic Limit, Shrinkage limit, Maximum Dry Density, Moisture Content, and California Bearing Ratio were determined on the soil in its natural state and on blending it with different percentages of Ground granulated blast furnace slag	Black cotton soil (BCS), Blast furnace slag (BFS), and stabilization	soil samples on a community access Kagata-Lomorimor road in Nakapiripiriti district in Northern Uganda. This is because it one of the districts whose bigger part is covered by the black cotton soils and Engineers always get construction problems in the area.	Materials	Gravel	Platform	K79

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80	Kyambogo University	Ssevume Julius	2015	INVESTIGATING THE INFLUENCE OF COARSE AGGREGATE PROPERTIES ON THE COMPRESSIVE STRENGTH OF CONCRETE	Library Department of Civil and Building Engineering	Both coarse aggregates and fine aggregates are the main constituents of concrete because they not only give the body to the concrete, they also have a significant effect on the fresh concrete based on coarse aggregate's shape, size, texture, grading and crushing type. Moreover it is proved that coarse aggregate's types has the severe effect on physical mechanical properties of concrete as coarse aggregate cover almost 60 to 80 percent of the total volume of concrete. This paper investigates the effects of properties of coarse aggregates on the compressive strength of concrete only. To observe the effects of crushed coarse aggregates sharply, all other concrete components like fine aggregate properties, water cement ratio and others are kept constant, for each type and two types of crushed aggregates were used. Machine and hand crushed aggregates types from different sources have been used to prepare different groups of concrete cubes, and these cubes have different variables that were studied to show their effect on compressive strength of concrete. Finally after one (1) week and after four (4) weeks, slump values (consistency of the concrete) and compressive strength were measured without mixing any admixture or super plasticizer to the concrete. Compressive strength difference for all groups at one week and four weeks also analysed at the end of the study.	Coarse aggregate properties, compressive strength and concrete, Aggregate Impact Value, Flakiness index Value	visiting quarries, from which coarse aggregates used in Kampala therefore was conducted in Kampala	Materials	Non-road	Base	K80
81	Kyambogo University	Okello Vincent Labii	2015	AN INVESTIGATION ON THE ENGINEERING PROPERTIES OF LOCAL CONSTRUCTION MATERIALS IN ABIM DISTRICT	Library Department of Civil and Building Engineering	Abim District has a wide variety of construction materials obtained within the local areas like sand, aggregates and bricks. However these materials are of unknown quality when it comes to their engineering properties leading to arguments on what could be the cause of defects in newly constructed buildings in the District. The cited problems range from poor workmanship to poor materials. However even with improved workmanship and supervision during construction, the defects have not been controlled in these buildings leaving the quality of building materials used questionable. The contents of this project therefore focused on determining the cause of the defects in the buildings and further investigated the engineering properties of the local construction materials in Abim District. The materials considered included sand, coarse aggregates, and bricks. The sand and bricks investigated were from four sources; Morulem, Alerek, Awach, and Nyakwae while the course aggregates were from Aninata. The tests carried out on the materials were both physical and mechanical in nature and the report summarizes the results obtained from the tests in chapter four and gives the conclusion and recommendations in chapter five. The report also gives the cost of the project in Appendices.	Sand/fine aggregates, coarse aggregates, test on bricks, aggregate crushing value, and mechanical strength of coarse aggregates.	four sites for sand mining in Morulem, Alerek, Awach and Nyakwae. Bricks from the four mentioned sites were also tested. Aggregates were sampled from Aninata because it is the quarry most used by the people in Abim District.	Materials	Gravel	Platform	K81
82	Kyambogo University	Wasajja Paul	2013	COMPARISON OF WHITE SILICA SAND AND BLACK SAND FOR CONCRETE WORKS	Library Department of Civil and Building Engineering	The study is an investigation performance of sand in Uganda's construction industry for concrete production as per the specifications. It mainly focus on test of quality in building construction of Uganda. The investigation is based on quality tests mainly on the performance of sand for concrete production. The tests to be carried out include chemical tests and strength test of harden concrete. The tests will be carried out on black and white sand in the laboratory, central material laboratory under the ministry of works housing and communication base in Kireka Kampala	Durability, resistance to abrasion, permeability, shear strength, chemical admixtures, aggregate formation	black sand from Bukasa quarry in Wakiso District Kira Town council and the white sand of Entebbe.	Materials	Non-road	Platform	K82
83	Kyambogo University	Mugagga Matovu	2013	UPGRADING VILLA ROAD TO BITUMINOUS PAVED SURFACE DESIGN OF SECTION CHAINAGE (0+000-1+000)	Library Department of Civil and Building Engineering	The economic growth of the Country is manifested by its road length and vehicle ownership. The rate at which a Country's Economy grows is very closely linked by an Elasticity of Transport Demand with respect to GNP to the rate at which the Transport Sector grows. Roads are designed and built to meet the demands of operational comfort, safety, capacity of people and goods. This should be environmentally friendly and economical	Annual Average Daily Traffic, Average Least Dimension, Granular Base-Material type 3, Moisture Content, Maximum Dry Density, Oversee Road Note, Tail water depth	Nyendo/ Ssenyange division, Masaka Municipality and limited to the design of the project road.	Design	Pavement	Solution / Application	K83
84	Kyambogo University	Kasiita Ibrahim	2013	EVALUATION OF PAVEMENTS IN RELATION TO TRAFFIC AXLE LOADS AND ITS CONTROL IN UGANDA (A CASE STUDY OF A SECTION ON NAMUTERE – BUGIRI ROAD)	Library Department of Civil and Building Engineering	This project is to evaluation of pavements in relation to traffic axle loads and its control in Uganda, taking a cause study of a section on Namutere –Bugiri road. This is due to the many roads have failed within a short while after commissioning, this is attributed to the heavy vehicles carrying goods way over the right load they supposed to carry and yet the pavement structure is designed basing on the required load of those vehicles. This is evident on Namutere – Bugiri road which was designed on the assumption that the legal axle load requirements would be adhered to, but developed distresses at an early stage, in the form of cracking, premature settlements, localized failures in the DBM, rutting, longitudinal rutting and bleeding. Therefore in this project an investigation into whether Uganda roads design should realistically follow legal axle limits or actual axle loading and propose appropriate design criteria it been taken. It was found that the most economic design method for road susceptible to high levels of overload is the Kenya Road Design manual. It is followed by the TRL, 1993 method. The most generous method is the Uganda Road Design manual.	Design traffic loading, side drains, ruts, cracks and potholes, traffic axle loads, drainage, traffic surveys, road pavement evaluation, temperature adjustment factors, design traffic loading	Namutere –Bugiri road	Traffic	Pavement	Solution / Application	K84
85	Kyambogo University	Kamwesigye Isaac	2014	UPGRADING OF AGENDA – MBALWA - NAMUGONGO ROAD FROM GRAVEL ROAD TO CLASS III BITUMINOUS SURFACED STANDARD. DESIGN OF SECTION 0+000 TO 1+000	Library Department of Civil and Building Engineering	This project was done with the aim of upgrading Agenda – Mbalwa - Namugongo road to a bituminous paved surface so as to provide residents of Mbalwa and areas around with an all-weather road which will eliminate dust to shops and homes nearby the road during the dry season and slippery road surfaces during wet season. Also the road is to provide an alternative route to Namugongo which will reduce the traffic jam on the existing paved road especially during martyrs day celebrations. It was done by designing this road with respect to geometry, drainage and pavement. The existing road is surfaced with marrum and during the dry season, a lot of dust is produced from the road by speeding vehicles and it spreads to the nearby homes and shops, also water collects at some points on the road during the wet season and as traffic passes, mud builds up gradually up to a point when the road becomes completely slippery and some vehicles completely fail to use the road. Laboratory and field tests, surveys, consultations, and observations are some of the methods that were used to collect data. A realignment has been proposed with curves having a minimum radius of 100m, appropriate layer thicknesses have been designed to handle the projected traffic for the design life of the project, an appropriate drainage system has also been designed and continuous maintenance especially of the drains has been proposed so as to keep the drainage system working as intended at all the time..	Transport Research Laboratory, Number of Average Daily Traffic, California bearing ratio, Growth Rate, Projected Traffic Flow, Wear Factor	Namugongo, Wakiso district. The beginning of the road is approximately 7km east of the Central business district of Kampala along Kireka-Namugongo road at coordinates of 00O 21'59"N and 32o38'55" E at an elevation of 3925ft (google map and google earth). The road starts exactly at Agenda trading	Design	Pavement	Solution / Application	K85

#	ORIGINATING INSTITUTION	AUTHORS	YEAR	TITLE	LOCATION OF DOCUMENT	ABSTRACT	KEYWORDS	GEOGRAPHICAL AREA	FOCUS AREAS	PAVEMENT LAYER FOCUS	TT LEVEL	Google Earth number
								centre (approximately 4.5km from Kireka), passes through Mbalwa trading centre and stops in Namugongo trading centre as shown in figure 1.1 below.				
86	Kyambogo University	Kilama David Crispus	2014	UPGRADING OF KASOKOSO - MUTUNGO ROAD (KIRA TOWN COUNCIL) FROM CLASS B GRAVEL ROAD TO BITUMINOUS SURFACE Section 0 + 000 – 0 + 750	Library Department of Civil and Building Engineering	The project is entitled "Upgrading of Kasokoso –Mutungo road". This project is aimed at identifying the best available management and Engineering approach to produce and maintain a good roadway facility that can safely handle the increased traffic volume on the project road. Kasokoso –Mutungo road is a Class B gravel road located in Kira Town Council and links residents of Kasokoso and surrounding to Kireka. The present state of the road is characterized by increasing traffic, irregular geometric alignment and width, ruts, gullies, corrugation and lack of drainage structures. Improvements of the road to Class III Bitumen will no doubt attract several benefits including but not limited to increased capacity, level of service, reduced transportation costs, reduced vehicle maintenance costs, controlled flow of storm water, increased road network, reduced noise and dust pollution. The project involved; Establishing the organization responsible for the maintenance and management of this road, source of funding for the road, planning strategy and location of the road corridor, Traffic assessments on road, carrying out road survey, obtaining axial loads from the available survey data, determination of the existing services along the road from different Utility providers, obtaining rainfall data from the Metrological Department, soil tests, selection of locally available base materials, comprehensive design of the flexible pavement structure of Kasokoso - Mutungu Road, analysis of results and findings and production of technical drawings among others.	Average Annual Daily Traffic, Average Daily Traffic Stopping sight distance	Site in Kasokoso (Kira Town Council) and government institutions such as UBOS, URA and Department of Metrological Survey (in Entebbe and Kampala) where some data were collected.	Design	Pavement	Solution / Application	K86
87	Kyambogo University	Ongala Geoffrey	2013	FEASIBILITY STUDY REPORT FOR IMPROVEMENT OF OMODO ANYURU ROAD IN LIRA	Library Department of Civil and Building Engineering	As mandated by the University for Final Year Students to carry out research projects for the award of Bachelor of Engineering in Civil and Building Engineering Degree, the author conducted his final year project in the feasibility study of improvement of Omodo-anyuru road. A case study was taken along the road for 1 km stretch from 0+000 – 1+400. The feasibility study was done from December 2012 to June 2013. The scope of the work comprised of the institutional, Technical and appraisal. Under institutional, the researcher aim at finding out how organ under this section contributed to their either improvement or failure of their roads particularly on the project road. The institution was looked at in the context of; funding where inadequacy in funding was sighted yet it is centre around which every activity is run. planning where it was found out that plans are made but are always overdue due to bureaucracy involved, administration and management. Technical aspect was handled within the context of; traffic, Geometry, Pavement and Drainage. The overall design of the section of Omodo-anyuru road was based on TRL (1993) and Uganda Road Design manual 1 (2005). It was established that the road was class III bituminous road. The report therefore constitutes the key output of the whole exercise carried out. It documents the field activities, desks studies, reviewed information and recommendations. The information has been presented under chapters that to say Introduction, Background, Methodology, Review, Analysis, Design, Reflections, Conclusion, Recommendations and Appendix.	Road drainage, road traffic noise, pavement design, traffic volume surveys, materials, road drainage.	Railway Division, Lira Municipal council. The road is the only main access to the industrial area and Uganda Railway Station.	Design	Pavement	Solution / Application	K87
88	Kyambogo University	Kyabaggu Edward	2014	UPGRADING OF KIWUNYA ROAD FROM CLASS A GRAVEL TO CLASS II BITUMINOUS PAVED SURFACE DESIGN OF SECTION CHAINAGE (FROM 0+000 TO 1+000)	Library Department of Civil and Building Engineering	The economic growth of the Country is manifested by its road length and vehicle ownership. The rate at which a Country's Economy grows is very closely linked by an Elasticity of Transport Demand with respect to GNP to the rate at which the Transport Sector grows. Roads are designed and built to meet the demands of operational comfort, safety, capacity of people and goods. The structure put up should be environmentally friendly and economical. The project therefore is about upgrading of Kiwunya road to bituminous standard. The following are included: The road was evidenced to have problems of poor drainage, potholes, and poor geometry among others. These affected the smooth flow of traffic due to dust pollution and flooding hence affecting the community around. Chapter one therefore examines the major aim of the project under study and its significance to the community. Different publications were reviewed concerning the design of similar pavements; these include: design manuals, text books, among others. The review covered but not limited to: traffic analysis, sub-grade strength classification, definition of uniform sections, material selection, geometric design, pavement design and drainage design. All are conceptualized in chapter two. To achieve the main objective of the project, various steps were undertaken; which include: traffic survey on the project site, topographic survey, DCP test, geotechnical analysis among others. These are critically analysed in chapter three. The results got were later merged to establish the conceptual model of the project. This helped in coming up with possible designs of one km stretch which was taken to be a critical section along that road, chapter four critically examines this. Finally conclusions were drawn about the project and recommendations made which are captured in chapter five. Additional information has also been included in the appendices which makes the report more detailed. It is hoped that the reader will discover that the proposed project needs urgent intervention so as to save the community.	Annual Average Daily Traffic, Average Least Dimension, Equivalent Standard Axial, Allowable Headwater depth, Linear Shrinkage, Oversee Road Note, Tail water depth	Kiwunya Road from January to May 2014. It was limited to the design of the project road. The design included; Traffic, geometry, drainage, pavement design	Design	Pavement	Solution / Application	K88
89	Kyambogo University	Afayo Nick	2014	DESIGN FOR THE UPGRADING OF ADUMI ROAD FROM CLASS B GRAVEL TO CLASS II BITUMINOUS SURFACE IN ARUA DISTRICT (Section 0+000 – 1+000)	Library Department of Civil and Building Engineering	This project is to upgrade Adumi road from class B gravel to class (II) bituminous surface with the aim of providing a safe, rapid, convenient, economical and environmentally compatible movement of people and goods. Adumi road stretches right from Arua town to the Uganda Congo border, for the locals, the network opens up opportunities for accessing employments, markets, education and health facilities as well as contributing to social inclusion and security. The road surface is uneven caused by potholes, poor road alignment which increases the travel time, accidents and vehicular operating costs. The project aims at upgrading Adumi road from the present class B gravel to class (II) Bitumen standard to ensure efficient and effective movement of traffic. In order to provide this facility, the various elements of the road such as the geometry, pavement structure and the drainage had to be designed. This project also includes computer subroutines to analyse and design road geometry and interpretation of subgrade strength classes. The average daily traffic was 886 veh\day with motorcycles taking the highest percentage and minibuses the lowest percentage giving a traffic class of T3, the subgrade class obtained was S5. From the structural catalogue the wearing course will be of double surface dressing with 175mm G80 of road base material and 100mm G30 sub-base material. From the hydrologic analysis and using the rational method the discharge of 0.93m3/s was obtained thus a longitudinal side drain of 0.5m base width 0.5m and 1:1.5 side slope was found to be adequate. The main challenge faced in the course of the project was financial constraints; Project needs money for data collection, transportation and documentation and also the project time was not Sufficient to produce a wholesome project inclusive of costing. Nevertheless, I have learnt that whatever the odds one still needs to give his very best, avoidance of last minutes preparation, to be a practical Engineer and appreciate practical participation. Technically, Priming should be done using MC-30 with a penetration depth of about 3-10mm the subgrade should be scarified to such a depth as will give a layer thickness after compaction of not less than 100mm	Average Daily Traffic, Average Annual Daily Traffic, Stopping sight distance, Overtaking sight distance	North West of the countryside popularly known as the west Nile, the terrain is fairly flat with seasonal rivers (River Enyau).Adumi road is about 17km but the study is limited to 1.0km from Ch. (0+000-1+000)	Design	Pavement	Solution / Application	K89
90	Kyambogo University	Ibubi Timothy	2014	INVESTIGATING CHALLENGES IN MAINTENANCE OF TOWN COUNCIL AND DISTRICT ROADS (CASE STUDY OF	Library Department of Civil and Building Engineering	This report focuses on the challenges met by key players in road maintenance and rehabilitation in Uganda today. The roads in Uganda today are failing terribly (in terms of roughness, rutting, potholes, edge step and cracking) before the lapse of their design life causing inflation in the vehicular operating costs for the local road users, increase in the accident rates and traffic congestion due to inadequate maintenance and rehabilitation of these roads. Proper maintenance of these roads helps keep them in good working condition and hence keeps the structural integrity, drainage and outlook of the roads in good shape. In Uganda today a lot of challenges are faced by the key players in maintenance and rehabilitation of the roads there by making it difficult to keep these roads	Annual District Road Inventory Conditional Survey, Bill of Quantities, Gross Domestic	Tororo	Maintenance & Rehabilitation	Pavement	Platform	K90

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				TORORO MUNICIPALITY)		in check	Product					
91	Kyambogo University	Owino Stephen	2014	DESIGN OF THE DRAINAGE FACILITY AT KYAMBOGO STAGE-JUNCTION ALONG KAMPALA – JINJA ROAD	Library Department of Civil and Building Engineering	Drainage design focuses on the adequate surface and subsurface drainage of the area as this will help in solving the problem of floods in the area. The prevailing conditions of the existing drainage system were observed and studied and it was found out that most of them are covered and some of them are blocked and clogged in sections for example those passing through UNRA offices near Kyambogo stage junction. The project has entirely focused on the different drainage systems and their designs, the contribution of the catchment area towards the flooding of the area, the soil characteristics, materials used in the lining of the drainage system and the their design procedures. The report also contains the coefficients obtained from different areas with their soil characteristics contributed by the different areas as it will described in the report and the different data obtained from different technical departments like the meteorological Centre the water sector organizations. Basing on the information obtained the catchment area of the area was also obtained using the topographical map obtained from the water sector in the course of knowing the contributing areas to the storm. The time of concentration was also obtained using the rainfall data obtained from the rainfall totals got from the meteorological Centre Kampala Uganda and this was used to design the drainage facilities in the area. Different books were referred to in design procedures that were used to obtain the different sections of the area as this was as sufficient as a guide for the whole report. Kyambogo stage junction along Jinja road side drains has a discharge of 3.531 m3/s yet the current discharge is 5.8 m3/s / so this renders the existing side drains inadequate to serve the purpose, these should be replaced with the designed side drains of the following design details. Base width of 1500 mm. Effective depth of 1100mm and a working slope of 1 in 56 as illustrated below. The above open drainage facility should discharge off its storm water into a cross drain of depth greater than 1.569 m. So this called for the design of a box culvert of V m, that gives a discharge capacity of /s. In the box culvert 12T16 @ 200 mm c/c should be provided vertically and 24T12 @ 300mm c/c in the midspan.	Land Coefficient, Area of Reduction Factor, Head water, Permissible velocity Discharge	Nakawa division along Kampala-Jinja road in the Eastern part of Kampala at Kyambogo stage junction.	Environment	Other	Solution / Application	K91
92	Kyambogo University	Agondeze Hillary Winyi	2013	ASSESSMENT OF PEDESTRIAN SAFETY AND MEASURES TO IMPROVE ON PEDESTRIAN SAFETY AT UNSIGNALISED CROSSINGS IN KAMPALA (A case study of Kyambogo stage and Kibuye stage crossing section)	Department of Civil & Building Engineering Library	Pedestrian Safety is a very important parameter in the design of traffic flow conditions at unsignalized pedestrian crossing sections. The safe design and operation of pedestrian crossing facilities must allow adequate time for pedestrians to cross safely during the walk sign indication. Data from 2,786 pedestrian crossing events at two unsignalized crossing sections in Kampala was analysed to determine the effect of age, gender, approach traffic volume, group size and crosswalk geometry on the crossing speeds of pedestrians which are the main cause of pedestrian crash severity at these unsignalized crossing road sections. Statistical analyses were conducted using Stata v11.0 to obtain the mean, 15th and 85th percentile speeds, with all testing carried out at a 95% confidence interval and to reveal which factors significantly contribute to pedestrians' speeds. Age, gender, crosswalk geometry and group size were found to significantly affect pedestrian crossing speed at these unsignalized crossing sections (Kyambogo stage and Kibuye stage crossing section). Pedestrians in the age group of 26-35 years had the highest mean speed of 1.29m/s and older pedestrians of 46 and above years had the lowest mean speed of 1.08m/s. Male pedestrians generally walked faster than female counterparts with mean speeds of 1.29 and 1.21m/s respectively. Pedestrians in groups walked slower than individual ones with groups of 2 to 4 walking at a mean speed of 1.15m/s and those in groups of 5 and above walking at 1.01m/s. The mean and 15th percentile pedestrian speeds at the studied crossing sections were 1.27m/s and 1.08m/s respectively. A model for predicting the mean/operating pedestrian speed was developed and a pedestrian crossover crossing facility which suits the case study in question was designed. The 15th percentile pedestrian speed of 1.2m/s recommended for unsignalized crossing section design by the Ministry of Works, Housing and Communications, Geometric Design Manual, 2005 needs to be revised in order to come up with a value that caters for all pedestrians in accordance to the crossing measures provided at the crossing facilities.	Pedestrian safety , unsignalised crossings	Kampala	Road safety	Other	Platform	K92
93	Kyambogo University	Asiimwe Ivan	2013	Proposed design for Improving Spear (Nakawa) Road to UNEB Junction (Ntinda)	Department of Civil & Building Engineering Library	This report consists of a detailed proposed design for Improving Spear (Nakawa) Road to UNEB Junction (Ntinda) which stretches a distance of 1.5km. The main objective was to a design flexible pavement with respect to the route, geometry, drainage and pavement. This was done by assessing the current traffic using the road, existing geometry, pavement structure and designing an appropriate drainage system. The project road was characterized by a broken back curve, reverse curve and sharp curves, which brought about so many delays. Lab and field tests, surveys, consultations, and observations were some of the methods that were used to collect data. Average Daily Traffic was 5156Vehicles/day, Saloon cars taking up the greatest percentage of traffic (26%), the subgrade at section 0+080, 0+980 and 1+300 was found having a CBR of 28%,34% and 29% respectively and most of the curves were substandard having a radius of less than 100m. A trapezoidal channel section, culverts were designed to cater for drainage. A double surface dressing has been proposed with chippings being sprayed at10.912kg/m2 and 7.502kg/m2. The ADT showed that the road was due for upgrading considering the Ministry of Work sand transports' criterion for upgrading a road in an urban setting with more than 8000Vehicles/day. Realignment has been proposed with curves having a minimum radius of 100m, continuous maintenance of the drains is necessary so as to prevent silting.	NO KEY WORDS	Kampala	Design	Pavement	Solution / Application	K93
94	Kyambogo University	Atukwasa Leonard	2012	Assessment of the efficiency of Mulago roundabout	Department of Civil & Building Engineering Library	The project title is assessment of the efficiency of Mulago roundabout. This report consists of detailed proposed methods of improving the traffic flow at Mulago roundabout. The main objective was to determine the current capacity of the roundabout by determining the capacities of individual capacities of all the approach arms and suggest means of improving the capacity at the roundabout for the next ten years. This was done by assessing the current traffic flow using the roundabout through classified traffic counts where the turning movements for all the approaches were established and assessing the geometry of the roundabout which was done by carrying out survey works so as to determine the geometric parameters of the roundabout road, existing geometry. The project roundabout was characterised majorly by traffic congestion. Institutional set up of KCCA has also been analysed by looking at its administration and management functions. From the results obtained, the peak hour traffic was 4581 pcu/hr and 4333 pcu/hr for the morning and evening peaks respectively on a Friday. It was established that for the morning peak, traffic inflow was distributed as 26%, 26%, 28% and 20% for Haji Musa Kasule road, Yusufu Lule road, Kira road and Binaisa road respectively whereas traffic outflow was 22%, 22%, 27% and 29% for Haji Musa Kasule road, Yusufu Lule road, Kira road and Binaisa road respectively. The geometric parameters analysed were found to be lying within the practical limits range according to the design manuals and publications used. Methods considered in improving the efficiency of the roundabout included using segregated left turn lanes which would involve separating vehicles for the left turn from other vehicles by provision of an auxiliary lane for this traffic. Flaring of the entries would also be a good measure but research shows that it increases the capacity by 20% but it increases accident rates due to increase in speed of vehicles entering the roundabout. Other measures discussed include signalization and grade separation but were not feasible for the project because they did not meet the requirements. The method of provision of segregated left turn lanes was adopted because it facilitates left turn flow, reduces approach flow and reduces vehicle conflict. Institutionally, KCCA should develop an organizational structure to perform accordingly. To incorporate slip lanes, demolitions and compensations will be carried out hence a proper plan should be put into consideration. This is because the existing road reserve is not enough to incorporate the slip lanes therefore studies should be carried out to find possibilities of fitting the option within the environment and a proper settlement plan should be drawn to ensure quick and peaceful evacuation of the land owners.	Assessment, efficiency, Mulago roundabout	Mulago Roundabout	Operations	Other	Solution / Application	K94
95	Kyambogo University	Baireghaka Benedicto	2012	FEASIBILITY STUDY FOR THE IMPROVEMENT OF IGANGA-MAYUGE ROAD (Case Study Chainage 0+000 km	Department of Civil & Building Engineering Library	This report consists of a detailed feasibility study for the improvement works on a section of 4Km from Buligo to Nawanzu on a 21Km stretch between Iganga and Mayuge. This project is meant to provide information necessary for the construction of a stable infrastructural link in respect to the traffic, geometry, drainage and pavement with an environment impact assessment report so as to promote adequate, safe, well maintained works, transport infrastructure and service for socio-economic development between Iganga and Mayuge district in Eastern Uganda. This was to done by assessing the current traffic that is operational on the road, existing geometry, the current drainage conditions and pavement structure through the field and laboratory, surveys, consultations, and observations. Traffic congestion, narrow carriageway, sharp curvatures, flooding, developed gullies and other	FEASIBILITY STUDY	Iganga	Design	Pavement	Solution / Application	K95

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				Buligo – Chainage 4+000 km Nawanzu)		road defects have been characteristic features on the project road. The ADT obtained showed that the road was due for upgrading considering the Ministry of Works and transports' criterion for upgrading a road in semi-urban setting with more than 300Vehicles/day. Realignment has been proposed with curves, continuous maintenance of the drains is necessary so as to prevent silting. The geometry of the road was designed according to standard parameters of paved roads and the subgrade strength was found from the traffic class obtained. A trapezoidal channel section, culverts were designed to cater for drainage and were found adequate to control flooding on the road surface. A double surface dressing has been proposed with chippings being sprayed at 10.912kg/m and 10.230kg/m2 for the first and second layer and binder being sprayed at 1.1794kg/m2 and 0.9688kg/m2 for first and second layer. The designed pavement structure was found adequate for a traffic design period of 15 years. Quality control for materials in accordance with the specifications should be ensured, during construction. Road signs should also be positioned to improve on the road users' information systems.					
96	Kyambogo University	Ssebanakitta John Francis.	2012	Feasibility Study for the proposed improvement of Kawuku to Bwerenga Road	Department of Civil & Building Engineering Library	The report represents an edition of the Feasibility Study for the proposed improvement of Kawuku to Bwerenga Road in respect to institutional, technical and appraisal. Under institutional; the funding, administration, organisational, planning, and stakeholder aspects were examined. Technically; traffic, geometry, pavement, and drainage were assessed for the project road. The environmental, social, economic and political aspects were assessed under the appraisal. The General objectives of the project are reducing transport costs, enhancing road safety, facilitating the Socio-Economic Development of the project area and National Integration of the islands of the Kalangala District by providing access to the mainland via the project road. The Study comprises: Review of existing data on the project road; Carrying out Traffic, Soils, Materials & Inventory of drainage facilities; Environmental /Resettlement Impact Assessment; Preliminary Engineering survey. This was done by assessing the current traffic using the road, existing geometry, pavement structure and designing an appropriate drainage system. The methodology used included: data collection and classification (laboratory tests, manual traffic counts, surveys reviews, observations and consultation); design and simulation (design was done by use of standards such as Uganda roads design Manual, Transport Research Laboratory , AASHTO; analysis carried out using civil Cad, Auto CAD land development, Programmable calculators, tables and charts. The project road was characterised with an impaired road carriageway, sharp curves, and non-functional drainage system. From the analysis, results obtained were, Average Daily Traffic was 872Vehicles/day (excluding motorcycles) which showed that the road was due for upgrading considering the Ministry of Works and Transports' criterion for upgrading a road with more than 300Vehicles/day, Motorcycles taking up the greatest percentage of traffic (80%) giving a traffic class of T4, some of the curves were substandard having a radius of less than 100m, the sub-grade at section was found having strength class of S5 and S6, a trapezoidal channel section; 0.4m wide base, 0.6m deep and side slopes of 1:2 & 1;1.5 and culvert crossing of 900mm diameter were designed to cater for drainage. The road is proposed to be upgraded from a class C gravel road to a paved class II road having a carriageway width of 6m and shoulders having 1.5m wide with a total roadway width of 9m to cater the future traffic, improved safety, reduced operation cost and social benefits of the community. The road structure will be composed of a double surface treatment, a 200mm thick base and a sub-base layer of 125mm thick (Ch 0+000 – 1+500). It is recommended that detailed studies on economic, social and environmental impacts be carried out on this road, CH 0+000 (Kawuku) – 3+200(Namugonde).	NO KEY WORDS	Kampala	Design	Pavement	Solution / Application	K96
97	Kyambogo University	Kayizzi Patrick	2012	INVESTIGATION OF THE PERFORMANCE OF ROADS IN KAMPALA (Case Study: Nakawa Division, Kisaasi-Kyanja) ,(001.000-002.500)	Department of Civil & Building Engineering Library	As mandated by the University for Final Year Students to carry out research projects for the award of Bachelors of Engineering Degree, the Author conducted his final year project in the Investigation of the performance of city roads. A case study of Nakawa division was taken where, a 1KM stretch was considered along Kisaasi Kyanja road, from Kyanja Ch 002+300 towards Kisaasi Ch 003+500. The investigations were conducted from August 2011 to June 2012. The scope of the investigation comprised of the institutional, Technical and appraisal contributions to the performance of the road. Under institutional, the researcher aimed at finding out how organ under this section have contributed to either the improvement or failure of the pavements particularly on the project road. The institution was looked at in the context of; funding where inadequacy in funding was sighted yet it is centre around which every activity is run, planning where it was found out that plans are made but are always overdue due to the bureaucracy involved, administration and management where administration structures were in place and operational but with some overlaps and collusions like the Lord Mayor and Executive director and her executives. The technical aspect was handled within the context of; traffic, Geometry, drainage and pavement and how their integrity, performance is directly contributing to the overall performance of the road. The investigations were accordance with BS 5930:1981 Code of practice for site investigations. The overall design of a section of Kisaasi Kyanja road designs were based on the TRL, AASHTO, and Uganda Road Design Manual (URDM). It was established that the project road was a Class II bituminous road (URDM 1994), with existing traffic of 11,675 pcu's that had outweighed the limits of (8-4)103pcu/d recommended by URDM 1994, the geometry in terms of Width had also narrowed to 4m average less than 6m recommended by URDM 1994, the road structure was also undergoing challenges like edge of matt failure, pot holes of up to 0.25m deep among other defects. During the appraisal section aspects like Social, Economic, Environmental and Political were looked at to so as to ascertain on how they had affected the project or on how they have been affected and finally projecting the outcome after the improvements. The report there for constitutes the key output of the whole exercise carried out. It documents the field activities, desk studies, reviewed information and recommendations. The information has been presented under chapters that is to say Preliminaries, Introduction, Methodology, Review, Analysis, Design, Findings, Reflections, Conclusion, Recommendation and Appendix	NO KEY WORDS	Kampala	Management	Pavement	Solution / Application	K97
98	Kyambogo University	Najjuma Esther	2012	A FEASIBILITY STUDY OF UPGRADING KYETUME- KATOSI ROAD FROM CLASS C GRAVEL TO CLASS 111 BITUMINOUS SURFACE. CASE STUDY (CH 0+000-1+034 KM)	Department of Civil & Building Engineering Library	This report covers a feasibility study of upgrading Kyetume-Katosi from gravel B to class 111 bituminous surface. The section under study was 1.034 Km long. Several activities were carried out which included Desk Study, Data collection, Analysis and interpretation of results. Data collection involved Manual traffic counts, axle load surveys, Topographical surveys, DCP tests, sample collecting of existing sub grade plus that of the available borrow pit. From all the above activities, it was discovered that the road required upgrading since the AADT exceeded 300veh / day. A new pavement to be adopted was designed as follows: • Double surface dressing was found to be applicable where the first layer had 14mm and the second layer 10mm aggregates respectively. • A 200mm thick cement stabilised road base was recommended throughout the section. • A 200mm thick sub base was found applicable Geometrical analysis gave horizontal alignment of circular curves with minimum radii of 175mm as well as transition curves of corresponding length. The vertical alignment was found to be adequate. A drainage system consisted of a trapezoidal open drain that was designed as to have a depth of 400mm inclusive of 100mm as a free board, bed width 300mm and side slopes 1:1.5. A cross drainage consisted of a pipe culvert with of 900mm was designed.	NO KEY WORDS	Kampala	Design	Pavement	Solution / Application	K98
99	Kyambogo University	Odongo Francis	2012	FEASIBILITY STUDY FOR IMPROVEMENT OF SEETA-NAMUGONGO ROAD (FROM CLASS B GRAVEL TO CLASS II B BITUMEN TRL/RDM STANDARD) A CASE STUDY FOR SECTION 0+00 FROM KOBIL JUNCTION TO 2+000 MISINDE	Department of Civil & Building Engineering Library	This project was carried out in Goma Division Mukono Municipality as a case study to evaluate various Options and opportunities establishing the viability of road investment projects. Maintenance, Rehabilitation and Upgrading were options of Improvements on Seeta-Namugongo road section. The objectives of the project were to study the adequacy of Institutional, Technical and general Appraisal. The primary data obtained were traffic 9640 veh/day, average sub grade strength of S5, average annual rainfal160mm, with peak discharge q of 2.68m3/sand nominal gradient of 3.6-7%, environmental mitigative measures and socioeconomic factors were considered and used for the design of this section. With Significant of increasing country's economic growth though elasticity of transport demand in the transport sector, producing friendly environment and political stability The study there for restrained the collected data to the TRL/ Uganda design manual in the design of these section parameters.	NO KEY WORDS	Kampala	Design	Pavement	Solution / Application	K99

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				TRADING CENTRE								
100	Kyambogo University	Atukwasa Aggrey	2013	Feasibility study for Improvement of MakhanSingh Street in Mbarara Municipality	Department of Civil & Building Engineering Library	This report covers the reconstruction of Makansingh street from Ntare road near Stanbic bank to Masaka road roundabout (Amahembe g'ente) a distance of 0.53Km. It addresses the causes of failure of the existing road. The report analyses the strength of the sub grade, assesses traffic loading, carries out site tests on borrow pit materials and surface dressing chippings; and proposes the design of a new pavement. Extensive literature review was carried out on available literature sources, which include; books, road construction standards and Road Design Manuals, interviews were also held with Technical Officials of Mbarara Municipality. A visual condition survey was carried out to establish the cause of the failure of the road. The traffic counts were done to determine the axle loading according to TRL Overseas Road note 31. Tests were carried out on borrow pit materials to determine their suitability as road base and sub base materials. The plasticity index was determined from the plastic and liquid limit values. The gradation tests were also carried on the borrow pit materials. Tests on chipping were carried out to determine their suitability for surface dressing. After carrying out tests, the results were analysed and using the thickness method of design a new pavement consisting of a 200mm thick sub-base, road base of thickness 200mm of stabilized gravel and two layers of surface dressing was designed. The following were recommended; the geometric and drainage aspect of the road should be analysed, maintenance should be given first priority and lastly, sensitizing the community on the importance of drainage on a road. This project when implemented will allow increased flow of goods and services to other parts of the country, improved comfort and lastly reduction of pollution due to dust caused by vehicles because of loss of paved surface.	NO KEY WORDS	Kampala	Design	Pavement	Solution / Application	K100
101	Kyambogo University	Odwar Costa Moses	2012	Feasibility Study for Improvement of Dembe-Kirowoza Circular Road	Department of Civil & Building Engineering Library	This report consists of a detailed proposed design for upgrading Dembe-Kirowoza Circular road to a bituminous paved surface which stretches a distance of 3.85km. The main objective was to a design flexible pavement with respect to the route, geometry, drainage and pavement. This was done by assessing the current traffic using the road, existing geometry, pavement structure and designing an appropriate drainage system. The project road was characterized by a broken back curve, reverse curve and sharp curves, which brought about so many delays. Lab and field tests, surveys, consultations, and observations were some of the methods that were used to collect data. From the results obtained, the Average Daily Traffic was 1116 Vehicles/day, Motorcycles taking up the greatest percentage of traffic (43%), the subgrade at section 0+500 was found unsuitable having a CBR 10% and most of the curves were substandard having a radius of less than 100m. A trapezoidal channel section, culverts were designed to cater for drainage. A double surface dressing has been proposed with chippings being sprayed at 13.367kg/m2 and 9.548kg/m2 for the first and second layer and binder being sprayed at 1.229kg/m2 and 0.949kg/m2 for first and second layer. The ADT showed that the road was due for upgrading considering the Ministry of Works and transports' criterion for upgrading a road in an urban setting with more than 300Vehicles/day. Realignment has been proposed with curves having a minimum radius of 100m, continuous maintenance of the drains is necessary so as to prevent silting. Quality control should be ensured for materials in accordance with the specifications as stipulated.	NO KEY WORDS	Kampala	Design	Pavement	Solution / Application	K101
102	Kyambogo University	Kirinnya Fraancis	2013	FEASIBILITY STUDY FOR IMPROVEMENT OF MASAKA-KIDDA ACCESS ROAD (TO TRA STANDARDS) CASE STUDY OF CHAINAGE 1+000 TO CHAINAGE 2+100	Department of Civil & Building Engineering Library	Institutional The feasibility study for the improvement of Masaka –Kidda Access road from Chainage 1+000 to Chainage 2+100 using TRL , Uganda road design manual and AASHTO standards was done. The implementation has been through a project team that has coordinated, supervised and managed the project. Technical The context of the project has been to analyse the project elements using the Institutional, Technical and appraisal format. The world over it is the responsibility of the pavement design engineer to ensure that the design produced conforms to departmental policies, procedures, standards, guidelines and good engineering standards. Statutes & codes of practice establish the responsibilities of the state, countries, districts, municipalities for the planning and development of the transportation systems serving the people. In Uganda all road construction, reconstruction, upgrading, operation and maintenance are contained in the government poverty action plan (PEAP) 2015. Masaka Kidda Access Road is a Tertiary, medium speed and moderate traffic gravel road the total road length is 2.1 km of which 1km is paved and 1.2km is unpaved, width is 6.5m average, in a fairly good condition and a gravel surface and has a rolling terrain, Appraisal The main objective of the project is to carry out a feasibility study, to assess the existing road conditions, find solutions regarding the current and projected traffic, geometry, drainage and environmental concerns on Masaka -Kidda Access road in order to produce an efficient, effective, reliable and safe road that will serve the increasing traffic and promote systematic development of the area.	NO KEY WORDS	Kampala	Design	Pavement	Solution / Application	K102
103	Kyambogo University	Byamukama k. William	2012	COMPARATIVE STUDY FOR THE CHOICE BETWEEN FLEXIBLE AND RIGID PAVEMENT (Case study: Mukono – Jinja Highway)	Department of Civil & Building Engineering Library	Transportation in Uganda is dominated by road and economies rely heavily on it for passenger and freight movement. Road network has considerably grown by both constructing new or upgrading existing ones and Mukono – Jinja highway is one of them to enhances safe, efficient and reliable transport services and provides an effective support to increased Agricultural and Industrial production, Trade, Tourism, Social and Administrative service to the communities though the choice between pavement types remains critical. Flexible pavements are widely used despite some doubts regarding their economics under different conditions and currently 99% of Uganda roads are flexible. All pavement types experience defects at some point in their design life and Mukono –Jinja road is faced with geometry, drainage and pavement defects like block cracking, alligator cracking, patching and potholes which testifies that it's failing structurally. This has led to a poor riding surface, delays, accidents, user costs and more others. The objective of this project is to carry out a comparative study for the choice between flexible and rigid pavement with respect to Traffic, pavement and appraisal (Economic, Environmental, and Socio-political aspects). In order to achieve the main objective the following tasks have to be carried: - Data collection, Classification, Design, Storage and Retrieval, Publication and Dissemination. From data collection, traffic was obtained by manual counts to give AADT of 10470veh/day, traffic loading on the west bound (To Mukono) having 62.28mesa compared to 23.09mesa east bound. Pavement investigation was by Visual Condition Survey (VCS) and field tests like Uk DCP machine. VCS show that (carriageway width is 7.0 m on average with 1.8 m shoulders, Fill height and ditch depth are on average less than 0.5 m on both sides, Ruts and other types of deformation show very high deformation, on average 14 mm on the LHS and 20 mm on the RHS. Cracking is not significant for most of the road sections and Pot holes are generally localized but isn't the case on rigid pavement section chosen during the study. Design standards like TRL 1993, AASHTO, Tanzania Road Design Manual and URDM standard for analysis and design in this project because of its economic conservation since the project is located in the developing tropical country. Two Pavement types have been designed and their materials specified using projected traffic on the project road. For instance flexible pavement (Asphalt Concrete 50mm, Road Base 200mm,Sub Base 200mm, Capping layer was designed for Design life 20 years) Whereas Concrete slab 330mm, Sub Base 150mm, 205mm Capping layer and 40 years design life for Rigid pavement) was designed to suite current escalating traffic on Project Road. The report has been organized in chapters with chapter one as introduction, two methodology, three review, four analysis, five design, six discussion all of which captured Institutional, Technical and Appraisal. Seven was reflections stating challenges and lessons learnt, eight was conclusion, nine was recommendations to government, university, and to students. References and Glossary followed before appendices.	NO KEY WORDS	Uganda	Design	Pavement	Solution / Application	K103
104	Kyambogo University	Okidi Perry Robert	2012	Evaluation of the Kampala Northern Bypass Road project	Department of Civil & Building Engineering Library	The project title is Evaluation of the Feasibility Study of the Kampala Northern Bypass road project with case study of the structural integrity of the pavement in relation to traffic. This project was carried out with consultation of key stakeholders mentioned in the team. The report aims at assessing the implementation extent of the Final feasibility Study of the bypass, learn from experience, provide an objective basis for assessing the results of the clients work and also provide accountability of its objective. Therefore the contents of this evaluation has been designed to capture with focus, the institutional, comprising of the funding, staffing to mention a few, technical comprising of parameters, traffic, pavement, drainage and appraisal aspects comprising of the environmental impacts, social economic impacts and safety. Special attention has also been drawn towards the structural integrity of the project to traffic. The problems associated with the bypass institutionally are drawn towards the management of the project, whereas technically traffic and pavement studies are eminent. For the appraisal aspects, environmental and safety matters were looked at.	NO KEY WORDS	Kampala	Design	Pavement	Solution / Application	K104

#	ORIGINATING INSTITUTION	AUTHORS	YEAR	TITLE	LOCATION OF DOCUMENT	ABSTRACT	KEYWORDS	GEOGRAPHICAL AREA	FOCUS AREAS	PAVEMENT LAYER FOCUS	TT LEVEL	Google Earth number
						The main and specific objectives of this evaluation institutionally is to appraise the project team structure and check efficiency of the supervision and contractor's team structure respectively. Technically establish the integrity of the pavement structure in relation to traffic, and specifically analyse traffic at feasibility, bypass opening and to date. To date the bypass traffic is estimated at 13950 vehicles per day compared to that at feasibility stage estimated at 3270 vehicles per day. Appraise the extent of safety implementation, cost and time. Check environmental impact as well. The overall project cost of construction and supervision is estimated at 61.76 million Euros compared to the initial budgeted amount at feasibility stage of 47.50 million Euros, giving an increase of up to 30.0 percent. The methodology adopted was data collection in both hard and soft copies which were then classified in the order of institutional, technical and appraisal. This data was then modelled using Microsoft word, excel and AutoCAD in the order above. Publication and dissemination was done, first was before a panel of examiners through power point presentation, there after additions and omissions were done according to the comments raised by the panel and audience after which copies of the final report was store in PDF and copied to the Kyambogo University. The project was completed after 64 calendar months instead of the planned 30 months and an Environmental Impact Assessment for the project was conduction after practical completion. A socio-impact assessment will be checked to focus on the appraisal of the socio- economic effects of the bypass project on society. Conclusions and recommendation to the project in terms of institution, technical and appraisal aspects was emphasized. The APA referencing system was used.						
105	Kyambogo University	Karuru Aggrey	2013	FEASIBILITY STUDY FOR THE UPGRADING KIGOMBYA-SSEZIBWA ROAD TO A PAVED BITUMINOUS SURFACE	Department of Civil & Building Engineering Library	This project will be titled Feasibility study for the improvement of Kigombya- Ssezibwa road. Feasibility is the term used to explain the extent of possibility and practicability of achieving something. Study is the process of devoting time and attention with the intent of acquiring knowledge .improvement is the process of enhancing the status of something while a road is a path established over land for the passage of vehicles, people, and animals. Kigombya -Ssezibwa road is found in Mukono Uganda. This road is currently under the responsibility of Mukono District Council. To carry out the study the following methodology were used; Traffic Surveys, Axle Load Surveys, Topographical Surveys, Geotechnical investigations, Hydrological Studies, Social Impact Assessments, Environmental Impact Assessments and Economic Analysis. From the results obtained, the Average Daily Traffic was 885Vehicles/day commercial vehicles, Saloon cars taking up the greatest percentage of traffic (15%), motor bike 57%, and small bus 8% curves were substandard having a radius of less than 100m. A trapezoidal channel section was designed to cater for drainage. A double surface dressing has been proposed with chippings being sprayed at 13.64kg/m2and 9.68kg/m2for the first and second layer and binder being sprayed at 1.18kg/m2 and 0.98kg/m2for first and second layer. The ADT showed that the road was due for upgrading considering the Ministry of Works and transports' criterion for upgrading a road in an urban setting with more than 300Vehicles/day.A realignment has been proposed with curves having a minimum radius of 100m, continuous maintenance of the drains is necessary so as to prevent silting. Quality control should be ensured for materials in accordance with the specifications as stipulated.	NO KEY WORDS	Kampala	Design	Pavement	Solution / Application	K105
106	Kyambogo University	Waiswa Richard	2013	DESIGN FOR THE UPGRADING OF KIRINYA-BUKASA ROAD FROM GRAVEL TO BITUMINOUS SURFACE. Case study Ch.2+050 Namataba to Ch.5+650 Bukasa	Department of Civil & Building Engineering Library	The Individual Project was titled Design for the upgrading of Kirinya-Bukasa Road from gravel road to bituminous surface road with a sub title, a Case Study of section from Km 2+050 to 5+650 (Ch.0+000 Namataba to Ch. 5+650 Bukasa).Upgrading in this sense means looking the possibilities and practicability of adopting a new better design to match the demands of the existing infrastructure after carrying out a thorough analysis, investigation and conclusive design in line with the acceptable standards in Uganda. A Road is a way between places that provides for access and direction for both motorized and non-motorized traffic. The Kirinya-Bukasa road is located in Wakiso District Kira town council the section begins from the Old Jinja road, 500m after the Namboole stadium turnoff in Bweyogerere, Kirinya parish. A section of this road up to KM 2+000 was upgraded in 2009 to bituminous surface standard by Kira Town Council. The findings got after making a preliminary study were the institutions responsible for the development and maintenance of the road network, the volume of traffic traversing the Kirinya-Bukasa road, the type and composition of the traffic, the current geometrics of the road, and the characteristics of the materials in the pavement and the status of the existing drainage structure in relation to its functionality. The findings got from the field data were analysed with the intent of formulating a better model of the existing structures. The models were then subjected to audits that were intended to arouse their negative effects to the society and environment and provide for their avoidance and mitigation measures. A reflection of the most important aspects that were put into consideration coupled with the recommendations and approvals of the study are also presented. The volume, loading and type of the traffic plying the road are the major aspects used in the geometric and pavement design. The hydrology and hydraulic characteristics of the area are used in the design of the drainage. In the recommendations is the carrying out of the Final Engineering Design. The FED should be accompanied with an Economical analysis versus performance audit. In conclusion, the Kirinya-Bukasa road should be upgraded from an engineered earth road to a paved road class III.	NO KEY WORDS	Kampala	Design	Pavement	Solution / Application	K106
107	Kyambogo University	Mugga Danis	2015	SUSTAINABLE URBAN TRAFFIC MANAGEMENT IN DEVELOPING COUNTRIES CASE STUDY KAMPALA	Department of Civil & Building Engineering Library	The rapid growth of vehicle ownership and the rise in population in Kampala had resulted into increase of traffic congestion, increase in the movement of people and vehicles on the city roads and streets and growth of demand for space to park which creates a greater competition for the use of the available facilities. This was evidentially supported by the research done on Namboole Kinawataka road which as 3.8km. The project road was characterized by motorized transport with a small percentage of non-motorized transport, heavy vehicles that use the route heading and from the industrial area. The road is highly affected by congestion during peak hours which increases pollution The edges of the road were continuously wearing leaving the motorable part very narrow. This adds to the poor drainage of which was mostly blocked by soil that was carried by run off forcing water to flow in the road carrying soils that later turn into dust obstructing the road users causing accidents and delays. The main objective of the project was to propose traffic control measures to the general increase of traffic flow for all modes of transport that will socially, economically and environmentally benefit all road users. In this study the field data collected consisted both of qualitative and quantitative data. The quantitative data was analysed using descriptive statistics SPSS and the result presented inform of tables, graphs, charts and percentages. The quantitative data was analysed through the use of content analysis of the questionnaires administered and traffic survey data with reference to the study objectives. The results showed that congestion was due to the road condition, driver's behaviour, nonexistence of non-motorized facilities, and bus bays. Traffic counts showed a good level of service on the road though a lot of diesel powered vehicles that pollute the environment. Providing non-motorized facilities was recommended, repairing of the road, providing street lights, bus bays, shifting peak hour travel and limiting the movement of certain vehicles in peak in peak hours.	NO KEY WORDS	Kampala	Operations	Other	Solution / Application	K107
108	Kyambogo University	Mutabazi Arthur	2014	Comparative Study of Shear Box and Triaxial Shear Strength Results of cohesive soils	Library Department of Civil and Building Engineering	Determination of soil shear strength properties is best achieved using direct shear strength machine (shear box) and triaxial test apparatus. The shear box machine is the primary method for shear strength parameters determination. It is disadvantageous as it involve; shearing occurs at the predetermined surface, poor drainage control, on-uniform deformations and stresses and no pore pressure measurement provisions. However, using triaxial testing apparatus gives an opportunity to achieve accurate results. Triaxial test apparatus allows the sample to shear at its weakest point, measurement of pore water pressure and controlled drainage. The challenges faced with using triaxial include its complexity and costs as compared to shear box machine which is cheap and simple to use. It is therefore critical that the two test methods are used together to balance both quality and costs of doing work. This research addresses the determination of soil shear strength parameters using shear box apparatus and triaxial apparatus. Shear strength calculated using shear strength box results compared with shear strength calculated using triaxial results. This is aimed at establishing a relationship between the two shear strength achieved using shear box apparatus and triaxial test apparatus.	Strength tests, direct shear test, particle size distribution curves, shear box	Kingfisher oil field in exploration area of the Lake Albert basin. The exploration area is situated at the lake shores of Lake Albert as shown in Figure. The study was conducted on an area of 3 Acres land stretching from the lake shores of Lake Albert up to the proposed well pads.	Materials	Gravel	Platform	K108
1	Kyambogo	Kabiito	2016	INVESTIGATION INTO	Library	The recent Government policy of investing heavily in infra structures such as roads and increased development of rural areas has led to the high demands for	Plasticity Index,	Kampala and Mukono	Materials	Gravel	Platform	K109

#	ORIGINATING INSTITUTION	AUTHORS	YEAR	TITLE	LOCATION OF DOCUMENT	ABSTRACT	KEYWORDS	GEOGRAPHICAL AREA	FOCUS AREAS	PAVEMENT LAYER FOCUS	TT LEVEL	Google Earth number
09	University	Julius		THE USE OF TREE SAP (M.GLAZIOVII MUELL) FOR LATERITE SOILS STABILIZATION.	Department of Civil and Building Engineering	limestone as a soil stabilizer. the extraction of gypsum rocks in Tororo and neighbouring areas has greatly been exploited to completion and as of today Tororo , the major limestone manufacture are importing gypsum rocks from Kenya and other neighbouring countries for the production of lime stone. On the other hand the tree planting campaign has been a daily talk of media lately with both local and international organizations emphasizing planting of trees as a means of controlling global warming. As a means of adding effort in this campaign, the researcher thought of extracting a stabilizer from the M.glaziovii muell tree. This research project titled "The investigation into the use of tree sap for laterite soil stabilization is aimed at finding an alternative naturally growing material that can substitute the other presently used scarce and expensive methods of soil stabilization. Also the scarcity of "good gravel" soils in and around the near places of the Towns, has led to high costs in road and embankment construction. The sap from the M.glaziovii muell tree sap was brought as a substitute in this research. Further, the fact that the sap is readily available and that it can be reproduced by simply planting more trees, hence reducing on global warming on the other hand. The need for this project is further justified by the fact the availability of gravel soils for civil engineering construction projects i.e. roads and foundation, are increasingly becoming scarce and laterite soils are still abundant. On the other hand the available soils of good quality have been put under restriction by environmentalists, leaving engineers with nothing but the expensive alternative of stabilization both mechanically and chemically or both. The main objective of this research is therefore to carry out an investigation into the use of tree sap for soil stabilization. It involved collecting sap samples from M.glaziovii muell tree, taking them to the laboratory to establish the presence of cementitious properties available, and then carry out proctor and CBR tests of both normal and mixed sample at varying percentages. The research clearly shows the mixing the sap with the soil increases its CBR by a percentage.	Shrinkage Limit Clays of Intermediate Plasticity, Clays of High Plasticity, Liquid Limit, Maximum Dry Density	District				
110	Kyambogo University	Kataabu John Brian	2016	CASE STUDY OF THE CAUSES OF CONTINUOUS DETERIORATION AND FAILURE OF PALACE ACCESS ROAD IN KYAMBOGO UNIVERSITY	Library Department of Civil and Building Engineering	This study deals with a study of the causes of continuous deterioration and failure of Palace access road in Kyambogo University which entailed visual surveys of the road condition, traffic assessments along the road, subgrade strength test, visual survey of the drainage conditions and conclusions drawn towards the causes of these pavement failures. Information from several sources in general about the causes of pavement failure was obtained majorly from studies done by (Kumar and Gupta, 1998) that cite the failures in terms of structural failure, surfacing layer failure and failure arising from environmental factors. The Uganda Roads Design Manual, 2010 was a major source of guide towards the investigation on the causes of continuous deterioration and failure of these roads due to its consistence with the factors in Kyambogo which was the area of study. The Dynamic Cone Penetrometer (DCP) test and the traffic volume assessments were key procedures that provided a guide in studying the pavement failures. By visual observation, defects like rutting, ravelling, pot holes, fatigue cracking showed possible subgrade settlement, rapid increase in traffic, poor road usage and poor drainage. To draw conclusive results and findings to these pavement failures, further investigations like traffic assessment, subgrade strength assessment, material suitability and level of drainage maintenance. This case study showed that some of the causes of pavement failure of the palace access road in Kyambogo University are ineffective drainage channels and poor maintenance of the existing drainage structures, poor workmanship especially the level of compaction of the sub-base and the road surface treatment, weak subgrade strength determined having CBR of 11.85% and a subgrade strength class of S4 from the DCP test and the increase in axle loading beyond the design traffic from the traffic assessment indicating an Average Daily Traffic of 1169 pcu/day and a Traffic class of T3. In conclusion, the major causes of failure of this road were identified as poor methods used in the maintenance of the roads, irregular de-silting of the drainage channels resulting into over flooding that damages the sub-grade through water infiltration, and increased traffic in the university as well as the inadequate subgrade strength of the soil.	Average Daily Traffic, Overseas Road Note, Gross Domestic Project, Plasticity Index	Kyambogo University, Kampala district. It also connects Jinja road to Naalya-Kamuli Road to Kireka-Namugongo road.	Management	Pavement	Solution / Application	K110
111	Kyambogo University	Abalo Concy Atare	2016	PRELIMINARY DESIGN OF A HYDRAULIC STRUCTURE Case Study: Yusuf Lwanga Road on Biyinzikka Nakazzadde channel, Lugazi town council.	Library Department of Civil and Building Engineering	The study is about design of a drainage structure. It comprises; carrying out a topographical survey to determine the vertical and horizontal profiles of the project area, assessing the capacity of the soil onto which the drainage structure will rest, obtaining and analysing the hydrological data in order to determine the discharge of the catchment area and carrying hydraulic and structural design of the suitable drainage structure. The topographical survey was carried out by geodetic levelling of the road over a stretch of about 500m. The results obtained were computed on an excel spreadsheet. Using AUTOCAD CIVIL 3D engineering software, the vertical and horizontal profiles of the project road were drawn. The bearing capacity of the soil was obtained through a geotechnical survey of the site and subsequent testing from the Central Materials Laboratory. The hydrological data was got from Lugazi Meteorological Centre. Analysis and design was done using the Uganda Drainage Design Manual alongside the TRRL Report 623. The structural design was done using selected BS codes. The study area was found to be a public residential place with minimum cultivation and light vegetation cover and having a steep gradient that required considerable amount of cut ad little fill. The catchment area was of size 0.22km2 and due to high volume of discharge, a box culvert was chosen over other types of culverts. The stream bed was clay and found to have a considerable bearing capacity, safe enough to carry the structure. To top, side and bottom loads were all obtained to aid in the structural design of the various structural components of the culvert and get the design reinforcements. I recommend that further research be done to examine other likely methods of analysis for instance the SCS curve number method of analysing rainfall data.	Ground Water Table, Design Ultimate Moment, Lever arm, Design value of the applied shear force, Whole Circle Bearing, Fore Bearing, Back Bearing	Yusuf Lwanga road at a point where it crosses Biyinzika Nakazzadde channel in Lugazi town council	Environment	Other	Solution / Application	K111
112	Kyambogo University	Meke Rogers	2016	STUDY ON COST CONTROL TECHNIQUES USED BY CONTRACTORS ON CONSTRUCTION PROJECTS IN UGANDA CASE STUDY: MBALE MUNICIPAL COUNCIL	Library Department of Civil and Building Engineering	The construction industry in Uganda is one of the leading industries in terms of growth. Like other industries, it's has been experiencing profound changes involving both business environment and internal organization. One of the key players in the industry are the contractors who perform the actual implementation by procuring the works with intent of attaining maximum profits as a result. This is subject to cost control measures which are rarely effectively used. Despite being aware of the likely final cost of the project as budgeted, contractors are faced with a problem of effectively using the different techniques of cost control and so the need to identify them and their effectiveness in implementation. However, construction costs have always escalated leaving many construction firms earning less than anticipated profits and in some cases making losses, at worst even abandoning some projects. The study will involve primary data collection from the field, secondary data collection by reviewing existing documents and written literature regarding the research. There is poor cost control by various construction firms and a consequent reduction in their profits and this can only be reverted if they conduct cost control effectively using the different techniques. It's therefore vital to have proper management of the resources, have clear responsibilities for the different personnel towards cost control, keeping proper cost records and implementation of projects within planned schedules that profit maximization can be attained.	Anticipated profit margin, mark-up costs.	buildings projects and on the side of the contractors in Mbale Municipal Council.	Construction	Pavement	Solution / Application	K112
113	Kyambogo University	Longoli Gilbert	2016	PRELIMINARY DESIGN OF SAND DAM IN LOPEEI SUB-COUNTY NAPAK DISTRICT	Library Department of Civil and Building Engineering	The report herein elaborates the preliminary design of the proposed SAND DAM in Lopeei Sub-county, Napak District, and Karamoja Region, Uganda. The project involved analysis of the current drought, inadequacy and non-functionality of the water sources, high rate of spread of diseases, High increase in population, famine and outward migration. This gave a conceptual model of what is required. Much of the water is lost during wet season in many ways i.e. much of it flows to the neighbourhoods through seasonal (ephemeral) river omaniman, other is lost due to Evaporation to the atmosphere and Percolation into the ground. After rains, this leaves people without water essential for drinking, preparation of food, Sanitation and hygiene, livestock and farming hence spend much hours in the search for water and greener pastures. I therefore concluded by proposing the design of a SAND DAM In Lopeei Sub-county Napak District, Karamoja Region, Uganda in order to curb down the challenges faced in this area. The preliminary design involves the following; Ø Introduction Ø Problem statement and Major Objectives Ø Methodology Ø Results and Discussions Ø Recommendations, Conclusions and relevancy of the work	Cohesion and Internal Angle of Friction, Area Reduction Factor, Frictional resistance, Horizontal Resistance, Allowable bearing capacity, Actual maximum bearing capacity	River Omaniman at Lopeei Sub county, Bokora County Napak District, Karamoja, Uganda.	Design	Non-road	Solution / Application	K113

#	ORIGINATING INSTITUTION	AUTHORS	YEAR	TITLE	LOCATION OF DOCUMENT	ABSTRACT	KEYWORDS	GEOGRAPHICAL AREA	FOCUS AREAS	PAVEMENT LAYER FOCUS	TT LEVEL	Google Earth number
						The report herein involves tables, Figures, graphs, photographs and written in a simple language for easy interpretation. This approach will make it more meaningful and inspiring to the reader.						
114	Kyambogo University	Sekiranda Steven	2016	AN INVESTIGATION INTO THE EFFECT OF THE DYNAMIC CONE PENETROMETER HAMMER DROP RATE ON THE STRENGTH OF SOIL	Library Department of Civil and Building Engineering	Road design very often requires a preliminary assessment of the in situ soils in a relatively short time and at reasonable cost, which a challenge is the traditional relatively time consuming and costly CBR test. In such situations DCP would be an effective device due to its relatively compact and lightweight design. However, to date the DCP test still faces serious challenges due to the lack of reliability of its results as its dependent on the personnel conducting the test. This is attributed to lack of standard hammer drop rate when conducting the test. This study focused on investigating the effect of hammer drop rate of dynamic cone penetrometer on measured soil strength. The DCP test was conducted on the compacted soil in the mould of 1.2 x 1.2 x 1.2m at different hammer drop rates ranging from 2 – 30 blows per minute and the average DCPI was obtained for each drop rate. It was found out that as the hammer drop rate increased, the DCPI decreased from 2 to 8 blows/minute as a result of reduction in residence time of the hammer at the anvil. There was also an increase in the DCPI at 10 blows/minute due to the transition from the effect of residence to the effect of velocity. Further reduction occurred between 10 and 15 blows/minute and a constant DCPI was observed for rates beyond 15 blows/minute. At 6 blows/minute, strong correlations between achieved CBR and DCPI were obtained which were consistent with literature with high coefficients of determination (R2) of 0.999 and 1 for Kalerwe – Nsooba and Northern Bypass borrow pits respectively. At 7 blows/minute, a strong correlation was obtained for the Northern Bypass borrow pit. With numerous existing CBR – DCPI correlations, it was found out that at 6 blows/minute, the TRL correlation predicted CBR values close to the measured laboratory CBR with a very small difference of 0.37 and 95% level of confidence. At 7 blows/minute, 5 equations predicted CBR values close to those obtained from the laboratory CBR tests. Therefore, the critical rate was obtained as 7±1 blows/minute.	Cone Penetration Test, Dynamic Cone Penetrometer, Optimum Moisture Content,	Mpigi – Kanoni, Northern Bypass and Kitala – Mpala borrow pits that are being used for the construction of Mpigi – Kanoni Road, Northern Bypass and Southern Bypass respectively.	Pavement structure	Pavement	Platform	K114
115	Kyambogo University	Nassali Salaamah	2016	INVESTIGATING THE CHALLENGES OF ADOPTING MECHANISTIC EMPIRICAL PAVEMENT DESIGN GUIDELINES ON NATIONAL ROADS IN UGANDA	Library Department of Civil and Building Engineering	This report presents research carried out by a fourth year student of Kyambogo University in the academic year 2015/2016 as her final year project. The main purpose of this research was to "Investigating the challenges of adopting Mechanistic Empirical Pavement Design Guidelines on National roads in Uganda". The study aimed at examining the hierarchical approach to road design inputs in regard to adoption of MEPDG in Uganda, investigating the necessary technology and resource requirements required for the adoption of MEPDG in Uganda, investigating implementation challenges of MEPDG for road design in Uganda and exploring the future direction of road design developments in Uganda. The researcher applied the use of interviews, document review and consultations from different experts of different Engineering agencies both Private and Government. The researcher reviewed different books, journals, conference and seminar notes all related to MEPDG. Interviews were conducted in different firms to different personnel, and all the above yielded great to the findings of the research. From the findings, there is a need to adopt MEPDG to replace the current empirical methods since MEPDG will create more reliable and cost-effective designs and rehabilitation strategies over the traditional design standards. The use and calibration of this program requires a high level of technical or expertise knowledge and experience with the fundamental properties of the materials under different loading and climatic conditions. Though the challenges that are indicated in the results are overwhelming, but if solved through government intervention, and also participation by both private and government firms there is a possibility that MEPDG can be adopted on national roads in Uganda. From the research findings, Areas that are considered very important and necessary in which more research should be carried out in regard to MEPDG in Uganda should be identified; adequate resources should be made available since MEPDG requires significant amount of time and resources. A lot of experimentation should be carried out locally on some roads to assess its suitability before implementation nationally. This survey will then provide justifications on whether MEPDG is applicable on Ugandan roads or not. The authorities should make a clear comparison between Uganda and other countries where MEPDG has been used, look at factors that favoured its implementation in those countries and the challenges they faced. It's from this surety, that can make a conclusive justified stand on whether to adopt it or not and if yes, what is the clear paths for it to succeed.	Average Annual Daily Traffic, Hot Mix Asphalt, Portland Cement Concrete, Integrated Climatic Model	Uganda looking at National roads across different regions both constructed and those undergoing construction under Uganda National Roads Authority and Ministry of Works and Transport.	Pavement structure	Pavement	Platform	K115
116	Kyambogo University	Kyeyago Phiona	2016	An Investigation into the Potential of Sugarcane Bagasse Ash for Utilization in Soil Stabilization	Library Department of Civil and Building Engineering	The rapid growth of industrialization has led to increased generation of industrial wastes. Also the high cost of stabilization materials like cement and the negative effects that come along with its production calls for a suitable substitute for it as regards chemical soil stabilization. This study investigated the use of Sugarcane Bagasse Ash in improving clay soil properties. Sugarcane Bagasse ash is a waste product of sugar producing factories which needs to be utilized. The study entailed determination of the chemical composition of SCBA, determining the properties of the soil before and after stabilization of the soil with SCBA and cement as an admixture. 5% cement was used in the study because literature has shown an improvement of soil properties by 5% cement content. SCBA was used as a replacement for 5% cement content in the mixture in percentages of 0%, 4%, 8%, 12% and 16%. The results and analysis showed existence of pozzolans in SCBA. There was an improved PI and CBR, that is, the PI decreased from 20 for neat soil to 10.1 for 16% SCBA replacement and the CBR increased from 14% of neat soil to 41% for 8% SCBA replacement, hence SCBA is a good pozzolan which can be used as a cement replacement for general soil improvements with respect to PI and CBR. Further research ought to be carried out using SCBA from a different source on other types of soil and using reduced cement percentages. Also, more strength tests ought to be carried out on SCBA-cement stabilized soil, for example, triaxial test and direct shear box.	Optimum Moisture Content, Plasticity Index and Liquid Limit	Mayuge Sugar Industries Limited (MSIL)	Materials	Gravel	Base	K116
117	Kyambogo University	Kamukama Ivan	2016	INVESTIGATING THE EFFICIENCY OF USING JUTE FIBRE AS A SUBGRADE REINFORCEMENT	Library Department of Civil and Building Engineering	Improvement in subgrade has always been an area of concern to highway and geotechnical engineers. In case of a highway, a weak subgrade results in greater thickness of pavement layer which increases the cost of pavement construction. To strengthen the subgrade soil, the use of jute fibre is advantageous because they are cheap, locally available, and user friendly. Fibre mixed randomly with subgrade soil has significant impact on the improvement of subgrade characteristics over the last decade. Keeping this in view an experimental study was conducted on locally available soil reinforced with jute fibre. In this study the soil samples were prepared at their Maximum Dry Density (MDD) corresponding to Optimum Moisture Content (OMC) in the CBR mould with and without reinforcement. The percentage of jute fibre by dry mass of soil was taken as 1.2%, 2.4%, 4.8%, and 9.6%. In the present investigation the length of fibre was taken as 25 mm, 50 mm and 100 mm, and the diameter generally varied between 2mm to 4mm for each fibre length. From the laboratory tests the effect of jute fibre content on density of soil (Optimum Moisture Content and Maximum Dry Density) was observed for each length. It was observed that the Optimum Moisture Content increases and the Maximum Dry Density decreases with the increase in jute fibre content for each length. The laboratory CBR values of soil and soil reinforced with fibre were also determined. The CBR value of soil increases when the fibre content increases for all fibre cut lengths up to around the fibre content of 4.8% when the CBR value starts to reduce. The effects of length of jute fibre on CBR value of soil were also investigated. Test results indicate that CBR value of soil increases with the increase in length of jute fibre but there is significant increase in CBR value of soil at 50mm - 60mm fibre cut lengths after which the CBR value starts to decrease.	Subgrade, Jute Fibre, Length and CBR Value	Kyambogo University in Nakawa division central part of Uganda as a case study.	Materials	Subgrade	Base	K117
118	Kyambogo University	Nkurunziza Donny	2016	FEASIBILITY OF SPEED HUMPS AND RUMBLE STRIPS AS A TRAFFIC CALMING MEASURE ON NATIONAL ROADS IN BUILT UP AREAS	Library Department of Civil and Building Engineering	This report presents a record of the findings of a research study to evaluate effectiveness of speed humps and rumble strips as traffic calming measures in built- up areas along National Roads in Uganda. The main objective of the study was to assess the feasibility of speed humps and rumble strips as traffic calming measures in built up areas along National Roads. The specific objectives of the study were as follows; [a] Establish the most common designs and configurations of speed humps and rumble strips in built areas along selected national roads, [b] Carry out a comparison of the performance of the different speed hump and rumble strip configurations on speed reduction along the selected national roads and [c] Establish the existing inbuilt geometry (height, width and length) of speed humps and rumble strips and compare them against Ministry of Work and Transport (2010) standards. In order to achieve the above objectives, two categories of hump and rumble strip configurations were assessed, speed values were collected at selected areas along Lukaya, Kamengo, and Kyabadaza on Kampala – Masaka road for configuration 1 and Zigoti, Buyala, Bujjuko situated on Kampala-Mityana road for configuration 2. Speed data was collected using video cameras following a designed field set- up. Speeds were computed based on time taken to traverse a known distance in the	Heavy Goods Vehicles and Perception Reaction Distance	Kampala – Masaka and Kampala – Mityana roads.	Road safety	Other	Platform	K118

#	ORIGINATING INSTITUTION	AUTHORS	YEAR	TITLE	LOCATION OF DOCUMENT	ABSTRACT	KEYWORDS	GEOGRAPHICAL AREA	FOCUS AREAS	PAVEMENT LAYER FOCUS	TT LEVEL	Google Earth number
						video, speeds for vehicles were determined for the approach, middle and exit study sections. These speeds were statistically analysed to determine the significance between measured speeds at different reference points; the mean speeds were found to be statistically significant for different hump and rumble strip configuration, however configuration 1 proved to be the most effective in speed reduction. The height, width and spacing of existing humps and rumble strips were measured using standard steel and fiber tape measures and the results compared with the Ugandan Ministry of Works and Transport standards for consistence. 100% of the heights of the humps and rumble strips were below the standards whereas only 17% of interval distances between successive rumble strips and humps were consistent with the standards. However further related studies are recommended on all the national roads in built up areas especially studies incorporating the effect of interval distance between successive devices (both rumble strips and humps), relationship between different vehicle classes and their behaviour over speed humps and rumble strips. Also more accurate and less tedious methods should be implemented such as pneumatic tubes, remote sensing using GPS and use of radar guns since video cameras are more prone to errors and are very tedious.						
119	Kyambogo University	Ilahi Kassim	2016	EFFECT OF COMPACTION DELAY AND COMPACTION EFFORT ON THE MECHANICAL PROPERTIES OF LIME AND CEMENT STABILISED LATERITIC SOILS	Library Department of Civil and Building Engineering	This report covers the study of effect of compaction delay and compaction effort on the mechanical properties of lime and cement stabilized lateritic soil. This research aimed at seeking ways of how the cost of lime and cement can be minimized in many soil improvements in Road construction projects. The specific objectives of this study were to; determine consistency, grading and strength characteristics of the soil for classification; determining the initial lime consumption, optimum cement dosage, and the achieved soil strength after aging and compaction. The soil was blended to bring it back to the MoWT, (2010) gradation envelop, where it was separated through sieving into coarse, intermediate, and fine fractions. While the percentages of cement used in the research were, 0.5%, 1.5%, 2.5%, 3.5% and 4.5%. The soil sample was subjected to sieve analysis, compaction test, Atterberg's limits test, CBR test and unconfined compressive strength test. From the results, the soil was classified as an A-2-7(3) soil on AASHTO classification and CH (Clay of high plasticity) on USCS basing on the plasticity chart, British system, (BS 5930:1999). From the Atterberg's limits, the liquid limit and plastic limit were seen to increase, while the plasticity index and shrinkage limit were decreasing with cement content. The MDD decreased with increase in cement content, where the decrease was greater at higher dosages, 2.5% to 4.5% compared to low dosages 0% to 1.5%, while the OMC increased. The UCS increased with both cement content and compaction effort, but generally, the UCS values decreased with increase compaction delay. A compaction delay of 4hours seemed to be the extreme limit for this lateritic soil stabilized with Portland pozzolana cement. However, compactive effort was more significant compared to aging period as seen in samples with low dosages of 0% to 1.5%.	Liquid Limit, Plasticity Index, Calcium Aluminium Hydrate, Intermediate Clay	Lateritic soil sample used was obtained from a borrow pit in Kanyanya, Wakiso district at a depth of 0.5-1m by a method of disturbed sampling.	Construction	Gravel	Platform	K119
120	Kyambogo University	Namudongo Robert	2016	PREDICTION OF THE STRENGTH OF COMPACTED LIME STABILIZED CLAY FOR SUBGRADE CONSTRUCTION USING FIELD FACTORS	Library Department of Civil and Building Engineering	Field factors can affect the strength gain of compacted lime stabilized clay which affects the strength of the subgrade. The major objective of this study was to investigate the effect of field factors on the strength of compacted lime stabilized clay soils for subgrade construction. Laboratory tests were carried out on the materials and included; Atterberg limits, particle size distribution (PSD), lime suitability tests, Proctor Compaction test and CBR. Laboratory results indicated an increase in CBR with increasing lime content up to 4% with a reduction after 4% (at 6%). The reduction in the CBR after 4% was attributed to the excess lime in the mixture not required for the early strength gain. The best suited lime content for stabilization of the clay was found to be 4% lime content. Laboratory results indicated higher CBR values for dry mixing of lime and clay than for slurry (wet) mixing. Hence dry mixing was used for all CBR tests of lime and clay to achieve the greatest possible strength for the study. Compaction delay affected the CBR for all the percentages of lime addition. The CBR value reduced with increase in time delay. However, the rate of reduction in CBR value decreased as the lime content was increased. Increase in the curing temperatures increased the CBR value. Temperature was found to be the strongest factor affecting the CBR since it has the highest correlation coefficient (0.601). A model for predicting the maximum and minimum CBR depending on the lime content, delay in compaction and temperature was formulated using SPSS software. Possible recommendations are given on how to increase its accuracy in this report. Further research is recommended in relation to the long term performance of the clay soil-lime stabilization, the effect of carbonation and Sulphur attack on the lime stabilized clays. Smaller variations of temperature should be considered when carrying out the tests for better accuracy of the regression model	Calcium-Alumina-Hydrates, Lime Content, Maximum Dry Density, Plasticity Index	clay samples collected from pits located at Kalerwe-Nsooba along the northern bypass.	Materials	Gravel	Platform	K120
121	Kyambogo University	Nakayenga Mariam	2016	A COMPARATIVE STUDY OF THE SHEAR STRENGTH PARAMETERS DERIVED FROM DIRECT SHEAR AND TRIAXIAL TEST (UU) ON COHESIVE SOILS.	Library Department of Civil and Building Engineering	This study presents a comparison between the shear strength parameters measured with Unconsolidated Undrained (UU) triaxial test device and the direct shear test device. It also presents the correlations between the shear strength parameters obtained from Unconsolidated Undrained (UU) triaxial test device and the direct shear test device. These results were analysed using the simple linear regression analysis to obtain a simple equation to predict triaxial shear strength parameters from direct shear test. The main objective of the study was to carry out a comparative study of the shear strength parameters obtained from the direct shear and Triaxial tests on cohesive soils. The study was conducted in areas around the central region in Uganda, and in areas located in wetlands. These areas included; Namanve which is located in Wakiso district and samples were picked along Namanve industrial park road, Kawanda site which is located in Masaka district and Entebbe site which is located in Entebbe kajjansi and the Masaka substation site which is located at Bwala hill in Masaka district. The tests were performed on samples of inorganic clays of both high and low plasticity. The results show that the triaxial friction angles and cohesion intercepts were higher than the values from direct shear test. The correlation equations were derived basing on the soil types from the various sites. The R- squared values from the correlations were generally above 50% which represented a good fitness of the data except for inorganic clays of low plasticity (CL) which was below 50%. It was found out that different boreholes gave different soil classifications. From this research, the correlation equations are limited to the different soil types from the various sites, and findings from this research serve as the basis for further research which should be conducted on the clay soil samples but using a different test condition, like the consolidated undrained and consolidated drained.	Cohesion, Consolidated Undrained, Liquid Limit, Natural Moisture, Shear stress,	central region in Uganda, and in areas located in wetlands. Samples were picked from different sites at a depth ranging from 2.5m to 5m.	Materials	Gravel	Platform	K121
122	Kyambogo University	Nalubega Mary Gloria	2016	APPLICATION OF STRESS PATHS IN UNDERSTANDING THE MECHANICAL BEHAVIOUR OF CEMENT STABILIZED SOIL	Library Department of Civil and Building Engineering	Soft soils exhibiting low strength properties in the case of external load require improvement. Chemical stabilization has been in existence for a long time and presents very good results in improving mechanical properties. This report presents results from a laboratory study on a cohesive soil-clay soil from Kyambogo which was stabilized with cement. Triaxial tests were performed mainly to study the application of stress paths in understanding the mechanical behaviour of cement stabilized soil. The influence of different back pressures was also studied. The beneficial effects of cement on the strength performance of soils have been widely documented. Cement treatment leads to improvement in the mechanical properties of soils. However, the findings of different researchers on the role of Portland cement on strength have not been entirely consistent. The use of stress path may enable us to better interpret the mechanical behaviour of cement treated soils. The main objective of this study was to determine and analyse the stress paths and examine their application in understanding the mechanical behaviour of cement stabilized soil. One type of clay was used. Laboratory tests were carried out to classify the raw soil after which, unconsolidated undrained triaxial tests were carried out on both the raw soil and cement stabilized soil (5% and 10%). The results of triaxial tests on the soils were interpreted using the Mohr-Coulomb theory. The locus of the top of Mohr circles gave the stress path. The results of undrained triaxial tests showed that stress paths direction shifted to the right indicating an increase in shear stress and principal stress of the cemented soil. The stress paths of the stabilized soil lies above that of the untreated soil due to the cementation bond. The unique stress path of 5% is a result of failure of the cemented bonding. Pore pressure change increases with cement content. It was concluded that the accurate prediction of the mechanical behaviour of cement stabilized soils is highly challenging because of the complexity of cementation and the collapsible nature of the soil structure as well as loading. It is also seen that the stress paths method can provide an approximate estimation of the behaviour of cement stabilized soil. However, to improve the accuracy of the method, further research should be carried out using consolidated undrained and consolidated drained triaxial testing.	triaxial tests, stress-strain properties, Cement treatment	Kyambogo University behind North Hall GPS coordinates	Materials	Gravel	Platform	K122
12	Kyambogo University	Gena Brian	2016	INVESTIGATING INTO THE USE OF TYRE	Library Department	The rate of accumulation and improper disposal of scrap tyres in Uganda is high and is primarily dependent upon the vehicle growth rate. Other factors that contribute to the high accumulation rates are the length of unpaved road network and the required service life of a single tyre. Tyres are made up of vulcanised rubber which is	Maximum Dry Density.	Sand samples will be picked from a borrow	Materials	Subbase	Base	K123

#	ORIGINATING INSTITUTION	AUTHORS	YEAR	TITLE	LOCATION OF DOCUMENT	ABSTRACT	KEYWORDS	GEOGRAPHICAL AREA	FOCUS AREAS	PAVEMENT LAYER FOCUS	TT LEVEL	Google Earth number
3				CHIPS AS SAND REINFORCEMENT FOR SUBBASE IN A FLEXIBLE PAVEMENT.	of Civil and Building Engineering	thermosetting and cannot be re-moulded and so scrap tyres can only either be discarded or put to other use. Various civil engineering applications appreciate the properties of scrap tyres such as lightness in weight, good thermal insulation and good hydraulic conductivity. This research uses tyre chips as reinforcement in sand to be applied as sub base in a flexible pavement. The tyre chips having no steel embedded in them are cut manually to a specific size of 10 mm x 30mm. The sand sample used in the research is subjected to classification tests which include natural moisture content test and sieve analysis tests (wet and dry sieving). The sand sample is also further subjected to compaction tests (modified proctor test) and CBR tests. The tyre chips are later on used to reinforce the sand sample in percentages of 5%, 7%, 9%, 11%, 13%, and 15% which are then subjected to compaction tests (modified proctor test) and CBR tests. The maximum dry density results obtained are 1.918 Kg/m3 at an OMC of 8.7% for sand, 1.892 Kg/m3 at an OMC of 7.9% for 5% tyre chips reinforcement, 1.854 Kg/m3 at an OMC of 7.7% for 7% tyre chips reinforcement, 1.830 Kg/m3 at an OMC of 7.5% for 9% tyre chips reinforcement, 1.80 Kg/m3 at an OMC of 7.5% for 11% tyre chips reinforcement, 1.780 Kg/m3 at an OMC of 7.4% for 13% tyre chips reinforcement and 1.756 Kg/m3 at an OMC of 7.2% for 15% tyre chips reinforcement giving a trend of decreasing maximum dry densities and optimum moisture contents with increasing percentages of tyre chips reinforcement. CBR values obtained were 25.5% for sand, 38% for 5% tyre chips reinforcement, 35.5% for 7% tyre chips reinforcement, 33% for 9% tyre chips reinforcement, 33.5% at 11% tyre chips reinforcement, 26.5% at 13% tyre chips reinforcement and 24% at 15% tyre chips reinforcement. An increase in the CBR value is seen to be optimum at 5% tyre chips reinforcement by 49% of the sand CBR implying that sand reinforced with tyre chips by 5% of its weight can be used as a subbase material in a flexible pavement.	Maximum Dry Density, Optimum Moisture Content. Cement Treated Base. Revolutions per Minute.	pit in Nakifuma (Along Kampala Kayunga road), the testing of materials will be done from TECLAB, a materials laboratory located in Nalukolongo				
124	Kyambogo University	Yashir Hassan	2015	STUDY OF ENGINEERING PROPERTIES OF GRAVEL FROM DIFFERENT SOURCES FOR ROAD CONSTRUCTION AND THEIR EFFECT ON BLENDABILITY CASE STUDY MUKONO	Library Department of Civil and Building Engineering	The study is aimed at preliminary study of the engineering characteristics gravel sources in Mukono district for road construction and the effect of blending on the properties on the engineering characteristics of gravel. Gravel as a focus of this study is a naturally occurring residual soil which is formed in place by weathering of bedrock. It's composed of unconsolidated rock fragment that have a general particle size range and include size classes from granule to boulders sized fragments. A literature review in soil and its characteristics, included a detailed description of all areas intended to be used for the study, the different types of stabilization as done. Laboratory tests were carried out in four selected gravel sources in Mukono district that is Katwadde, Kiwaala, Kako and Lugya borrow pits. . Tests that were carried out on the neat soil samples from the different borrow pits revealed that not all gravel sources have the gravel that meets the engineering specifications hence the need for stabilization in order to enhance the quality of the sub base, base and most importantly the pavement. According to the test results on the blended samples, it was realized that there was a considerable reduction in the plasticity and an increase in the California bearing ratio (CBR) The various tests carried on the neat soil samples, the blended samples and the right types of stabilizers have been shown in this report.	Strength test, material survey, gravel	Mukono district	Materials	Gravel	Platform	K124
125	Kyambogo University	Omara Charles Dickens	2015	DESIGN OF A SINGLE SPAN REINFORCED CONCRETE BRIDGE ON AKOCIMA STREAM IN DOKOLO DISTRICT	Library Department of Civil and Building Engineering	This report presents the design of a single span reinforced concrete bridge on Akocima stream in Dokolo District. Background: Batta to Okwalongwen district road crosses Akocima stream and links Okwalongwen sub-county to district headquarters and other parts of the district. Drainage structure on this stream was inadequate with only four lines of 900mm diameter R.C.C culverts and three lines of 600mm diameter R.C.C culverts leading to washing away of culverts and fill materials causing bottleneck at this point during heavy flood. Methodology: Procedures undertaken to gather information or data and investigate it to attain the desired objectives included site condition survey, soil investigation, determination of catchment areas, flow velocity, length of basin, fall and height difference from the bridge location to the highest point of catchment and structural analysis of the bridge members. Site condition survey involved getting general impression of the surrounding features through observations, gathering information from the resident community through verbal interviews about the flood history of the stream , recording type and sizes of existing drainage structures, determining flow levels during dry and wet periods and the cross sectional profile of the stream at the bridge location. Soil test involved picking disturbed and undisturbed samples from two trial pits dug 1.5 meters deep one upstream and one downstream of the bridge location and taken to the University laboratory for analysis. The tests included natural moisture content, sieve analysis, liquid limit, plastic limit, plasticity index and drained shear box test. Hydrological and hydraulic analysis involved determination of catchment areas length of the basin, fall of the basin, time of concentration, velocity of flow, peak discharge, wetted perimeter and cross-sectional area of stream flow and length of the bridge. Traffic data collection and analysis involved getting traffic data from engineering department of Dokolo district since the road was impassable and analysing to determine the type, loading and frequencies of the traffic on the road. Structural design involved determination of loads, shear and bending moment forces and design of abutments and foundations. Results: The highest levels of the flood ever reached were established using the resident community elders. Existing drainage structures was four lines of 900mm diameter R.C.C culverts and three lines of 600mm diameter of R.C.C culverts. Cross sectional profile showed highest flood levels at 1096.454m above sea levels and lowest flood level at 1095.750 meter above sea level and lowest stream bed at 1094.787m above sea level. Both trial pits 1 and 2 had bulk density as 20.55 and 20.83 respectively, liquid limit as 46.20 and 48.60 respectively, plastic limit as 25.85 and 26.00 respectively, plasticity index as 20.35 and 22.60 respectively, cohesion as 9 and 10 respectively, angle of friction as 22.4 and 21.9 respectively, allowable bearing capacity as 145 and 152 KN/m2 respectively and natural moisture content as 26 and 27 respectively. The soil was found to be inorganic clay of low to medium plasticity (silt and clay). Catchment area (A) was 40 Km2, length of basin (L) as 8.5 kilometres, fall of basin (H) as 152 meters, slope of basin (S) as 0.38%, time of concentration (T) as 1.6 hours, rainfall intensity as got from the department of metrology was 55 mm/hour for Lango sub-region, average velocity as 1.45m/s, maximum discharge as 28.8m3/s, area of normal and peak flows as 4.06m2 and 19.86m2 respectively, height of bridge (H) as 3.0 meters and maximum flow height as 2.4 meters. The road was found to have traffic class 2 with a 3-axle track as the heaviest commercial goods vehicle and average frequency of five times per day. Tandem system of loading was considered for the design which considered vehicular action of 300KN per bridge deck area and pedestrian action of 9KN/m2 as variable actions on the deck. Bridge abutment was 800mm thick, 800mm thick footing/foundation and 460mm thick concrete deck and 6800mm length of footing. Conclusion: Adequate bridge was designed to handle determined stream discharges and flood would be safely conveyed under the bridge structure since worst load and flood conditions with adequate overboard was considered. Recommendation: All major streams should be gauged and data carefully recorded and stored to ease evaluation of stream behaviours by students and other stakeholders. Further tests should be done to established bearing capacities of soil at lower levels before construction. Road warning signs installation and regular bridge maintenance should be considered on construction of the bridge. The design needs to be implemented in order to save the community.	Ultimate Bearing Capacity, Time of Rainfall Concentration, Ordinary Flood Level, Catchment Area, Competent Velocity	Akocima stream on Abakuli – Adagnyeko road about 21 kilometres north of Dokolo District Headquarter	Design	Other	Solution / Application	K125
126	Kyambogo University	Oleng Morris	2013	Feasibility Study for the improvement of Lira-Abim Road	Library Department of Civil and Building Engineering	The project is entitled feasibility study for the improvement of Lira- Abim road. This feasibility study is aimed at identifying the best available management and Engineering approach to produce and maintain a good roadway facility that can safely handle the increased traffic volume and specifically the institutional, geometrical, pavement, drainage and environmental problems on the road. Road improvement and management across the globe are not matching with the rate of car ownership. And yet well maintained road network coupled with high rate of vehicle ownership defines a country's level of prosperity. Lira- Abim road is a class C gravel road located in orum trading centre currently under the management of Otuke District town council with the logistical support from central government through Uganda road fund The present state of the road is characterised by increasing traffic, irregular geometric alignment and width, ruts, gullies, corrugation, erosion and lack of drainage structures. Improvements of the road to class 111 Bitumen will no doubt attract several benefits including but not limited to increased capacity, level of service, reduced transport, the flexible pavement structure of lira-Abim road, analysis of results and on costs, reduced road network, reduced noise and dust pollution The feasibility study involved ; Establishing the organisation responsible for the maintenance and management of this road, source of funding for the road, planning strategy and location of the road corridor, traffic assessments on the road, carrying out road survey, obtaining axial loads from the available survey data, determination of the existing services along the road from different utility providers, obtaining rainfall data from the metrological department, soil tests, selection of locally available base materials, comprehensive design of the flexible pavement structure of Lira- Abim road	Oversee road note, maximum dry density, moisture content, linear shrinkage.	Lira-Abim road is approximately 3.2km long, it's a feeder Road located in Otuke district	Design	Pavement	Solution / Application	K126

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127	Kyambogo University	Oculi Samuel	2016	PRELIMINARY DESIGN OF CROSS DRAINAGE STRUCTURE AT KAJAMAKA SWAMPALONG KANYUM-MALERA ROAD-KUMI DISTRICT	Library Department of Civil and Building Engineering	This report gives an account of a project carried out as an individual final year project. The project was preliminary design of across drainage culverts at kajamaka swamp located along kanyum-atutur road in kumi district. The report contains four chapters. Chapter one provides an introduction to the project, the problem statement considered and the objectives of the study and the location. Chapter two and three relay the literature review and the methodology to be employed in the project respectively. The methodology dealt with the survey of the site, hydrological analysis and sizing of the culverts. Chapter four outlines the findings and results of the study. These include the topographical map, design storm of the stream and the sizing of culverts and structural details Chapter five entails the challenges encountered, conclusion and recommendations	Drainage, shear box test, hydraulic design	Kajamaka swamp crossing located about 3km from Kanyum along Kanyum-Atutur-Malera road in Kumi	Design	Other	Solution / Application	K127
128	Kyambogo University	Njogera Jacob	2016	AN INVESTIGATION INTO THE EFFECTIVENESS OF DYNAMIC CONE PENETROMETER IN ASSESSMENT OF STRENGTH OF SUBGRADE	Library Department of Civil and Building Engineering	Soil properties vary with space and time and therefore the general use of DCP-CBR relationships without prior testing to verify the suitability and reliability of the correlations is discouraged. Despite the fact that various correlations have been developed, researchers have not reached a consensus on the general DCP-CBR correlation.	Soaked CBR, moisture content, maximum dry density	Kyambogo university	Pavement structure	Pavement	Platform	K128
1	International University of East Africa	Uwitonze Alice	2016	A STUDY ON THE PERFORMANCE OF RECYCLED AGGREGATES IN CONCRETE	FACULTY OF ENGINEERING , DEPARTMENT OF CIVIL ENGINEERING , Dr.Lawrence Muhwezi	The study was aimed to investigate the performance of recycled aggregates in concrete in comparison with the natural aggregates. The properties chose included compressive strength and workability (consistency). The TSMA approach was adopted for the mixing procedure for the Recycled Aggregate Concrete (RAC) because of the benefits associated with it in improving the properties of the recycled aggregates. Other objectives included; investigating the workability of recycled aggregate concrete (RAC) in comparison with natural aggregate (NAC), investigating the variation in compressive strength of RAC and NAC and investigating the tensile strength of RAC in comparison with NAC. According to these results, the performance of recycled aggregate concrete, even with the total replacement of coarse natural with coarse recycled aggregate, is mainly satisfactory, not only in terms of the mechanical properties, but also the other requirements related to mixture proportion design and production of this concrete type. The only two properties which are lower than natural aggregate concrete properties are the modulus of elasticity and shirking deformation. It is not recommended to apply this type of recycled aggregate for structural elements for which large deformation can be expected. Also, this type of concrete should not be used for structural exposed to aggressive environment conditions without appropriate previous testing.	Natural Aggregates, Natural Aggregate Concrete, Ultimate Tensile Strength, Recycled Aggregate Concrete, Recycled Concrete Aggregate, Construction and Demolition	Kampala	Materials	Non-road	Platform	I1
2	International University of East Africa	Katoke Aksanti David	2016	ASSESSMENT OF THE VIABILITY OF THE USE OF RECYCLED CONCRETE AGGREGATE IN THE PRODUCTION OF STABILIZED SOIL BLOCKS	FACULTY OF ENGINEERING , DEPARTMENT OF CIVIL ENGINEERING , Dr.Lawrence Muhwezi	The generation of huge amounts of construction waste is anticipated due to the demolition of older structures. Stabilized soil blocks have many benefits in terms of sustainability. Thus, incorporating recycled aggregates (RA) into stabilized soil blocks would greatly contribute sustainable practices in the construction industry and promote the wider use of this building technology. The overall target of this study is to assess the viability of using recycled aggregates in the production of stabilized soil/cement blocks and to further the development of future sustainable construction. For this purpose, we used soil with Recycled Aggregates, to examine its effect on the compressive strength (CS) of stabilized soil blocks and also compare the linear shrinkage between the mixes with Recycled Aggregates (RA) and without RA. A critical review of the literature was undertaken to examine the type and cost of construction and demolition waste, the benefits of their management and the general view on recycled aggregate and soil blocks. In the methodology, we focus on the test methods and explain the materials and tools used. The particle size distribution test was done, followed by the atterberg limit and linear shrinkage test. Some samples were tested for unconfined compressive strength after 7 days, 14 days and the other after 28 days. The results of unconfined compressive tests in this experiment indicate that stabilized soil blocks mixes with RA have acceptable strength of more than 2.5 MPa. All blocks have strengths exceeding 2.5 MPa and thus can be used in stabilized soil blocks construction. The addition of RA in this study does not lead into a decrease in characteristics, and in general. Finally in this study, the results of linear shrinkage test fulfilled our expectations and were acceptable. In regards to stabilized soil blocks incorporating RA, this study focused in most part on the effect that RA has on the compressive strength and shrinkage of stabilized soil blocks.	Construction and demolition, Compressed Earth Blocks, Linear shrinkage, Recycled Aggregate and Stabilized Soil Blocks	training site of a company called Makiga Engineering LTD located in Industrial area, 8th street and the laboratory tests were carried out in the makerere laboratory of engineering	Materials	Gravel	Base	I2
3	International University of East Africa	Isaac Magezi	2016	EXPERIMENTAL INVESTIGATION OF THE PROPERTIES OF CONCRETE MADE FROM BRICK AGGREGATES	FACULTY OF ENGINEERING , DEPARTMENT OF CIVIL ENGINEERING , Dr.Lawrence Muhwezi	In Uganda today the most construction material used in construction is concrete. The current aggregate used in the construction industries are non-renewable aggregates from the quarrying activities. Besides that, the growth of the construction industry has also produced lots of product mainly the waste materials which are dumped off as land filling. However the materials dumped as land fill can be used again in concrete production especially brick wastes. The study was conducted to investigate the properties of concrete made from brick aggregates. In order to fulfil the objective, there are tests that were conducted to determine concrete performance, such as compressive strength test, slump test, and sieve analysis. The data was collected and analysed to satisfy the study on brick waste as an alternative coarse aggregate partial replacement in concrete production. The findings of the study indicated that brick aggregate concrete deviated by 8.6% above the design value but lower than the reference natural aggregates by 12.8% with 100% of coarse brick aggregates content at 28 days. The results also indicate that the optimum strength of brick waste concrete has achieved the grade 30 of concrete that was designed for; brick aggregate can effectively be used as a coarse aggregate in concrete. From experiments the strength of brick aggregate concrete is less than that of stone aggregate concrete for same aggregate size. However the strength still lies in limits of the designed strength which is still suitable for use in the construction of any structure designed for; properties, aggregates, strength, concrete and design.	Properties, aggregates, strength, concrete and design	Kansanga - Kampala town	Materials	Non-road	Base	I3
4	International University of East Africa	Birori Jean Yves	2016	UPGRADING OF JOHN KIYINGI ROAD FROM GRAVEL TO A CONCRETE BLOCK PAVED ROAD IN KAMPALA DISTRICT-UGANDA	FACULTY OF ENGINEERING , DEPARTMENT OF CIVIL ENGINEERING , Dr.Lawrence Muhwezi	The conception and design of concrete block pavement deals with the requirements within construction of layers so that the pavement should be able to carry the applied load during the expected design life. The objective of this project is to design and provide construction approach on using concrete block pavement in such manner that: its serviceability and traffic jam should be increased and decreased respectively, even the cost of maintenance will be low. The case study is a segment of Kasanga-Nsambya (Makindye division). The justification of this project is to allow all stakeholders to get more information about the design and construction road concrete block. In order to achieve the objectives, we have to do data collection, eventual soil tests, library and internet documentation and survey works. The study gives out the following results: hydraulic, geometric and structure design, it provides also the types of material which will be used during the construction of structural pavement layers.	Street, highway, roads, transportation, plastic limit, liquid limit, grading modulus, equivalent standard axle load	Kampala district-makindye county. Road segment of 1.075km joining Kansanga –Nsambya	Design	Pavement	Solution / Application	I4
5	International University of East Africa	Kiwanuka Mike	2016	A STUDY INTO THE USE OF LAKE SHELLS POWDER TO IMPROVE THE BEARING CAPACITY OF LOOSE SANDY SOILS BY GROUTING METHOD (CASE	FACULTY OF ENGINEERING , DEPARTMENT OF CIVIL ENGINEERING , Dr.Lawrence Muhwezi	Construction on the landing site often demands deep foundation beside of the poor engineering properties and the related problems arising from weak soils at shallow depths. The soil profile on lambu landing site often consists of very loose sandy soils extending to a depth of 3 to 4m from the ground level underlain by some clay soil particles of medium consistency. The very low shearing resistance of the foundation bed causes local as well as punching shear failure. Hence structures built on soils may suffer from excessive settlements. The present investigation was aimed at obtaining solutions for the problems like poor bearing capacity of the soils thus poor foundation soils for the structures. Soil tests were carried out in the field and laboratory. These tests included shear strength test which was conducted in the laboratory using shear box test method on grouted specimens to obtain shear parameters (cohesion and angle on internal friction), dynamic cone penetrometer test (DCP) which was conducted in the field on ungrouted samples and in laboratory on ungrouted samples and in laboratory on grouted samples and particle size distribution test conducted in laboratory on ungrouted samples. Only one method of hand mixing was adopted to replace the grout with the pores of sand medium.	Grouting, shear strength, bearing capacity and settlement	Lambu landing site soils in Masaka District	Materials	Gravel	Solution / Application	I5

#	ORIGINATING INSTITUTION	AUTHORS	YEAR	TITLE	LOCATION OF DOCUMENT	ABSTRACT	KEYWORDS	GEOGRAPHICAL AREA	FOCUS AREAS	PAVEMENT LAYER FOCUS	TT LEVEL	Google Earth number
				STUDY: LAMBU LANDING SITE)		The effect of shells powder on shear strength and shear strength parameters of loose sandy soils were investigated. From the present study, increasing values of strength were recorded on grouted samples.it was found out that the bearing capacity of soils increased with increase in the content of lake shells powder. Also bearing capacity was high on grouted than ungrouted samples. The results of the various investigations conclusively proved that grouting can be used as an effective method for improving the strength characteristics significantly.						
6	International University of East Africa	Ibrahim Abdi Jama	2016	THE ASSESSMENT OF VARIABILITY OF UGANDA'S PAVED ROADS CONSTRUCTION UNIT COSTS	FACULTY OF ENGINEERING , DEPARTMENT OF CIVIL ENGINEERING , Dr.Lawrence Muhwezi	The global economic situation that has affected all sectors of economies has seen widespread variations in prices of many sectors including construction. In Uganda, the road sector has seen an upward trend in prices of construction and maintenance over the past years. This trend has caused concern not only to the GoU but also to the public which has attributed to corruption and inefficiency of government departments, handling procurements and non-competitive procurement practices. Escalating costs of road construction undermine the government's efforts to improve roads, reduce the amount of infrastructure that can be provided from a given funding commitment in addition to creating adversarial relationships between parties. There has been no in-depth analysis of what causes road work construction, cost escalation and its trend. This study was meant to derive pavement construction unit rates and to investigate the relationships between derived rates and actual contractors' bid rates. It was also meant to find out why contractors operating in the same environment have far different rates and also to establish cost trends. The methodology involved the use of checklists, interviews and case studies. This entailed derivation of unit rates for individual inputs of pavement layers based on recommendations of the MoWT specifications. The resultant unit rates were as a result of the prevailing market prices. Contractors' rates were obtained from the leading implementers of both development and rehabilitation road projects and were stratified into two groups of regional and international contractors. A comparative analysis was done to establish whether there were significant differences between the derived and contractors' rates for the different classifications of contractors. In addition, construction cost trends were determined from previous projects while putting into consideration the financial indices. Data analyses showed that there were strong correlations between contractors' rates and the derived rates with coefficients of 0.915 and 0.745 for international and regional contractors respectively. For both classes of contractors, p is less than approx. 2 thus at 95percent confidence level, the null hypothesis was rejected.it was realized that trends for G15, gravel and surfacing were increasing hence responsible for the current high costs of road construction. Future studies should be carried out to derive unit rates for other road construction activities such as drainage, structures and ancillary works. In addition, future studies should focus on packaging projects according to type, size, duration of construction and location in order to prove analyses showed that there were strong correlations between contractors' rates and the derived rates with coefficients of 0.915 and 0.745 for international and regional contractors respectively. For both classes of contractors, p is less than approx. 2 thus at 95percent confidence level, the null hypothesis was rejected.it was realized that trends for G15, gravel and surfacing were increasing hence responsible for the current high costs of road construction. Future studies should be carried out to derive unit rates for other road construction activities such as drainage, structures and ancillary works. In addition, future studies should focus on packaging projects according to type, size, duration of construction and location in order to provide insights that influence the bid prices.	Bill of quantities, design bid build, design and build, equivalent standard axle loads	Uganda	Construction	Other	Platform	I6
7	International University of East Africa	Francis Lado Franco	2016	AN INVESTIGATIVE STUDY ON THE EFFECTS OF VARIOUS ADMIXTURES ON THE PROPERTIES OF HARDENED CONCRETE-UGANDA	FACULTY OF ENGINEERING , DEPARTMENT OF CIVIL ENGINEERING , Dr.Lawrence Muhwezi	This report presents all the work performed in this project. The main research project was to investigate effects of various admixtures on the engineering properties of hardened concrete. The effects of various admixtures on strength property of hardened concrete cubes were tested at different ages, the crushing compressive stresses of different cubes with respect to admixtures used in the experimental research were determined, the properties of hardened concrete such as compressive strength, shrinkage, elastic modulus and flexural strength in relation to various admixtures were also determined, and finally the interrelationship of various hardened concrete properties among different tested cubes at different ages of test was established. The findings indicate that only sika rapid-2 increased compressive strength of concrete at the age of 28 days more than those of sika-Aer entrainment and sika retarder. It was established that all the tested admixtures had negative impact on property of flexural strength with sika-Aer entrainment having the highest percentage of 21.05percent. Sika rapid-2 indicated an increase in elastic modulus of concrete than the other admixtures used in this study and finally Sika retarder had no adverse impact on shrinkage strains of hardened concrete than the other two admixtures. It was concluded that sika rapid-2 had no adverse effects on compressive strength of concrete. Sika-Aer entrainment has an effect on the flexural strength of the concrete more than those of sika –rapid 2 and sika retarder. Sika rapid-2 does not have any adverse effect on shrinkage strain of hardened concrete base on these findings. The study recommended that all additives and their applications should be under control dosage and be applied only by experts. The additives should be applied based on the purpose of concrete structure designed. Similar laboratory test should be intensively done to check the impact of additives on properties of concrete before use on the structure.	Compressive strength, flexural strength, elastic modulus and shrinkage	Makerere University Structural Laboratory	Materials	Non-road	Solution / Application	I7
8	International University of East Africa	Simmy Okori Odeki	2016	AN ASSESSMENT OF RURAL ROAD MAINTENANCE IN UGANDA- A CASE STUDY OF BAMUNANIKA AND KATIKAMU SUB-COUNTIES, LUWERO DISTRICT	FACULTY OF ENGINEERING , DEPARTMENT OF CIVIL ENGINEERING , Dr.Lawrence Muhwezi	The proposal was carried out from Aug 2015 to June 2016 and the topic was 'an assessment of rural road maintenance in Uganda' with the case study at Bamunanika and Katikamu sub-counties of Luwero district. The main objective of this research was to assess the rural roads maintenance in Uganda, taking a case study of Katikamu and Bamunanika sub-counties. The specific objectives of the project were to assess the existing road situation, challenges facing rural road maintenance, assess the impact of poor maintenance on communities and propose improvement strategies and policy framework for rural road maintenance in the two sub-counties. The study questions covered the existing systems of rural road maintenance in two sub counties, challenges facing rural road maintenance, types of rural road maintenance works are being used for road, technologies of rural road maintenance being used, impacts of poor maintenance and what proposed strategies of rural road maintenance have been set in place and proposed policy frame work of road maintenance in Katikamu and Bamunanika sub counties? From the finding in the first instance it is concluded that all the roads in the study area that is Kalangala, Nkokonjeru and Koko-koziri, the condition of all these according to the findings are cracked basically due to the poor maintenance of the road this contributed about an average of 75 percent of road conditions. Regarding the impact of road maintenance it can be concluded in the study area the major impact of poor maintenance are high rate of accident which is attributed to huge potholes in the roads, mechanical breakdown as a result of exposed culvert, flooding in reference to the finding was also clear that this problems is a result of blocked side drainage, striking and according to the finding it's as a result of eroding of road soil all these coming as a result of poor maintenance. Effective monitoring and evaluation of the project: the finding showed clearly that poor maintenance is as a result of abuse of funds, therefore effective accountabilities through the office of IGG should be active enough to ensure that the funds given to URA is well accounted and enable the smooth and effective work accomplishment. There is also need for the authority to apply a thorough maintenance of the roads rather than the use of periodic system that is currently being applied, this is because it becomes more expensive to maintain when it is in a more distorting state, there the authority have to revise the time allocated for maintaining the roads.	Road shoulder, road chamber and meter drain	Luwero District	Maintenance & rehabilitation	Pavement	Solution / Application	I8
1	Kampala International University	Kagaba Rogers and Twizeyimana Selemaani	2016	DESIGN OF A DRAINAGE STRUCTURE FOR YUSUF LWANGA ROAD, LUGAZI TOWN COUNCIL, BUIKWE DISTRICT	DEPARTMENT OF CIVIL AND MECHANICAL ENGINEERING , Wafula Peter	This project is located in Lugazi town council. Lugazi also referred to as —Kawolo especially by the local inhabitants, is a town in the Buikwe district of the central region of Uganda. Located on the Kampala - Jinja highway, the town is approximately 46 kilometres by road, east of Mukono, nearest large town, also on the highway between Kampala and Jinja. The dominating activities are trade and agriculture, fueled by a growing population and the existence of the Sugar Corporation of Uganda Limited. Yusuf- Lwanga road located at a coordinate 36o 02'57''N and 0o 00'15''E is an array of a clear transportation and drainage problem. The road was opened by the Town Council to help boost transport within the area. However, overtime, the road has deteriorated both in shape and in the drainage aspect. The study is about design of a drainage structure. It comprises; carrying out a topographical survey to determine the vertical and horizontal profiles of the project area, assessing the capacity of the soil onto which the drainage structure will rest, obtaining and analysing the hydrological data in order to determine the discharge of the catchment area and carrying hydraulic and structural design of the suitable drainage structure. The topographical survey was carried out by geodetic levelling of the road over a stretch of about 150m. The results obtained were computed on a excel spreadsheet. Using AUTOCAD CIVIL 3D engineering software, the vertical and horizontal profiles of the project road were drawn. The bearing capacity of the soil was obtained through a geotechnical survey of the site and subsequent testing from the Central Materials Laboratory. The hydrological data was got from Lugazi Meteorological Centre. Analysis and design was done using the Uganda Drainage Design Manual alongside the TRRL Report 623. The structural design was done using selected BS codes. A Box culvert size of 2000X2600m was found suitable according to the results obtained from the hydraulic design and the topography of the place to carry both the stream and runoff water across the road.	Lever arm , Width of cross-section , Intensity – Duration – Frequency curve , Whole Circle Bearing Design Ultimate Moment	Yusuf Lwanga road at approximately 2.3 Km from Kampala – Jinja highway in lugazi town, Buikwe district.	Design	Other	Solutions / Application	KM1
2	Kampala International University	Odongo James Okoth and Abdimajid	2016	INVESTIGATING THE PERFORMANCE OF INDIGENOUS CONTRACTORS IN	DEPARTMENT OF CIVIL AND MECHANICAL ENGINEERING	Indigenous contractors around the world almost face similar problems and challenges such as shortage of skills of manpower, poor supervision and poor site management, unsuitable leadership, shortage and breakdown of equipment. In Uganda, many projects are never completed within the estimated time, cost, quality and scope. Health and safety considerations, environmental concerns, functionality issues, low profitability and difficulty in satisfying the project parties have all remained a tight spot. The objective of this study was to examine the factors that affects the performance of indigenous road contractors, Assess the level of	Procuring and Disposing Entity	Kampala since most of the road stake holders such as UNRA (Uganda National	Construction	Other	Platform	KM2

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		Isse Omar		IMPLEMENTATION OF ROAD PROJECTS IN UGANDA - CASE STUDY OF SELECTED LOCAL COMPANIES	, Mr Oyagbola Ismail	performance of the selected contractors and determine better policy frameworks / solutions or stringent measures to the problem identified and make strategic recommendations. The study design was cross sectional and descriptive in nature with A quantitative Research approach. Questionnaires were used to collect data that were used in the processing and analysis of findings. The data was analysed by use of SPSS toolset and was presented in tables and charts. The results show that overall level of performance of construction companies was at 48.5% which below the average score of 50% basing on the findings in relation to performance attributes such as projects being completed within budget, projects being completed on schedule, stakeholder's satisfaction with the project complying with the specification. Conclusions show that local contractors are under-performing basing on performance attributes in relation to their variables. Recommendations were made on how to improve the level of performance of local contractors on road projects in Uganda through the use of better Practices such as Earned Value Management, Project Monitoring and Evaluation against Benchmarks, Human resource and total quality Management.		Roads Authority), Ministry of works and Transport (MW&T) and Kampala City Council Authority (KCCA) have their headquarters/offices around Kampala.				
3	Kampala International University	Mohamed Farah and Ahmed Khaalid	2016	ASSESSMENT OF VARIATION IN UNIT COST OF PAVED ROAD CONSTRUCTION IN UGANDA	DEPARTMENT OF CIVIL AND MECHANICAL ENGINEERING , Wafula Peter	The global economic situation that has affected all sectors of economies has seen widespread variations in prices of many sectors including construction. In Uganda, the road sector has seen an upward trend in the prices of construction and maintenance over the past years. This trend has caused concern not only to the GoU but also to the public which has attributed it to corruption, inefficiency of government departments handling procurements and non-competitive procurement practises. Escalating costs of road construction undermine the government's efforts to improve roads, reduce the amount of infrastructure that can be provided from a given funding commitment in addition to creating adversarial relationships between parties. There has been no in-depth analysis of what causes road work construction cost escalation and its trend. This study was meant to derive pavement construction unit rates and to investigate the relationships between derived rates and actual contractors' bid rates. It was also meant to find out why contractors operating in the same environment have far different rates and also to establish its trends. The methodology involved the use of checklists, interviews and case duties. This entailed derivation of unit rates for individual inputs of pavement layers based on recommendations of the MoWT specifications. The resultant unit rates were as a result of the prevailing market prices. Contractors' rates were obtained from the leading implementers of both development and rehabilitation road projects and were stratified into two groups of regional and international contractors. A comparative analysis was done to establish whether there were significant differences between the derived and contractors' rates for the different classifications of contractors. In addition, construction cost trends were determined from previous projects while putting into consideration the financial indices. Data analyses showed that there were strong correlations between contractors' rates and derived rates with coefficients of 0.915 and 0.745 for international and regional contractors respectively. For both classes of classes of contractors, p is less than a/2 thus at 95percent confidence level, the null hypothesis was rejected. It was realised that trends for G15, gravel and surfacing were increasing hence responsible for the current high costs of road construction. Future studies should be carried out to derive unit rates for other road construction activities such as drainage, structures and ancillary works. In addition, future studies should focus on packaging projects according to type, size, duration of construction and location in order to provide insights that influence the bid prices.	Right of way, bill of quantities, average daily traffic, California bearing ratio and standard mean error	Uganda	Construction	Other	Platform	KM3
4	Kampala International University	Naliko Issa	2016	AN INVESTIGATION INTO THE STRENGTH DEVELOPMENT OF CONCRETE BLENDED WITH 10 PERCENT NATURAL POZZOLANA USING DIFFERENT DESIGN MIXES	DEPARTMENT OF CIVIL AND MECHANICAL ENGINEERING , Bukenya Stanley	In the past years, the use of supplementary cementing materials has become an integral part of high strength and high performance concrete mix design. Research has revealed that mortars and concrete produced with a 5-20percent replacement of ordinary Portland cement (OPC) with mineral additives yields higher strengths comparable to when only OPC is used in the production. In this study, various mixes with a 10 percent local natural pozzolana were used in replacement of Ordinary Portland Cement to produce high strength concrete. The concrete produced was subjected to tests that included slump, setting time and compressive strengths of concrete with blended Ordinary Portland cement. Natural pozzolana used in the study was sourced from Kisoro District in South Western Uganda. Compressive strength characteristics of concrete were determined at different ages of 7, 14 and 28 days. Forty 150mm *150mm concrete cubes were cast with different mix ratios as determined from mix designs. The results show an increase in the initial and final setting time of the binder paste. The results also show an increase in compressive strength of concrete with curing age for the different mix ratios. The compressive strength increased with blended concrete after 28 days for the different ratios but there was no significant change in the compressive strength after 28 days with the unblended concrete cubes.	Uganda code, Indian standards, high strength concrete and normal setting concrete	natural pozzolana used in the study was obtained in form of volcanic tuffs before being milled. It was collected from kisoro in south western Uganda, sand from Lwera on Masaka road, OPC from hardware world sold in Ntinda outlet and course aggregates from zirobwe-Luwero	Materials	Non-road	Platform	KM4
5	Kampala International University	Obodi Francis Ouma	2017	MITIGATING URBAN FLOODING PROBLEM AT SHOPRITE NAKAWA KAMPALA-UGANDA	DEPARTMENT OF CIVIL AND MECHANICAL ENGINEERING , Dr.Lawal Abdul Qayoom Tunji	This project entails mitigation of urban problem at Shoprite Nakawa Kampala Uganda. The problem of urban flooding is of serious concern if not well handled. Shoprite Nakawa entrance acts as a downstream where all the surface runoff from three upstream includes new vision offices, areas around Uganda china hospital, Naguru and from Nakawa market including total petro station. From fig 1.0 it is clear that surface runoff collects downstream at the entrance of Shoprite Nakawa and at this point the drainage channels were found not to be efficiently draining off the accumulated runoff. The other contributing factor was on the current condition of surface. A wider portion off the area is paved and this reduces the amount of water that infiltrates into the soil. With the aid of Arc GIS and remote sensing we were able to come up with the land use map of the area as well the soil map. The land use map with the help of Google earth was of great importance in analysing the paved areas, bare land and land having vegetation since they all have varying impact on runoff. The soil map helped in understanding the existing soil type with the specified watershed. This similarly was important since different soil type have varying rates of infiltration. These analysis were crucial in coming up with the necessary recommendations as discussed in chapter five.	Hydraulic grade line, British standard, energy grade line, probable maximum flood and storm water management model	main entrance of Shoprite shopping mall Nakawa at the terminal of Shoprite road	Environment	Other	Solutions / Application	KM5
6	Kampala International University	Lubajo John and Musinguzi Elijah	2017	INVESTIGATING THE USE OF SAW DUST ASH AS A STABILIZER FOR LATERITE SOIL FOR USE IN SUBGRADE PAVEMENT LAYER	DEPARTMENT OF CIVIL AND MECHANICAL ENGINEERING , Wafula Peter	This study has investigated the effects of saw dust ash (SDA) on the engineering properties of one of the common road construction material in Uganda, the laterite soil. The sustainable utilization and minimization of industrial and domestic wastes provides secondary raw materials that lead to sustainable technologies. This research project investigated or looked into the viability of the use of saw dust ash as stabilising material over chemical stabilisers in the market such as cement, lime etc. The scope of the research has covered the potential of using saw dust ash in Uganda as a chemical stabilizing replacement material. Traditionally, saw dust has been considered a waste material and has generally been disposed of by damping or burning, although some has been used as low grade fuel. However, when burned, the resulting saw dust ash (SDA) is a pozzolanic material that could be potentially used in stabilization of laterite soils for road construction. Literature states that the amount of siO2, Fe2O3, Al2O3 and CaCO3 in a good pozzolanic material should be at least 70percent for good binding properties with saw dust ash having a combined percentage of 81.16 percent. The methodology used was laboratory testing of materials. The investigation included laboratory tests and analysis of the results of the tested samples with saw dust ash content of 0,3,5,7 and 10 percent by weight of the dry soil. The properties that have been evaluated include the California bearing ratio (CBR), the atterberg limits such as linear shrinkage , liquid limit, plastic limit, plasticity index (PI) and the standard proctor compaction test. The results and discussions reflected how the different percentages of saw dust ash were used to stabilise lateritic soils and how they affected the lateritic soils' engineering properties, pointing out the cause of the effect on the lateritic soil. The findings of this research have called for a 5 percent of saw dust ash (SDA) by dry weight of soil that has yielded optimum results to be used for effectively stabilizing lateritic subgrade soils in the modern construction industry	Maximum dry density, saw dust ash, plasticity index and liquid limit	saw dust was obtained from timber milling sites around Bwaise area. The lateritic soils were sampled from different borrow pits along the Mukono-Jinja road owned by Stirling Civil Engineering LTD. All the laboratory tests were carried out from Stirling Mukono Laboratory	Materials	Subgrade	Platform	KM6
1	Uganda Christian University	Karuhanga Martin	2016	INVESTIGATION INTO THE CAUSE OF ACCIDENTS ALONG KAMPALA-JINJA HIGHWAY CASE STUDY (NTAAWO-KIGUNGA ALIGNMENT)	Library Department of Civil and Building Engineering, Dr.E. Wozeei	Approximately 1.24 million people die every year on the world's roads and another 20 to 50 million sustain non-fatal injuries as a result of road traffic injuries. Road traffic injuries are also estimated to be on the eighth leading cause of death globally (global status report on road safety 2013). One of the constraints is alignment design. This research analyses geometric design elements for Ntawo-kigunga alignment using the road design manuals (AASHTO (American association of state highway and transportation officials), 2014) (Tanzania ministry of communications and works, 2011) and (ministry of works and transport, 2005) to study the adequacy of road safety. The geometric design elements were determined by a field road survey using a total station that produced the road alignment profile. Calculations using standard equations in the design manual determined the respective design elements. It was found that horizontal and vertical alignment design elements showed no large deviation from the recommended values in design manuals. On the other hand there were high operating speeds of vehicles along the curve.(kanelladis, 1991) & (Nikiforos stamadiais and haufeng gong, January,2007) reported that drivers negotiating highway curves neither know nor observe design speed, they tend to drive at speeds that are comfortable for them based on their perception of the horizontal, vertical and cross-sectional geometry. Finally,	Federal highway administration, geographic information system	Kampala-Jinja highway case study ntawwo-kigunga alignment	Road safety	Other	Solution / Applications	U1

#	ORIGINATING INSTITUTION	AUTHORS	YEAR	TITLE	LOCATION OF DOCUMENT	ABSTRACT	KEYWORDS	GEOGRAPHICAL AREA	FOCUS AREAS	PAVEMENT LAYER FOCUS	TT LEVEL	Google Earth number
						placement of sign posts at the beginning of the curve is recommended, to help reduce on traffic accidents as drivers move at speeds that are comfortable for them. Further research on topics like mathematical modelling to develop speed profiles would be a tool used to broaden and understand the aspect along the curve, and also roadway hydroplaning to investigate more into the issue of vehicles skidding the road.						
2	Uganda Christian University	Bwambale Ahebwa	2016	REDUCTION OF TRAFFIC CONGESTION AT SEETA JUNCTION ALONG KAMPALA-JINJA HIGHWAY	Library Department of Civil and Building Engineering, Dr.E. Wozeei	This project aimed at reducing the traffic congestion at seta junction by enhancing it with a suitable design that would safely accommodate the traffic volumes going through the junction. Data was collected by reviewing past documents, carrying out traffic surveys, topographic surveys and by observation of the prevailing site circumstances that occur from day to day. Analysis was done using standard procedures from design manuals like Uganda roads design manual, design manual for roads and bridges, oversees road notes and other literature under the same field of study. The findings of the study were that the traffic volumes going through the junction were very high i.e. 24949veh/day on both the main approaches and 4705veh/day from the minor approaches. These volumes exhibited high numbers of turning movements at the junction which ended up clogging it and hence leading to congestion at the junction. From the topographic survey, it was discovered that the junction was not designed for the prevailing traffic volumes and that the existing layout, which was in the form of a stagger, contributed to the congestion since the stagger distance was 36.21m which was less than the minimum required for a right/left staggered junction. The junction was redesigned into a grade separated junction as it was suitable for the traffic volumes going through the junction. A narrow simple diamond interchange was deemed suitable for the junction	Ramp design speed, length of declaration lane, length of acceleration lane, single lane exit, single lane entrance, layout of the junction, average daily traffic, annual average daily traffic, design hourly volume	Seeta township in Mukono District, Central Uganda	Operations	Other	Solution / Applications	U2
3	Uganda Christian University	Namwase Margaret	2015	INVESTIGATING THE EFFECTS OF BLENDING LATERITIC SOILS WITH CRUSHED ROCK AGGREGATES FOR THE USE IN ROAD BASE CONSTRUCTION	Library Department of Civil and Building Engineering, Dr.E. Wozeei	Due to the scarcity of suitable materials for the use in road base layer construction , the research was conducted to investigate the effect of blending the locally available road sub base materials i.e. lateritic soils in Busia, Mbale District with crushed rock aggregates for use as a road base material. The crushed rock aggregates varied amounts by weight of dry lateritic soil were used as stabilisers and during the study, it was observed that as the percentages of the crushed rock aggregates was increased in lateritic soils, the physical properties which included grading and the plasticity of the soil were improved. The results of the study indicated that the percent blend of crushed rock aggregates with percent lateritic soils could be recommended for use as a road base material in a both sealed and unsealed roads though the rain fall regime of the area where the material is to be used should be taken into consideration since the blend still contained some clayey particles.	California bearing ratio, crushed rock run, maximum dry density, plasticity limit	Uganda	Materials	Base	Platform	U3
4	Uganda Christian University	Opio Martine	2015	INVESTIGATION ON THE EFFECT OF FINENESS OF VOLCANIC ASH ON THE COST AND STRENGTH OF CONCRETE AS A PARTIAL REPLACEMENT OF ORDINARY PORTLAND CEMENT	Library Department of Civil and Building Engineering, Dr.E. Wozeei	In this study, natural pozzolana (volcanic ash) of percent with the different diameters 90, 75, 60 um was used in replacement of ordinary Portland cement to produce concrete. The concrete produced was subjected to tests that included; slump test, setting time, comprehensive strength, consistency and carbonation, natural pozzolana used in the study was sourced in the study from Kisoro district in south western Uganda. Compressive strength test were done at different ages of 7 and 28 days using a mix ratio of 1:2:4 as determined from the mix design. 27 cubes of 150*150*150mm were cast for different fineness of volcanic ash. The results showed a decrease in the initial and final setting time of the binder mortar as the diameter of volcanic ash reduces (i.e. increase in fineness of volcanic ash which also leads to the increase of surface area of volcanic ash) this was as a result of the increase in the hydration reaction of concrete. The results also showed that as the diameter of volcanic ash reduces the power consumption also increases since more power is required to grind the volcanic ash to finer required size. The cubes made of different diameters showed resistance to carbonation because of the improved permeability which makes concrete dense hence increasing its durability. Conclusively it was observed that the properties of blended concrete were positively affected by the degree of fineness of pozzolana and the workability of concrete reduces with the increase in the fineness of volcanic ash reduces the fluidity of concrete at a given w/c. The consistency of mortar was not affected since the amount of water used was fixed. Admixtures (air entraining admixtures) was recommended to be used in the concrete to improve the workability of concrete and 7 percent blast furnace slag and lithium was also recommended to reduce the effect of alkali silica reaction(ASR) in the concrete.	Ordinary Portland cement, British standard, calcium hydroxide, binder volcanic ash and mega Pascal	Kisoro District in south Western Uganda	Materials	Non-road	Platform	U4
5	Uganda Christian University	Nakitende Esther	2016	INVESTIGATING THE USE OF SAWDUST ASH WITH LIME AS A STABILISING AGENT FOR SUBGRADE	Library Department of Civil and Building Engineering, Dr.E. Wozeei	Lateritic soils are the types of soils which are a product of tropical weathering with a red or reddish colour. These soils always have the problem of soil unstable and structure settlement, therefore the construction of buildings, roads, bridges canals and railway in lateritic soils has always been associated with stability problem and settlement. Lateritic soils were a type of fine grained soils which change volume in different forms like elastic deformation, consolidation and secondary compression, as these soils are disturbed they become expansive whose water content is higher than its liquid limit; such materials display extremely low yield stresses and represent difficult construction conditions. In Uganda the problem of these soils has taken space from the attention of geologists and civil engineers. This is because many failures of the flexible pavements in Uganda have continued to be attributed to the presence of weak subgrade conditions, so necessity to improve soil properties for road building has resulted into the use of various stabilizers. The objectives of this study was to determine the suitable percentage of sawdust ash and lime +SDA mixes which can be used best as stabilizing material. This project investigates the laboratory evaluation of lateritic soils that are stabilized with saw dust with different percentages (2, 4, 6, 8 and 10 percent), lime with percentages (2, 4 and 6 percent) and with the combination percentages of both lime +SDA mixes with soil. The mixture of all admixtures with the lateritic soils improves the Atterberg limits and also their mechanical properties of the soil, as expressed by their reduction in the PI and LL and also there increment in the CBR and UCS. This study has revealed that saw dust ash satisfactorily acts as a cheap stabilizing agent for sub-grade purposes in expansive soils and the best results can be obtained when small percentage of lime added to the SDA.	Plasticity index, saw dust ash, lime, ash, linear shrinkage, unconfined compressive strength	1m section on a 45km gravel road located in Kisaasi Nyange, the raw dust was collected from Ndeeba sawing carpentry workshop located in Kibuye, Ndeeba in Kampala division	Materials	Subgrade	Platform	U5
6	Uganda Christian University	Masiko Thomasi	2016	INVESTIGATING THE EFFECT OF QUARRY DUST ON CEMENT STABILIZED FINE GRAINED SOILS FOR USE AS IMPROVED SUBGRADE OF UNPAVED ROADS	Library Department of Civil and Building Engineering, Dr.E. Wozeei	Performance and durability of road pavements is significantly dependent on the strength and stability of the underlying soil layers most especially the subgrade pavement layer. Poor subgrade materials that are predominantly in existence in Uganda don't provide sufficient support under traffic loading and environmental conditions. Strength through several mechanisms which include chemical and mechanical stabilisation. To select the stabilizer mechanism to use several factors are put into consideration. These include the particle size, distribution of the soil sample and the atterberg limits. This project focussed on improving the engineering properties of a fine grained soil using quarry dust and cement. Quarry dust which is a waste product from the quarrying industry has been found to be a suitable stabilizer in laterite soils based on literature review. The quarry dust used in this research project was obtained from starling stone quarry located in Mbalala along Mukono-Jinja high way and the soil used in this study was obtained from Namagunga. Preliminary test results on this soil were carried out to determine if the soil required stabilisation. The tests included California bearing ratio, particle size distribution and atterberg limits and showed that the soil sample required stabilization since it fell under A-7-6 group which a poor subgrade materials based on (ASTM D 3282 (2004). The atterberg limit tests classified the soil as silt of intermediate plasticity (MI) based on the unified soil classification system (USCS) and was stabilized using a combination of quarry dust and cement by weight of the dry soil in accordance with the British standards. The combined effect of quarry dust and cement investigated based on compaction characteristics, unconfined compressive strength, California bearing ratio, and atterberg limit tests. Results indicated a general increase in maximum dry density and a decrease in optimum moisture content for the combined effects of quarry dust, improvements were noted in CBR and UCS with peak value at 30 percent quarry dust and 8 percent cement content.it was observed that quarry dust and cement can be used to stabilize fine grained soil and should be extensively used on other types of fine grained soil such as clays	Liquid limit, linear shrinkage, plastic limit, plastic index, California bearing ratio	Quarry dust samples were obtained from starling stone quarry located in Mbalala along Mukono –Jinja road and soil samples obtained from Namagunga	Materials	Subgrade	Platform	U6
7	Uganda Christian University	Namugaya Tracy Kevin	2016	USE OF SUGAR MOLASSES AS A CONCRETE ADMIXTURE	Library Department of Civil and Building Engineering, Dr.E. Wozeei	The issue of concrete strength and its durability is important for any structure. Concrete is a mixture of aggregates, cement and sometimes additives or admixtures. Additives are added to cement during its manufacture to enhance its properties while admixtures are added to fresh concrete during mixing to improve on its properties. Concrete with a lot of water added to it is workable yet weak, while concrete with limited amounts of water is strong but not workable. Therefore admixtures like sugar molasses can be used to achieve both properties i.e. workability and strength. Sugar molasses are both a water reducer and retarding admixture. They reduce on the amount of water required for a given concrete mix and also slow down the initial setting time to facilitate transportation, placement and compaction of concrete. Tests on cement for the setting time, workability, strength and durability were therefore carried out to ensure that the sugar molasses do not compromise the desired concrete. This project will hopefully show that sugar molasses, a product of the sugar factories is a necessity in tropical countries like Uganda.	Calcium oxide, sulphite, roller compacted concrete, alkali carbonate, reaction	Kakira sugar factory	Materials	Non-road	Base	U7
8	Uganda Christian	Natumanya Douglas	2015	DESIGN OF TRAFFIC CONTROL SYSTEM AT	Library Department	Traffic lights that have been designed are specifically for spear motor road junction/intersections to aid the flow of traffic from different directions. The purpose of the lights is clear and the theory behind them is sound; meaning that at particular junction vehicles should regularly flow through, minimising the queue build up in any	Classification of vehicles, queue	Spear motors road junction , Nakawa in	Operations	Other	Solution / Applications	U8

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	University			SPEAR MOTORS ROAD JUNCTION, NAKAWA	of Civil and Building Engineering, Dr.E. Wozeei	one direction. Multiple sets of traffic have been designed to be in sequence, without affecting the flow of vehicles from one approach to the next. The traffic data provided information for parameters used to develop the design. The 22 vehicles wait at the junction within an hour from Jinja approaching the junction with an average of 73 secs per arriving vehicle and 19 vehicles have to wait at the junction from Kampala approach towards the junction with an average 70 seconds for each vehicle and from Ntinda is found that is 15 vehicles have to wait at the junction within the one hour and their average waiting time for each vehicle being 61 seconds. The delay time presented above helped to give the cycle length in the traffic signs where junction has a free flow of traffic.	length, traffic flow, flow factors	Kampala city				
9	Uganda Christian University	Nyamagenyi Barbra Sophie	2016	IMPROVING CLAY SOIL USING COARSER FRACTION (SAND)	Library Department of Civil and Building Engineering, Dr.E. Wozeei	An experimental study that was carried out in this study seeks to understand the mechanical mechanism of stabilisation of clay (an expansive soil) by adding an anti-shrinkage material at various percentages and mixing the soils of different gradation. The first aim of the study was to analyse the effect of stabilisation on the various consistency limits or variation of soil consistency. The results obtained showed a marked improvement in the soil consistency that yields good properties for brick making. The study of the effect of the additive on the quality of the bricks was also carried out of which the bricks were subjected to durability tests which only limited to the compressive strength, water absorption and abrasion resistance tests of the produced bricks and results compared to the fired bricks.it was found out that the addition of sand is capable of improving the strength of the bricks however, the standard water absorption test and wet compressive strength was unsuccessful because the produced eco bricks could not be soaked in water directly for 24 hours due to the soil mass or disintegration of the bricks hence only dry testing was possible for compressive strength. However the researcher came up with a new mechanism to carry out the water absorption since the immersion of the bricks directly in water was considered too hostile to the eco bricks. This mechanism involved protecting the brick by enclosing it in a nylon cloth that allowed water to pass through without allowing loss of soil mass of which the test was seen to be a success.	Plastic index, liquid limit, plasticity index, unified soil classification system	Uganda	Materials	Gravel	Base	U9
10	Uganda Christian University	Sentubwe Anthony	2016	INVESTIGATING THE USE OF KAOLIN AS A STABILISING AGENT DURING ROAD MAINTENANCE	Library Department of Civil and Building Engineering, Dr.E. Wozeei	Maintenance of a road is required to keep a road in its originally constructed condition. Factors like increased traffic volumes can contribute to the deterioration of a road so stabilisation of the subgrade soils of the road helps to improve the engineering properties of the underlying soils of the road. Some of the common stabilizing agents used include lime, cement, volcanic ash, bagasse ash but this project addresses soil treatment /stabilisation with a mixture of kaolin and lime as an alternative. Kaolin is a pozzolanic material and when combined with lime, it forms cementious materials, the kaolin used in this project was from buwambo, physical and chemical tests were done on it to determine whether it needs the minimum standards as per ASTM C618 for use as a pozzolan. The soil used in this project was from Baha'i and laboratory tests were carried out on the soil to determine whether or not it required stabilisation and according to the particle size distribution, atterberg limits and California bearing ratio, the soil needed stabilisation. The soil was also classified as clays of intermediate plasticity (CL) according to the unified soil classification system (USCS). The soil was stabilized with 0,2,4,6 and 8 percent kaolin and lime by weight of the dry soil.	Plastic index, liquid limit, plasticity index, unified soil classification system, maximum dry density	1 km of Baha'i road	Materials	Gravel	Base	U10
11	Uganda Christian University	Daphine Audrey Biira	2016	USE OF HORIZONTAL DRAINS FOR SLOPE STABILISATION	Library Department of Civil and Building Engineering, Dr.E. Wozeei	Slope failures in rwenzori have occurred after heavy rains that are followed with light intense rains. The study focussed on the use of horizontal drains in slope stabilisation of rain fall induced failures through reduction in seepage and pore water pressures while assessing the factors that influence landslide occurrences in rwenzori region. Particle size distribution and atterberg limit tests were carried out to classify the soil. Permeability test was carried to with reference to BS 1377: part 5: 1990 to determine the hydraulic conductivity. Permeability influences the seepage patterns and water levels. It depends on the size and shape of soil particles, degree of compaction and gradation of soil. Direct shear box test with reference to BS 1377: Parts 7: 1990 determine the shear strength. The project came with the following findings; soils were classified as sandy clays using the unified soil classification system with angle of friction of 31 degrees and according to atterberg limits, they have medium plasticity of 12.2 percent the clay particles provide some cohesion between the particles and this bound tends to hold particles together and hence provide strength in terms of friction and cohesion. The permeability obtained from the constant head test was 1.24*10squre negative 5cm/sec which is low due to the presence of clay particles that do not allow water to flow through them easily. In conclusion, the horizontal drains with slot size 0.01 inch should be installed in the bottom slope inclined at an angle of 10degrees and at a spacing of 8m in order to drain water by gravity out the soil hence decreasing the moisture content and pore water pressures.	Atterberg limit tests, shear strength, topples and falls	Slopes of Mount Rwenzori , Kasese district in south western Uganda	Environment	Other	Base	U11
12	Uganda Christian University	Owora Geoffrey	2016	INVESTIGATING THE USE OF DIATOMITE TO IMPROVE SILTY CLAY SOILS FOR SUBGRADE USE	Library Department of Civil and Building Engineering, Dr.E. Wozeei	The objective of this paper is to investigate the effect of lime and diatomite (natural pozzolana) on the engineering properties of interest of the silty clay for upgrade use. The properties studied are atterberg limits, compaction parameters, CBR and unconfined compressive strength. From the study, addition of lime reduced liquid limit, increased plastic limit, reduced linear shrinkage and decreased plasticity index. The CBR and unconfined compressive strength of the soil was considerably increased with addition of lime. Also the study showed that increase in diatomite content increased the limit and plastic limit and reduced the plasticity of the soil while reducing that shrinkage characteristic of the same soil. The maximum dry density reduced, California bearing ratio, and unconfined compressive strength of soil increased with the addition of lime and diatomite content according to ratios mixed. From the study, the diatomite can be used as an additive in the stabilisation of subgrade soils especially silt clay soils which were investigated in this study.	Liquid limit, maximum dry density, plastic limit and clay diatomite	0+500 km, Njeru town council, Buikwe district	Materials	Subgrade	Base	U12
13	Uganda Christian University	Sewanyana Ambrose	2016	GEOMETRIC DESIGN IMPROVEMENT OF KYALIWAJALLA CROSS INTERSECTION	Library Department of Civil and Building Engineering, Dr.E. Wozeei	This study aimed at the geometric design improvement of kyaliwajjala intersection in Kira municipality, Wakiso district in Central Uganda. It looked at the genesis of the traffic congestion being experienced at the intersection apparently. Due to the fact that kyaliwajjala intersection is a crucial road connect to the northern bypass, Jinja highway, Gayaza and Kasangati areas, as well as the Namugongo martyrs shrines and seta in Mukono district, it makes it a busy intersection, required data was collected through direct field surveys for example the traffic volume, speed and the topographical data in order to understand the problem and provide a solution to the problem. It was found that the main cause of congestion at the intersection is due to the heavy turning trucks and un restricted parking of vehicles, the study therefore recommends a solution of an interchange, which will hopefully reduce delays, congestion and severity accidents. The detailed results, design artistic impression, conclusions and recommendations of the proposed solution are all documented in this report.	Average annual daily traffic, level of service, design vehicle, daily high volume, weekly average daily traffic	Kyaliwajjala in Kira municipality, Wakiso district located in Central Uganda	Operations	Other	Solution / Applications	U13
14	Uganda Christian University	Niyonzima Bernard	2015	DETERMINING THE OPTIMAL AMOUNT OF PORTLAND CEMENT TO BE REPLACED BY VOLCANIC ASH IN CONCRETE	Library Department of Civil and Building Engineering, Dr.E. Wozeei	In the past years, the use of supplementary cementing materials has become an integral part of high strength and high performance concrete mix design. Research has revealed that mortals and concrete produced with a 5-30 percent replacement of ordinary Portland cement (OPC) with mineral additives yields strengths comparable to when only OPC is used in the production. In this study, various combinations of a local natural pozzolana were used in replacement of ordinary Portland cement to produce concrete. The concrete produced was subjected to tests that included; slump, compressive strength and absorption test of concrete blended with ordinary Portland cement. Natural pozzolana used in the study was sourced from Kisoro District in south western Uganda. Compressive strength characteristics of concrete were determined at different age of 7, 14, and 28 days using a mix ratio of 1:2:4 as determined from the mix design. The results show an increase in compressive strength of concrete with curing age but a decrease with the increasing natural pozzolana content	Volcanic ash, mega Pascal and calcium oxide.	Mutolele, Kisoro district	Materials	Non-road	Base	U14
15	Uganda Christian University	Mutyaba Johnson	2015	UPGRADING OF BUGUJJU-SEETA ROAD FROM GRAVEL TO BITUMINOUS STANDARD	Library Department of Civil and Building Engineering, Dr.E. Wozeei	This project aimed at carrying out drainage design and pavement design of Bugujju-seeta road in order to provide a safe, economical efficient and environmentally friendly road than adverse to the environment. The project came out with the following findings; ADT for station A and B were 2488 pcu/day and 2913 pcu/day respectively. The road was found to be class C gravel road of category B.it is upgraded to class 111 bitumen of category B. roadway width adopted was 8.6m carriage way width was 5.6m, lane width2.8m, camber of 2.5percent and shoulder width of 1.5m on both sides of the pavement. The project road was designed in two sections , section one (CH 0+000 to CH: 0+600) consisted of 50mm for surfacing,200mm granular road base and 200mm for granular sub-base. The second section (0+600 to 1+0000) consisted of 50mm for surfacing, 200mm for granular road base and 275mm for granular sub-base. The difference in the thickness was due to the different subgrade classes in these particular sections of the road. Concrete culverts of 900mm diameter were designed to curb storm water for proper performance of the drainage system.	Annual average daily traffic, average daily traffic, head water, plastic limit, Pascal second	Central materials laboratory (CML);kireka under the ministry of works and transport (MoWT)	Design	Pavement	Solution / Applications	U15
16	Uganda Christian University	Atim John Paul	2016	OPTIMAL ROUTE SELECTION USING GIS	Library Department of Civil and Building Engineering, Dr.E. Wozeei	This research project aimed at exploring the use if GIS for engineering purpose of transportation planning, with all emphasis on optimal route corridor selection. This c and time costs incurred in the traditional methods of route corridor selection. The report describes all the procedures taken to execute the purpose of the study, the relevant data, how it was acquired and how it was manipulated into the desired result. This report accounts for the development of a model which can in a single debug perform all the functions of optimal route selection given the right data input to produce intermediate functional results.	Multi criteria analysis, digital elevation model and analytical hierarchy process	Masaka district in southern Uganda, its boarded by bukomasimbi district to the northwest, kalungu to the north , kalangala to the east and south	Operations	Other	Platform	U16
1	Uganda	Bukoosi	2016	MECHANICAL	Library	This study aimed at stabilising gravel clayey lateritic soil using air cooled blast furnace slag a by-product in the steel factories to be used as road base material for a	Flakiness index,	ACBFS was obtained	Materials	Base	Platform	U17

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7	Christian University	Percy		STABILIZATION OF GRAVEL CLAYEY LATERITIC SOILS TO BE USED AS ROAD BASE MATERIAL FOR A PAVED ROAD USING AIR COOLED BLAST FURNACE SLAG (ACBFS)	Department of Civil and Building Engineering, Dr.E. Wozeei	paved road. The soils had poor properties such as high PI, and didn't meet CBR requirements as per the standard specification. The study mainly looked at properties such as grading, flakiness, atterberg limits, OMC, MDD and 4 day soaked CBR for the materials used. A mix design of 50 percent slag and 50percent lateritic soil was determined as suitable for the road base since it gave a CBR of 148 and a PI of 5.7 which meet the specified standards of a CBR not less than 80 and PI not greater than 6 according to the MoWH and C specifications for road and bridge construction. The research is considered successful since it met all the set objectives.	liquid limit, plastic limit, optimum moisture content, air cooled blast furnace slag	from tembo steel rolling mill in Iganga. The lateritic soils were sampled from a borrow pit along the Mukono-Jinja road owned by sterling civil engineering ltd, all the laboratory tests were carried out from sterling Mukono Laboratory				
18	Uganda Christian University	Gasore Frank	2016	USE OF SAW DUST ASH AS A PARTIAL REPLACEMENT OF CEMENT IN MAKING CONCRETE	Library Department of Civil and Building Engineering, Dr.E. Wozeei	This study was carried out to investigate the use of saw dust ash as partial replacement of cement in making concrete. Concrete cubes measuring 150mm by 150mm by 150mm, concrete beams measuring 150mm by 150mm with a span of 750mm and concrete cylinders measuring 150mm by 300mm were made from seven different concrete mixes prepared by using saw dust ash to replace 0, 5,10,20,25 and 30 percent of ordinary Portland cement by weight. The work abilities of the fresh concrete mixes were evaluated using the slump test while compressive strengths of concrete cubes, flexural strengths of concrete beams and splitting tensile strength of concrete cylinders were evaluated at 7,14,and 28 days using a mix ratio of 1:1:64:2:17 as determined from the mix design. The results show a decrease in workability with an increase in replacement percentage which is 48mm at 0 percent (control) to 25mm for 30 percent percentage replacement and an increase in compressive, flexural and splitting tensile strength of concrete with curing age but a decrease with increasing saw dust ash content. Saw dust can be used to partially replace ordinary Portland cement in making concrete as it does not compromise the flexural strength when 10 percent saw dust ash is used and for splitting tensile strength when 5 percent saw dust ash is used but it affects the compressive strength by reducing it as partial percentage of OPC increases.	Loss on ignition, ordinary Portland cement, saw dust ash and pozzolanic activity index	saw dust was collected from Uganda Christian University carpentry section	Materials	Non-road	Base	U18
19	Uganda Christian University	Odero Leonard	2016	GEOMETRIC RE-DESIGN OF BUGOLOBI T-JUNCTION	Library Department of Civil and Building Engineering, Dr.E. Wozeei	This project research aimed at reducing the heavy congestion, turning conflicts and delays at the junction. Traffic counts were conducted for one week that involved 5 days of 16 hour counts and two 24 hour counts. The 16 hour traffic counts were converted to 24 hour traffic by multiplying with the conversion factors to give an average daily traffic. The average daily traffic was projected to design the year. The discharge headways stabilised at the seventh and subsequent vehicles. Topography survey was carried out with a Leica icon GPS 60 a control point was established from WSG84 datum and WGS84 episode with an icon GPS60. Spot speed study was conducted to estimate the free flow speed. For each speed group, the percentage frequency of observations within the group was plotted versus the middle (mid-mark) speed of the group. The selection of the design vehicle was based on the largest vehicle (5 axle truck) that was accessing the junction. Selection of the intersection type was done basing on the plot of minor road average daily traffic against major road average daily traffic. The selected intersection type was an interchange. Conclusions based on the results obtained from the field and recommendations for further research are presented in this report.	Average daily traffic, peak hour factor, sight distance, entering sight distance, channelized left turn, global positioning distance	Bugolobi located in Nakawa Central Division	Operations	Other	Solution / Applications	U19
20	Uganda Christian University	Tusiime Edinah	2016	INVESTIGATING THE PERFORMANCE OF PROBASE TX-85 WITH SILT-CLAY SOILS	Library Department of Civil and Building Engineering, Dr.E. Wozeei	The stabilisation of soils with additives is a chemical method that can be used to improve soils with undesired engineering effect. The development of the new technology has led to an increase in the number of non-traditional stabilizers such as sodium chloride, calcium chloride and sodium silicate. The main aim of this research was to evaluate the performance of TX-85 liquid soil stabilizer with silt clay soils. The soil samples were collected from Kitgum district. The physical properties tests that were conducted on soil samples included atterberg limit, sieve analysis and mechanical tests were compaction, unconfined compressive strength and California bearing ratio tests. Stabilization using TX-85 will ensure that roads remain passable during rainy seasons and dust free in dry season. This report presents the influence of different mix proportions of TX-85 on the different soil parameters. The percentages of 2, 4,8and 10 of TX-85 were mixed with the soil sample. The addition of TX-85 increases the strength of the soil up to 8 percent and later on a decrease is noticed at 10 percent mix. However, the study should be extended to soils from other parts of Uganda to find out how probase performs on varied Ugandan soils.	Plasticity index, California bearing ratio and unconfined compressive strength	Soil samples were collected from Kitgum District and TX-85 sample was obtained from UB Engineering and consultancy firm	Materials	Gravel	Base	U20
21	Uganda Christian University	Kaweesi Micheal Wasswa	2016	DESIGN FOR UPGRADING OF BAJJO ROAD IN CONSIDERATION OF PEDESTRIAN AND MOTORCYCLIST SAFETY	Library Department of Civil and Building Engineering, Dr.E. Wozeei	Development of bajjo as an urban centre has resulted to high road maintenance costs due to increase in traffic flow. Bajjo road which is unpaved was taking 13,367 dollars per year for maintenance but due to the increase in the traffic, the maintenance costs have increased to 22,017 dollars per year there is need to upgrade the road. According to Uganda road sector support initiative in 2012, 8,743 motorcycles accidents (24.5) occur mostly in urban centres when the road is upgraded due to mix of traffic. To reduce traffic accidents on upgraded roads, separate lanes for both pedestrians and cyclists of 2.5m were provided. With pavement design having a double surface dressing having granular road base of GB1 to GB3 of thinness 150mm, granular sub base of GS material with thickness of 125mm,designining a drainage by use of the rainfall intensity from the metrological centre and catchment area by use of the arch GIS.	Annual average daily traffic, California bearing ratio, plasticity index, maximum dry density, passenger car units and overseas road note	Bajjo road in Seeta Mukono	Road safety	Other	Solution / Applications	U21
22	Uganda Christian University	Jesse Tusuubira Aweebwa	2016	PARTIAL REPLACEMENT OF PORTLAND AND CEMENT WITH METAKAOLIN IN THE MANUFACTURE OF INTERLOCKING SOIL STABILISED BLOCKS	Library Department of Civil and Building Engineering, Dr.E. Wozeei	This research project investigated the partial replacement of Portland cement with metakaolin in the manufacture of interlocking stabilised soil blocks with 0, 5,10,15,20 and 30 percent cement replacements by metakaolin produced from the calcination of kaolinite clay obtained from Buwambo. A review of the available literature was done in order to better understand the calcination process of kaolinite, establish a suitable criterion to be followed for soil characterization and assessing the suitability of the stabiliser to be used. Further review was done in order to find out what various researchers have done to better the properties and interlocking blocks and identify the gap in knowledge. After the review of literature, block samples were made with varying metakaolin contents as listed above with samples containing 0 percent metakaolin designated as the control. The block samples were tested for wet and dry compressive strengths, water absorption and abrasion strength to assess the improvements due the metakaolin additions. The performance of the different mix designs was assessed in compared to the control and acceptable standards. The research study concluded that dry compressive strength improved with 5 and 10 percent and the wet compressive strength improved for all partial replacements of cement as compared to the recommended standards. Water absorption and percentage loss in mass after abrasion were generally noted to increase with increasing metakaolin additions and all ratios exhibited values that were within the recommended range. The research recommended a 30 percent partial replacement of Portland cement with metakaolin since the results obtained with that replacement were in proximity to the recommended standards and significantly reduces the use of Portland cement whose production process is environmentally unfriendly.	Mega Pascals, loss on ignition, relative humidity, compressed stabilised earth block	Livingstone construction company premises in Nakasongola District(Uganda)	Materials	Surfacing	Platform	U22
23	Uganda Christian University	Jjuuko Adrian	2016	DETERMINING THE OPTIMAL AMOUNT OF ORDINARY PORTLAND CEMENT TO BE PARTIALLY REPLACED WITH RICE HUSK ASH IN CONCRETE PRODUCTION	Library Department of Civil and Building Engineering, Dr.E. Wozeei	Cement is widely noted to be the most expensive constituent of concrete. The entire construction industry is in search of a suitable and effective waste product that would considerably minimise the use of cements and ultimately reduce the construction cost. Rice husk ash (RHA) which has the pozzolanic properties is a way forward. This research study was therefore, experimentally carried out to determine the optimal amount of ordinary Portland cement(OPC) to be partially replaced with rice husk ash (RHA) in concrete production. The rice husk ash was collected from tilde Uganda limited and burnt at Uganda clays limited. Ordinary Portland cement (OPC) was replaced with rice hush ash (RHA) By weight at BY WEIGHT AT 0,5,10,15,20 and 25 percent with a mix design of 1:1:84:2:44. Chemical characterization tests were carried out on the rice husk ash to determine the major oxides of silica, alumina, and iron. Physical tests carried out were slump test concrete and compressive strength test, flexural and splitting tensile strength tests on hardened concrete at different ages 7,14,and 28 days of curing. The results on chemical characterization tests revealed that the sum of the percentages of the three major oxides were greater than the set standard result (70 percent) while for the physical tests the slump test results decreased as the percentage replacement of ordinary Portland cement (OPC) with rice hush ash (RHA) increased, which indicated less workable concrete. The compressive strength ,flexural and splitting tensile tests of the hardened concrete also decreased with increasing ordinary Portland	Mega Pascal, ordinary Portland cement and high strength concrete	Tilda Uganda Limited which is located either side of main Jinja to Tororo highway in Kibimba near the town of Bugiri in eastern Uganda	Materials	Non-road	Base	U23

#	ORIGINATING INSTITUTION	AUTHORS	YEAR	TITLE	LOCATION OF DOCUMENT	ABSTRACT	KEYWORDS	GEOGRAPHICAL AREA	FOCUS AREAS	PAVEMENT LAYER FOCUS	TT LEVEL	Google Earth number
						cement(OPC) replacement with rice hush ash (RHA)						
24	Uganda Christian University	Brian Musuto	2016	DESIGN OF PREVIOUS CONCRETE PAVEMENT USING DIFFERENT AGGREGATE SIZES	Library Department of Civil and Building Engineering, Dr.E. Wozeei	Previous concrete pavement differs from traditional concrete pavement designs in that the structure permits water to pass freely through it. The void content which is ultimately related to the effectiveness of the pavement is critical of the mix design; however special consideration is required in order to obtain higher air void content while maintaining strength and durability. A study was undertaken to design a pervious pavement for a parking lot proposed to be constructed at Uganda Christian University. The objectives of this study were to select the aggregates, identify a design storm, carry out material tests, prepare a pervious concrete mix design and carry out a pavement thickness design. In this study, a 24 hour 25 year design storm for Uganda Christian University was identified AIV, flakiness index, specific gravity of aggregates tests were carried out, 8 mixes were prepared using the aggregate sizes of 0-6, 6-10, 10-14 and 14-20mm with 4 having 8percent fines and the other 4 without fines. The samples from these mixes were tested for compressive strength in order to carry out the pervious concrete thickness design. A design storm of 130mmwas used, AIV and flakiness index were below 25 percent for the different aggregate sizes, the size of 0-6 gave the highest compressive strength of 14.7Mpa and 10-14mm gave the lowest strength of 8.9Mpa. Results from the thickness design showed that smaller sizes require smaller thickness as compared to bigger aggregate sizes due to the high compressive strength of the concrete.	Mix design, storage capacity and flexural strength	Uganda Christian University-The site is boarded by accounts department and agape square to the north, the law faculty to the east, the canteens and netball grounds to the south, agape rise road and old football pitch to the west	Materials	Non-road	Platform	U24
25	Uganda Christian University	Nakayenga Joyce	2015	EVALUATION OF PEDESTRIAN SAFETY AT THE MUKONO-KAYUNGA JUNCTION	Library Department of Civil and Building Engineering, Dr.E. Wozeei	According to the documented statistics, pedestrians are the most vulnerable road users. Many studies have extensively analysed road safety of intersections, but did not put their major focus on the pedestrians. In this report, diagnostic approach of analysing pedestrian safety at un signalised intersections was conducted. This was investigated by analysing the existing conditions at the Mukono-Kayunga junction by six surveyors in a period of three months. The field surveys were carried out on a week day and weekend during morning and evening hours. The safety problems were identified by comparing the existing conditions to the recommended standards and ranked according to their significance and severity. The suitable counter-measures for these problems were identified and the ones with the highest recommendation were used in the designs which were based on the existing conditions and the recommended standards. From the analysed data, the complexity of the junction, left turning lane width, radius for turning vehicle, right turning lane width, through lane width were not severe and had ranks of 1.11,1.25,1.42 and 1.42 respectively. However, the junction sight distance, lighting, pavement marking, pedestrian crosswalks, skid resistance, traffic signs and vehicle speed were severe with ranks of 2.54, 3.67, 4.46, 3.02, 4.42 and 4.46 respectively. These posed a threat to pedestrian safety and therefore the suitable counter measures for these safety problems were designed. The designs were obtained by determining the existing conre obtained by determining the existing conditions of the junction such as traffic volume, climate, pavement condition, location of the junction and width of lanes and using the recommended standards in the overseas road notes and the MWOT design manuals to find the most suitable design for the conditions. A 30mm thick single surface dressing, solar streetlights, hatched and edge carriageway lines pavement marking, traffic signs and a vehicle speed of 50km/hr were designed.	Annual average daily traffic, feet, traffic conflict analysis technique	Mukono-Kayunga Junction	Road safety	Other	Solution / Applications	U25
26	Uganda Christian University	Nasasira Derrick	2015	INVESTIGATING THE USE OF VOLCANIC ASH AS A PARTIAL SUBSTITUTE FOR CEMENT DURING SOIL STABILIZATION	Library Department of Civil and Building Engineering, Dr.E. Wozeei	The need for affordable and sustainable alternative construction materials to cement in developing countries cannot be under emphasised. The geotechnical properties e.g. strength, organic matter, bearing capacity and compressibility of soil determine it engineering behaviour. The soil sample used in this study was obtained from a gravel road stretching from bugujju town to ankrah hill in Mukono municipality, Mukono District. Laboratory tests were carried out on the soil sample to determine whether or not it required stabilization. Therefore, volcanic ash was taken as a choice for stabilization of the soil sample in this paper. Volcanic ash material chosen for this research project was provided at the ministry of energy and mineral development (MEMD) laboratory. Suitability tests classified the soil sample as clay of low plasticity (CL) using the unified soil classification system (USCS). The soil sample was stabilized with 8-12 percent cement by weight of the dry soil. Using the British standard light (BSL) compaction energy, the effect of volcanic ash on the soil was investigated with respect to compaction characteristics, California bearing ratio, and unconfined compressive strength tests. Results obtained, indicate a general decrease in maximum dry density and increase in optimum moisture content (OMC), all with increase in volcanic ash content (0-4percent) at specified cement contents. There was also an improvement in the CBR and UCS with increase in the volcanic ash content. There was also an improvement in the CBR and UCS with increase in the volcanic ash content at specified cement contents to their peak values at 4 percent volcanic ash. For the UCSs, the extruded samples were cured for a period of 7 and 14 days. Unconfined compression test (UCS) was conducted on all samples to determine volcanic ash impact on soil properties in term of strength increase. Having analysed the laboratory test results, it was noticed that 4 percent volcanic ash provided the optimum volcanic ash percentage for stabilization of the soil samples. An increment in the strength of soil specimens was noticed though the highest strength of 1190KPa was realized with sample mixed with 4 percent volcanic ash and 8 percent cement and cured for 14 days. Therefore, volcanic ash can stabilize and improve the engineering properties of soil mainly strength. Generally, unconfined compression test (UCS) indicates that, the soil gained strength due to different volcanic ash percentages added.	Unconfined compressive strength, California bearing ratio, maximum dry density, organic clays of high plasticity	Bugujju-ankrah in bugujju town, Mukono District	Materials	Gravel	Platform	U26
27	Uganda Christian University	Ephrance Nshemereirwe	2016	STABILISATION OF EXPANSIVE SOILS USING BAGASSE ASH AND LIME	Library Department of Civil and Building Engineering, Dr.E. Wozeei	Expansive soils like clay undergo swelling or shrinkage due change in climatic conditions independent of loading. These soils become a problem when encountered during road construction and shrinkage, settlement of such clays leads to cracking and break up of roads they support. This research work is aimed to evaluate the suitability of bagasse ash and lime for stabilization of expansive soils stabilisation so as to improve on its engineering characteristics. Bagasse ash is largely available in abundance and it exposes a disposal problem to sugar factories that produce it hence its usage in construction will help solve the problem. Stabilization of the clay soils will reduce on the costs involved in excavation and transportation of the fill material during road construction. Lime is also an expensive material therefore partially replacing it with bagasse ash in stabilisation will help reduce on the road construction costs. The tests carried out included the classification tests(Atterberg limits, sieve analysis), strength tests (standard proctor(MDD),CBR tests) on virgin soil as per BS 1377 part 2 and part 4 standards respectively and the unconfined compressive strength as per TMH1,1986, Method A14. Chemical tests were also done on bagasse ash. The preliminary investigation of the soil sample showed that it was fine grained fat clay with high plasticity (CH) according to USCS. Such soils are characterised with high volume changes. According to ASTM D3243, it exceeded maximum P.I of 10 and CBR reported at 95 percent MDD of the soil was 3 percent which is below the minimum CBR of 7 required for G7 materials according to the general specifications for road and bridge works. Thus rated as poor material for subgrade and therefore not suitable. The already mentioned tests were carried out again to evaluate the properties of the stabilised soils. The soil was stabilised with bagasse in different percentages of 4, 6, 8 and 10 percent by dry weight of soil. It was then stabilised with lime with the same percentages as those of ash and later with ash-lime admixtures. Analysis of the results shows that slight improvement on the geotechnical properties of bagasse ash stabilised soil. Both lime and bagasse ash reduces plasticity index, swelling and increase CBR with increase in percentages both independently and when mixed together. Ash alone increases MDD and UCS up to 6 percent and then they reduce for the following percentages while lime alone reduces MDD and increases UCS for all percentages. The admixture of lime and ash is almost the same as that of lime alone but more pronounce. From this study it was found out that bagasse ash stabilized soil do not meet the minimum requirement Uganda specification for road and bridge works for use as a sub grade material in road construction. Therefore, this study shows that lime in combination with bagasse ash can be effectively used to improve expansive soils with low CBR value and high plasticity.	Liquid limit, optimum moisture content, free swell index, clay of high plasticity and unconfined compressive strength	Uganda	Materials	Gravel	Platform	U27
28	Uganda Christian University	Kawuuki Felix	2015	DESIGN OF A MULTI-STORY PRIVATE CAR PARKING GARAGE AT NATEETE	Library Department of Civil and Building Engineering, Dr.E. Wozeei	Kampala being a highly congested city in matters concerning traffic with about 450000 cars that need parking in the city, this particular characteristic of the latter has led to the following; increased in vehicle time wasted as people walk through this high traffic increased accidents as people join and leave the on-street parking's at a growth rate of about 5 percent of the total annual accidents for the last 5 years, much time wasted in traffic jam, increased stress due to the much confusion in the city. The project is feasible in Kampala city as confirmed by the transportation engineer of (K.C.C.A) Eng wasswa joel in a personal interview with him. The main objective of this project was to design parking garages at the peripherals of Kampala city so as to cab down high traffic problem. Apparently there 3 gazette areas by K.C.C.A among which are Banda, Nateete and Bwaise. In this case my focus was on Nateete park since there is high connectivity to the parks and also due to the roads. A land survey and soil survey were carried out, architectural and structural designs and drawings made. The scope is mainly on the civil and structural works. For land survey reference was done to the survey that had been carried out 2 years ago, the parking survey was done according to transportation engineering 1 Tom V.Matthew Jan-May 2006. The results were found to be 2200bays, the bay dimension with 2.5m by 5m and 40223.7 vehicles in an hour leave or parked in the parking garage. The soil survey was done in accordance with BS5930:1981 and BS1377: part 2:1990 for field work and laboratory tests respectively, architectural designs were made using a soft called Arch card 18. The structural design was according to the Euro code 2 and BS8110. The results of the project show that 2acers of land	Design load, design strength and loads	Nateete parking garage	Design	Other	Solution / Applications	U28

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						available, 2200 bays and 40223.7 vehicle leave and park in an hour, allowable bearing capacity of 100KN/M2, 150KN/M2 and (C) =0.33, Q=15.6 Degrees, the structure is made of two buildings meeting at an angle of 120 degrees and joined by a third building at that angle in form of a shell.						
29	Uganda Christian University	Babyesiza Davis	2015	CONTROL OF SILTING OF SURFACE DRAINS ON GRAVEL ROADS IN NAKAWA DIVISION	Library Department of Civil and Building Engineering, Dr.E. Wozeei	Road maintenance has become a major problem especially on gravel roads in Nakawa Division and Amka road is one of the affected roads in the division. This has greatly been due to silting and accumulation of sediment in the open side drains in the gravel road. It has resulted into the problems such as culvert blockage and drains thus poor drainage. Excessive silting leads to pollution of the downstream water sources and also is a health hazard since water ponds and acts as a bleeding place for mosquitoes. This research focuses on the design of a silt fence as a control mechanism for silting. It also analyses the parameters responsible for silt and sediment accumulation in the side drains. Efficient drainage enables water to be diverted to a controlled outlet point also to flow off the road through drains and mitre drains. The digital elevation model of Mutungo was used to delineate the catchment area and it was estimated to be 110422.78m2. The rational method was used to determine the maximum possible run off of 4.468m3/s and velocity for the catchment area was estimated to be 4.046*10-5m/this was used to design the silt fence. This was achieved using the IDF curves and run off coefficients obtained from tables in the appendix. The soils in the catchment area were observed to have high percentages (65.68 percent) of silt and fine sand from the atterberg limits results and therefore they are highly eroded by run off thus most of the sediment is eroded from the catchment area and therefore a silt fence can help to trap sediment from filling up the side drains. It is recommended that the slopes (9.15 percent steepness) of the side drains should be protected from erosion by either planting grass or chemical stabilization using lime or cement.	Catchment area, digital elevation model, sediment and silting	Nakawa Division on Amka road in Mutungo	Environment	Other	Solution / Applications	U29
30	Uganda Christian University	Agudo Linda Petra	2016	DESIGN OF A POROUS ASPHALT PAVEMENT ON A RESIDENTIAL ROADWAY	Library Department of Civil and Building Engineering, Dr.E. Wozeei	Porous asphalt pavements that allow run-off from impermeable surfaces during rain storms to percolate into the pavement structure. Initially they were designed to reduce noise, splash and aquaplaning. Over the years it has been discovered that these pavements can perform a lot more that and after thorough research and practise porous asphalt pavements have been found to aid in storm water drainage. With typically 4 layers, that is the porous asphalt layer, choker course, stone bed and sub-grade; the stone bed is most crucial in the pavement as it provides temporary storage for storm water as it percolates from the surface allowing it gently infiltrate into the soil design before joining the water table as treated water. The aim of this project was to design a porous asphalt pavement on residential road way. This required the hydrological design, structural design and mix design. Whereas the hydrological design determines the stone bed depth, the structural design determines the porous asphalt surface depth and the base course depth, and the mix design determines the optimum bitumen content for the best performance. The structural design required total traffic expected, CBR value and environmental factor to determine the structural number which is used in thickness determination. Thus traffic counts were conducted and the soil tested for strength in the laboratory. The hydrological design required the infiltration rate of the soil carried out from the laboratory using a constant head permeability. The mix design involved determining the performance of specific binder content to the four different criteria, which is cantabro loss, binder drainage, air void content and indirect tensile strength, results from the soil tests indicated a silt clay soil which has very low permeability to water and thus a thicker stone bed is required in the design. In the mix design, the binder drainage was more than that required and thus use of fibres like banana fibre should be incorporated into the design. The hydrology design determined the thickness of the stone bed to be 32cm and the structural determined the porous asphalt surface and base to be 9.1cm and 6.35cm respectively.	Aggregate crushing value, aggregate impact value, porous asphalt, saturated surface dry and soil surface value	residential area in Lira District on a residential road	Materials	Surfacing	Platform	U30
31	Uganda Christian University	Ankunda Jimmy	2015	COST COMPARISON OF DIFFERENT PAVEMENT SURFACINGS FOR UGANDA CHRISTIAN UNIVERSITY ROAD	Library Department of Civil and Building Engineering, Dr.E. Wozeei	The final year project entitled 'cost comparison of different pavement surfacing's for Uganda Christian University road network was carried out at Uganda Christian university as a case study describing the need for upgrading gravel surface roads in UCU. Four possible low cost sealing options which include Otta seal, single surface dressing(SSD), with sand capping, premix seal and penetration macadam were considered and analysed under existing conditions of the project area. This was done to obtain a surfacing which is more economically viable. The methodology used was economic evaluation that included the use of unit rate analysis in the preparation of bills of quantities to help in cost estimations. This was done by obtaining information about the basic cost data on labour, equipment and materials. This helped in developing unit rates and estimation of each low cost seal option construction cost by developing bills of quantities to obtain one which is more economically viable. In addition, Otta seal was compared to gravel road maintenance over a design life period of 10 years and it proved to be more economically viable than gravel maintenance for this period of time in the project area. Therefore Otta seal would be recommended as the most effective surfacing option for the road network in UCU. Basing on the outcome of this project, the following recommendations should be taken in account; design manuals on low volume sealed roads including LCS should be developed by the ministry of works and transport, a trail section should be first constructed to minimize risks that may be involved in the implementation of this project in the project area and regional labour working rates should be developed by the Ministry of Works and Transport.	Annual average daily traffic, annual daily traffic, low volume road, low cost seals, bitumen, bills of quantities and maximum dry density	Uganda Christian University in Mukono District	Management	Surfacing	Solution / Applications	U31
32	Uganda Christian University	Kashoborozi Osbert and Aturinda Emmanuel	2017	INVESTIGATING THE USE OF CRUSHED CONCRETE AGGREGATE WASTE IN STABILIZATION OF LATERITE SOILS FOR SUB BASE MATERIAL IN ROAD CONSTRUCTION	Library Department of Civil and Building Engineering, Dr.E. Wozeei	The research and design aimed at stabilising lateritic soil classified as gravel with clay (GC) according to USCS using crushed concrete from demolished buildings, foundations, roads and other structures air to be used as sub base for a paved road. Lateritic soils were sampled along the Mukono-Jinja highway from a borrow pit owned by Stirling company LTD and the concrete waste aggregates were obtained from one of the dumping sites kawempe- kirinya and Namanve. The research aimed at stabilizing lateritic soils, using crushed concrete aggregates from demolished buildings, foundations, roads and other structures, for use as sub-base for a paved road. Lateritic soils were sampled along the mukono –jinja high way from a borrow pit owned by Stirling company LTD. Crushed concrete aggregate wastes were fairly angular and strong as they showed comparative values to the fresh aggregate waste were fairly angular and strong as they showed comparative values to the fresh aggregates as earlier researched. All laboratory tests were carried out from Stirling mukono laboratory. The lateritic soils were blended with different percentages of waste aggregates 0, 30, 40 and 50 percent chosen basing on other studies. The study looked at properties such as grading and flakiness of the waste aggregates, grading, atterberg limits, optimum moisture content, maximum dry density and 4 day soaked California bearing ratio for the stabilised and un stabilised material. Mix ratio with 40 and 50 percent of the waste aggregates was considered suitable for use as sub base material. They had CBR of 46 and 59 respectively, at 95 percent relative compaction and PI values of 13.64 and 11.40 these met the specified standards of a CBR equal or less than 14 according to the general specifications of ministry of works, housing and communications (2004).	Optimum moisture content, plastic index, maximum dry density, liquid limit and California bearing ratio	lateritic soils was obtained from a borrow pit long mukono-jinja road. Concrete wastes were obtained from kawempe, kirinya and Namanve dumping centres owned by Roko construction company. The laboratory tests were carried out at Stirling laboratory in Mukono.	Materials	Subbase	Platform	U32
33	Uganda Christian University	Tumwine Kenneth and Kabanda Patrick	2017	INVESTIGATING THE EFFECT OF CEMENT KILN DUST ON WEAK SUB GRADE SOILS FOR ROAD CONSTRUCTION IN UGANDA	Library Department of Civil and Building Engineering, Dr.E. Wozeei	In engineering activities soil with poor geotechnical properties e.g. strength, plasticity, bearing capacity and compressibility have proved to be problematic although they can be stabilized and then used. The soil sample used in this study was obtained from one of the dumping site along the Kampala-Entebbe expressway in kajjansi, Wakiso district. Laboratory tests were carried out on the soil sample to determine whether or not it required stabilization. Cement kiln dust was used as the stabilizer for this research work. The cement kiln dust was obtained from hima cement factory in kasese. The soil sample was classified an A-7-6bon AASHTO classification. The soil sample was stabilised with 2.5 to 25 percent in the interval of 2.5 percent of cent kiln dust by weight of the dry soil using British Standard Heavy (BSH) compaction energy, the effect of cement kiln dust on the soil was investigated with respect to compaction characteristics, California bearing ratio (CBR) and unconfined compressive strength (UCS) tests. Results obtained, indicate a general decrease in maximum dry density (MDD) and increase in optimum moisture content (OMC) all with increase in cement kiln dust content. There was also a tremendous improvement in the CBR and UCS with increase in quantity of cement kiln dust. For the UCS, the extruded samples were cured for a period of 7 and 28 days. Unconfined compression tests (UCS) was conducted on all samples to determine the impact of CKD on soil properties in term of strength having analysed the laboratory test results, it was noticed that 12.5 percent cement kiln dust provide effective stabilisation of soil samples that met all the requirements by the general specifications for roads and bridges (2004) for the upper grade layer in road construction. An increment in the strength of soil specimens was noticed though the highest strength of 1.46 Mpa was realised with sample mixed with 20 percent cement kiln dust and cured for 28 days therefore, cement kiln dust can stabilize and improve the engineering properties of soil mainly strength. Generally, unconfined compression test (UCS) indicates that, the soil gained strength due to different KFD percentages added.	Optimum moisture content, plastic index, maximum dry density, liquid limit and California bearing ratio	soil samples were obtained from one of the dumping site along Entebbe express way. The chemical tests were conducted from analytical laboratory and directorate of geological surveys and mines, Entebbe and the soil from CKD was obtained from hima cement LTD	Materials	Subgrade	Platform	U33
34	Uganda Christian University	Otai Hillary and Muke Donald	2017	INVESTIGATION OF THE FEASIBILITY OF PARTIALLY REPLACING REGULAR SAND WITH	Library Department of Civil and Building Engineering,	With the growing rate of the construction industry in developing countries with Uganda as a reference, there is increased pressure on the available construction materials like aggregates, sand among others hence increased environmental concerns which has further increased the need to research on various potential substitutes. One such substitute is volcanic tuff that has been found to contain pozzolanic properties hence a potential suitable replacement for cement however various researchers have shown that it can be also used partially replace sand/ fine aggregates in both mortar and concrete production. Volcanic tuff when used to partially replace sand in the production of mortar, it has been found to lower the strength of the resultant composite which formed the basis of this research in an	Ordinary Portland cement and pozzolanic Portland cement	kichwamba sub-county in kabarole district in the western part of Uganda	Materials	Gravel	Platform	U34

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				VOLCANIC TUFF AND STRENGTHENING IT WITH ELEPHANT GRASS FIBER	Dr.E. Wozeei	attempt to improve the strength properties of the composite by incorporation of elephant grass fibres. Laboratory investigations were performed to determine the chemical composition of the volcanic tuff and the physical properties of the resultant mortar at various percentages that is 0, 15, 30 and 50 and these properties included the grading, consistency workable life and the compressive strength and later elephant grass fiber was added to the most ideal percentage which was 30 percent. The incorporation of volcanic tuff alone showed a reduction in the compression strength however inclusion of elephant grass fibres showed an increase in strength up-to 7 percent implying that a mortar composite containing volcanic tuff can be strengthened using elephant grass fibres. Conclusively an increase in the percentage of volcanic tuff beyond 28 percent in mortar will lower the strength of mortar much further but inclusion of elephant grass will increase its strength however more than 0.5 percent fiber reinforcement by mass of cement will lower its strength further.						
35	Uganda Christian University	Shiba Doreen and Mbaziira Daniel Apuuli	2017	INVESTIGATING THE EFFECT OF PARTIALLY REPLACING CEMENT WITH LIME KILN DUST ON THE DURABILITY OF MORTAR	Library Department of Civil and Building Engineering, Dr.E. Wozeei	Cement is widely noted to be the most expensive constituent of concrete. The entire construction industry is in search of a suitable and effective waste product that would considerably minimize durability of the cement. Lime kiln dust (LKD) is one of the industrial waste product that can be used since it has some pozzolanic properties. Therefore, this research study focused on the durability of mortar with LKD partially replacing cement. Experiments were carried out to determine how LKD influences the durability of mortar of different environmental conditions. The lime kiln dust was obtained from muhokya, kasese. Ordinary Portland cement (OPC) was replaced with LKD by weight at 0, 10, 20,30,40,50 and 60 percent with a mix design of 0.7:0.3:3. A chemical characterization test was carried out on the LKD to determine the major oxides of silica, alumina and iron. Durability tests carried like water absorption, acid attack and sulphate attack were carried out on mortar specimen at different ages of 7, 14, 21 and 28 days of exposure to acid and sulphate solutions. The results on chemical characterization tests revealed that the main composition of LKD is CaO and SiO2 while for the permeability test indicated an increase in water absorption as the percentage replacement of ordinary Portland cement(OPC) with lime kiln dust (LKD) increased, which increased , which indicated a high permeability of the mortar. The acid attack test indicated a less decrease in weight as the percentage replacement of ordinary Portland cement (OPC) with lime kiln dust (LKD) increased.	Lime kiln dust, ordinary Portland cement and water cement ratio	muhokya, kasese where we obtained the lime kiln dust due the presence of lime industries.	Materials	Gravel	Platform	U35
36	Uganda Christian University	Murokozi Bruno and Namakoye Joanitah	2017	ASSESSING THE EFFECTIVENESS OF HYDRATED ROAD LIMES PRODUCED IN UGANDA IN STABILIZING CLAY SOILS	Library Department of Civil and Building Engineering, Dr.E. Wozeei	Road lime is used to stabilize clay soils in Uganda. The main types of road lime used are kasese road lime and Tororo road lime. The major objective of this study was to investigate the effectiveness of hydrated road limes produced in Uganda in stabilising fine clay soils. Laboratory tests were carried out on the materials and these included; chemical composition of lime, atterberg tests, gradation, suitability of lime, compaction test and UCS. The lime samples were obtained from different sample sources i.e. from the production industry, from seroma hardware source and from the lime hardware source located along Entebbe road. The chemical tests of both Tororo and kasese were consistent and indicated that kasese road lime had very low lime content (CaO) compared to Tororo road lime i.e. from the production industry, from seroma hardware source and from the lime hardware source located along Entebbe road. The chemical tests of both Tororo and Kasese were consistent and indicated that Kasese road lime had very low lime content (CaO) compared to Tororo road lime i.e. Kasese lime did not comply with the average value of CaO of specified by the standard. The specified value by the standard is 72 percent CaO and acceptable value, 55 percent. The CaO percentage in Tororo was above 65 percent which complied with the standard since it was above the acceptable value 55 percent. Laboratory results indicated an increase in UCS with increasing lime content up to 4 percent with a reduction after 4 percent (at 6percent) for Tororo road lime while for Kasese road lime the UCS didn't show much change with the same lime content. The reduction in the UCS after 4 percent of Tororo road lime was attributed to the excess lime content. The reduction in the UCS after 4 percent of Tororo road lime was attributed to the excess lime in the mixture not required for the early strength gain. The best suited lime content for stabilisation of the clay was found to be 4.4 percent lime content for Tororo lime but Kasese lime didn't provide the best suited lime content for stabilization because it didn't reach the required pH of 12.3-12.4, laboratory results indicated higher UCS values for dry mixing of lime and clay soil than for slurry (wet) mixing. Hence dry mixing was used for all USC tests of lime and clay soil to achieve the greatest possible strength for the study, compaction delay affected the UCS for all the percentages of lime addition. The UCS value reduced with increase in time delay though the UCS of soil stabilized with Kasese didn't show much change. However, the rate of reduction in UCS value decreased as the lime content was increased. It is noted that kasese road lime are still experiencing shrinkage and cracking. We recommend further research in long term performance of the clay soil-lime stabilization, the effect of carbonation and sulphur attack on the lime stabilized clays.	Road lime	suitable clay soil samples collected from pits located at Ntawo which is 23 km from Kampala.	Materials	Gravel	Platform	U36
37	Uganda Christian University	Owani Isaac and Tugume Brian	2017	INVESTIGATING THE USE OF CRUSHED ROCK AGGREGATES AND CARBON BLACK IN STABILIZATION OF SUITABLE LATERITIC SOILS FOR USE IN BASE CONSTRUCTION	Library Department of Civil and Building Engineering, Dr.E. Wozeei	The increased crushed rock aggregate consumption resulting from road construction has greatly contributed to the depletion of rocks in Uganda. The purpose of this research and design project was therefore to investigate the use of carbon black in reduction on the amount of crushed rock aggregates used in mechanical stabilisation of suitable lateritic soils for road base construction. The lateritic soils were sampled from a borrow pit owned by SBI international holdings (UG) 60 KM from mukono town along kayunga-jinja road. The crushed rock aggregates of size ranging from 0.075mm-37.5mm were obtained from a quarry owned by SBI international holdings (UG) 21km from Ndese town off kayunga-jinja road. Carbon black was sourced from GM tire recycling plant, njeru eastern Uganda (0, 22'42.9N33 08'10.4E) preliminary tests on the lateritic soil were carried out to determine if the soil required stabilization. The tests included particle size distribution, atterberg limits, maximum dry density and California bearing ratio tests. Results obtained were analysed graphically and a blend of 50 percent lateritic soil, 40 percent aggregates and 10 percent carbon black was found to be most effective in producing base material since it gave a CBR of 69.4 percent at 95 percent relative compaction and a PI of 7 which meet the requirements of CBR above 60 percent as per the general specifications for road and bridges (2004) of the ministry of works, housing and communication in Uganda. This research concluded that 50percent lateritic soil, 40percent crushed rock aggregates and 10 percent carbon black can be used for road base construction instead of 50 percent aggregates and 50 percent lateritic soil as per research carried out by Jjuuko et al (2014) this therefore meant that there is a 10 percent reduction in crushed rock aggregates consumption. The research is considered a success because it met all the set objectives	Carbon black, linear shrinkage, maximum dry density, plasticity index and liquid limit	lateritic soil sample was obtained from a borrow pit owned by SBI international holdings (UG) 60km from mukono along kayunga- jinja road, crushed rock aggregates were obtained from a quarry owned by SBI international holdings (UG) 21km off kayunga-jinja road carbon black was obtained from GM tire recycling plant, njeru eastern Uganda, the laboratory tests were carried out at SBI international Holdings(UG) Laboratory	Materials	Base	Platform	U37
38	Uganda Christian University	Allan Ssebunya and Shadri Tendo Salim	2017	USE OF SUGAR MOLASSES AS A WATER REDUCING ADMIXTURE ON VOLCANIC ASH BLENDED CONCRETE	Library Department of Civil and Building Engineering, Dr.E. Wozeei	The use of admixtures and natural pozzolans has become an integral part of production of high strength concrete with better durability properties due to their enormous importance. The optimum amount of VA that can potentially replace OPC while maintaining the strength and durability properties equal to that of the control has been studied and found to be 10 percent .This research was therefore conducted to find a possibility of increasing this optimum amount that can potentially replace OPC; this was done with the aid of sugar molasses. Five different percentages of volcanic ash were used to potentially replace cement (0, 5, 10, 15 and 20 percent) and then three dosages of the admixture (0, 0.3, and 0.5 percent) of the weight of cement were used. The water content in the concrete mix was reduced by 6 percent. Test results manifested an increase in workability, setting time and compressive strength up to 63.7Mpa at 0.5 percent dosage with molasses.	Cement, ordinary Portland cement, and British standard	Kisoro, Kampala, wakiso and mukono districts through sample collection preceded by laboratory analysis	Materials	Non-road	Platform	U38
39	Uganda Christian University	Masereka Edwin Wasingya and Kabyanga Crispus	2017	INVESTIGATING THE USE OF WATER TREATMENT SLUDGE AS A FILL MATERIAL IN HIGHWAY CONSTRUCTION AS AN ALTERNATIVE	Library Department of Civil and Building Engineering, Dr.E. Wozeei	Water treatment is necessity for the provision of safe water to the people during the treatment, sludge is one of the wastes from this process. The management of this water treatment sludge at the water treatment plants is difficult since it requires large portion of land for its disposal. This research was aimed at investigating the possibility of using WTS in highway construction as a fill material mainly in the subgrade layer. The investigation was done on the mixture of WTS and other materials like natural soil and quarry dust, which is a stone quarry waste. The classification tests (atterberg limits and sieve analysis) and strength tests (standard proctor (MDD) and CBR) were done on the neat soil and on different mixtures as per BS 1377 part 2 and part 4, 1990 standards respectively. The preliminary investigations carried out on the neat WTS showed that it was a silty or clayey gravel and sand which was non plastic with a high liquid limit of 75.3 which exceeded the minimum LL of 40 percent for a fill material in the subgrade on an embankment according to AASHTO system of classification. WTS had a CBR value of 11 percent at 93percent of MDD	Linear shrinkage, water treatment sludge, liquid limit, optimum moisture content and plasticity index	WTS was obtained from ggaba water treatment plant, quarry dust from kigunga, mukono principality, the soil was obtained from	Materials	Gravel	Platform	U39

#	ORIGINATING INSTITUTION	AUTHORS	YEAR	TITLE	LOCATION OF DOCUMENT	ABSTRACT	KEYWORDS	GEOGRAPHICAL AREA	FOCUS AREAS	PAVEMENT LAYER FOCUS	TT LEVEL	Google Earth number
				WAY OF ITS DISPOSAL		which was above 7 percent as required for G7 material by the general specifications for road and bridge works. Mixture of WTS with a plastic soil reduced the liquid limit up to 47.6 percent at 50:50 WTS: soil ratio which was still above the limit for fill materials in the subgrade layer. Addition of quarry dust to the WTS soil mixture reduced the LL to 40percent at 35:40:25 (WTS :SOIL;QD) all the mixture ratios met the minimum strength requirements of CBR greater than 7 percent as specified by the ministry of works, housing and communication in the general specifications for roads and bridge works(series 3000). Chemical analysis revealed that WTS contained nitrogen, phosphorus, potassium, magnesium, sodium, calcium, aluminium, sulphur and chloride. The filtration of the slurry also showed that 11.85 percent of wet sludge produced at ggaba water treatment plant is solid. Therefore the sludge is not to be used independently on the road because of its high water retention capacity but mixing it with soil and quarry dust improved its properties to suit use as a fill material in road embankment.		bugujju, mukono municipality and soil physical and mechanical laboratory tests were done at GETLAB LTD in naguru-kampala				
40	Uganda Christian University	Sekitoleko John and Tadhuba Simon peter	2017	INVESTIGATING THE APPLICATION OF INORGANIC MUNICIPAL SOLID WASTE INCINERATOR BOTTOM ASH AS A PARTIAL REPLACEMENT OF ORDINARY PORTLAND CEMENT IN MASONRY MORTAR PRODUCTION	Library Department of Civil and Building Engineering, Dr.E. Wozeei	This research has been carried out in order to establish a sustainable way of managing inorganic municipal waste without causing any harm to the environment. Municipal solid is basically broken down into two constituents that is the organic municipal waste which includes food residues which is currently broken down to form organic manure for example in katikolo where all mukono organic waste is collected. The other constituent is the inorganic municipal solid waste which comprises of paper, industrial waste, textiles and so many others. Different management techniques have been used to dispose of this waste which include recovery, reuse, recycle and incineration. This research in particular is focusing at how the incineration strategy is used and how best can the incinerator residue which in this case is termed as inorganic municipal waste –incinerator ash, this residue contain pozzolanic properties which included the alumina ,silica, iron, calcium which react with the water in mortar to form oxides. The production of cement exposes the environment to air pollution, production of carbonic gases to the environment hence leading to environmental deterioration. Unlike cement production, the ash is obtained after burning at high temperatures of above 500 degrees centigrade that during burning not even smoke is observed at the chimney chamber of the incinerator. Also incorporating this ash in cement emphasizes the point of zero waste mitigation, because after incineration the waste is to be used rather than disposing it off again to the environment. With established percentages of partial replacement for Portland cement with this ash , considering different curing stages that is to say 7 and 28 days, the compressive strength at 28 days with a percentage of 10percent of ash , it showed similar strength with the control mortar at the same curing age. This research clearly indicates that the ash leads to tremendous improvement in the engineering properties of mortar, and ensures a pollution free sustainable environment.	Ordinary Portland cement and incinerator bottom ash	no specific geographical scope since it is limited to the use of an incinerator bottom ash to partially replace Portland cement in mortar production. It is basing on the use of this mortar in Uganda as a construction raw material. This ash was obtained from a local incinerator that burns inorganic waste collected from nakasongola district	Materials	Non-road	Platform	U40
41	Uganda Christian University	Emmanuel Basil Agula and Twenatwine Wycliffe	2017	INVESTIGATION OF THE USE OF LYME AS AN ALKALI ACTIVATOR OF SURKHI (LIME – CRUSHED CLAY BRICK) MORTAR	Library Department of Civil and Building Engineering, Dr.E. Wozeei	The use of lime mortars has slowly diminished over the years. This could be attributed to the invention of the ordinary Portland cement (OPC) mortar resulted into the diminished use of surkhi (lime crushed clay brick) mortar. With time it was almost extinct. Previous researchers have emphasised on the need to improve lime – crushed clay brick mortar for use in masonry works considering the costs incurred in OPC mortar. Emphasis has mainly been placed on the need to activate the pozzolanicity of the pozzolanic material. Many techniques of activation have been investigated most especially chemical activation using alkaine. This research therefore identifies the possibility of using lye as an alkali activator in the lime-crushed clay brick mortar. To embark on this, lye was tested for chemical composition and ph. The alkalinity and composition of lye offer a possibility of activating the unreacted crushed clay particles. In this research, a preliminary study is under taken to evaluate the use of lye as an alkali activator to stimulate the formation of reaction products. This analysis was done in comparison with a control mortar which didn't contain any activator. The tests on setting time and compressive strength showed that the lye activated mortar produced better qualities as compared to mortar with no additive. The compressive strength increased and the setting tine reduced. Following the proportions; 0, 5, 10, 15 and 20 percent investigated, the one containing 20percent other proportions. The study therefore showed that lye could greatly improve compressive strength and reduce setting time of surkhi (crushed clay brick) mortar.	Hydrogen potential and Indian standards	Mukono district and the tests done at the government analytical laboratory under the ministry of internal affairs and makerere structural laboratory	Materials	Non-road	Platform	U41
42	Uganda Christian University	Ahmed Katuntu and Noeline Owomugisha	2017	INVESTIGATING THE EFFECT OF WATER – CEMENT RATIO ON DURABILITY PROPERTIES OF CONCRETE PRODUCED BY PARTIALLY REPLACING CEMENT WITH BRICK POWDER	Library Department of Civil and Building Engineering, Dr.E. Wozeei	Brick powder is a material that can be obtained from brick waste generated by brick making industries. Several researchers identified it as a pozzolanic material thus can be used as a binder to partially replace cement. Additionally, its effect on the strength properties of concrete has been proven to be comparable to the conventional concrete. In order to make its use more effective, this research was conducted to study its effect on durability properties in detail as well as to reveal the effect of water- cement ratio on the same properties. This was achieved by carrying out several tests such as : the chemical analysis of the BP (from kilns subjected to temperatures between 900 and 1005 degrees centigrade) and the compressive test to confirm the results obtained by the previous researchers , the permeability test, alkali-silica reactivity of the aggregates and the sulphate attack test. All the tests were carried out using three pre-determined water cement ratios (0.4, 0.55, and 0.6) and at five percentage replacements of OPC with BP (0, 15, 25, 35 and 45 percent) to achieve the main objective of the study. The chemical analysis and compressive tests confirmed the previous results whereby BP was found to possess both pozzolanic and cementitious properties; and the strength was increased by over 30 percent as the w/c ratio was decreased from 0.6 to 0.4. The permeability increased with increase in percentage replacement as well as decrease in w/c ratio. The aggregates used were innocuous thus not prone to alkali-silica reactivity. It was concluded that high quantities of BP adversely affect the strength and permeability of concrete but offer high resistance to sulphate attack. The 0.55 w/c ratio was identified as the most appropriate ratio to be used in structural concrete production involving the use of BP at a mix design of 1:2:3. It was recommended that the 0.6w/c ratio should be avoided during the production of structural concrete due to its poor strength, high permeability and susceptibility to sulphate attack at 0 percent cement replacement. It was also recommended that the 0.4 w/c ratio should only be used with the help of additives to improve its workability.	Ordinary Portland cement, high strength concrete and brick powder	brick powder was collected from bugembe in jinja district	Materials	Non-road	Platform	U42
43	Uganda Christian University	Bamwesigye Stephen and Nakyeyune Josephine Ritah	2017	USE OF LIME PILES AS AN ALTERNATIVE METHOD FOR STABILISATION OF ROAD EMBANKMENTS	Library Department of Civil and Building Engineering, Dr.E. Wozeei	Various incidences have been reported on the failures of embankment along the roads in Uganda for example on fort portal –bundibujo road and kamwenge – fortportal road. In this research the main focus was on kamwenge-fortportal road at km 189+900 whose embankment was failing. This consequently reduced the road width, led to high costs of road maintenance and formation of potholes due to reduced pavement layers. The core reason for stabilising embankment in-situ was to improve its strength, reduce the excessive settlement when subjected to traffic loads. The improvement of engineering properties of clayey soil in-situ on road embankment was carried out by using lime pile technique. This technique was selected considering its advantages and disadvantages compared to other techniques which were discussed in this report. Preliminary test of sampled soil were carried out to analyse neat and stabilized soil sample and these included; particle size distribution, atterberg limit tests, linear shrinkage test and shear box tests. The sieve analysis using 75um, 425um, 2mm test sieves indicted 17.4, 80.7, and 1.9 percent respectively. The liquid limit of neat clay soil was 58.6percent which reduced by 5.1, 4.9 and 2.7 percent. The plastic limit of neat was 26.5percent which significantly reduced by 10.2, 7.1 and 3.6 percent. The linear shrinkage was increased from 5.7 percent by 12.3 percent, 7.8 percent, 5.8 percent. The maximum density of neat sample was 1.801kg/m3 which increased to 22.2 percent, 27.3 percent and 7.8 percent. There was increase of optimum moisture content from 13.4percent by 9.7percent, 3.3percent and 10.2 percent. Cohesion of soil increased from 19kpa by 20.8percent, 4.0percent and 16.7 percent. The angle of internal friction increased from 13 degrees by 7.1percent then increased by 12.5percent and then finally by 15.8percent with curing days. There was signified reduction of water permeability in the soil which also increased the stability of the soil to be used for road embankment. The water required to achieve maximum compaction was reduced however water content for ion migration was increased which required attention. There was increase in cohesion strength between the stabilized soil particles which also contributed to the stability of the embankment. The internal angle of friction of soil particles increased which reduced the ability to slide off on the road section. We recommend that more research on the alignment of clayey material before and after should be carried out. The durability of embankment stabilized with lime piles should also be researched about. Research on different lime pile spacing and diameters on how it affects the soil parameters.	Cohesion, liquid limit, maximum dry density, plastic index and kilo Pascal's	soil properties of the stabilized clayey material obtained from an embankment on kamwenge-fort portal road km (18+900). Chemical tests were carried out within six months. the curing period was 14,21and 28 days	Materials	Other	Platform	U43
44	Uganda Christian University	Ochan Terry Adei and Onesmus Mugisha	2017	INVESTIGATING THE PERFORMANCE OF USING STEEL FIBBERS IN CULVERTS AS AN ALTERNATIVE TO	Library Department of Civil and Building Engineering,	The performance of concrete depends on its ingredients. It is well known that plain concrete is brittle and weak in tension but strong in compressive strength. Most of the culverts that are produced within the country have steel cages embedded in them to reduce on the cracking as well as to improve the tensile, flexural and shear resistance properties. For the steel cage to fully perform its duties, it should be centred with in the culvert walls. Centring of the BRC within the culvert walls is a little hard because of the deflections that do occur during the casting and this comprises the strength of the culverts. This report describes the investigation of the performance of using steel fibres on culverts as an alternative on the reinforcement by BRC using the centrifugal technique of concrete pipe production. Experimental	Water cement ration, reinforced fiber concrete and ordinary	Uganda	Materials	Other	Platform	U44

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				STEEL CAGE(BRC) AS REINFORCEMENTS	Dr.E. Wozeei	investigation were done using M25 concrete mix and tests were carried out as stated in various standards that is the British standard and American standards which included compressive strength test, splitting tensile strength test, crushing test on the culverts produced to determine strength concrete properties and the loading capacity of the culverts respectively. From the experimental results which were compared with the plain concrete as well as in the production of culverts. An improvement in compressive strength of 11.87percent, tensile strength of 12.5percent was observed in steel fiber reinforced concrete and for the steel fiber reinforced concrete culverts had a strength improvement of 90percent to thee plain culverts and 35.7 percent to the culvert that contained BRC.	Portland cement					
45	Uganda Christian University	Hellen Melling Clement and Tusabe S Kalyebara	2017	DESIGNING A PAVED ROAD USING GEOGRIDS TO REDUCE THE THICKNESS OF PAVEMENT LAYERS	Library Department of Civil and Building Engineering, Dr.E. Wozeei	Performance and durability of road pavements is significantly dependent on the strength and stability of the underlying soil layers most especially the subgrade pavement layer. Currently in Uganda most roads are constructed through low lying areas characterised by soft soil, hence weak clay soils. The main practise has been to import stronger lateritic soils and dump it in layers over the weaker soils thickness of more than 1.0m. This is expensive, especially the depleted, hence the need to utilise alternative means of improving the strength of the weaker subgrades. This study focussed on the application of geogrids in pavement layers to reduce their overall thickness and life cycle costs of the road. A low lying section on the baijo road connecting mukono to seeta was used as a case study. According to the AASHTO classification system of subgrade materials, the subgrade soils fell under the soil ranges of A-7, A-7-6 and A-6group, therefore a poor subgrade material requiring stabilisation. The average CBR was determined as 19percent. The inclusion of the geogrid reduced the overall lifecycle of the road. The base CBR was 61 percent which was greater than the required hence its good material base. The traffic data for bajjo-seeta road was 68941 vehicles with a percentage of the heavy traffic, 7.33percent. The traffic was of category 11 and group 1 according to TM 5-822-5. The design traffic was projected for 25 years at an expected national growth rate of 7 percent and gave the design hourly volume (DHV) of 32 vehicles and the road class was E, according to TM-5-822-2, giving a design of index of 2 for the road. With this DI and the subgrade CBR value known, the recommended minimum asphalt concrete (AC) thickness was found to be 4 in and the base thickness 4in, a total thickness of 8in, the reinforced equivalency thickness of 4 in the base thickness of the reinforced pavement was found to be 2in suggesting the use of geogrid to reinforce the existing base material could offer a better alternative to borrowing other materials it reduced the base thickness by 50 percent (the total pavement layers by 25 percent) and because the base thickness is less than 14in, the geogrids were to be laid between the subgrade and the base. The initial cost of reinforcement was found to be greater by 180percent over the unreinforced. However, the total cost plus maintenance cost was found to be 42 percent cost effective for reinforcement after the 25 years design life of the road.	Moisture content, linear shrinkage, liquid limit, plastic limit and design traffic	geogrids were supposed to be obtained from south Africa through the help of a company (fibertex south Africa pty Ltd) but the transportation turned out to be more expensive, hence we failed to access. The subgrade material was acquired from bajjo seeta road 400m away from jinja highway where the project is based. And the marrum from Uganda Christian University for the base layer and tested from Stirling Laboratory Iganga. Interpretation of results and finding was limited to identification of important engineering properties	Pavement structure	Pavement	Platform	U45
1	Transportation Research Laboratory (TRL)		1958	A Laboratory Investigation of the Stabilization of Five Tropical Gravels From Uganda Using Portland Cement or Hydrated Lime	TRL	A laboratory investigation has been made of the effect of the admixture of Portland cement and of a hydrated lime on the strength and behaviour on immersion in water of five tropical gravel soils from Uganda. A cement content of 4 per cent by weight and hydrated lime contents of 2 and 4 per cent by weight were used in the investigation. The strength of the stabilized gravels and the effect of immersing them in water were determined using the cylinder penetration ratio tests. Comparing the gravels stabilized with 4 per cent of cement and those stabilized with 4 per cent of lime, the higher strengths were obtained with the cement-bound gravels, the lime-bound gravels only approaching at an age of 6 months the strength of the cement-bound gravels at an age of 1 week. For specimens tested at ages of 1 and 2 weeks, immersion in water resulted in a similar small reduction in strength for both the cement and lime bound gravels. It is concluded that the gravels could be successfully stabilized with 4 per cent of either Portland cement or hydrated lime but that the use of Portland cement would result in stronger materials more resistant to wetting.	Uganda	Material	Gravel	Platform	T1	Uganda
2	Transportation Research Laboratory (TRL)		1958	A Laboratory Investigation of the Properties of Five Soils from Uganda	TRL	A laboratory investigation has been made of the properties of five soils submitted to the Road Research Laboratory by the Public Works Department - Uganda. The investigation comprised classification tests on the soils and the determination of their chemical and compaction characteristics. Two of the soils were red clays and appeared to be residual soils, unlike the red clays from Kenya so far examined which were of volcanic origin. The third soil was a decomposed quarzitic gravel. It was texturally a gravel-sand-clay similar to others from Uganda, that have been tested at the Laboratory. The remaining two soils were silty sands; one of which contained mica, that reduced the densities obtainable with the B.S. compaction test.	Uganda	Material	Gravel	Platform	T2	Uganda
3	Transportation Research Laboratory (TRL)		1959	A Pilot Study in Uganda of the Effects Upon Economic Development of the Construction of Feeder Roads	TRL	In March 1958, the writer visited Uganda to look into the possibilities of investigating the effects of feeder roads on rural economic development. This report describes a pilot study made in the West Nile District of Uganda into the economic effects of feeder roads constructed in the District during 1948 to 1951. Some population migration followed the construction of the roads, and there was a considerable rise in the production of the District's main cash crop (cotton). In this example it is fortunate that the only planned stimulus to development was the construction of feeder roads, and that there is an adjacent area with similar conditions, but where no roads were built, to serve as a control. That study has provided experience which will help in planning similar investigations elsewhere where situations may be more complex.	West Nile	Construction	Other	Platform	T3	West Nile
4	Transportation Research Laboratory (TRL)		1959	The Growth of Road Traffic in British Overseas Territories Since 1946	TRL	The note gives statistics of road mileage, vehicle registrations, fuel imports and road accidents, together with main road traffic flow indices, for the following British Overseas Territories, selected as those from which the greatest amount of information was available and including at least one member of each of the main groups of territories: Barbados, British Guiana, Fiji, Hong Kong, Nigeria, Northern Rhodesia, Nyasaland and Uganda. In each of these countries there has been a steady increase in the amount of road traffic since 1946. During the years 1951-1957 the figures available show the following average annual increases: Registered vehicles: 7 - 20 per cent; Fuel imports: 8 - 13 per cent; Traffic index (4 territories only) : 12 - 26 per cent; Fatalities: 5 - 20 per cent.	Uganda	Operations	Other	Base	T4	Uganda
5	Transportation Research Laboratory (TRL)		1961	An Investigation of the Effects of Soaking and Compacting Procedures on the Results of California Bearing Ratio Tests on Two Tropical Soils and Stabilized Soils	TRL	The California bearing ratio (CBR) test is widely used in tropical territories to determine the strength of subgrade, sub-base and base materials used in road construction. Variations in the test procedure - particularly with regard to the compaction and soaking methods, make it difficult to compare test data. To assist efforts being made to reconcile differences in the test procedure. The effect of different levels of compaction and different methods and times of soaking in the CBR test on the strength and swelling properties of soils and stabilized soils has been investigated. The materials studied were a clayey lateritic gravel (both untreated and stabilized with hydrated lime) and a silty sand (both untreated and stabilized with Portland cement). The conclusions were: (i) There was no significant difference between the effects of soaking from the bottom only and soaking from both the top and the bottom of the test specimens; (ii) A period of soaking of 4 days was adequate for sensibly constant moisture conditions with the materials studied; (iii) The increase in moisture content on soaking was inversely proportional to the initial air content of about 5 per cent; (iv) The highest strengths after soaking were obtained with specimens compacted at the optimum moisture content for compaction. For specimens which after soaking had a similar dry density and moisture content the strengths, within the limits of experimental error, were the same.	Uganda	Material	Gravel	Platform	T5	Uganda
6	Transportation Research Laboratory (TRL)		1970	The Density of Rain gauge Networks For The Measurement of Storm Rainfall Over	TRL	Rainfall records for three networks of raingauges in, East Africa have been studied to establish the raingauge densities required for a series of representative catchment experiments in Kenya and Uganda. Densities between 2½ and 5 raingauges per km2 are shown to be required for small catchments, reducing to about 1/10 of these densities for the larger catchments which range in size from 85 to 170 km2.	Uganda	Environment	Non-roads	Base	T6	Uganda

#	ORIGINATING INSTITUTION	AUTHORS	YEAR	TITLE	LOCATION OF DOCUMENT	ABSTRACT	KEYWORDS	GEOGRAPHICAL AREA	FOCUS AREAS	PAVEMENT LAYER FOCUS	TT LEVEL	Google Earth number
				Representative Catchments In Kenya and Uganda								
7	Transportation Research Laboratory (TRL)		1970	The Analysis Of Daily Rainfall Records For a Rain gauge Network At Jinja, Uganda	TRL	Sixteen years of record for a network of 29 standard rain gauges on the Northern shore of Lake Victoria are analysed. Methods of estimating design tolerance for mean annual rainfall and daily depth-frequency equations are illustrated. It is suggested that these will normally be + I 0 per cent of the measured values in East Africa. As a rule of thumb mean annual rainfall should only be quoted to the nearest I00 mm. Reduction factors for daily point rainfall to estimate storm rainfall over a catchment are shown to be 10 per oe~t, 15 per cent and 20 per cent for areas Of 15, 40 and 80 km- climatically similar to the studied network.	Jinja	Environment	Non-roads	Solution / Application	T7	Jinja
8	Transportation Research Laboratory (TRL)		1970	Representative Rural Catchments in Kenya and Uganda	TRL	This report describes networks of small rural catchments throughout Kenya and Uganda. The purpose of these is to provide data for the development of a design method for the estimation of waterway sizes for small bridges and culverts. The programme is being run jointly by the Kenya and Uganda Governments and the Road Research Laboratory, of the United Kingdom Ministry of Transport. The six catchments in each country are described. They have been sited to provide information on the effect on the runoff hydrography of the following catchment parameters: (a) area (b) spatial and temporal rainfall variability (c) topography and soil type (d) swamp. For each catchment a rainfall runoff correlation will be prepared, and unit hydrography isolated. An attempt will be made to correlate these with the above catchment parameters to estimate flood flows for ungauged catchments.		Environment	Non-roads	Platform	T8	
9	Transportation Research Laboratory (TRL)		1971	The Installation of Two Representative URBAN Catchments in Kampala	TRL	Two urban catchments in Kampala, Uganda, which are on sloping red clay soils and have different densities of building, are being studied to determine what modifications will be needed to the RRL method of sewer design under tropical rainfall conditions.	Kampala	Environment	Non-roads	Solution / Application	T9	Kampala
10	Transportation Research Laboratory (TRL)		1974	The Compaction of Soils and Stabilized Bases on Roads in East Africa	TRL	As part of a study of aspects of normal road-building practice in tropical countries, the states of compaction achieved in road bases and earthworks were investigated at ten road construction schemes in East Africa. In addition, where possible, controlled compaction trials were carried out. The most significant conclusion from the investigation is that the states of compaction achieved in the field correspond quite closely with those obtained in full-scale compaction tests carried out at the Transport and Road Research Laboratory. The relation between compactive effort, moisture content and the dry density obtained in the field followed accepted patterns; overstressing was noted on a uniform sand soil. The optimum moisture condition for compaction in the field was close to the optimum moisture content in the B.S. Compaction test 2.5 Kg (5.5 lb) rammer method, and simple and rapid methods of appraising the moisture conditions were effective in maintaining the moisture contents within an acceptable range. The study showed that the states of compaction commonly specified for tropical roads can be attained under normal working conditions.	Uganda	Construction	Base	Platform	T10	Uganda
11	Transportation Research Laboratory (TRL)		1974	The Prediction of Storm Rainfall in East Africa	TRL	A simple method for predicting the characteristics of storms for the design of drainage structures in East Africa is described. The variation of 2 year daily point rainfall, and the 10:2 year ratio for daily rainfall, over East Africa are given in map form. Using these, daily point rainfall for any return frequency can be calculated. To arrive at the design storm the daily point rainfall is adjusted using a generalised depth-duration equation and a graphical representation of the variation of mean rainfall with area.	Uganda	Environment	Non-roads	Platform	T11	Uganda
12	Transportation Research Laboratory (TRL)		1976	The East African Flood Model	TRL	Four years of data from 13 small representative rural catchments in Kenya and Uganda were analysed to develop improved methods of flood estimation for highway bridges and culverts. Due to the short period of record and the very quick response time of the catchments, Unit Hydrography techniques were found inappropriate. A technique which made better use of limited data, therefore, had to be developed. Rainfall and runoff were fitted to a simple three parameter conceptual catchment model. The model was then used to predict the 10 year flood using a 10 year design storm. A simple technique is then developed for predicting the peak flow and base time of design hydrography for ungauged catchments.	Uganda	Environment	Non-roads	Platform	T12	Uganda
13	Transportation Research Laboratory (TRL)		2005	Increased Application of Labour-Based Methods Through Appropriate Engineering Standards	TRL			Construction	Other	Platform	T13	
14	Transportation Research Laboratory (TRL)		2014	Design Review Report: Application of Low-Cost Seals: Design Review, Supervision of Trial Contracts, Training and Production of Documentation	TRL			Design	Surfacing	Solution / Application	T14	
15	Transportation Research Laboratory (TRL)		2014	Detailed Report: Application of Low-Cost Seals: Design Review, Supervision of Trial Contracts, Training and Production of Documentation	TRL			Construction	Surfacing	Solution / Application	T15	
16	Transportation Research Laboratory (TRL)		2014	Final Report: Application of Low-Cost Seals: Design Review, Supervision of Trial Contracts, Training and Production of Documentation	TRL			Construction	Surfacing	Solution / Application	T16	
17	Transportation Research Laboratory (TRL)	J Rolt, A Otto, K Mukura, C Koojo	2011	Development of Training Modules, Conducting Training and Establishment of Demonstration Site for Low-cost Sealing of Roads in Uganda. Training Report	TRL	Uganda is a land-locked country and, not surprisingly, the dominant mode of transport is roads. The national road network consists of about 10,500 kilometres of trunk roads, 27,500 kilometres of district roads and 30,000 kilometres of community access roads. In a country that is mainly agricultural and where the majority of the population live in the rural areas, the district and community roads are absolutely vital for the livelihood and economic development of the people. The development of road infrastructure that unlocks areas with high	Mbale	Construction	Surfacing	Platform	T17	Mbale

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						agricultural potential, and enables access to markets and social services for rural population is thus key to the government's poverty reduction programmes. Good gravel, which is essential for the construction and maintenance of these roads, is becoming increasingly scarce, not only in Uganda but in many other African countries. Therefore alternative road designs are required that do deplete the sources of gravel so quickly and provide a more sustainable solution to the problem of road provision. It is on this basis that this project was conceived. The objective is to demonstrate ways of providing more durable road surfacings by sealing roads in a low-cost way. A key aspect of this is the use of labour-based methods to give a cheaper alternative to fully mechanised works which require a large initial capital investment cost for road constructors. A second key aspect of the project is the adoption of cheaper design and construction options based on locally available materials.						
18	Transportation Research Laboratory (TRL)	K Mukura, J Rolt, A Otto	2011	Development of Training Modules, Conducting Training and Establishment of Demonstration Site for Low-cost Sealing of Roads in Uganda. Guidelines on use of locally available materials in the construction of low-volume roads	TRL	Road provision has become more challenging owing to a number of factors. 1. Funding for the construction of roads is increasingly becoming inadequate. 2. Construction costs are increasing owing to the increase in cost of materials, plant and equipment. 3. Road construction materials especially good natural gravels are scarce and it is difficult to acquire new sources due to the increase in demand for land for agriculture. 4. Aggregate that meets standard specifications for surfacing is in most cases only obtained in limited places and long haul distances are resulting in high landed costs. 5. The demand for sustainable road networks is putting pressure on road authorities to deliver with limited resources. While much attention has been given to major roads such as trunk roads it has been realised that road networks that feed into the trunk roads need to be improved as they are important drivers of socio-economic development. The major challenge therefore is to find out ways of minimising the cost of construction without compromising the quality of the roads. There are several ways of achieving this objective. 1. Change the geometric designs which in term reduces costs. 2. Study deterioration mechanisms in order to optimise designs, especially of pavements and surfacing. 3. Analyse the opportunities to the engineer and develop targeted approaches to road provision which lower costs and enhance quality. 4. Take into account the available materials and carry out designs which allow for their use. 5. Develop home-grown specifications which take into the local environment, traffic and available materials. The principle should be based on designing for the locally available materials rather than sourcing materials for the standard design. This means that designing becomes a variable rather than the standard and that locally available materials influence the design.	Mbale	Construction	Surfacing	Platform	T18	Mbale
1	UNRA		2017	Soil Stabilization: Guidelines for best practise	UNRA		soil stabilisation	Uganda	Material	Gravel	Platform	UNRA1
2	Makerere University	Umaru Bagampadde, David Kaddu	2014	Scientific evaluation of varied Ugandan road soils stabilized and sealed with PROBASE technology				Uganda	Material	Gravel	Base	M2
3			2014	Update on innovations using alternative technologies on the national roads in Uganda				Uganda	Material	Gravel	Base	x3
4		Landlock	2012	Monitoring and evaluation report; LANDLOCK technology pilot	UNRA		proprietary soil stabilisation	Akia Akoi	Material	Gravel	Base	x4
1	Google Scholar	DA Wepener, P Kruger, WJ Botha, Prof Sam Tulya-Muhika	2001	ROAD MANAGEMENT AND FINANCING – THE UGANDA EXPERIENCE IN THE IMPLEMENTATION OF ROAD USER	*'Meeting* 20th South African Transport Conference South Africa, 16 – 20 July 2001.	Uganda has a total road network of approximately 35,700 km (excluding community roads) of which about 8 % is paved. The classified road network consists of about 9,500 km (of which 24 % is paved), but which accommodated 57 % of the travel in Uganda (in terms of million vehicle kilometres per year). In order to maintain and improve this major network, the Government of Uganda (GOU) has prepared a 10-year Road Sector Development Program (RSDP), stretching between 1996/7 and 2005/06.Expenditure under this program would amount to some US$ 1,397 million already committed. Of the US$ 1,397 million already committed about US$ 783 million has been allocated through international donor commitments and US$614 from Government of Uganda (GOU) commitments. To manage the anticipated increase in expenditure of roads, but also to ensure greater efficiency, the GOU has not only decided to establish commercially orientated Roads Agency in the immediate future, but to commercialise the whole road sector. A study was consequently commissioned by the		Uganda	Management	Other	Base	GS1

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				CHARGES	*the Transport Challenges in Southern Africa'* Organised by: Conference Planners. Conference Papers Produced by: Document Transformation Technologies	Ministry of Works, Housing and Communications, funded by the World Bank, to assess the existing Road User Charges (RUC) system used in Uganda and its equity in terms of the costs each category of user imposes on road infrastructure and on other road users. The study also has to make recommendations as to the required adjustments in the existing system, including the identification of more appropriate instruments to raise revenue towards a more efficient, equitable and more effective framework. The options to link the revenue raised through appropriate road user charging instruments to expenditure on roads i.e. the user-pay or fee-for-service principle also had to be exploited under the study. This paper highlights the major findings of the study and discusses the lessons learned and the way forward in terms of the commercialisation of the road sector in Uganda.						
2	Google Scholar	Christina Malmberg Calvo	1994	Case Study on Intermediate Means of Transport Bicycles and Rural Women in Uganda	Sub–Saharan Africa Transport Policy Program. The World Bank and Economic Commission for Africa. SSATP Working Paper No 12	One of the objectives of the Rural Travel and Transport Project (RTTP) is to recommend approaches for improving rural transport, including the adoption of intermediate transport technologies to facilitate goods movement and increase personal mobility. For this purpose, comprehensive village-level travel and transport surveys (VLTTS) and associated case studies have been carried out. The case studies focus on the role of intermediate means of transport (IMT) in improving mobility and the role of transport in women's daily lives. The present divisional working paper is the second in a series reporting on the VLTTS. The first working paper focussed on travel to meet domestic needs (for water, firewood, and food processing needs), and on the impact on women of the provision of such facilities as water supply, woodlots, fuel efficient stoves and grinding mills. The present case study documents the use of bicycles in eastern Uganda where they are a means of generating income for rural traders and for urban poor who work as bicycle taxi-riders. It also assesses women's priorities regarding interventions to improve mobility and access, and the potential for greater use of bicycles by rural women and for women's activities. The bicycle is the most common IMT in SSA, and it is used to improve the efficiency of productive tasks, and to serve as a link between farms and villages, nearby road networks, and market towns. The study indicates that the financial return on these activities is so high that the cost of the bicycle can be recovered in less than twelve months. It is further asserted that the main reason for the relatively small number of bicycle traders is the lack of credit. The study highlights the general situation in SSA where IMT are predominantly owned and used by men and, where, for mainly cultural and economical reasons, women rarely get to use IMT for their transport needs. The RTTP is a component of the Sub-Saharan Africa Transport Policy Program (SSATP). The general objective of the SSATP is to help governments improve transport policies so as to enhance the efficiency of transport services, and to ensure that they are sustainable. The RTTP has supported the development of country strategies (Madagascar, Ghana, Ethiopia, Uganda, Tanzania), and has produced a comparative review of rural transport policies1 as well as thematic and policy papers dealing with rural road strategies2 and intermediate means of transport.3 The country specific work as well as the above-mentioned surveys will provide the basis to prepare guidance papers on key aspects of rural transport strategies. This will support the drive to address the transport needs of rural households and, more generally, to develop rural infrastructure services in Africa.		Uganda	Operations	Other	Solution / Application	GS2
3	Google Scholar	Milton Mutto,	2002	The effect of an overpass	African Health	Objectives: To describe the pedestrian population, their use of an overpass, and to assess pedestrian perceptions and responses to the risk of traffic crashes, determine pedestrian injuries in relation to traffic flow, and compare	Overpass, Pedestrian	Nakawa Trading centre	Road safety	Non-roads	Solution /	GS3

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		Olive C Kobusingye, Ronald R Lett		on pedestrian injuries on a major highway in Kampala – Uganda	Sciences Vol 2 No 3 December 2002	traffic crash and pedestrian injury rates before and after the overpass construction. Setting: The study was conducted in Nakawa trading center approximately six kilometers from the center of Kampala city on a major highway. The trading center has a busy market, small retail shops, industries, a sports stadium, offices, low cost housing estates, schools, and an estimated population of 6,226 residents, 15.1% of them students. Methodology: Pedestrian road behavior and traffic patterns were observed, and police traffic crash records reviewed, one year before and one year after overpass construction. A convenient sample of overpass and non-overpass users was interviewed to assess their perceptions of risk. Results: A total of 13,064 pedestrians were observed (male: female ratio= 2.2:1). The overall prevalence of pedestrian overpass use was 35.4%. A bigger proportion of females (49.1%) crossed on the overpass compared to males (29.2%). More children (79.7 %) than adults (27.3%) used the overpass. The majority of pedestrians (77.9%) were worried about their safety in traffic but only 6.6% thought of the overpass as an appropriate means to avoid traffic accidents. Traffic was not segregated by vehicle type. Mean traffic flow varied from 41.5 vehicles per minute between 0730-0830 hours, to 39.3 vehicles per minute between 1030-1130 hours and 37.7 vehicles per minute between 1730-1830 hours. The proportion of heavy vehicles (lorries, trailers, tankers, and tractors) increased from 3.3% of total vehicle volume in the morning to 5.4% in the evening *(t = 2.847, p <0.05)*; 44.0% of the collisions occurred in the evening with 35 pedestrian casualties before and 70 after the overpass intervention. Conclusions: The prevalence of pedestrian overpass use was low with adult males least likely to use it. Pedestrians had a high perception of risk, which did not seem to influence overpass use. Pedestrian were more likely to be injured during slow traffic flows. There were more traffic crashes, and pedestrian injuries, but fewer fatalities after the construction of the overpass. The national roads system in Uganda is experiencing a period of exceptional activity and promise following a large increase in public spending in the sector and institutional reforms designed to enhance substantially the efficiency of this investment. This report undertakes a political economy study of the changes in the sector as a contribution to thinking about the most suitable form and content of donor support to the reform process. The study builds on previous work showing that an increase in both the volume and the efficiency of investment in national roads in Uganda would contribute substantially to raising the pace and improving the structure of economic growth in Uganda and in the East African sub-region. It can therefore be seen as an exercise in the political economy of growth policy options. The report uses a 'layered political economy approach', the generic features of which are described in the Preface. Sections 1 and 2 then describe some major features of the political context of policymaking in Uganda, the sector background and the major stakeholders in the process of reform. They then set out three possible scenarios. These are: • That the 2008 policy changes regarding national roads signify a substantial shift in presidential priorities and policymaking style, such that there is considerable scope for donors to have an impact by plugging financing gaps and providing conventional technical assistance (TA) on a large scale. • That, although the above is not the case, the institutional changes of the past year have nonetheless altered the incentives or decision logics within the sector in important ways, and henceforth the balance of forces will be more favourable to those wishing to see real change in ways of working. This would be another scenario favourable to a conventional donor response. • That the changes involve neither a transformation of the systemic political environment, nor a definitely transformed set of incentives for sector actors, but there is nonetheless some 'room for manoeuvre' arising from the dynamics of the reform process. In the last scenario, there is scope for donor-supported action to tip evenly balanced equilibria in a pro-reform direction and contribute to pro-growth and pro-poor outcomes 'against the odds'. However, this calls for a particular sort of donor programming, which permits the solution of a large number of small institutional and collective action problems in a very dynamic setting. The report argues that the third scenario is in fact the one that corresponds most closely to the current situation in Uganda. This argument is grounded in previous political economy studies in Uganda by the authors and others, and it draws heavily on two and a half weeks of interviews and discussions with participants in and close observers of the roads reform process. The first possible scenario is rejected on the grounds that the evidence of a sea change in President Museveni's approach to the roads sector is unconvincing. Even if he has new reasons to take road building and maintenance more seriously, and this was an important factor in the initiatives of 2008, his own system of rule will tend to prevent this leading to any dramatic change in the political factors affecting what happens in the roads sector. While the funding of	Injuries, Urban Uganda, Accidents.				Application	
4	Google Scholar	David Booth and Frederick Golooba-Mutebi	2009	Aiding Economic Growth in Africa. The Political Economy of Roads Reform in Uganda	Overseas Development Institute. Working Paper 307			Uganda	Management	Other	Solution / Application	GS4

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						maintenance through the new Road Fund seems secure, it would be unwise to assume that either the Uganda National Roads Authority (UNRA) or the Ministry of Works and Transport will be immune in the future to the pressures to provide political rents that damaged the performance of the sector in the past. The second scenario is one in which the decision logics of several key actors move in a pro-reform direction. This seems unlikely because the demand for service delivery outcomes remains weak compared with the appetite for patronage, which is the key to the cost benefit calculations made by the President and his supporters. There are doubts about how far the creation of UNRA has ushered in an organisation of a new type, characterised by more performance-oriented incentives. Meanwhile, the suppliers of construction and consulting engineer services in the private sector, who are victims of the system in some important senses, face prohibitive collective action problems as advocates of reform. Including donor money and influence in this discussion does not open up markedly more hopeful prospects, as donors suffer from well understood political economic impediments of their own. That leaves the possibility of an agenda of exploiting the limited but not insignificant room for manoeuvre created by the reform as a process. We are concerned with dynamics in which different actors define and redefine their interests partly in response to what others have decided to do. Typically, change processes of this type present opportunities in which an intelligent and respected third party can broker meetings and agreements, and help the main players to overcome what would otherwise be situations of stalemate or logjam. In the particular case of Uganda roads, there seems scope for third party action of this general type in at least the following fields: • Communication about performance; • Brokering otherwise missing dialogue among key players; • Facilitation of countervailing networks of influence; • Lowering barriers to collective action by private actors; • Facilitating appropriate forms of 'infant industry' support to local firms; • Mobilising influence to enable otherwise blocked organisational transformations. The central proposition advanced in the report is that donor support to the sector, particularly but not exclusively the UK Department for International Development (DFID) component, should be conceived primarily in terms of this type of third party facilitation of change in a dynamic, multi-stakeholder environment. This is where the most important gap is to be found. Such an approach would not be unprecedented. It has been deployed effectively in the series of DFID-funded programmes originally titled Making Markets Work for the Poor. Additionally, in Latin America and elsewhere, the types of outreach and engagement activities that DFID's relatively flexible grant funding permits has been the basis of mutually satisfying partnerships with World Bank task managers among others. This is another relevant precedent. The report does not get into details about possible programme designs. However, it follows from the conclusions of the political economy analysis that there will be a strong case for adopting a process, not blueprint, design. The relevant opportunities cannot be mapped out in detail in advance, and there will be considerable scope for learning from experience about what kinds of facilitation work best. Similarly, the investment in staff with the relevant networking and facilitation skills should be viewed as the most powerful component of any package of support, not the funding, the hardware or the conventional TA. Staffing decisions will be crucial, and in this instance we would recommend a careful pairing of local and international personnel.					
5	Google Scholar	MARIE CIBOT, SARAH BORTOLAMIOL, ANDREW SEGUYA, SABRINA KRIEF	2015	Chimpanzees Facing a Dangerous Situation: A High-Traffic Asphalted Road in the Sebitoli Area of Kibale National Park, Uganda	American Journal of Primatology 77:890–900 (2015)	Despite the spread of road infrastructures throughout Africa to support regional development, industry, and tourism, few studies have examined how wild animals adapt their behavior and ecology in roadforest ecotones. Indeed, while numerous studies have demonstrated chimpanzee adaptability in anthropogenic landscapes, none have examined the effects of asphalted highways on wild chimpanzee behaviors. In a 29-month survey, we assessed the dangers posed by an asphalted road crossing the Sebitoli area of Kibale National Park (Uganda). We analyzed 122 individual chimpanzee crossings. Although the asphalted road represents a substantial threat to crossing animals (89 motorized vehicles per hour use this road and individuals of six different primate species were killed in 1 year), chimpanzees took into account this risk. More than 90% of the individuals looked right and left before and while crossing. Chimpanzees crossed in small subgroups (average 2.7 subgroups of 2.1 individuals per crossing event). Whole parties crossed more rapidly when chimpanzees were more numerous in the crossing groups. The individuals most vulnerable to the dangers of road crossing (females with dependents, immature, and severely injured individuals) crossed less frequently compared with nonvulnerable individuals (lone and healthy adolescents and adults). Moreover, healthy adult males, who were the most frequent crossing individuals, led progressions more frequently when crossing the road than when climbing or descending feeding	road-crossing; risk perception; protective behavior; Pan troglodytes schweinfurthii;	Kibale National Park, Uganda	Road safety	Non-roads	Solution / Application	GS5

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6	Google Scholar	D Bishai, B Asiimwe, S Abbas, A A Hyder, W Bazeyo	2014	Cost-effectiveness of traffic enforcement: case study from Uganda	http://dx.doi.org/10.1136/ip.2008.018341	trees. Almost 20% of the individuals that crossed paid attention to conspecifics by checking on them or waiting for them while crossing. These observations are relevant for our understanding of adaptive behavior among chimpanzees in human-impacted habitats. Further investigations are needed to better evaluate the effects of busy roads on adolescent female dispersal and on their use of territories. Mitigation measures (e.g., bridges, underpasses, reduced speed limits, speed-bumps, signposts, or police controls) should be established in this area. Background: In October 2004, the Ugandan Police department deployed enhanced traffic safety patrols on the four major roads to the capital Kampala. Objective: To assess the costs and potential effectiveness of increasing traffic enforcement in Uganda. Methods: Record review and key informant interviews were conducted at 10 police stations along the highways that were patrolled. Monthly data on traffic citations and casualties were reviewed for January 2001 to December 2005; time series (ARIMA) regression was used to assess for a statistically significant change in traffic deaths. Costs were computed from the perspective of the police department in $US 2005. Cost offsets from savings to the health sector were not included. Results: The annual cost of deploying the four squads of traffic patrols (20 officers, four vehicles, equipment, administration) is estimated at $72,000. Since deployment, the number of citations has increased substantially with a value of $327 311 annually. Monthly crash data pre- and post-intervention show a statistically significant 17% drop in road deaths after the intervention. The average cost-effectiveness of better road safety enforcement in Uganda is $603 per death averted or $27 per life year saved discounted at 3% (equivalent to 9% of Uganda's $300 GDP per capita). Conclusion: The costs of traffic safety enforcement are low in comparison to the potential number of lives saved and revenue generated. Increasing enforcement of existing traffic safety norms can prove to be an extremely cost-effective public health intervention in low-income countries, even from a government perspective.		Uganda	Road safety	Non-roads	Solution / Application	GS6
7	Google Scholar	Lydia MAZZI Kayondo, Prof. S.S Tickodri Togboa, Prof. Gerhard Bax	2007	An Overview of the Gaps and Limitations in the Utilization of GITs for Road Infrastructure Maintenance in Uganda	GITs as Decision Support Tools for RIM - Uganda	This paper is part of ongoing research on the use of Geographical Information Technologies (GITs) as decision support tools in road infrastructure maintenance in Uganda. It discusses the gaps in the use of GITs in the road infrastructure maintenance process of Uganda and the limitations experienced while enhancing the use of these technologies. Road maintenance organizations using GITs are often faced with the need and desire to solve similar and cross-cutting technical problems that are repetitive in nature. However, their current institutional arrangements do not permit forging of lasting partnerships, use of standardized data and operating under a coordinated GIS infrastructure. They also lack common and standardized datasets to address key state-wide and local maintenance requirements. Challenges to coordinating how geospatial data are acquired and utilized are the norm in Uganda. Similarly, collection of duplicate data sets at the local and national levels is a common scenario. We finally identify the limitations to use of GITs in the sector as; lack of infrastructure to support utilization of geographic datasets, unavailability of and limited accessibility to geographic data, lack of geospatial capacity at individual and organizational levels and the digital divide. Above all, there are no policies for accessibility and standard use of GITs.		Uganda	Maintenance & Rehabilitation	Pavement structure	Solution / Application	GS7
8	Google Scholar	Bakamwesiga, Hilary; Mwakali, Jackson; Sengendo, Stephen and Thelandersson, Sven	2014	Impact of environmental exposure on concrete strength in highway bridges in Uganda	1st International Conference on Construction Materials and Structures In Proceedings of the First Internati	Deterioration of concrete structures is a worldwide problem. Environmental exposure is known to affect concrete strength in structures. While moisture affects rebound values by lowering them, carbonation does the opposite. The aim of the study was to determine the insitu concrete strength of three bridge elements, namely, pier, abutment and deck and evaluate the environmental conditions such as moisture and abrasive forces on the near surface of concrete. Acknowledging that destructive tests on concrete are expensive and time consuming, this research used rebound hammer test a non-destructive test (NDT) method. The easiness, simplicity and portability of the rebound hammer made it possible to cover all 13 highway bridges in a period of two months. All the study sites were under the management of Uganda National Roads Authority (UNRA). The choice of test locations was based on BS 1881: Part 202. Rebound hammer tests were done on main elements of bridges namely, decks, piers and abutments. Where possible a maximum of 3 test points were chosen for every single test location. In addition to the universal machine calibrations, the rebound values were correlated to the standard concrete cube compressive strength using old concrete factors. Preliminary results show that although there is significant variation in concrete strength in both pier and abutment, the variation is relatively more pronounced in latter. The paper recommends a combined methodology involving the use of several NDTs to come up with sufficiently reliable results. In conclusion, the development of a formal Bridge Management System (BMS) to enable		Uganda	Environment	Other	Platform	GS8

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9	Google Scholar	Clare Tawney, Keith Cornish, Alex Mugova	1986	Improving access to finance for small- and medium-sized enterprises in the road sector: the CrossRoads Guarantee Fund in Uganda	onal Conference on Construction Materials and Structures p.861870 http://dx.doi.org/10.3362/1755-1986.2014.013 International Journal of Advances in Management and Economics, ISSN: 2278-3369. Derek Friday| May.-June. 2012 | Vol.1 | Issue 3|78-87	collection of data through regular monitoring and inspection programs would facilitate prioritization of Maintenance, Repair and Rehabilitation (MR&R) strategies. Credit guarantee funds are a tried-and-tested instrument to improve access to finance. This paper aims to share experience from the CrossRoads Guarantee Fund in Uganda. The Fund was established in 2012 as one of the interventions under the CrossRoads Programme funded by the Department for International Development (DFID) and the European Union (EU) to build capacity and competitiveness in Uganda's roads sector. The objective of the Fund is to improve access to finance for contractors/consultants. The Fund has created significant benefits and impacts that include enabling contractors to secure bid securities and performance bonds valued at Ugandan Shillings 11.7 bn (US$4.7 m); improving relationships between financial institutions and contractors; and significant crowding-in by financial institutions. Important lessons to guide scaling up or replication of similar initiatives are emerging. First, a guarantee fund creates significant behaviour change on both the supply and demand sides of the financial services market. Second, high leverage and impact can be achieved from a modest investment. Third, fund access conditions should be stringent enough to minimize moral hazard. Fourth, fund utilization, leverage, and outreach depend on work flow. Finally, protracted procurement processes raise costs and undermine the effectiveness of a guarantee fund.		Uganda	Management	Non-roads	Platform	GS9
10	Google Scholar	Derek Friday	2012	Modification of Road Infrastructure to Increase Driver Compliance in Uganda		Deteriorating driver behaviour over the last decade is documented as the leading contributor to the increasing rate of accidents on roads in Uganda. Studies done in this area have blamed the bad driver behaviour to social norms and the loop holes in the safety regulation enforcement system to ensure driver compliance. Besides the social and regulatory environment, poor road infrastructure has had a great influence on the driver's compliance levels in the country. It is probable to infer that the state of the road infrastructure is highly responsible for driver non compliance to safety regulations from this study's findings. The inferences made in the paper are a result of the findings from data collected from 285 respondents comprising of traffic officers and analysed using SPSS. The study also critics the Risk Homoeostasis Theory and makes numerous contributions to theory, policy implications and recommendations to improve road safety.	Driver compliance, Road infrastructure, Roads, Uganda	Uganda	Road safety	Non-roads	Solution / Application	GS10
11	Google Scholar	Twaibu Semwogerere, Peter O. Lating, and	2013	Erosion Features on Gravel Roads in Uganda–Formation and Effects	International Journal of Applied Physics	In the event of erosion flows, the road is one unique surface with various flow and deposition characteristics. Earlier studies focus on erosion features on shores and coasts and sometimes on desert plains as a result of wind erosion, but hardly on roads. Erosion features are detrimental to road designers, constructors, and users. This paper focused on gravel roads which constitute a larger percentage of the rural roads. These are a key to accumulation of wealth for developing countries. It also looked at the identification, formation, and extracting effects of features as a result of erosion on the road surface pertaining to various road surface characteristics.	Dune, erosion, modeling, rill.	Uganda	Material	Gravel	Base	GS11

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		Samuel B. Kucel			and Mathematics, Vol. 3, No. 4, July 2013	Rills and dunes on roads are active features which gully up bigger parts of the roads causing flooding and other dangerous effects. Various experiments like sieve analysis, runoff speeds and measuring road rill/dune sizes with respect to slope size, rain intensity, and road sizes were considered for this study. The main data analysis tool used was STATA V11. Findings included higher runoff speed on roads than other erosion fields, determination of the rate of road reduction, flooding by rills or dunes and provision of good background to modeling erosion on roads.						
12	Google Scholar	George Bogere, Godber Tumushabe, Eugene Ssemakula	2013	GOVERNANCE ASPECTS IN THE WATER AND ROADS SECTORS Lessons From Five Districts In Uganda	ACODE Policy Research Paper Series No.59, 2013	Governance in contemporary Uganda is defined by elective democracy, decentralization, liberalization and privatization, all of which took root in the 1990s. The drawing in of non-state actors in the provision of social services has created a number of challenges and dilemmas, particularly the sub-optimal capacity of the state to finance and effectively oversee the provision of social services by numerous actors. These challenges bring to the fore the question of the potential to improve the level and quality of service provision. Despite increases in funds allocated for service delivery in the budget over the last decade, service delivery indicators for many sectors remain below target levels. There are reports of widespread corruption and embezzlement of funds meant for service delivery in Uganda. Reinikka & Svensson (2004) found that in the mid-1990s, 24 percent of the capitation grant to primary schools was captured by local government officials and politicians. District officials have been suspected of colluding with construction companies to divert funds, inflate costs and carrying out sub-standard works. This paper explores three issues in relation to the provision of social services, namely i) service delivery measures for water and roads as defined by the actors and relations among them; ii) the implications of the different service delivery measures for the quality of services; and iii) the applicability of accountability in the provision of water and roads services. This study largely draws from the World Bank's framework for accountability premised on the principal agent framework. The study covered five districts of Uganda including Ntungamo, Soroti, Nebbi, Mbale and Wakiso. Multivariate probit analysis was used to investigate two basic relationships: (i) between governance aspects and the quality of services based on both objective evaluations as well as perceptions of users; and (ii) between demand for accountability (for which reporting issues related to service delivery by users is used as a proxy), and personal factors. The findings agree with other writers that contracting out the provision of social services to the private sector is not a guarantee for better outcomes. Evidence from road works under the jurisdiction of sub-national governments (districts) shows that the frequency of monitoring of works is very important for quality of roads. The study also shows that incentives for front line providers for water sources under community management are very important for quality of services rendered. The findings suggest that there are disconnects in the long route of accountability under the prevailing service delivery arrangements. This is largely attributed to the existence of several power centers whose boundaries of responsibility in service delivery are blurred. The situation is compounded by the absence of clearly spelt out mechanisms for handling and resolving complaints related to social services. Results show that citizens start with the nearest center and move up to higher levels with progressively reducing degrees of responsiveness. In many cases the authorities reported having limited capacity to react to the service delivery issues raised by citizens. Further, the absence of clear complaint handling and redress mechanisms, results in diminished direct responsibility for authorities at different levels to act. In addition, there appears to be a problem with decentralization in terms of the extent of political control over service delivery at sub-national (local government) levels. Initially, the Chief Administrative Officers (CAOs) were appointed at district level and were accountable to the district councils. Later, in response to collusion and mutual interference between the political and technical leadership, the appointment of CAOs was recentralized. This seems to have significantly reduced the influence of the political arm over the technical functions at district level. The findings also suggest that that there are failures related to institutional arrangements (widely referred to as compact failures in the literature) which negatively impact on the quality of services. Examination of road works shows that direct provision of road works by the districts is characterized by complications in monitoring and quality assurance, given the non- separation of roles. The short route of accountability, as used in the study brings out challenges faced under community management of social services. Under community management of water sources, frontline service providers are largely volunteers with no remuneration. While these individuals can be dismissed from these positions for poor performance, absence of direct, individual loss arising out of this action negates the efficacy of dismissal in		Uganda	Management	Other	Platform	GS12

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13	Google Scholar	David Bishai; Adnan A Hyder; Abdul Gha□□ar; Richard H Morrow; Olive Kobusingye	2003	Rates of public investment for road safety in developing countries: case studies of Uganda and Pakistan	Health Policy Plan (2003) 18 (2): 232-235. DOI: https://doi.org/10.1093/heapol/czg028	sanctioning against misconduct and poor performance. The study shows that rewarding frontline service providers in this case water source is associated with higher levels of user satisfaction. Four key policy recommendations for Uganda are drawn from this study. i) There is need to put in place a coherent grievance handling and redress mechanism in relation to social services compatible with the decentralized framework. While the proposed client charter would go a long way in effecting this recommendation, its implementation has so far been slow, with seemingly limited government commitment. ii) The government should set standards for social service provision across the country and ensure compliance to them. The standards should cover aspects such as unit costs for service delivery and specification of details of works. iii) Civil society organisations should focus more on scrutinizing the actions of policy makers and technocrats at sub-national levels and demand for better services. iv) Front line service providers under community management should be provided with some form of reward – not necessarily pecuniary, clearly define their roles and responsibilities and indicate to them the sanctions for misconduct or poor performance. *Objective*: This paper assesses the magnitude of public investment in road safety in Uganda and Pakistan. *Methods*: The study reviewed government budgetary records on expenditure for road safety for each country, as well as World Bank estimates of bilateral and NGO assistance directed to road safety. The authors interviewed key informants in each government who would know about public or NGO activity on road safety. *Results*: Budgetary expenditure on road safety at all levels of government in Uganda and Pakistan is $0.09 and $0.07 per capita respectively. *Discussion*: The scale of public activity in road safety in Uganda and Pakistan is extremely limited. If there are diminishing returns to scale for road safety investments, this would suggest that the potential effectiveness of properly chosen safety measures could never be higher.		Uganda	Road safety	Non-roads	Solution / Application	GS13
14	Google Scholar	Nyende Magidu, Jeff Geoffrey Alumai, Winnie Nabiddo	2010	PUBLIC EXPENDITURE TRACKING ON ROAD INFRASTRUCTURE IN UGANDA: A CASE STUDY OF PALLISA AND SOROTI DISTRICTS	Economic Policy Research Centre Research Report No. 3	The main message of this study is that public action by making the choice to invest in infrastructure, has to be taken to alleviate the plight of Uganda's economy which is endowed with adverse, natural or geographical aspects like tropical climate. Drawing from the existing literature of the various channels or means through which infrastructure affects growth, this study argues for strengthening structures and implementation in the promotion of infrastructure particularly rural roads. In order to identify the sector constraints, the study utilized public expenditure tracking and Focus Group Discussion (FGD) in the two selected districts of Pallisa and Soroti. The findings indicate that not all resources reach the beneficiary levels; capacity challenges exist both among the staff and service providers. This situation is worsened by inadequate funding for rural roads provision. First, apart from increasing public investment, the most important role to be played by the government in this changing scenario will include: strengthening capacity among the local government staff; carrying out performance audit on various firms that execute the works; and maintain road machinery in sound working conditions for provision of better and efficient roads network.	Resource tracking, infrastructure provision, local governments, service provision	Pallisa and Soroti	Management	Other	Solution / Application	GS14
15	Google Scholar	Derek Friday, Benjamin Tukamuhabwa, Moses Muhwezi	2012	Road Communication Technologies and Safety Regulation Enforcement on Roads in Uganda	International Journal of Advances in Management and Economics, ISSN: 2278-3369.	The growing concern for safety regulation enforcement is attributed to the increasing carnage of road injuries and deaths from road accidents in Uganda. With bad driver behaviours accounting for 80% to 95% road crashes, this study sought to establish whether road communication technologies can improve safety regulation enforcement and deter such behaviour. Data was collected from 285 respondents comprising of traffic officers and analysed using SPSS. The study also critics the Risk Homoeostasis Theory and makes numerous contributions to theory and practice and also provides both policy implications and recommendations to improve road safety regulation enforcement.	Roads, Road Communication Technologies, Safety Regulation Enforcement, Uganda	Uganda	Operations	Other	Solution / Application	GS15

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16	Google Scholar	Olive Kobusingye, Adnan Hyder, Nabeela Ali	2001	EXPLORING THE PERCEIVED CAUSES OF ROAD TRAFFIC CRASHES IN UGANDA AND PAKISTAN: A PILOT STUDY	Derek Friday et. al.| May.-June. 2012 | Vol.1 | Issue 3|17- 26 Johns Hopkins Bloomberg School of Public Health, 615 North Wolfe Street, Suite E-8132, Baltimore, MD	This cross-sectional, qualitative, pilot study sought to understand the perceived causes and possible solutions for traffic crashes in Uganda and Pakistan over a 3-month period. Fifty-two stakeholders in Uganda and 29 in Pakistan were purposively sampled and interviewed using focus group discussions and in-depth interviews. There was a strong similarity in the perceived causes of traffic crashes in both countries, despite the differences in culture and history. Perceived causes of road traffic crashes and injuries included lack of proper driver training, low levels of awareness about road use, speeding, inadequate transportation, lack of political commitment to road safety, and corruption in traffic law enforcement. In addition, government policy on importation and taxation of vehicles, and alcohol were also cited in Uganda. Increased road safety awareness campaigns, improved traffic law enforcement, and advocacy for increased political commitment to road safety, were the main interventions suggested. It is important to engage stakeholders and harness their perceptions to optimise the success of injury prevention and control measures in the low-income world. Where risk perception appears to conflict with strong evidence from research, such as the dangers of transporting children on pick-up trucks, more extensive sensitisation with the presentation of evidence would be required.		Uganda	Road safety	Other	Solution / Application	GS16
17	Google Scholar	Gaël Raballand, Patricia Macchi, Dino Merotto, Carly Petracco	2009	Revising the Roads Investment Strategy in Rural Areas. An Application for Uganda	The World Bank, Africa Region, Transport Unit, Policy Research Working Paper 5036	Based on extensive data collection in Uganda, this paper demonstrates that the rural access index, as defined today, should not be a government objective because the benefit of such investment is minimal, whereas achieving rural accessibility at less than 2 kilometers would require massive investments that are not sustainable. Taking into account the fact that plot size is limited on average to less than 1 hectare, a farmer's transport requirement is usually minimal and does not necessarily involve massive investments in infrastructure. This is because most farmers cannot fully load a truck or pay for this service and, even if productivity were to increase significantly, the production threshold would not be reached by most individual farmers. Therefore, in terms of public policy, maintenance of the existing rural roads rather than opening new roads should be given priority; the district feeder road allocation maintenance formula should be revised to take into account economic potential and, finally, policy makers should devote their attention to innovative marketing models from other countries where smallholder loads are consolidated through private-based consolidators.		Uganda	Management	Other	Platform	GS17
18	Google Scholar	Jennaro B. Odoki, Farhad Ahmed, Gary Taylor and Sunday A. Okello	2008	Towards the Mainstreaming of an Approach to Include Social Benefits within Road Appraisal. A Case Study from Uganda	THE WORLD BANK GROUP, TRANSPORT PAPERS, TP-17	Developing countries dedicate a considerable share of total infrastructure investment to roads. The adoption in 2000 of the Millennium Development Goals and an increasing emphasis on justifying road investments in terms of their contribution to poverty reduction have directed considerable attention to low volume rural roads. Often the poorest of the poor live in remote rural areas and improved access to social and economic services is a key factor in raising their living standards. The traditional road appraisal frameworks do not fit well with this trend as they generally ignore the impact of social benefit and poverty reduction. Past attempts to overcome these problems have lacked consistency. Therefore, there is a need to develop a consistent framework to address the poverty and social benefit aspects in a systematic manner. A study into the "identification and treatment of social benefits in road transport project appraisal" was conducted in 2003-04. The study highlighted the problems of identification, separation, measurement, forecasting and valuation of social benefits within a cost-benefit approach framework. It recommended a flexible approach using the principles of multi-criteria analysis (MCA) that is capable of combining qualitative and quantitative data into a single analytical framework. One of the study outputs was a computerized software tool that can be used alone or within the framework of globally accepted appraisal models. Although such tools appear to be robust in methodological terms, there are fundamental operational problems, including the choice of the benefits/costs indicators and their weights. The current study		Uganda	Management	Other	Platform	GS18

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19	Google Scholar	Douglas Gollin, Richard Rogerson	2010	AGRICULTURE, ROADS, AND ECONOMIC DEVELOPMENT IN UGANDA	WORKING PAPER 15863. http://www.nber.org/papers/w15863	undertook field testing of the proposed social benefits model and the software tool to recommend the choice of indicators with their corresponding weights based on results from the field. In addition, the study aimed to improve the capability of the Highway Development and Management Model (HDM-4) and Social Benefits Software Tools in addressing road investment related social issues. The field study was conducted in Acholi and Bugisu sub-regions of Uganda. The two sub-regions are different in demographic, poverty and transport intensity terms. Data were collected at different levels – project (community), program (district) and strategic (national). The project level data collection involved a total of four communities, two remote communities and two communities with good access. District and national level data were collected from decision makers at the respective levels. The qualitative methods included semi-structured interviews and focus group discussions. The quantitative methods used structured questionnaires, both open and closed-ended. The main responses sought included identification of benefits/costs arising out of road development and pairwise comparison between different types of costs and benefits. The data were analyzed using specialized MCA software. The following table provides the weights and ranges for different types of benefits/costs, social benefits/costs, and different social costs and benefits. A large fraction of Uganda's population continues to earn a living from quasi-subsistence agriculture. This paper uses a static general equilibrium model to explore the relationships between high transportation costs, low productivity, and the size of the quasi-subsistence sector. We parameterize the model to replicate some key features of the Ugandan data, and we then perform a series of quantitative experiments. Our results suggest that the population in quasi-subsistence agriculture is highly sensitive both to agricultural productivity levels and to transportation costs. The model also suggests positive complementarities between improvements in agricultural productivity and transportation.		Uganda	Management	Other	Platform	GS19

Appendix C – discussion summary from workshop

Discussion topic for Group 1: "the structure of road research in Uganda"

- **Question**: Where should the EDMS be hosted?
  Consolidated answer: Either at UNRA or Uganda Road Fund

- **Question**: What are the possible challenges that you foresee in the implementation of the EDMS?
  Consolidated answer: Access control, Mandate, Resources

- **Question**: Who should perform quality control?
  Consolidated answer: Pool of people/ ad-hoc committee suitably qualified

- **Question**: What funding sources can be considered for hosting, operational resources, maintenance?
  Consolidated answer: Subscription fee can be considered.
- **Question**: What platform should be used to discuss, plan, disseminate and apply research?
  Consolidated answer: Universities and research institutions, the Sector Working Group, or a sub-sector committee of Sector Working group focused on research. The composition of the sub-sector committee should be such that it is capable and has the technical background to manage and monitor research. The sub-committee should be open to members of the road industry that are not necessarily members of the Sector Working Group.

- **Question**: Any other comments on functionality of the EDMS?
  Consolidated answer: Requirement for Dash board: A tool is required to comment on any research.

Discussion topic for Group 2: "requirements for the EDMS"

- **Question**: What do you see as the main functions of the system?
  Consolidated answer: The group agreed with the view that the EDMS should really be used to manage research (in addition to the basic function of listing and directing you to research previously or currently conducted). The group therefore proposed that the EDMS should rather be named the Research Management System (RMS).

- **Question**: What are the main categories of research you would like to see?
  Consolidated answer: The group supported the items that were proposed in the presentation, namely:
  - Traffic
  - Material
  - Natural environment
  - Pavement structure
  - Design
  - Construction
  - Management
  - Maintenance and rehabilitation

The group however recommended that Road Safety be considered as an additional item. Operations was also added after the workshop as it was deemed by the authors that it covers a specific area that were not clearly detailed under the other categories.

- **Question**: What are the main items you would like to see for each research item?
  Consolidated answer: The group supported the items that were proposed in the presentation, namely:
  - Author
  - Year
  - Subject
  - Key words
  - Organization
  - Synopsis
  - Field (category)
  - Geographical area/ location
  - Journal or conference (if published)

- **Question**: Do you have any specific user requirements? (such as accessibility, viewing of data, dashboard, reporting on metadata)?
  Consolidated answer:
  - The EDMS needs to be accessed by both the public and other stakeholders;
  - As a registered stakeholder, you should be able to contribute towards the system, and manage the research you have submitted;
  - Registered members should be awarded a trust threshold by a suitably qualified UNRA official. In line with this, new registrations should go through a process of being rated as a researcher (in order to assist with the quality control process);
  - Members would like to filter projects based on keywords;
  - Members would like to search for projects using a forgiving search mechanism;
  - Shapefiles will need to overlay interest areas as a spatial view of resources is required;
  - A workflow (programmed into the system) is needed to drive content and information updates;

- **Question**: Where should the EDMS be hosted?
  Consolidated answer: UNRA should ideally host the EDMS