

# ROAD RESEARCH AND DEVELOPMENT IN ETHIOPIA



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# Organization of the presentation

**ROAD RESEARCH  
AND DEVELOPMENT  
IN ETHIOPIA**

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**2. AFCAP Initiatives in Ethiopia**

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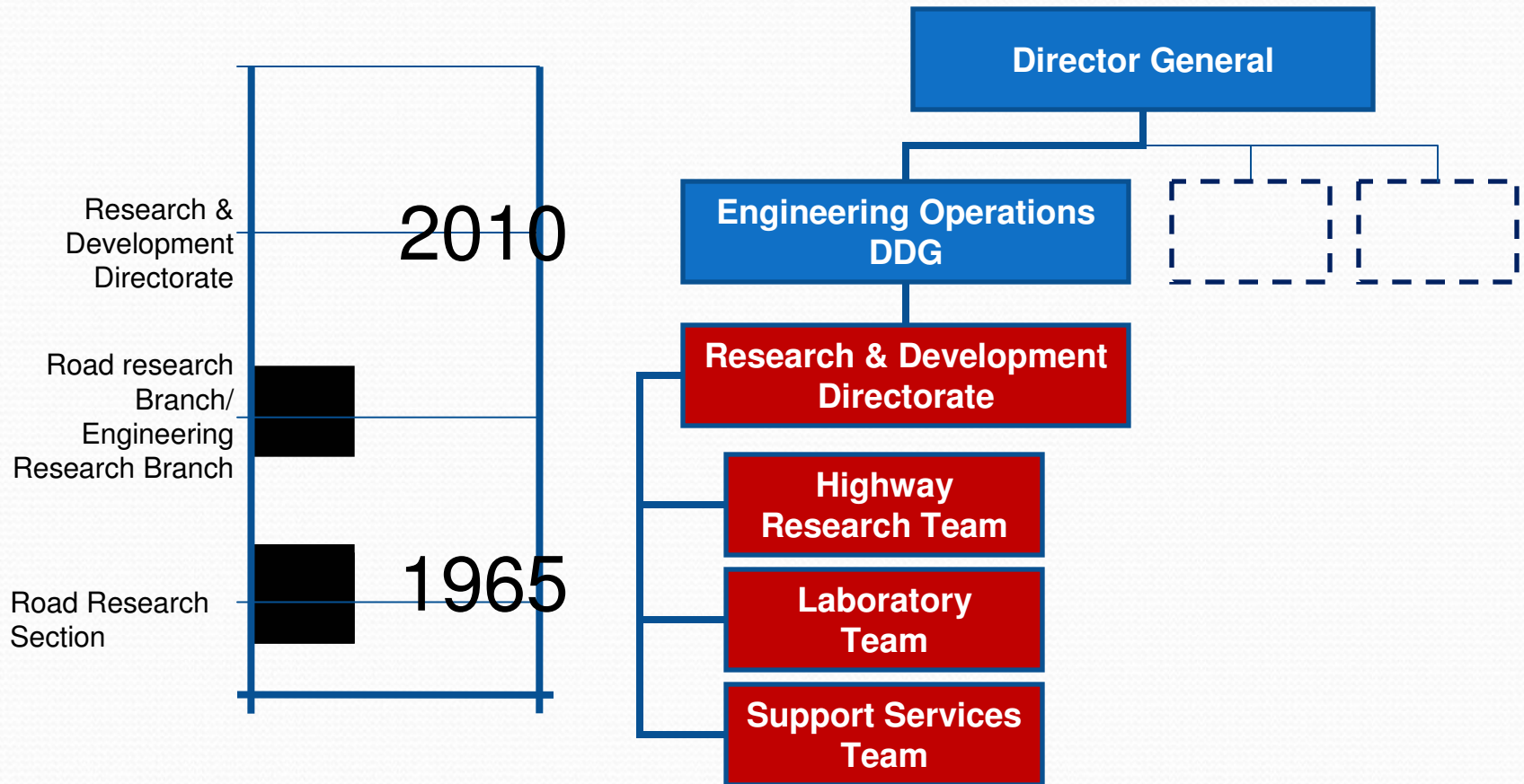
**4. National Road Research Programs**

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# 1. Introduction

Research effort in the road sector has a long history which goes back to 1965.





## Early researches

- Early researches include the JRRP with TRRL
- Some of the researches conducted are
  - *Development of terrain classification system (1977)*
  - *Axle load survey techniques and effects of vehicle and road characteristics on vehicle speed (1977)*
  - *Investigation of weathered basaltic materials (1985, 1988)*
  - *Application and use of cinder gravel (1987)*
- Important results from the early researches
- Information used to feed the deterioration model in HDM

## **2. AFCAP Initiatives in Ethiopia**

- Ethiopia joined AFCAP in 2008 as one of the partner countries
- ERA is acting as program coordinator for all AFCAP activities in Ethiopia
- ERA is now managing sizable research projects under the AFCAP umbrella
- These researches complement the Road Sector Program (RSDP) of the country.
- The research projects under the AFCAP are believed to be responsive to the current and urgent problems facing the road sector



## **Some of projects running under the AFCAP**

- Preparation of Manuals, Specifications and Standard Bidding Documents for Low Volume Roads (<300vpd) in Ethiopia
- Development of Pavement Design Standards & Specifications For Low Volume Roads in Ethiopia
- Review of Surface Dressing Practice in Ethiopia
- Training for Improved Performance of Surface Treatments in Ethiopia

## **3. Collaborative Researches**

ERA continues to promote collaborative research programs, with national and international research partners

### **3.1 National Collaborative Research**

These national collaborative programs are carried out as part of agreements signed between the relevant national researchers, such as the Civil Engineering Department of Addis Ababa University, and the Ethiopian Roads Authority



## Collaborative Researches ... cont.

Most recently this research has focused on problems arising around slope stability, slope failure prevention and geotechnical investigation. Projects recently undertaken include:

- Study of the land slip problem at Km. 369 of Tarmaber - Combolcha road

- **Funding:** *Government of Ethiopia*

- **Research Partners:** *Department of Civil Engineering, Addis Ababa University*

- **Status:** *Complete*



## Collaborative Researches ... cont.

- Study of Rock fall, Unstable slopes and Landslips at various locations along Tarmaber - Combolcha Road.
  - **Funding:** Government of Ethiopia
  - **Research Partners:** AAU, Department of Civil Engineering,
  - **Status:** Complete
  
- Desk study and Surface Investigation of the Landslide Problem that has occurred along Asebe Teferi - Kulubi Road.
  - **Funding:** Government of Ethiopia
  - **Research Partners:** Department of Civil Engineering, Addis Ababa University
  - **Status:** Complete

## 3.2 International Collaborative Research

ERA has been conducting Research programs in collaboration with TRL. The most recent programs include

- Performance Criteria and Life Cycle Costing for Low Volume and Labor Based Unpaved Road.
- **Funding:** Government of Ethiopia, DFID (UK)
- **Research Partners:** Transport Research Laboratory; Regional Road Authorities
- **Status:** Completed



## International Collaborative Research ... cont.

- Improving the Performance of Limestone Wearing Course and Low – Cost Surfacing, Southern Region.
  - **Funding:** Government of Ethiopia, DFID
  - **Research Partners:** TRL; Southern Rural Roads Authority
  - **Status:** On-going



## 4. National Road Research Programs

- 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

## National Road Research Programs ... cont.

### 4.1 Research on Labor-based Road Construction

Sections of road were constructed near to the ERA Training Centre at Chancho to evaluate the effectiveness of using

- Different design methods,
- Materials and compaction technologies that would typically be used for labor-based road construction and maintenance and
- Also to investigate the possibilities of better utilizing available materials in unpaved roads



## National Road Research Programs ... cont.

- Projects recently undertaken include
  - Use of Locally Available Marginal Gravel Wearing Course Material as Pavement Surfacing
  - Determination of Maximum Aggregate Size in Relation to the Selected Compaction Technology
  - Practical Demonstration of Road Construction on Expansive Soil Sub grade



## 4.2 Research on Proprietary Stabilization Products and Dust Palliatives

- The use of lime, cement and bitumen along with mechanical stabilization and blending are traditional, accepted and proven approaches in the road engineering
- Other “chemical additives” are marketed internationally as soil compaction aids and stabilizers

## National Road Research Programs ... cont.

- Many of the marketers of these products claim that their product is a “cure for all problems” and Ethiopia like many African countries is subjected to the “hard sell” on these products.
- ERA’s Research & development has established a set of procedures for the acceptance of these products. The procedure involves research on the performance and environmental impact of these products.

## National Road Research Programs ... cont.

- Current evaluation of such products include
  - CON-AID Chemical,
  - Dallas Roadways Product,
  - PURE CRETE and
  - TerraZyme



## 5. Future Researches

- The Research and Development Directorate of Ethiopian Roads Authority has plans of future research works. This planned portfolio of research includes;
  - National Slope Management and Protection System
  - National Construction Material Database
  - Remote Sensing Data for Road Planning, Preliminary Engineering and Environmental Assessment
  - Comparison of the performance and life cycle cost of cement concrete and asphalt road pavements

## **6. The way forward**

### **6.1 Establishment of Road Research Center**

Aim is to provide quality research services to the road industry in Ethiopia

- The premises for the center is already identified
- Fund for the preparation work has been secured (WB, ADB)
- Services for the establishment of the center is under procurement process (Technical evaluation)



## The way forward ... cont.

- The core operation of the research center will be conducting and mainstreaming research and advances in;
  - Road design
  - Road construction and maintenance,
  - Road network management and safe road operation
- In general the Research Center will assist road organizations in Ethiopia with aspect of technology development and transfer and their implementation in to practice,



## 6.2 Establishment of Landslide Task Unit (LTU)

- This unit is formed For the identification and study of the landslide problems in Ethiopia.
- The unit is currently involved in the study of landslide problems in the Abay Gorge
- Also provides technical support for ERA's Regional directorates and other road authorities in the country

## 6.3 Establishment of Transport Knowledge and Information Centre in Ethiopia

- With the support of AFCAP ERA to establish a Knowledge and Information Centre to facilitate the uptake of national, regional and international best practices and new technologies.
- The short-term objective is to establish the centre with an initial focus on the roads sector but with a longer term vision to expand and mainstream activities across the whole transport sector in Ethiopia

## **6.3 Research Coordination**

- Research steering committee has been established for the coordination of the growing research program
- The committee oversees the planning and implementation of all road related research works



## The way forward ... cont.

- The committee is chaired by ERA's Director General and is composed members from;
  - Regional and Rural Roads Authorities;
  - Addis Ababa City Roads Authority;
  - the Road Fund;
  - Contractors and Consultants Associations,
  - Universities;
  - Training Schools

**Thank You**