TRL/ANE Research – RRIP&AFCAP
Developing Mozambique Guideline/Manual through Research & Development
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Introduction

- Specifications and standards are a product of research
- It is important to carry out local research with local materials and for local environment
- Foreign specifications should be adapted to local situations
- Documentation should be adequate yet concise and comprehensible
Background

- Current documentation is a manual (Normas de Execução) – a translation of the SATCC specification into Portuguese

- Mozambique has poor road building materials e.g. problematic coastal sands cover vast areas

- Majority of roads are low volume

- AFCAP research has provided an opportunity to develop specifications and work norms through research
Draft Guideline on specifications and Work Norms for LVR chapters

- **Planning** – provides road map to successful delivery
- **Road evaluation** – focus on in-situ strength
- **Geometric design** – follow existing alignment as much as possible
- **Drainage design** – focus on subsurface drainage
- **Materials, pavement design and work norms** – focus on minimising costs through efficient designs and QA
- **Design of surfacing and work norms** – choice of surfacing options and QA
Illustration of subsurface drainage design
Pilot projects under RRIP and AFCAP

- Phase 1: 10 projects - completed
- Phase 2: 13 projects - ongoing and some completed and 1 project abandoned and 6 singled out for detailed research
- Phase 3: 10 projects ongoing and 5 earmarked for detailed research
- Total length of test sections > 40km
- Scope of project: planning, design, construction, monitoring, analysis, documentation
Research options

- Blending of materials e.g. white sand with clay, red sand with plastic calcrete
- Emulsion treated sand bases
- Untreated sand bases
- Reprocessing existing wearing course for road base
- 150mm and 100mm imported base
- Armoured sand bases
Research options – (cont)

- Concrete slabs with design variations and hand packed stone with strong concrete screed on ramps
- Cape seal and single surface dressing by LB methods and machine based with crushed and natural aggregate
- Otta seal with variations in nominal maximum size of aggregate 19mm, 13mm and 9mm) using quartzite and calcrete
- Slurry seal 15mm on ETB and untreated red sand base, ETB, and armoured sand bases
Research options – (cont)

- Sand seal on armoured sand base, blended base, etc.
- Sand seal on untreated red sand, normal gravel
- Penetration macadam with natural aggregate on untreated sand base
- Brick and cobble stone paving
- etc
Inhacufera Machaze Road-Otta seal
Zero Mopeia Road – Otta seal
Xitaxi Moeda Road – Concrete slabs
Cumbana Chacane Road – Blending
Cumbana Chacane Road – calcrete Otta seal
Towards final Guideline/Manual for LVR

- Unpaved roads – incorporate results of the Engineering Standards Project in Mozambique completed in 2006

- LVSR – RRIP/AFCAP research
  - Monitoring of test sections (Equipment procured through AFCAP and ANE)
  - Time limited for monitoring but ANE will continue monitoring beyond the project

- Preparation of specifications and work norms

- Final Guideline/Manual (ANE decision)
Conclusion: QA Question

- Which field compaction test result shows the best compaction and why? (Specification for minimum compaction of base is 95%)

- A. 87%, 91%, 95%, 96%, 100%, 110%  
  Avg=96.5%

- B. 95%, 98%, 113%, 120%, 125%, 127%  
  Avg=113%

- C. 94%, 95%, 95% 97%, 98%, 98%  
  Avg=96.1%
Thank you
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