

FIDIC-GAMA 2017



Conference on Infrastructure

7 - 10 May | Cape Town | South Africa

African Partnerships for Sustainable Growth

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The sustainability of unsealed roads surfaced with marginal gravels: Tanzania case study

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Introduction

- Sustainability simply put is meeting the needs of both present and future generations.
- Unsealed roads have proved to be sustainable due to their long history as a medium of local transport throughout the history of mankind.
- Marginal gravel materials can be employed as unsealed roads surfacing materials despite their inherited problems such as extreme variation in Atterberg limits and grading.
- Appropriate management of unsealed roads can ensure those elements affecting its sustainability are minimized further to be environment friendly



Unsealed roads deterioration

- Deterioration of unsealed roads pavements is effected by its being on earth where almost everything except diamond deteriorate with time.
- Their deterioration is associated with the interaction over time of its surfacing material with traffic loads and climate.
- Its deterioration is further accelerated with poor unsealed road management or inadequate maintenance budget
- The rate of deterioration is determined by factors associated with road design, construction, maintenance, traffic, and environment in which it operates



Performance Survey

- The occurrence of unsealed road distress will depend on
 - a) Initial unsealed road condition after construction,
 - b) The characteristics of marginal gravel materials employed as surfacing materials,
 - c) The manner in which it has been maintained,
 - d) The type and volume of traffic, and
 - e) The environment
- All the above can be determined by performance survey conducted periodically throughout its design life



Performance Survey...

- Unsealed road performance survey intends to identify, capture and arrest the deterioration trend of unsealed road distress during its design life through proper management.
- Two method of performance survey may be applied, namely
 - a) All unsealed roads in a region are surveyed, and
 - b) Samples of unsealed roads covering expected varying performance in the region are surveyed.
- The study used the second approach.



Performance Survey

During the study of unsealed road performance survey

- Four unsealed roads in Iringa region , Tanzania were selected for conducting the study,
- These roads were selected due to their proximity to study centre,
- Eight sections , each of 300 m length with expected performance differences were selected



Results of the Performance Survey of Unsealed roads under study

- Materials characteristics in terms of grading analysis, Atterberg limits , shrinkage product and grading coefficient were noted.
- Climate and terrain in which each section falls , and the prevalent distress were also given.
- The sections suffered fast changing surface condition due to the high traffic volume and lack of timely and appropriate maintenance.
- Distress noted on the sections were due to poor control of gravelling materials and inadequate compaction



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Conclusion and Recommendation

- Performance survey is paramount in ensuring the sustainability of unsealed roads surfaced with marginal gravel materials.
- An ideal grading envelope for marginal materials should be wider at the fine side and thinner at the coarser side due to big variation of the materials on the finer part and a relative uniformity on the coarser part.
- The study noted that despite not meeting the conventional standards the marginal gravel materials performed relatively well with appropriate management.

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Thank you for attending.



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