

DEVELOPMENT OF MAINTENANCE MANAGEMENT MODEL OF THE DETERIORATING KITONGA GORGE CONCRETE PAVEMENT TO ENHANCE SUSTAINABILITY OF ROAD SECTION.

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ABSTRACT

The Kitonga Gorge concrete pavement sections is 7.64 km and is located 440 km West of Dar es Salaam and 60 km East of Iringa Town on Tanzania Highway. The road section is facing deterioration problem 12 years after its rehabilitation in 2004. TANROADS, an agency responsible for maintenance management of the road section has prioritized maintenance on the road section, however, the implemented practice seems not to offer long term solution to the deterioration problem. The main objective of the research was to develop the Maintenance Management Model of the deteriorating concrete pavement section to enhance its sustainability.

The research had three specific objectives namely, to identify factors leading to pavement deterioration on the road section; to assess the current maintenance management practice used to maintain pavement on the road section; and finally, to develop maintenance management model of the pavement for sustainability of the road section.

To accomplish the specified objectives, the researcher conducted a comprehensive literature review, collected data through structured questionnaire, interviewed specific people, collected historical data from the available database, and collected actual field data. Factors for pavement deterioration and other common pavement distresses and their causes were reviewed. An overview of the various of deterioration models were also studied including their advantages and disadvantages.

From the study findings, the deterministic pavement deterioration prediction model was developed based on pavement historical data from 2010 to 2016. The input variables of the model were the pavement age in years since major rehabilitation in 2004, traffic loading in tons/year, rainfall intensity in mm/year. Average air temperature in degree Celsius and Maintenance effort applied in every year to maintain pavement on the road section. The developed model was tested using data for 2005, 2007, and 2009, and found can predict the deterioration of pavement up to 94.8% accuracy.

The maintenance management model was developed based on local condition of Iringa. It is therefore recommended that; the model can only be used for management of concrete pavement roads with local conditions similar to that of Iringa.

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