



**COMPARISON OF THREE PERFORMANCE PREDICTION METHODS FOR
BITUMINOUS ROAD INFRASTRUCTURE**

**BY
PATRICK ETOKO
B. ENG. CIVIL (KYU), PGD (GU), ODC (UTC - LIRA)**

**A research report submitted to the College of Business and Management Sciences
in partial fulfillment of the requirements for the award of a Degree of
Master of Public Infrastructure Management of
Makerere University**

SEPTEMBER 2015

Abstract

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 pavements 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 measurements 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 for 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.