
Development of a Methodology for Optimization and Prioritization of Pavement Maintenance for Provincial Road Networks

H D S Gunasomma¹, H.R. Pasindu²

Abstract

Pavement management system is a decision support system that is used by road development agencies to maintain its road networks, extending their useful life within the available budget and resource constraints. The methodology of selecting maintenance strategies for authorities is an integral component of the pavement management system. Most current systems cannot be customized to reflect the local conditions with resources available and required extensive data collection and calibration, which are not sustainable for those authorities, especially in developing countries. Thus, the identification of new approaches, which have been addresses the issues in implementing a pavement management system in developing countries such as Sri Lanka, is a major requirement.

This paper proposes a methodology adopting optimization and prioritization models to be used by local provincial road agencies, which assist the decision making for selecting roads for pavement maintenance.

The study is focused on the existing pavement management systems, their components, institutional characteristics and their methodology to identify the main constraints that affect the pavement maintenance planning and for the formulation of the maintenance strategy in the provincial road agencies. Main constraints and priority factors were identified by the opinion survey from the Engineers of provincial road agencies. Based on the opinion survey five main priority factors were finalized namely Pavement condition, traffic volume, Connections to existing roads, Land use pattern and Importance to the community. The optimization model was developed to maximize the network performance while considering the budget constraints. The Priority index that is computed for different roads is incorporated into the optimization model. The proposed procedure presents an integrated prioritization and optimization approach applying Analytical Hierarchy Process (AHP) and linear programming.

Keywords: Optimization, Prioritization, Pavement Management

1. Post Graduate Student, Department of Civil Engineering, University of Moratuwa, Sri Lanka, dgunasoma@gmail.com
2. Senior Lecturer, Transportation Engineering Division, Department of Civil Engineering, University of Moratuwa, pasindu@uom.lk