Michigan State University

Ph.D. Dissertation Defense

Development of an Enhanced Pavement Condition Score for Michigan

By

Muntahin Hasnat

Advisor: Dr. Mohammed Emran Kutay

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Abstract

The Michigan Department of Transportation (MDOT) has been using the Distress Index (DI) since the inception of its pavement management system (PMS). In the early 1990s, DI was developed to help MDOT engineers in their decision-making process, budget allocation, and prioritization for future maintenance or reconstruction activities. However, the raw data requirements for the DI are complicated, and somewhat unique compared to the rest of the nation, and MDOT has been having difficulty in finding vendors to collect PMS data. Over the last three decades, the pavement industry has seen many advances in data collection, distress identification, performance modeling, and other processes fundamental to PMSs. Consequently, there is a need to revisit the DI used by MDOT and revise it according to modern pavement data collection standards and calculation methodology. The objective of this study was to develop an enhanced pavement condition score and associated PMS data collection methodology for use by MDOT. To meet this objective, 2081 flexible and 741 rigid pavement sections were selected from MDOT’s performance database. Then, five different condition indices used by other state agencies were computed using the MDOT’s PMS data and compared them against MDOT’s Distress index (DI). The results were presented through statistical analysis and scatter plots. Maintenance records were used to compare the magnitudes of different indices right before maintenance activities were performed. The new pavement condition parameter was selected to follow the current state of the practice in its rating scale and consider major distresses. The developed new condition parameter is backward compatible using MDOT’s historical pavement management data. Moreover, while developing the new pavement condition index, important criteria such as policy sensitivity, ease of understanding, usefulness in decision-making were considered. Furthermore, various performance models were used to predict the new condition index and International Roughness Index (IRI) data and pavement fix lives were estimated for both asphalt and rigid pavements.