

Jordan University of Science and Technology

An overview of pavement degradation prediction models

Authors: Amir Shtayat, Sara Moridpour, Berthold Best, Shahriar Rumi

Abstract: Pavement management systems (PMSs) have a primary role in determining pavement condition monitoring and maintenance strategies. Moreover, many researchers have focused on pavement condition evaluation tools, starting with data collection, followed by processing, analyzing, and ultimately reaching practical conclusions regarding pavement condition. The analysis step is considered an essential part of the pavement condition evaluation process, as it focuses on the tools used to find the most accurate results. On the other hand, prediction models are important tools used in pavement condition evaluation to determine the current and future performance of the road pavement. Therefore, pavement condition prediction has an effective and significant role in identifying the appropriate maintenance techniques and treatment processes. Moreover, pavement performance indices are commonly used as key indicators to describe the condition of pavement surfaces and the level of pavement degradation. This paper systematically summarizes the existing performance prediction models conducted to predict the condition of asphalt pavement degradation using pavement condition indexes (PCI) and the international roughness index (IRI). These performance indices are commonly used in pavement monitoring to accurately evaluate the health status of pavement. The paper also identifies and summarizes the most influencing parameters in road pavement condition prediction models and presents the strength and weaknesses of each prediction model. The findings show that most previous studies preferred machine learning approaches and artificial neural networks forecasting and estimating the road pavement conditions because of their ability to deal with massive data, their higher accuracy, and them being worthwhile in solving time-series problems.