A multi-input deterioration-prediction model for asphalt road networks

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A B S T R A C T

This paper presents an innovative network-level, multi-input deterioration-prediction model for flexible asphalt pavements specific to four climatic conditions (wet freeze, wet non-freeze, dry freeze and dry non-freeze) and for two classes of roads (high-capacity arterials and low- to medium-capacity collectors). The model considers the impact of climate, maintenance, construction, material properties, age, traffic and surface distress such as cracking. Condition data from the US long-term pavement performance database were used to determine changes of pavement condition index (PCI) over time and then utilized in a regression analysis. The prediction model showed good accuracy with a high determination coefficient. A sensitivity study showed that while the age of construction and traffic are largely responsible for pavement deterioration, the area and length of cracks appearing on the road surface can be effectively used in the prediction model. Maintenance has a positive impact on the model performance, showed in improvement of PCI. The model is simple and versatile and has the potential to be adopted in countries with similar climate and traffic conditions.