

## **PAVEMENT MANAGEMENT: DATA CENTRIC RULES AND UNCERTAINTY MANAGEMENT IN SECTION CLASSIFICATION BY A FUZZY INFERENCE SYSTEM**

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### *ABSTRACT*

Pavement section classification is one of the key elements of the decision-making process in a pavement management system. It helps to monitor the pavement conditions and assists in the optimization of maintenance and rehabilitation requirements. This paper presents a fuzzy inference system (FIS), with appropriate membership functions, for section classifications and for calculating the Pavement Condition Index (PCI). The FIS is a powerful tool to deal with the uncertainty and subjectivity involved in section classification. The input data of FIS were obtained from the Long-Term Pavement Performance (LTPP) database. The severity and extent of seven distress types, namely alligator cracking, block cracking, longitudinal and transverse cracking, patching, potholes, bleeding, and raveling, were used for fuzzy membership function and rule generation. The output fuzzified PCI was compared with the PCI calculated by Micro-PAVER. The result shows a correlation of approximately 76% between the two methods. A sensitivity analysis was carried out to evaluate the effect of each distress type on the classification model. It was found that within the tested sections, a pavement crack has the greatest influence on section classification compared to the other distress types.