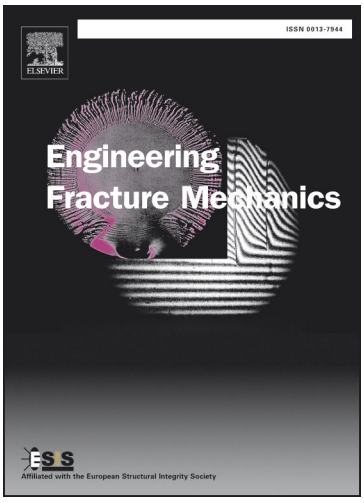

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Micromechanical Modeling of Asphalt Concrete I-FIT Specimens

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Abstract

Analytical and numerical micromechanical models have been previously used to understand fracture behavior of heterogeneous materials like Portland cement concrete or asphalt concrete (AC). In this study, the behavior of asphalt concrete was studied during a semi-circular bending (SCB) fracture test, Illinois Flexibility Index Test (I-FIT), using micromechanical level finite element models. The models were validated in multiple steps using the strain fields calculated with the digital image correlation (DIC) technique as well as the global scale forces measured in the same experiment. The micromechanical model was developed to evaluate the effects of microstructural features such as aggregate gradation, aggregate distribution, and void space on fracture behavior of AC. The model focused on pre-peak behavior and assumed that AC consists of aggregates and mortar. Aggregates were considered linear elastic with material constants reported in the literature, while the mortar was considered linear viscoelastic. Mortar was defined as the combination of binder, air voids, and material passing 2.36 mm sieve. Mixture theory was utilized to

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