Simplifying the Double-Edge-Notched Tension (DENT) Test

Liquid asphalt is a strong binding and waterproofing agent. Asphalt is mixed with sand and rocks (aggregates); the mixture is referred to as asphalt concrete, and is used to construct pavements. Fatigue cracking is one of the most common failure mechanisms in asphalt pavements. Researchers have proposed numerous tools to evaluate materials prone to fatigue cracking. The Double-edge-notched Tension (DENT) test was developed to evaluate asphalt binder resistance to ductile failure at intermediate temperatures (15 to 25°C). The DENT test is based on fundamental non-linear fracture mechanics theory. It was first developed by Andriescu et al. (Transportation Research Record, 2004) and the test results correlated well with cracking performance in the field. However, many stakeholders in the industry have concerns with the test's applicability, variability, sample preparation time, and sample size. Thus, further research efforts are needed to enhance and streamline the DENT test. DENT testing was conducted on a relatively large number of binder types at the Federal Highway Administration (FHWA) Turner-Fairbank Highway Research Center (TFHRC). Working with FHWA, the research team will consult the literature and utilize this dataset to propose ideas to simplify the testing procedure. Additional experimental work to validate the simplified procedure will be conducted in the second phase of the project.

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