

EXPERIMENTAL EVALUATION OF CRACK PROPAGATION IN ASPHALT MIXTURE BASED ON PHOTOELASTICITY

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ABSTRACT

In this paper the deformation and crack propagation on the surface of asphalt mixture is investigated based on photoelasticity technique. The effectiveness of the photoelasticity measurements is evaluated with an experimental plan which includes six asphalt mixtures commonly used in Germany together with monotonic and fatigue tests on notched semi-circular bending specimens, under constant strain rate and cyclic loading, respectively. A digital camera capable of acquiring 30 images per second is used to record the deformation with different frame rates for monotonic and fatigue tests. During monotonic testing, minimal deformation on the specimen surface could be detected as load increased, while cracking occurred suddenly at peak load. A similar trend could be observed over a longer time for fatigue tests. Cracking occurred nearly at the end of the tests and needed an additional number of load cycles to reach complete failure.