

Accepted Manuscript

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PII: S0142-1123(15)00272-8

DOI: <http://dx.doi.org/10.1016/j.ijfatigue.2015.08.020>

Reference: JIJF 3696

To appear in: *International Journal of Fatigue*

Received Date: 29 January 2015

Revised Date: 17 August 2015

Accepted Date: 23 August 2015



Please cite this article as: Shane Underwood, B., A Continuum Damage Model for Asphalt Cement and Asphalt Mastic Fatigue, *International Journal of Fatigue* (2015), doi: <http://dx.doi.org/10.1016/j.ijfatigue.2015.08.020>

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A Continuum Damage Model for Asphalt Cement and Asphalt Mastic FatigueB. Shane Underwood^a, Ph.D.

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Abstract

An analytical model is developed for the mechanical degradation of asphalt cement and mastic under repeated loading. The model is derived by applying the strain decomposition principle to consider linear viscoelastic, nonlinear viscoelastic, and damage mechanisms. The experimental processes to isolate the behaviors and the analytical functions used to model each are described. It is found that the Schapery type damage approach is capable of modeling the fatigue process of these materials once appropriate consideration is taken for their nonlinear viscoelastic responses. Fatigue in asphalt mastics is also found to occur due to physical damage occurring in the asphalt cement.

Keywords

Continuum damage
Nonlinear viscoelastic
Asphalt cement
Asphalt mastic
Fatigue

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