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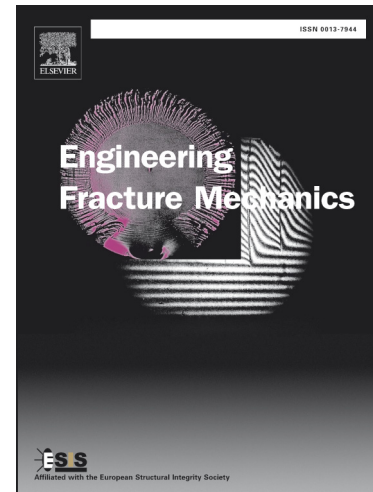
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Investigating the effect of aircraft impact loading on the longitudinal top-down crack propagation parameters in asphalt runway pavement using fracture mechanics

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Abstract

Effect of aircraft impact loading during landing time on the crack propagation parameters was investigated. Boeing 777-300 aircraft specifications were considered. In order to simulate loading condition and nonlinear unbound layers characteristics, two codes were implemented by subroutines of ABAQUSTM software. The model was validated by American national airport pavement testing facility data. The effect of aircraft vertical velocity, pavement friction coefficient, crack position, crack depth and asphalt elastic modulus was studied. Aircraft vertical velocity and asphalt elastic modulus were recognized as the most significant parameters. Increase of these parameters considerably increased the stress intensity factors and reduced fatigue life.

Keywords: Crack propagation; Top-down crack; Fracture mechanics; Stress intensity factor; Aircraft impact load

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