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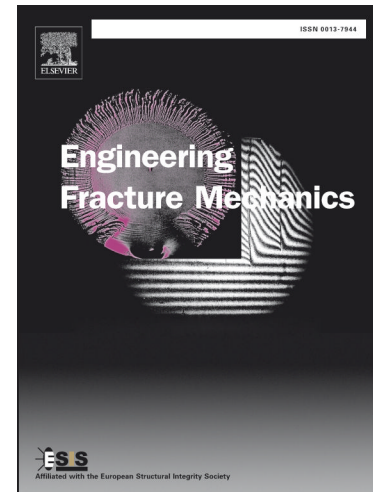
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Accurate Analytical Structural Stress and Stress Intensity Factor Solutions for Similar and Dissimilar Spot Welds in Lap-Shear Specimens

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Abstract

New analytical closed-form structural stress solutions for a rigid inclusion in a finite square thin plate under counter bending, central bending, in-plane shear and tension are developed. The new solutions are used to derive new analytical structural stress and stress intensity factor solutions for similar and dissimilar spot welds in lap-shear specimens. The new analytical solutions can predict the stress intensity factor solutions for similar and dissimilar magnesium/steel spot welds in lap-shear specimens of equal thickness under pinned loading conditions with less than 6% differences when compared with the results of three-dimensional finite element analyses.

Keywords: rigid inclusion; spot weld; structural stress; stress intensity factor; lap-shear specimen

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