High-contrast inclusions in generalized out-of-plane problem

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Abstract

The rigid inclusion model predicting a singular stress field in an elastic plate, is validated for the first time via photoelastic experiments under mode I [1]. Results show that the stress concentrations near corners of stiff inclusions can reach very high values leading to catastrophic failure of structural components. In particular, for the case of rhombohedral rigid inclusion, it is experimentally observed a stress magnification factor 5.3.

Stiffener Neutrality under Mode II

Theoretical singularities at the tip of the rigid wedge (left, under plane strain) and of the notch (right) under Mode I, respectively. Further F(θ) represents the shape of regular polygons.

Notch Stress Intensity Factor under Mode III

K<sub>Ⅲ</sub>(n) and K<sub>Ⅲ</sub><sup>∞</sup>(n) are notch stress intensity factor for void and stiff inclusions, respectively. Further Ω(β) represents the shape of rhomboid type polygons.

The stress intensity near a stiffener disclosed

Stiffener and Crack Neutrality under Mode III

REFERENCES


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