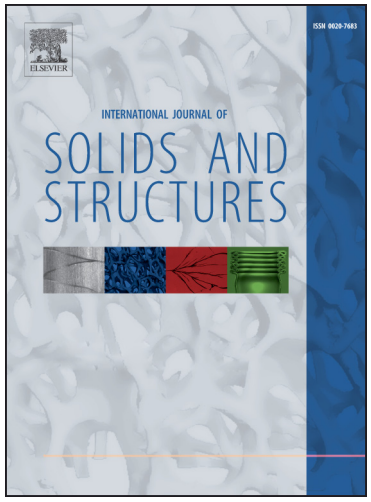

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Stress concentration around a nanovoid near the surface of an elastic half-space

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Abstract

Stress concentrations typically occur near discontinuities in structural elements and are often responsible for crack initiation. The aim of this study is to assess the stress concentration effects in the vicinity of a nanovoid located near a free surface. A semi-analytical investigation was carried out using the method of displacement potentials and coherent surface models. We investigated the dependence of stress concentration on a few important parameters like surface properties, external loads, bulk properties, as well as void size and location. Our analysis highlighted a few possible combinations of governing parameters that can reduce, prevent, and even reverse stress concentrations in nanoporous media.

Keywords: Stress concentration, nanovoid, half-space, displacement potentials method

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