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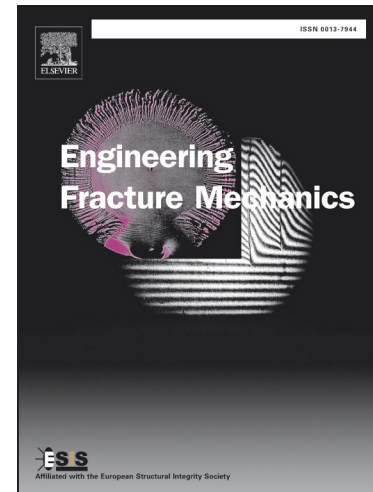
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A coupled peridynamic strength and fracture criterion for open-hole failure analysis of plates under tensile load

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Abstract: A coupled peridynamic model combining both strength and fracture energy conditions is proposed for open-hole failure analysis of plates under tensile load. In this model, both the tensile strength (σ_c) and critical energy release rate (G_c) are considered to predict failure behavior of holed plates in tension, from which a coupled peridynamic criterion (CPC) is established. The coupled model is utilized to analyze the stress distributions and failure history of holed plates and validated with the analytical and experimental data in literature. The new CPC is capable of predicting the whole open-hole failure process of plates, from the intact phase to the crack initiation and propagation, and it can quantitatively capture both the notched strength and fracture energy of holed plates.

Keywords: peridynamics; coupled failure criterion; holed plates; notched strength; fracture energy.

1. Introduction

The holes or cutouts are unavoidable in construction of structures with connections, and

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