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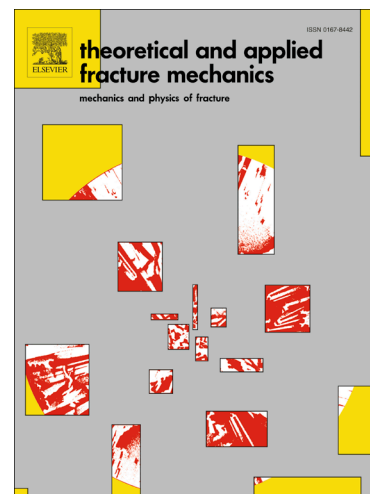
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Tensile failure prediction of U-notched plates under moderate-scale and large-scale yielding regimes

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Abstract

The main goal of the present research is to check if the recently published experimental results on tensile load-carrying capacity (LCC) of ductile U-notched Al 7075-T6 and Al 6061-T6 plates could successfully be predicted by means of combining the Equivalent Material Concept (EMC) with the Averaged Strain Energy Density (ASED) criterion, which is fundamentally a brittle fracture criterion. By using the two main material properties, namely the fracture toughness and the tensile strength of the equivalent material, which is extracted from the EMC, the maximum load that each notched plate could sustain is predicted by means of the combined EMC-ASED criterion. It is revealed that the EMC-ASED criterion is capable of predicting well the LCC of both aluminum plates, independent of the level of ductility of materials and the size of plastic region around the notch at crack initiation instance.

Keywords: Averaged Strain Energy Density (ASED); Ductile failure; Equivalent Material Concept (EMC); Large-scale yielding (LSY); Moderate-scale yielding (MSY); U-notch.

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