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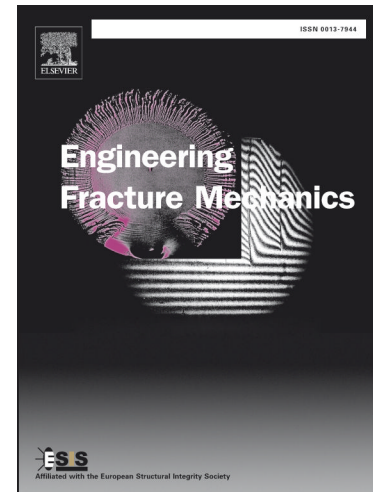
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Cohesive Crack Analysis of Size Effect for Samples with Blunt Notches and Generalized Size Effect Curve for Quasi-Brittle Materials

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Abstract

This paper deals with the study of size effect on structural strength for quasi-brittle materials under mode I fracture conditions. By using a linear cohesive crack model, accurate numerical simulations were performed to compute the size effect curves for two test configurations – namely, the three-point bending test with span-to-depth ratio equal to 3 and the center crack panel test – featuring sharp notches and blunt notches whose width is also scaled with the specimen dimension.

The analysis of the results shows that, as the specimen size tends to infinity, the asymptotic behavior depends on the type of notch. For sharp notches the size effect curve tends asymptotically to Bažant's Size Effect Law. On the contrary, for blunt notches the size effect curve tends to a horizontal asymptote corresponding to the elastic limit. The elastic limit can be calculated by the tensile strength reduced by the stress concentration factor at the tip of the blunt notch and it depends on the geometry of the specimen.

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