

عنوان مقاله:

Fracture Parameters for Cracked Cylindrical Shells

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خلاصه مقاله:

In this paper, 2D boundary element stress analysis is carried out to obtain the T-stress for multiple internal edge cracks in thick-walled cylinders for a wide range of cylinder radius ratios and relative crack depth. The T-stress, together with the stress intensity factor K, provides a more reliable two-parameter prediction of fracture in linear elastic fracture mechanics. T-stress weight functions are then derived from the T-stress solutions for two reference load conditions corresponding to the cases when the cracked cylinder is subject to a uniform and to a linear applied stress variation on the crack faces. The derived weight functions are then verified for several non-linear load conditions. Using the BEM results as reference T-stress solutions; the T-stress weight functions for thick-walled cylinder have also been derived. Excellent agreements between the BEM results and weight function predictions are obtained. The weight functions derived are suitable for obtaining T-stress solutions for the corresponding cracked thick-walled cylinder under any complex stress fields. Results of the study show that the two dimensional BEM analysis, together with weight function method, can be used to provide a quick and accurate estimate of T-stress for 2-D crack problems.

کلمات کلیدی:

Fracture mechanics, T-stress, Contour integral approach, Thick-walled cylinders, Boundary element method

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