

عنوان مقاله:

Reliability Analysis of Notched Plates under Anisotropic Damage Based on Uniaxial Loading Using Continuum Damage Mechanics Approach

محل انتشار:

ماهنامه بین المللی مهندسی، دوره 34، شماره 1 (سال: 1400)

تعداد صفحات اصل مقاله: 10

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خلاصه مقاله:

Extensive recent researches have been underway to model the fracture mechanics degradation based on continuum damage mechanics (CDM) technique. CDM theory is a powerful tool for solving problems such as large plastic deformations that the fracture mechanics is unable to solve. This model is derived by means of the thermodynamics internal variable theory and based on the experimental results on material properties. In this paper, the reliability of rectangular plates containing a central circular hole under static tensile load using the CDM approach for ductile fracture has been studied. To investigate the initiation and evolution of damages, anisotropic damage expressed by second order damage tensor is used to derive constitutive equations. Then, these relationships together with material constants are implemented with subroutine in ABAQUS software. The reliability assessment has been investigated using first order reliability method (FORM) and second order reliability method (SORM). Based on the FORM and SORM, the limit state functions and random variables have been obtained according to the energy density release rate. The probability of failure of each plate with different hole sizes is estimated based on the anisotropic damage theory, and the results are compared with the isotropic damage model. Finally, the sensitivity analysis of the coefficient of variation is performed.

کلمات کلیدی:

Anisotropic Damage, Continuous Damage Mechanics, Energy Density Release Rate, First order reliability method, Second-Order Reliability Method

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