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Calculation of Stress Intensity Factors in Rotating Disks Containing 3D Semi-Elliptical Cracks

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Abstract : Initiation and propagation of cracks may cause catastrophic failures in rotating disks, and hence determination of fracture parameter in rotating disks under the different working condition is very important issue. In this paper, a comprehensive study of stress intensity factors in rotating disks containing 3D semi-elliptical cracks under the different working condition is investigated. In this regard, after verification of modeling and analytical procedure, the effects of mechanical properties, rotational velocity, and orientation of cracks on Stress Intensity Factors (SIF) in rotating disks under centrifugal loading are investigated. Also, the effects of using composite patch in reduction of SIF in rotating disks are studied. By that way, the effects of patching design variables like mechanical properties, thickness, and ply angle are investigated individually.

Keywords : stress intensity factor, semi-elliptical crack, rotating disk, finite element analysis (FEA)
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