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# Mixed Mode Fracture Analyses Using Finite Element Method of Edge Cracked Heavy Spinning Annulus Pulley

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**Abstract :** Rotating disk is one of the most indispensable parts of a rotating machine. Rotating disk has found many applications in the diverging field of science and technology. In this paper, we have taken into consideration the problem of a heavy spinning disk mounted on a rotor system acted upon by boundary traction. Finite element modelling is used at various loading condition to determine the mixed mode stress intensity factors. The effect of combined shear and normal traction on the boundary is incorporated in the analysis under the action of gravity. The variation near the crack tip is characterized in terms of the stress intensity factor (SIF) with an aim to find the SIF for a wide range of parameters. The results of the finite element analyses carried out on the compressed disk of a belt pulley arrangement using fracture mechanics concepts are shown. A total of hundred cases of the problem are solved for each of the variations in loading arc parameter and crack orientation using finite element models of the disc under compression. All models were prepared and analyzed for the uncracked disk, disk with a single crack at different orientation emanating from shaft hole as well as for a disc with pair of cracks emerging from the same center hole. Curves are plotted for various loading conditions. Finally, crack propagation paths are determined using kink angle concepts.

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