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FINITE ELEMENT ANALYSIS OF A STIFFENED PANNEL WITH TWO BAY CRACK UNDER UNIAXIAL LOADING

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ABSTRACT:-This work has relevance to the fail-safe design of the pressure cabin of a wide-bodied transport aircraft. The pressure cabin is designed to arrest a fast fracturing crack of two-bay length under the application of a limit load during flight. In this work investigation of the fail-safe feature in a flat stiffened panel in the presence of two-bay crack is carried out. Internal pressurization is one of the critical load cases considered in the fuselage design. Internal pressurization introduces both hoop stress and longitudinal stresses in the structure. The objective of this work is to investigate crack initiation, crack growth, evaluation of stress intensity factor at the crack tip and crack arrest features in the stiffened panel under uni-axial stress field. The longitudinal crack is initiated from the rivet hole and stress intensity factor is calculated using modified virtual crack closure integral (MVCCI) method at each stage of crack propagation.

The stress intensity factor is calculated by damage tolerance analysis for uniaxial stress field and which compared with the fracture toughness of the material. The crack is arrested within two-bay crack length.

Keywords—Fail-safe design, Crack initiation, stress intensity factor, FEA.

DESIGN AND ANALYSIS OF FLYWHEEL FOR DIFFERENT GEOMETRY AND FOR DIFFERENT MATERIAL

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ABSTRACT:-Flywheel is a device used to store energy and utilize it whenever required. Generally, flywheels used in different applications are of circular disc and are designed with respect to their yield strength. Existing flywheel have limitations on rotational speed and kinetic energy storage. Hence, in this paper we attempt to analyze the rotational speed of flywheel by changing its cross sectional geometry and materials. We have analyzed the flywheel for two different materials viz. High Strength Steel and Graphene.

Finite element analysis is carried out for different materials and different cross sectional geometry to obtain maximum rotational speed and kinetic energy storage by using ANSYS software.

Keywords— Flywheel, High Strength Steel, Graphene.

