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FINITE ELEMENT ANALYSIS OF A COMPOSITE ROCKET MOTOR CASING FOR BUCKLING AND STATIC FAILURE

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Abstract

Rocket motor casings are used to carry solid propellant in space applications like Missiles and Satellites. Since this is a weight critical application, major portion of the casing is made of fiber reinforced composite materials. Helical winding of fibers in making the composite casing results in complex response of the structure due to the loads applied for testing and/or during operation. Many of the researchers worked on composite pressure vessels, analyzed the structure behaviour based on certain assumptions such as plane strain, axi-symmetric, shell type of cylindrical walls etc. In the present investigation, more realistic finite element simulation is carried out for assessing the buckling and axial compression behaviour of a composite rocket motor casing. The problem is modelled in ANSYS 12 software. It is observed that the cylinder is safe in strength point of view. Buckling factor in first mode is found to be 2.21 and hence the structure is safe in buckling point of view also.

Keywords: FEM, FRP, Composite cylinder, Buckling, Failure