

Buckling Analysis of Laminated Composite Plates with Central Holes

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Abstract : Laminated composite plates are made up of plates consisting of layers bonded together and made up of materials chemically different from each other but combined macroscopically. These have an application in aircrafts, railway coaches, bridges etc. because they are easy to handle, have got improved properties and the cost of their fabrication is low. But their failure can lead to catastrophic disasters. And generally, the failure of these structures is due to the combined effect of excessive stresses on it and buckling. Hence, the buckling behavior of these kinds of plates should be analyzed properly. Holes are provided either at the center or elsewhere in the laminar plates for the purpose of pipes for electric cables or other purposes. Due to the presence of holes in the plates, the stress concentration is near to the holes and the stiffness of the plates is reduced. In this study, the effect of a cut-out, its shape, different boundary conditions, length/thickness ratio, stacking sequence, and ply orientation has been studied. The analysis was carried out with laminated composite plates with circular, square and triangular cut-outs. Results show the effect of different cut-out shapes, boundary conditions, the orientation of layers and length/thickness ratio of the buckling load

Keywords : buckling, composite plates, cut-out, stress

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