

Effect of hybridization material on buckling analysis of composite plates on elastic foundation using new theory of trigonometric deformation

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Abstract. This paper presents the effect of hybridization material on variation of critical buckling load with different cross-ply laminates plate resting on elastic foundations of Winkler and Pasternak types subjected to combine uniaxial and biaxial loading by using two variable refined plate theories. Governing equations are derived from the principle of virtual displacement; the formulation is based on a new trigonometric shape function of displacement taking into account transverse shear deformation effects vary parabolically across the thickness satisfying shear stress free surface conditions. These equations are solved analytically using the Navier solution of a simply supported. The influence of the various parameters geometric and material, the thickness ratio, and the number of layers symmetric and antisymmetric hybrid laminates material has been investigated to find the critical buckling loads. The numerical results obtained through the present study with several examples are presented to verify and compared with other models with the ones available in the literature.

Keywords: Buckling; hybrid, Cross-ply laminates; Winkler and Pasternak; Elastic foundation; two variables plate theory.
