

Study of the Buckling of Sandwich Beams Consider Stretching Effect

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Abstract : In this work, an analytical approach using a refined theory of hyperbolic shear deformation of a beam was developed to study the buckling of graduated sandwiches beams under different boundary conditions. The effects of transverse shear strains and the transverse normal deformation are considered. The constituent materials of the beam are supposed gradually variable depending on the height direction based on a simple power distribution law in terms of the volume fractions of the constituents; the two materials with which we worked are metals and ceramics. The core layer is taken homogeneous and made of an isotropic material; while the banks layers consist of functionally graded materials with a homogeneous fraction compared to the middle layer. In the end, illustrative examples are presented to show the effects of changes in different parameters such as (material graduation, the stretching effect of the thickness, boundary conditions and thickness ratio-length) on the vibration free of an FGM sandwich beams.

Keywords : FGM materials, refined shear deformation theory, stretching effect, buckling

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