

Abstract

The objective of this research is to conduct a study on the effect of transverse shear on the mechanical behavior of beams in gradient material type property of FGM loaded in bending. The structures are considered beams material gradient type property P-FGM, this type of material which has continuously variable components of materials multi - phases in a predetermined profile and which is defined by the change in volume fractions power law through the thickness of the material.

The mechanical behavior of FGM beams is determined by the use of approaches based on mathematical formulation of the equilibrium equations and the development of simplified classical theory of beams. Research of the effect of changing the gradient property determines the evolution of resistance of FGM structures and their deformations and calculates normal and tangential stresses through the thickness of the material. To achieve these objectives, by applying the classical theory of Timoshenko beams to model the transverse shear strains suitable for the structures considered. Rely on the approach of Navier, a formulation development to be presented followed by a comparison of our results to theories with higher order to test the validation of this model.

Keywords: Transverse Shear, Mechanical behavior of beams in bending, FGM material