عنوان مقاله:

Bending, Buckling and Vibration of a Functionally Graded Porous Beam Using Finite Elements

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خلاصه مقاله:

This study presents the effect of porosity on mechanical behaviors of a power distribution functionally graded beam. The Euler-Bernoulli beam is assumed to describe the kinematic relations and constitutive equations. Because of technical problems, particle size shapes and micro-voids are created during the fabrication which should be taken into consideration. Two porosity models are proposed. The first one describes properties in the explicit form as linear functions of the porosity parameter. The second is a modified model which presents porosity and Young's modulus in an implicit form where the density is assumed as a function of the porosity parameter and Young's modulus as a ratio of mass with porosity to the mass without porosity. The modified proposed model is more applicable than the first model. The finite element model is developed to solve the problem by using the MATLAB software. Numerical results are presented to show the effects of porosity on mechanical behaviors of functionally graded beams

کلمات کلیدی:

Mechanical Behaviors; Porous material; Functionally graded material; Beam Analysis; Finite Element Method

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