

عنوان مقاله:

Elastic-Plastic Large Deformation of Functionally Graded Circular Plates Considering the Effect of Elastoplastic Material Behavior

محل انتشار:

بیست و یکمین همایش سالانه بین المللی مهندسی مکانیک (سال: 1392)

تعداد صفحات اصل مقاله: 6

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خلاصه مقاله:

Functionally Graded Materials are heterogeneous composite materials that consist of gradient compositional variation of the constituent materials. This continuous changes result in gradient material properties. Ceramic is light and has good heat resistance and metal has high strength, whereas FGM made by ceramic and metal can work at super high performance mechanical and thermal loading. This paper discusses a finite element solution of elastic-plastic stresses and deformations at the FGM plates subjected to lateral loads. A user material subroutine (UMAT) is used to integrate the elastic-plastic constitutive model of the FGM into the FEM code, ABAQUS. Finite element solution predicts the yielding through the thickness of FG plate. Metal phase behavior is estimated by elastic perfectly plastic and nonlinear power law material behavior with combined hardening. In this case, the effective properties of FGM are estimated by the Tamura model. Results are compared with those from the literature. It is shown that the distribution of the stress fields depends on the geometry and material properties of FG plate. Moreover, the effect of strain hardening on the distribution of plastic strains is investigated.

کلمات کلیدی:

FGM, Elastic-Plastic, Finite Element Method

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