

Accepted Manuscript

Bending behaviour of two directional functionally graded sandwich beams by using a quasi-3d shear deformation theory

Armağan Karamanlı

PII: S0263-8223(17)30465-8

DOI: <http://dx.doi.org/10.1016/j.compstruct.2017.04.046>

Reference: COST 8477

To appear in: *Composite Structures*

Received Date: 9 February 2017

Revised Date: 4 April 2017

Accepted Date: 18 April 2017



Please cite this article as: Karamanlı, A., Bending behaviour of two directional functionally graded sandwich beams by using a quasi-3d shear deformation theory, *Composite Structures* (2017), doi: <http://dx.doi.org/10.1016/j.compstruct.2017.04.046>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

BENDING BEHAVIOUR OF TWO DIRECTIONAL FUNCTIONALLY GRADED SANDWICH BEAMS BY USING A QUASI-3D SHEAR DEFORMATION THEORY

Armağan Karamanlı

*Department of Mechatronics, Faculty of Engineering and Architecture, Assistant Professor, Istanbul Gelişim University, 34215, Istanbul, Turkey.

‡ Corresponding Author; Armağan Karamanlı, Istanbul Gelişim University, 34215, Istanbul, Turkey, Tel: +90 212 422 7020, armagan_k@yahoo.com

Abstract

This paper presents the static behaviour of two-directional functionally graded (FG) sandwich beams subjected to various sets of boundary conditions by using a quasi-3D shear deformation theory and the Symmetric Smoothed Particle Hydrodynamics (SSPH) method. The SSPH code, which is developed based on the present formulation of the FG sandwich beam, is validated by solving a simply supported conventional functionally graded beam problem. Numerical results which are in terms of maximum dimensionless transverse deflections, dimensionless axial, normal and shear stresses are compared with the analytical solutions and the results from previous studies. Various FG sandwich beam structures are investigated by considering different aspect ratios (L/h) and sets of boundary conditions and using power-law distribution.

Keywords: Meshless Method; Functionally Graded Sandwich Beam; Stretching Effect; SSPH Method; Quasi-3D Shear Deformation Theory

1. Introduction

In recent years, the use of the structures which are made of functionally graded materials have been increasing in many modern engineering applications such as aerospace, marine, automotive, nuclear energy, biomedical and civil engineering due to varying material properties over a changing dimension which allow to enhance the bond strength through the layer interfaces, high resistance to temperature shocks, lower transverse shear stresses and high strength to weight ratio.

Download English Version:

<https://daneshyari.com/en/article/4911994>

Download Persian Version:

<https://daneshyari.com/article/4911994>

[Daneshyari.com](https://daneshyari.com)