Accepted Manuscript

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PII: S1359-8368(16)32142-4

DOI: 10.1016/j.compositesb.2017.05.031

Reference: JCOMB 5054

To appear in: *Composites Part B*

Received Date: 29 September 2016

Revised Date: 21 March 2017

Accepted Date: 8 May 2017

Please cite this article as: Lim T-K, Kim J-H, Thermo-elastic effects on shear correction factors for functionally graded beam, *Composites Part B* (2017), doi: 10.1016/j.compositesb.2017.05.031.

Thermo-elastic Effects on Shear Correction Factors for Functionally Graded Beam

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Keywords: Functionally graded beam, Temperature-dependent, Neutral surface, Shear correction factor

Abstract

Functionally Graded Materials (FGMs) have been used as advanced structures in high temperature regions for excellent thermal barriers. In this regard, present study considers the compensation of the shear stress effects in thermal environments to be more crucial than conventional evaluation. As the beam model with thermo-mechanical behavior, the material properties are considered temperature-dependent and vary continuously in the thickness direction. For the structure, First-order Shear Deformation Theory (FSDT) is employed in the formulation. And the model is based on the neutral surface concept to consider the un-symmetric properties of materials in the thickness direction. To check the validity of present works, results are compared with previous data. Furthermore, numerical analyses are performed with the temperature-dependent shear correction factors. Also, three types of model such as the Power-law (P-), Exponential (E-) and Sigmoid (S-) FGMs are discussed in detail.