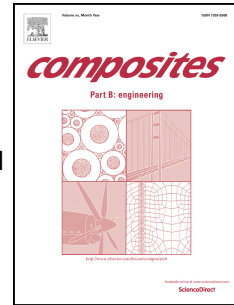


Accepted Manuscript

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Bekir Akgöz, Ömer Civalek



PII: S1359-8368(17)32433-2

DOI: [10.1016/j.compositesb.2017.07.024](https://doi.org/10.1016/j.compositesb.2017.07.024)

Reference: JCOMB 5160

To appear in: *Composites Part B*

Received Date: 1 June 2017

Revised Date: 19 June 2017

Accepted Date: 1 July 2017

Please cite this article as: Akgöz B, Civalek Ö, Effects of thermal and shear deformation on vibration response of functionally graded thick composite microbeams, *Composites Part B* (2017), doi: 10.1016/j.compositesb.2017.07.024.

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Effects of thermal and shear deformation on vibration response of functionally graded thick composite microbeams

Bekir Akgöz^{a, 1} and Ömer Civalek^a

^aAkdeniz University, Civil Engineering Department,
Division of Mechanics, Antalya-TURKIYE

Abstract

In this paper, thermal and shear deformation effects on the vibrational response of **non-homogeneous** microbeams made of functionally graded (FG) materials are carried out. It is assumed that the temperature-dependent material properties of FG microbeams change smoothly and gradually throughout the height according to the classical rule of mixture. The governing differential equations and related boundary conditions are derived by implementing Hamilton's principle on the basis of hyperbolic shear deformation beam and modified couple stress theories and they are analytically solved. The results are given together with other beam theories. A detailed parametric study is performed to indicate the influences of slenderness ratio, material length scale parameter, gradient index, shear correction factors and temperature rise on natural frequencies of FG microbeams. It is revealed that the use of modified shear correction factor can provide more accurate and valid results for first-order shear deformable microbeam model.

Keywords: B. Microstructures; B. Thermomechanical; B. Vibration; C. Analytical modelling

¹Corresponding author: Tel: +90-242-3106360; Fax: +90-242-3106306

E-mail address: bekirakgoz@akdeniz.edu.tr

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