11th. World Congress on Computational Mechanics (WCCM2014)
5th. European Conference on Computational Mechanics (ECCM V)
6th. European Conference on Computational Fluid Dynamics (ECFD VI)
July 20 - 25, 2014, Barcelona, Spain

MODELING AND ANALYSIS OF FGM STRUCTURES

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Key words: FGM and Composite Structures, Statics and Dynamics, Elastic Stability, Multiphysical Analysis

ABSTRACT

Development of new finite elements and other solution techniques for modeling linear and nonlinear behavior of Functionally Graded Material (FGM) beam and shell structures where continuously or discontinuously varying material properties occur. Elastostatics and vibration, elastic stability of structural elements. Homogenization of varying material properties of beams and shells. Inclusion of the shear force deformation effect, elastic foundation and large axial forces. Multiphysical analysis (thermoelasticity, electro-thermal-structural problem, the Thomson and Seebeck effects, electromagnetic-structural problems) of FGM structures. Experimental verification of the FGM structures behavior.

REFERENCES

[1] J. Murin, M. Aminbaghai, J. Hrabovský, V. Kutis, S. Kugler, "Modal analysis of the FGM beams with effect of the shear correction function". Composites: Part B, **45,** pp. 1575-1582, (2013). http://dx.doi.org/10.1016/j.compositesb.2012.09.084.

[2] M. Aminbaghai, J. Murin, V. Kutis. "Modal analysis of the FGM-beams with continuous transversal symmetric and longitudinal variation of material properties with effect of large axial force". *Eng Struc,t* **34**, pp. 314–29. (2012).

[3] V. Kutis, J. Murin, R. Belak, J. Paulech, "Beam element with spatial variation of material properties for multiphysics analysis of functionally graded materials". *Comput Struct* **89**, pp. 1192–205, (2011).

[4] S. Kugler, P. Fotiu, J. Murin, "Numerical analysis of FGM shells with enhanced finite elements. Sent for publication to Int. J. Engineering Structures", (2012).