

Mechanical and Thermal Stresses in A Functionally Graded Cylinders

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Abstract : In this study, thermal elastic stress distribution occurred on long hollow cylinders made of functionally graded material (FGM) was analytically defined under thermal, mechanical and thermo mechanical loads. In closed form solutions for elastic stresses and displacements are obtained analytically by using the infinitesimal deformation theory of elasticity. It was assumed that elasticity modulus, thermal expansion coefficient and density of cylinder materials could change in terms of an exponential function as for that Poisson's ratio was constant. A gradient parameter n is chosen between - 1 and 1. When n equals to zero, the disc becomes isotropic. Circumferential, radial and longitudinal stresses in the FGMs cylinders are depicted in the figures. As a result, the gradient parameters have great effects on the stress systems of FGMs cylinders.

Keywords : functionally graded materials, thermoelasticity, thermomechanical load, hollow cylinder.

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