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Axisymmetric bending of functionally graded circular and annular plates. (English)

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Summary: Axisymmetric bending and stretching of functionally graded circular and annular circular plates is studied using the first-order shear deformation Mindlin plate theory. The solutions for deflections, force and moment resultants of the first-order theory are presented in terms of the corresponding quantities of isotropic plates based on the classical Kirchhoff plate theory. This gives the Mindlin solution for functionally graded circular plates whenever the Kirchhoff solution to the problem is known. Numerical results for displacements and stresses are presented for various percentages of ceramic-metal volume fractions.

MSC:

74K20 Plates

74E30 Composite and mixture properties

Cited in **50** Documents

Keywords:

axisymmetric bending; analytical solutions; functionally graded materials; ceramic-metal composite; stretching; first-order shear deformation Mindlin plate theory; Kirchhoff plate theory; displacements; stresses

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