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ELASTIC TORSION OF COMPOUND PRISMATIC BODIES WITH CROSS-SECTIONS OF COMPLEX SHAPE

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Purpose. Study the stress state of composite prismatic bodies with biconnected domain under torsion

Methodology. The studies were carried out through the usage of the method of the integral (potential) representation of the Airy stress function.

Findings. For the considered boundary problem the Green function has been constructed. The problem has been reduced to the integral equations, and this affects the accuracy of the approximate solutions. The studies have been carried out for the regions which boundaries do not fully coincide with the coordinate lines of the original system that allows showing more saliently the advantage of the method. Represented the results of the numerical implementation of the algorithm. The analysis of the shear stresses has been carried out.

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Keywords: elastic torsion, stress, two-dimensional boundary problem, methods of integral representation

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THERMOMECHANICAL BEHAVIOR OF A THICK THREE–LAYER CYLINDRICAL PANEL WITH RIGIDLY CLAMPED ENDS.

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Purpose. To investigate the thermomechanical behavior of a thick three-layer cylindrical panel with rigidly clamped ends.

Methodology. The three-dimensional connected problem of resonance vibrations and dissipative heating of a thick three-layer nonelastic cylindrical panel is investigated for the temperature independent of the temperature of the mechanical and thermophysical properties of the material by the finite element method, under the action of harmonic over time uniform pressure.

Findings. By a finite element method a three-dimensional problem on the forced resonance vibrations and dissipative heating of a thick three–layer cylindrical panel with rigidly clamped ends is solved. The nonelastic material behavior is described by a conception of the complex characteristics. It is supposed that the mechanical and thermophysical material properties do not depend on a temperature. An influence of a structural inhomogeneity on the amplitude– and temperature–frequency characteristics, on the natural frequency, maximum deflection, maximum temperature and damping coefficient of the panel are investigated.

The results of the calculations showed that the structural heterogeneity significantly influences the indicated dynamic characteristics.

Keywords: resonant vibrations, cylindrical panel, damping coefficient

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