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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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THE PECULIARITIES OF THERMODYNAMIC FUNCTIONS AND T-PHASE

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Purpose. Study was to determine the mechanism of formation, physical properties and thermodynamic functions cubicboroncarbideiron $Fe_{23}(CB)_6$[1-3].

Methodology. The study was performed on samples containing carbon 1.0-4.0% (wt.) and boron 2.0-4.5% (wt.), otheriron. In the work we use differential thermal, metallographic, chemical and X-ray spectroscopic analyses.

Findings. For alloys in the Fe-B-C containing carbon 1.0-4.0% (wt.) and boron 2.0-4.5% (wt.), other iron cubic boron carbide $Fe_{23}(CB)_6$, it should be perform pre-processing of the alloy, such as annealing at 1170 K, further heated to a temperature of 30 K above liquidus and then cooled at a speed of 10-100 K/s to room temperature.

It is for the first time that using a model which takes into account the contributions of the first high-level approximation of the cubic expansion of the cubic boron carbide $Fe_{23}(CB)_6$ thermodynamic depending entropy, enthalpy and heat capacity Cp temperature were obtained.