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ЗМІСТ

STABILITY OF HOLLOW SHELLS OF LINEARLY VARIABLE THICKNESS UNDER THERMAL LOADS

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Structures in the form of plates and shells are subjected to various force and temperature fields [1, 2]. Thermal loads lead to additional deformations, which can significantly change the stiffness of thin shells [3].

The study deals with flat smooth steel shells with different thicknesses varying along the meridian, which are rigidly clamped along the contour. The shell is heated uniformly by T degrees, which is accompanied by nonlinear deformation of the shell and a change in its stress state, which affects its deformation forms and loss of stability under further force loading. The shell is then loaded with a pressure of intensity q at a constant temperature field. The properties of the materials are constant and temperature-independent, since in the considered problems the heating temperature was within the permissible limits.

At the first stage of thermal force loading, during which heating occurs, the shape of the deformation of the panels is practically independent of the thickness, both for linearly variable and constant. At the second stage, the heated shells lose their stability under pressure loading, which has its own characteristics for shells of different thicknesses with different preheating intensities.

The analysis of the effect of changes in the thickness of the shells on the value of the upper critical load shows that with an increase in the volume of the shell, the value of its critical load increases during heating and decreases during cooling. It can be concluded that for almost all heating options for panels of linearly variable thickness, this increase is linear, and for panels of constant thickness, it is parabolic.

Thus, the results of studies that take into account the additional effect of temperature heating confirm the greater efficiency and load-bearing capacity of panels of linearly variable thickness compared to panels of constant thickness.

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