
Simulation of stress-strain state of defected composite shells

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The paper examines an important problem of modeling the stress-strain state of the defected composite shells. The issue is a promising one because presently shells made of composite materials often serve as elements of different bearing constructions and it is often impossible to avoid defects even at the manufacturing stage. We propose a mathematical model of deformation of defected cylindrical shells made of composite materials. The model is based on Timoshenko hypothesis. We examined defects of disbond type and with the help of this model we described an algorithm for solving the problem of stress-strain state of defected cylindrical shells. For the numerical solution of the problem we used the finite element method. The presented results of numerical simulations have established patterns of influence of local imperfections in the structure on the stress-strain state of cylindrical shell made of composite materials with defects such as disbonds.

Keywords: stress-strain state, cylindrical shell, composite materials, Timoshenko shell model, disbonds.

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