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Numerical analysis method for studying local forms of stability loss of bearing layers of three-layered shells using mixed forms

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Abstract

A revised formulation of linearized stability problems of three-layered shells with a soft filler has been presented. The form of stability loss of the rigid layers is mixed in the shells when the moment precritical stress-strain state (SSS) is reached and is localized in the principal moment SSS zones. If the filler thickness is much greater than the thickness of the rigid layers, the size of the bulges and thickness of the filler have the same order of magnitude. Thus, a very fine grid must be used for a numerical solution of the stability loss equations, which poses considerable computational difficulties. A numerical analysis method is proposed for the local forms of mixed mode stability loss of the rigid layers of a three-layered shell. Using this method, the solution of equations for the precritical SSS by the finite element scheme is found but an analytical solution of reduced stability loss equations is presented for estimating the critical load. This solution is an asymptotic approximation for local modes of stability loss implemented into design. © 1995 Plenum Publishing Corporation.

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