

Buckling of Plates on Foundation with Different Types of Sides Support

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Abstract : In this paper the problem of buckling of plates on foundation of finite length and with different side support is studied. The Finite Strip Method is used as tool for the analysis. This method uses finite strip elastic, foundation, and geometric matrices to build the assembly matrices for the whole structure, then after introducing boundary conditions at supports, the resulting reduced matrices is transformed into a standard Eigenvalue-Eigenvector problem. The solution of this problem will enable the determination of the buckling load, the associated buckling modes and the buckling wave length. To carry out the buckling analysis starting from the elastic, foundation, and geometric stiffness matrices for each strip a computer program FORTRAN list is developed. Since stiffness matrices are function of wave length of buckling, the computer program used an iteration procedure to find the critical buckling stress for each value of foundation modulus and for each boundary condition. The results showed the use of elastic medium to support plates subject to axial load increase a great deal the buckling load, the results found are very close with those obtained by other analytical methods and experimental work. The results also showed that foundation compensates the effect of the weakness of some types of constraint of side support and maximum benefit found for plate with one side simply supported the other free.

Keywords : buckling, finite strip, different sides support, plates on foundation

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