

剪斷變形을考慮한 水平曲線보의 自由振動

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Free Vibrations of Horizontally Curved Beams with Shear Deformation

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Key Words : rotatory inertia, torsional inertia, horizontally curved beam, shear deformation, free vibration, natural frequency.

Abstract : The ordinary differential equations governing free vibrations of elastic horizontally curved beams are derived, in which the effect of shear deformation as well as the effects of vertical deflection, rotatory and torsional inertias are included. Frequencies and mode shapes are computed numerically for parabolic curved beams with hinged-hinged, hinged-clamped and clamped-clamped ends. Comparisons of natural frequencies between this study and ADINA are made to validate the theories and numerical methods developed herein. The lowest three natural frequency parameters are reported, with and without the effects of rotatory inertia and shear deformation, as functions of three non-dimensional system parameters: the horizontal rise to span length ratio, the slenderness ratio and the stiffness parameter.

비균질 Pasternak 지반위에 얹혀진 박판의 자유진동 해석

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Free Vibration Analysis of Thin Plate on Inhomogeneous Pasternak Foundation

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Key Words : Free Vibration, Thin Plate, Inhomogeneous Pasternak Foundation, Concentrated Mass

Abstract : Recently, as size of building structure becomes larger, mat area of building structure is supported on Inhomogeneous foundation. The equipment machineries in building are mostly on basement story. The slab of the lowest basement story with equipment machineries is considered as concentrated masses on plate supported on foundation. In this paper, vibration analysis of rectangular thin plate is done by use of rectangular finite element with 4 nodes. The solutions of this paper are compared with existing solutions and natural frequencies of thin plates, with concentrated masses, on inhomogeneous Pasternak foundation are calculated.