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SHORT COMMUNICATIONS

AN ENERGY ESTIMATE OF THE FLEXURAL BEHAVIOUR OF A CIRCULAR FOUNDATION EMBEDDED IN AN ISOTROPIC ELASTIC MEDIUM

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INTRODUCTION

The elastic analysis of circular plates embedded in soil and rock media is of importance to the

minimization of the total potential energy functional. The general procedure outlined above is used to analyse the flexural behaviour of the circular foundation, the deflected shape of which is represented by a second-order parabolic curve. This particular deflected shape is assumed to represent, approximately, the flexural behaviour of a moderately rigid foundation (i.e., the relative rigidity of the soil–foundation system is different from an infinite value). Using the

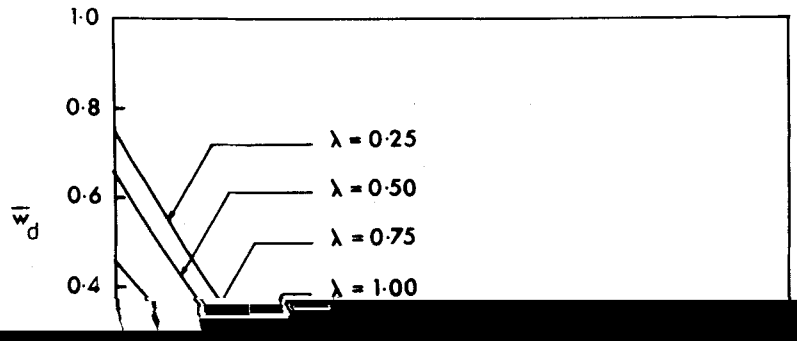
energy method, analytical expressions are derived for the deflection and the central flexural moment of the embedded circular foundation. Numerical results presented in this note illustrate

The elastic strain energy of the circular plate subjected to the axisymmetric deflection $w(r)$ is composed of only the flexural energy of the plate U_f given by

From the principle of stationary total potential energy we require

The constants C_1 and C_2 can be determined from the equations which are obtained by the

It may be noted that while the energy method provides an accurate estimate of the deflections of the foundation $w(r)$, the accuracy with which $w(r)$ is able to predict the flexural moments in the foundation is, in general, considerably less (see e.g., Dym and Shames[7]). Any inaccuracies that may be present in the energy expression for $w(r)$, as defined by (16), are greatly magnified in


1·0
0·8
0·6
0·4
$\bar{w}_d$
λ = 0·25
λ = 0·50
λ = 0·75
λ = 1·00

CONCLUSIONS