

THE EFFECT OF STIFFENING RINGS ON THE DEFLECTION OF CIRCULAR ISOTROPIC PLATES UNDER STATIC LOADING

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ABSTRACT

This paper presents an analysis of the deflection of isotropic circular plates with stiffening rings under the action of static pressure. The linear equation with variable coefficients governing the deflection of circular plates under such loading is derived. The effect of the stiffening rings are introduced by approximating the varying thickness/ plate radius by a Fourier series. Numerical examples are illustrated for non-stiffened plates of two thicknesses and two stiffened plates, with one and two stiffening rings respectively, all under clamped-edge boundary condition. Results showed the role of the stiffening rings in minimizing the deflection of the plate and eventually the induced stresses under the action of external pressure. Moreover, the present model results showed close agreement with those obtained by applying a finite element analysis using ANSYS code consequently, illustrating the versatility of this simple and elegant method.

Keywords: Industrial Application, Plates, Pressure Sensors