International J. of Engg. Research & Indu. Appls. (IJERIA). ISSN 0974-1518, Vol.2, No.II (2009), pp 177-188

## INVESTIGATION OF THE EFFECT OF CRACK ORIENTATION ON VIBRATION CHARACTERISTICS OF A CRACKED RECTANGULAR PLATE USING FINITE ELEMENT METHOD

## P. V. JOSHI, S. K. DHAGAT AND AJAY TIWARI

## Abstract

Plate structures are primary elements in engineering and are used in many applications like airplane wings, ships, platforms, bridges and in almost every industry. Presence of a crack poses serious threat to plate structures and hence many researchers have investigated mode shapes, natural frequencies and peak amplitudes of such plates with varying edge boundary conditions, in which crack is located at the centre and is parallel to one of the edges. In this work, a finite element model is developed for the study of vibration characteristics of a rectangular plate with a crack at the centre consisting of a continuous line. An attempt has been made to investigate the effect of inclination of the crack ( $0^0$  to  $150^0$ ) on the natural frequencies, mode shapes and peak amplitude. Two boundary conditions CCFF (clamped, clamped, free, free) and SSSS (all four edges simply supported) with half crack length varying from 10 to 25mm have been analyzed for this purpose. It can be concluded that the natural frequencies and amplitudes are a function of inclination of crack.