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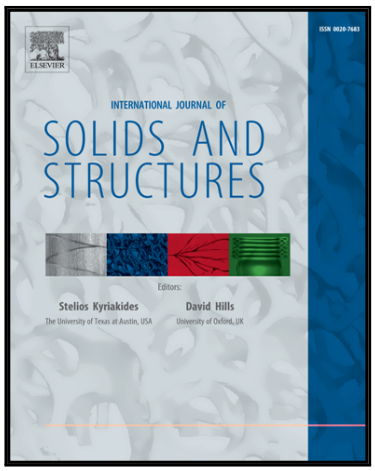

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ACCEPTED MANUSCRIPT

SEMI-INFINITE MOVING CRACK IN AN ORTHOTROPIC STRIP

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ABSTRACT :The elastodynamic problem of semi-infinite moving crack in an orthotropic strip has been considered. Using Fourier transform technique the boundary value problem has been converted to standard Wiener-Hopf equation which has been solved to get the analytical expressions for the stress intensity factor and crack opening displacements. Finally the stress intensity factor and crack opening displacement have been plotted graphically against various parameters for different orthotropic media to show the effect of material orthotropy.

KEY WORDS Semi-infinite crack,orthotropic strip, Wiener-Hopf equation, Rayleigh wave velocity, stress intensity factor, crack opening displacement.

1. INTRODUCTION

Cracks and inclusions are common in almost every materials. The main objective in engineering structure is to avoid the growth of a crack initiated originally. It was found that the stress has a square root singularity at the tip of the crack. In this prospect a non-dimensional quantity called stress intensity factor is calculated to predict the state of stress at the tip of the crack. Many researchers did their work in this field to find the stress intensity factor and other expressions related to fracture. Initially researchers considered the problems involving static cracks only.

In 1951 Yoffe introduced the moving Griffith crack model. He assumed that the crack propagates with a constant speed and without change in length along the crack propagation axis. Knauss (1966) solved the problem of stresses in an infinitely long isotropic strip of finite width containing a straight

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