

Analysis of Reflection Coefficients of Reflected and Transmitted Waves at the Interface Between Viscous Fluid and Hygro-Thermo-Orthotropic Medium

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Abstract : Purpose - The purpose of this paper is to investigate the fluctuation of amplitude ratios of various transmitted and reflected waves. Design/methodology/approach - The reflection and transmission of plane waves on the interface between an orthotropic hygro-thermo-elastic half-space (OHTHS) and a viscous-fluid half-space (VFHS) were investigated in this study with reference to coupled hygro-thermo-elasticity. Findings - The interface, where $y = 0$, is struck by the principal (P) plane waves as they travel through the VFHS. Two waves are reflected in VFHS, and four waves are transmitted in OHTHS as a result namely longitudinal displacement, Pwave -, thermal diffusion TDwave - and moisture diffusion mDwave - and shear vertical SV wave. Expressions for the reflection and transmitted coefficient are developed for the incidence of a hygrothermal plane wave. It is noted that these ratios are graphically displayed and are observed under the influence of coupled hygro-thermo-elasticity. Research limitations/implications - There isn't much study on the model under consideration, which combines OHTHS and VFHS with coupled hygro-thermo-elasticity, according to the existing literature Practical implications - The current model can be applied in many different areas, such as soil dynamics, nuclear reactors, high particle accelerators, earthquake engineering, and other areas where linked hygrothermo-elasticity is important. In a range of technical and geophysical settings, wave propagation in a viscous fluid-thermoelastic medium with various characteristics, such as initial stress, magnetic field, porosity, temperature, etc., gives essential information regarding the presence of new and modified waves. This model may prove useful in modifying earthquake estimates for experimental seismologists, new material designers, and researchers. Social implications - Researchers may use coupled hygro-thermo-elasticity to categories the material, where the parameter is a new indication of its ability to conduct heat in interaction with diverse materials. Originality/value - The submitted text is the sole creation of the team of writers, and all authors equally contributed to its creation.

Keywords : hygro-thermo-elasticity, viscous fluid, reflection coefficient, transmission coefficient, moisture concentration

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