

THERMOELASTIC RESPONSES DUE TO A DEEP POINT HEAT SOURCE

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Abstract

The deep point heat source affects long-term thermal responses of an elastic soil mass. To simulate the stratified earth medium, the soil mass is modeled as a cross-anisotropic thermoelastic medium with different properties in horizontal and vertical directions. Analytical solutions of the displacements and temperature increments of the soils are obtained by using Hankel integral transform. Numerical results for thermal stresses are presented to portray the effects of anisotropic thermal properties on the response of a point heat source. The rise of the ratio of linear thermal expansion coefficients leads to corresponding rise of thermal stress components with varying degrees of anisotropy. However, the thermal stress components decrease with higher ratio of the thermal conductivities .

Keyword : Mathematical Modelling, Point Heat Source, Integral Transform, Closed-form Solution