Modelling of a Buried Deep Horizontal Line Heat Source in a Cross-Anisotropic Thermoelastic Medium

呂志宗,林鳳彩
Civil Engineering
Architecture
cclu@chu.edu.tw

Abstract

In this paper, the deep buried line heat source of constant strength affects the thermally mechanical responses of the stratum are presented. To simulate the stratified earth medium, the soil mass is modeled as cross-anisotropic with different properties in the horizontal and vertical directions. On the basis of fundamental solutions caused by a deep point heat source, the analytic solutions of ground deformation, thermal stresses and temperature changes of the thermoelastic medium due to deep line heat source are presented by using appropriate line integral techniques. The anisotropic soil shows significant effect on long-term thermally elastic responses compared with the results from isotropic soil. Besides, the derived solutions illustrated that shear modulus does not have influence on long-term displacements and temperature increment of the strata for the case of isotropic properties.

Keyword：Point Heat Source, Line Heat Source, Fundamental Solution, Closed-form Solution.