Stresses Induced in Saturated Asphalt Pavement by Moving Loads

Authors : Yang Zhong, Meijie Xue

Abstract : The purpose of this paper is to investigate the stresses and excess pore fluid pressure induced by the moving wheel pressure on saturated asphalt pavements, which is one of the reasons for a damage phenomenon in flexible pavement denoted stripping. The saturated asphalt pavement is modeled as multilayered poroelastic half space exerted by a wheel pressure, which is moving at a constant velocity along the surface of the pavement. The governing equations for the proposed analysis are based on the Biot's theory of dynamics in saturated poroelastic medium. The governing partial differential equations are solved by using Laplace and Hankel integral transforms. The solutions for the stresses and excess pore pressure are expressed in the forms of numerical inversion Laplace and Hankel integral transforms. The numerical simulation results clearly demonstrate the induced deformation and water flow in the asphalt pavement.

Keywords : saturated asphalt pavements, moving loads, excess pore fluid pressure, stress of pavement, biot theory, stress and strain of pavement

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