Displacement Function Method of Space Problem for Transversely Isotropic Foundation Based on Damage Theory

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The damage of transversely isotropic foundation was considered based on damage theory and a general three-dimensional solution for transversely isotropic foundation in the image field was strictly obtained by the displacement function method. The Galerkin's displacement function for isotropic elasticity was modified, and Hankel integration transform and Bessel function theory were employed in the solution. With the Hankel integration inversion shift theory, the fundamental expression of strain and stress in the transversely isotropic foundation was presented for different cases that the characteristic roots were equal or not. The solution included the axisymmetric and asymmetrical problems. It could be used to solve some specific asymmetrical problems in semi-infinite space under different boundary conditions.

Keywords: Transversely isotropic foundation, Displacement function method, Hankel transform, Damage