

Structural Evaluation of Airfield Pavement Using Finite Element Analysis Based Methodology

Authors : Richard Ji

Abstract : Nondestructive deflection testing has been accepted widely as a cost-effective tool for evaluating the structural condition of airfield pavements. Backcalculation of pavement layer moduli can be used to characterize the pavement existing condition in order to compute the load bearing capacity of pavement. This paper presents an improved best-fit backcalculation methodology based on deflection predictions obtained using finite element method (FEM). The best-fit approach is based on minimizing the squared error between falling weight deflectometer (FWD) measured deflections and FEM predicted deflections. Then, concrete elastic modulus and modulus of subgrade reaction were back-calculated using Heavy Weight Deflectometer (HWD) deflections collected at the National Airport Pavement Testing Facility (NAPTF) test site. It is an alternative and more versatile method in considering concrete slab geometry and HWD testing locations compared to methods currently available.

Keywords : nondestructive testing, pavement moduli backcalculation, finite element method, concrete pavements

Conference Title : ICPEDCA 2018 : International Conference on Pavement Engineering, Design, Construction and Analysis

Conference Location : Vancouver, Canada

Conference Dates : September 17-18, 2018