

Characterization of Bonding Condition for Concrete Overlay Design using FWD Deflection Measurements

by

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ABSTRACT

Based on the results of a theoretical study that was done to investigate unbonded and fully-bonded two slab concrete pavements, this presentation presents a practical approach to characterize interface bonding between concrete overlay and existing pavement using falling weight deflectometer (FWD) deflection measurements. This presentation briefly displays the intrinsic relations between pavement interface bonding and structural capacity, and presents an explicit equation for quantifying partially bonded interface, which may be utilized in concrete overlay design.

An ultra-thin white-topping (UTW) pavement that consists of six sections was chosen to verify the proposed procedures for back-analyzing interface bonding using FWD deflections. In order to fulfill this, laboratory tests were conducted to measure the properties of UTW mix at different times. FWD deflections were measured before and after the construction of UTW pavement. It is shown that FWD deflections can be used to characterize interface bonding condition for concrete overlay design.

KEYWORDS: concrete overlay, unbonded interface, partially bonded interface, fully bonded interface, falling weight deflectometer (FWD) deflection, ultra-thin white-topping (UTW)