Characterization of Highway Pavements Using the Rolling Dynamic Deflectometer

ABSTRACT

The Rolling Dynamic Deflectometer (RDD) was developed at the University of Texas at Austin by Dr. Kenneth H. Stokoe II and his colleagues. The RDD is used to continuously measure pavement deflections while moving along the pavement surface at 1 to 2 miles per hour. The RDD has been used to test both highway and airfield pavements in Texas to provide a better indication of pavement structural condition than devices that provide results at individual test points spaced along the route.

The RDD has been used extensively to test Jointed Concrete Pavement projects in several TxDOT districts. RDD testing is used to determine mid-slab deflections and joint load-transfer efficiency necessary for designing rehabilitation strategies. During testing on a IH JCP rehabilitation project, Dr. Dar Hao Chen, of the CST-Pavements and Materials Branch evaluated the joint conditions and predicted premature reflective cracking that would occur at specific joints based on RDD test results. Testing showed that over 300 joint repairs were required; however, due to limited funds, less than 10 repairs could be performed prior to placement of the ACP overlay. Dr. Chen and University researchers monitored the pavement after it was opened to traffic and observed premature reflective cracking within one month at certain joints and more extensive reflective cracking after one year as had been predicted.

The RDD has also been used to evaluate CRCP pavements during forensic investigations and testing prior to rehabilitation design development. Extensive testing has also been performed on a variety of ACP pavements ranging from very weak to relatively strong structural conditions and compared to deflections obtained with the Falling Weight Deflectometer. Testing showed that the point specific FWD results coincided with the continuous RDD testing up to deflections representative of pavements from ‘very good’ to ‘fair or poor’ structural condition.

The RDD has proven its value during testing on numerous projects and has saved millions of dollars through improved rehabilitation designs. RDD testing is currently supported by the CST-Pavements and Materials Systems Branch through an Interagency Contract with the University of Texas. To obtain information about conducting RDD testing on projects in your district please contact:

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Figure 1. Photograph of Rolling Dynamic Deflectometer