

Project Level Pavement Evaluation Using FWD, GPR, and Video Logging and Its Application in Pavement Rehabilitation in Indiana

Richard Y. Ji and Tommy E. Nantung
INDOT Office of Research and Development
1205 Montgomery Street
West Lafayette, Indiana 47906, USA
Email: Yji@indot.IN.gov (R. Ji) and tnantung@indot.in.gov (T. Nantung)

Pavement rehabilitation is a major activity for all highway agencies, as such, accurate and efficient measurement of the rehabilitated pavement performances becomes an important process in the operation procedure. The Indiana Department of Transportation (INDOT) has a project level pavement evaluation program that began several years ago. This project level evaluation program employs Falling Weight Deflectometer (FWD), Ground Penetration Radar (GPR), Pavement coring and video logging. The program provides valuable information about pavement performance characteristics and offers useful tools for developing pavement rehabilitation strategies, specifically overlays and pavement underseals.

Currently, INDOT is using the American Association of State Highway and Transportation Officials (AASHTO) 1993 Guide, and the Mechanistic-Empirical Pavement Design Guide (MEPDG) for pavement overlay and rehabilitation program.

FWD Testing

In the state of Indiana, six districts take responsibility to complete routine maintenance of pavement, both functional and structural. In the project level testing, most FWD testing requests focus on overlay design and underseal estimation. FWD testing is also requested for the purpose of selecting economic strategies between reconstruction and overlay. The engineers from the six districts fill out on-line FWD testing requests for the purpose of overlay and underseal.

Visual Condition Survey with Video Logs

Prior to any field data collection, pavement evaluation engineers can conduct a visual inspection of pavement conditions by reviewing the video logs. Currently INDOT uses the PathView video logging program developed by the Pathway Service Inc. PathView provides digital images of roadways and pavement surfaces along with road condition data such as International Roughness Index (IRI), Rutting and Pavement Condition Rating (PCR). Video logs can help engineers to locate areas with pavement distresses, identify distress type, and estimate the severity and extent of the distresses. The information not only allows engineers to set up appropriate field testing plans, but also provides valuable insights information during data analysis.

Thickness Data Collection from Coring

Analysis of FWD data requires knowledge of pavement structure profile. For some pavement sections, the exact structure is not known; therefore, pavement coring is required. Coring also allows engineers to determine if and where stripping susceptible asphalt layers lie in the pavement section. However, due to its destructive nature, only a limited number of pavement coring should be performed. In past studies, one core per mile was extracted in both directions from the selected roadways.

Thickness Data Collection Using Ground Penetrating Radar (GPR)

GPR provides a non-destructive method for estimating pavement layer thickness. One of the advantages of GPR lies in its capability in continuously measuring variation of thickness throughout the pavement sections. According to the past experiences of INDOT in the network level testing, GPR can provide accurate thickness for full depth asphalt pavement. However, in composite pavements, the method has difficulties in measuring concrete pavement underneath the HMA overlay.