

Road Evaluation

Determining Asphalt Thickness without Coring

The Project

In 2004, the Arizona Department of Transportation, owner of a JILS truck-mounted FWD system, expressed its desire to implement a method of collecting and storing pavement thickness information during the FWD data collection process.



Project Description

ADOT normally acquires its FWD data every 2/10 of a mile and obtains pavement thickness via core data every one mile. The asphalt thickness is assumed to be constant between cores.

Actual pavement thicknesses have been shown to vary by an order of magnitude within only 100 meters (328 ft)—a rate of change not detectable by coring procedures. The cost of a coring crew is approximately \$2,000/day and requires workers to operate in dangerous environments requiring traffic control.

One of the most critical elements in the accurate interpretation of deflection testing results is the use of accurate pavement layer thickness data in the process. The elastic model is extremely sensitive to such layer thickness. State Departments of Transportation estimate the cost of applying 1 inch of asphalt per lane mile at over \$50,000, making an over-design rehabilitation strategy requiring excess asphalt clearly undesirable. Conversely, an under-design strategy using insufficient asphalt can result in premature pavement failure and the need to rehabilitate sooner than expected.

Foundation Mechanics responded to ADOT's request by fully integrating the GSSI RoadScan GPR system into their JILS truck-mounted FWD system. Their FWD program, JTEST, imports the GPR results. It then displays and stores the pavement layer thickness that was located directly under the FWD



load plate. GPR data processing was automated and simplified using an innovative development technique called EZ Tracker—a simple point-and-click procedure to identify pavement layers. The result is a successful integration of two related technologies providing both valuable data and substantial cost savings.



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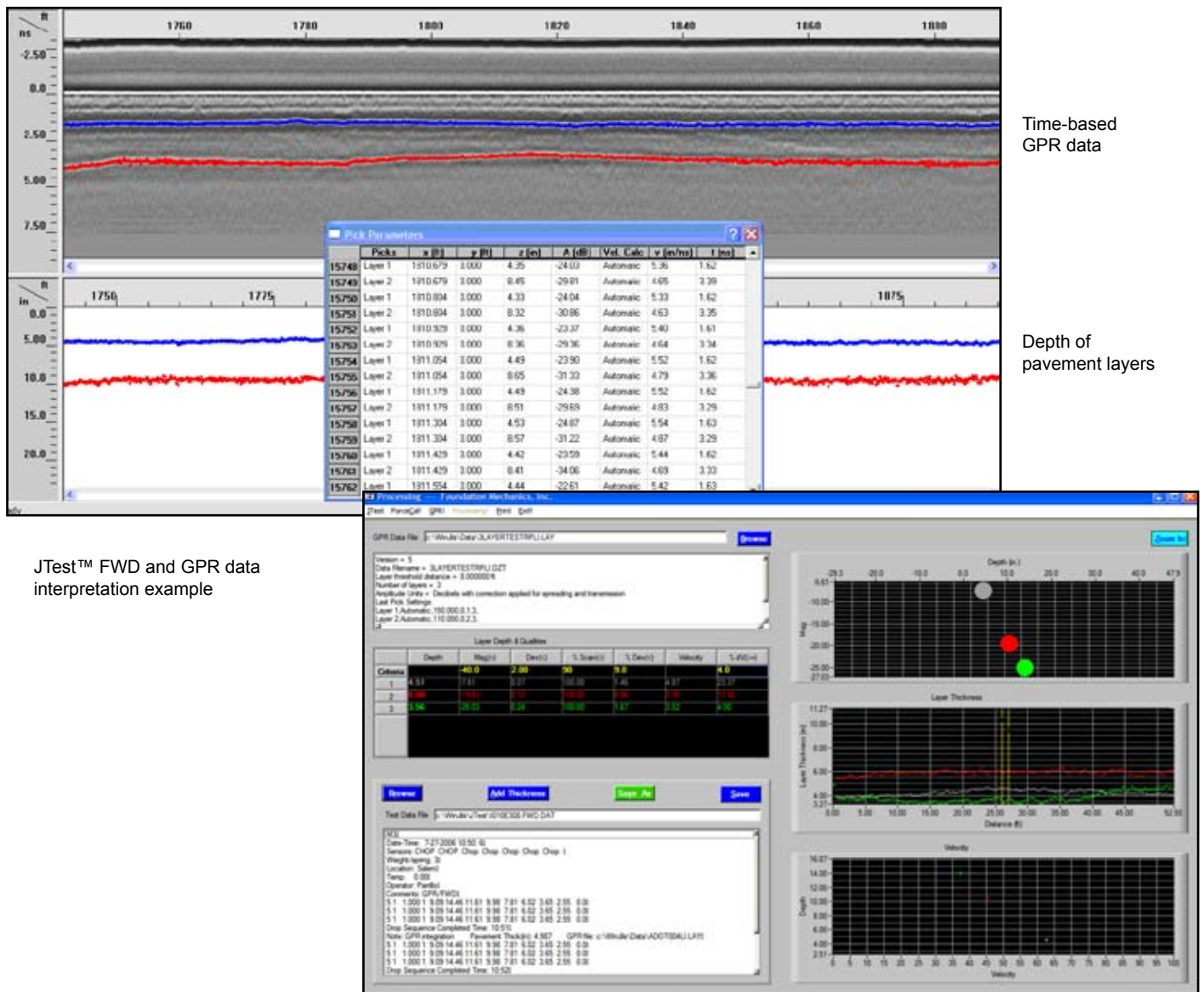
Courtesy: Arizona Dept. of Transportation
Phoenix, Arizona USA

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Outcome

Twenty-four individual cores and twenty-four individual GPR scans were performed on two separate Arizona highways. The asphalt thickness obtained from the actual core data ranged from 2.88 to 7.13 inches. The average difference in asphalt thickness between the measured cores and GPR calculated thickness was less than 4%. Although occasional coring is still required to obtain material properties, the evaluation study concluded that GPR is a reliable method for obtaining accurate asphalt thickness without coring.



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