

ABSTRACT

BOND DEVELOPMENT IN CONCRETE OVERLAYS

Data collection to determine the rate of bond strength development between concrete overlays and existing pavements and the evaluation of nondestructive testing methods for determining concrete strength were the objectives of this study.

Maturity meters and pulse velocity meters were employed to determine the rate of flexural strength gain and determine the time for opening of newly constructed pavements to traffic. Maturity measurements appear to provide a less destructive method of testing. Pulse velocity measurements do require care in the preparation of the test wells and operator care in testing. Both devices functioned well under adverse weather and construction conditions and can reduce construction traffic delay decisions.

Deflection testing and strain gaging indicate differences in the reaction of the overlay and existing pavement under grouting versus nongrouted sections. Grouting did enhance the rate of bond development with Type III cement out performing the Type II grout section.

Type III and Type II cement grouts enhanced resistance to cracking in uniformly supported pavements where joints are prepared prior to overlays achieving target flexural strengths.

Torsional and direct shear testing provide additional ways of measuring bond development at different cure times.

Detailed data analysis will be utilized by TRANSTEC, Inc. to develop a bonded overlay construction guidelines report.