U.S. Department of Transportation
Federal Highway Administration

PRODUCT BRIEF

Temperature Prediction and Adjustment Procedures for Asphalt Concrete Pavements

Introduction

Deflection testing is used to evaluate a variety of pavement characteristics, including axle or vehicle load capacity, structural life, and uniformity. Deflection results from all pavements are dependent on seasonal variations that affect the underlying aggregate and subgrade. The results from asphalt pavements are also dependent on the temperature of the asphalt. To effectively analyze deflection results, they must be adjusted to account for seasonal and temperature variations.

Over the years, a number of methods have been developed to measure the asphalt temperature and to adjust the deflection results for the effects of temperature. Deflection equipment and analysis methodologies have also continued to improve over the years, but the study of the effects of temperature on the deflection of asphalt pavement has generally been limited in scope or location.

To address this issue, the Long Term Pavement Performance (LTPP) program developed a model for predicting the temperature within an asphalt layer from surface temperature data collected during routine deflection testing, along with procedures to adjust deflection testing results for temperature. The temperature prediction model and adjustment procedures were then used as the basis for proposed standards that have been submitted to the American Association of State Highway and Transportation Officials (AASHTO) Subcommittee on Materials for possible adoption.

Proposed Temperature Prediction and Adjustment Standards

Proposed Standard Practice for Estimating Asphalt Temperature

This proposed standard provides a method for predicting temperature within the asphalt layers of flexible pavements using readily obtained data - specifically, the infrared pavement surface temperature typically obtained automatically as the falling-weight deflectometer (FWD) data are collected, the average air temperature for the day preceding testing, and the time of testing. It is based on temperature prediction relationships developed through analysis of data from the LTPP seasonal monitoring test sections.

Procedures for Adjusting Deflection Data

This proposed standard provides temperature adjustment factors for backcalculated asphalt concrete layer moduli, deflection under the center of the FWD load plate, and deflection basin shape factors. Application of these procedures to adjust deflection test results to a standard temperature allows data obtained under varying temperature conditions to be compared and used interchangeably.

Who Can Benefit From These Standards?

The LTPP temperature prediction and adjustment standards can benefit anyone involved in the analysis, interpretation, or application of pavement deflection data collected on flexible pavements. State and Provincial highway agency personnel and engineering consultants involved in pavement manage-

ment and pavement design applications will want to consider these procedures. These procedures may also be of interest to other individuals and agencies having an interest or involvement in pavement engineering and research.

For More Information

The procedures for temperature prediction and adjustment data are presented in Report No. FHWA-RD-98-085, Temperature Predictions and Adjustment Factors for Asphalt Pavements. This report is available from FHWA's LTPP website (www.tfhrc.gov) in pdf format. It is located in the Library section under Reports. Hard copies are also available from the R&T Report Center at (301) 577-0818.

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