U.S. Department of Transportation
Federal Highway Administration

PRODUCT BRIEF

LTPP Pavement Performance Forecast

Introduction

Developed as part of pooled fund study TPF-5(013), the Long-Term Pavement Performance (LTPP) Performance Forecast produces freeze/thaw performance predictions for both rigid and flexible pavements. These predictions are based on regression models using data available from approximately 800 in-service test sections in the LTPP database. These sections consist of a variety of climates with various subgrade types and a range of loading conditions. Using the LTPP Performance Forecast, researchers can compute roughness, structural cracking, environmental cracking, rutting, and faulting predictions as a function of pavement age. The forecasts are based on user-defined inputs for traffic, structure, environment, and subgrade conditions.

Complete details on the model development and the pooled fund study can be found in the final report, *Effects of Multiple Freeze Cycles and Deep Frost Penetration on Pavement Performance and Cost* (FHWA-HRT-06-121).[1] Because the main objective of the study was to quantify the impacts of frost on pavement performance, the models developed and implemented in this application cover both frost and nonfrost regions and are applicable to a range of climates.

Application and Use

The LTPP Performance Forecast can be used by State, county, and local agencies to forecast or estimate performance trends for pavement sections of interest in specific user-defined environmental settings.

While the LTPP Performance Forecast is not a pavement design program, it can be used to help agencies check and calibrate a mechanistic empirical-based pavement design program (i.e., the *Mechanistic Empirical Pavement Design Guide* (MEPDG)) against local conditions. MEPDG was developed using national models that represent the average performance trends throughout the United States. The final corresponding report documented significant differences in pavement performance across the United States based on various environmental conditions. As a result, agencies should consider calibrating MEPDG for their local conditions by adjusting MEPDG calibration factors. Procedures on how to use the LTPP Performance Forecast to calibrate MEPDG models to local conditions are described in the final report. This is particularly useful for agencies that do not have measured pavement performance data available for calibration purposes. Similarly, the LTPP Performance Forecast could also be used to check and develop pavement performance trends used in an agency's pavement management system. The online application can be found at www.ltpp-products.com.

Example

A screen shot of the international roughness index (IRI) prediction computed for a flexible pavement is provided in figure 1. This prediction was based on pavement condition, pavement structure, traffic loading, and environmental information input by the user. The values in parentheses for each input provide the user with the range of data that was used in developing the models. Extrapolation outside of these ranges should be performed with caution.

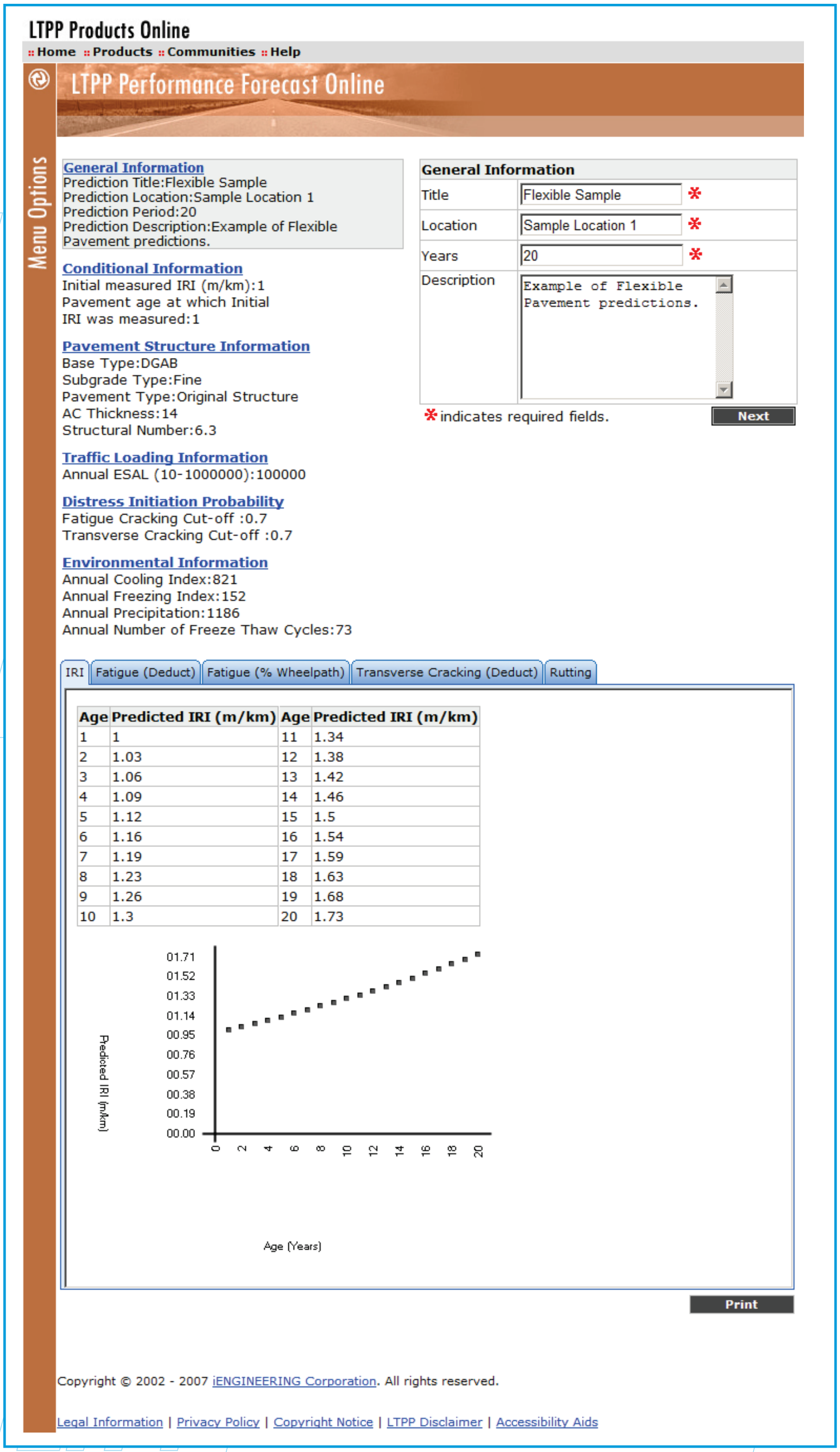

Figure 1. Flexible pavement example.

http://www.fhwa.dot.gov/pavement/ltpp/index.cfm

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Reference— Jackson, N. and Puccinelli, J. (2006). *Long-Term Pavement Performance (LTPP) Data Analysis Support: National Pooled Fund Study TPF-5(013): Effects of Multiple Freeze Cycles and Deep Frost Penetration on Pavement Performance and Cost*, Report No. FHWA-HRT-06-121, Federal Highway Administration, Washington, DC.

Researchers—The Contracting Officer's Technical Representative (COTR) was Larry Wiser, HRDI-30.

Distribution—This ProductBrief is being distributed according to a standard distribution. Direct distribution is being made to the Divisions and Resource Center.

Availability—This ProductBrief may be obtained from the FHWA Product Distribution Center by email to report.center@dot.gov, fax to (814) 239-2156, phone to (814) 239-1160, or online at http://www.fhwa.dot.gov/pavement/ltpp/index.cfm. The software can be obtained at ltpp-products.com.

Key Words—LTPP data, Freeze, Thaw, Pavement performance, Regression, and Models.

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