

Using FWD Data with M-E Design and Analysis

~Study Update~

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Outline of Presentation

- Overview
- Objective
- Study Tasks
- Timeline

Overview

- Use of FWD data for characterizing in-service pavements and *routine* backcalculation has seen little change, if any, during the last decade in spite of advances in computing technology and power. In some cases, the use of FWD data for M-E analysis and design has seen a decline.
- Significant challenges still exist in setting up backcalculation analysis and interpreting results.
- Backcalculation still remains as much of an art as a science.

Overview (continued)

- These issues most likely contributed to the less than optimal use of FWD data in the rehabilitation portion of the new MEPDG. MEPDG was intended to be based on state of the practice.

Objective

- Review state of the practice and art in *routine* backcalculation.
- Review FWD data analysis within the context of M-E design and design.
- Develop best practices guideline for using FWD data for M-E analysis and design with particular emphasis on the effective and efficient use with the MEPDG.
- Develop recommendations for advancing use of FWD data for M-E analysis and design.

Study Tasks – Phase I

- Task 1: Review of state of the practice and art in FWD backcalculation and deflection analysis.
- Task 2: Demonstrate how FWD data can best be used with the MEPDG.

Study Tasks – Phase II

- Task 3: Case studies to showcase the use of FWD data to determine input parameters for the MEPDG.
- Task 4: Develop practical guidelines for performing backcalculation and interpreting the results.
- Task 5: Recommendations for improvements to FWD data analysis and interpretation for immediate implementation.
- Task 6: Final report documenting the research findings, conclusions and recommendations.

Task 1: Review state of the practice and art

- Review state of the practice in backcalculation, modeling approaches and software tools for routine analysis and interpretation of FWD data.
- Review unique analytical strengths, user friendliness aspects and tools and aids to assist in the analysis and interpretation.
- Review state of the art and applicability to state of the practice. The evaluation shall be based on data and computing resource requirements for *routine* analysis and interpretation of FWD data.

Task 2: Demonstrate use of FWD data with MEPDG

- Critically review and demonstrate the optimum use of FWD data with MEPDG.
- Develop recommendations for the effective and efficient use of FWD data with MEPDG.
 - Material models in MEPDG and FWD data analysis.
 - Static and dynamic, time domain and frequency domain, linear and non-linear models and analysis
- Identify potential experimental or test sections for case studies.

Task 3: Case studies on the use of FWD data with MEPDG

- Case studies to demonstrate the use FWD data in-lieu of or in addition to laboratory data for characterizing in-service pavement layer properties for MEPDG rehabilitation analysis.
- Comparison of performance predictions using FWD and laboratory derived strength properties and comparison with available observed performance.

Task 4: Guidelines for FWD data analysis and interpretation

- Review existing guidelines for analyzing FWD data and interpreting results.
- Solicit volunteers experienced in FWD data analysis to analyze and interpret a set of real world FWD data for the purpose of M-E design and analysis.
- Develop practical guidelines for analyzing FWD data and interpreting results.
- Develop best practices guideline to assist users in setting up and analyzing FWD data and interpreting of results.

Task 5: Recommendations for improvement to FWD data analysis

- Identify improvements to FWD data analysis and interpretation of results with immediate implementation potential.
 - Improvements to current procedures, software and tools.
 - Improvements that will help to bridge the gap between state of the art and practice.
- Recommendations for efficient and effective use of FWD data in future versions M-E design and analysis.

Task 6: Final Report

- Final report documenting the study findings, conclusions and recommendations.
 - Practical guidelines for FWD data analysis.
 - Guidelines for using FWD data with MEPDG.
 - Recommendations for advancing the use of FWD data in M-E design and analysis.
 - Recommendations for bridging the gap between state of the art and practice.

Timeline

- Study to begin – October 2006
- Phase I expected completion – 6 months from start date
- Phase II expected completion – 18 to 24 months of start date

Questions or comments?

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