

STRATEGIC PLAN — LTPP — FOR LONG-TERM PAVEMENT PERFORMANCE DATA ANALYSIS

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U.S. Department of Transportation



Federal Highway Administration



Transportation Research Board



PURPOSE AND GOAL

The purpose of this plan is to guide recommendations by the TRB LTPP Committee concerning the national-level analysis of data collected within the Long-Term Pavement Performance studies.

The goal for this plan is to develop knowledge, relationships, prototype performance models and other findings to facilitate improved pavement treatment strategy selection and reliable performance prediction.

The Committee will use this plan to help it determine whether the limited resources available for LTPP data analysis are used in the most effective manner. The Committee will evaluate newly proposed analyses, work currently in progress, and completed work for compliance with this plan. The Committee understands that the Federal Highway Administration intends to use this plan for similar purposes.

The Committee invites all agencies that are partners and participants in the LTPP studies to adopt this plan. If so adopted, this plan will provide uniform guidance for national-level LTPP data analysis.

The Committee formally adopted this strategic plan at its meeting of November 8-9, 1999. The plan is now in effect, and will be kept current by the Committee from this date forward to the completion of LTPP. The Committee will review the plan annually, and will update it when necessary.



EXPECTATIONS

It is anticipated that this plan will be used to:

1. Guide development of LTPP analysis problems by the TRB ETG on Data Analysis.
2. Guide selection of LTPP analysis problems by the TRB LTPP Committee.
3. Support the programming of national-level LTPP analysis by sponsors.
4. Guide the formulation of LTPP analysis project statements.
5. Support assessment of progress in analysis of the LTPP data.
6. Communicate outcomes anticipated from LTPP Analysis.



ANALYSIS OBJECTIVES

The objectives of the national-level analysis effort are as follows. Each objective is important to the achievement of the overall goal.

1. Improve traffic characterization and prediction.
2. Improve materials characterization.
3. Improve consideration of environmental effects in pavement design and performance prediction.
4. Improve evaluation and use of pavement condition data in pavement management.
5. Evaluate existing and/or develop new pavement response and performance models applicable to pavement design and performance prediction.
6. Provide guidance for maintenance and rehabilitation strategy selection and performance prediction.
7. Quantify the performance impact of specific design features (presence or absence of positive drainage, differing levels of pre-rehab surface preparation, etc.).

The specific LTPP analysis outcomes expected to address these objectives are shown in the chart on the following page.

LONG-TERM PAVEMENT PERFORMANCE STRATEGIC PLAN OBJECTIVES AND ANALYSIS OUTCOMES

PLAN GOAL: To develop knowledge, relationships and models to facilitate improved pavement design and reliable performance predictions.

STRATEGIC OBJECTIVES

- 1.** Traffic characterization and prediction.
- 2.** Materials characterization.
- 3.** Determination of environmental effects in pavement design and performance prediction.
- 4.** Evaluation and use of pavement condition data in pavement management.
- 5.** Development of pavement response and performance models applicable to pavement design and performance prediction.
- 6.** Maintenance and rehabilitation strategy selection and performance prediction.
- 7.** Quantification of the performance impact of specific design features (presence or absence of positive drainage, differing levels of pre-rehab surface preparation, etc.).

ANALYSIS OUTCOMES

| | | | | | | | |
|--|--|---|--|---|--|--|---|
| <p>A. Guidelines for data collection (hardware, software, placement, calibration, data collection frequency).</p> <p><i>Some elements require work beyond LTPP data analysis, but analysis is needed to provide some components.</i></p> <p style="text-align: right;">H 1</p> | <p>A. Relative importance of different material characteristics in predicting pavement performance.</p> <p style="text-align: right;">VH 1</p> | <p>A. Impact of temperature and moisture variations (independent of frost penetration) on pavement performance.</p> <p><i>Related to 4-E</i></p> <p style="text-align: right;">VH 1</p> | <p>A. Comprehensive guidelines for assessing the relative performance of different pavements.</p> <p style="text-align: right;">VH 1</p> | <p>A. Guidelines for selection of appropriate load-response models for use in pavement design as a function of the acceptable level of risk and model complexity.</p> <p><i>Closely related to B and C</i></p> <p style="text-align: right;">VH 1</p> | <p>A. Performance and efficacy of maintenance and rehabilitation treatments as a function of pre-treatment condition.</p> <p style="text-align: right;">C 1</p> | <p>A. Impact of design features on measured pavement responses (deflections, load-transfer, strains, etc.).</p> <p style="text-align: right;">VH 1</p> | |
| | | | | | | | <p>B. Relationships to enable interchangeable use of laboratory and field-derived material parameters.</p> <p style="text-align: right;">VH 1</p> |
| | <p>B. Guidelines for applying traffic loading and classification data in pavement design.</p> <p style="text-align: right;">C 2</p> | <p>C. Relationship between as-designed and as-built material characteristics.</p> <p style="text-align: right;">H 1</p> | <p>C. Long term changes in pavement characteristics due to environmental effects and aging.</p> <p><i>Related to 4-E</i></p> <p style="text-align: right;">H 1</p> | <p>C. Models relating functional and structural performance.</p> <p style="text-align: right;">H 2</p> | <p>C. Calibrated relationships (transfer functions) between pavement response and individual distress types.</p> <p><i>Closely related to A and B</i></p> <p style="text-align: right;">VH 1</p> | | <p>C. Guidelines for the selection of pavement design features.</p> <p style="text-align: right;">VH 3</p> |
| | <p>C. Procedures for forecasting and back-casting traffic loading data.</p> <p style="text-align: right;">C 3</p> | <p>D. Performance impact of different levels of material variability and quality.</p> <p style="text-align: right;">H 1</p> | <p>D. Recommendations for climatic data collection to adequately predict pavement performance.</p> <p><i>Depends on A and B but not C</i></p> <p style="text-align: right;">VH 2</p> | <p>D. Criteria for applying performance measures (including variability) to construction quality evaluation.</p> <p style="text-align: right;">H 2</p> | | | |
| <p>D. Impact of pavement roughness on the dynamic loads applied to pavements.</p> <p style="text-align: right;">H 3</p> | <p>E. Estimate material design parameters from other materials data (for example, Resilient Modulus from gradation and density).</p> <p style="text-align: right;">H 1</p> | <p>E. Region Specific Guidelines for Considering Environmental and Load Effects.</p> <p><i>Depends on A and B but not C</i></p> <p style="text-align: right;">H 2</p> | <p>E. Relationship between variation in pavement performance measures and environmental factors.</p> <p><i>Related to 3-A, B, and C</i></p> <p style="text-align: right;">H 2</p> | | | | |

- Priorities**
- Critical **C**
 - Very High **VH**
 - High **H**
- Sequence** 1 2 3

Sequence numbers denote the order in which Analysis Outcomes should be addressed for a given Objective. Analysis Outcomes with the same sequence number can be addressed at the same time.

Note: Explanatory comments are in bold italic text.