STRATEGIC PLAN

FOR LONG-TERM PAVEMENT PERFORMANCE DATA ANALYSIS

November 9, 1999

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 LTTP 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 products 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 results leading to products expected to address these objectives are shown in the chart on the following page.

LONG-TERM PAVEMENT PERFORMANCE STRATEGIC PLAN OBJECTIVES AND PRODUCTS

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

STRATEGIC OBJECTIVES

ANALYSIS RESULTS LEADING TO PRODUCTS

1. Traffic characterization and prediction

- **A.** Guidelines for data collection (hardware, software, placement, calibration, data collection frequency)
  Some elements require work beyond LTPP data analysis, but analysis is needed to provide some components.
  H 1
- **B.** Guidelines for applying traffic loading and classification data in pavement design
  C 2
- **C.** Procedures for forecasting and back-casting traffic loading data
  C 3
- **D.** Quantitative information on the impact of pavement roughness on actual (dynamic) loads applied to the pavement
  H 3

2. Materials characterization

- **A.** Quantitative information as to the relative importance of different material characteristics in predicting pavement performance
  VH 1
- **B.** Relationships to enable interchangeable use of laboratory and field-derived material parameters
  VH 1
- **C.** Procedures for determining as-built material properties
  H 1
- **D.** Quantitative information on the performance impact of different levels of material variability and quality
  H 1
- **E.** Estimate material design parameters from other materials data (for example, M_r from gradation and density)
  H 1
- **F.** Information as to the relationship between as-designed and as-built material characteristics
  Follows A
  VH 2

3. Determination of environmental effects in pavement design and performance prediction

- **A.** Quantitative information on the impact of temperature and moisture variations (independent of frost penetration) on pavement performance
  Related to IV-E
  VH 1
- **B.** Quantitative information on the impact of freeze-thaw cycles on pavement performance.
  Related to IV-E
  VH 1
- **C.** Quantitative information on the long-term changes in pavement characteristics due to environmental effects and aging
  Related to IV-E
  H 1
- **D.** Recommendations for climatic data collection to adequately predict pavement performance
  Depends on A and B but not C
  VH 2
- **E.** Region-specific guidelines for considering environmental effects in pavement modeling
  Depends on A and B but not C
  H 2

4. Evaluation and use of pavement condition data in pavement management

- **A.** Guidelines defining measurements required to compare performance of different pavements, including information on strengths and limitations of each recommended pavement condition measure
  VH 1
- **B.** Improve measures of pavement structural condition for use in network-level pavement management
  VH 2
- **C.** Models relating functional and structural performance
  H 2
- **D.** Criteria for applying performance measures (including variability) to construction quality evaluation
  H 2
- **E.** Quantitative information on variation in pavement performance measures as a function of environmental factors
  Related to III-A, B, and C
  H 2

5. Development of pavement response and performance models applicable to pavement design and performance prediction

- **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
  Closely related to B and C
  VH 1
- **B.** Mechanistic-empirical procedures for using commonly collected pavement data to predict specific distresses
  Closely related to A and C
  VH 1
- **C.** Calibrated relationships (transfer functions) between pavement response and individual distress types
  Closely related to A and B
  VH 1

6. Maintenance and rehabilitation strategy selection and performance prediction

- **A.** Quantitative information on the performance of maintenance and rehabilitation treatments, including the effect of pre-treatment condition
  C 1
- **B.** Guidance on the timing and selection of pavement maintenance and rehabilitation options, and expected performance life of each
  Follows A
  C 2

7. Quantification of the performance impact of specific design features (presence or absence of positive drainage, differing levels of pre-rehab surface preparation, etc.)

- **A.** Quantitative information on the impact of design features on measured pavement responses (deflections, load-transfer, strains, etc.)
  VH 1
- **B.** Quantitative information on the impact of design features on pavement distress
  VH 2
- **C.** Guidelines for the selection of pavement design features
  VH 3

Note: Explanatory comments are in bold italic text.

Product Priorities

Critical	C
Very High	VH
High	H
Sequence	1 2 3

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