

# OHIO DEPARTMENT OF TRANSPORTATION OFFICE OF PAVEMENT ENGINEERING RESEARCH IMPLEMENTATION PLAN

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**Title:** Laboratory Characterization of Materials & Data Management for Ohio-SHRP Projects (U.S. 23)

**State Job Number:** 14695

**PID Number:**

**Research Agency:** Ohio University

**Researcher(s):** Teruhisa Masada

**Technical Liaison(s):** Brad Young, Roger Green

**Research Manager:** Karen Pannell

**Sponsor(s):** Howard Wood, David Humphrey

**Study Start Date:** 3/30/1998

**Study Completion Date:** 1/31/2002

**Study Duration:** 46 Months

**Study Cost:** \$121,330.00

**Study Funding Type:** 80 Federal / 20 State form ODOT SPR (2)

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## **STATEMENT OF NEED:**

Highway design engineers in the U.S. have been relying on the 1986-1993 American Association of State Highway and Transportation Officials (AASHTO) Design Guide, which is based on the many empirical elements obtained in the 40-year old AASTHO Road Test. Today, traffic volumes, traffic loads, and expectations for better pavement performance have outgrown the accuracy of the empirical design method. The performance and life of highway pavements have received increased concern across the U.S., since the maintenance and reconstruction of pavement systems cost the state and federal governments billions of dollars each year. Due to the great expense and effort often associated with roadway maintenance, many states are now behind schedule for highway repair. The inability to characterize material properties and their effect on pavement performance is believed to be a contributing factor to the pavement performance problems that exist.

## **RESEARCH OBJECTIVES:**

- Determine the mechanical properties of the materials that were used in the Ohio-SHRP (U.S. 23) project.
- Integrate and consolidate all the data for the Ohio-SHRP (U.S. 23) project that could be utilized for implementation in development of calibration of mechanistic design approach by the ODOT engineers and other designers and researchers.

## **RESEARCH TASKS:**

1. Perform literature review of laboratory tests performed on each different pavement material.
2. Perform laboratory testing on pavement materials.
3. Present key information on the Ohio-SHRP Test Road project.
4. Summarize currently available standard test protocols that were applied to measure the mechanistic properties of the pavement materials utilized in the Ohio-SHRP project.
5. Present in detail every mechanistic property measured in the current study.
6. Develop a computer-based database, packaged into a CD-ROM disk, to allow for fast and easy access to the information/data related to the Ohio-SHRP Test Road project.

**RESEARCH DELIVERABLES:**

- The final report will describe all research activities, findings, and conclusions.
- The CD-ROM Disk containing database of Ohio-SHRP test Road information.

**RESEARCH RECOMMENDATIONS:**

- Laboratory test descriptions and results summarized in the final report document can enhance highway engineer's understanding of the state of the laboratory testing of pavement materials, and general properties/behaviors of the highway pavement materials utilized in the Ohio-SHRP Test Road.
- Engineers and researchers interested in the Ohio-SHRP Test Road project can access both the general project information and properties of construction materials instantly through the provided CD-ROM computer database.
- Various material properties measured in the laboratory under the current study will be useful for preparing the data inputs during the implementation of the M-E procedure to the Ohio-SHRP Test Road. Preliminary review of several documents found many material properties measured in the current study to be designated as material property inputs into the M-E procedure.

**PROJECT PANEL COMMENTS:**

The physical properties of materials used on the Ohio SHRP Test Road were summarized in a database developed specifically for this project.

**IMPLEMENTATION STEPS & TIME FRAME:**

Data has been utilized by the projects entitled "Truck/Pavement/Economic Modeling and In-Situ Field Test Data Analysis Applications", pooled fund number SPR-2(203), which has a December 9, 2006 completion date; and "Material Properties for Implementation of Mechanistic-Empirical (M-E) Pavement Design Procedures", state job number 14767, which was completed March 1, 2004.

**EXPECTED BENEFITS:**

The determination of these properties facilitated the early analysis of response and performance data which otherwise would have been delayed until LTPP completed their testing. These data could also be used to help implement the NCHRP 1-37A procedures

**EXPECTED RISKS, OBSTACLES, & STRATEGIES TO OVERCOME THEM:**

None

**OTHER ODOT OFFICES AFFECTED BY THE CHANGE:**

None

**PROGRESS REPORTING & TIME FRAME:**

Implementation complete, no reporting is necessary.

**TECHNOLOGY TRANSFER METHODS TO BE USED:**

- The final report of this research will be available online at the ODOT website.
- The database files will be available to download from the ODOT website.
- The Final Report was also distributed to all other state departments of transportation in addition to national libraries and repositories.

**IMPLEMENTATION COST & SOURCE OF FUNDING:**

No funding needs are anticipated.

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**Approved By:** (attached additional sheets if necessary)

**Office Administrator(s):**

Signature: David Humphrey Office: OPE Date: 2/10/2006

**Division Deputy Director(s):**

Signature: Howard Wood Division: Planning Date: 2/14/2006