

November 1, 2005

**Consortium of Accelerated Pavement Testing (CAPT)
Transportation Pooled Fund Project**

Solicitation Number: xxx

Status: xxx

Title: Consortium of Accelerated Pavement Testing (CAPT) and Technical Exchange Partnership

Sponsoring Agency: Federal Highway Administration

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Lead Agency: Federal Highway Administration

Date Posted: xxxx

Solicitation Expires: 6/30/2006

Commitment Start Year: 2006

Commitment End Year: 2008

Duration: continuous, with minimum of 24 months of commitment required

Commitments Required: \$25,000 (\$12,500 per year)

100% SP&R Approval: Pending Approval

Background

Nationwide, federal, state and municipal transportation agencies invest over \$30 billion annually in the construction, repair and maintenance of highway and runway pavements. Research to improve design standards, materials and construction specifications and maintenance practices is a constant and expensive feature of the annual budgets of these organizations. Application of the findings of this research is often delayed by the enormous cost and lengthy nature of full-scale field evaluations.

The recent history of accelerated pavement testing has been characterized by a lack of common practice among the practitioners. As the owners of the individual test facilities focused on the solution of very specific problems, each study or experiment has tended to be unique, with study-specific experiment designs, testing regimes, data collection practices and data management protocols.

Thus, even when studies conducted at two or more facilities may have the same basic objectives, the variation in practice adds unacceptable uncertainty to attempts to merge and analyze data from the various studies. This same variation inhibits truly collaborative studies where two or more facilities might investigate different segments of a shared experiment design. These technical handicaps can only be overcome if a mechanism for the early identification of collaborative opportunities and the development of consensus practices is created and applied.

Each facility is managed independently and little collaboration, coordination or even data sharing has taken place among the facilities, the nationwide investment is sub-optimized. To overcome this, the FHWA and a group of state departments of transportation from 9 of the 15 US facilities have proposed creation of a joint or pooled funded program to encourage coordination among the various facilities and provide resources and management for collaborative studies.

What is an Accelerated Pavement Testing? These facilities generally *apply full-scale wheel loads to full pavement structures by either machines or vehicles in a test facility, test track, or in-service pavement for the purpose of determining pavement response and performance in a compressed time period*¹.

The facility owner/operators recognize the benefits of sharing experiences and working towards the goal of full cooperation on specific experiment. The understanding of each other's equipment, individual experimental designs, instrumentation and measurement strategies, loading, materials selection and handling, construction techniques, and the reporting of findings are all areas is complicated and challenging.

The best way to address these issues is to meet continuously and to share knowledge and information. In time, it is hoped that by working together, the facility owners/operators better work together to collaborate on specific experiments so as to further improve the speed of the experiments and to add more cells of data. Once this technology sharing is underway, collaboration on future experiments - recycled materials, asphalt modifiers, warm asphalt, concrete pavements, composite pavements, pavement preservation strategies, drainable bases, performance specifications, tire impacts on pavements, and a host of other topics - will be feasible.

The CAPT will pool the efforts of the participating agencies to develop deliverables in ten major areas or tracks. They are:

1. APT / Test Track Facility and Equipment (including real time mounted instrumentation and testing capabilities)
2. Standard Terminology and Test Procedures (A Cross Cutting Track)
3. Construction Site Practices and Procedures

4. Instrumentation of Pavement, Bases, Subgrades, etc,
5. Pavement Condition Evaluation Techniques and Frequency
6. Data Acquisition, Storage, and Sharing Methodologies

7. Experimental Design and Loading Methodologies
8. Theoretical Models for Pavement Response and Distress
9. Performance Relationships (linkages to LTPP, RTL, etc.)

10. Training, Education, Outreach, Economic Analyses

Appendix 1 further identifies more detailed potential collaboration issues that owners/operators might consider during the pooled fund study.

From this effort, owners/operators should get a better grasp of APT cost allocation, performance data interpretation and application, a better understanding of pavement performance variability of strategies, and in general and faster implementation of innovation and technology transfer

Objectives: The main objective of the CAPT Pooled Fund is to develop technical deliverables unique to APT facilities and to accelerate technology transfer among APT owners.

¹ From NCHRP 512 Accelerated Pavement Testing: Data Guidelines, Foreword

Scope of Work:

- Organize and structure a program that identifies and produces key technical deliverables
- Provide a means to define, support and share APT technology of mutual interest.
- Develop a longer-range plan of collaboration (strategic plan), including potential cooperation with international community.
- Provide for special studies, investigations, research and training.

Anticipated Benefits:

There is an increasing demand for advice and consultation to develop and improve accelerated pavement-testing programs. The CAPT pooled fund will be able to provide advancements by offering:

- Shared expertise and exposure to national and international knowledge.
- Fast-track technology transfer, training and deployment of innovations.
- Timely solutions to highly technical pavement testing and analysis issues.
- Continuous working relationships with industry, academia and other public agencies.
- Solutions to overcome agency and industry barriers to change.
- Specifications on the next generation of equipment and instrumentation.
- Ways to minimize duplication of efforts as a result of working on common objectives.
- Ways to reduce costs as a result working on common issues.
- Focused and group-supported research needs, funding mechanisms and prioritization of work.

Supporting Literature:***National Cooperative Highway Research Program***

- Synthesis of Highway Practice 325: Significant Findings From Full-Scale Accelerated Pavement Testing
- Synthesis of Highway Practice 235 (1996) Application Of Full-Scale Accelerated Pavement Testing
- Report 512 (2003) Accelerated Pavement Testing: Data Guidelines;

TRB

- Long Term Pavement Performance Committee: Letter report dealing with the use of accelerated pavement testing as a complement to full-scale, long-term pavement performance studies (2004).
- Circular E-C004: Report On Apt Data Survey Transportation Research;
- Full-Scale/Accelerated Pavement Testing: Current Status And Future Directions: Transportation in the New Millennium (2000).
- Committee AFD40 Full-Scale and Accelerated Pavement Testing (various documents)

International Cooperation

An important aspect of the CAPT is the possible cooperation with the European Union, under their Co-operative Science and Technology study program of the European Community (COST). This organization has just completed a synthesis of European activities and has been cooperating with TRB AFD40 Full-Scale and Accelerated Pavement Testing. This Committee and the COST 347 committee are working on mechanism to exchange information in the future.

Final Comments: This will be a two-year project with likely renewal. Additional meetings, besides the semi-annual meetings, are possible. The proposed budget will cover the cost of meeting arrangements, state travel, and a meeting report. Each state will provide funding of a minimum of \$12,500 each year for a 2-year renewable period. The two-year commitment/obligation of funds can be split over the both years or the full amount can be committed/obligated in the first year of the program. Nine states (CA, IL, KS, MN, FL TX, LA, IN, OH), the National Center for Pavement Technology and the FHWA have expressed interest in the program. A final report will be prepared at the end of the two-year period.

Appendix 1. Collaboration Opportunities

Under the 10 Tracks, APT owners have further expressed the need to address the following issues and prepare detailed practices to improve both local operations and teaming possibilities:

- **Examples of Technical Goals**
 - Reduce potential conflicts in theoretical approaches
 - Work to prioritize various factors
 - Minimize operational challenges
 - Better understand what others are doing in their experimental plans
 - Save constituent materials for future testing. Without constitutive materials to allow for future testing, performance results become limited.
 - Apply APT to longer term pavement goals
 - Link APT results to both laboratory testing and to actual pavement performance

- **Examples of Improved Practices**
 - Refine and improve on common data formatting, test method, and practices
 - Minimize differences in tests often attributed to local or regional issues
 - Make the data “clearly” understandable – *“transferability of the data”*
 - Make sure each experiment generates reasonable sets of data
 - Access each other’s raw data, ex. Dynamic Modulus filtering/analysis

- **Examples of Subject Matter Themes for Potential Collaboration**
 - Composite Pavements
 - M-E Design Guide (Structural Design)
 - Warm Mix Asphalt
 - Recycled Materials
 - Thermal Cracking
 - Modified Binders
 - Moisture Damage
 - Superpave, Performance of Coarse- and Fine-gradations