State Planning and Research Program
Yearly Report

PROJECT TITLE:
TPF-5 (132) Investigation of Low Temperature Cracking in Asphalt Pavements - Phase II (MnROAD Study)

OBJECTIVES: The main objective of this study is to validate the laboratory test procedures, models, and pavement design procedures that come out of Phase I of this study. This will be accomplished by monitoring two new test sections at the Minnesota Road Research Facility (MnROAD). Phase I was aimed at developing a fracture mechanics-based specification for a better selection of asphalt binders and mixtures with respect to their resistance to crack formation and propagation. This fracture mechanics approach will also be used to investigate the detrimental effects of aging and moisture on the fracture resistance of asphalt materials.

PERIOD COVERED:
2009 Year End Report – (October 1, 2009 – December 31, 2009)

PARTICIPATING AGENCIES:
CT, IA, MN, ND, NY, WI, LRRB

PROJECT MANAGER:	**SP&R PROJECT NO**:	PROJECT IS:
Benjamin Worel **LEAD AGENCY**: Mn/DOT **PRINCIPAL INVESTIGATOR**: Mihai Mareausenu (University of MN)	TPF-5 (132)	____ Planning __X__ Research & Development

ANNUAL BUDGET:
Total Research Funding = $525,000
Contract = $475K
(Completion Date = January 31, 2012)
Project Administration = 26K (agency meetings)
Agency Discretion = 24K

Minnesota SPR and Partner Funding (not final)
- Construction (3 test cells) = $400,746
- Instrumentation Costs = $56,429

PROJECT EXPENDITURES TO DATE:
- 2 State meetings held 3/11/2008 and 11/18/2009
- Agencies Meetings cost = $3,600 (updated 9/27/09) + the costs from the Nov 2009 meeting.
- No additional funding will be required to complete this project as contracted.

WORK COMPLETED:
1. December 2007 - Project was just work plan developed and approved
2. March 11, 2008 Agency Kickoff meeting held in Minnesota
3. June 17, 2008 - Contract finalized between University of Minnesota and Mn/DOT – work starts. University of Minnesota has subcontract with Iowa State and working on the other two universities.
4. October 2008 MnROAD Test cells are completed on the mainline for this study.
5. March 2009 State meeting (20 minutes) in Minneapolis at AAPT (Handout attached).
6. November 18, 2009 Agency meeting was held in Minnesota (meeting notes on the Pooledfund.org web site. During this meeting each task was discussed and the agencies and contractor also decided that the final project output will consist of a two-tiered implementation system, which the exploring the following in the next 6 months (will be a working draft).
    - Using the specifications to do your own testing on materials for the state or hire consultants to do it for you. Define the costs to develop the testing equipment and fixtures needed. Also make some proposals what testing protocol would be suggested related to the specific binders, aggregates, and mixtures used in a state.
    - Use the results of the testing already done by the Universities to develop a program to predict fracture toughness related to typical testing done at each state. This may include aggregate quality, fracture, creep, PG grades, modifiers, air voids, recycled mix properties (percent, grad, AC content).

SUMMARY OF ACTIVITIES EXPECTED TO BE PERFORMED NEXT QUARTER:

1. Contractors continue to work this quarter doing much of the lab testing this year.
2. Currently no outreach materials have been created for this project.
3. Mn/DOT will be requesting funding (agency discretion funding ~ 24K) to help support MnROAD test section monitoring over the next 2 years as discussed at the last pooled fund meeting in November 2009.

STATUS AND COMPLETION DATES:

Mihai's task summary

Task 1 – Update on low temperature cracking research

Completed 98%

Literature review was submitted at the end of the year. It was rewritten with the comments from the TAC members to make it more useable for the states. State will review in January 2010.

Task 2 – Expand Phase I test matrix with additional field samples

Completed 60%

Gyratory compacted cylinders were delivered to UIUC team after the project meeting in November and DCT testing is in progress. It is anticipated that all testing will be completed by the end of next quarter.
Also in next quarter, a presentation will be made to the mix ETG in February to discuss a proposed AASHTO SCB draft specification and to solicit participants for a SCB and DCT round robin.
Work is in progress on the sub-task on physical hardening at University of Wisconsin and it is anticipated that 90% of the work will be completed by the end of next quarter.

Task 3 – Develop low temperature specification for asphalt mixtures

Completed 25%

Most of the work has focused on sub-task 3 on developing a simplified method to obtain creep compliance of asphalt mixtures. It is anticipated that at the end of next quarter, when all experimental data from Task 2 is obtained, work will continue on the other two sub-tasks.

Task 4 - Develop Improved TCMODEL

Completed 50%

Work has continued on further improvement of the model. Further refining will occur after all experimental data from Task 2 will be completed

Task 5 - Modeling of Asphalt Mixtures Contraction and Expansion Due to Thermal Cycling

Completed 15%

Progress was made in this task at University of Wisconsin. More mixtures were tested and the Tg dilatometric apparatus has been further refined to make it more user friendly.

Task 6 – Validation of new specification

Nothing to report

Task 7 - Development of draft AASHTO standards and Final Report

Nothing to report