

State of Wisconsin/Department of Transportation
RESEARCH PROGRESS REPORT FOR THE QUARTER ENDING: Sep 30, 2002

Program: SPR-0010(36) FFY99	Part: II Research and Development
Project Title: Wet Pavements Accident Study of Longitudinal and Transverse Tined PCC Pavements	Project ID: 0092-00-08
Administrative Contact: Nina McLawhorn	Sponsor:
WisDOT Technical Contact: Error! Bookmark not defined.	Approved Starting Date: Dec 15, 1999
Approved by COR/Steering Committee: \$75,000.00	Approved Ending Date: Jul 31, 2002
Project Investigator (agency & contact): Alex Drakopoulos: Marquette University	

Description: The study will be conducted over 31.5 months, and will be completed in four (4) phases.

Task 1: PCC Pavement Data Availability and Participation by Other States

Task 2: Assembling Pavement and Crash Database and Interim Report

Task 3: Analysis

Task 4: Draft Final and Final Report

Background:

Study would document relative safety characteristics of each type of tining to allow states to understand trade-off's made when departing from preferred transverse tining to a more quiet longitudinally tined pavement. Results would determine impact, either for or away from longitudinally tined pavements.

Total Study Budget	Current FFY Budget	Expenditures for Current Quarter	Total Expenditures to Date	Percent Complete
\$75,000.00	\$25,000.00	\$0.00	\$63,756.25	0 (%)

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Progress This Quarter:

(Includes project committee mtgs, work plan status, contract status, significant progress, etc.)

Awaiting decision on request for four-month no-cost extension. Letter sent February 6, 2003, for extension to end of May 2003.

Work Next Quarter:

When permission to proceed is received, the WETTIME program will be further modified to process the necessary climate data and produce the percent time pavements were wet, dry, or covered with snow or ice during each analysis year. Accident rates will then be produced, using the accident database and the WETTIME program output. Final report will document literature search, database, analysis and findings.

Circumstances affecting progress/budget:

Gantt Chart:

Note: Gantt chart shown in State Fiscal Year Quarters

State of Wisconsin/Department of Transportation
RESEARCH PROGRESS REPORT FOR THE QUARTER ENDING: Mar 31, 2003

Program: SPR-0010(36) FFY99	Part: II Research and Development
Project Title: Effects of Ground Granulated Blast Furnace Slag in Portland Cement Concrete	Project ID: 0092-02-14a
Administrative Contact: Nina McLawhorn	Sponsor:
WisDOT Technical Contact: Error! Bookmark not defined.	Approved Starting Date: Nov 7, 2001
Approved by COR/Steering Committee: \$194,251.00	Approved Ending Date: Dec 31, 2003
Project Investigator (agency & contact): Steve Cramer: UW-Madison	

Description: Federal transportation directives encourage the use of by-product materials and mandate open and unrestricted competition for alternative cementitious materials. In 1995, the EPA listed ground granulated blast furnace slag (GGBFS) as a recyclable material in the Federal Register. GGBFS is a cementitious materials that replaces a portion of the portland cement in a concrete mix and is being used with increasing frequency for pavement in concrete in Wisconsin.

The production and use of GGBFS is more than 100 years old, yet significant levels of use in Wisconsin are quite recent. GGBFS is manufactured across the world but recently has been offered in Wisconsin by only one manufacturer.

Relevant questions associated with GGBFS use for Wisconsin include: 1) what replacement level of cement is most appropriate and what are the performance tradeoffs with different levels?

2) How do the fineness and activation characteristics vary from shipment to shipment of GGBFS among shipments of the current primary supplier and those of other new suppliers planning product introduction in 2001?

3) How does the GGBFS effect performance, change with different cement chemical compositions?

4) Are there undesirable interactions with admixtures or other additives?

Total Study Budget	Current FFY Budget	Expenditures for Current Quarter	Total Expenditures to Date	Percent Complete
\$194,251.00	\$64,750.33	\$18,195.23	\$17,079.41	44 (%)

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Progress This Quarter:

(Includes project committee mtgs, work plan status, contract status, significant progress, etc.)

A sample of GGBFS has been obtained from a local company using GGBFS each month to monitor the variability of monthly samples being used in the region. The chemical analysis and particle distribution results for samples from August to October 2002 showed low variability. The use of GGBFS declines during colder months and the material does not turn over quickly. Instead of daily shipments, the time between shipments was longer than a week.

Compression testing on the first set of mixes is coming to a close. As expected, the early strengths of GGBFS concretes were less than OPC concrete. At 56-day testing, the PC concrete strength was still higher, but the gap was much smaller than at 7-day testing. Later this fall, one year tests will be conducted. The GGBFS concretes are expected to have higher strengths by that time.

In January, the second set of mixes was completed. These included the igneous coarse aggregate, the first brand of cement, and the three replacement levels. Compression tests are currently being conducted. Trends are similar, with higher GGBFS levels having lower strengths. For every replacement level, the igneous mixes have higher strengths than the limestone mixes.

In March, the scaling tests were completed for the first set of GGBFS mixes which utilized limestone coarse aggregates. Several trends were observed. With a higher level of GGBFS, more scaling occurred. The curing compounds improved

resistance to scaling compared to the wet cured samples. The resin curing compound performed better than the wax-based compound. There was one unexpected trend. For the GGBFS concretes, the air cured samples performed (less scaling) better than the wet cured samples. These early results suggest that the common accepted rules on concrete curing may need some modification to optimize GGBFS concrete performance.

Shipments of three different brands of commonly used cements for paving in Wisconsin were ordered and obtained in March to enable continued preparation of concrete mixes per the work plan.

The next set of mixes is currently being done using cement type I, both coarse aggregates and three cement replacement levels. The materials are all conditioned at 40° F, mixed outdoors in cool weather, and cured for 56 days in 40° F conditions in a controlled environment. The current use of GGBFS is restricted to temperatures above 40° F. These mixes are done to observe the performance of GGBFS at this restriction temperature.

Work Next Quarter:

Prepare and evaluate concrete mixes per the work plan. Continue deicer scaling tests with current and newly prepared concrete specimens.

Circumstances affecting progress/budget:

We are running behind schedule since only one graduate student is currently on the project, but progress is being made. A second graduate student is being sought for the project.

State of Wisconsin/Department of Transportation
RESEARCH PROGRESS REPORT FOR THE QUARTER ENDING: Mar 31, 2003

Program: SPR-0010(36) FFY99	Part: II Research and Development
Project Title: Evaluation of Methods for Characterizing Air-Void Systems in Wisconsin Paving Concrete	Project ID: 0092-03-16
Administrative Contact: Nina McLawhorn	Sponsor:
WisDOT Technical Contact: Dave Larson	Approved Starting Date: Jan 1, 2003
Approved by COR/Steering Committee: \$199,965.00	Approved Ending Date: Jun 1, 2005
Project Investigator (agency & contact): Lawrence Sutter: Error! Bookmark not defined.	

Description: The study will be conducted over 30 months, and be completed in 7 phases:

1. Literature review
2. Interim report summarizing the Literature Review findings
3. Preparation of Concrete Mixtures
4. Testing of Fresh Concrete
5. Testing of Hardened Concrete
6. Data Analysis
7. Final Report

Total Study Budget	Current FFY Budget	Expenditures for Current Quarter	Total Expenditures to Date	Percent Complete
\$199,965.00	\$66,655.00	\$0.00	\$0.00	0 (%)

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Progress This Quarter:

(Includes project committee mtgs, work plan status, contract status, significant progress, etc.)

During this quarter the contract was finalized. Michigan Tech was notified on March 11, 2003 that the contract had yet to be processed completely but a March 3, 2003 start date was planned. On April 2, 2003 MTU officials notified the Principal Investigators that the contract was in place and work could commence.

Even though MTU did not have a contract, work was initiated on the initial phases of the project. In addition to readying the laboratory facilities, a literature review was begun on air entrainment chemicals and measurement.

Work Next Quarter:

In this quarter, work will continue in earnest on Task 1: Literature Review. Michigan Tech University and the University of New Brunswick researchers have a sizable body of literature already assembled on this topic, and will continue to synthesize it during the preparation of the literature review. This information will be incorporated into Task 2: Interim Report, and will form the basis for any required revisions to the proposed work plan.

Circumstances affecting progress/budget:

None

Gantt Chart:

2003												
Task			3	4	5	6	7	8	9	10	11	12
Task 1			■	■	■	■						
Task 2					■	■	■	■				
Task 3									■	■	■	■
Task 4												■
Task 5												
Task 6												
Task 7												
2004												
Task	1	2	3	4	5	6	7	8	9	10	11	12
Task 1												
Task 2												
Task 3	■	■	■	■	■	■	■					
Task 4	■	■	■	■	■	■	■					
Task 5	■	■	■	■	■	■	■	■	■	■	■	■
Task 6									■	■	■	■
Task 7												
2005												
Task	1	2	3	4	5	6	7	8	9	10	11	12
Task 1												
Task 2												
Task 3												
Task 4												
Task 5	■	■	■									
Task 6	■	■	■	■	■	■	■					
Task 7			■	■	■	■	■	■				

Note: Gantt chart shown in State Fiscal Year Quarters

**Quarterly Progress Report – April 2003
ISU/Iowa DOT Management Agreement**

CTRE Project Number: 02-133
Pooled Fund Project: TPF-5(066)

Project Dates: February 1, 2003 – December 31, 2008 Overall Project dates
February 1, 2003 – December 31, 2003 Current Contract dates

Project Title: Material and Construction Optimization for Prevention of Premature Pavement Distress in PCC Pavements

Principal Investigator: Tom Cackler
voice: 294-3230 email: tcackler@iastate.edu

Project Technical Monitor: Sandra Larson
voice: 239-1646 email: sandra.larson@dot.state.ia.us

Progress Report:

Project is on schedule	Yes
Project is within budget	Yes
Significant changes in project description	No

Problems (current or anticipated):
No significant problems encountered.

Products and tangible results this quarter (reports/articles written, oral reports/interviews given):
A summary pamphlet was developed to give an overview of the project and show the relationship with other related research.

Interaction with Technical Monitor and/or Project Advisory Committee (brief recount of meetings):
Conference calls with the Interim Executive Committee were held on February 28 and March 25. Several coordination meetings were also held with the Sandra Larson, the Iowa DOT lead state administrative manager.

Brief summary of this quarter's research:
Work on the project during February and March concentrated on coordination of this project with other relevant projects including FHWA Tasks 4 and 64, and other ISU studies including work on concrete mix properties and blended cements, with the objective of avoiding duplication of effort. Contacts were made with FHWA regarding furnishing their mobile concrete laboratory in support of the field work to be done this year. Also considerable effort was made in preparing presentations, surveys, and technical material for the first TAC, Technical Advisory Committee meeting to be held on April 9 in Chicago in coordination with the Midwest Concrete Consortium meeting on April 10 and 11.

Students working on project this quarter (names and whether on assistantship or hourly):

Students were not utilized this reporting period but will be in the future as the laboratory and field work progresses.

Project: Material and Construction Optimization for Prevention of Premature Pavement Distress in PCC Pavements

Work Progress by Task:

Task #	Task Description	Completion Date Expected/Actual	% of task completed
1	Data Collection – literature search and multi-state survey of current and past projects	May 2003	15%
2	Test development – determine tests that need to be developed for pilot project	August 2003	15%
3	Pilot project in Iowa – <ul style="list-style-type: none"> ▪ gain experience with new testing procedures ▪ development of protocol for sampling and testing ▪ field verification of laboratory testing and solutions 	September 2003	0%
4	Present findings at MC2 meeting	October 2003	0%
5	Technology transfer – develop initial standards/guidelines (“Best Practices”) for testing		0%

Anticipated activities during next quarter: During the next calendar quarter work will concentrate on data collection and survey of states, experimental test design and supporting laboratory work, and preparation for field-testing to be accomplished the following quarter.

Budget Report:

BUDGET CATEGORY DESCRIPTION	AMOUNT BUDGETED	EXPENDITURES THIS PERIOD	CUMULATIVE EXPENDITURES
SALARIES/WAGES	\$207,649	\$3,330	\$3,330
BENEFITS	\$52,621	\$884	\$884
TRAVEL	\$31,830	\$648	\$648
SUPPLIES/MATERIALS	\$1,900		
SUBCONTRACTS			
TELECOMMUNICATIONS	\$540	\$53	\$53
PRINTING/COPYING	\$1,000	\$240	\$240

POSTAGE	\$1,400		
OTHER DIRECT COSTS	\$33,500	\$34	\$34
INDIRECT COSTS (University Overhead)	\$85,914	\$1,349	\$1,349
CATEGORY TOTALS	\$416,354	\$6,538	\$6,538