

**OHIO DEPARTMENT OF TRANSPORTATION  
QUARTERLY RESEARCH REPORT**



For Quarter Ending: March 31, 2010

Date Submitted: April 30, 2010

|                                   |  |                                 |          |
|-----------------------------------|--|---------------------------------|----------|
| <b>Project Title:</b>             | Evaluation of Fiber Reinforced Composite Dowel Bars and Stainless Steel Dowel Bars |                                 |          |
| <b>Research Agency:</b>           | Applied Pavement Technology, Inc.  |                                 |          |
| <b>Principal Investigator(s):</b> | Roger M. Larson and Kurt D. Smith  |                                 |          |
| <b>State Job Number:</b>          | 134411   | <b>Agreement Number:</b>        | 22160    |
| <b>Project Start Date:</b>        | October 17, 2008   | <b>Contract Funds Approved:</b> | \$54,000 |
| <b>Project Completion Date:</b>   | October 17, 2011   | <b>Spent to Date:</b>           | \$11,347 |
| 21 % Funds Expended               |  | 23 % Work Done                  |          |
|                                   |  | 38 % Time Expired               |          |

**List the Technical Liaisons and other individuals who should receive a copy of this report:**

Roger Green (Office of Pavement – 614-995-5993)

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TPF-5(188) Technical Panel Members: Mark Gawedzinski (Illinois); Andy Gisi (Kansas); Barry Paye (Wisconsin); Max Porter (Iowa State University); Seung-Kyoung Lee (FHWA)

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**SUMMARY OF PROGRESS FOR QUARTER:**

*Attach a progress schedule consisting of graphical information depicting (1) a schedule of research activities tied to **each task** defined in the proposal, (2) a comparative status of actual versus estimated expenditures, (3) a percentage completion of the research, (4) and a brief description of the activities accomplished by **each member** of the research team as listed in the project budget.*

The quarterly progress report for the period ending December 31, 2009 was prepared by Roger Larson and Kurt Smith and submitted on February 4, 2010.

Only Wisconsin and Ohio are currently proceeding with project monitoring including evaluating the condition of epoxy-coated dowels in older JCP projects to evaluate the extent of the corrosion problem in their State. Both States will be using the acid soluble test in accordance with ASTM-C 1152 which is compatible with Dr. S-K Lee's research at TFHRC. The other States' activities are on hold due to funding limitations. Updates on the testing programs in Wisconsin and Ohio are summarized below.

Wisconsin (provided by Barry Paye)

Professor Crovetto was expecting to receive the results from the chloride ion tests from Giles by April 26. The data will then be merged with the dowel corrosion information. The merged data should be available

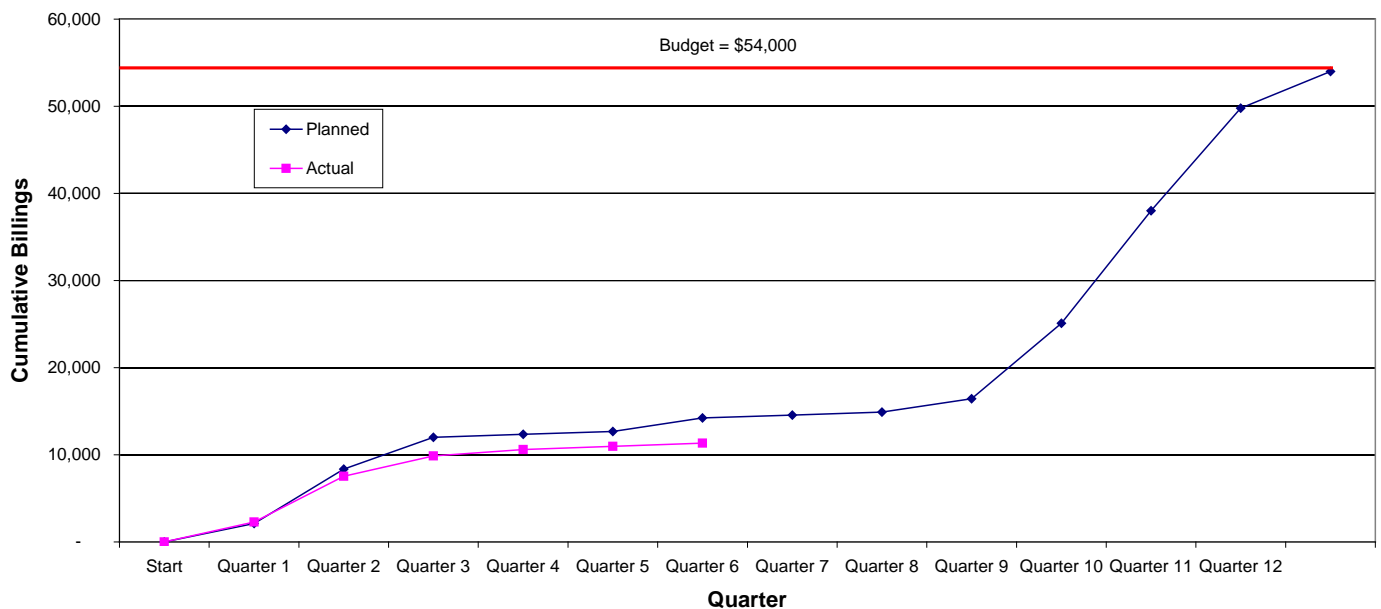
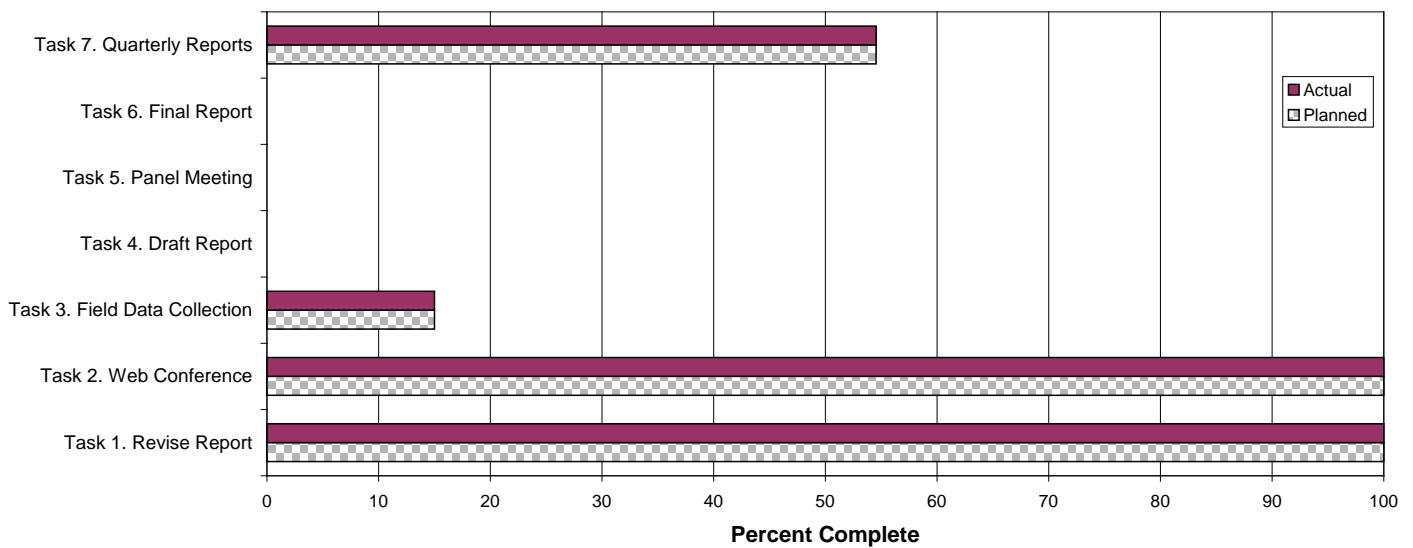
shortly. Also, the draft final report documenting this effort should be submitted by the end of May and finalized by late June or mid-July.

Ohio (provided by Roger Green)

Three of the test sections have been cored and the dowels have been removed from two of the three sections. ODOT is in the process of identifying and coring the remaining 5 sites. The testing lab has asked to spread the collection effort over the summer to eliminate the need to store the cores. The ODOT test lab did not have the materials on hand to do the acid soluble test so the material was ordered. The last of the material should arrive this week and the testing should begin soon. It is planned to coordinate the coring and testing on the US 50 site with the FWD testing this fall. Ohio plans to put their data in the same format that Wisconsin is using.

No activity other than updating the quarterly progress report was undertaken during this quarter.

**Planned to Actual Progress**



**PROPOSED WORK FOR NEW QUARTER:**

During the next quarter, continued monitoring of data collection by the various States will be conducted. Actual analysis is not expected to begin until the 2009 and 2010 monitoring data become available.

**IMPLEMENTATION (if any):**

**No change from two previous quarters which is included below:**

It is suggested that the States evaluate their epoxy-coated dowel bar specifications to help ensure that best practices are being followed. Report UCPRC-RR-2005-10 (FHWA No. S/CA/RI-2006/27) dated January 2007 provides the following recommendations:

*It is recommended that: a) Quality control checks to control holidays be implemented, and b) Bar ends should be coated with epoxy, and care must be taken during shipping, storage, and installation. Stainless steel clad, hollow stainless steel, or microcomposite steel dowels should be considered for locations with high risk of chloride exposure.*

This interim guidance is suggested until the results of this research are available. Also, the FHWA TechBrief *Long Life Concrete Pavements*, FHWA-HIF-07-030 dated July 2007 includes dowel specifications used by Washington State and Minnesota for their long-life PCC pavements that can be considered if more corrosion-resistant dowels are currently required. A TechBrief on alternative dowel bar coatings is being developed under the FHWA ACPT and should be available in the future.

**PROBLEMS & RECOMMENDED SOLUTIONS (if applicable):**

*(Describe any problems encountered or anticipated that might affect the completion of the project within the time, scope, and fiscal constraints set forth in the contract, along with recommended solutions to those problems. NOTING DIFFICULTIES IN THIS SECTION DOES **NOT** CONSTITUTE A REQUEST TO MODIFY THE PROJECT. Requests for additional time, money, or scope revisions must be submitted in a separate letter to the Office of R&D Administrator.)*

A revised evaluation plan has been prepared with recommended testing by the states to complete the evaluation of the various alternative dowel bar material projects that were constructed in 1997-1998. FWD testing, coring, and profile evaluation of field projects by the states in calendar years 2009 and 2010 was recommended.

The revised Evaluation Plan also recommended taking cores of epoxy-coated dowels in 15 to 30<sup>+</sup>-year-old concrete pavements to help evaluate their condition and long-term performance so the relative cost effectiveness of either FRP dowels or stainless steel dowels can be evaluated. No project funding for the chloride testing of the concrete cores taken for the experimental dowels or for the coring and chloride testing of the older epoxy-coated dowel projects is available. This work would have to be conducted by the participating States.

As noted above, it is likely that evaluation data will only be available from Ohio and Wisconsin. The amount of data actually collected during 2009 and planned evaluations for 2010 may dictate the need for a modification of the proposed project schedule in the future.

**EQUIPMENT PURCHASED (if any):**

None.

**CONTACTS & MEETINGS:**

*(Describe any meetings or contacts with ODOT technical liaisons and other pertinent individuals relative to this project.)*

Contacts were made with Roger Green, ODOT, and Barry Paye from Wisconsin DOT. As noted above, ODOT has decided to conduct corrosion testing of the cores at the dowel bar level using ASTM C 1152, acid soluble test. Cores are being taken in Ohio and submitted to their laboratory for testing. Testing is also underway in Wisconsin and preliminary data are expected shortly, with the Final Report submitted by July 2010.