

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

|   |   |
|---|---|
| <b>Program: SPR-0010(36) FFY99</b>  | <b>Part: II Research and Development</b>    |
| <b>Project Title: Investigation of Bridge Approach Settlements</b>            | <b>Project ID: 0092-00-13</b>               |
| <b>Administrative Contact: Nina McLawhorn</b>                                 | <b>Sponsor:</b>                             |
| <b>WisDOT Technical Contact: Bob Arndorfer</b>                                | <b>Approved Starting Date: Apr 18, 2000</b> |
| <b>Approved by COR/Steering Committee: \$99,979.00</b>                        | <b>Approved Ending Date: Apr 18, 2007</b>   |
| <b>Project Investigator (agency &amp; contact): Sam Helwany: UW-Milwaukee</b> |   |

**Description:** This study will be broken into two phases. Phase one will consist of personal interviews and a literature search of all existing work and research in this area. After this portion of the study is completed, a 'best practices' summary report will be submitted. This report will discuss which methods appear to be the most promising for solving the identified approach problems. Phase two will involve performing field pilot studies of a limited number (2-5) of the 'best practice' methods that show the most promise for WisDOT use. This will include construction of the bridge approaches as well as monitoring of them for a period of several years. Monitoring may include such items as pavement distress, maintenance history and vertical displacement. A cost comparison of the various methods will also be performed. Interim reports will be submitted yearly until the final report is written at the conclusion of the testing period.

| Total study budget | Current FFY budget | Expenditures for current quarter | Total Expenditures to date |
|--------------------|--------------------|----------------------------------|----------------------------|
| <b>\$99,979.00</b> | <b>\$12,497.37</b> | <b>\$0.00</b>                    | <b>\$0.00</b>              |

**Progress This Quarter:**

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

Two inclinometer casings have been installed for measuring both horizontal and vertical displacements of the approach embankment of the College Ave. bridge located in Milwaukee District 2 (Bridge structure #B-40-518, Location: 11th St & College Ave, Milwaukee). Monitoring of horizontal and vertical displacements has started and will continue for six years thereafter.

Two bridges have been selected in District 4 to apply CLSM and geosynthetic-reinforced fill methods for approach settlement alleviation. Mr. Keith Kronstedt (District 4 Chief geotechnical engineer and member of the oversight committee of this project) and his associates from District 4 have been instrumental in this respect. Thanks to their efforts, the Hemlock Creek Bridge (State Project Number 6933-00-70) has been constructed with one of its approaches using CLSM fill. The construction of another bridge with a geosynthetic-reinforced soil approach is underway. The approaches of these bridges will soon be instrumented with inclinometers to measure vertical and horizontal displacements. Monitoring will start after installation and will continue for six years thereafter.

Two additional bridges in District 2 will be identified. Mr. Steven Maxwell (member of the oversight committee of this project) is actively involved in this search.

**Work Next Quarter:**

Instrumentation for the two new bridges in District 4 will be installed (inclinometers). Monitoring of these two bridges and the existing bridge on College ave. will continue.

**Circumstances affecting progress/budget:**

None

**Gantt Chart:**

| Task | Year 1  |         |         |         | Year 2  |         |         |         | Year 3  |         |         |         |
|------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
|      | Quart 1 | Quart 2 | Quart 3 | Quart 4 | Quart 1 | Quart 2 | Quart 3 | Quart 4 | Quart 1 | Quart 2 | Quart 3 | Quart 4 |
| 1    | xxxx    | xxxx    |         |         |         |         |         |         |         |         |         |         |
| 2    | xxxx    | xxxx    |         |         |         |         |         |         |         |         |         |         |
| 3    | xxxx    | xxxx    | xxxx    | xxxx    |         |         |         |         |         |         |         |         |
| 4    |         |         | xxxx    | xxxx    |         |         |         |         |         |         |         |         |
| 5    |         |         |         |         | xxxx    | xxxx    | xxxx    | xxxx    |         |         |         |         |
| 6    |         |         |         |         | xxxx    | xxxx    | xxxx    | xxxx    | 42%     |         |         |         |
| 7    |         |         |         |         |         |         |         | xxxx    | 42%     |         |         |         |
| 8    |         |         |         |         |         |         |         |         |         |         |         |         |

**Note: Gantt chart shown in State Fiscal Year Quarters**

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| <b>Program: SPR-0010(36) FFY99</b>   | <b>Part: II Research and Development</b>   |
| <b>Project Title: Estimating Pile Setup for Wisconsin</b>  | <b>Project ID: 0092-00-14</b>              |
| <b>Administrative Contact: Nina McLawhorn</b>  | <b>Sponsor:</b>                            |
| <b>WisDOT Technical Contact: Jeff Horsfall</b>   | <b>Approved Starting Date: Nov 3, 2000</b> |
| <b>Approved by COR/Steering Committee: \$30,000.00</b>   | <b>Approved Ending Date: Jun 28, 2002</b>  |
| <b>Project Investigator (agency &amp; contact): Al Wagner: Wagner Komurka Geotechnical Group</b> |  |

**Description:** This study will consist of personal interviews and a literature search of all existing work and research in this area. This may involve contacting Engineering Consultant firms with expertise in this area, generating a database of available project data and analyzing this data to check the design methodologies being investigated. A report will discuss which method(s) appear to be the most promising for estimating the amount of set-up in the design stage of a project. This analysis will include identifying the subsurface investigation needs and costs associated with this design method(s).

| Total study budget | Current FFY budget | Expenditures for current quarter | Total Expenditures to date |
|--------------------|--------------------|----------------------------------|----------------------------|
| <b>\$30,000.00</b> | <b>\$15,000.00</b> | <b>\$0.00</b>                    | <b>\$0.00</b>              |

**Progress This Quarter:**

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

Completed acquisition, review, examination, assessment, and logging of set-up literature by Dr. Edil and WKG<sup>2</sup>. Prepared draft final report and submitted it to TOC for review.

**Work Next Quarter:**

**Finalize report, incorporating TOC review comments.**

**Circumstances affecting progress/budget:**

**Gantt Chart:**

**Note: Gantt chart shown in State Fiscal Year Quarters**

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|   |  |
|---|--|
| <b>Program: SPR-0010(36) FFY99</b>  | <b>Part: II Research and Development</b>   |
| <b>Project Title: Determination of Influences on Support Strength of Crushed Aggregate Base Course Due to Gradational, Regional and Source Variations</b> | <b>Project ID: 0092-02-01</b>              |
| <b>Administrative Contact: Nina McLawhorn</b>   | <b>Sponsor:</b>                            |
| <b>WisDOT Technical Contact: Error! Bookmark not defined.</b>   | <b>Approved Starting Date: Sep 6, 2001</b> |
| <b>Approved by COR/Steering Committee: \$99,972.00</b>  | <b>Approved Ending Date: Jul 6, 2003</b>   |
| <b>Project Investigator (agency &amp; contact): Richard Reusser: OMNNI</b>  |  |

**Description: Background:**

The State of Wisconsin uses approximately 10,000,000 tons of crushed aggregate base course (CABC) annually, primarily as a base course layer, in its highway improvement projects. CABC is produced from both sand and gravel deposits, typically deposited in glacial and fluvial environments, and stone quarries. It is intended not only as a pavement support layer, but also as a stable working platform during the construction of the surface layer.

| Total study budget | Current FFY budget | Expenditures for current quarter | Total Expenditures to date |
|--------------------|--------------------|----------------------------------|----------------------------|
| <b>\$99,972.00</b> | <b>\$33,324.00</b> | <b>\$0.00</b>                    | <b>\$0.00</b>              |

**Progress This Quarter:**

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

In the second quarter of 2002, we attempted to sample grade 2 base course from sand gravel sources located in the pre-Wisconsin aged glacial deposits in Marathon, Langlade and Lincoln counties to perform basic laboratory testing on them. However, only three sources were identified that anticipated having grade 2 crushed gravel base course available. Attempts to contact the owner of two of the sources have failed. No additional resilient modulus results were available this quarter to look for correlations with the existing test data and/or geologic units.

**Work Next Quarter:**

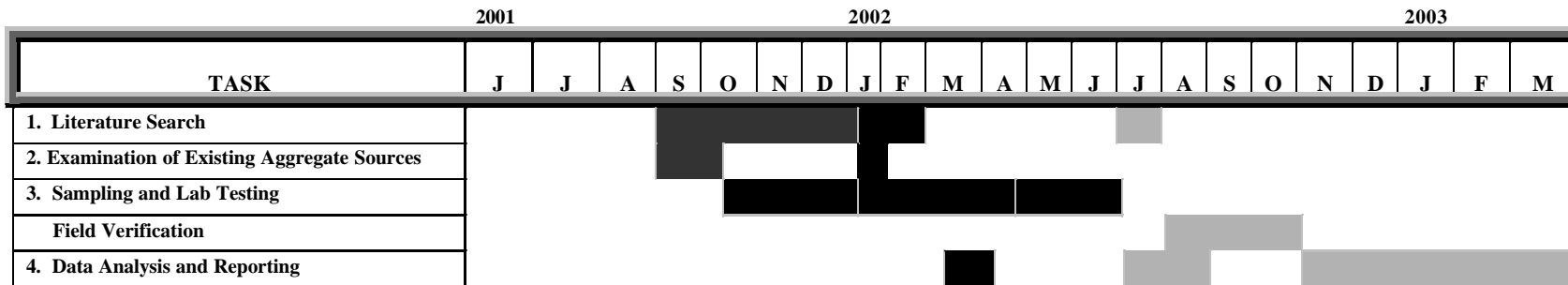
Continue to attempt to contact operators of pre-Wisconsin aged glacial deposits in Langlade and Lincoln counties to arrange for sampling of CABC. Analyse the resilient modulus test results as they become available and look for correlations with the existing test data and/or geologic units. All resilient modulus results are expected by mid-August. We will also work identify the most appropriate method for estimating the resilient modulus of base course material placed in the field and begin the field testing program.

**Circumstances affecting progress/budget:**

Inability to contact pit specific owners needed to arrange for the sampling of pre-Wisconsin aged glacial deposits. Resilient modulus testing is not yet complete so data analysis cannot proceed as planned.

**Gantt Chart:**

**Project Progress and Schedule**



*Project Start:* September 2001

*Project Completion:* Approximately April 2003

| Task                                      | Estimated Percent Complete |
|---|----------------------------|
| Literature Search                         | 85%                        |
| Examination of existing aggregate sources | 100%                       |
| Sampling and testing                      | 90%                        |
| Field verification                        | 0%                         |
| Data analysis and reporting               | 10%                        |

**Note: Gantt chart shown in State Fiscal Year Quarters**