

State of Wisconsin/Department of Transportation
 RESEARCH PROGRESS REPORT FOR THE QUARTER ENDING: Sept 31, 2007

Program: SPR-0010(36) FFY99		Part: II Research and Development	
Project Title: Comparison of Three Different Methods Determining Pile Bearing Capacities		Project ID: WisDOT 0092-07-04	
Administrative Contact: Nikki Hatch		Sponsor: Wisconsin Department of Transportation	
WisDOT Technical Contact: Mr. Jeffrey Horsfall		Approved Starting Date: Oct. 1, 2006	
Approved by COR/Steering Committee: \$30,000		Original End Date: April 1, 2008	
Project Investigator (agency & contact): James H Long/ Univ. of Illinois UW Sub-award: 296H984		Current End Date: June 30, 2008	
		Number of Extensions: 1	

Percent Complete: 50 percent

Request a No Cost Time Extension (Please Select One): YES NO

Reason for No Cost Time Extension:

Project Description:

This project will quantify the ability of the three methods (EN, Gates, and PDA) for predicting pile capacity in a way that allows Wisconsin DOT to assess when or if it is appropriate to use each of the methods and to confidently estimate the reliability/safety and economy associated with each method.

The steps necessary to achieve the overall objectives stated above are listed below:

- to review the current use and state of practice for using the three methods
- to collect load test information, statewide and nationwide, that will allow the calculation of EN, Gates, and dynamic pile test and/or static load tests results
- to quantify the agreement between EN, Gates, dynamic pile tests and/or static load test results
- to compare the predictions made with EN, Gates, and dynamic pile tests
- to quantify the accuracy of each of the methods and identify their limitations
- to assess the cost-effectiveness for each of the methods

Particular emphasis will be directed toward investigating the FHWA-modified Gates method since WisDOT is considering its use. In addition, an alternative modified Gates formula will be developed as part of this study to assess if better accuracy can be achieved using a minor modification to the Gates equation.

Progress This Quarter:

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

Collection and interpretation for data from the Marquette Interchange is in progress (Task 2b). Using data from six reports (Pile Test Program Data Report, Sixth Street Viaduct Rep Pile Report, Structure B-40-285NB GRL Final Report, Structure B-40-285SB GRL Final Report, Structure B-40-1121 GRL Final Report, and Structure B-40-1423 GRL Revised Final Report), we have created a database of pile data for the Marquette Interchange.

This database contains information for 97 closed-end pipe piles. All of the piles have PDA and CAPWAP estimates of capacity from EOD and BOR. Using data from the report, we are also determining capacity using three different dynamic formulae, the Wisconsin ENR, FHWA-Gates, and Allen Methods. Static load tests were performed on seven of the piles and that information is included as well. Other information such as length, size, hammer type, and soil type is also included.

About half of the piles contained in the Pile Test Program Data Report had to be omitted. These piles were driven using a Junttan hydraulic hammer, and there was no record that reported the stroke height during driving. While

the stroke setting was reported, and the frequency of impact was reported, there was no measurement of stroke height and communication with the hammer manufacturer has not successfully identified a reliable correlation between stroke height and the measurements reported. This prevented determining capacity from dynamic formulae, and therefore, the piles have been left out of the database.

Work Next Quarter:

The next quarter will see some continued effort to collect additional information from the Marquette interchange. However, this quarter will focus on analyses of the results and quantifying how well the pile driving formulae perform. Toward the later part of the quarter we will start to investigate method to improve the formulae.

The next project meeting with the Technical Review Panel is planned to occur in November 2007. A more specific date will be set up closer to November.

Circumstances Affecting Progress/Budget:

There have been no circumstances affecting the current progress or budget.

Gantt Chart:

The Gantt chart for the project is given on the next page.

WORK-TIME SCHEDULE

Task	Description	Month															
		Jan 01	Feb 02	Mar 03	Apr 04	May 05	Jun 06	Jul 07	Aug 08	Sep 09	Oct 10	Nov 11	Dec 12	Jan 13	Feb 14	Mar 15	Apr 16
1a	Collect Publ.	xx	xx	xx													
1b	Review Publ.		xx	xx													
1c	Interim Rpt.			xx													
2a	Collect PI's Pile Data	xx	xx	xx	xx	xx											
2b	WDOT MI* Data		xx	xx	xx	xx	xx	xx	xx	xx	xx	xx	xx	xx			
2c	WDOT misc	xx	xx	xx	xx	xx											
2d	Catalogue Data						xx					xx					
3a	Quantify Methods with Static Load Tests							xx	xx	xx	xx						
3b	Quantify Methods with Dynamic Load Tests									xx	xx	xx					
3c	Dev. Improved Gates											xx	xx				
3d	Identify Limitations of Gates												xx	xx			
3e	Identify Cost Savings													xx	xx		
3f	Prepare and Submit Report														xx	xx	
3g	Review, re-edit, and Issue Final Report																xx
	Meetings	*M			*M							*M					*M