

State of Wisconsin/Department of Transportation
 RESEARCH PROGRESS REPORT FOR THE QUARTER ENDING: September 30, 2007

Program: SPR-0010(36) FFY99		Part: II Research and Development	
Project Title: Specification and Design of Fiber Reinforced Bridge Deck Forms for use on Wide Flange T-Girders		Project ID: 0092-06-07	
Administrative Contact: Nikki Hatch		Sponsor: Wisconsin Department of Transportation	
WisDOT Technical Contact: Scot Becker		Approved Starting Date: 10/3/2005	
Approved by COR/Steering Committee: \$94,735		Original End Date: 10/2/2006	
Project Investigator (agency & contact): Lawrence C. Bank, UW-Madison		Current End Date: 10/31/2007	
		Number of Extensions: 1	

Percent Complete: 100 %

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

Reason for No Cost Time Extension: -NA-

Project Description:

Wide-flange W54 and W72 pre-stressed concrete girders are currently being used in Wisconsin for highway bridge construction. As the spans get longer the spacing between the girders gets smaller as a result of using wider top flange to carry the required design moments. The use of permanent, stay-in-place forms made of fiber materials (i.e., not made of plywood) or other alternative materials may be able to provide significant benefits in terms of constructability for Wisconsin wide-flange bridges. Benefits should accrue from decreased costs of materials, decreased cost of labor, and decreased costs due to shorter construction times. These will accrue from the fact that no formwork will need to be manually constructed before deck casting and stripped after deck placement (labor savings), shallow haunches can be used since standard haunching hardware will not be required (saving on concrete material quantity), and that permanent forms will be quicker to install than conventional systems (saving in construction time).

This research investigation will evaluate a number of different fiber reinforced and other commercially available "off-the-shelf" deck forming systems. Experimental load testing and tests of specific haunching and lapping details of selected systems will be conducted at the University of Wisconsin. Based on the results of these tests, numerical finite element analyses, and economic cost/benefit analysis recommendations will be made to the WisDOT for the preferred system(s) to be used in Wisconsin. Specifications and design guidelines compatible with the Wisconsin Bridge Manual will be developed for use by WisDOT.

Specific research objectives are as follows:

1. To investigate different material systems that can be used for bridge deck forms for short spans (1 – 4 ft). Variables will consist of material type, manufacturing method, cost, availability, and durability. Bridge contractors in WI will be consulted as to their current and preferred systems to ensure close coordination with industry practices and to obtain cost figures.
2. To conduct physical experiments on prototype fiber reinforced deck forms made of different material systems to determine their stiffness, load carrying capacity (static and impact) and failure modes.
3. To develop and compare methods of placing, supporting and attaching different types of bridge deck forms to the flanges of T-girders. Experiments will be conducted to assess the constructability of different haunching or tie down details.
4. To develop a standard material and/or performance specifications for different deck form systems. The specifications will be of the form appropriate for Contract Documents and will include quality control and quality assurance provisions.

Progress This Quarter:

The draft final report was prepared and submitted to the TOC for review. A presentation was made to the TOC on September 14, 2007.

Work Next Quarter:

Submit final report and documentation

Circumstances Affecting Progress/Budget: None

Gantt Chart:

Progress to date and scheduled future research activities

	Sept/Oct 05	Nov/Dec 05	Jan/Feb 06	Mar/Apr 06	May/June 06	July/Aug 06	Sept/Oct 06	Nov/Dec 06	Jan/Feb 07	Mar/Apr 07	May/June 07	July/Sept 07
1. Advisory Committee	Completed											
2. Review of COTS systems and materials		Completed	Completed									
3. Downselection for testing		Completed	Completed	Completed								
4. Laboratory testing and analytical studies			Completed	Completed	Completed	Completed	Completed	Completed				
5. Design for constructibility				Completed	Completed				Completed	Completed	Completed	
6. Economic analysis								Completed	Completed	Completed		
7. Specifications development					Completed	Completed			Completed	Completed	Completed	
8. Design guide development				Completed	Completed					Completed	Completed	Completed
9. Final Report			Completed	Completed	Completed						Completed	Completed
								Projected				
								Completed				

Projected task
Completed task