

State of Wisconsin/Department of Transportation
RESEARCH PROGRESS REPORT FOR THE QUARTER ENDING: September 30, 2008

Program: SPR-0010(36) FFY99		Part: II Research and Development	
Project Title: Guidelines for the Implementing the Bridge Health Index		Project ID: MRUTC 08-07 (0092-07-14)	
Administrative Contact: Jason Bittner		Sponsor: MRUTC	
WisDOT Technical Contact: Scot Becker		Approved Starting Date: May 15, 2007	
Approved by COR/Steering Committee:		Original End Date: May 14, 2008	
Project Investigator (agency & contact): Teresa Adams, UW-Madison		Current End Date: December 31, 2008	
		Number of Extensions: 1	

Percent Complete: 75%

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

Reason for No Cost Time Extension: n/a

Project Description:

The goals of this research are to identify/develop tools for using the bridge Health Index (HI) in a comprehensive bridge management system and specifically for decision-making in the context of a bridge preventive maintenance (PM) program. Specific outcomes are (1) demonstration and definition of the bridge HI on Midwest bridges (2) guidelines for integrating the HI with PM criteria (3) planning models that forecast bridge HI for different maintenance scenarios (4), and recommendations for integrating the HI into the overall bridge management decision-making process.

Progress This Quarter:

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

Task 1: Health Index Definition

Task 1 was complete and the final report is being prepared.

Task 2: Health Index (HI) Implementation Guidelines

A survey was sent to State Pontis user representatives (a total of 87 national wide). 26 surveys returned (approximately 30% return rate). 14 out of 26 returned surveys addressed they are currently using bridge HI for their bridge management. They include Delaware, Florida, Hawaii, Kansas, Massachusetts, Montana, Oregon, Utah, and Wyoming. Two responses came from Kansas and Utah. The research team contacted these

agencies individually. The information we wish to obtain: 1) how the states use smart flags for calculating HI 2) the non-CoRe elements the states are currently using 3) the failure cost or weight factors with element replacement cost. So far, we have gotten information from Delaware, Kansas, Oregon and Utah. An analysis of the survey responses will be included in the final report.

Table 1 Bridge Health Index Usage in State DOTs

State	Agent	Use Smart Flag for cal. HI?	Non-CoRe Element?	State specific failure cost?	Information delivered?
Delaware	Douglas Finney	No	Yes	Pontis default	Yes
Florida	Richard Kerr	No	Yes	Yes	
Hawaii	James Fu	No response	No	Pontis default	
Kansas	Deb Kossler	Yes	No	Yes	Yes
Kansas	K F Hurst	Yes	No	Yes	
Massachusetts	Mohammed Nabulsi	No	No	Pontis default	
Montana	Paul Jensen	Yes ¹	Yes	Yes	
Oregon	Bruce Novakovich	No	Yes	Pontis default	Yes
Utah	Chris Potter	Yes	Yes	Pontis default	Yes
Utah	Terri Taylor	Yes	Yes	No response	
Wyoming	Paul Cortez	No	No	Yes ²	
Anonymous	-	Yes	No	Pontis default	
Anonymous	-	No response	No response	No response	
Anonymous	-	No response	No response	No response	

¹ Montana has Modified HI including smart flag.

² Wyoming is developing in house Bridge Index.

Task 3: Analyze Health Index of Midwest Bridges

In a previously completed project, “Guidelines for the Preventive Maintenance of Bridges” MRUTC Project ID 07-14, the research team investigated the relationship between HI and preventive maintenance. One PM activity (deck washing, code 61a) was selected to show the relationship. However, analysis of the data indicates that HI values are not particularly sensitive to the affects of preventive maintenance.

For the current project, the research team will investigate sensitivity of HI to changing failure costs. That is how the failure cost impacts the calculation of bridge HI. This is about analysis of HI by varying failure cost within its allowable range. By the simulation process, the frequency distribution of the HI can be shown by changing the failure cost. This analysis can determine the effects of failure cost on the bridge HI.

Task 4: Tools for Modeling Impact of Preventive Maintenance

Based on the previous research, there is little or no distinct relationship between PM and bridge HI for Wisconsin data. Thus, the research team decided will explore the development of an analytical model rather than an empirical model. This model can show how much PM activity can improve the long term bridge performance.

Work Next Quarter:

- 1) Complete task 2 and write up the report
- 2) Simulation for sensitivity analysis of failure cost on bridge HI
- 3) Generalized Modeling for the impact of preventive maintenance to long term bridge performance

Circumstances Affecting Progress/Budget:

Gantt Chart:

Task	% complete		Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	
			1. Health Index Definition	100%	Proposed	█									
		Actual					█	█	█	█					
2. HI Implementation Guidelines	80%	Proposed	█												
		Actual							█	█	█	█	█	█	
3. Analyze HI for Midwest Bridges	70%	Proposed				█									
		Actual									█	█	█	█	
4. Tools for Modeling Impact of PM	20%	Proposed							█						
		Actual												█	
5. Demonstration	0%	Proposed										█			
		Actual													
6. Final Report	0%	Proposed							█						
		Actual													

Gantt chart (Modified work plan)

Task	% complete		Jul	Aug	Sep	Oct	Nov	Dec
			1. Health Index Definition	100%	Proposed			
		Actual						
2. HI Implementation Guidelines	80%	Proposed	█					
		Actual	█	█	█			
3. Analyze HI for Midwest Bridges	70%	Proposed	█					
		Actual	█	█	█			
4. Tools for Modeling Impact of PM	20%	Proposed			█			
		Actual			█			
5. Demonstration	0%	Proposed				█		
		Actual						
6. Final Report	10%	Proposed	█					
		Actual			█			