State of Wisconsin/Department of Transportation/Midwest Regional University Transportation Center
RESEARCH PROGRESS REPORT FOR THE QUARTER ENDING: June 30, 2008

Program:	Part
Project Title: Guidelines for Implementing the Bridge Health Index **Administrative Contact**: Jason Bittner **WisDOT Technical Contact**: Scot Becker **Approved by COR/Steering Committee**: **Project Investigator (Agency & Contact)**: University of Wisconsin-Madison, Teresa M. Adams	**Project ID:** MRUTC 08-07 **Sponsor:** MRUTC **Approved Starting Date:** May 15, 2007 **Approved Ending Date:** May 14, 2008

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 program. Specific outcomes are (1) demonstration and definition of the bridge HI on Midwest bridges (2) guidelines for integrating the HI with preventive maintenance criteria (3) planning models that forecast bridge HI for different maintenance scenarios (4) recommendations for integrating the HI into the overall bridge management decision-making process.

Total study budget	Current FFY budget	Expenditure for current quarter	Total Expenditure to Date	Percent Complete
$ 50,329	$50,329	$8,204	$23,754	70%

Progress This Quarter

- The survey was sent to Pontis user group representatives and 24 surveys returned including Florida, Colorado and Pennsylvania. Analysis of the returned survey is being performed. The following up interviews or conference calls would be set up if necessary.
- From the literature, the research team found two sets of failure cost: one from Florida practice and the other from AASHTO website. Failure cost is crucial to calculate Health Index and we are reviewing them whether those can be applied to this project.
- The research team contacted Matt Murphy in SW region and obtained the data of bridge preventive maintenance activities. The data contain type of activity, time when performed, cost etc. Also the historical bridge performance data was delivered from Travis McDaniel in WisDOT.

Task 2: Health Index (HI) Implementation Guidelines

This task includes investigating other states experience and process of using the HI for bridge management. The research team decided to do the survey to the Pontis users in the States. The survey was sent to Pontis user group representatives and 24 surveys returned. The list of recipients was attained from Shiv Gupta in WisDOT. From the returned survey, 13 states are currently using bridge Health Index for their bridge management. Table 1 presents the summary of the bridge Health Index usage and its project type in State DOTs. The following up interview or conference call would be set up in necessary.

Table 1 Bridge Health Index Usage in State DOTs

State	Agent	Usage of Health Index (HI)	Project Type
Arizona	Clifton Guest	No	N/A
Colorado	Mark Nord	No	N/A
Delaware	Douglas Finney	**Yes**	Preventive Maintenance, Rehabilitation
Florida	Richard Kerr	**Yes**	Communicate with the public and registration
Hawaii	James Fu	**Yes**	Preventive Maintenance, Rehabilitation, Improvement
Iowa	Jan Wiley	No	N/A
Kansas	Deb Kossler	**Yes**	Preventive Maintenance, Rehabilitation
Kansas	K F Hurst	**Yes**	Preventive Maintenance, Rehabilitation, Improvement, Safety
Massachusetts	Mohammed Nabulsi	**Yes**	Rehabilitation, Improvement
Montana	Paul Jensen	**Yes**	No answer
Nevada	Hossein Hatefi	No	N/A
New Hampshire	David E. Powelson	No	N/A
Oregon	Bruce Novakovich	**Yes**	No answer
Pennsylvania	Lance Savant	No	N/A
Utah	Chris Potter	**Yes**	Rehabilitation, Improvement
Utah	Terri Taylor	**Yes**	Preventive Maintenance, Rehabilitation, Improvement, Safety, Security
Wyoming	Paul Cortez	**Yes**	No answer
Anonymous	-	**Yes**	Rehabilitation
Anonymous	-	No	N/A
Anonymous	-	No	N/A
Anonymous	-	No	N/A
Anonymous	-	No	N/A
Anonymous	-	**Yes**	Improvement
Anonymous	-	No	N/A

Task 3: Analyze Health Index of Midwest Bridges

The purpose of this task is to make a quantitative and qualitative assessment of the Health Index for bridges. To compute and analyze Health Index, there is required information such as element failure cost and element condition. The research team acquired the appropriate data from literatures and bridge engineers in WisDOT. Especially, failure cost is essential factor to compute Health Index. The research team found two sets of failure cost: one from Florida practice and the other from AASHTO website. We are reviewing those can be applied to this project.

- AASHTO
  website: http://assetmanagement.transportation.org/tam/aashto.nsf/docs/E5D2A9F05323691185256B3A004E0632?opendocument&CurrentCategory=c.%20Management%20Systems
- Florida DOT: http://www.pdth.com/florida.htm.

Table 2 summarizes the required information to compute HI in WisDOT.

Table 2 Required Information to Calculate and Analyze Bridge Health Index in WisDOT

Objective	Items	Where to get
Calculation of Health Index	Element Number	Bridge Management Database: obtained
	Element Condition	Bridge Management Database: obtained
	Element Failure Cost	AASHTO website or Florida DOT *
Assessment of Health Index	Historical Element Condition	Bridge Management Database: obtained
	Maintenance cost	Matt Murphy (SW region): obtained
	Maintenance History (Preventive Maintenance)	Matt Murphy (SW region): obtained
	Rehab or Replacement History	Not obtained

* Data was obtained but the research team is reviewing those can be applied to this project.

From the survey, the research team realized State DOTs are using different failure cost (or weight factor) to calculate their bridge HI. Also they have diverse maintenance criteria using HI. Some states are using their own values while others are using Pontis default values. The states that are using their own values would be contacted and be asked to deliver their values.

Table 3 Calculation and Implementation of HI in State DOTs

State	Agent	Failure Cost (Weight Factor)	Maintenance Criteria
Delaware	Douglas Finney	Pontis default value	**State specific value**
Florida	Richard Kerr	**State specific value**	**State specific value**
Hawaii	James Fu	Pontis default value	**State specific value**
Kansas	Deb Kossler	Pontis default value	**State specific value**
Kansas	K F Hurst	**State specific value**	Pontis default value
Massachusetts	Mohammed Nabulsi	Pontis default value	Pontis default value
Montana	Paul Jensen	**State specific value**	**State specific value**
Oregon	Bruce Novakovich	Pontis default value	No use
Utah	Chris Potter	Pontis default value	Pontis default value
Utah	Terri Taylor	No use	Pontis default value
Wyoming	Paul Cortez	**State specific value**	**State specific value**
Anonymous	-	Pontis default value	Pontis default value
Anonymous	-	No use	**State specific value**

Task 4: Tools for Modeling Impact of Preventive Maintenance

As a preliminary analysis, the research team started to make modeling impact of one of preventive maintenance activities, bridge deck washing. To calculate HI, failure cost obtained from AASHTO website was used. The analysis will show how much the bridge condition can be improved by deck washing and will suggest its optimal cycle.

Work Next Quarter

1) Complete analyzing the returned survey and set up the following interview
2) Select the failure cost that can be used for this project
3) Modeling the impact of preventive maintenance

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	75%	Proposed												
		Actual												
3. Analyze HI for Midwest Bridges	60%	Proposed												
		Actual												
4. Tools for Modeling Impact of PM	10%	Proposed												
		Actual												
5. Demonstration	0%	Proposed												
		Actual												
6. Final Report	0%	Proposed												
		Actual												