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Minutes Of The
AASHTOWare Bridge Management Task Force Meeting
June 12 - 13, 2018   Big Sky, MT

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General Information – Meeting of the Bridge Task Force

Date: Tuesday, June 12, 2018

Participants:

AASHTO	Judy Tarwater	AASHTO	Project Manager
SCOA	Tim Armbrecht	Illinois DOT	SCOA Liaison
T&AA	Will Holmes	Kentucky TC	T&AA Liaison
BrM Task Force	Eric Christie	Alabama DOT	Vice-Chair
	Derek Constable - absent	FHWA	FHWA Liaison
	Beckie Curtis	Michigan DOT	Bridge Management
	Mark Faulhaber	Kentucky TC	Bridge Management
	Craig Nazareth	Rhode Island DOT	Bridge Management
	Bruce Novakovich	Oregon DOT	Bridge Management
BrDR Task Force	Todd Thompson	South Dakota DOT	Chair
	Josh Dietsche	Wisconsin DOT	Bridge Rating (BrR)
	Jeff Olsen	Montana DOT	Bridge Design (BrD)
	Dean Teal	Kansas DOT	Bridge Design (BrD)
BrM Contractor	Josh Lang	Bentley	Bridge Management
	Josh Johnson	Bentley	Bridge Management
	Zac Boyle	Bentley	Bridge Management
Guest	Jeff Vigil	New Mexico DOT	BrMUG Secretary
	Vinacs Vinayagamoorthy	California DOT	Future TF Member

General Discussion

Eric Christie convened the meeting at 8:00am. Eric welcomed Vinacs Vinayagamoorthy to the meeting and participants performed self-introductions.

Agenda Item 00:   Review Agenda / Assign Minutes Recorder

Judy Tarwater and Beckie Curtis will take the meeting minutes. The agenda was reviewed and the following topics were added to the agenda.

- Under Agenda Item 2b – Discuss MDTA BrM Evaluation – Support and Requests for information
- New Agenda Item 5 BrM User Manual and Tech Manual Status
- New Agenda Item 8b (now 9b) – City of Calgary Bridge Management System RFP
- New Agenda Item 8c (now 9c) – Outreach Opportunities for States Considering Alternate Bridge Management Solutions

Agenda Item 01:   Prior Business

1a.   Review April Meeting Minutes

Minutes from the April 24-25, 2018, Task Force meeting held in Charleston, SC were reviewed and approved as is.

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1b.   Review April Meeting Summary Minutes

The Summary Minutes for the April Task Force Meeting in Charleston, SC were reviewed and approved as is.

Agenda Item 02:   Project Update

2a.   Budget and Schedule

Bentley presented the budget report for the FY18 MSE contract. All billings reported include invoices issued through 05/31/18. Most of the work to date under the MY18 MSE contract has been under TM1 (Project Management and Administrative Services) – 85%, TM2 (Customer Support) – 94%, TM3 (Maintenance Services) – 103%, TM4 (Meetings) – 76%, TM6 (Task Force Directed Tasks) – 62%. The overall budget spent to date – 81%.

Three enhancements were completed as part of the contract but were not included in the release because they were considered high risk for proper implementation.

2b.   Customer Support Statistics

Bentley presented an overview of the customer support hours by agency as of 05/31/18. Agencies with the highest support levels (over 50 hours) include Alaska, Illinois, Kentucky, Michigan, New Jersey, Oregon, Rhode Island, South Dakota, Vermont, and Virginia. Agencies with over 25 hours in support hours include Arizona, California, FHWA, Idaho, Kansas, Mississippi, North Dakota, Oklahoma, and Wyoming.

Maryland Transportation Authority (MDTA)

The Task Force discussed Bentley support for the MDTA BrM Evaluation and their request for detailed information on the bridge management lifecycle.

> Specific MDTA Request: The LifeCycle node in the Total Utility tree appears to be empty. However, in the Weights Profile, Utility Components are changed to Condition 25, LifeCycle 75, Mobility 0, and Risk 0, which are consistent with analysis results in Program Results, Effects on Utility Criteria. What are the calculation details behind the LifeCycle node in the Total Utility tree?

MDTA is an organization under the Maryland Department of Transportation, an AASHTO Member Agency; however, MDTA/Maryland DOT is not a current licensee of the AASHTOWare Bridge Management software. Their access to the software is through the evaluation copy they obtained in March 2017 (expires 09/30/18). The Task Force made the decision to explain the formula to the MDTA and walk them through the user manual; however, the actual formula and BrM tech manual will not be provided to MDTA.

North Dakota DOT (NDDOT)

The NDDOT requested an estimate of service units required to assist them in moving to BrM 5.3, including assistance in setting up the modeling, costs and other items associated with getting the program to perform the modeling, projection and asset management portion of the program. NDDOT has approximately 1200 NBIS length bridges they want to manage with about 430 of these NBIS length culverts. In response, Bentley provided the following estimate. However, due to the current Bentley workload, NDDOT was advised that they will not be able to get started on such a project for several months. NDDOT indicated that they are willing to wait.

- Task – Configuration Elicitation
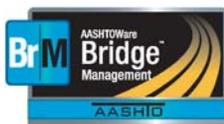
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In a series of eight (8) 4-hour meetings, Bentley will prompt and elicit NDDOT's configurations for the following modules of BrM 5.3:
- Utility
- Benefits
- Actions
- Network Actions & Policies
- Lifecycle Policies

Bentley will also share the experiences of other states where it is considered helpful to the decision-making. The results of the elicitation will be provided in excel spreadsheets for a more permanent record of the findings.
- Task – Element Configuration
  Bentley will analyze NDDOT's historical CoRe element data in an attempt to establish some baseline deterioration rates. Alternatively, NDDOT may elect to determine these values by elicitation. The results will be provided in both an Excel spreadsheet and a BrM upload script.
- Task – NBI Configuration
  Bentley will evaluate NDDOT's historical data to establish an approximate NBI Conversion Rate and an NBI Deterioration Rate. These rate suggestions will be provided to NDDOT in both an Excel spreadsheet and a BrM upload script.

The outlined scope would be in the range of 5-6 BrM Service Units. The traditional one-week orientation would not be required since NDDOT has already had the initial training with Zac Boyle. Additional assistance to support the upgrade to 5.3 (i.e. Bentley staff on-site for upgrades, fixing reports, help turning the connection from your custom collector into a web service call to use the API, etc.) would add additional service units to the estimate. Bentley is waiting on a response from NDDOT on their specific needs in order to finalize the project scope and cost.

New Jersey DOT (NJDOT)
The freeze project issues experienced by the NJDOT have been resolved. Bentley continues to follow-up with the NJDOT on a weekly basis to do a "health check".

The **Alabama** and **Alaska DOTs** both have service unit projects in the queue. The Notice to Proceed for these projects have been signed by the states but not yet forwarded to the AASHTO Project Manager. ALDOT's project includes the development of the module to schedule processes (currently on the user group priority list but not included in the top ten).

Connecticut DOT (CTDOT)
The CTDOT is still unhappy with the length of time (6 months) it took Bentley to provide them with an estimate for hosted services. Once presented, the proposed cost was much higher than CTDOT had anticipated (based on previous discussions with Bentley staff). With the estimate in hand, CTDOT is currently evaluating options for hosting their instance of BrM. Options under consideration are 1) hosting directly with Bentley (in lieu of a project through AASHTO HAOs), 2) hosting with Bentley via AASHTO HAOs, and 3) hosting in-house.

Manitoba ID

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The Bentley support contract with the Manitoba Infrastructure Department is still ongoing. The latest status is from 05/24/18 in which Corey Beynon advised that after two months of working to get Oracle 10g stood up on a Bentley server, Bentley has had no success. The main issues Bentley is running into are related to the age of Oracle 10g and that it is not supported nor compatible with what we have available to use. This project is currently on the back burner.

California DOT
Bentley is waiting on Caltrans for information on the scope of their project needs

Texas DOT (TxDOT)
The scope for the TxDOT project has still not been tied down.

2c.   Service Unit Status
Josh Johnson presented the service status report as of 05/22/18. In general, a majority of the service unit projects are on track. Five (5) projects, Colorado, New Hampshire, City of Phoenix, Texas, and Virginia have been placed on hold at the request of the agencies.

Following the April Task Force meeting, Bentley reached out to the owners of service unit projects that appeared to be near completion to check the status and determine whether or not these projects can be closed and the unused service units restored to their service unit accounts or creating a separate contract for ongoing support. The following summarizes the results of that outreach.

Agency	Last Contact
Alabama DOT	6/1/2018 - Contacted for change request; in progress. This will officially become an ongoing support project.
Alaska DOT	6/7/2018 - Contacted for close out. AKDOT wants to open a new project soon.
Colorado DOT	6/7/18 - Bentley followed-up regarding closing out the existing project. CODOT advised that they wanted to keep the project open to use for support to move to 5.3.
Idaho TD	6/7/2018 - Contacted regarding project status/close out. No response to date.
Kentucky TC	5/30/2018 - Contacted for change request; in progress. This will officially become an ongoing support project.
New Hampshire DOT	6/7/2018 - Set up a meeting to discuss this project & BrM on 6/12/2018.
Texas DOT	6/7/2018 - Contacted regarding project status/close out. No response to date.
Virginia DOT	6/7/2018 - to Christopher Williams regarding project stats/close out of 'support project'. Their project will be change-ordered to support their update to BrM 6.0.

2d.   License Revenue Report
Judy Tarwater provided a summary of FY18 license activity (and revenue) as of 05/21/18.

License Type	Quantity	Revenue
BrM Evaluation License	1	$ 0
BrM Educational License	7	$ 0
HAO Service Units	3	$ 9,000

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BrM Local/Small Agency License	2	$ 18,000
Local/Small Agency Support	0	$ 0
Service Units	80	$ 1,102,000
BrM Super Site License	45	$ 1,602,000
BrM Developer License	1	$ 1,500
		$ 2,732,500

2e.   Service Unit Report

Judy Tarwater provided a summary of service unit activity as of 05/21/18.

Agenda Item 03:   FHWA Report

Derek Constable provided the following FHWA update.

FHWA Risk Based Routine Inspection Interval Memo:

- Released 06/08/18 (see Attachment B)
- Risk assessment process must be developed and submitted to FHWA for approval along with inspection interval determinations.
- Minimum process requirements detailed in the memo.
- Is expected that process will align with NCHRP Report 782 Proposed Guidelines for Reliability Based Inspection Practices.
- A bridge may be assigned one of three risk levels: 1, 2, and 3 corresponding with inspection intervals of ≤12mo, ≤24mo, and ≤48mo respectively

The Task Force discussed whether or not the FHWA would require all bridges to be categorized and, if so, would this field need to be added to the BrM database.

2019 NCHRP Research Projects:

2019 NCHRP Research Projects have been selected. One of interest to the Task Force may be Problem A-06, Implementation of Programmatic Life Cycle Cost Analysis in a Transportation Asset Management Framework. The project objectives seem to align well with planned enhancements for BrM.

National Bridge Inspection Standards and Coding Guide Update:

- Currently listed with an August, 2018 release for comment (per below website)
- https://www.reginfo.gov/public/do/eAgendaViewRule?pubId=201804&RIN=2125-AF55

Agenda Item 04:   BrM Project Staffing

Bentley presented information to the Task Force on Bentley staff resources. A 12 month schedule of scheduled work was presented showing an existing workload of approximately 6 months

Bentley management understands that Bentley is understaffed for the current workload; however, they have made the decision that the current, and future expected contract opportunities, will support their current staffing only through the end of calendar year 2018. Therefore, Bentley management is reluctant to increase staff for BrM maintenance, enhancement and support activities.

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Agenda Item 05: BrM User Manual and Tech Manual Update

5a.   BrM User Manual

Bentley forwarded the draft User Manual to the Task Force in mid-May for a one week comment period. The Task Force provided the following feedback.

- The User Manual is written in a conversational style with a lot of commas, colons, etc. to represent pauses in speech; however, there are no linking words (like and, or, such as) to let the reader know what the relationship of word 1, word 2 is supposed to be.
- Given the conversational tone, it appears that the writer seems to be conversing with someone who is as intelligent and as well informed as the writer. The writer is obviously a Bentley team member who is well versed in the intricacies of the software; therefore, raising concern that end users consuming the information in the User Manual will not be able to understand the informative anecdotes contained in the text due to the fact that they are too brief in nature and assume a lot of prior understanding and knowledge.
- There is concern that the guide, as written with a lot of details of the anecdotes glossed over, will result in readers being confused and the software believed to more daunting rather than providing real world case studies that to which users could relate.
- The anecdotal snippits would be easier to review and understand if they were paired with the text from the manual to which they are related.
- The Task Force also suggested that a technical writer review the final draft before the User Manual is considered complete.

5b.   BrM Technical Manual

Bentley forwarded the draft Tech Manual to the Task Force and interested users in early June for a two week comment period. The Tech Manual will be delivered to the user community upon completion in the summer of 2018. The Task Force agreed to the concept that the technical manual will be periodically updated when new versions of the software are released and/or approximately every 6 months.

Agenda Item 06: Enhancements

6a.   Import / Export

Bentley forwarded the draft Excel Import / Export FDS to the Task Force on 05/25/18 for review and comment. The changes to BrM can be summarized into two categories:

- An update to the import/export functionality to include support for the Excel (.xlsx) file format.
- Improved import error handling to the end user.

This would include changes to the following pages:

- Gateway > Import
- Gateway > Export

This is meant to be an exchange of data back and forth, and will facilitate one time changes. Bridge data, inspection data, or individual tables that can be selected are included in the FDS. The process would allow a user to select a group of bridges, then go to Gateway, then choose what type of file to export, and then choose what information they want to include. If the data will be imported from a different system, the user could first export the excel file in the correct format, add the data from their external system onto the pre-formatted sheet, and import the data. Security in the FDS is set up so that if you can export then you

can import. The Export/Import capabilities are designed to work for the same version. It would take manual effort to review and modify the spreadsheet in order to upgrade between versions.
Currently in 6.0, pages with grids can be selected and exported to excel. This is a separate function from the proposed FDS.
This is only for bridges, not for multi-assets.

6b.   Clearance
This discussion was tabled until a bi-weekly conference call to allow for time to review.

6c.   Multi Media
Bentley forwarded the draft Multi Media FDS to the Task Force on 06/01/18 for review and comment. The purpose of the Multimedia Module is to assist agencies in storing and retrieving documentation related to their assets. General documents and photos can be stored for any asset (regardless of asset type). Also, inspection specific documents can be stored by inspection date.

Documents include, but are not necessarily limited to, Microsoft Office files, images files, CADD drawing files and text files. The general goal should be that any document or file that can be stored and retrieved by the agency's chosen document management system should be supported. The existing file share based media system will continue to be supported. For example, Idaho currently has a media system and any modifications to the multi-media module would need to account for the existing requirements and functionality of that system.

In addition to changes to media retrieval and storage, there will also be a new Multimedia widget created with the purpose of proving the user access to the agency's multimedia files from within a configurable set of tasks.

The update will consist of four major components.
- The existing Multimedia task will be updated to better organize existing UI fields, as well as add additional fields and features.
- A "widget" will be developed to more easily access multimedia files from within specific tasks to eliminate the need to navigate to the Multimedia task to view files.
- Multimedia security will be enhanced to provide more detailed security control.
- A foundation will be created to better integrate BrM multimedia with multimedia from other platforms with the option to create interfaces for specific platforms as needed.

Mark Faulhaber advised that Kentucky is willing to kick in several Service Units as well as their current code for the Front End and Middleware. Both are currently aimed at ProjectWise.

Eric asked if the delete button could be hidden. Bentley has not looked at performance as the system grows. The single folder idea within the FDS was based on not breaking systems that are already in place. Docrefkey exists to find something within Multimedia. Additionally, within the folder there is a way to define names. Photo compression is included, but other size control is not in place. Will recommended that file compression is an informed decision.

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6d.   LCCA

Bentley forwarded the draft LCCA FDS to the Task Force on 06/01/18 for review and comment.

The purpose of enhancing the LCCA Module is to assist agencies in creating lifecycle plans for each bridge and enabling those profiles to be used as part of a network analysis in terms of a refined LCC for any given number of bridges. Furthermore, this will enable agencies to create bridge level lifecycle plans that fit their specific practices and policies for any given bridge. This functionality is useful whether a user is programming work that is schedule to be done in the short term (5 years or less), or for creating a long term program (e.g. 10, 15, 20, 50 years, etc.).

A life cycle cost analysis (LCCA) is a methodology for determining the optimal economic option from a set of alternatives for constructing, operating, maintaining and disposing of a given asset. With regards to transportation assets, specifically bridges, this means evaluating timing and costs for all interventions for a specified length of time and then converting those cost to a prevent value. Given that a LCCA utilizes time value of money, the timing of interventions is very important. As such the enhancements proposed in this FDS are designed to augment the existing LCCA module within BrM to account for timing of interventions. These enhancements will enable users to create an optimized lifecycle plan (LCP) for any given bridge. It is important to note that while the enhanced functionality can be used as part of the network level analysis in terms of planning future work, the LCCA analysis itself and corresponding LCP are intended to be conducted at the bridge level.

ILDOT would like to have the ability to associate, by default, how many years certain types of repairs will 'buy' the DOT (i.e. a time benefit for every action type).

LCCA is not currently being considered at the bridge level; however, the Task Force believes this should be in the requirements. There was a suggestion to allow multiple lifecycle trees to be compared. For instance, if a bridge in reality is a candidate for either an overlay now or a deck replacement in 10 years, the current bridge level analysis wouldn't consider that scenario. Another option to evaluate different lifecycle trees would be to evaluate the possible actions and determine how many years of deferment would be required to optimize for that action, then compare the resultant life cycles of each action to identify the most optima tree of actions and deferments.

6e.   Utility Values

The functionality will consist of two components. The first update will be the addition of a process that will perform all necessary Utility Value and Health Index calculations, and save the resulting data in the database for efficient retrieval when needed. The second update will be to allow for the addition of new columns when creating and editing custom Layouts. These columns will be based off the Utility Weight Profiles that are configured in the system, as well as the new Health Index column that will be added to the Bridge table.

Calculation Process:

A new process will be created to calculate and save Utility values for every Utility Weight Profile that exists in the database at the time of the process is run, as well the Health Index rating. This will avoid the need to run the process intensive calculations every time the data is needed. The process will be kicked off by

clicking a button that will be available on the Bridge List task. Once started, the button will be replaced by a status message indicating the process is running. The process will run asynchronously, allowing the user to complete other actions while waiting for the process to completely. When the process is complete, the button on the Bridge List will reappear, along with an updated date of when the process was last run.

Manage Layouts:
Functionality will be added to allow the user to add several new columns to user-created Layouts. Once added to a Layout, they will function in a matter that is consistent with all existing Layout columns.

Bridge List:
A button will be added to the Bridge List that will be visible whenever a Utility or Health Index Value is present in the currently selected Layout. In addition to the button, there will also be a label that will show a date, indicating when the calculation process was last run. When clicked, this button will be hidden and replaced with a message indicating that the process is currently being run. When the process is finished, the button will again show, along with an updated "last run" date.

In order to store utility values, two options were considered. The first was leveraging the scheduled process as outlined above and storing the value in the database. A second option would be to mass calculate based on one utility profile and health index and then export to excel.

6f.   Tool Tips
Bentley forwarded the draft Tool Tips FDS to the Task Force on 05/25/18 for review and comment.

The change to BrM for this project will include updating the field-level tooltips to be less obtrusive as to interfere less with data entry.

The current "hover-over" tooltips will be moved to a group-level overlay format. Tooltips will no longer show when hovering over a field. Instead, control groups will now have an icon placed inside the group header, next to the group title. When this icon is clicked, an overlay will appear with a grid that will display meta data related to the fields within the given control group. The overlay icon will only appear on groups that have controls as immediate children. In other words, a control group that only has other control groups as immediate children in the hierarchy will not display he overlay icon. However, a control group that has other controls groups as children, and also controls not contained in sub groups will show the overlay icon (and clicking this icon will only show information related to the controls that are not in sub groups).

The overlay can then be closed by clicking anywhere outside of the grid. If the control is in a grid or contained in another special circumstance where a control group is not present, it will require special consideration. In these cases, the icon to show the overlay should either be added to the grid header, or the controls added to a group to have the ability the show the icon.

The popup itself will be interactive to better utilize the available screen space. Upon appearing, the popup will feature a grid with one row per field contained in the selected control group. Each row will display commonly used properties pertaining to the associated field. If more information is needed, the user can

click the expand icon and a details view will appear that will show the remaining data that is not shown by default.

This update will be a somewhat trivial change for controls that were created and can be edited using the Visual Forms Editor. However, there may be tasks with controls that contain special cases, which could significantly increase effort. It is recommended to prioritize the tasks, likely starting with Inspection and Tunnel tasks, where this update could have the biggest impact, so that those tasks can be the focus of this update.

<u>6g.   Other Deferred FDSs</u>
  i.   QA/QC
  ii. Project Cost
  iii. Track History

Bentley is waiting on champions to come up with requirements so that they can work on the FDSs. Bentley will send out a priority survey to the user group to determine the priority of the QA/QC, Project Cost, and Track History enhancements.

<u>6h.   Bentley Benefits Page (Into the Core Product)</u>
Bentley has been working with a number of departments of transportation providing setup and configuration services. Included in a majority of the work performed is work on the setup of benefits for each state. Through this process Bentley has come to the realization that changes/updates to the Benefits Page could be delivered to the end users to provide a more user friendly environment. In working through the various engagements with DOT installations, Bentley created a "new benefits page" for their use in providing user support. Bentley recommended to the Task Force that the revised Benefits Page (developed for use within the Bentley support team) be delivered to the end users via a post-BrM 6.0 patch. The Task Force concurred with this approach and asked Bentley to develop a cost estimate to incorporate the new Benefits Page into the BrM core product.

The Task Force agreed to include the enhancement as part of a contract modification to BrM 6.0.

<u>6i.   Virginia DOT Enhancement List</u>
Virginia requested that the rule builder include combined and weighted Element Condition States. The Task Force agreed to include with the Illinois enhancement using Virginia funding.
Rule = $W_1 \times CS_1 + W_2 \times CS_2 + W_3 \times CS_3 + W_4 \times CS_4$

<u>6j.   Other Enhancements from Training</u>
No discussion.

Agenda Item 07:   RIPI Requests (Regression Testing Tool / Results Comparison Tool)
The SCOA was balloted on 05/21/18 to secure Program Development Pool (RIPI) funding to support the following projects. SCOA approved both funding requests on 06/08/18.

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These enhancements will be added to either the 5.3.01 (6.0) project contract via a contract modification for the increased funding and a date extension or to the FY19 MSE via a contract modification for the increased funding.

Agenda Item 08:   BrM TAG Activities

8a.   Testing TAG

Bruce Novakovich advised that the first post-testing meeting of the members of the Testing TAG will be June 27 with subsequent meeting held every two weeks thereafter. At least three members of the Testing TAG will be testing both the workstation and enterprise versions of the software. Bentley will provide an updated full install version of BrM 5.3 to the Beta Testing TAG this week. For members of the Testing TAG who have already installed and started testing, updates will be provided via patches.

8b.   Reports TAG

Beckie Curtis received information (and a link) from Bentley that the revised reports are ready for testing. She will forward the reports testing information to the Reports TAG this week.

8c.   Database TAG

Craig Nazareth reported that the Database TAG continues to meet regularly. The Task Force discussed the idea of developing a long term strategy/plan for opening up all of BrM's functionality for use with multi-assets.

    i.   Adding an MPO Field

        The Database TAG is also working on options to add an MPO Field to allow the user to easily group these structures. This field would be added to the Bridge Table. The Task Force concurs with the concept of adding an MPO field; however, they did not come to consensus on whether or not the new field should be set up to be used for more than one entity (in which case the field would be tied to a table of available options). The Task Force decided to reach out to the New Jersey DOT to determine their feedback on this issue.

Agenda Item 9:   Marketing Activities

9a.   12th National Conference on Transportation Asset Management

The BrM Abstract was approved (Utilization of AASHTOWare BrM to Meet Agency Policy and Objectives for Bridge Management, for the Podium Session). Harjit Bal (New Jersey DOT) will present the presentation. Sunday workshops have also been scheduled in conjunction with this conference. Derek Constable is assisting the workshop organizers who have reached out to the Indiana and North Carolina DOTs for inclusion in the workshops.

9b.   City of Calgary Bridge Management System RFP

The City of Calgary published a Notice of Proposed Procurement advising that The City of Calgary intends to release a Request For Proposal (RFP) in the upcoming months seeking a bridge management system solution. Judy Tarwater registered on The City of Calgary Procurement site and advised that the RFP is planned to be published in July 2018. Judy will check for future communiques and advised the Task Force and Bentley when the RFP is posted for response. The Task Force made the decision to evaluate the RFP (when posted) for possible response with a BrM solution.

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9c.   Outreach Opportunities for States Considering Alternate Bridge Management Solutions

The Task Force discussed agencies who have recently expressed a potential interest in investigating the use of BrM in their organizations. These agencies include the Georgia DOT, the Maryland DOT, Nova Scotia, and Hillsborough County, FL (Ben Loeser – 813-307-1887, loeserb@hcflgov.net).

Georgia DOT is coming to the ALDOT to get a presentation of BrM inspection processes within Alabama. Bentley reached out to Ben Loeser (Hillsborough County, FL) following the NBPPC conference. The ball is currently in their court.

9d.   City of Chicago Interest in BrM

Tim Armbrecht advised that the City of Chicago is interested in securing an evaluation copy of BrM. The City of Chicago has approximately 200-300 bridges on their inventory (bridges that are not on the state bridge inventory). The Task Force is agreeable to allowing the City of Chicago to evaluate the BrM software and made the decision to extend to them the opportunity to attend the 2018 BrMUG meeting (with AASHTO reimbursement).

Tim Armbrecht advised the City of Chicago bridge management staff to contact Judy Tarwater for information on securing an evaluation copy of BrM and the possibility of attending the 2018 BrMUG meeting. Benesch is assisting the City of Chicago in evaluating software to support their bridge management needs and may also request an evaluation copy of the software.

9e.   The Kercher Group – FHWA Project

The Kercher Group is working with the FHWA on a bridge management project which will be supported by The Kercher Group. The Task Force made the decision to allow The Kercher Group to secure a Special Evaluation copy of BrM, i.e. a production license for BrM for the purpose of supporting their involvement in the FHWA bridge management project (similar to NCHRP projects completed with the use of BrDR).

The project name is "Bridge Management Systems Workshop" (project number HIF180062PR). Procurement was through an FHWA IDIQ. The project has been awarded to GPI Inc. The BMS subject matter experts performing development and delivery are from the Kercher Group (Dave Juntenen formerly of Michigan DOT and Charles Pilson formerly of Agile Assets). The project scope includes workshop development followed by delivery to host agencies.

The project was awarded on 05/18/18 with a project duration of 20 months. The project is expected to end around 02/2020.

Agenda Item 10:   User Group

10a.   2018 BrMUG Meeting Agenda

The Task Force had previously discussed the following possible topics for possible inclusion in the 2018 BrMUG Agenda.
- Opening / Welcome Remarks – Jeff Vigil
- Welcome to New Mexico – TBD
- AASHTOWare Bridge Task Force Update – Eric Christie
- Brief Overview of AASHTOWare / BrM User Survey Results – Judy Tarwater

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- FHWA Update – Derek Constable
- BrM Version 6.0 / Patchable Version
- Visual Forms Editor
- Using BrM to develop the TAMP (KYTC, MIDOT, NJDOT)
- Setting up Element / NBI Deterioration Parameters
- Care and Feeding of the Optimizer
- Future Enhancements (to include ILDOT Customizations)

Jeff Vigil (BrMUG Secretary) advised that the NMDOT has been discussing possible topics for the BrMUG agenda, including the following.

- Training on the individual modules of BrM
- Presentation by a state that is further along with BrM and bridge management – Kevin Murata (HIDOT)
- BrM Customizations – walkthrough of how to build custom forms (how to build a page) – Mark Faulhaber?

No decisions were made on definite topics for inclusion. Jeff Vigil will work with Judy Tarwater over the next few weeks to finalize the BrMUG agenda and related BrMUG meeting details. To date, 19 attendees have registered for the 2018 BrMUG.

10b.   2018 BrM End User Survey
The Task Force reviewed the draft 2018 BrM End User survey. Several questions from last years' survey were deleted and a few additional question were added. Judy Tarwater will make the changes discussed and forward to the Task Force for review and comment.

The survey should be distributed to the BrM End User Designees by 08/01/18.

10c.   BrMUG SWAG Suggestions
The Task Force discussed ideas for possible SWAG items to be distributed during the 2018 BrMUG meeting.

Agenda Item 11:   Review Action Items
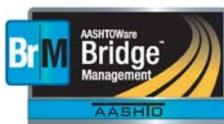Beckie Curtis reviewed the action items recorded during the meeting.

Agenda Item 12:   Draft Quarterly Status Report Content
This discussion was deferred to a conference call. The intent is to send out the quarterly status report before the user group meeting.

Agenda Item 13:   Executive Session
The meeting adjourned at 4:58pm. There was no Executive Session.

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Attachment A: **Listing of Bridge Task Force, TRT, TAG and User Group Personnel**

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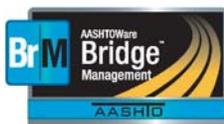
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Attachment B: FHWA – Risk-Based Interval Determination for Routine Bridge Inspections
From Joseph L. Hartmann, PhD, P.E. (Dated 06/06/18)

U.S. Department
of Transportation
**Federal Highway
Administration**

Memorandum

Subject: **INFORMATION:** Risk-Based Interval   Date: June 8, 2018 Determination for Routine Bridge
Inspections

From: /Original signed by/   In Reply Refer To: HIBS-30
Joseph L. Hartmann, PhD, P.E.
Director, Office of Bridges and Structures

To: Division Administrators
Federal Lands Highway Division Directors

The Moving Ahead for Progress in the 21st Century Act (MAP-21) (P.L. 112-141), was signed into law on July 6, 2012. As part of this enactment, Section 1111 amended Section 144 of Title 23 United States Code (U.S.C.) and directed the Federal Highway Administration to, "consider a risk-based approach to determining the frequency of bridge inspections."

Section 650.311(a)(3) of the National Bridge Inspection Standards (NBIS) (23 CFR 650 subpart C) states, "Certain bridges may be inspected at greater than twenty-four month intervals, not to exceed forty-eight months, with written FHWA approval." This extended routine inspection interval has historically been accomplished by following Technical Advisory 5140.21 dated September 16, 1988 (http://www.fhwa.dot.gov/bridge/nbis/t514021.cfm). To meet Section 1111 of MAP-21, the FHWA has developed risk-based, routine inspection interval guidance in the attachment that State transportation departments, Federal agencies, and tribal governments can use as an alternate approach to the current technical advisory.

Additionally, 23 CFR 650.311(a)(2) states, "Certain bridges require inspection at less than twenty-four intervals." The attached risk-based, routine inspection interval guidance may also be used to satisfy this provision.

When State transportation departments, Federal agencies, and tribal governments consider using this option, the Division offices should review the submission then coordinate with the Office of Bridges and Structures for final approval.

Please direct questions to John Thiel at (202) 366-8795 or e-mail at John.Thiel@dot.gov or to Shay Burrows at (202) 366-4675 or e-mail at Shay.Burrows@dot.gov .

cc:
Directors of Field Services

HIBS-30
Brian Kozy, HIBS-10
Joe Krolak, HIBS-20

Risk-Based, Routine Inspection Interval Implementation Guidance
June 8, 2018

Bridges typically exhibit structural deterioration in a predictable manner over time; therefore, risk of structural safety or serviceability loss during the time between inspections is an effective measure upon which to base the interval of inspections. When risk is low, bridges may be inspected less frequently, and as risk grows, bridges should be inspected more often.

Bridges have attributes and a set of damage modes that may occur that will define the risk. The risk of each potential damage mode should be evaluated. The one that is the most critical is used to select the appropriate routine inspection interval. The process for identifying risk-based inspection intervals involves the identification and use of an interval that is commensurate with the risk of safety or service loss for each bridge. It provides additional flexibility to bridge inspection organizations by applying experience and engineering knowledge to optimize the use of limited resources across their bridge inventory.

This guidance establishes a general framework and process for assessment of risk, and provides bridge inspection organizations the latitude for exercising their knowledge in determination of probability, consequence, and risk for bridges in their inventory. The process requires bridges to be classified into one of three risk levels for consistency and uniformity. These risk levels have inspection intervals not to exceed 12, 24, or 48 months

This process allows for risk assessment by quantified statistical analysis, when possible, or by qualitative expert judgment. The risk assessment process, criteria, and resulting intervals should be documented and submitted by the State transportation department, Federal agency, or tribal government with a request for FHWA approval. For owners to implement inspections using the proposed risk-based intervals, it is envisioned that they will follow these general steps:

1. Assemble a Risk Assessment Panel (RAP), which includes the National Bridge Inspection Standards (NBIS) program manager and at least three experts with collective experience in bridge design, evaluation, inspection, maintenance, materials, and construction, to develop a formal policy.
2. Utilize the RAP to establish definitions for risk levels, categories, and the probability and consequence levels that will be used to define the risk for each bridge to be assessed.
3. Utilize the RAP to establish the damage modes and the attributes that will be considered in classifying probability and consequence levels, depending on their relevance to the bridge being considered. A system of screening, scoring, and thresholds will be defined by the RAP to assess the risks. Scoring is based on prioritizing attributes and their relative influence on damage modes.
4. Utilize the RAP to define a formal set of risk assessment criteria, written in standard logical format amenable for computer programming.
5. Develop and document supplemental inspection procedures and data collection that are aligned with the level of inspection required to obtain the data to apply the criteria.
6. Apply the criteria to bridges and classify each bridge into one of three risk levels with a corresponding interval not to exceed 12, 24, and 48 months.
7. Submit the formal criteria and a summary report to the FHWA for approval. Once approval is granted, the owner may implement risk-based, routine inspection intervals for the bridges.
8. Any time in the future that the criteria are revised, the criteria and summary report must be resubmitted to the FHWA for approval.

It is recognized that there may be few quantified measures to develop mathematical risk calculations; therefore, the knowledge and experience of qualified experts may be used to determine the expected performance and outcomes. The RAP should define a set of detailed criteria to classify bridges into one of the three risk levels. The criteria should be based

<mark>on the fundamental proposed definitions of risk and address all required considerations. It is expected that this will follow the NCHRP 12-82 process of using a matrix with risk partitions and probability and consequence categories on the two axes.</mark>

The risk assessment criteria and resulting intervals must be documented and submitted by the State transportation department, Federal agency, or tribal government with a request for FHWA approval. At a minimum, the request must include the elements listed below. Changes to the risk assessment criteria must be resubmitted for FHWA approval.

1. Endorsement from the RAP members, including the NBIS program manager and at least three experts with collective experience in bridge design, evaluation, inspection, maintenance, materials, and construction.
2. Documentation clearly defining screening criteria, bridges being analyzed, attributes, damage modes, risk assessments and results.
   a. The screening criteria is used to determine if a bridge should be considered in the assessment or to establish maximum inspection intervals. At a minimum, the screening criteria should include:
      i. Requirements for significant flexure and shear cracking in concrete primary load members.
      ii. Requirements for fatigue cracking and corrosion in steel primary load members.
      iii. Requirements for other details, loadings, conditions, and inspection findings that are known to affect the performance of the bridge or its elements.
         **Bridges classified as in poor condition cannot have an inspection interval greater than 24 months.
   b. The attributes in each assessment should include material properties, loads and safe load capacity, and condition.
   c. The damage modes in each assessment should include:
      i. For steel elements: section loss, fatigue, and fracture. ii. For concrete elements: flexural cracking, shear cracking, and reinforcing steel corrosion.
      iii. For superstructure elements: seismic, overload, and vehicle/vessel impact iv. For substructure elements: seismic, scour, and settlement.
   d. A set of criteria to assess risk for each bridge element in terms of probability and consequence of structural safety or serviceability loss in the time between inspections.
3. Classification of the analyzed bridges into one of three risk levels with an interval not to exceed 12, 24, and 48 months.
4. Supplemental inspection procedures and/or data collection that are required to apply the criteria, as appropriate.

Additional information can be found in NCHRP Report 782, Proposed Guideline for ReliabilityBased Inspection Practices. This report is a result research performed under NCHRP Project 1282, Developing Reliability-Based Bridge Inspection Practices.

The owner should review the criteria after each inspection to ensure the proper interval is assigned. Then the owner must establish the next inspection due date based on the established interval and the last inspection date. Information on the criteria used to establish the inspection interval should be kept in the bridge file.

<mark>Lastly, any new, rehabilitated, or structurally modified bridge should receive an initial inspection, be in service for at least 24 months, and receive its next routine inspection before establishing a risk-based, routine inspection interval. The assessment must be reviewed after each routine inspection to set the next inspection interval.</mark>

Risk-Based Inspection Interval Implementation Definitions
June 8, 2018

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Attribute - Characteristic of the design, loading, conditions, and environment that affect the expected performance of a bridge or bridge element.

Consequence - A measure of impacts to structural safety and serviceability in a hypothetical scenario where a damage mode progresses to the point of requiring immediate action. This may include costs to restore the bridge to safe operating condition or other costs.

Damage mode – Typical damage affecting the condition of a bridge element that may affect the structural safety or serviceability of the bridge.

Probability - Extent to which an event is likely to occur during a given interval. This may be based on the frequency of events, such as in the quantitative probability of failure, or on degree of belief or expectation. Degrees of belief about probability can be chosen using qualitative scales, ranks, or categories such as, remote, low, moderate, or high.

Risk - The exposure to the possibility of structural safety or serviceability loss during the interval between inspections. It is the combination of the probability of an event and its consequence.