

**Summary Minutes Of The
AASHTOWare Bridge Design-Rating (BrDR) Task Force Meeting
August 4, 2016 Chicago, IL**

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General Information – Meeting of the Bridge Design & Rating Task Force

Date: Thursday, August 4, 2016

Participants:

AASHTO	Judy Tarwater	AASHTO	Project Manager
SCOJD	Bruce Johnson	Oregon DOT	SCOJD Liaison
BrDR Task Force	Todd Thompson	South Dakota DOT	Chair
	Joshua Dietsche	Wisconsin DOT	Bridge Rating (BrR)
	Jeff Olsen	Montana DOT	Bridge Design (BrD)
	Dean Teal	Kansas DOT	Bridge Design (BrD)
	Amjad Waheed	Ohio DOT	Bridge Rating (BrR)
	Tom Saad	FHWA	FHWA Liaison
BrM Task Force	Eric Christie	Alabama DOT	
	Beckie Curtis	Michigan DOT	
BrDR Contractor	Jim Duray	Michael Baker, International	BrDR Contractor
	Herman Lee	Michael Baker, International	BrDR Contractor
	Krishna Kennelly	Michael Baker, International	BrDR Contractor
	Geoff Trees	Michael Baker, International	BrDR Contractor
Third Party	Richard Pickings	BridgeSight	
Contractors	Brian Goodrich	BridgeTech	
(Agenda Item 1)	Mark Jablin	BridgeTech	
	Ron Love	Bentley Systems	
	Bill Beyer	Bentley Systems	
	Shri Bhide	Bentley Systems	
BrDR	Daniel Jones	Alabama DOT	
Modernization	Jesse Hamilton	Alabama DOT	
TAG	Shanon Murguitio	Idaho DOT	
(Agenda Item 2)	Phil Litchfield	Illinois DOT	
	Justin Belue	Illinois DOT	
	Jeff Ruby	Kansas DOT	
	Jake Pfannensteil	Kansas DOT	
	Creightyn McMunn	Michigan DOT	
	Talia Belill	Michigan DOT	
	Richard Withers	Mississippi DOT	
	Scott Westerfield	Mississippi DOT	
	Devin Roberts	Montana DOT	
	Brenda Crudele	New York State DOT	
	Jeremy Fisher	Ohio DOT	
	David Coley	South Dakota DOT	
	Patrick Wellner	South Dakota DOT	
	Alex Pence	Wisconsin DOT	
	Yihong Gao	Minnesota DOT	

Notes Taker: Dean Teal / Judy Tarwater



Agenda Item 0: Review Agenda/Assign Minutes

Recorder

Todd Thompson opened the meeting at 8:00 am. Dean Teal was assigned as the meeting minute's recorder. The agenda was reviewed and the following agenda item was added.

- Agenda Item 7c: Prestress Design Tool Phase II

Agenda Item 1: Third-Party Development

1a. Modernization Architecture Review

Baker provided an overview of the planned architecture directions.

- Client-server with local database
- User interface will be similar to the current interface
- Engines will still need to be registered (similar to the current API process)
- Access to the data will be available via a Domain API. The names of items will remain the same as they are in the current architecture, with the exception of basic clean-up of some of the existing cryptic names.
- The class structure will be the same
- Contractors will be provided access to the .NET library so they could continue to use COM if they wish to do so. A lot of flexibility.
- The contractor advised the developers that approximately 95% of the coding they would see in the API will be unchanged.
- The changes made will make it easier to connect.
- The new domain will be in C#, beginning with the release in year 3 (June 2019).
- A public API is not included in the project scope.
- June 2019 will likely be the last release of the legacy system at which time the sunset process will begin.

Third-Party Developer Discussion

A discussion was held with the Third party developers.

Task Force Discussion

- The Task Force is willing to look for potential opportunities to have additional discussion with the third-party developers as the modernization project moves forward.

Agenda Item 2: Modernization Kickoff Meeting

Todd Thompson presented an overview of the BrDR Modernization Project background, detailing the status of the current program architecture and source code. In addition, Todd provided an overview of the need for functionality enhancements and improvement to the user interface and reporting capabilities. Modernization will also reduce maintenance costs and implementation times for the incorporation of new product features/functionality.

The Task Force worked with professor Anthony Lattanze from the Software Research Institute at Carnegie Mellon University in August 2013. A workshop of stakeholders was conducted to identify the requirements that drive the software design.

- Performance – reduce analysis time, improve load time for opening a bridge
- Usability – modern UI, better feedback, improved reporting
- Extensibility – easy to add new functionality, support for third party developers
- Modifiability – can be easily modified

An Architecture Workshop was conducted in March 2014 to initiate the development of the architecture design. Experiments were conducted to evaluate options to be considered for the final design. These experiments included



tests on data access layers, payload serialization, web services, user interface.

The proposed architecture includes client-server with a local database, client-server architecture with shared database, and service oriented architecture. The proposed architecture can also be enhanced to support server side analysis.

The current system released April 1999 with architecture based on technology from the mid-1990's. Software development tools have improved a great deal and hardware capabilities have improved significantly. In addition, user expectations have matured. The long term viability of the product requires it to be migrated to a more modern architecture.

The BrDR Modernization project will:

- Significantly upgrade the core technology to a modern software architecture
- Improve analysis performance
- Improve the user interface
- Improve reporting capabilities
- Reduce maintenance costs
- Reduce implementation time for new features

At the core of these improvements is the comprehensive design of a new software architecture that can support the desired outcome of the modernization

BrDR Modernization Solicitation:

- Seeking agencies to contribute a total of \$740,000 each
- State Planning and Research (SP&R) funds may be used with no requirement for state matching funds
- A break-even analysis shows the timeframe when the reduced costs due to modernization efficiencies offsets the cost of modernization is 4-6 years

The BrDR Modernization project will be carried out as a multi-year, phased effort with a 48-month software development and testing cycle. The BrDR legacy system will continue to be supported. (Maintenance of the legacy system will be limited to bug fixing and spec updates.)

BrDR Modernization Project Objectives:

- A new, more robust architecture
- A modernized user interface similar to the existing interface so as not to require retraining of users but with sufficient changes to improve and simplify data management
- All capabilities of the existing system
- Complete reuse of all data contained within the existing database
- Improved reporting of analysis results.
- Include many of the enhancements requested by the users
- A code base that is less costly to maintain and enhance
- A new analytical engine that matches the analysis results of the existing engine but is significantly faster when running on hardware containing a multi-core processor. As hardware containing more cores becomes available the performance of the new analytical engine will continue to improve.

BrDR Project Scope:

- Primarily a conversion effort with a focus on improving performance
- Re-develop the overall system architecture
- Re-develop the architecture of the analysis engines
- Re-develop the entire user interface
- Maintain the class design of the existing Domain (API)
- Minimal visual enhancements – most of the user interface will look and function like the legacy system



- Minimal changes to the computations and analysis results
- Produce nearly the same analysis results as the legacy system
- New engine testing will consist of comparisons to legacy system
- The five primary components will remain:
 - Bridge Explorer
 - Bridge Workspace
 - Library Explorer
 - Configuration Browser
 - Project Explorer
- BWS will have an option for a “simplified” view
- Support for:
 - multiple display monitors
 - viewing of multiple windows
 - window docking
 - tabs
 - ribbon toolbars
- Employ the latest development processes
- Two releases – June 2018, June 2019

BrDR Modernization Development Approach:

- Two releases and the conversion completed in three years
- Development effort divided into two phases – Analysis Engines and User Interface
- Modernization of the analysis engines is a two year effort
- Modernization of the user interface is a three year effort
- To meet the three year project schedule the two phases will be worked on concurrently
- First release will feature the legacy user interface with the legacy engines and the modernized engines
- The second release will include both the modernized user interface with the modernized engines
- This approach has the following benefits:

- The first release can be used to test the engines by comparison of the analysis results from the two engines (legacy and modernized). The results should be nearly identical.
- Regression testing of the modernized engine is simplified
- The first release directly addresses the highest priority Quality Attribute – Performance of the analysis
- All structure types are supported by the first release (legacy UI and modernized engine)

BrDR Modernization TAG Roles and Responsibilities:

- Review, provide feedback, and approve components of the software design such as:
 - User interface mockups
 - Report mockups
 - Engine Flowcharts
 - Beta Testing
- Review of software design materials
 - Review the materials within the allotted timeframe and provide feedback so the development isn’t delayed
 - Provide feedback to the Task Force for Review Gate approvals
- Beta testing
 - Test the requested features as outlined in the Beta test plans within the allotted timeframe and report issues (JIRA)
 - Provide feedback to the Task Force for Review Gate approvals

The BrDR TAG members made the decision to have just one TAG that will be responsible and involved in participating in the three major tasks identified above.

- SharePoint will be used as the document repository to support BrDR TAG activities.
- JIRA accounts will be set up for all TAG members to support beta testing activities.



Baker initiated the review of sample window screen shots and discussed the desired approach on how to handle future TAG reviews. The TAG community requested additional information be provided by Baker to spell out more details of the as-is when mock-ups are developed to show comparisons between as-is and to-be. Mock-ups will be developed for TAG review and Baker's WebEX system will be used to support future online meetings to facilitate screen sharing functionality.

Baker provided an overview of the new concept for the Bridge Explorer.

- Batch program should skip over bridges that error out (without watching and selecting 'OK' on various pop up boxes) and continue to process the remaining bridges in the batch run. The user could then go back to address the bridges that were skipped.
- Edit error message pop-ups to include a hyperlink to the location of the error or additional information to assist the user in identifying the location of the error(s).
- More schematic drawings should be included in the system. TAG members have agreed to provide Baker with a list of the schematics they would like to have included in the system.

Agenda Item 3: Prior Business

3a. Review June Meeting Minutes

Minutes from the June 14 - 15, 2016 Task Force Meeting in Madison, WI were reviewed and approved as written.

3b. Review Action Items

Jeff Olsen reviewed the Action Items and updates were provided to the Task Force.

Agenda Item 4: User Group

4a. Summary Minutes from June Meeting

The summary minutes for the June BrDR Task Force meeting in Madison, WI will be posted on SharePoint for Task Force review and comment.

4b. Discussion

The 2016 RADBUG meeting was a success. The attendance was a record number and the large number of end user presentations is a positive trend. The end users seem to be effectively using the software.

The Task Force discussed the extent in which the BrDR User Interface will be changed in the Modernized Software. It was decided to begin with revisiting the look and feel of some of the initial screens the user is introduced to when they enter the system (Bridge Workspace and Library Explorer). The ability to display the screens on multiple monitors will improve the user experience.

Agenda Item 5: Update on 6.8 Remaining FP Tasks

5a. Progress and Schedule Review

Beta 1, which included reinforced concrete, prestressed concrete and the copy utility was sent out yesterday. The Steel Rating Tool will be included in Beta 2 (end of August) and production is expected to be released in September. BrDR tutorials will be updated to be consistent with the 6.8 release by the end of August. The 6.8 Project contract expires 10/31/16.

5b. Beta TAG

Gary Doerr (NDDOT) and Yihong Gao (MNDOT) were added to the Rating Tool TAG.

Agenda Item 6: Modernization

6a. Kickoff Meeting Discussion

The Task Force discussed creating a "Wish List" folder under the Discussions area of the BrDR



Modernization TAG SharePoint site for users to post information to document features they would like to have included in the modernized product.

It was suggested that a one week initial review period would be appropriate for TAG review and comment on a packet of 30 window mock-ups. A total two week review/comment/review period per 30 window packet is expected. Webinars for more comprehensive changes will be scheduled to support a better understanding of the proposed changes.

6b. Progress Update

Baker has been working on processes, development standards, library mockups, and library window development.

Once the rough development schedule has been established, the regularly scheduled Task Force conference call should be set up to review and approve work items. Documents for review and approval will be posted on SharePoint. Baker will send a notification email which includes a direct link to the document to be reviewed.

Agenda Item 7: Enhancements

7a. Caltrans Enhancements

Caltrans submitted a list of 19 enhancements which are summarized in the table below.

Issue	JIRA Issue #
Superstructure should be "dynamically linked" to substructure of MCB	BRDRSUP-937
Setting password for all users (this enhancement would not include the incorporation of agency-required password rules)	

Issue	JIRA Issue #
Limiting "Lever Rule" values of One Lane LLDF to Multi Lane LLDF, since Multi Lane LLDF includes the Single Lane LLDF (with MPF of 1.2)	
Incorporate Moment-Curvature Approach to establish shear capacity	
Difference in skew angle between adjacent support overwrite (affects only the moment LLDF)	BRDRSUP-936
Establish the LLDF for exterior using "full box" case – set to interior girder LLDF	
When extending the range of applicability, limit the values to Lever Rule (LLDF)	
Report Writer for Stringer-Floorbeam-Girder system	
Update the truss model to handle both LFR and LRFR	BRDRSUP-745, BRDRSUP-693, BRDRSUP-780
Web line analysis for all MCBs (where the web lengths are different)	
Incorporate partial tension-field approach for steel bridge shear capacity	
Introduce advance option of LLDF for MCB	
Multiple post-tension cable path be considered for the MCBs	BRDRSUP-939
Not meeting minimum shear reinforcement area by 10%, $A_{provided}/A_{required}=0.9$	



Issue	JIRA Issue #
User Defined Load distribution for Dead Load (DC2) to each web of MCBs; This is to handle "Sound Walls" on existing MCBs	BRDRSUP-938
Iterative Process when establishing RF for load dependent cases	
LLDF for One or Two Cell Box girder bridges	
Use of corresponding moment and shear when establishing shear rating factor	
Introduce rating factor for Bent Caps substructure)	

7b. Michigan Password Change Functionality – JIRA 982 (CI-7b)

MDOT requests that the login screen be enhanced to allow users to change their passwords on demand. The system administrator should have the ability to set the amount of time between password resets. This could possibly be tied to Windows authentication, though it would need to make allowances for logging into multiple databases (with different passwords).

Assumptions:

1. Estimate is for implementation in the Phase 2 release of the modernized BrDR.
2. Estimate assumes ALTER USER for Oracle and ALTER LOGIN for Microsoft SQL Server can be used to implement this functionality.
3. Password of the owner of the BrDR database does not expire.
4. Estimate does not include changing the current way of adding users to the BrDR database (AASHTOWare BrDR User’s Manual page 47-49).

Estimate includes:

1. Add "Password Expiration Policy" field in the Bridge Admin Utility. Option 1 is

"Does not expire". Option 2 is "Expire in XX days".

2. Implement the Password Change Functionality in the Connect dialog. Password can be changed by the users at any time.
3. BrDR API access to this functionality.

Estimate excludes:

1. Integration with Windows authentication.
2. Implementation of password recovery mechanism.
3. Implementation of password strength rules.

7c. Prestress Design Tool Phase II

The Prestress Design Tool was discussed. The Task Force needs to decide which enhancements will be included in Phase II.

Agenda Item 8: Miscellaneous Topics

8a. Installation Restriction on Virtual Machine

The BrDR Special Consultant Option software license does not allow the user to install the software on a virtual machine. The Task Force recently received a complaint from one of the consultant licensees on the issue of the VM being disabled; however, the Task Force made the decision to not make any changes to the special consultant option license software at this time.

Agenda Item 9: Marketing Activities

Nothing new since the Task Force meeting in Madison, WI. Arpine Baghdarsarian attended the first day of the RADBUG meeting and had quite a bit of positive interaction with the BrDR user community.

Jeff Olsen will present a BrDR presentation at the IHEEP conference next week in Helena, MT. Jeff will review previous presentations and work with Baker to fine tune a PowerPoint presentation.



Beckie Curtis will also present a BrM presentation at the IHEEP conference.

Agenda Item 10: Review Action Item list from this meeting

Judy Tarwater read the action items recorded during the meeting.

Agenda Item 11: Task Force Executive Session (as needed)

No Executive Session was held. The meeting adjourned Thursday, August 4, 2016 at 3:51pm.

