

**Summary Minutes Of The
AASHTOWare Bridge Design-Rating (BrDR) Task Force Meeting
January 30 – 31, 2019
Long Beach, CA**

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

Date: Wednesday, January 30, 2019

Participants:

AASHTO	Judy Tarwater	AASHTO	Project Manager
SCOA	Tim Armbrecht – absent	SCOA	SCOA Liaison
T&AA	Will Holmes	T&AA	T&AA Liaison
BrDR Task Force	Todd Thompson	South Dakota DOT	Chair
	Mark Bucci	Louisiana DOTD	Bridge Rating (BrD)
	Joshua Dietsche	Wisconsin DOT	Bridge Rating (BrR)
	Dean Teal	Kansas DOT	Bridge Design (BrD)
	Tom Saad - absent	FHWA	FHWA Liaison
	Vinacs Vinayagamoorthy	California DOT	Bridge Rating (BrR)
BrM Task Force	Mark Faulhaber	Kentucky TC	Bridge Management
BrDR Contractor	Herman Lee	Michael Baker, International	BrDR Contractor
	Geoff Trees	Michael Baker, International	BrDR Contractor

Notes Taker: Judy Tarwater and Vinacs Vinayagamoorthy

Agenda Item 0: Review Agenda/Assign Minutes

Recorder

Todd Thompson opened the meeting at 11:15am. Todd welcomed Mark Bucci (LADOTD) as the newest member of the BrDR Task Force. Meeting participants performed self-introductions. The agenda was reviewed and the following items were added to the agenda.
Agenda Item 4e: Purging Older VI incidents
Agenda Item 5d: Incorporating Password Scheme to the software for Agencies that use Active Directory Domain System Management
Agenda Item 9c: Bridge Data Webservice

0a. Update on BrDR Task Force Membership

Todd advised that Judy Tarwater sent a BrDR/BrM Task Force recruitment flyer to the AASHTO bridge community on December 19, 2018. Interested candidates were requested to submit their resumes with management approval to Judy Tarwater by January 25, 2019.

Four nominations for the BrDR Task Force and five nominations for the BrM Task Force were received.

Todd Thompson (Task Force Chair), Eric Christie (Task Force Vice-Chair), Tim Armbrecht (SCOA Liaison), and Judy Tarwater (AASHTO Project Manager) will review the resumes and set up candidate interviews to make decisions on which candidates would best compliment the skill sets of the existing Task Force members. The Task Force member recommendations will be forwarded to SCOA in early-February for their review and approval. Once their approval has been secured, the nominees and selected new member will be notified, probably in mid-February. The selected Task Force member's term will begin in March of 2019 (for the BrDR position) and in July of 2019 (for the BrM positions).



Agenda Item 1: Prior Business

1a. Review October Meeting Minute

Minutes from the October 23 - 24, 2018 Task Force Meeting in Newport, RI were reviewed and approved as-is.

1b. Review Action Items

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

Agenda Item 2: Financial Overview and Work Plan Summary

2a. Update of the FY2019 MSE Work Plan

Baker provided an update on the FY2019 MSE work plan as of 12/31/18.

2b. Update on 7.0 Project Work Plan (June 2019) (Handout LBC-2b)

Baker provided an update on the Modernization Project work plan as of 12/31/18.

2c. Update on 7.1 Project Work Plan (June 2020)

Baker has started developing mockups that will be used to enhance the PS Design Tool and to create the Steel Design Tool. Baker is planning to send these mockups to TAG for review in a month's time.

Agenda Item 3: Update on BrDR Licenses (FY2019)

3a. Product Report

Judy Tarwater presented a product license summary report developed from the Excel output from AASHTOWare Manager. The report included licenses ordered as of 12/12/18.

Item	FY17	FY18	FY19	Sponsoring Agency
Bridge Design - 120-Day Evaluation License	12	5	3	
Bridge Design Developer License	2	2	2	
Bridge Design Educational License	7	11	10	
Bridge Design Single Workstation Option	4	3	3	
Bridge Design Special Consultant Option	34	39	26	
Bridge Design Unlimited Option	15	16	16	
Bridge Design/Rating Service Units	94	94	38	
Bridge Rating - 120-Day Evaluation License				
Bridge Rating - 120-Day Evaluation License	23	16	5	
Bridge Rating Agency Sponsored Consultant Licenses	3	3	4	ILDOT, MIDOT, VADOT, OHDOT
Bridge Rating Developer License	5	6	9	
Bridge Rating Educational License	7	11	10	
Bridge Rating Single Workstation Option	25	59	23	
Bridge Rating Special Consultant Option	348	438	325	
Bridge Rating Unlimited Option (Members)	39	41	35	
Bridge Rating Unlimited Option (Non-Members)	N/A	N/A	10	
Sponsored Consultant Licenses (Bridge Rating) - No Fee	59	139	107	ILDOT
Sponsored Consultant Licenses (Bridge Rating) - No Fee	87	107	90	MIDOT
Sponsored Consultant Licenses (Bridge Rating) - No Fee	85	84	74	VADOT
PGSuper Professional		2	3	KDOT, MassDOT, ORDOT
BridgeLink Professional		1	2	ITD, MSDOT



3b. Service Unit Report

Baker presented the service unit summary report.

3c. Evaluation Software

The current summary of BrDR software evaluations was reviewed.

Agenda Item 4: Support and Maintenance Report

4a. Incident and Report Summary

Baker presented the Defect History Report through release 6.8.3 Seventy-six (76) new defects have been added since the Task Force meeting in October 2018. The total number of defects reported were 2510. Currently, 2317 defects have been resolved; 93 defects are not reproducible; 5 defects need more information; and 95 defects are unresolved.

4b. Progress on Bug Resolution

Baker reviewed Maintenance Progress reports for the 6.8.4 release as of 01/14/19. Out of 208 total reported incidences, 122 have been resolved and 86 are assigned for resolution.

4c. Enhancement List Update

Baker presented an update on the Enhancement List. Nine (9) additional enhancements have been added to the TAG Enhancement List since the last Task Force meeting.

Technical	BRDR-1927	AASHTOWare Engine is incorrectly placing the truck within travelway for a floorbeam – stringer system
Miss Function	BRDR-1930	OKiePROS failure for members with default member alternative rating type set to LRFR
Useability	BRDR-1965	Add 'Description' column to all user defined loads
Miss Function	BRDR-1968	Steel girder strengthening: Cover plates and Post-Tensioning
Technical	BRDR-1980	Add a checkbox to the stiffener definition to control the use of tension-field shear values when

		transverse and longitudinal stiffener
Useability	BRDR-1982	Add double angle cross section type for diaphragm spec checking
Output	BRDR-2033	Add Girder Member Span Lengths to BWS Report Tool
Useability	BRDR-2036	Culvert Haunches
Useability	BRDR-2039	Analysis Template Impact Override Method

4d. Maintenance Issues

- Third Party Support - The current developer license fee of \$500 includes 2 hours of support. Baker advised that API related support for developer licensees (i.e. Bentley, Celtic Systems, Eriksson Software, BRASS, and Promiles) will continue to increase. In example, Baker advised that Promiles support has exceeded the 2 hours provided with the developer license. The Task Force discussed the possibility of advising third party developers to purchase Service Units to support additional support needs in lieu of increasing the developer license fee to cover the support cost. As a result, the Task Force directed Baker to propose a developer license fee scheme, to include an option for third party developers to secure additional support hours. This topic was discussed further under agenda item 8a.

4e. Purging older VI Incidences

- Vinacs Vinayagamorthy suggested the Task Force consider purging the existing Enhancement list to allow the list to be more easily managed. The enhancement list was previously purged six years ago; however, since then the list has continued to grow.
- The current process for list management involves the Beta TAG short listing the enhancements based on the importance of each issue. Judy Tarwater then sends the list to all End User Designees and posts the list in



the RADBUG Registration web site so that all users can review any of the incidents. This process allows the members to vote on any issues that are important to them during the RADBUG meeting. Each vote from an Agency with unlimited license gets 37 points and Consultants with an unlimited license get 27 votes and so on. Enhancements with the highest vote count are considered for inclusion in the next release.

- Features that are missed during the development process are typically added to the Maintenance bucket.
- The Task Force discussed the JIRA issues that are identified as duplicate incidences. Currently, the person reporting an issue needs to add his/her name as watcher to receive correspondence. It is suggested that the person's name of the duplicate incident automatically be added to the original incident as watcher so that all the correspondence about the issue will be shared with this person. The Task Force also discussed JIRA issues that have been "accepted" (meaning the issue was resolved satisfactorily), but not closed by the developer. The Task Force recognizes these can cause issues; however, no decision was made on how to resolve.

Agenda Item 5: Enhancements

5a. Incorporate Ohio Corrugated Metal Pipe (CMP) Spreadsheet

Baker shared the email communications between Baker who is a Research team member of NCHRP 15-54 and Vinacs Vinayagamoorthy. Per this correspondence, there will be a section revision on CMP. As a result, Baker proposed to postpone the effort until a clear guideline has emerged and has been published.

5b. Changes to the Cb calculation for floorbeam analysis to support concurrent moment (AI 2018-BrDR-069)

Baker provided an estimate to incorporate the concurrent moment along the unbraced length. This enhancement (JIRA BrDR-1649) was originally requested by Illinois DOT and the Task Force directed Baker to provide an estimate. However, no decision was made as to when this feature will be added to the software.

5c. MBE October 2018 Errata and MBE 2019 Interims

Baker provide an estimate for enhancing the software to include the LRFD Specification updates, MBE 2018 errata, and 2019 Interims.

5d. Incorporating Password scheme to the software for Agencies that use the Active Directory Domain Management services.

Caltrans uses Active Directory Domain Management (ADDM) services for its users to log into its servers and would like to modify the BrDR software so Caltrans can manage user accessibility of BrDR software using ADDM services. Baker will review the process and provide a cost estimate by the RADBUG Meeting in July 2019.

Agenda Item 6: BrDR 7.1 Contract Modification #1

6a. Steel Design Tool

The Task Force made the decision to include the remaining features needed in the Steel Design Tool in the upcoming BrDR 7.1 contract modification #1.

6b. BrM Web Service Integration

The Task Force reviewed and approved the BrR/BrM Webservices Integration Project RIPI request as presented by Baker. Baker advised that some minor revisions are necessary to



provide additional technical detail in the project scope.

6c. Additional User Requested Enhancements

The Task Force made the decision to include the following in the BrDR 7.1 contract modification.

- Steel Design Tool additions
- User Group Enhancements(new task)
- BRDRSUP-553 Implement 3D FEM and 3D FEM-Vehicle Path analysis for superstructure with hinges (new task)
- BrM web service integration (new task)
- Rating Tool Permit Analysis Settings (new task)
- Caltrans updates (deltas) task increases
 - SUP-1619 Schedule Based RC I beam with post tensioning
 - BRDRSUP-1622 Limiting lever rule on single lane
 - BRDRSUP-1623 Limit applicability range values to lever rule
 - BRDRSUP-938 User-defined load distribution (DC2) to MCB webs
 - SUP-1627 Range of applicability for slabs
 - BRDRSUP-1628 Report writer for girder-floorbeam-stringer systems

Agenda Item 7: Modernization

7a. Project Update

Baker added one more alpha tester to the project, bringing the total number of alpha testers to five (5).

Baker advised that Baker builds the software at the end of day each Friday and tests the software to insure all the issues identified by the testers are tested again. Currently, Jeff Olson is helping Baker with regression testing.

The idea of releasing 6.8.4 and 7.0 at different times was discussed. Dean pointed out that only 6.8.4 can be used to compare the results

produced by the Legacy and Modernized engines to ensure the accuracy of the modernized engine, since only the 6.8.4 version has the Modernized engine and Legacy engine. Furthermore, any fixes made to the 6.8.4 modernized engine will be incorporated into the 7.0 version. As a result, Dean Teal suggested that the 6.8.4 should be released first.

The software has approximately 1000 user interface and approximately 18000 data entry locations. Checking each entry location and to ensure that the software retains its expected behavior presents a huge challenge. Many ideas were discussed.

7b. January 2019 Quarterly Status Report

The Task Force reviewed the draft January 2019 BrDR Modernization Status Report.

7c. TAG Update

Dean Teal reported that there have been no changes on the BrDR Modernization TRT. There are a total of 21 members on the Beta Testing TAG. Two members were recently added.

7d. 6.8.4 and 7.0 Beta Testing

The Beta Testing TAG will conduct on-site testing in the Baker Pittsburgh offices the week of March 18th. Twelve testers have agreed to participate. A majority of the testers have already secured approval for travel. Two people have agreed to concentrate on substructure testing

The Task Force discussed establishing a process to more easily document information for bug reports to be entered into JIRA. The tester should ensure sufficient information to effectively describe the issue without getting too detailed on what is reported. Options to simply this



process will be discussed while the testers are working in the Baker offices.

The Task Force also made the decision to add a Time and Materials task for 500 hours (\$75,000) for Baker beta testing.

Agenda Item 8: FY2020 – Finalize Documentation

8a. Catalog

The Task Force reviewed and approved the draft BrDR language for the FY2020 AASHTOWare Catalog with the planned addition of an Enhanced Developer Support option.

With the exception of the Developer license fee, the BrDR license fees will remain same level as the fees for FY2019. With the active AASHTOWare wide licensing strategy project underway, it is possible that the license fee structure for outlying years may be different from the structure we currently have.

BrDR Licenses	2019	2020
BrD Unlimited (AASHTO Member Agency)	\$ 37,500	\$ 37,500
BrD Unlimited (Non AASHTO Member)	\$ 50,000	\$ 50,000
BrR Unlimited (AASHTO Member Agency)	\$ 37,500	\$ 37,500
BrR Unlimited (Non AASHTO Member)	\$ 50,000	\$ 50,000
BrD Workstation (1)	\$ 10,000	\$ 10,000
BrD Workstation (2+)	\$ 8,500	\$ 8,500
BrR Workstation (1)	\$ 10,000	\$ 10,000
BrR Workstation (2+)	\$ 8,500	\$ 8,500
BrD Consultant	\$ 5,000	\$ 5,000
BrR Consultant	\$ 5,000	\$ 5,000
BrD Agency Sponsored	\$ 90,000	\$ 90,000
BrR Agency Sponsored	\$ 90,000	\$ 90,000
Developers	\$ 500	\$ 750

BrDR currently supports Oracle 11 and 12; however, Oracle has deprecated the product in version 12. Oracle has announced that they are dropping support for non-container databases. Non-container databases may not work in Oracle 13.

8b. FY2020 MSE Work Plan

The Task Force reviewed the draft FY2020 MSE Work Plan.

8c. FY2020 BrDR Strategic Plan

The Task Force reviewed the BrDR Strategic Plan developed for the current fiscal year and discussed additional strategic directions that should be incorporated into the plan for FY2020.

- Preserving and expanding the user base
- Supporting other business processes
- Enhancing usability
- Improving the software development process
- Facilitating third-party development
- Cloud Hosting (multi-phased approach)
- Expedited Releases
- Third Party Integrations (to include integration with other AASHTOWare products)

Agenda Item 7: Miscellaneous Topics

9a. 3D analysis file management (AI 2018-BrDR-073)

Baker presented a white paper on customizing the analysis temporary file output location. In several instances, users who have large bridges – especially 3D bridges – have run into temporary storage limitations. This limitation has occurred even in cases where sufficient resources have existed on secondary drives. By customizing the output location, users with small primary drives, shall be able to analyze more models and larger models without running into primary drive storage limitations.

The features of this enhancement would include:

- Allow user to specify analysis temporary file output location in the system preferences window



- Allow the user to specify the number of analysis' to keep temporary data for
- Enumerate list of bridges in temporary output location and allow user to specify bridges to always persist temporary data
- Enumerate list of data in temporary output location, to permit user to cleanup specific or all analysis data
- Allow user to disable feature

Dependencies: AASHTO Engine and third party engines to switch "hardcoded" temporary file output location from existing location to new location.

9b. Deliver BrDR Bridge Models and As-built Plans

Vinacs Vinayagamoorthy advised that he plans to provide 32 bridge models along with the as-builts plans. Examples representing Steel Rolled girder, Steel Plate girder, Steel Built up girder, Prestressed I girder, Reinforced Concrete (RC) Tee girder, Cast in Place (CIP) RC Multi Cell Box (MCB) Girder, CIP Post-Tensioned MCB Girder, and RC Slab will be included. Vinacs has already assembled 13 bridges (2 from Virginia, 2 from Mississippi and 9 from California) and is working on completing all of these bridge models. Once all the bridge models are gathered, these will be forwarded to Baker so that Baker can maintain and distribute to users.

9c. Bridge Data Webservice

The Task Force discussed the timing for when the webservices for BrDR connection to the bridge database should be activated.

Agenda Item 10: Third-Party Issues

10a. Long-term Strategy

No current activity.

10b. Version Compatibility

An issue concerning version compatibility between a third party software and BrDR was discussed.

Agenda Item 11: User Group

11a. Summary Minutes from the October Meeting

The summary minutes for the October BrDR Task Force meeting in Newport, RI were provided. Judy Tarwater will post these on the SharePoint site for Task Force review and comment. Once in final form, the summary minutes will be forwarded to David Schroeder (Secretary RADBUD) for posting on the RADBUD website.

11b. 2019 RADBUD Meeting

George Huang and the RADBUD officers asked Judy Tarwater to send an email to the BrDR community to request speakers for a list of proposed topics for the 2019 RADBUD meeting. The RADBUD Officers also asked the Task Force to review their proposed topics and suggest additional topics to be included in the list.

The RADBUD Officers suggested the following:

- Potential Presentation Topics (Baker of Task Force)
 - New features are included in the 2019 release and will be included in 2020 release.
 - Suggested workaround to users by Baker
- Potential Presentation Topics (Users)
 - The experience of using BrD, especially involving sub-structure analysis.
 - The experience of using BrR
 - The experience of using PS Design Tool
 - The experience of using Regression Test Utility
 - The experience of using the Rating Tool for permitting system



- Software workaround and potential new features or enhancement for BrDR

George also advised that we may need to actively look for the following presentations:

- Rating of curved steel plate girder and LRFR for truss using BrR - Baker
- Timber bridge rating with BrDR - User

The Task Force agreed that these two topics would be good topics to include in the RADBUG agenda. Baker could present the curved steel plate girder and LRFR to truss using BrR presentation. The Timber Bridge rating presentation topic will be included in the list of topics to forward to users to seek presentation.

The Task Force suggested the following potential topics for Baker to present:

- Baker's presentation from TRB (BrDR presentation on AASHTO LRFD bridge design capabilities)
- Troubleshooting 3D modeling issues
- Training session for Third Party Developers?

Agenda Item 12: Work Plans

12a. Planning Estimates

No discussion.

12b. Future Work Plans

Discussed under agenda items 5 and 6.

Agenda Item 13: FHWA Update

Tom Saad provided the following FHWA update. The FHWA has finalized a report on shear analysis of concrete bridge elements. The synthesis report is intended to provide guidance for the bridge community to address challenges that are commonly faced when rating concrete bridge components for shear. The objective of the study was to determine why shear ratings are often low when little visual distress is observable, and to make suggestions for the best approaches

for analyzing concrete shear behavior to develop confidence in shear load rating results. The report provides recommendations for improved implementation to increase the accuracy in establishing concrete element shear capacity. The FHWA intends to draft ballot items for AASHTO Technical Committee consideration and to conduct additional studies to establish an accurate and practical approach to ascertain the shear capacity of concrete bridge components.

The FHWA Office of Bridges and Structures is developing guidelines and load rating examples for tunnel components to support the need for State Highway Agency's to load rate tunnels in accordance with the National Tunnel Inspection Specifications. FHWA intends to host a webinar to provide training, demonstrate the requirements for tunnel load rating and the contents of the guide. A 95% complete product was recently reviewed by FHWA and the guide is scheduled to be available by the fall of 2019.

A study on the impacts of truck platooning was recently initiated by FHWA to determine if the effects of truck platoons will necessitate the need for additional guidance for bridge load rating engineers. There is concern that trucks operating in platoons may be able to operate with minimal headway distances, necessitating a need for additional guidance in the MBE for assessing bridges in corridors where platoons will operate. The results of this study will be available in early 2020.

FHWA is currently updating the National Highway Institute Course No. 130092, Load and Resistance Factor Rating of Highway Bridges to bring the course up-to-date with MBE revisions that have been adopted in recent years. The course was delivered in Virginia, West Virginia and New Jersey in recent months. You may register for



open seats for courses that have been scheduled at <https://www.nhi.fhwa.dot.gov/course-search?tab=0&key=130092&res=1>. Additionally, you can find excellent Reference Manuals that were developed to coincide with many of the FHWA National Highway Institute Course curriculum that is developed for bridge design and analysis engineers at <https://www.fhwa.dot.gov/bridge>.

FHWA will host the Southwest States Load Rating Program Peer Exchange in the summer of 2019. This will be the sixth regional peer exchange in as many years and will allow load rating specialists from the States of Alaska, Arizona, California, Hawaii, New Mexico, Nevada, Oklahoma, Oregon and Texas to discuss challenges and share best practices in bridge load rating, posting and permitting.

FHWA hosted the 26th webinar in the FHWA Bridge Load Rating Webinar Series on December 19th entitled *Load Rating of Concrete Bridges without Plans*. The webinar included presentations of State practice implemented by the Indiana and Alabama DOTs. The webinars in this series, which provide a good source of information on best practices in bridge load analysis, posting and permitting, are recorded and available for viewing at <https://www.fhwa.dot.gov/bridge/loadrating/>.

Agenda Item 14: Five Year Projection for BrDR

Judy Tarwater provided the Five Year BrDR Financial Projections to the Task Force during Executive Session.

Agenda Item 15: Licensing Issues

15a. Third Party Add-ons

Baker updated the Task Force on Baker actions to secure the BrDR API to ensure that in the event a third party unintentionally distributes/bundles

portions of BrDR with their own product, the BrDR dlls are not included in their delivery. The additional security involves a 'lock' on the API in addition to the user interface. Baker will implement new licensing software with version 7.0.

15b. Design Tools

No discussion.

Agenda Item 16: Marketing Activities

16a. 2019 TRB Standing Committee on Steel Bridges Workshop

Baker presented a BrDR presentation on AASHTO LRFD bridge design capabilities during the 4 hour Workshop which was held in conjunction with the 2019 TRB Annual Meeting in January 2019 in Washington, DC. The presentation went well. There seemed to be a big interest in the diaphragm forces at the Steel Committee meeting. The committee indicated that they will seek vendor approval before revealing the results. There also was talk of modeling bridges for which they have field results to see how accurately the model represents real life.

16b. 2019 IBC Meeting – June 11, 2019 (National Harbor, MD)

Lubin Gao contacted Todd Thompson to offer the Task Force an opportunity to make a presentation at the FHWA Load Rating Workshop at the International Bridge Conference tentatively scheduled on June 11, 2019. (Possibly a presentation on the current functionality of BrDR and future directions?) Todd will follow-up with Lubin to let him know that we would be interested in making the requested presentation.

Agenda Item 17: Review Action Item list from this meeting

Vinacs Vinayagamoorthy read the action items recorded during the meeting.



Agenda Item 18: Task Force Executive Session
(as needed)

An Executive Session was held between 11:00am and 11:20am to discuss Task Force financials. Meeting was adjourned at 4:00pm.

