Summary Minutes Of The
AASHTOWare Bridge Design-Rating (BrDR) Task Force Meeting
August 6, 2021
New Orleans, LA (Virtual)

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

Date: Friday, August 6, 2021

Participants:

AASHTO	Judy Tarwater	AASHTO	Project Manager
	Ryan Fragapane	AASHTO	Project Manager
SCOA	Tim Armbrecht - absent	SCOA	SCOA Liaison
T&AA	Will Holmes - absent	T&AA	T&AA Rep
BrDR Task Force	Todd Thompson	South Dakota DOT	Chair
	Mark Bucci	Louisiana DOTD	Bridge Design (BrD)
	Michael Johnson	Idaho TD	Bridge Rating (BrR)
	Jeff Ruby	Kansas DOT	Bridge Design (BrD)
	Tom Saad	FHWA	FHWA Liaison
	Vinacs Vinayagamoorthy	California DOT	Bridge Rating (BrR)
BrDR Contractor	Herman Lee	ProMiles	BrDR Contractor
	Geoff Trees	ProMiles	BrDR Contractor
	Tim Pilcher	ProMiles	BrDR Contractor
	Krisha Kennelly	ProMiles	BrDR Contractor
	Hanjin Hu	Michael Baker	BrDR Contractor

Notes Takers: Ryan Fragapane and Mike Johnson

Agenda Item 0: Review Agenda/Assign Minutes Recorder

Todd Thompson opened the meeting at 9:00 am. The agenda was reviewed. No changes were made.

Agenda Item 1: Prior Business

1a. Review June Meeting Minutes

Minutes from the June 17 - 18, 2021 Virtual Task Force Meeting (Whitefish, MT) were reviewed. The meeting minutes were approved as is.

1b. Review Action Items

Vinacs reviewed the Action Items and updates were provided to the task force.

Agenda Item 2: User Group

2a. Summary Minutes from the June Task Force Meeting

The summary minutes for the June BrDR Task Force Virtual (Whitefish, MT) 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 the RADBUG secretary for posting on the RADBUG website.

2b. Summary Minutes from the July Task Force Meeting

The summary minutes for the July BrDR Task Force VIRTUAL 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 the RADBUG secretary for posting on the RADBUG website.

2c. 2021 RADBUG Survey Results / Follow-up

The Survey was distributed to the member agency end user designees (49 total recipients) and was open for feedback from June 30 through July 16, 2021. 35 responses were received from 30 member agencies.

Three (3) responses from	Arizona
Two (2) responses from	Mississippi, North Dakota, and Virginia
One (1) response from	Alabama, California, Colorado, Florida, Idaho, Illinois, Iowa, Kansas, Kentucky, Louisiana, Manitoba, Michigan, Minnesota, Missouri, Nebraska, New Jersey, New Jersey Turnpike, New York State, Ohio, Pennsylvania, Rhode Island, South Carolina, Tennessee, Texas, Utah, Wisconsin

The task force reviewed the summary results (including individual responses to open ended questions) as well as individual responses submitted from specific respondents.

2d. User Priorities / Strategic Directions

The task force discussed the components of their Strategic Directions document.

1. AASHTOWare BrDR Mission Objectives
   a. Efficient Bridge Design, Load Rating, and Permitting
      i. Design
         1. Provide a solution that can design the most common superstructure and substructure types.
            a. Steel Girders, Prestressed Girders, Slab Bridges, Multi-Cell Box Girders, and RC Beams
            b. Concrete Column Bents, Concrete Pile Bents - This may be too specific
      ii. Load Rating
         1. Provide a solution that can rate the most common bridge types. - Clarification based on Becky Curtis's comment. I think we should focus and enhance the software to address the most common bridge types and their variants. There are several bridge configurations that occur, often within the most common bridge categories that are not addressed within the software. Consider providing enhancements that address the bridge types and their variants that occur within 90-95% of the most common bridge types (see nationwide bridge type list).
         2. Utilize bridge model database to maintain and update structure model over the life of the asset.
      iii. Permitting
         1. Utilize bridge model database to facilitate the evaluation of permit vehicles and permit routing.
   b. Pooled Fund Software Development
      i. Provide a solution that would otherwise be cost prohibitive at the quality/level needed.
   c. DOT-Driven software
      i. Facilitate software improvements to meet needs of various states through collaborative means.
      ii. Provide user driven software enhancements.
   d. Consistency and Flexibility
      i. Provide consistent approach, which meets federal requirements.
      ii. Support agency defined features and elements in bridge model.

2. Strategic Directions
   a. Establish Long Range Planning Objectives (5 years) – Task Force should vote to select what features we would like to prioritize from the list below. At a

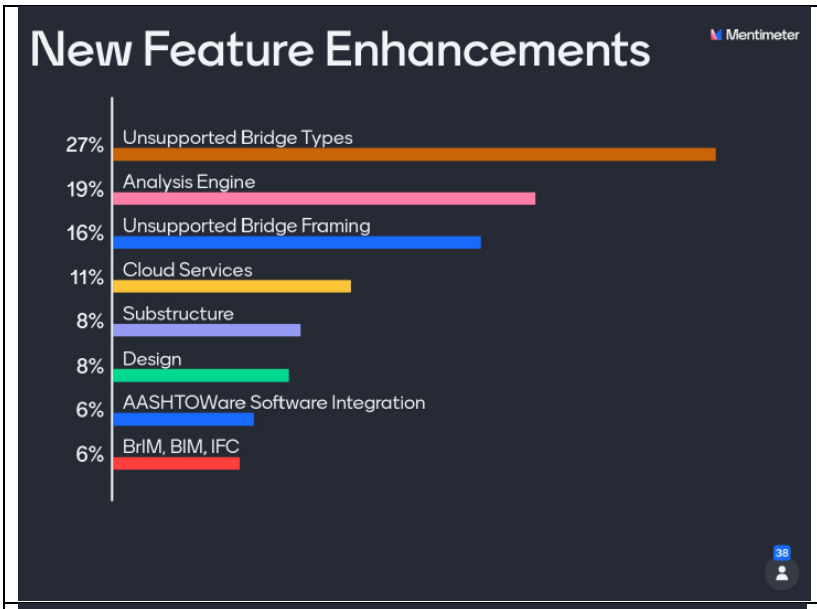
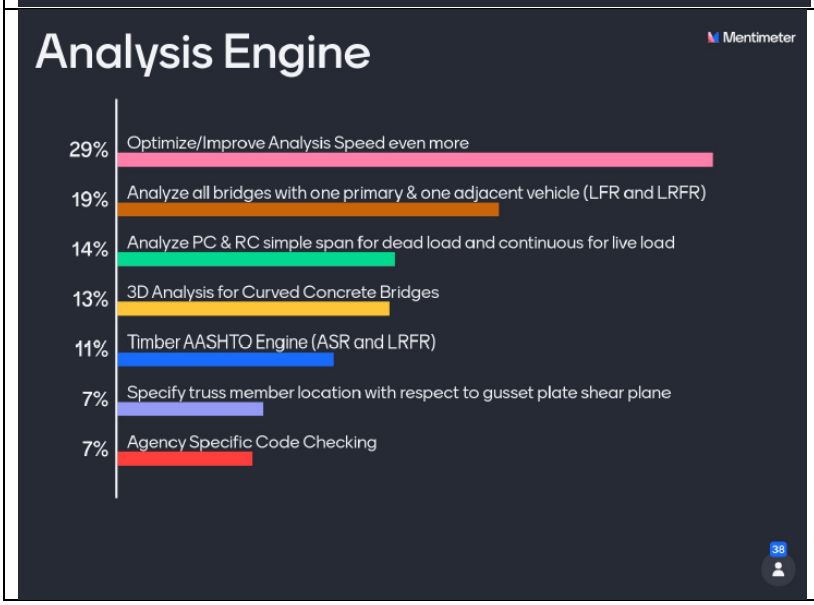
minimum, consider assigning percentage of budget to “Add New Features” and “Enhance Existing Features”.

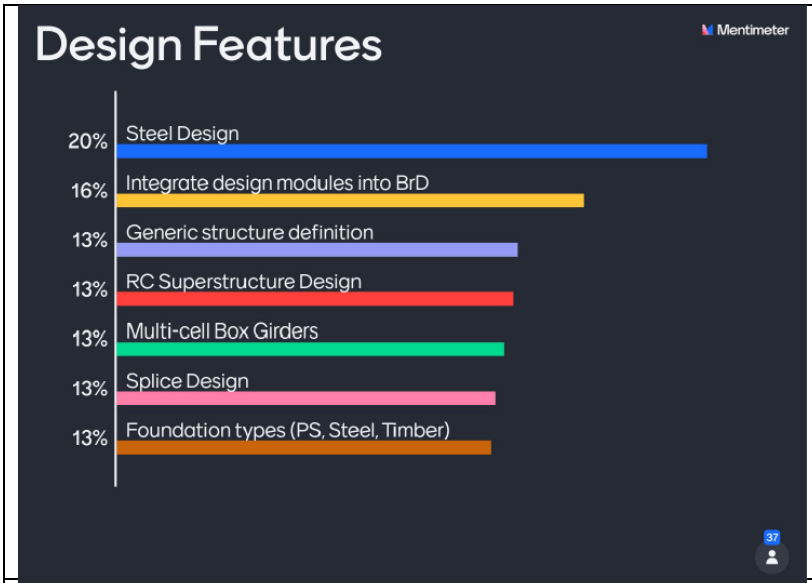
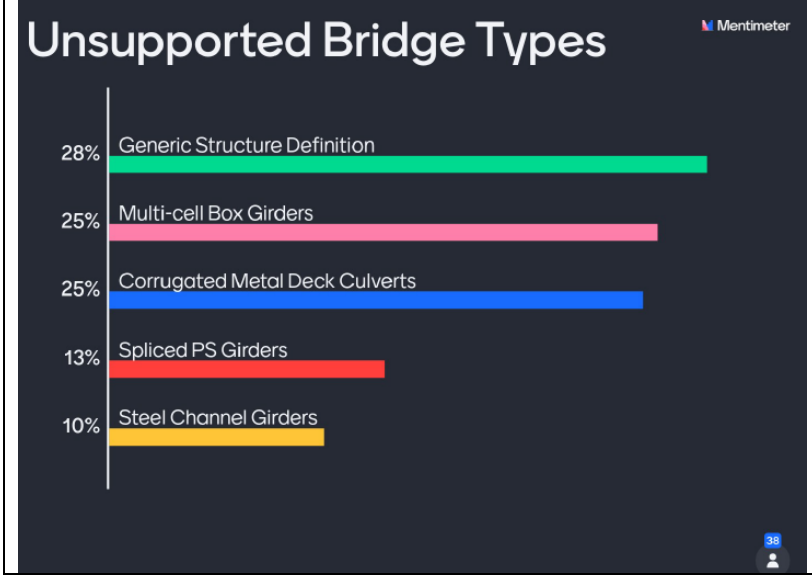
b. Add New Features
   i. AASHTOWare Software Integration
   ii. Analysis Engine
      1. Timber AASHTO Engine (ASR and LRFR)
      2. Optimize/Improve Analysis Speed
      3. DOT Specific Code Checking
      4. 3D Analysis for Curved Concrete Bridges
      5. Analyze PC & RC simple span for dead load and continuous for live load
      6. Specify truss member location with respect to gusset plate shear plane
      7. Provide mechanism to analyze all bridges with one primary vehicle and one adjacent vehicle (LFR and LRFR)
   iii. BrIM/IFC
   iv. Cloud Services
      1. Hosting
      2. Web Based Analysis
   v. Design Features
      1. Steel Design
      2. Splice Design
      3. Reinforced Concrete Superstructure Design
      4. Integrate design modules into BrD
      5. Multi-cell Box Girders
      6. Generic Structure Definition
      7. Foundation Design (PS, Steel, Timber)
   vi. Substructure Rating
   vii. Unsupported Bridge Types
      1. Corrugated Metal Deck Culverts
      2. Multi-cell Box Girders (Straight, curved, hinged, multi-duct, integral substructure)
      3. Spliced PS girders
      4. Steel Channel Girder
      5. Generic Structure Definition
   viii. Unsupported Bridge Framing
      1. Curved bridges with chorded girders
      2. Curved bridges with kinked girders
      3. Dog-legged girders
      4. Splayed curved girders
      5. Floor beams with hinges
      6. Hinges in girder floor system
      7. Accommodate varying bridge width along span length

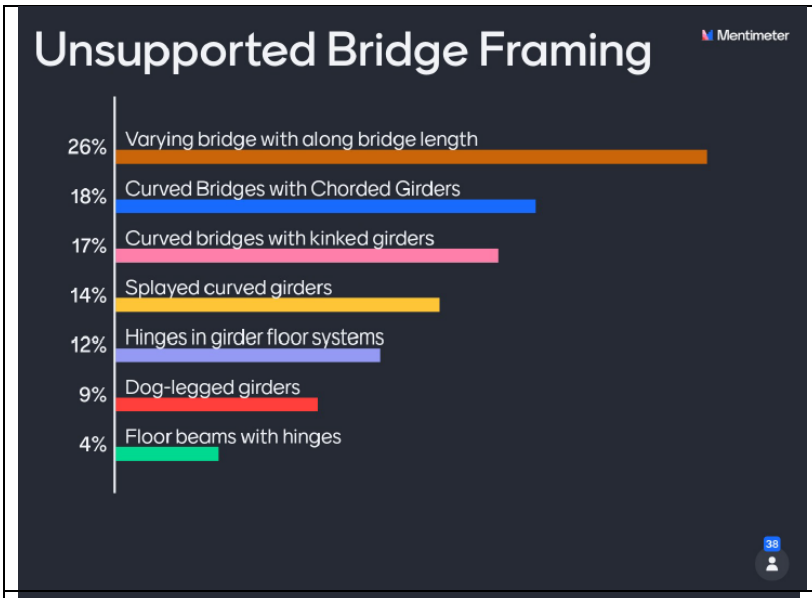
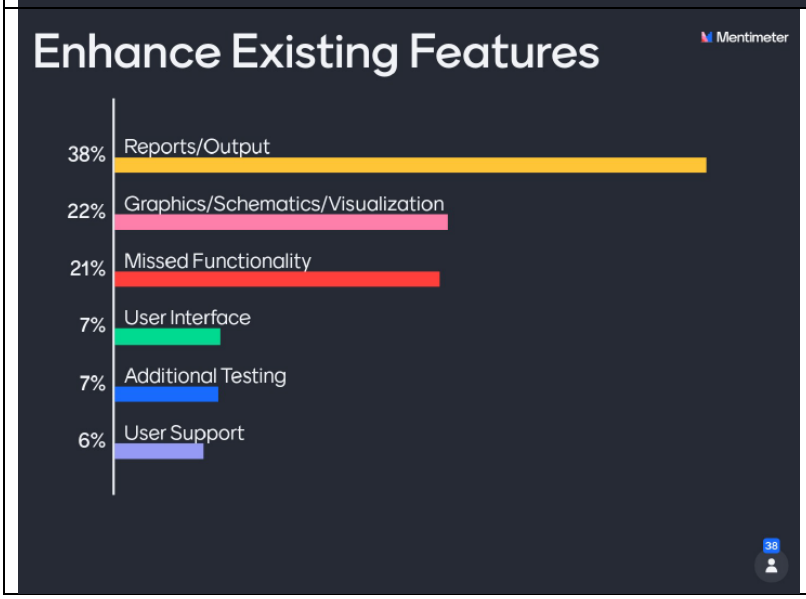
c. Enhance Existing Features
   i. Additional Testing
   ii. Graphics/Schematics/Visualization
   iii. Missed Functionality
      1. Add typical precast shapes to library
      2. Model PS section loss
      3. Analyze local web yielding and local web crippling for steel beam ends
      4. Truss model works for LFR and LRFR w/o modification
      5. Calculate LDF for all beam-slab bridge types
   iv. Reporting
   v. User Interface
   vi. User Support
      1. Training Tools/Examples
      2. Improve Help Documentation

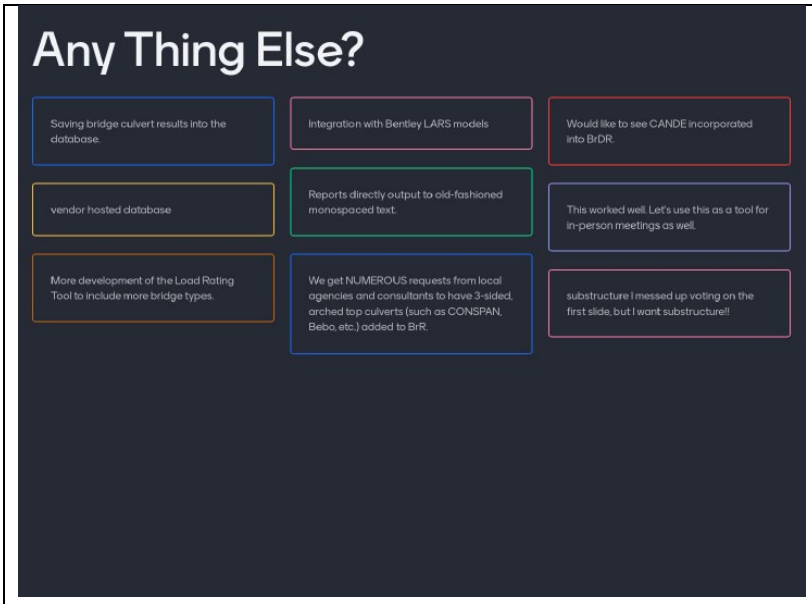
<u>2e. RADBUG Business Meeting MentiMeter Responses</u>

The task force reviewed the user responses from the RADBUG Business Meeting MentiMeter Strategic Directions survey. The task force is impressed with the audience’s response to the use of the MentiMeter platform.

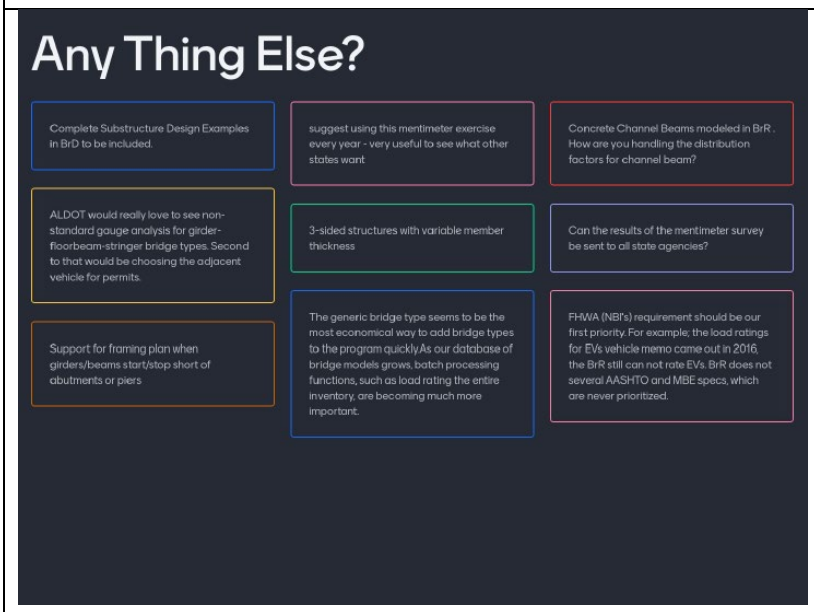
	The task force noticed that the two areas that are currently being 'pushed' by AASHTO and COBS (AASHTOWare Software Integration and BrIM, BIM, IFC) are the lowest priority categories from the use community perspective. The task force may need to make a more concerted effort to explain the value of these initiatives. It was also suggested that a majority of the meeting attendees are end users who are concerned only with the functionality of the product.
	Although not the highest priority, the inclusion of the Timber Engine needs to be a priority given the eventual demise of the Madero Engine, and the fact that source code for the engine is non-existent. The task force may need to consider that items pursued by the task force that were not voted highest priority in this poll may need to be explained to the user community to help them understand why particular decision are made.

	Steel Design was rated the highest priority, which is encouraging since it will be delivered in BrDR 7.2.
	Generic Structure Definition bridge type would allow the ability to support several new bridge type in one 'fell swoop'. A representation of a bridge could be used to support bridge design decisions. The task force made the decision to have a sub-group of the task force work with ProMiles to develop generic structure definition requirements.

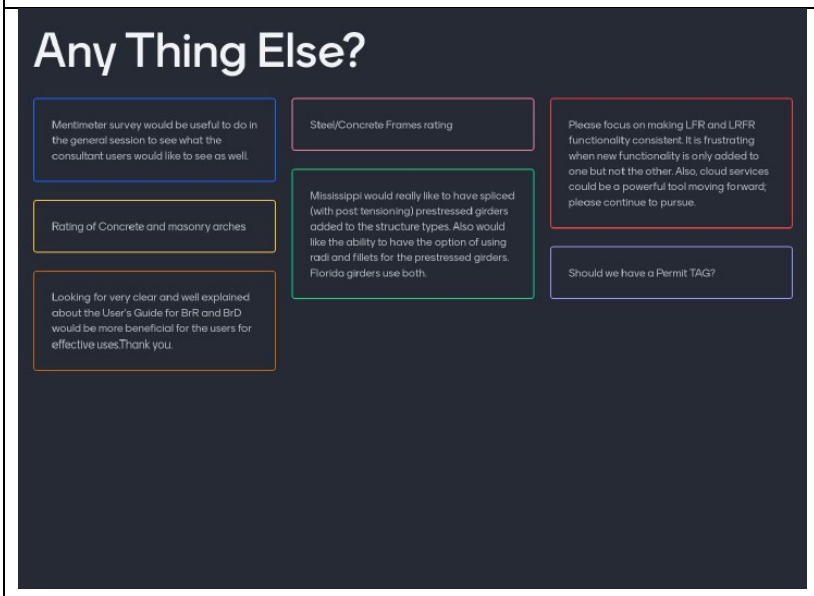
		
		The task force is currently working to address the top two priorities (Reports/Outputs and Graphics/Schematics/Visualization)



- Saving bridge culvert results into the database
- Vendor hosted database
- More development of the Load Rating Tool to include more bridge types
- Integration with Bentley LARS models
- Reports directly output to old-fashioned monospaced text.
- We get NUMEROUS requests from local agencies and consultants to have 3-sided, arched top culverts (such as CONSPAN, Bebo, etc.) added to BrR
- Would like to see CANDE incorporated into BrDR
- This worked well. Let's use this as a tool for in-person meetings as well
- Substructure – I messed up voting on the first slide but I want substructure



- Complete Substructure Design Examples in BrD to be included
- ALDOT would really love to see non-standard gauge analysis for girder-floorbeam-stringer bridge types. Second to that would be choosing the adjacent vehicle for permits.
- Support for framing plan when girders/beams start/stop short of abutments of piers
- Suggest using this mentimeter exercise every year – very useful to see what other states want
- 3-sided structures with variable member thickness
- The generic bridge type seems to be the most economical way to add bridge types to the program quickly. As our database of bridge models grows, batch processing functions such as load rating the

	entire inventory are becoming much more important. • Concrete Channel Beams modeled in BrR. How are you handling the distribution factors for channel beams? • Can the results of the mentimeter survey be sent to all state agencies? • FHWA (NBIs) requirement should be our first priority. For example, the load ratings for EVs vehicle memo came out in 2016. The BrR still cannot rate EVs. BrR does not support several AASHTO and MBE specs, which are never prioritized.
	• Mentimeter survey would be useful to do in the general session to see what the consultant users would like to see as well • Rating of Concrete and Masonry Arches • Looking for very clear and well explained about the Unser's Guide for BrR and BrD would be more beneficial for the users for effective use • Steel/Concrete Frames Rating • Mississippi would really like to have spliced (with post-tensioning) prestressed girders added to the structure types. Also would like the ability to have the option of using radii and fillets for the prestressed girders. Florida girders use both. • Please focus on making LFR and LRFR functionality consistent. It is frustrating when new functionality is only added to one but not the other. Also, cloud services could be a powerful tool moving forward. Please continue to pursue. • Should we have a Permit TAG?

2f. Logistics – Posting RADBUG Webinar Videos and PowerPoint presentation (in pdf format)
Judy Tarwater walked through the RADBUG information posted on SharePoint.

- **PowerPoint presentations in pdf format** – The presentation PowerPoint files have been converted to pdf and are posted on SharePoint at: *Br Design-Rating ->RADBUG -> 2021 – New Orleans Virtual 2 -> Post-RADBUG Presentation pdfs and Videos to Post*. The pdf files of the Business Meeting and FHWA presentations are included in this directory but are labeled "DO NOT POST" as a file name prefix as a reminder that these are not to be posted for public consumption. The six (6) videos presented during the ProMiles BrDR Introduction and Training Session are also stored in this directory.

  The task force directed ProMiles to post, under the training tab of the BrDR portion of the aashtowarebridge.org website, the presentation pdf files approved for public consumption (i.e. all presentations in all sessions except for the RADBUG Business Meeting session) with the exception of the FHWA presentation, which could potentially be posted later. The six (6) presentation videos will be posted on the BrDR YouTube Channel and links inserted in the aashtowarebridge.org RADBUG meeting documentation for easy access.

  The task force also directed Judy Tarwater to forward the RADBUG presentation pdfs to Amjad Waheed, RADBUG secretary, for posting on the aashtobr.org website.

- **RADBUG Webinar Recording Videos** – The RADBUG webinar videos are posted on SharePoint at: *Br Design-Rating ->RADBUG -> 2021 – New Orleans Virtual 2 -> Post-RADBUG Webinar Recordings to Post* for Task Force/ProMiles consumption.

  The RADBUG Business Meeting Session will not be posted on the website/YouTube channel for public consumption. The RADBUG 2021 Opening Session will also not be posted on YouTube until after approval to release the FHWA presentation has been secured from FHWA management.

  ProMiles advised that they will make minor adjustments to the ProMiles Technical Presentations 1 webinar video to remove, or "blur", a few instances of possible ProMiles IP exposure prior to making the webinar videos available for public consumption. Final versions of the webinar videos (with the exception of the Opening Session and the RADBIG Business Meeting) will be posted on the BrDR YouTube Channel and links inserted in the aashtowarebridge.org RADBUG meeting documentation for easy access. (similar to how the information from the 2020 RADBUG meeting was organized).

- **Webinar Attendee Reports –** The Webinar Attendee Reports are posted on SharePoint for Task Force members and ProMiles staff access. An attendee report for each session is available as well as a multi session report showing session attendance by attendee name. In addition, a consolidated email list of all attendees is included and can be provided to member agency staff on request. (Posted on SharePoint at: *Br Design-Rating ->RADBUG -> 2021 – New Orleans Virtual 2 -> Webinar Attendee Reports)*.

2g. Other RADBUG Follow-up Actions?
Judy Tarwater advised that she has been contacted by an attendee from the City of New York requesting the issuance of a PDH certificate for their records because the State of New York does not allow self-reporting via the PDH form provided. One PDH certificate was issued on request immediately following the meeting. The

task force was advised that if they are made aware of other attendees with a similar need, please advise the attendee to email their request to Judy (with their completed PDH form attached) and she will create and forward a PDH certificate pdf document to them via email.

Agenda Item 3: BrDR 7.1 and 7.2

3a. Project Update and Schedule Review

ProMiles reported on the 7.0 concluded on July 30th and they 96 issues submitted for beta 1, beta 2, and beta 3. They are currently building Beta 4 and are working on regression testing use cases. The additional bridges secured from the user community are being used for this effort. The BrM webservices effort and BBTSD-1878 / BBTSD-1876 (from Caltrans, identified during the testing of Beta 3) could impact the delivery of BrDR 7.1. (The delay time frame will depend on the results of the BrM webservices discussion next week.)

Recent changes to the BIM IFC initiative will impact the delivery of BrDR 7.1.

3b. TAG Update

Mike will be sending mockups to the culvert tag.

3c. Beta Testing Update

Currently in the final stages of Beta Testing v7.1. The acceptance build (Beta 4) will be sent out August 13 if no change in schedule.

3d. Supplemental Beta Testing

Some bridges were sent in from the testing tag. They will use those for supplemental testing.

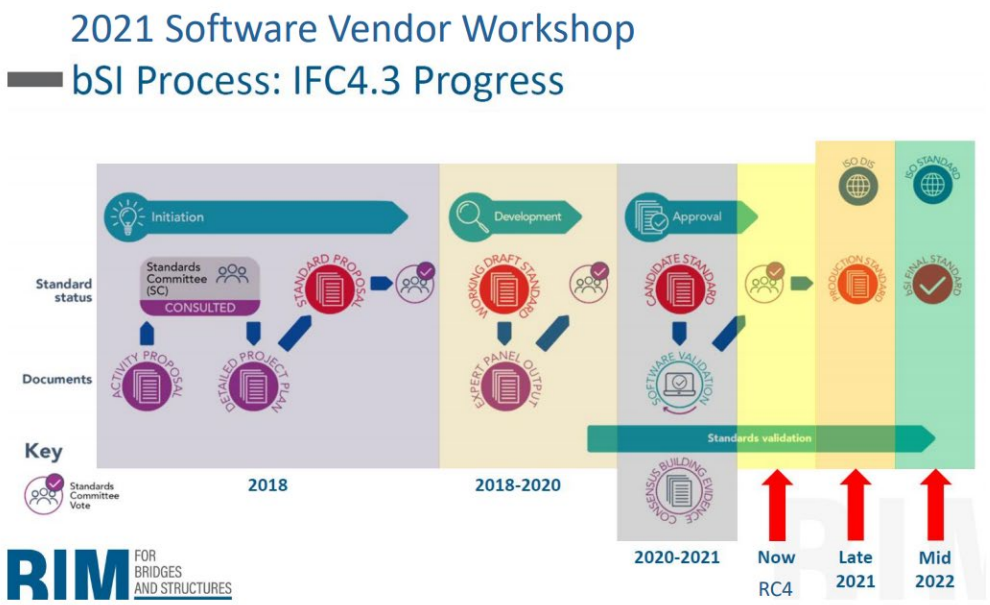
3e. BrM Webservice Integration (BrDR 7.1)

ProMiles advised that the BrM integration was planned in 2018 for inclusion in the modernized product. The goal of the project is to get back to the same level of integration that once existed between the two product sets.

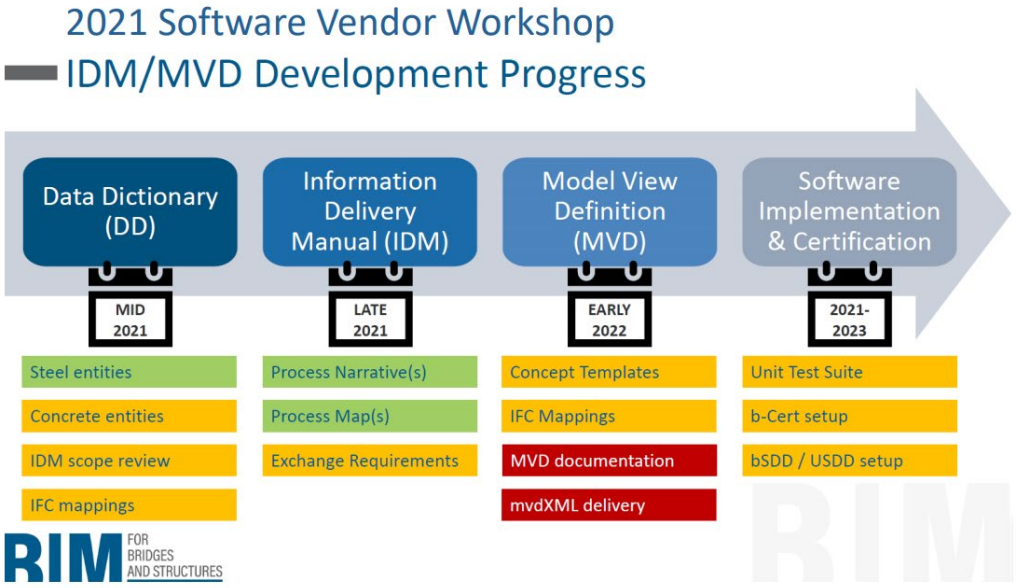
The classic five vehicles are supported as well as pushing bridge ratings to the FHWA reporting format. Currently there is no endpoint to push to the rating history. Accessing load rating events is optional; therefore, the webservice integration needs to support this requirement. A detailed discussion between ProMiles and Mayvue technical staff needs to take place to work out the details on the specific webservices requirements need to be addressed.

3f. IFC 4.3 Data Exchange Implementation (BrDR 7.2)

Promiles presented an overview of the information presented during the TPF-5(372) BIM for Bridges and Structures Annual Software Vendor Workshop (July 20 – 22, 2021).

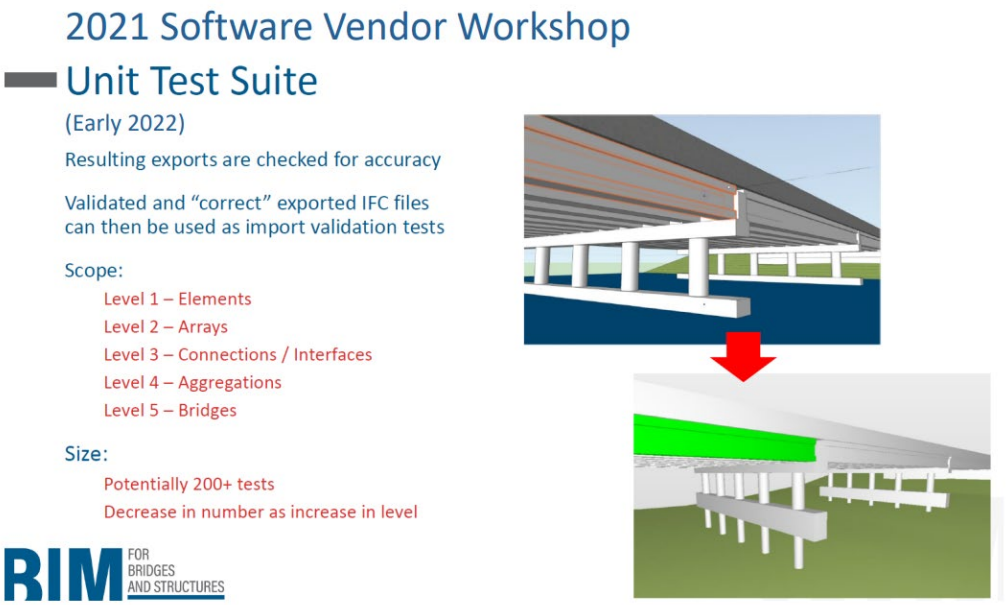


The three red arrows indicate the current state and future plans. Additional changes to the ICS4.3 schema are expected next year; however, the changes are not expected to be major.



The IFC schema is more flexible than the MVD. The MVD is expected to be completed in early calendar year 2022.

While not complete, a draft MVD should be available in the near future.



The test suite will be based on the MVD and will be available in early 2022.

- Summary
  - Model view definition (MVD) will be released early 2022
  - Unit test suite will be released early 2022
- Recommendation
  - Finish the IFC import/export for bridge superstructure for v7.2
  - Start the IFC import/export for bridge substructure in early 2022 (for v7.3)
- Benefits
  - Reduce the chance of making changes because of MVD
  - Use the unit test suite for both internal alpha testing and testing for TPF

The recommended approach will not impact the delivery date for BrDR 7.2. There will likely be some changes to bridge superstructure; however, there will likely be more changes to bridge substructure. The task force agreed with ProMiles' recommendation to include bridge superstructure in 7.2 and bridge substructure in 7.3.

Agenda Item 4: Enhancements

4a. I Girders with Prestressing and Post Tensioning

The task force discussed the recent request from the Mississippi DOT related to the FP1 task in the BrDR enhancement list (BRDRSUP-1619 Schedule based RC I beam with post tensioning).They are also interested in adding reinforced concrete channel beams to the beam library.

4b. Internal Release Utilite V3.0 Estimate

ProMiles presented an estimate for the Internal Release Utility. ProMiles presented an estimate to further enhance the Internal Release Utility for external use. The Internal Release Utility (IRU Utility), is a utility developed by a few developers as a side-project to help facilitate rapid and Agile testing. At the time, the tool was strictly meant to be an internal tool (thus the name), to be used by developers and testers, to test with up-to-date builds. As the tool was enhanced, select Beta TAG members were given access to the application and the benefits became immediately clear. Users were able to report issues, have the issues fixed, and have a build back to the end-user, within the same day in some cases. This was all done via an automatic process.

4c. Critical Rating Results API Estimate

ProMiles presented an estimate for the Critical Rating Results API.ProMiles presented an estimate for an API to consolidate the logic to determine the Critical Rating Results. This enhancement would move the logic to the API so this information can be obtained from a central location. Additionally, this functionality would be made available to 3rd party developers. This enhancement would also update the Bridge Explorer Batch Analysis to only retain data for a single bridge in memory at one time, greatly improving runtime performance for large batch analyses.

4e.INDOT Load Rating Tool Enhancment

ProMiles presented an estimate for a load rating tool enhancement. This is for enhancing the precomputed data analysis to generate both LFR and LRFR data in the same run. This enhancement will also cover upgrading Load Rating Tool scenario to consider both LRFR and LFR for one permit evaluation. Another part of

this enhancement will be to support concurrent precomputed data generation.

Agenda Item 5: Work Plans

5a. 7.1/7.2 Work Plan Amendment Discussion

Promiles presented the draft BrDR 7.1 Contract Mod 2 document.

5b. 7.3 Work Plan Discussion

The task force reviewed the BrDR enhancement list and made decisions on which enhancements should be targeted for inclusion in BrDR 7.2 and 7.3. In addition, several enhancements were targeted to be funded via the FY2022 MSE RIPI task. Several of these enhancement will be delivered in 7.3.

Agenda Item 6: BrD Presentation Outline / Content for BrD Marketing Efforts

The task force reviewed the current ProMiles-developed outline for a BrD overview/high level features presentation to be used for DOT marketing efforts. As discussed during the April Task Force meeting, the presentation outline is to serve as the basis for the development of a BrD Overview presentation with consideration given to developing the materials in 'bite size' chunks for easy deployment and consumption.

Agenda Item 7: Review Action Item list from this meeting

Ryan Fragapane read the action items recorded during the meeting.

Agenda Item 8: Task Force Executive Session (as needed)

Meeting was adjourned at 4:00pm central.