BUREAU OF STRUCTURES

Bridge Technical Committee Meeting Minutes

Date: Monday, March 20, 2023 **Time:** 1:00pm-3:00pm **Location:** SWR Dane/Rock/Columbia Rm

Introductions *5 min*

Online attendees: Jeremy Ashauer, Dominique Bechle, Bill Dreher, Brad Diener, Brent Freeman, Julie Brooks, Carolyn Brugman, Chad Halverson, Chandler Schreiber, Christine Hamil, Phil Ciha, Ruth Coisman, Mark Finnell, Gary Courneya, Brian Rowekamp, Joel Anderson (SPS), Habib Tabatabai, Hans Hallanger, Julie Jenks, Christine Krall, Linda Krueger, Leah Rhodes, Brandon Lamers, Luke Haun, Matt Grove, Mike Ryan, Dave Pantzlaff, Jim Parry, Pat Cashin, Cami Peterson, Craig Pringle, John Rublein, Ryan Pheifer, Elisabeth Stump, Dan Sydow, Ann Thielmann, Jonathan Thomas, Tim MacLaughlin-Barck, Tom Romenesko, Krissy VanHout, Craig Webster

In-Person attendees: Josh Dietsche, Aaron Bonk, Laura Shadewald, James Luebke, Dave Staab, Mark Mutziger, Kyle Busch, Kevin Weber, Isaac Groshek, Chad Hayes, Joe Balice, Josh Wade, Bill Ryan, Tadd Owens, David Stanke, Scott Stroud

Subcommittee Report(s) *10 min*

5 min	**Design & Construction Subcommittee Update** No specific requests came in from the contracting community since this last BTC meeting. Subcommittee will remain in place on an as-needed basis. No current plan in place for a meeting of this group.	Aaron Bonk
5 min	**Overlay Equipment Working Group** James provided a brief background on the work that Terex Bidwell has been putting into this area, and further discussion will be held at the next meeting as that timing likely aligns better for more substantial updates.	James Luebke

Standing Topics *25 min*

10 min	**Wisconsin Highway Research Program Bridge Items** http://wisconsindot.gov/Pages/about-wisdot/research/whrp.aspx James discussed two projects that recently completed their research: 1) Adhesive anchors and 2) Optimizing bridge slopes. James discussed active projects including low-slump concrete overlay improvements, best practices for underwater placement of concrete, and IR deck thermography. He also mentioned a project soon to kickoff, which will look into overhead and vertical concrete patching applications. Mark Mutziger asked if shotcrete would be investigated and Jim Parry asked if an APL will be developed. James responded that shotcrete and an APL are not the focus of the research, but are of interest.	James Luebke
10 min	**Bridge Manual Updates**	James Luebke

James provided an abbreviated update presentation on recent WBM updates, which was previously presented to all Bridge Manual distribution list subscribers. The full presentation is found on the BOS website Bridge Manual Updates - January Webinar Slides.

5 min **Specification Changes/Updates** — Aaron Bonk

Aaron Bonk provided an update indicating that the next Standard Spec is due for final approvals and publications in the near term, with a larger report out on specifics to come at the next Bridge Tech meeting. All of what was finalized in terms of structures spec updates was previously run through Bridge Tech Committee, was discussed with and accepted by Matt Grove, and was also accepted by FHWA/Joe Balice.

Previous Meeting Carryover Topics/Action Item(s) Review — 40 *min*

5 min **Initiative to Reduce Overruns in Concrete Masonry Overlays** — Aaron Bonk

Aaron indicated that this issue is still being considered for further evaluation. BOS has looked into recent project data and it does indicate that on occasion, the associated bid items (overlays, deck prep, etc.) are still overrunning to a relatively significant extent. That said, further review and refinement of the data is needed. BOS's structures construction program manager (Carolyn Brugman) will be looking into this topic as she gets into her new role, and we will bring this back for further consideration at the next Bridge Technical Committee meeting. **Action Item(s):** Aaron Bonk/Carolyn Brugman to analyze data further and bring back for discussion at summer 2023 Bridge Tech Committee meeting.

5 min **Railroad Coordination Reviews** — Matt Grove

Matt talked about delays in coordination reviews that are affecting the ability to continue construction efficiently, and also are having affects on lettings at this point. Matt also indicated that industry is having much better luck working directly for them, as opposed to when WisDOT is involved. David Stanke indicated that it simply boils down to whose dollars are involved and that driving the railroad's desires to keep things moving. One thing for consideration would be to lengthen the times between lettings and the start of construction, in order to give the railroads the most flexibility possible. Matt stated that he understands that it is tough for WisDOT to make improvements in this area, but that it would be good to continue to keep pressure on this item to hopefully make some sort of positive change.

5 min **Releasing Falsework Timing Related to Parapet Pours** — Aaron Bonk

Aaron worked with BPD to include clarifying language in 502.3.5.4(4) to alleviate field misinterpretations of the spec as

follows: "Do not place concrete parapets, sidewalks, and medians on cast in place *slab span* structures until the falsework is released for that superstructure unit…". No further action required at this time (item to be closed).

5 min	**Additional Dimensioning on Skewed Structures** James discussed the intent to update our Bridge Manual Standards and guidance to call for designers to include this information on future bridge plans. It is expected that this update will be finalized with the July 2023 Bridge Manual updates. No further action required at this time (item to be closed).	James Luebke
5 min	**Approved Products Lists – Conc Surf Repair, Shotcrete** At the October 2022 WisDOT Statewide Design/Construction Conference Call, Aaron Bonk discussed the need for field engineers to engage BOS when disputes over spec and/or manufacturer recommendation come up in the field. BOS will continue to message that field staff should engage BOS as disputes arise. BOS will additionally push to ensure that specifications are clear in terms of requirements at the time of bidding to avoid confusion in the field. No further action required at this time (item to be closed).	Aaron Bonk
5 min	**Migratory Bird Netting & Structures Scope of Work** Aaron Bonk discussed bird netting and inclusion of this item within structures projects with the WisDOT ecologist as a follow-up to the last meeting. It is her contention that this area has been improving over the last number of years and that there are not projects that include netting as a deterrent, nor is it included in most/all projects. The thought is that this item has been improving over the last number of years and some of what contractors had been seeing was carryover from previous guidance that no longer exists. Additionally, WisDOT and WDNR have been working with certain counties to install netting where there isn't time in the contract to physically perform the work. Brad Diener indicated that proposal 24 from February letting is a situation where netting may not be necessary and also didn't have the time to get installed (i.e., the project hasn't been awarded as of this date so there is no way they can get netting up to meet the closure window). BOS will review this project with WDNR to understand the project specific situations that led to what is shown in the contract. Kevin Weber asked the question of whether multiple bid items should be called for in situations where structure removal	Aaron Bonk

	happens one year (requiring netting) and the new build happens in the second year (requiring netting). The bid item is listed by station, not structure ID; but the intention is that netting is required in both situations. BOS can look into clarifying this issue by using a 'structure ID' and multiple "each" bid items when this situation presents itself. **Action Item(s):** Aaron Bonk will follow up with WDNR, as well as BPD/BTS, to see if clarification guidance can be provided on all aspects of this issue.	
5 min	**Jacking with Live Loads/Staged Construction** James followed up with the BOS repair crews to see what their experience has been with jacking under live loads. They indicated that they view this as a case-by-case issue, the structure type dictates whether this can be handled or not, and that they feel that treating each case on a project-level basis is the best course of action. There doesn't appear to be a clear direction that can be applied uniformly for all projects. David Stanke asked whether the loads would be provided when jacking is required per plan, and James indicated that existing dead and live load reactions are to be placed on the plans. This is a change from what has been the case in the past. No further action required at this time (item to be closed).	James Luebke
5 min	**Exposure of Epoxy Reinf. In P/S Girders** At the last meeting, it was discussed that bags were used on every shear stirrup on girders to keep the 60-day exposure window requirement in place per the standard spec. James reviewed this situation by researching other states' requirements, what the spec requirements are (ASTM's), etc.; and there is no indication that WisDOT is being overly conservative by keeping this requirement. James also stated that some other states have been using reusable covers, which may be more environmentally conscious compared to the bags currently being used. No further action required at this time (item to be closed).	James Luebke

New Topics — 40 *min*

10 min	**Seal Concrete Mix Design** On a recent project, discussions between the contractor and the project team about requirements for seal concrete were brought forward. The specific issue at hand was the nature of a given seal for a project – "non-structural" vs. "structural" – and whether modifications to the mix design could be made. BOS and BTS approved the request to change the aggregate size for	Aaron Bonk/Jim Parry

	this particular project given that the seals were "non-structural" in nature given that piles were driven through the seal to bearing, and that the seals were there to be able to dewater and pour the footings and piers above. Discussion held on the need to have two separate seal bid items in the spec was held. Kevin Weber indicated that allowing the contractor to determine what types of mixes to use would be beneficial. Kevin also commented on the inability to pour and pump No. 2 fractured stone, whether it is high or low slump, in these types of pours. Granite/limestones that are used in the northern part of the state are difficult to pour in this fashion. David Stanke indicated that he has seen the same thing, and that the main issue is that inconsistencies amongst field staff are what cause risk to their bids (they don't know what to expect from field staff). The discussion led to the main question being whether a No. 2 stone is needed in seal pours or not (and other structure pours as well), especially when the rebar spacing is not allowing vibrators to get in to stop segregating the concrete. Mark Finnell stated that a recent spec change in 501 was made to allow concrete masonry seals to use the No. 1 stone. Jim Parry indicated that optimized mixes can eliminate the need for the larger stone, and also will aid in reducing cracking which was the original intent of the larger size aggregate in the older mix designs. **Action Item(s):** Aaron Bonk will set up discussions with BTS and Krissy VanHout to determine if additional spec modifications should be considered to aid in avoiding future field contract administration disputes.	
10 min	**Opening Concrete/Maturity Method** On a recent project, a contractor was using the maturity method in order to streamline getting their forms stripped/pulled. On this particular project, the cylinders were being cured offsite in a controlled environment, however, they were instructed that the cylinders were supposed to be cured in a similar fashion to the rest of the structure. When the contractor pulled those cylinders back to the elements similar to the field, they were unable to get strengths on their breaks. Kevin was wondering whether other contractors have been running into similar direction for this type of situation as it is inconsistent with his past knowledge of this method. David Stanke indicated that he didn't understand the WisDOT direction to field cure cylinders with the maturity method, as most projects they've worked on for WisDOT and the rest of	Kevin Weber

	the country are cured in a lab to create the maturity curves for a specific mix design that can be applied in conjunction with the sensors/probes in the field. Mark Finnell indicated that a document has been assembled related to maturity method and what WisDOT's expectations are with this technology. This document is attached to the back of the meeting minutes. **Action Item(s):** WisDOT will also look into the potential to bring in outside testing agencies to present on this process at a future Bridge Tech Committee meeting.	
10 min	**In-Stream Barge Spud Pile Restrictions** On a current project, a contractor is running into issues with spec implementation/past direction related to spud pile use during in-stream disturbance restriction windows. Inconsistencies from project to project and region to region in terms of contract administration are causing difficulties among contractors. From the contractors' perspective, there is a lack of clarity of what "in stream disturbance" means for WisDOT projects and better clarifying this would help this situation. David Stanke indicated that other states have definitions that limit disturbance to the stream bed. Means and methods, specific to particular water crossings, need to be assessed. **Action Item(s):** BOS will take the lead on organizing a smaller group - including WDNR, BOS, BPD (Brandon Lamers), BTS (Alyssa Barrette), etc. - to assess this situation and to determine what types of clarifications are needed, what types of means and methods can be used, etc.	Kevin Weber
10 min	**Erosion Control/Turbidity Barrier Issues** There have been projects recently where turbidity barrier isn't able to be installed and maintained for the life of the bridge project – it isn't a situation where the installation is simply difficult. Josh Wade discussed increased velocities of the water during construction/exceedingly large difference between normal water and Q2 + 2' elevation, and projects not acknowledging this fact when including the bid item in the contract. This lack of awareness during the design is leading to subs not putting in bids on contracts and projects seeing additional costs. Consideration should be made to moving to cofferdams when the situation will present challenges to turbidity barrier. Hans Hallanger indicated that this specific situation is on his/Jeremy's list to review and provide potential updates to the FDM/CMM. **Action Item(s):** Hans Hallanger to review this situation and provide a status update at a future Bridge Tech Committee meeting.	Matt Grove/Josh Wade

5 min	**In-Person vs. Hybrid Bridge Tech Meetings Moving Forward** Aaron discussed whether it would be beneficial to get attendees back in person for all meetings, some meetings, etc. Short discussions were held with the recommendation for BOS to send out a poll to attendees. **Action Item(s):** Aaron Bonk will send out a poll to attendees to see what their preferences are for this meeting moving forward.	Aaron Bonk
5 min	**Major Specification Rewrite/Movement** **Action Item(s):** Mark will bring forward a topic at the next meeting for more widespread awareness.	Mark Finnell

BUREAU OF STRUCTURES

Bridge Technical Committee Meeting Sign-In Sheet

Date: Monday, March 20, 2023 **Time:** 1:00pm-3:00pm **Location:** SWR Dane/Rock/Columbia Rm

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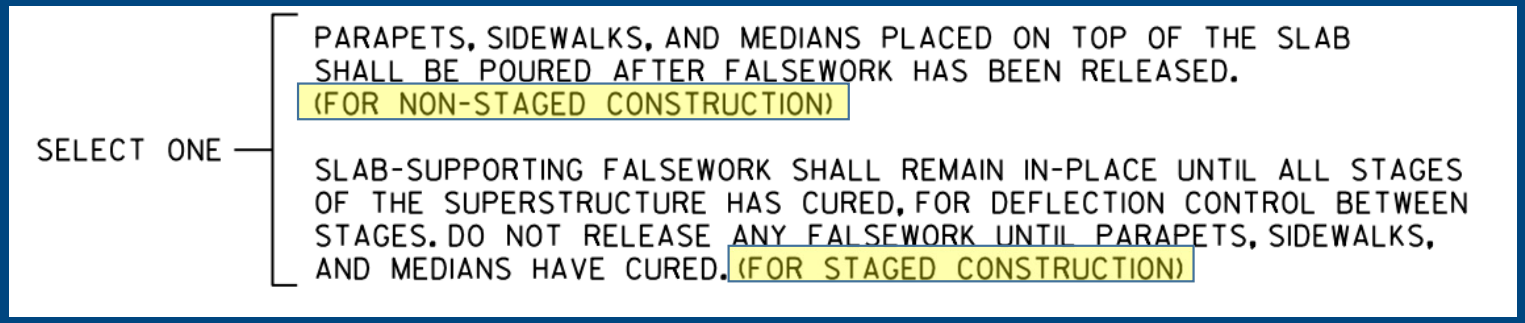
WisDOT Bridge Manual

January 2023 Updates

James Luebke, P.E.
Policy and Standards Engineer
March 1, 2023

Chapter Updates

- Chapter 18 – Slab Falsework Removal



Standards: 18.01, 18.02, 18.03

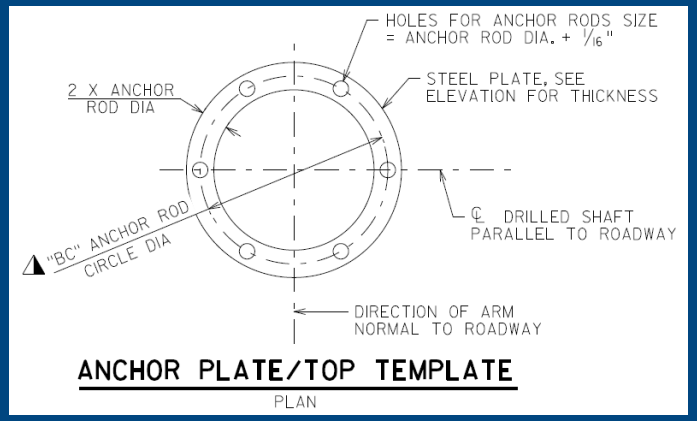
Chapter Updates

- Chapter 19 – Lifting Checks
  - Clarified:
    - Span < 153 ft ➔ Lifting check not required
    - Span ≥ 153 ft ➔ Noted as a Long Span and lifting check required at 1/10 points

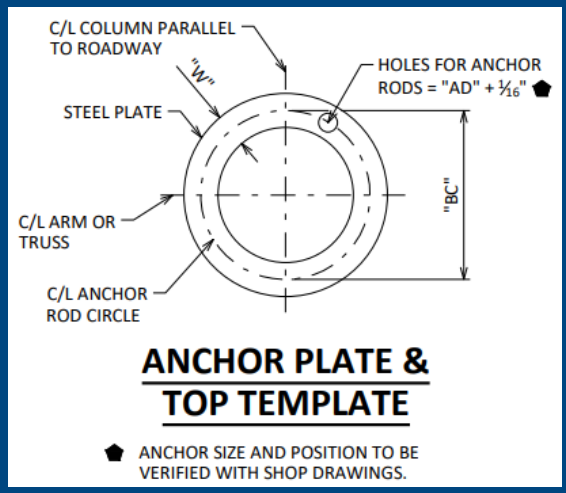
THIS NOTE APPLIES TO LONG SPANS AS DEFINED IN THE NOTES FOR THE 72W" GIRDER, TABLE 19.3-2 OF THE BRIDGE MANUAL:
FOR STORAGE, HANDLING, AND TRANSPORTING, THIS GIRDER IS REINFORCED TO ALLOW A MAXIMUM OVERHANG FROM THE LIFTING LOCATION OR POINT OF SUPPORT OF UP TO 1/10 THE GIRDER LENGTH. THE CONTRACTOR IS RESPONSIBLE FOR LATERAL STABILITY OF THE GIRDER UNTIL THE DECK IS CURED. (IF NOTE DOESN'T APPLY, REFERENCE SECT. 503.3.4 OF STD. SPEC. FOR GUIDANCE)

Chapter Updates

- Chapter 39 – Contractor Designed Structures
  - Clarified anchor rods are contractor designed



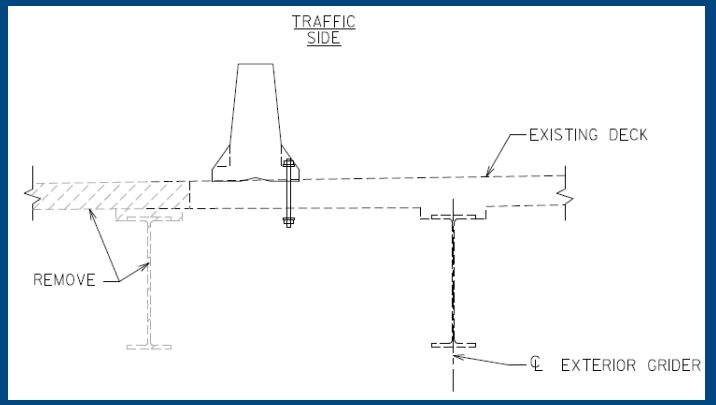
March 2021



January 2023

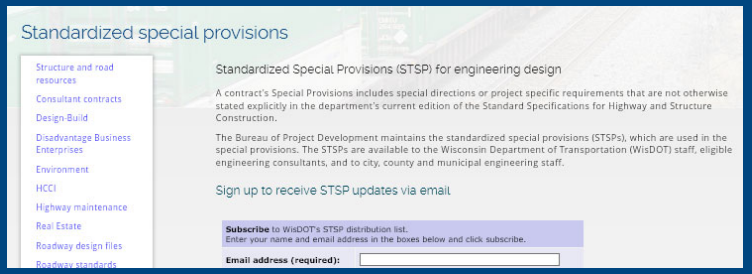
Chapter Updates

- Chapter 40 – Staged Temporary Support
  - Added guidance for deck replacements with staged construction.
  - Evaluate Temporary Support Condition
  - Use Temporary Support SPV bid item for contractor-designed support



Other Updates

- New Approved Products List (APL) and Updated STSP:
  - Sheet Membrane Waterproofing for Asphalt Overlays (516.0600.S)
    < 6-inches between membrane and asphaltic pavement
  - Sheet Membrane Waterproofing for Buried Structures (516.0610.S)
    ≥ 6-inches between membrane and asphaltic pavement



Other Updates

- Updated BOS Special Provisions:
  - Temporary Support *02/23*
  - Temporary Bridge Widening *02/23*
  - Temporary Structure *02/23*

Questions and/or Feedback

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March 20, 2023

MEMORANDUM: Concrete Maturity: Requirements and Guidance

Background:
The department offers several ways to determine opening strength for concrete. One of the methods that can be used is maturity. Maturity is the concept of measuring the concrete's temperature and the time it takes to reach that temperature. This time-temperature relationship can then be used to estimate the concrete's strength when cylinders or beams are broken at certain times. This method provides a non-destructive means of estimating the in-situ concrete's strength and determine if the concrete has gained enough strength to open it to service or removing formwork and falsework.

Requirements for Calibrating Maturity Curves:
CMM 870.4.8.1 and CMM 870.4.8.2 outlines the requirements for calibrating maturity curves for WisDOT contracts. A maturity curve must be developed for each mix design that will use this method to determine opening strength. The procedure for developing and calibrating the maturity curve requires the calibration samples being made in the field instead of being made in the lab. The cylinders used to develop the curve are casted on the first day of the concrete pour on the project. After the cylinders have been casted, they need to be cured in similar conditions to the concrete in the field. This means placing these cylinders in with the concrete that was placed so the cylinders can cure under the same environmental conditions. It has been shown that calibrating maturity curves using this method matches with how the concrete is curing in the field. Standard Specification 502.3.10.1.3.3 requires the maturity curve to have data points that exceed 120 percent or greater than the required opening strength. What this means is the curve only needs to be developed for the duration it takes the concrete strength to exceed 120 percent of the required opening strength specified in the contract. Once the data points reach or exceed the 120 percent threshold and meets the other remaining requirements found in ASTM C1074, the maturity curve can be used to estimate the opening strength on the project. Submit the newly established maturity curve to WisDOT project staff for review and approval prior to use.

***Requirements for Verifying Concrete Maturity*:**
Standard Specification 502.3.10.1.3.3 outlines the verification of the maturity curve and when a new one must be developed. A set of verification cylinders must be made each work week to validate the curve. These verification cylinders must be field cured alongside the concrete element that was casted. This curing process is not dissimilar to how the calibration cylinders were cured during development of the curve. The verification cylinders that are broken must break within +/- 10% of the curve. If the verification cylinders vary greater than +/- 10%, the maturity curve must be redone. Similarly, a new maturity curve must be developed if the concrete mixture design changes. Any changes to the mix design may affect how the concrete reacts which may impact the time-temperature relationship. Development of the new curve will have to follow the same procedures as the previous curve.

Guidance on Concrete Maturity:
Concrete maturity is a good way to estimate the in-situ concrete strength. However, there are items to consider when using maturity. One of those items is the placement of the maturity sensor(s) within the concrete element. CMM 870.4.8.3 states to install sensors in locations that are critical in terms of exposure conditions and structural requirements. One such critical area are the edges of the concrete element. Concrete at the edges will cure slower than concrete in the center of the element. It is good practice to place sensors 2" – 4" from the edge of the element. Another item to consider with maturity are seasonal changes. A maturity curve developed during colder weather will not be valid during warmer weather. The hydration (reaction) of cement can be impacted by temperature and humidity changes which has a direct impact on the maturity curve. A new maturity curve will be needed to reflect with the change of seasons. In addition to seasonal changes, the maturity sensors should not be turned on until they have been embedded in the mass of concrete or the verification cylinders. Premature activation of these sensors can impact the maturity calculation and provide inaccurate data. The next item to consider is to have multiple maturity sensors placed in the concrete. Though 502.3.10.1.3.3 specifies the minimum number of sensors to be placed in the concrete, it is good practice to place an extra sensor just in case of sensor failure. This extra sensor should be placed in a different critical location. Additionally, having more sensors will help build a better temperature profile of the concrete element to ensure different parts of the element are curing at the same rate. The last item to consider is to cast a separate set of opening strength cylinders. Doing this can help supplement the maturity curve if there are sensor failures or if the verification cylinders exceed the +/- 10% threshold.