



## **Bridge Technical Committee – Minutes Wisconsin DOT, Industry, and Partners**

Friday March 29th, 2019

9:30 – 12:00 Noon

SW Region office (Dane – Rock Rooms)

### **Subcommittee Reports:**

#### **1. Bureau of Technical Services – Ready Mix Concrete Subcommittee/Overlay**

There are three items still open for discussion by this sub-committee that may move forward soon based on availability of subcommittee:

- Concrete overlays and equipment per the specification (2017 discussion/survey/specification) – **Updates From March 4<sup>th</sup> Meeting**. The department is interested in moving forward with examination and updates to the current specification (502.3.7.8) that combines the Type E concrete overlay with limited available finishing machines. We will be reaching out to project staff related to past experience. We would like to examine, modify, and propose a solution on CY2019. Please see attached minutes from the March 14<sup>th</sup>, 2019 Overlay Subcommittee.
- Pumping of Concrete an air loss (2018 request by Industry for research) – **No Action**
- Concrete Masonry Overlay Decks (CMOD) – Overruns and Measurement (December 2018) – **Discussion this meeting (See New Topic #1)**

### **Standing Topics:**

1. IH-39 (Illinois – Dane County) (Laura Shadewald) – **3 Lets in July**
2. Wisconsin Highway Research Program Bridge Items – (Dave Kiekbusch)

WHRP: <http://wisconsindot.gov/Pages/about-wisdot/research/whrp.aspx>

### **Previous Meeting Carryover Topics:**

1. **Concrete Approach Pavement (April Rieger)** - It involves detail 13B2, concrete approach pavement. The expansion joint is shown only traversing the mainline pavement and not the shoulders, which are tied to the concrete mainline. There's no relief in the concrete shoulders to provide for deck expansion. Expansion joints are not shown in the standard detail for concrete pavement shoulders, just dowel bars at the joints.

James Luebke briefly explained the situation and stated that the department (BOS/BPD/BTS) is aware of this issue, which was brought forward by SE maintenance. BOS has previously recommended to BPD/BTS that roadway approaches and other approach elements (beam guards, flumes, etc.) be fully detailed in the contract plans to supplement the standard detail drawings (SDDs) to avoid conflicts.

**Action item:** Bureau of Technical Services looking at improvements to the joint detail – **Closed Item for now.**

2. **Wet Cure vs Structure loading (Matt Grove).** The intent of the specification is not clear, leading to inconsistent interpretation and potential project delays. In that past, it was common to use structures for construction traffic prior to the end of the wet cure period, as long as there was 3500psi and the deck remained wet. This interpretation has changed and is potentially going to delay operations.

This topic was discussed at length. Field staff stated that the current specifications are clear as to not allow loads that are not necessary to perform subsequent pours on that structure. It was noted that some projects have allowed exceptions on a project-by-project basis. It was also noted that the project exceptions (weight of load and frequency of loads) varied throughout the state. BOS expressed concerns of about allowing heavy loads (potentially over legal limits) on still curing concrete. Jim Lucht provided a summary of the project specifics for IH-39. Contractors stated that they should be allowed use the structure, as they see fit, provided concrete strengths were sufficient and the wet cure was not disrupted.

Discussion at the March 29<sup>th</sup> meeting pointed out the combine time needed if the deck and approach slab are poured separately could be problematic for schedule. Dan Kowalski indicated that perhaps a redesign of the detail to eliminate the joint would be helpful.

**BOS Comments:** For the wet cure item – we are not changing the spec; contractor should follow the spec. – no construction traffic on deck during wet cure. – **Closed Item**

3. **Bureau of Technical Services is considering implementing a shadow specification for use of the Super Air Meter, SAM, for structures (Chad Hayes/Jim Parry)**

The Super Air Meter measures the distribution of air in concrete, like hardened air measurement. ASP 6 outlines 1 SAM per concrete paving project. There will be some SAM testing on structures projects in CY2020 by minimum number of yards and not part of the acceptance. It is being added to the HPCP program Tech-1 and Tech-2 training.

**Action item:** Future updates on how this worked for bridge and pavement projects.

#### New topics:

1. **Payment of Concrete Overlays, associated Items, and Draft Specifications, Special Provision and Potential Spec change for Concrete Masonry Overlay Decks, Deck Prep 1 & 2, Full-Depth Deck Repair, Joint Repair and Curb Repair. (Bill Dreher).** Bill Dreher discussed an internal WisDOT report related to cost overruns on projects and the structures items that were identified for follow-up. Concrete Masonry Overlay Decks (CMOD) – This item was the top structures item overrun by dollar value. It has some variability but is twice as likely to overrun than underrun. There is desire by the department to change the method of measurement from volume (Cubic Yards) to area (Square Yards). This would substantially reduce the variability and overrun potential. to the CMOD item.

There was quite a bit of discussion related to concerns that Industry had related to this direction. These include:

- There could be issues related to actual vs. plan cross slopes and amount of concrete to correct cross slope. This could also affect corrections to profile (sags) within spans.
- Contractors indicated when placing a second overlay, it is best to completely mill off original.
- Inspectors have directed contractor to mill deeper to minimize deck prep (Type 1).
- Contractors mentioned that this may address overrun issues but may introduce more issues with ride quality.

- Contractor said that one recourse may be use of 25% change in quantity may be a way to address overrun of materials.
- One comment asked if coring the deck during design to determine existing overlay thickness would be helpful in quantifying quality and removal depth.

There are 4 bridges in the March 4, 2019 let that are pilots of the SY measurement approach. We will bring forward any lessons learned from these pilots for updates and discussion at the July 2019 Bridge Tech meeting.

**Action item:** BOS will evaluate SER Pilot Project of 4 bridges and report back at the July Bridge Tech Meeting.

2. **Do epoxy coated bars and uncoated bars arrive on the same truck? (Dave Kiekbusch)** My reason for asking is that uncoated bars are nearly as expensive, or even a little more expensive, than coated bars. I was thinking that maybe the uncoated project bars are shipped to the site, while the coated bars are shipped to the coating facility and then to the site, thus incurring two shipping charges. Possibly looking at coating everything (not including prestressed girders). Generally, there are two deliveries (noncoated & coated). Some contractors will have everything coated (**Caution: This could affect design development lengths of reinforcement**). It was noted that during demolition of bridges with coated reinforcement that the concrete usually falls off the green bars. This illustrated that there may be a less of a bond between concrete and reinforcement for coated bars.

**Action item:** No changes to policy or practice. - **Closed Item.**

3. **Discussion on changing the units of measure for expansion devices from lump sum to LF (Laura Shadewald).** Laura discussed the payment of expansion joints as Lump Sum (LS) vs. Linear Foot (LF). The question was should we be bidding them by the linear foot. Comments from the contractors was that they get quotes by the linear foot then change it over to Lump Sum. There was general agreement that we could move to showing this quantity as linear foot on bridge plans.

**Action item:** BOS will move to detailing the expansion joints as linear foot for bid items. Implementation in the near future. - **Closed Item.**

4. **STP -107-070 - Erosion Control Structures (Krissy Van Hout)** Request that contractors install the rip rap in front of the abutment along the river up to the break point after the grading is complete prior to pounding piling. The streams that are flashy are the most critical. Turbidity barrier has limited effectiveness in many instances. As example a bridge on the Manitowoc river currently building, the river rises 7 feet in a 2-year event. **Krissy lead the discussion on this item. Comments included:**

- Placement of riprap prior to abutment construction makes sense if site conditions make it practical. Though, in some instances, riprap may be in the way of abutment formwork.
- This may be an issue with sub-contractors doing different operations
- Other erosion control features may be under-designed.

There were two options for re-wording the stp 107-70 Erosion Control Structures that Krissy went over (attached below). It sounded like the shorter version was generally favored.

**Action item:** BOS will look at Bridge Manual guidance, Krissy will follow up with Mike Hall.

5. **Certifications older than 3 Years (Lucas Haun)** In discussions with material suppliers, specifically those dealing with steel components, if certs that are older than 3 years will not be accepted, this will have a significant impact on the cost of the materials. *(Please reference the CMM 8-45.1.2, which refers to a 2-year requirement, not a 3 year one. This appears to have been in the CMM since at least November 2017 when the section was last updated). (See Attachments)*  
This guidance is intended for materials with a limited shelf life (BTC discussion). It is recognized that it is impractical for steel pile. We really need to find out more information CMM 8-45.1.2 and what it is meant to apply to and what is not subject to this guidance.

**Action item:** BOS (Bill Oliva) will reach out to BPD (CMM and Oversight Engineers) to get more information on items that this applies to and the timeline (2-year) criteria.

6. **Contract time / Lack of flexibility in schedules / impact on work force (Matt Grove).** Matt shared an industry wide concern with work force availability. As department contracts have moved from working day to completion day, this has resulted in difficulties for industry to recruit and retain workers that do not prefer to work nights and weekends. The vertical industry is becoming more of an appealing option for the construction structures workforce. *Some of the specific items discussed were:*

- Special Provisions that call out expedited time frame or work result in fewer number of bidders.
- Industry feels that engineers time estimates often are not realistic or practical.
- The nature of weather delays is changing, and this aggravates the situation.
- Industry is concerned (as well as the department) with the safety implications of expedited work schedules and night work.

**Action item:** BOS will share this message with the department design/construction community and management at the department. This was brought before the April 2019 State-wide Design/Construction call as well as the April 2019 PDS Chiefs meeting for awareness and discussion. - **Closed Item.**

### **Standing Item - Specification Changes / Updates – Discussion (Mike Hall)**

- Revise 526.3.2(2) to clarify what contractor plans need to show and what information the contract plans provide. - temporary structure
- 509.5.8 Concrete Overlays

#### **Addition to the Agenda:**

1. Discussion on field welding of pile remnants in the shop vs in the shop.
2. Overlay and Joint replacement – minimizing parapet removal. (Dan Kowalski) asked why not minimize the removal of parapets during joint replacement? In response, Bill Dreher related concerns about the durability of remaining parapet that would not be removed.
3. Discussion on mandatory night pours of bridge decks. Contractors believe this leads to higher cost for materials related to batching at night and delivery. One contractor indicated this added \$12/CY to his material costs.
4. Michael Hallstead of WDNR had a concern related to temporary structures and permits. The discussion was along the lines of duration of temporary structures.

## Attachments:

- **Attachment for New Item #5 - Certification**

### 8-45.1.2 Material Inspection & Documentation

All manufactured products, including conditionally approved products that have been previously inspected and tested at the source, must be inspected as soon as possible after delivery to the job site for any evidence of damage or noncompliance.

Documentation and reporting for material acceptance is essential and required on all WisDOT projects. All material documentation and reporting must be completed and entered into the department's material reporting software no more than 60 working days after the work completion date.

The project engineer should follow these steps as a minimum for documentation of all materials delivered to the project.

1. Inspect all manufactured and pre-qualified products as soon as possible after delivery.
  - a. Including materials on approved lists, from certified sources, and conditionally approved products.
  - b. Record relevant inspection information in the material record.
2. Verify that products delivered match the certifications, approved lists, etc.
3. Review all certifications of compliance and certified reports of test and analysis. As part of the review process, assure the documents are dated within two years of the project LET date. Ensure that the manufacturer/supplier name, product name, and appropriate ASTM/AASHTO reference, and signature and title of the person certifying the product for the company is included. Reviewer initials and date certificates. Refer to [CMM 8-45.2.4](#) for additional details regarding approval by certification. Ensure that a [DT1349](#), Source of Materials Report, is in the project file before incorporating any out-of-region or out-of-state materials into a project (see [CMM 8-40.6](#)).
4. Assign a document ID to all external material acceptance documents for tracking and reference purposes. For MIT/MTS reports, use the unique prefix report number as the document ID.
5. Document the inspection in the Inspector's Daily Report and with a diary entry in a MIT/MTS prefix 905 report as a basis for acceptance (BFA). Reference all certifications, shop inspection reports, Buy America documentation, specific test prefix report(s), and other external documents in the 905 report.

- Attachment for New Item #4 – Erosion Control

**EXISTING:**

**107-070 DELETE ALL DESIGNER NOTES FROM YOUR SPECIAL PROVISIONS**  
*Required in all contracts with waterway structures.*

**#. stp-107-070 Erosion Control Structures.**

Within seven calendar days after beginning work on the bridge superstructure, place all permanent erosion control devices, including riprap, erosion mat, ditch checks, seed, fertilizer, mulch, soil stabilizer, or any other item required by the contract or deemed necessary by the engineer. These devices shall be in place in the area under the bridge and on both sides of the roadway, from the waterway to a point 100-feet behind the backwall of the abutment. Within said limits, place these devices to a height equivalent to the calculated water elevation resulting from a storm that occurs on the average of once every two years (Q2) as shown on the plan, or as the engineer directs. Before initial construction operations, place turbidity barriers, silt screens, and other temporary erosion control measures as the plans show, and remove them after the permanent erosion control devices are in place unless directed otherwise by the engineer.

In the event that construction activity does not disturb the existing ground below the Q2 elevation, the above timing requirements for permanent erosion control shall be waived.  
stp-107-070 (20030820)

**PROPOSED:**

**107-070 DELETE ALL DESIGNER NOTES FROM YOUR SPECIAL PROVISIONS**  
*Required in all contracts with waterway structures.*

**#. stp-107-070 Erosion Control Structures.**

Within seven calendar days after completing the excavation for a substructure unit, place all permanent erosion control devices, including riprap, erosion mat, ditch checks, seed, fertilizer, mulch, soil stabilizer, or any other item required by the contract or deemed necessary by the engineer. These devices shall be in place in the area under the bridge and on both sides of the roadway, from the waterway to a point 100-feet behind the backwall of the abutment. Within said limits, at a minimum place these devices to a height equivalent to the calculated water elevation resulting from a storm that occurs on the average of once every two years (Q2) as shown on the plan, or as the engineer directs. Before initial construction operations, place turbidity barriers, silt screens, and other temporary erosion control measures as the plans show and remove them after the permanent erosion control devices are in place unless directed otherwise by the engineer.

In the event that construction activity does not disturb the existing ground below the Q2 elevation, the above timing requirements for permanent erosion control shall be waived.  
stp-107-070 (2019XXXX)

OR

**107-070 DELETE ALL DESIGNER NOTES FROM YOUR SPECIAL PROVISIONS**  
*Required in all contracts with waterway structures.*

**#. stp-107-070 Erosion Control Structures.**

Within three calendar days after completing the excavation for a substructure unit, place riprap or other permanent erosion control items required by the contract or deemed necessary by the engineer around the unit at a minimum to a height equivalent to the calculated water elevation resulting from a storm that occurs on the average of once every two years (Q2) as shown on the plan, or as the engineer directs.

In the event that construction activity does not disturb the existing ground below the Q2 elevation, the above timing requirements for permanent erosion control shall be waived.  
stp-107-070 (2019XXXX)

- Attachment for Specification Changes

(c1) bridge - temp structure.docx  
Contact: Bill Dreher 266-8489

3/14/19 2:17 PM

### **(C1) Bridge - temp structure**

**Revise 526.3.2(2) to clarify what contractor plans need to show and what information the contract plans provide.**

#### **526.3.2 Design**

**Replace paragraph two with the following:**

- (2) ~~The Ensure that the~~ temporary structure shall span the stream and ~~have has~~ dimensions sufficient to not constrict stream flow ~~during use. The basic design criteria shall provide for a 5 year frequency storm with 6 inches of backwater. The plans shall s~~Show the minimum bridge length between faces of ~~abutment sheet piling, and the resultant five year frequency high water elevationsupport on the temporary structure plans. Determine the minimum low superstructure elevation using the given high water elevation and considering local conditions. The~~ Ensure that the ~~structure shall have~~has a low superstructure elevation and an open waterway area no less than the contract plans specify. Also ensure that the structure has the minimum a roadway width no less than specified in the special provisions specify as measured between the faces of the railings or curbs, and at right angles to the centerline. Provide vertical abutments designed to prevent spilling fill material into the stream. If building a temporary crossing over a stream or lake subject to boating use, construct it to provide horizontal and vertical clearance, as the jurisdictional agency may require, adequate for row boats and small power boats.



# Minutes - BTC Overlay Subcommittee

## Monday March 4, 2019

(minor updates after March 29<sup>th</sup> Bridge Tech Committee)

Attendees include:

Bill Oliva, WisDOT BOS	Aaron Bonk, , WisDOT BOS	Bill Dreher, WisDOT BOS
Doak Christenson, WisDOT BPD	Darrin Stanke, Kraemer, Inc	Kevin McMullen, WCPA
Wayne Chase, WisDOT BPD	James Parry, WisDOT BTS	Chad Hayes, WisDOT BTS
Krissy VanHout, WisDOT - NER	Dan Kowalski, ZTI	Jason Samz, ZTI
Michael Hall, BPD	James Luebke, WisDOT BOS	

### 1. Payment for Overlay – Square Yard (SY) vs. Cubic Yard (CY). – Pilot Project for 2019

- Bill Dreher discussed an internal WisDOT report related to cost overruns on projects and the structures items that were identified for follow-up. Concrete Masonry Overlay Decks (CMOD) – This item was the top structures item overrun by dollar value. It has some variability but is twice as likely to overrun than underrun. Change the method of measurement from volume (Cubic Yards) to area (Square Yards). This would substantially reduce the variability and overrun potential. There was in-depth discussion related to the Type 1, Type 2, and full depth deck preparation as it relates to the CMOD item.
- Bill indicated that there were 4 bridges in the March 12<sup>th</sup> Letting that would pilot the CMOD as a SY item.
- The next step would be to update the 2020 Standard Specification to reflect SY as a basis of measurement for all CMOD.
- There was discussion from a number of contractors as it related to the measurement of actual cross slope in the field prior to Letting of a project to accurately determine the amount of materials that would be placed in a CMOD. The question was raised if the actual cross slope was different than plan information, would this constitute a change of condition? This concept needs to be addressed and no determination was made at the meeting. In addition, safety concerns (due to traffic) were raised in making pre-letting measurements. BOS pointed out that plan quantities include an extra ½” of thickness to address variations, yet actual quantities are still overrunning considerably.
- Contractors felt that there was a lot of variability due to drains and other that you could not get an idea of until you are on sight doing the work.
- Jason Samz said that some contractors like to mill at least 1-1/2 inch to get as much of the Type 1 deck prep with the mill as practical. Contractors do not like to do hand chipping. The concept of making the minimum mill depth 1” was raised to address this.
- Jason said that the accuracy of standard milling equipment was ¼”.
- Jason shared that the 2<sup>nd</sup> overlay is more difficult in that you usually need to remove the first overlay completely and that quantity is variable as well.
- Jason also shared that Minnesota DOT does have a Square foot (SF) overlay measurement, however, MnDOT has a procedure for variation in the quantity . MnDOT pays for the material over a certain point (similar to WisDOT Pile spec). MnDOT has a 2” overlay and a 3”





overlay by the Square Yard (SY) to get contractors a better quantity estimate. WisDOT pointed out that we can't utilize this approach for every item.

- **ACTION ITEM:** BOS will investigate how MnDOT does their measurement and payment of CMOD including how materials and variations are addressed. We will take this into consideration as we move forward. However, we have a current set of projects in the March Letting that will not be changed.

## 2. Concrete Overlay (Type E) and Machine requirements – next steps. Recent WisDOT Internal discussions on our Specification (Oliva, Parry, & Dreher)

- We discussed the current specification 502.3.7.8 and the equipment requirements that limit the types of equipment (and potential contractors) from doing CMOD work on WisDOT projects. This item was brought forward by Ryan Pheifer in 2017. The department wants to move forward with the effort to examine and modify the combination of material and equipment requirements that has historically limited the number of bidders due to the limited amount of equipment that can meet this specification.
- We discussed why our current spec is being used and that it has resulted in desirable performance of the overlays. Vibration is key to the current Type E overlay for consolidation. Without vibration the concrete surface will not close-up and there will be honey combing in the finished overlay. Bidwell lacks vibration.
- Plasticizer may adjust our overlay to be workable with modern machines (no vibration)
- One of three things could/should happen to address:
  - a. Contractors need to get equipment (drums like Ohio spec) that vibrate
  - b. We need to adjust the mix to work with non-vibrating equipment
  - c. Go to completely different overlay (Latex Modified)
- The outdated Vibra-Screed machines are limited to a 16 foot width that may lead to more longitudinal construction joints on decks (these are undesirable for a long-term performance perspective).
- Darrin thought we should take a look at the Hoan Bridge overlay that used perhaps a modification to the Type E overlay mix and contemporary drum finishing machine (i.e. Bidwell).
- Jason Samz thought there was opportunity for other contractors to pick up outdated used vibra-screed finishing machines as his company does for spare parts. He indicated that ZTI has increased the number of machines they have, however, new machines are not available for purchase; rather, used machines and parts can sometimes be found.
- Krissy indicated that addressing our current spec combination of Type E and outdated finishing machine was one of the recommendations in the 2017 FHWA deck construction audit report.
- **ACTION ITEMS:** BOS will move forward with the Overlay Team to determine a new combination of Rigid Concrete Overlay and finishing machine that produces the desired performance (construction and service).



- **ACTION ITEM:** BOS will contact the Hoan Bridge Overlay Team to determine what was done, how did construction go, how is it performing, and what is there to be learned.
- We will give the March 29<sup>th</sup> Bridge Technical Committee and update and we have a target of bring resolution to this item in CY2019.

## Reference Items:

### Section 509 Concrete Overlay and Structure Repair

Use a finishing machine to finish concrete overlays conforming to 502.3.7.8 and the following:

1. The machine shall have 2 linearly oscillating transverse screeds. For the front screed use, a synchronous vibratory screed with a variable frequency the operator can adjust. Provide enough identical vibrators to provide at least 2 vibrators for each 5 feet of screed length. Ensure that the bottom face of each screed is at least 7 inches wide with a rounded leading edge. Each screed shall have an effective weight of at least 75 pounds per square foot of bottom face area. Provide each screed with the capability to positively control of the vertical position, the angle of tilt and the shape of the crown.
2. The machine shall have an adjustable metering device ahead of the leading screed that traverses the width of the machine.
3. The machine shall have capability of forward and reverse motion under positive control. Make provisions for raising the screeds to clear the screeded surface for traveling in reverse.

## Ohio – From Ryan Pheifer

**847.09 Finishing Machine.** An approved self-propelled finishing machine shall be used with supports outside the prepared deck surface to be overlaid, except where hand finishing equipment is authorized. The finishing machine shall be equipped with forward and reverse drive mechanisms that enable precise velocity control of the machine while it is moving in either direction. It shall be equipped with one or more rotating rollers. It shall be equipped with augers and **either a vibrating pan or vibrating rollers**. Vibrating frequency for pans and rollers shall be variable from 1500 to 5000 pulses per minute. The Contractor shall furnish the necessary verification of these vibration frequencies. Screeds shall have provisions for raising above the finished concrete surface.

The placing and finishing equipment shall be designed so that the elapsed time between depositing concrete and final finishing shall not exceed 10 minutes.