

# WISCONSIN DOT STRUCTURES INSPECTION PROGRAM TECHNICAL BULLETIN

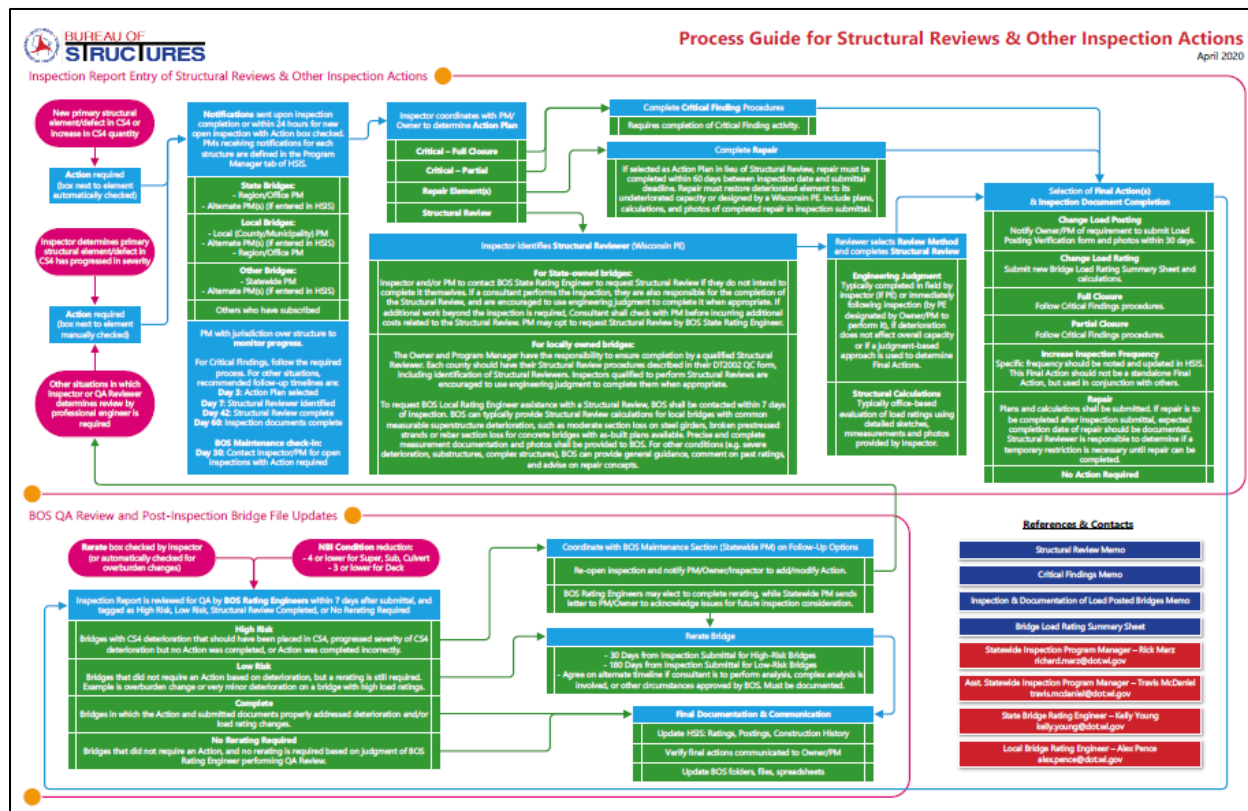
Issue 5 – May 2020

## STRUCTURAL REVIEW & OTHER INSPECTION ACTIONS

Bureau of Structures has added a Process Guide for Structural Reviews & Other Inspection Actions to its Maintenance & Inspection website. This is a flow chart to outline the expectations and necessary steps for completing an Inspection Action.

Inspection Actions are required when element deterioration has reached Condition State 4 or becomes worse. In some cases, HSIS will automatically require an Inspection Action and in other cases, the inspector is responsible for manually adding it. Inspection Actions are most often Structural Reviews completed by a professional engineer, but they can also be completed by performing repairs or following the Critical Finding process.

Structural Reviews were discussed in past Inspection Technical Bulletins, BOS Policy Memo, and 2019 WisDOT Structure Inspection Refresher Training.



*Process Guide for Structural Reviews & Other Inspection Actions (Click to Download)*

## STEEL GIRDER END DETERIORATION

One of the most common deterioration issues observed affecting the capacity of a bridge and requiring an Inspection Action is section loss at the ends of steel girders. When holes or very thin webs above a bearing or near it occur, the beam end is susceptible to buckling and can no longer reliably support load. Therefore, the load must transfer to adjacent girders and/or localized failure may occur.

The Structural Review for this condition often requires complex analysis, engineering judgement, and evaluation of multiple scenarios. BOS can typically update load ratings and assist with Structural Reviews for minor to moderate section loss. However, when the section loss becomes very severe with holes or very thin webs, the complex analysis and consideration of repair options is beyond the scope of BOS's usual assistance with local bridge ratings. In those cases, the local bridge owner may need to close the bridge or utilize a professional engineer to design the repair or determine the safe load carrying capacity.

Repairs often consist of plates or angles bolted to girder ends or construction of a new bent in front of the existing abutment. Temporary options are sometimes acceptable, such as a bracket to support the girder out past its deteriorated end.

Some bridges have the beam ends encased in concrete, however this does not always help. The steel girder along the face of the concrete diaphragm can become severely deteriorated, the girder condition inside the encased portion is unknown, and the load path from the steel girder down to the substructure is uncertain.

In any case, bridge owners are encouraged to proactively address this common condition. Repairing leaking joints and existing minor corrosion can help prevent a sudden and severe reduction in load carrying capacity.

These photos are from recent observations done by a structural reviewer on several bridges with steel girder end deterioration, and they coordinated with BOS and the counties to promptly address them. The structural reviewer provided detailed measurements and sketches of section loss for BOS to update its load rating files. BOS informed the structural reviewer when the deterioration was too severe for its analysis model to be reliable. In these cases, the reviewer made recommendations for temporary postings or partial closures and designed repairs. Their analysis and design focused on the beam ends, while BOS confirmed the previous load rating for the bridge would be restored if the repair was completed. County crews then performed the repairs according to plans provided by the reviewer. The result was an efficient collaboration among local bridge owner, their consultant, and BOS that addressed the immediate risk and then provided a long-term solution. The BOS rating contacts are Alex Pence,

[Alex.Pence@dot.wi.gov](mailto:Alex.Pence@dot.wi.gov) for Local bridges and Kelly Young, [Kelly.Young@dot.wi.gov](mailto:Kelly.Young@dot.wi.gov) for State bridges.





Did you know: There are 175 Fracture Critical bridges in Wisconsin, the Blatnik bridge in Superior (pictured above) being one of them. This includes bridges with the following span configurations: 31 Bascules, 7 Box Girders, 55 Deck or Thru Girders, 4 Rigid Frames, 9 Tied Arches, 59 Trusses, and 10 Vertical Lifts. All Fracture critical members shall be inspected at arm's length.

## POLICY UPDATES

➤ The Structural Review Memo was updated in March and can be found on the [WisDOT Structure Maintenance and Inspection Website](#).

## STRUCTURES INSPECTION TRAINING

- 2019 WisDOT Structure Inspection Refresher Training, see Attachment A of May 2019 [Bulletin](#) for complete directions. This training is required for all inspectors that want to remain active team leaders and all new inspectors coming into the program. Inspectors can take the training modules multiple times if they wish.
- NHI Course 130056 - Safety Inspection of In-Service Bridges for Professional Engineers
  - Course filled, postponed until late 2020. Date to be determined.
- WisDOT Ancillary Structures Bolt and Anchor Rod Training
  - The Bureau of Structures is in the process of finalizing a 2-part ancillary structures bolt and anchor rod training module that will be added to the Structures Inspection Refresher Training currently on the Learn Center. This online training is intended to replace the previous 1-day bolting course and covers WisDOT specific requirements and procedures for bolt and anchor rod tensioning. These modules will be required refresher training for all Ancillary Sign/Signal/HML inspection team leads and recommended for team members, who will need to submit the completion certificate by December 31, 2020.

The modules will also be available and highly recommended for region and consultant construction staff and contractors who build “S” Sign and “L” High Mast Lighting structures. It is expected that this training will be posted to the Learn Center by the end of May. Please contact Steve Doocy, [Steve.Doocy@dot.wi.gov](mailto:Steve.Doocy@dot.wi.gov), if you have any questions.

## 2020 STRUCTURES INSPECTION FIELD MANUAL

The printed 2020 Structure Inspection Field Manual is estimated to be available sometime the week of May 10<sup>th</sup> or May 17<sup>th</sup>. **Inspectors will need to contact their nearest Region Office PM or BOS PM for where they would like to pick up the manual.** The new manual has a new type of binding that unclips allowing inspectors to incorporate future updates without having to reprint whole manuals at each release. On the second to last page of the manual the inspector has access to a handy concrete crack width gauge and 6” ruler printed on clear plastic. The manual and updates list can also be found on the [WisDOT Structure Maintenance and Inspection Website](#).

## 2019 INSPECTION FREQUENCY PERFORMANCE

WisDOT monitors inspection frequency performance to ensure that our bridges are getting inspected at the proper frequency and to adhere to the FHWA Metrics for the Oversight of the National Bridge Inspection Program (Metrics 6-10). The expectation is the inspection will be performed in the month that the inspection is due and completed in the Highway Structures Information System in a timely fashion. Inspectors shall create the inspection report in HSIS within 28 days after the month in which the inspection was performed. For example, any inspection performed in the month of July shall be created in HSIS no later than August 28<sup>th</sup>. Creation of inspections in HSIS requires three basic pieces of information: the date of the inspection, the inspection Team Leader’s name, and the inspection type. This inspection report shall then

be filled out and submitted by the inspector within 30 days. WisDOT encourages programs to utilize tablet devices as an aid for a timelier entry of inspection reports.

The following table shows the routine bridge inspection performance summary for the 2019 inspection season (which runs from 4/1/2019 to 3/31/2020). Overall, the results indicate a very high percentage of inspections were performed on-time. An inspection is considered on-time when performed in the month that it is due or before. Keep up the great work!

For more information, please contact Travis McDaniel or Richard Marz.

DTSD Performance Management Strategic Initiative  
Routine Bridge Inspection Performance Summary

State Programs in Bold				Local Programs in Italics			
Program	On-Time	Required	% On-Time	Program	On-Time	Required	% On-Time
<b>Superior</b>	<b>190</b>	<b>190</b>	<b>100.0%</b>	<i>Rhineland</i>	<b>102</b>	<b>102</b>	<b>100.0%</b>
<i>Ashland</i>	2	2	100.0%	<i>Florence</i>	3	3	100.0%
<i>Barron</i>	30	30	100.0%	<i>Forest</i>	6	6	100.0%
<i>Bayfield</i>	22	22	100.0%	<i>Iron</i>	3	3	100.0%
<i>Burnett</i>	5	5	100.0%	<i>Langlade</i>	36	36	100.0%
<i>Douglas</i>	9	9	100.0%	<i>Lincoln</i>	49	49	100.0%
<i>Polk</i>	21	21	100.0%	<i>Menominee</i>	1	1	100.0%
<i>Rusk</i>	17	17	100.0%	<i>Oneida</i>	2	2	100.0%
<i>Sawyer</i>	8	8	100.0%	<i>Price</i>	7	7	100.0%
<i>Taylor</i>	62	62	100.0%	<i>Shawano</i>	47	47	100.0%
<i>Washburn</i>	1	1	100.0%	<i>Vilas</i>	4	4	100.0%
<b>Eau Claire</b>				<b>Wis Rapids</b>			
<i>Buffalo</i>	24	24	100.0%	<i>Adams</i>	3	3	100.0%
<i>Chippewa</i>	28	28	100.0%	<i>Green Lake</i>	19	19	100.0%
<i>Clark</i>	54	54	100.0%	<i>Marathon</i>	125	143	87.4%
<i>Dunn</i>	14	14	100.0%	<i>Marquette</i>	3	3	100.0%
<i>Eau Claire</i>	19	21	90.5%	<i>Portage</i>	48	48	100.0%
<i>Jackson</i>	61	65	93.8%	<i>Waupaca</i>	38	38	100.0%
<i>Pepin</i>	41	41	100.0%	<i>Waushara</i>	15	15	100.0%
<i>Pierce</i>	72	73	98.6%	<i>Wood</i>	82	82	100.0%
<i>St. Croix</i>	14	14	100.0%	<b>Green Bay</b>			
<i>Trempealeau</i>	44	44	100.0%	<i>Brown</i>	68	71	95.8%
<b>La Crosse</b>				<i>Calumet</i>	6	6	100.0%
<i>Crawford</i>	19	19	100.0%	<i>Door</i>	2	2	100.0%
<i>Grant</i>	234	234	100.0%	<i>Fond du Lac</i>	81	81	100.0%
<i>Juneau</i>	48	48	100.0%	<i>Kewaunee</i>	12	12	100.0%
<i>La Crosse</i>	96	96	100.0%	<i>Manitowoc</i>	65	67	97.0%
<i>Monroe</i>	25	25	100.0%	<i>Marinette</i>	6	6	100.0%
<i>Richland</i>	44	44	100.0%	<i>Oconto</i>	4	4	100.0%
<i>Vernon</i>	38	38	100.0%	<i>Outagamie</i>	96	96	100.0%
<b>Madison</b>				<i>Sheboygan</i>	86	88	97.7%
<i>Columbia</i>	17	17	100.0%	<i>Winnebago</i>	35	35	100.0%
<i>Dane</i>	46	46	100.0%	<b>Waukesha</b>			
<i>Dodge</i>	15	16	93.8%	<i>Kenosha</i>	1	1	100.0%
<i>Green</i>	32	32	100.0%	<i>Milwaukee</i>	84	89	94.4%
<i>Iowa</i>	27	32	84.4%	<i>Ozaukee</i>	4	4	100.0%
<i>Jefferson</i>	9	9	100.0%	<i>Racine</i>	7	9	77.8%
<i>Lafayette</i>	13	13	100.0%	<i>Walworth</i>	12	12	100.0%
<i>Rock</i>	24	25	96.0%	<i>Washington</i>	17	17	100.0%
<i>Sauk</i>	23	23	100.0%	<i>Waukesha</i>	21	25	84.0%

## INSPECTION REMINDERS

All bridge inspections have been deemed essential during the COVID-19 Pandemic. Federal law dictates inspection policy, and FHWA does not have legal authority to change the requirements. For more information on federal guidelines, refer to 23 U.S.C. 144, National Bridge and Tunnel Inventory and Inspection Standards, or its implementing regulations, 23 CFR 650 Subparts C and E. Please communicate any challenges or issues that arise with your Region Bridge PM or contact the Bureau of Structures directly.

## TORQUE WRENCH AND ANCHOR TENSIONING UPDATE

Using the department's new battery powered torque wrench and multiplier, BOS Maintenance Crews have been working to verifying anchor rod tension for overhead sign structures and re-tensioning anchors as needed. To date, approximately 20 sign structures have been completed in the SW-Madison and NE regions. Structures were selected based on maintenance actions for loose anchor rods or failed torque verification of anchor rods noted in previous inspection



reports. The department expects to save money and effort by performing this work as opposed to traditional plan letting. Additionally, this work provides snooper and maintenance crews work that can be done between scheduled inspections or down time while waiting for material deliveries or traffic control.

### ABOUT THE BULLETIN

The Bureau of Structures at WisDOT will publish 1~2 newsletters a year to discuss topics involving inspection, maintenance, repair, or improvement information and initiatives. If you have ideas for future topics, please submit to Rick Marz, Travis McDaniel, Matt Coupar or Steve Doocy.

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