

# State-Aid Bridge News

August 7, 2008

- **Bridge Management Update**

All agencies should have received their Pontis bridge inspection data by now. If you have not received it, contact Lisa Hartfiel at 651-366-4557. Also, if your agency is interested in using the new web-based bridge inspection application, contact Lisa.

Recently revised state law allows increased culvert inspection intervals.

To be eligible for 48 month interval, a culvert must meet all of the following criteria:

1. The structure must be classified as a culvert (FHWA Item # 43 must be "19")
2. The NBI culvert condition rating code (FHWA Item #62) must be rated "7" or higher.
3. The Structural Evaluation appraisal rating (FHWA Item #67) must be rated "7" or higher.
4. The Scour Code (FHWA Item #113) must be rated "N", "8", "5", or "9"

To be eligible for a 24 month interval, a culvert must meet the following criteria:

1. The NBI culvert condition rating code (FHWA Item #62) must be rated "5" or higher.
2. The Structural Evaluation appraisal rating (FHWA Item #67) must be rated "5" or higher.

All other culverts must be inspected on a 12 month interval.

A new inspection frequency report will be posted on the web site by the end of August. The new report will include culverts eligible for 48 month inspections. A 48-Month Culvert Safety Inspection Interval Request form will also be available on the web site.

New load ratings or re-ratings should be submitted to the Bridge Management Unit using the forms available on the web site. Old load rating forms will no longer be accepted. If you have questions about load rating submittal, contact Jim Pierce at 651-366-4555.

- **New York Style Local Bridge Demonstration Project**

Blue Earth County, S.M. Hentges & Sons, Inc., Erickson Engineering, and Mn/DOT are engaged in the necessary shop drawing reviews, fabrication inspections, and up front planning and coordination to construct a NY style bridge.

The bridge contractor has only 30 working days to complete construction. The short window of construction was intended to demonstrate rapid construction. Construction of the bridge will start this September. We intend to document and photograph the construction process to be shared and used as an educational and marketing tool for future projects.

The bridge calls for 4'-0" wide by 2'-3" precast concrete side by side box beams spanning approximately 68 feet and supported on steel sheet pile wall abutments. Other bridge amenities include metal tubular traffic railing, and a 6 inch concrete composite deck.

We're extremely delighted to see County Materials Corporation (one of our primary local precasters ) willing to fabricate and supply the box beams. Also we're very excited to see our local agencies, bridge consultants, fabricators, and contractors take interest in implementing other proven, innovative bridge technologies for Minnesota.

It's apparent that our industry is on board to design and build safe durable bridge systems that reduce construction time, and inevitably reduce construction costs. Bridge innovation has worked in other states such as New York and Washington. Effective bridge innovation that breeds rapid construction and cost competitiveness is a national trend that has simply made its way to Minnesota!

Note, effective bridge innovation (such as the side by side precast concrete bridge) will use repetition in design, fabrication, and construction. Over time the comfort level with design and construction of the innovative bridge will improve. As efficiencies, refinement and improvement are realized, the innovative bridge type will become cost competitive with the more traditional bridge types such as the cast-in-place concrete slab span bridge.

- **Local Bridge Replacement Program Update**

The 2008 legislative session ended with an appropriation of \$50 million in the State Transportation Fund for the Local Bridge Replacement Program. The entire \$50 million has been dedicated to bridge projects. This appropriation was prioritized in the following manner:

\$25 million set aside for Lowery Ave Bridge (CSAH 153) over the Mississippi River in Hennepin County; \$13 million for the match of the local Federal STIP bridge projects; \$7 million for fracture critical bridges; and \$5 million for the projects on the bridge waiting list with priority given to bridges that are closed, load posted, and road in lieu projects.

To date there have been 129 township, city, or county bridges funded in 2008. The waiting list for bridge bonds or town bridge funds currently has 88 projects requesting approximately \$19 million in funding. Currently on the bridge priority master list there are 670 unfunded project identified for 2008 requesting \$74 million in bond funds and an additional 380 projects for 2009-2010 making the total bond requests for the next two years \$157 million.

- **Local Agency Use of Treated Wood Products**

After several meetings with the Treated Wood Task Force (Mn/DOT task force to determine the current treated wood needs for Mn/DOT and local transportation projects), treated wood needs and application were identified. Treated wood needs on Mn/DOT projects generally include large quantities of timber noise walls. However, typically on a much smaller scale, treated wood needs on local projects include small permanent and temporary vehicular bridges, pedestrian and board walk bridges, aesthetic bridge rail, curbing, scuppers, and pedestrian lead-in-guard railing.

The Mn/DOT Office of Environmental Services (OES) developed a Hazard Evaluation Process (HEP) for the purpose of assessing potential adverse environmental impacts that could result through the use of various products, including treated wood products. Mn/DOT has determined that certain types of treated wood products present an unacceptable liability risk related to long-term environmental impacts on soil and/or surface water. Therefore, Mn/DOT maintains a list of approved treated wood products and application restrictions for use on Mn/DOT projects and facilities.

Currently, our primary local timber bridge and components supplier uses copper naphthanate (CuNap) as a wood preservative. The Mn/DOT Task Force has not finalized their decision on use of CuNap, but OES determined that use of CuNap on Mn/DOT projects should be restricted to non-residential and non-recreational areas (the HEP determined that copper levels leaching from the wood will exceed current regulatory cleanup thresholds in residential and recreational settings) and not used within 100 feet of surface water (rivers, streams, lakes or ponds) because of potential negative effects of leaching copper on aquatic life. Other treated wood products approved for use on Mn/DOT projects may not have application restrictions (creosote and non-aqueous pentachlorophenol) or be approved for use in residential/recreational areas but not within 100 feet of surface water (Envirosafe Plus and Wolman L3®).

Mn/DOT has determined that the local agency engineer may conduct their own liability evaluation considering use of products such as CuNap relative to the proximity of residential/recreational properties and surface waters for projects including construction of structures on local road systems, even if their decision may violate Mn/DOT's restrictions on product use. In the case of CuNap, we would recommend detailing the bridge as to avoid putting timber directly in water. We would also request to continue the use of an asphalt wearing course to limit preservative runoff, and note that the treated wood is waterproofed, which may reduce runoff of the preservative.

So in summary, we suggest the local agency engineers work closely with their design consultant, the timber product suppliers, and Mn/DOT during the preliminary planning phase. Factors such as environmental risk, cost, and durability should all be considered in assessing the appropriate wood preservative to select for a local timber bridge or related project. We would also recommend that you contact Brian Kamnikar of the Mn/DOT Environmental Office, phone no. 651-366-3617 for additional pertinent information that may be helpful as you consider the potential environmental liability associated with selection of materials on your specific treated timber project.

- **Laboratory Testing and Inspection Services Request Form**

If your bridge project is funded with any federal monies, Mn/DOT inspection services and/or lab testing is required. The federally funded projects will receive Mn/DOT inspection services and/or lab testing whether or not we receive a Laboratory Testing and Inspection Service Request Form. However, we still recommend that you submit a request form to assure we properly schedule this activity for your project. Inspection services may include pre-cast concrete structures, shop drawing reviews, and structural metals inspections. If your bridge project is funded with state monies you can request either Mn/DOT or Mn/DOT certified consultant inspection services and/or lab testing. Regardless, we need to receive the Laboratory Testing and Inspection Service Request Form to schedule these services when the project has state funds.

Please continue to submit the filled out Laboratory Testing and Inspection Service Request Form to your Mn/DOT State Aid Project Manager or State Aid District Engineer along with submitting a copy to Barry Glassman (Structural Metals Inspection), Thomas Merritt (Structural Metals Shop Drawing Review), and Steve Grover (Precast Concrete Structures Inspection) of Mn/DOT. If convenient, please feel free to PDF these forms via e-mail to Barry, Thomas and Steve.

Contact information:

Barry Glassman, [Barry.Glassman@dot.state.mn.us](mailto:Barry.Glassman@dot.state.mn.us), 3485 Hadley Ave N, Oakdale MN, 55128

Steve Grover, [Steve.Grover@dot.state.mn.us](mailto:Steve.Grover@dot.state.mn.us), 1400 Gervais Ave, Maplewood, MN 55109

Thomas Merritt, [Thomas.Merritt@dot.state.mn.us](mailto:Thomas.Merritt@dot.state.mn.us), 3485 Hadley Ave N, Oakdale MN, 55128

- **In-Depth Inspection of Fracture Critical Local Bridges Update**

The National Bridge Inspection Standards (NBIS) effective 2006, now requires an in-depth inspection (members inspected from an arms reach) of fracture critical bridges, with intervals not to exceed 24 months of non redundant bridge members that are determined to be fracture critical.

Note, a fracture critical bridge is a bridge that is not load path redundant and that has at least one fracture critical member. Fracture critical members are steel tension members whose failure would be expected to result in collapse of the bridge.

In-depth inspections of fracture critical bridges will remain the responsibility of the Bridge Office. Scheduling priority for in-depth inspections will be given to large and complex bridges. The State Aid Office has programmed the necessary special funding to sustain the required 24 month in-depth fracture critical inspection frequency.

Because the work demand is essentially doubling (5 year to 2 year frequency) for our Mn/DOT bridge inspectors, consultants will be contracted to assist in meeting this new NBIS requirement. Note, there are approximately 89 fracture critical bridges on the local system. Approximately 80% are on the federal aid "on system" and approximately 20% are on the federal aid "off system". Note, Mn/DOT has started to conduct fracture critical inspections of approximately 45 bridges to stay on schedule to meet the 2 year frequency requirement.

As Mn/DOT continues to staff up with qualified bridge inspectors, we're anticipating fewer consultant contracts in fiscal year 2010 and overtime. Along with that, we also anticipate fewer bridges to be inspected as we push to get them replaced and off the inventory.

Any questions regarding in-depth inspection requirements can be directed to Todd Niemann, State Bridge Inspection Engineer at 651-366-4567.

- **Gusset Plate Review of Existing Local Truss Bridges**

As you recall, the gusset plate review and inspections program was the result of information released by the National Transportation Safety Board in mid January 2008 indicating that the original design of the gusset plates on the I-35W Bridge was inadequate. As directed by the Governor, Mn/DOT immediately began checking the gusset plates on all 25 of the state's steel truss bridges, and started the planning process to check the gusset plates on all of the local steel truss bridges.

As Mn/DOT personnel and their bridge consultants were developing and refining the gusset plate analysis and rating procedures on the state's truss bridges, development and execution of a local truss screening tool was employed. At the request of the County Engineer's Bridge Committee, the screening tool was developed to allow the affected county and local agency to determine the necessity of a gusset plate check.

The screening tool took into account several factors such as current bridge load posting requirements, whether or not the bridge was closed or scheduled for replacement, any changes in gusset plate condition, or any significant changes in load on the bridge. Of the 87 local truss bridges identified for screening, 34 of them have been requested for a gusset plate check. The 34 bridges were then further prioritized for scheduling the gusset plate checks based primarily on ADT.

As a result we currently have three bridge consultants under contract to complete the gusset checks of 9 higher volume bridges. The affected counties and cities include Polk, Norman, St Louis, Clay, Wabasha, Washington, and the City of Duluth. The bridge consultants selected to conduct this work are SRF Consulting Group, LHB, and WSB. All three of the selected consultants bring knowledge and cost efficiencies from their gusset plate checks and analysis work of the Trunk Highway (TH) truss bridges. In fact, it was just recently that gusset plate checks for all 25 Trunk Highway truss bridges were completed.

The examinations of the TH truss bridges (March-June 2008) lead to closure, repair or replacement of several bridges. The St. Cloud DeSoto Bridge was closed due to distortions found in gusset plates. The bridge will be replaced and is scheduled to be opened for traffic by November 2009. Two lanes of traffic were closed on the Blatnik Bridge in Duluth after load calculations and inspections discovered that gusset plates in eight locations on the bridge did not fully meet load requirements. Angle irons were installed to strengthen the gusset plates. The TH 43 Bridge in Winona was closed due to rust and corrosion found in gusset plates at several locations, repairs to the gusset plates were completed in June 2008.

As we proceed with the gusset plate checks on the local system its conceivable we may encounter similar concerns and problems as found on the TH truss bridges, and have to investigate and take the appropriate action to assure public safety. As planned, the lessons learned and experience gathered on the TH system will certainly help us address any potential issues on the local system. Also due to much lower traffic volumes and less complex truss systems than the TH truss bridges, we're hopeful that if significant issues do arise they will be easier to manage and address.

Like the TH truss bridges, in-depth physical inspections will also be conducted to confirm the current condition of the gusset plates. If concerns with the gusset plates are found during inspections, the design review will be reevaluated to determine if the gusset plates remain adequate. The current schedule to complete all local gusset plate checks is as follows:

- 9 high volume truss bridges on the federal aid system, complete in December 2008.
- 9 higher volume truss bridges off the federal aid system, complete in 2009.
- 15 lower volume truss bridges off the federal aid system, complete in 2010.

Eligible local fracture critical bridges will continue to have priority for bridge replacement. As we move into 2010 and depending what we discover, it is possible that more truss bridges could be added for gusset plate checks. However, we currently anticipate fewer bridges to conduct gusset plate checks on as more and more get scheduled for replacement.

- **Coding Bridge Scour with Unknown Foundations-by Petra DeWall**

The bridge scour program has a five step procedure that is designed to determine the scour susceptibility of bridges with minimal effort. The first part of the process was the primary screening. This screening placed bridges into one of three categories: low risk (code I), unknown foundation (code G) or scour susceptible. This was an effort to identify the bridges that needed further evaluation for scour vulnerability with minimal effort. In the past, the FHWA exempted unknown foundations from being evaluated due to the lack of a process and guidance. They are concerned that some bridges with a G code may be in fact scour critical and has recently developed guidance to deal with these structures. The FHWA has a target date of November 2010 for eliminating the number of bridges with unknown foundation codes from the National Bridge Inventory (NBI).

Initial screening has been completed for all bridges in the state. Some of our local bridges still have G ratings and need to be taken to the next step. The next step for G rated bridges should be the Secondary Screening Process. A worksheet has been updated to aid in this process. This will result in the bridge being rated either: low risk (code I), limited risk (code K) or scour critical (code R). A previous version of the screening form had resulted in bridges being coded J- further analysis required. J codes are no longer acceptable and the bridge will now be rated R-scour critical. Contact Petra DeWall at (651)-366-4473 or [petra.dewall@dot.state.mn.us](mailto:petra.dewall@dot.state.mn.us) to get a copy of the Secondary Screening Worksheet.

If desired, a Level I Scour Evaluation could be performed to further fine tune the coding of the bridges rated R in the Secondary Screening. This would entail doing a hydraulic analysis of the structure to determine the potential scour depth. The engineer would then make an educated assumption as to the foundation (guidance for this has been provided by FHWA), then code the bridge accordingly. Please refer to: "*Bridge Scour Evaluation Procedure For Minnesota Bridges*". A copy is available at the following web site: <http://bridge/Hydraulics/BridgeScour/BridgeScourProcedure.pdf>

The following are links to guidance from the FHWA for handling bridges with Unknown Foundations:

- [Risk-Based Management Guidelines for Scour at Bridges with Unknown Foundations](#) . See Chapter 5 for Scour Risk Management Guidelines which include guidance for Inferring Foundations and Screening Bridges According to Risk.
- [Technical Guidance for Bridges over Waterways with Unknown Foundations](#) has the following suggestions: Check known foundation types of bridges built during the same period of time as your bridge of interest. Historical foundation practices were very repetitive and rather simple in concept.

We have approximately 142 G-rated bridges 20+ feet in length on the local system (these are all bridges that the FHWA cares about) owned by either City, Township, or County. The FHWA has a target date of November 2010 for eliminating the number of bridges with unknown foundation codes (G-rated bridges) from the National Bridge Inventory (NBI).

On going discussions between the State Aid Office, the County Engineer's Bridge Committee, and the Local Agencies will continue to determine a course of action to address possible funding needs and technical assistance to accomplish this FHWA requirement to eliminate the G-rated bridges.

- **Accelerated Bridge Construction (ABC) Work Shop**

The FHWA in cooperation with the Iowa Department of Transportation is holding a two day workshop on accelerated bridge construction (ABC).

The work shop will cover the Iowa experience with ABC projects, and class participants will be divided into work teams to discuss the challenges, opportunities and obstacles in implementing ABC. The work teams will take sample Iowa bridge projects and bridge construction details and develop changes, strategies and modifications necessary to accommodate accelerated construction.

The Minnesota FHWA is funding State Aid Bridge to participate in this workshop which will be held on August 11<sup>th</sup> & 12<sup>th</sup>, 2008. We intend to share the information and results of this workshop with our local agencies and their bridge consultants.

- **Load Rating for the Special Hauling Vehicles (SHV) & Other Load Rating Issues**

What is a Special Hauling Vehicle (SHV)? How does it differ from the Timber Haulers Truck? Why should we load rate for the SHV? These are just a few questions you may feel compelled to ask. But before we try to explain and answer these questions, we would like to congratulate those that worked hard for the legislation to remove the exemption of unregulated over-legal loads under the Implements of Husbandry. It was perfect timing as the FHWA modified the National Bridge Inventory System to require posting of all unregulated over-legal loads.

However, we now must address the SHV. SHV's are single trucks that typically have liftable axles that can produce significantly higher stresses than our posting trucks (legal single or semi trucks). SHV's are legal and becoming more commonplace on all roads. Gravel and milk trucks are often considered SHV's.

As you recall the Timber Haulers Truck allowed a 90,000 lbs. gross vehicle weight for a combination vehicle with 6 axles. The timber truck is similar in length to our 80,000 lbs. gross vehicle weight posting truck with 5 axles. The lengths of these combination trucks are approximately 51 feet from front to rear axle. With the SHV we can have a 7 axle configuration with up to 77,500 lbs. gross vehicle weight over a length from front axle to rear axle of only 30 feet.

The trucking industry innovatively made these trucks legal by adding axles without adding proportional length. The liftable axles are in the down position when hauling and in the up position when operating without payload to save on tire wear. When the truck is fully loaded and with all axles down, it will tend to produce significantly more stress in the bridge than our legal semi-trucks. As the span increases beyond 50 to 60 feet, the effects and increase in stress become even more pronounced when loaded with a SHV.

In recognition of the effects of an SHV on our nation's bridges, AASHTO has now introduced the SHV as a new posting vehicle. On the local system we will need to start reevaluating the rating and possible posting requirements of local bridges for SHV. We have approximately 1800 local bridges that will need to be rated to address the SHV trucks.

Another concern that needs to be addressed is our large backlog of local bridges either missing or with outdated load ratings. The FHWA is cracking down on missing and outdated load ratings. We will need to also address this issue. We know there are several counties and local agencies already engaged in rerating their bridges for SHV's and are also addressing their missing and outdated load ratings.

In an effort to address these statewide rating issues, the Mn/DOT Bridge Office has agreed to take the lead to secure special funding and to coordinate this effort with the help of our local bridge consultants. The Bridge Office will further assess the overall magnitude of this effort, develop criteria, lists and schedules to complete the work. It's envisioned that this work will be conducted in fiscal year 2010.

Again, on going discussions between the Bridge Office, State Aid Office, the County Engineer's Bridge Committee, and the Local Agencies will continue to determine a final course of action to address this FHWA requirement to rate for the Special Hauling Vehicles & update load rating on the local system.

- **The State Aid Bridge Tool**

Were proud to announce that the Bridge Tool is available and fully operational to use! This tool was developed to assist the local agencies retrieve pertinent local bridge information on an internet based map.

Bridge scour codes, postings, deficiency status, rail rating, ADT and the NBI bridge deck rating can all be displayed on a map. This tool also has a nice feature to allow the user to link to the various related bridge reports.

The bridge tool can be reached through the State Aid Web Page: <http://www.dot.state.mn.us/stateaid/> in the left column you'll find a drop down menu for Applications, select Bridge Info. You'll then be prompted to sign in. Once into the tool detailed instructions can be found under HELP. The instructions will walk you through the necessary steps to print a map, copy and paste a map, saving a current view in a bookmark, and measuring distances on the map. It's simple, but if you have any questions please contact Petra DeWall, the program architect.

- **Interstate 35W Bridge - Rebuild**

Construction updates on the rebuilding of the I-35W Mississippi River Crossing along with other interesting facts about this new bridge structure are available online at <http://www.dot.state.mn.us/i35wbridge/rebuild/>.

August 1<sup>st</sup>, 2008 marked the solemn anniversary of the I-35W bridge disaster where 13 people lost their lives. In memory of those lost in the collapse, the I35W bridge construction ceased for approximately 6 hours in the afternoon to have a period of silence.

Mn/DOT has posted information at <http://www.dot.state.mn.us/minnesotabridges/index.html> with a message from Commissioner Sorel. It is titled "One Year Later". It has an informative piece on the timeline from August 1<sup>st</sup>, 2007 thru June 19<sup>th</sup>, 2008 marking key and important events

According to the latest construction update, the I-35W Bridge project will be complete sometime between mid-September and mid-October 2008, more than two months ahead of schedule. Note, the contract called for completion of the bridge by Dec. 24, 2008 and allowed for an incentive payment of \$2 million for every 10 days the project is completed before then, up to a maximum of \$20 million for completion 100 days early.

The federal government is paying \$234 million to build the bridge, \$12 million in right-of-way costs, and \$27 million in potential incentives. The city of Minneapolis is paying for a pedestrian tunnel and the state is paying the \$4.8 million cost of making the bridge ready for light rail.

Flatiron-Manson, a joint venture, is the contractor on the project

- **State Aid Bridge Contacts:**

	Phone #
<u>Dave Conkel</u> State Aid Bridge Engineer	651-366-4493
<u>Steve Brown</u> State Aid Bridge Engineering Specialist	651-366-4495
<u>Brian Homan</u> State Aid Bridge Plans Engineer	651-366-4494
<u>Petra DeWall</u> State Aid Bridge Hydraulics Engineer	651-366-4473
<u>Tara Olds</u> Graduate Engineer	651-366-4496