# State-Aid Bridge News

January 12, 2005

- **Bridge Hydraulic Information**

The updated Bridge Hydraulic Information (BrHydInfo) data is on line and can be linked from the State Aid Bridge Website at http://www.dot.state.mn.us/bridge/StateAidBridge. Please keep forwarding your bridge hydraulic data to Petra DeWall for entry into the system. We really appreciate everyone's effort in this project. Note, Petra DeWall's phone number has changed to (651)-747-2162, but her mailing address has not.

Happy New Year!
From: Petra DeWall

- **Load and Resistance Factor Design (LRFD) of Local Bridges**

We're pleased to see that approximately 75 % of our local bridge design consultants are developing bridge plans using AASHTO LRFD Specifications. The few that have yet to fully convert over to LRFD have recently informed us that they're working hard at developing their own in-house programs, spreadsheets, etc… They see full conversion to LRFD within the next few months.

Our original time frame for full implementation of LRFD on the local system was set for October 1, 2007, which is also the deadline imposed by the FHWA. It's encouraging to see the majority of the bridge designers move forward with this new design philosophy. To be fully converted over to LRFD a few years ahead of the imposed FHWA deadline is impressive.

LRFD brings a significant amount of change in how the bridge designer analyzes, designs, and details a bridge structure. We can identify with the extra time and effort required to learn and comprehend the LRFD specification. The State Aid Bridge team looks forward to working with all of our local bridge design consultants for continued success with LRFD implementation.

As a reminder, the latest edition of the LRFD Mn/DOT Bridge Design Manual is available online. You will be able to access the manual through the Bridge Office Website at **http://www.dot.state.mn.us/bridge**. Mn/DOT intends to keep the online manual updated and current with the latest AASHTO LRFD Specifications and Mn/DOT Bridge design/detailing practices.

If you have any questions on the LRFD Bridge Design Manual please contact Dave Dahlberg, our LRFD Implementation Engineer, at 651-747-2116

- **Asbestos on Bridges**

The Minnesota Environmental Protection Agency (MPCA) has now defined the problem of asbestos containing materials to include bridges. This decision was brought down from the Federal EPA, with new law and regulations for asbestos on bridge demolition projects.

We encourage our local agencies and their design consultants to visit the State Aid Bridge Website at http://www.dot.state.mn.us/bridge/StateAidBridge for the process to assure Asbestos Containing Materials (ACM's) and Regulated Waste are identified and removed from bridge demolition projects. It is important to be aware of the new asbestos and regulated waste assessment requirements and to comply with the federal law. The enforcement of removal of ACM's and regulated waste applies to all bridge removal and bridge deck removal projects beginning with December 2004 lettings.

The local agency is responsible to secure the Asbestos and Regulated Waste Assessment Report. If the bridge or the utilities located on the bridge contains any asbestos and/or regulated waste, provisions must be included in the contract documents for their removal and disposal. The local agency may use their design consultant to assist them in the process to assure compliance with asbestos and regulated waste assessment, abatement and removal.

During the assessment stage, we recommend soliciting to multiple licensed asbestos and regulated waste consultants for price quotations. Our recent experience reveals that prices for these services may vary significantly. For example, a northern county recently accepted quotations for a 20 foot single span bridge asbestos and regulated waste assessment. Fees ranged from $700 to $3,130, this did not include traffic control. The scope of services also varied significantly, some proposed an estimated fee with multiple material sample inspections, while others proposed a not-to-exceed fee with just a few material sample inspections. Traffic control also ranged from $250 on up. The design consultant assisting the county for this project used the list of pre-qualified consultants, which is kept in the Mn/DOT Office of Technical Support Consultant Services ph. # 651-282-5127.

All local agencies who currently have approved bridge projects placed on the waiting list for bridge funding should take the necessary action to comply with all ACMs and regulated waste assessment and removal.

The local agency and/or their design consultant should contact the Mn/DOT Office of Environmental Services ph. # 651-284-3754 for questions regarding ACMs assessment, rules, and regulations.

- **Use of Spiral Welded Steel Pipe for Concrete Piling**

Spiral welded pipe is typically manufactured using either the electric-fusion-welded process or the double submerged arc weld process. Spiral welded pipe manufactured using either of these processes has been accepted by Mn/DOT. Along with seamless pipe, spiral welded pipe is specified and is used on our Trunk Highway bridges.

The spiral welded pipe using the electric-fusion-welded process tends to leave flash weld material that does not meet the steel surface requirements for a painted finish per Mn/DOT specifications. However, the spiral welded pipe using the double submerged arc weld (DSAW) process does provide a steel surface acceptable for a painted finish that is aesthetically pleasing. Note, the DSAW process does not require grinding in the shop or field to achieve the proper steel surface finish.

When preparing the special provisions for bridge projects with piling, the bridge designer should continue to specify the electric-resistance-welded pipe and seamless pipe. In addition, we encourage the designer to allow the double submerged arc welded spiral pipe for exposed and/or non exposed piling applications, and may specify electric-fusion-welded spiral pipe for non exposed applications only.

Allowing spiral welded steel pipe on our local bridge projects is our effort to insure cost competitiveness, and Buy America compliance.

- **Amendment to Minnesota Statutes 216D "Precautions to Avoid Damage"**

These changes apply to your utility coordination process on SAP and SP construction projects *with excavation* . The two most significant changes introduce the utility quality level and the preliminary and preconstruction utility meeting. MS 216D can be found online at: http://www.revisor.leg.state.mn.us/data/revisor/statutes/2004/216D/

Bridge Designers must now use the following note on all construction plans for projects involving excavation on anything let in February 2005 or thereafter:

***"The subsurface utility information in this plan is utility quality level D. This utility quality level was determined according to the guidelines of CI/ASCE 38-02, entitled "Standard Guidelines for the Collection and Depiction of Existing Subsurface Utility Data."***

The above note should be placed under the construction notes located on the General Plan and Elevation sheet of the bridge plans.

Also, to be in full compliance with this law, project managers should hold a preliminary design meeting for all projects that involve excavation work, MS section 216D.04 1a (c), and the construction engineer should hold a preconstruction meeting for all projects that involve excavation work, MS section 216D.04 1a (d).

If you have any questions regarding the new requirements, please call Merry Daher at (651) 296-7067.

- **2004 Rule Changes on Bridge Width**

Effective on November, 1st 2004, minimum bridge width must be in accordance with new Rules 8820.9920. Because transportation funding is limited, it was necessary to amend the Rules to develop ways to reduce costs. Therefore, it was necessary to not require widened bridges where the roadway in many cases is already wider than the minimum standard width.

In addition, roadways are sometimes constructed more narrow than the minimum widths shown in the design charts (received by variance) and therefore, because a bridge's useful life is much greater than the useful life of the roadway, the proposed rule language now requires the bridge to be built to a minimum required lane and shoulder (or lane plus 4 feet if the shoulder is less than 2 feet).

The old rule of the "curb to curb minimum width for new or reconstructed bridges is the sum of the lane and shoulders widths plus 4 feet" ***is now....***

***"The curb-to-curb minimum width for new or reconstructed bridges must be no less than either the minimum required lane plus shoulder width or the proposed lane plus shoulder width, whichever is greater, but in no case less than the minimum lane widths plus four feet, and in no case less than required per Minnesota Statutes, section 165.04."***

***Minnesota Statutes, section 165.04 reads:***

***All bridges and culverts on any trunk highway, county state-aid highway, or municipal state-aid street hereafter established, constructed, or improved shall be at least 24 feet wide between curbs.***

***All bridges, culverts, and approaches thereto on all other roads, except cartways, hereafter established, constructed, or improved shall be at least 20 feet wide.***

With these charts, we see more pre-design coordination between the local agency and the agency's bridge design consultant to determine a feasible bridge width. Again, it's our intent to assure the minimum standards are followed, and the least cost bridge is being proposed. Please continue to rely on SALT, and/or the SA Districts to determine the level of bridge funding for proposed bridge widths greater than the minimum as set forth by the 2004 Rules 8820.9920.

- **2004 Rule Change to Vertical Clearance Design Chart**

There are approximately 12 high load vehicular impacts a year on our freeway system today. Pedestrian Bridges and Sign Structures are generally constructed with slender structural elements and without the support redundancy of typical highway bridges, thus compromising their ability to withstand a high load impact. To be consistent with current policy used by the State Bridge office for Pedestrian Bridges over the Trunk Highway System, and provide additional safety for pedestrians, ***the Vertical Clearance in design chart 8820.9956 was raised by one foot for Pedestrian Bridges and Sign Structures to 15'– 6" for Urban Design.***

This is reasonable because of the public safety benefit to pedestrians on pedestrian structures and to provide a consistent clear height throughout the transportation system.

Also, a footnote was added that allows existing skyway structure replacement at the existing clear height to avoid significant costs incurred if major structural changes to buildings were required. This is necessary to maintain the existing pedestrian walkway systems currently in use.

This is reasonable because of the excessive costs that would be required to retrofit existing building in order to maintain existing pedestrian skyway systems.

- **Three-Sided Precast Concrete Bridge Structures**

The three-sided precast concrete bridge, designed and constructed by a contractor, is an evolving type of construction being adopted by Mn/DOT for use in appropriate bridge applications. The three-sided precast concrete bridge structure provides an alternative to the standard bridge structure, multiple four-sided box culvert, pipe culvert, and precast concrete arch.

There are two types of three-sided bridge structures: arch top and flat top. These structures can be constructed rapidly, thus minimizing road closure time and they allow for a natural stream bottom. Potential applications include pedestrian underpasses and stream crossings where the waterway opening requirements are on the low end of a conventional bridge but are at the high end of box culvert capabilities. They are generally not as economical as cast-in-place concrete bridge structures or multiple precast concrete box culverts.

In general, precast concrete three-sided structures may not be used if any of the following are true: 1) the design span exceeds 42 feet, 2) maximum rise exceeds 13 feet, 3) fill height exceeds 10 feet, 4) fill height is less than 3 feet, 5) skew exceeds 30°, 6) proposed foundation is in unusually weak soil, or 7) site access prevents transporting and erecting three-sided structures.

Currently, there are no nationally recognized standards for three-sided bridge structures, and the design methods vary between suppliers. Therefore, a Mn/DOT Technical Memorandum was developed which contains guidance for design, submittal requirements, material specifications, construction quality assurance, and the Mn/DOT State Aid Bridge review and approval process for use of these structures.

Within the next few months, the Mn/DOT Bridge Office will be issuing Technical Memorandum No. 05-01-B01, "Use of Three-Sided Precast Concrete Bridge Structures".

- **Upcoming State Aid Bridge Topics**

Below is a list of some bridge topics that State Aid Bridge and the Mn/DOT Bridge Office are currently developing. We will soon issue design and implementation guidance to our local agencies and their bridge design consultants regarding these topics.

- New LRFD foundation recommendations for spread and pile supported bridge foundations. These recommendations will provide the bearing resistance capacities that can be evaluated directly against the actual ultimate factored loads/reactions.

- LRFD and Bridge Load Rating Issues. As we continue to implement LRFD, a few issues have arisen when determining the actual load rating. The Mn/DOT Bridge Office is developing some LRFD design modifications for our prestressed concrete and steel beam bridges to assure a satisfactory load rating.

- Curved steel girder design guidance. The Mn/DOT LRFD design manual is being updated to include design procedures for curved steel girders.

- New pier protection policy. Mn/DOT Bridge Office pier protection policy is being developed. The intent of this policy is to protect the bridge from vehicular hits to the substructure that could trigger a progressive collapse.

- New National Bridge Inspection Standards. The Mn/DOT Bridge Office is currently assisting the local agencies in compliance with these new inspection standards.

- Mn/DOT treated wood policy. Mn/DOT is continuing to develop a policy guideline for chemically treated wood products, and an approved products list for wood preservatives.

- **State Aid Bridge Contacts:**

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