

State-Aid Bridge News

July 20, 2004

- **State Aid Bridge Staff Changes**

Steve Brown

We are pleased to announce the appointment of Steve Brown as the new State Aid Bridge Engineering Specialist.

Mr. Brown previously held the position of Engineering Specialist in the Bridge Pre-Design Unit for approximately 3 years, and has been with the Bridge Office since 1986. He has valuable experience in bridge surveys, hydraulics, foundations, site development, road design, and utilities. Prior to his position as the Engineering Specialist in the Bridge Pre-Design Unit, Steve worked in the Bridge Final Design Area, preparing detailed construction drawings for bridges on our National Highway System.

Steve's position was created to provide some stability, and additional expertise in the areas of bridge planning and design for the State Aid Bridge Office. Steve is also filling a vacancy left by Petra DeWall. Steve started his new position in the State Aid Bridge Unit on April 7, 2004.

Petra DeWall

Petra has returned to the Bridge Office from her mobility assignment as a Government Liaison for Mn/DOT. Petra is currently working in the Bridge Hydraulic Unit designing waterway openings for our Trunk Highway Bridges. The Bridge Hydraulics Unit is currently in great need for Petra's assistance and expertise in bridge hydraulics.

In agreement with SALT, Petra will also continue her integral part in assisting the Local Agencies with bridge hydraulics and related hydraulic issues. We envision her assistance requiring approximately 20% of her time.

- **Bond Fund Projection**

No new funds were made available in the 2004 regular session. Therefore, unless there is a 2004 special session, we have no new bond funds for any projects. All new projects will be placed on a waiting list until new bond funds become available, likely in May of 2005.

Please feel free to contact Kim DeLaRosa (CSAH Support) at 651-296-2440 if you have any questions regarding new bridge applications and the status of the waiting list for bridge funding. You can contact Brad Kennedy (SALT Accounts Officer) 651-296-9974 for payment requests and related questions.

- **Re-Rating Bridges for Forest Product Haulers**

The Bridge Construction Unit in cooperation with SALT will be soliciting for consultants to re-rate the 600 or so bridges identified as candidates to be posted. The candidates for posting will receive a posting sign for legal loads (See sample posting sign below) until it's determined through a re-rating that the bridge is adequate for 98,000 pounds gross weight.

The Bridge Office will administer the contract to re-rate the bridges. They envision hiring 2 to 3 local bridge consultants to rate the bridges using "VIRTIS" (AASHTOWare Program). Mn/DOT has already paid for the "learning curve" in the consultant use of VIRTIS through previous contracts to assist the Bridge Office with Trunk Highway bridge ratings. The consultants should be able to fairly quickly and economically rate these bridges.

It is preferred that the ratings not be done by manual calculation or using other software. If the ratings are done using VIRTIS the Bridge Office can store those ratings, and in the future can easily re-rate the bridges for the counties. However, VIRTIS cannot rate truss bridges, so other methods must be used.

If you have any questions regarding this program, please contact Gary Peterson (State Bridge Construction Engineer) 651-747-2107, and/or Greg Coughlin (SALT Division Project Engineer) 651-296-1660.



R12-5, 30" X 36"
High Intensity background sheeting

- **Bridge Management Update**

AASHTO had proposed optional changes to the Pontis Deck Condition State percentages. We will NOT convert to using the new optional percentages. We will leave the deck percentages the way they are now. Continue to rate decks the same as you have been doing.

Pontis element and general notes have been cleaned up. There still may be some erroneous notes, but most of it should be gone. Pontis will no longer add anything to the notes, so any remaining junk in the notes can be cleaned up. Also, if you have useful information that you think was deleted from a note, we can restore the original note.

We would like your help in verifying some inventory items. The Bridge Management Unit will distribute worksheets containing bridges or culverts with the following conditions:

- Culverts where the approach roadway (including maintained gravel shoulders) is wider than the roadway over the culvert (between curbs or railings). Both dimensions should be verified and corrections reported to the Bridge Office.
- Bridges where roadway width (curb-to-curb or rail-to-rail) is wider than deck width (out-to-out). Both dimensions should be verified and corrections reported to the Bridge Office.
- Bridges with deck width (out-to-out) or roadway width (curb-to-curb or rail-to-rail) = 0. Both dimensions should be verified and corrections reported to the Bridge Office.
- Please try to check this information during your next routine bridge safety inspections.

A draft version of the Pontis Bridge Inspection Booklet will be sent to all agencies for review and comment In August.

The Bridge Management Unit will be distributing a set of reports and worksheets to all agencies in July. Any corrections returned to the Bridge Management Unit by the end of August will be entered into Pontis before the inspection data is sent out in September.

Reports on the website have been updated. Note the following changes:

- The inspection report with two years of condition data will be the only inspection report available. The report with one year of data will be dropped.
- Some reports can now be sorted by bridge number, agency bridge number, route and reference point, and township.

- **The New LRFD Mn/DOT Bridge Design Manual**

LRFD (Load Factor Resistance Design) is a design methodology that accounts for variability in both construction materials and loads. This design method should achieve fairly uniform levels of safety for different bridge types, and will provide a consistent method of design.

The State-Aid Bridge Office allows and encourages the use of the LRFD design specification for local highway bridges per State Aid Operation Rules Chapter 8820.

The Bridge Office has created a new Mn/DOT Bridge Design Manual to specifically guide bridge designers in the use of LRFD specifications. This new LRFD Bridge Design Manual is now 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.

On February 18th thru 20th the Bridge Office conducted a workshop on the use of the new LRFD bridge design manual for our trunk highway, and local bridge consultants. The workshop was well received, and many of our local bridge consultants have started using this new design philosophy.

Below is the proposed time frame for full implementation of LRFD on the Local system:

- All new bridges on which preliminary engineering is initiated after October 1, 2007, shall be designed by the LRFD Specifications, in line with the deadline imposed by FHWA.
- All new culverts, retaining walls, and other standard structures on which preliminary engineering is initiated after October 1, 2010, shall be designed by LRFD Specifications, in line with the deadline imposed by FHWA.

- **BrHydInfo**

The Bridge Hydraulic Information (BrHydInfo) database is now available online.

This GIS application was developed to enable the user to access information in the data base by simply clicking on a map. Queries to the data base can be made by entering any part of the bridge's number. This will return a list of all bridges that contain the combination of numbers entered. Just click on the bridge you want from the list. The program will display a map showing the general location of your selected bridge. Bridges with hydraulic information are noted with blue markers. By clicking on the bridge marker, a report is displayed showing all of the hydraulic information we have available on that bridge.

The hydraulic data that is available is archived information only; so engineering judgment should be used when utilizing the data. *If you haven't already done so, please submit any hydraulic information you have to Petra DeWall- State Aid Bridge Office so it can be included in the database.*

- **Inspecting Timber Bridge Structures**

The State Aid Bridge Office has been asked on several occasions to assist the counties in evaluating and confirming the NBI ratings for timber bridges. The bridges in question are generally over 50 years old, and are borderline for being eligible for bridge replacement funds.

Our major concern with these bridges is the timber piling. We generally find rotting and decaying timber piling near the water line. In some cases the rotting is so advanced you can see crushing and complete failure of the timber fibers. We often find that sounding the timber piles detects hollow areas and internal decay. If deterioration can not be detected using visual and/or sounding methods, we recommend using advanced techniques such as boring, drilling, or probing. Mn/DOT can assist the counties with advanced inspection techniques if warranted.

Amazingly, we find that the superstructure components of the timber bridge are in good condition with minor cracking or splitting. It should be noted that cracking and splitting are inherent with timber bridges, and do not necessarily equate to structural deficiency. We recommend that cracks or splits be monitored to see if they're actually growing, which could result in a potential deficiency.

All new timber bridges are required to be founded on steel pipe piling. Hopefully, this will improve the longevity of the timber bridge structures. The State Aid Bridge Office generally processes 1-2 timber bridges a year. They tend to be more expensive than the conventional concrete slab span bridge.

- **Trends In Local Highway Bridge Design**

Temporary bridge structures versus Staged construction

In many cases the local bridge contractor has opted to provide a temporary bridge in lieu of the staged construction plan shown in the project documents. The county's bridge consultant should evaluate the feasibility of staged construction versus a temporary bypass bridge.

Generally, the contractor designs the temporary bridge in accordance with a performance specification included in the project documents. The bridge design is reviewed and approved through the State Aid Bridge Office. Because the bridge is still a public use facility and funded with State Monies, we require the bridge plan to have its own bridge number, and signed and approved by the State Bridge Engineer.

In past projects with the use of temporary bridges, we ask assistance from the counties in setting minimum roadway width, alignments, and securing the required permits.

3 sided box culverts

Some counties have selected this structure type to reduce construction time, to provide an efficient hydraulic cross section, and to enhance aesthetics.

These precast concrete structures span approximately 40 feet, they can have either a flat roof or an arch roof configuration. They require a minimum of 2 foot cover, and are good for designs with a maximum of 10 feet of cover. They are generally founded on pile supported, cast-in-place, concrete footings. However, precast concrete footings have been used. These structures are typically more costly than the conventional cast in place concrete slab, but offer benefits in speed of construction, and aesthetic appeal.

Mn/DOT will be issuing a Technical Memorandum on the use of these structures. The memo should be available within the next few months.

Precast concrete bridge components for rapid design and construction

Mn/DOT in cooperation with Center for Transportation Studies of the University of Minnesota is initiating research into the feasibility and use of precast concrete superstructure/substructure bridge elements. New precast concrete slab span systems, precast concrete pier caps and columns, and precast concrete deck panels will be considered for research.

The study will address constructability, improved quality, and effects on life cycle costs. The Bridge Office met with the University of Minnesota Research Team in July, and they're hopeful to start the research study ASAP.

- **State of the State Aid Bridge Office**

The State Aid Bridge Office continues to process preliminary and final bridge plans prepared by the county's consultant. Despite the depletion of the State Bridge Bond Funds, the counties and their design consultants continue to submit bridge plans for review and to be placed on the waiting list for funding.

During the past few construction months, the State Aid Bridge Office continues to prepare deck elevation reports to assist the contractors in formwork erection for concrete deck construction for new beam bridges.

They continue to field technical questions, and related issues posed by the county's design consultant. Occasionally they have conducted on site bridge inspections to assist the counties in determination of overall bridge condition and bridge fund eligibility.

They're currently preparing the fiscal year 2004 bridge cost reports. The report should be available sometime in early August.

- **State Aid Bridge Contacts:**

| | Phone # |
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| <u>Dave Conkel</u> State Aid Bridge Engineer | 651-747-2151 |
| <u>Steve Brown</u> State Aid Bridge Engineering Specialist. | 651-747-2152 |
| <u>Brian Homan</u> Assistant State Aid Bridge Engineer | 651-747-2153 |
| <u>Petra DeWall</u> Senior Bridge Hydraulics Engineer | 651-747-2164 |
| <u>Vacant</u> Graduate Engineer | 651-747-2154 |