

bridging THE GAP

BRIDGE INSPECTIONS AND RATINGS PLAY IMPORTANT ROLE IN PLANNING AND MAINTENANCE

Many were moved by the recent opening of the new I-35W bridge in Minneapolis. This tragedy certainly focused the nation's attention on the problem of aging infrastructure. The Minnesota Legislature and Mn/DOT have responded by prioritizing the repair or replacement of the state's worst bridges.

Local units of government—city, county, and township—have the same responsibility for maintaining, repairing, and replacing bridges within their respective jurisdictions. By Minnesota standards, a bridge or culvert is a span which is ten feet or greater in length as measured along the centerline of the road. While state or federal bridges that cost millions of dollars to replace may grab the headlines, there are many smaller local bridges and culverts that cross dry runs, farmed waterways, small streams, or lakes that are vital to providing safety and continuity in our transportation system.

Two means of evaluating bridges include sufficiency rating and load capacity rating.

Sufficiency Rating

The sufficiency rating (SR) inspection process uses a standard, national rating system that includes rating major bridge components and materials as well as the adjoining roadway. The Federal Highway Administration (FHWA) formula considers structural adequacy and safety (55%), serviceability (30%), and essentiality for public use (15%). These values are compiled to determine an overall sufficiency rating that ranges from 0 (worst) to 100 (best).

The rating is used to determine eligibility for state (SR less than 80) or federal (SR less than 50) funds. The SR is also useful in observing the overall bridge condition and the effect of use over the years. It does not,

however, indicate how much weight can be carried by the bridge nor its remaining useful life. Findings of a safety inspection—deteriorating steel beams, cracked or rotted timber pilings, or excessive gravel on top of the deck, for example—may warrant re-evaluation of a bridge's load carrying capacity.

Load Capacity Rating

Load capacity ratings involve the review of the bridge by a licensed engineer who is familiar with the inspection process. The goal is to determine how much weight a bridge can safely carry. Several factors can impact the ongoing ability of the structure to continue to carry the weight for which it was designed. For example, repeatedly adding gravel or bituminous to the deck over a number of years eventually reduces the amount of traffic weight it can carry. Load restrictions can have a significant impact on a community, affecting which routes school buses and emergency service vehicles may use as well as local agriculture, manufacturing, logging, and other industries. Further, recent changes in state laws will remove the exemption for implements of husbandry—that is, effective Jan 1, 2010, farmers will be subject to the same road and bridge weight restrictions as trucks.

While they may have been inspected and given an SR, many bridges across the state have not been rated for load capacity since the early 1970s. A lot has changed since then—structures deteriorate and the trucks and farm implements have gotten larger and heavier.

public SIGHTINGS

Cindy Nelson, Crosby (MN) City Clerk, was appointed Region 2 Vice President of Minnesota Clerks and Finance Officers (MCFOA).

Dave Robley, PE, Douglas County Engineer, was elected President of the Minnesota County Engineers Association (MCEA). **David Olsonawski, PE**, Hubbard County Engineer, was elected Vice President.

The Parks & Trails Council of Minnesota awarded **Terry McGaughey** a 2008 Parks & Trails Award in the field of Citizen Action for “the major impact he has had on the excellence of our state’s thriving system of public parkland and trails.”

Linda Lee Retka is the new Pierz (MN) City Administrator.

Greg Wagner, former Baxter (MN) City Planner, has joined West Central Initiative as an Economic Development Planner.

Long-time Starbuck (MN) City Clerk **Marilyn Mortenson** has retired.

Jerry Walseth retired from his position as Superintendent of Brainerd (MN) Public Schools. **Steve Razidlo** is the new Superintendent.

Carol Pasanen, retired Principal of fifth- and sixth-grades at Forestview Middle School in Baxter (MN), accepted a data analysis position through the Paul Bunyan Cooperative.

The **City of Breezy Point (MN)** established a partnership with North Memorial Ambulance Services to provide emergency care to the city’s residents as well as police paramedic services to Pelican Township and a police paramedic to offer specialized medical care to the multi-agency Crow Wing County Tactical Response Team.

Widseth Smith Nolting has expanded by opening an office in Sioux Falls (SD). **Nathan Lund, PE**, has been named project manager. ■

If you have a “public SIGHTING,” contact Liesa Thill, Widseth Smith Nolting, 218.829.5117, liesa.thill@wsn-mn.com.

hind SIGHTS

115 years ago . . . The Ferris Wheel, designed by George Washington Gale Ferris, Jr., awed the crowds at the 1893 World’s Columbian Exposition (World’s Fair) held in Chicago. Suspended between 140-foot-high towers, the 250-foot diameter wheel carried thirty-six gondolas, each weighing 13 tons and accommodating 40 seated passengers. Two 1,000-hp steam engines turned the remarkable apparatus.

100 years ago . . . The Ford Motor Company introduced the Model T.

80 years ago . . . The fifteen millionth Model T rolled off the assembly line.

40 years ago . . . A 6-cent stamp commemorating the lifelong work of Walt Disney was issued in 1968. One of Disney’s early jobs was drafting subdivision plats.

Today . . . Total number of bridges—including state, county, city, and township—measuring 20 feet or longer in . . .

- North Dakota: 4,978
- South Dakota: 4,660
- Minnesota: 13,054

Shot Tower . . . A high tower, usually round, in which shot are made by dropping molten lead from an upper story into a cistern of water.

weathering THE STORM

GREENWOOD STREET BRIDGE: BUILDING ON 50 YEARS OF PLANNING



Conceptual rendering



Driving sheet piling for east pier cofferdam



Forming east pier arches



East pier prior to stain application

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outside the LINES

WEATHERING THE ECONOMIC STORM: PLANNING

When budgets are tighter, some cutbacks are necessary and prudent. It's important, however, for local governments to continue to make long-range plans for their infrastructure, thus making good decisions over the long haul on the best use of funds. Organized, continuous, and directed growth are the result of taking a focused look into the future.

Case In Point

The Thief River Falls, Minn., community is watching the construction of the city's new Greenwood Street bridge (see sidebar, at left). Although detailed study has gone into this \$3.1 million project over the last two years, planning actually started 50 years ago.

Minnesota's Municipal State Aid System was established in 1958. Thief River Falls' city leaders at the time had the foresight to realize that, as the city grew, another east-west corridor and Red Lake River crossing would be needed. They placed Greenwood Street on the state aid system when much of it was a gravel township road—or non-existent—and maintained it as a priority in the city's comprehensive plans. Meanwhile, the city has constructed segments of Greenwood Street to nine-ton state aid standards and installed water and sanitary sewer trunk lines across the river, paving the way for the future bridge.

During this same period, major employers Arctic Cat Inc. and Digi-Key Corporation continued to grow. Employing more than 3,000 people, both companies are located in the southwest part of the city, west of the Red Lake River. Residential growth, on the other hand, has been primarily on the east side of the river. Consequently, traffic at the closest river crossing has increased significantly; the new bridge will serve an estimated 5,000 vehicles when it is open to traffic

Detailed planning for the new bridge started in 2006 with the completion of a federal Project Memorandum, which included traffic noise analysis, cultural resources investigation, geotechnical exploration, and other extensive environmental studies. Every detail for the bridge was carefully discussed and communication was vital among the City, public works staff, utilities department, private utilities, engineers, and state and federal agencies including Minnesota Department of Transportation, Minnesota Department of Natural Resources, Federal Highway Administration, and U.S. Army Corps of Engineers.

The resulting 300-foot-long, three-span bridge will accommodate four lanes of vehicular traffic, snowmobiles, and pedestrians. Concrete form liners and red- and brown-toned stain will give the double arch piers the appearance of dry-stacked field stone, providing an attractive addition to the community.

Plan Ahead

Developing—and sticking to—a long range plan brings many rewards, not the least of which are consistency, continuity, and understanding. Even when budgets are tight, completing a project every year or every other year encourages ongoing efficiency and shows measured progress toward a community's shared goal. ■



Dave Kildahl, PE, is a civil engineer and vice president with Wisdeth Smith Nolting.

The Next Step

So how does a local unit of government find out how their bridges are doing? Each county must inspect all bridges on its local road system at least biannually. The County Engineer maintains records of all the bridges in the county, including inspections, scour information, and ratings. The engineer is further responsible for prioritizing and administering bridge replacement projects for townships and small cities as well as the county's bridges. Projects are prioritized according to need, with the availability of funds—federal, state, and township, each with its own nuances—typically being the limiting factor.

Not only does this process identify major rehabilitation or replacement concerns, but it also highlights areas on or around a bridge where maintenance is needed. Taking these “small steps” now may extend the life of a bridge in the future.

Working with the County Engineer and, often, an engineering consultant who specializes in bridge and roadway design, local governments can ensure the ongoing safety and the efficient transportation of those who travel their roads. ■

Tracey Von Bargen, PE, is a civil engineer with Widseth Smith Nolting.

ask the EXPERT

Q How can my business benefit from the energy tax credit?

A The Energy Policy Act of 2005 (EPA 2005) provides a federal tax deduction to the owner of a commercial building property that meets energy-efficiency requirements and is put into service from January 1, 2006, through December 31, 2008. To qualify, the property's interior lighting system; heating, ventilating, and air conditioning (HVAC) and hot water systems; or building envelope must be certified as providing specific energy and power cost savings when compared to a building that meets minimum energy standards (ANSI/ASHRAE/IESNA Standard 90.1-2001, Energy Standard for Buildings Except Low-Rise Residential Buildings).

A fully qualified property reflects a reduction in energy and power costs of 50% or more, while a partially qualified property saves 16-2/3% or more. An owner may receive a tax deduction for the cost of the energy-efficient systems up to a limit of \$1.80 per square foot for a fully qualified property and \$0.60 per square foot for a partially qualified property.

Consult your tax professional or review the information provided by the web sites listed below. ■

Jack Christofferson, PE, is a mechanical engineer and vice president with Widseth Smith Nolting.

quick LINKS

Check out these websites for more information on this issue's topics:

www.irs.gov Internal Revenue Service

www.nrel.gov National Renewable Energy Laboratory

www.energy.gov/taxbreaks.htm U.S. Department of Energy

www.efficientbuildings.org Commercial Building Tax Deduction Coalition

www.ashrae.org American Society of Heating, Refrigerating and Air-Conditioning Engineers



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route TO: