

The MINNESOTA Local Bridge Scanning Tour

by Dave Conkel, Minnesota Department of Transportation

Minnesota has 14,368 bridges on the local highway system. Approximately 13% are classified as structurally deficient or functionally obsolete with an age of 60 years or older. Over the past decade, Minnesota has been replacing its aging local bridge system at a rate of approximately 215 bridge structures annually.

The structure types commonly used for replacement in Minnesota are 25% precast concrete culverts, 33% cast-in-place concrete slab spans, 35% precast, prestressed concrete I-beams, 3% steel beams, 2% timber, and 2% precast concrete arch bridges. Recognizing an opportunity to possibly expand the local bridge inventory with long lasting, economical, and rapidly built bridges, a Minnesota Local Bridge Scanning Tour (LBST) team was formed.

The LBST team was initiated in 2006 by the Minnesota Department of Transportation (Mn/DOT) office of State Aid for Local Transportation and the Minnesota Division Office of the Federal Highway Administration (FHWA). The primary purpose of the LBST team was to visit other states across the nation that owned or contained local bridge types proven to be safe, durable, economical, and that can be rapidly constructed. The team consisted of several local bridge consultants, county engineers, and FHWA and state DOT representatives.

Early in the development of this initiative, it was realized that consultation with industry experts would help the team locate specific areas of the nation to assure a successful scanning tour. The team met with the Precast/Prestressed Concrete Institute, U.S. Forest Service,

and conversed with the National Steel Bridge Alliance. After extensive consideration and input from our nation's experts, the team selected the states of New York and Washington to begin the bridge tours.

These states were selected primarily due to their extensive use of precast concrete bridge systems, similar weather and environment to Minnesota, and a good representation of urban and rural roadways. The tour of New York in October 2006 emphasized the west region of the state and included Erie, Cattaraugus, Allegany, and Steuben counties. The team became very interested in their adjacent precast, prestressed concrete box beam system for local bridges.

In Washington State in 2007, the team's focus area was the east and northwestern regions of the state including Spokane, Adams, Whatcom, and Tacoma counties. The team was impressed with their advanced and predominate use of precast, prestressed concrete technology. Notable local bridge types that stimulated the team's interest were the adjacent precast, prestressed concrete bulb-tee beam bridges, and the precast, prestressed concrete spliced bulb-tee girder bridges. The team also scanned timber and steel bridges during these tours.

At the conclusion of the New York and Washington visits, the LBST team decided to pursue and implement the adjacent precast, prestressed concrete box beam system as a new Minnesota local bridge type.

In 2008, Blue Earth County, Minn., and the county's local bridge consultant, with support from the FHWA and Mn/DOT, began developing

a local bridge project to demonstrate the New York-style adjacent box beam superstructure, metal traffic railing, and steel sheet pile abutments. The bridge superstructure called for adjacent 2-ft 3-in.-deep by 4-ft 0-in.-wide precast, prestressed concrete box beams to achieve a 32-ft 0-in.-wide roadway with a span of approximately 70 ft. The bridge superstructure also incorporated a 6-in.-thick composite cast-in-place concrete slab overlay.

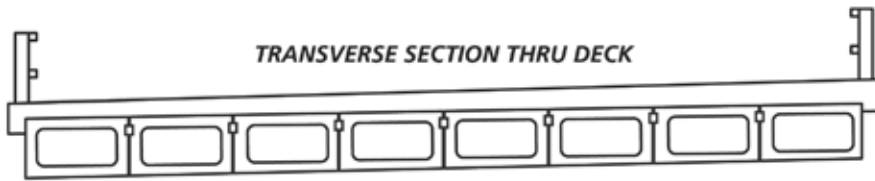
To keep up the momentum and the success of the scanning tours, in 2009, several members of the LBST team took a day trip to Monroe County, Wis., where they visited several bridges that used adjacent precast, prestressed concrete box beams with noncomposite, cast-in-place concrete slabs and bituminous overlays, and side-mounted metal traffic railings. Once again,



The erection of an adjacent precast, prestressed concrete box beam bridge on steel sheet pile abutments. This is a demonstration bridge in Blue Earth County, Minn.

An adjacent precast, prestressed concrete box beam bridge with top-mounted metal traffic railing located in Erie County, N.Y.





The proposed cross section of a demonstration bridge incorporating New York features to be located in Blue Earth County, Minn.

Blue Earth County, Minn., took the lead in developing another set of adjacent concrete box beam bridges that incorporated features from Wisconsin in an effort to further reduce time of construction and lower overall construction costs.

The team continues their dialogue and strong interest in implementing other proven bridge systems and details. These include the adjacent bulb-tee beam bridges as seen in Washington. The team is currently developing plans to visit Iowa and possibly other Midwestern states.

In the end, it will be the many long lasting business relationships developed during these scanning tours that will continue to help us share, learn, and promote proven and viable bridge technologies from across the country.

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The LBST team visiting an adjacent precast, prestressed concrete bulb-tee beam bridge in Adams County, Wash.



An adjacent precast, prestressed concrete box beam bridge with side-mounted metal traffic rails in Monroe County, Wis.

EDITOR'S NOTE

PDFs of three presentations may be viewed and downloaded from the ASPIRE™ website, www.aspirebridge.org. They can be found there in the issue's Table of Contents or by clicking on "Resources" and selecting "Referenced Papers." These are presentations of the details and results of the 2006 New York State Tour and the 2007 Washington State tour. The presentations include many interesting photographs.



The LBST team inspecting precast, prestressed concrete, post-tensioned, spliced bulb-tee girder fabrication at the Central Pre-Mix Prestress Co. plant in Spokane, Wash.



Minnesota Local Bridge Scanning Tour team in Washington State. The photo includes representatives from Adams County, Wash.; Polk County, Minn.; Cattaraugus County, N.Y.; the Washington Department of Transportation; the New York and Minnesota offices of the FHWA; and Washington and Minnesota bridge design consultants.

Participants in the Local Bridge Scanning Tours, 2006-2009

Organized by the Minnesota Department of Transportation office of State Aid for Local Transportation and the Minnesota Division Office of the Federal Highway Administration

COUNTY ENGINEERS:

- Alan Forsberg, Blue Earth County, Minn.
- Rich Sanders, Polk County, Minn.
- Gary Bruggeman, Steele County, Minn.
- Bill Fox, Cattaraugus County, N.Y.
- Mark Burr, Cattaraugus County, N.Y.
- Carl Dimmig, Erie County, N.Y.
- Kevin Obrien, Niagara County, N.Y.
- Steve Catherman, Stueben County, N.Y.
- Guy James, Allegany County, N.Y.
- Clint Biggar, Adams County, Wash.
- Public Works, Whatcom County, Wash.

PRECAST CONCRETE MANUFACTURERS:

- Cameron West, Concrete Technology Corporation, Tacoma, Wash.
- Chuck Prussack, Central Pre-Mix Prestress Co., Spokane, Wash.
- Dan Whitford and Bob Skulds, LC Whitford, Wellsville, N.Y.
- Mike J. Kistner, Kistner Concrete Products Inc., Lockport, N.Y.

CONSULTANTS:

- Kent Rohr & Jeff Rensch, WSN Consulting Engineers, Alexandria, Minn.
- Larry Erickson, SRF Consulting Group Inc., Minneapolis, Minn.
- Ron Benson, Erickson Engineering, Minneapolis, Minn.
- Ken Johnson, Wheeler Lumber LCC, Minneapolis, Minn.
- Jerry Nicholls, Nicholls Engineering Inc., Spokane Valley, Wash.

INDUSTRY:

- John Dick, Precast/Prestressed Concrete Institute, Chicago, Ill.
- Jim Wacker, Forest Products Laboratory, Madison, Wis.
- Calvin Schrage, National Steel Bridge Alliance, Lincoln, Neb.

FEDERAL & STATE AGENCIES:

- Romeo Garcia, Minnesota Division Office, FHWA, St. Paul, Minn.
- Earl Dubin, New York Division Office, FHWA, Albany, N.Y.
- Patti Loken, Mn/DOT, Oakdale, Minn.
- Dave Conkel, Mn/DOT, Oakdale, Minn.
- Kevin Marracino, NYSDOT Region 5, Buffalo, N.Y.
- Ron Mauro, NYSDOT Region 6, Hornell, N.Y.
- Grant Griffin, WSDOT, Olympia, Wash.

PROJECT / DCR ACCESS ROAD BRIDGE OVER ROUTE 24



Existing abutments were replaced with two concrete stub-type abutments supported on steel piles.



To avoid deflection issues resulting from unequal weight distribution, all of the precast concrete segments were placed onto the temporary erection beams prior to their actual assembly.