

A Tale of Two Yanktons

BY DAN SHARP



A new steel span over the Missouri River replaces a National Historic Register bridge to route auto traffic between South Dakota and Nebraska.

PRETTY SOON, THERE WILL BE A NEW WAY TO GET FROM NEBRASKA TO SOUTH DAKOTA—AND VICE VERSA, OF COURSE. Construction began this summer on a new, 1,590-ft, welded steel-plate girder bridge over the Missouri River between Yankton, S.D. and South Yankton, Neb. It is the first bridge over the Missouri River to be designed in-house by the Nebraska Department of Roads (NDOR).

The bridge is being constructed approximately 900 ft west of the Meridian Bridge, the current span between the two towns. The 84-year-old, two-level, steel truss bridge carries U.S. Route 81 motorists via a single lane on the top level. Northbound traffic is underneath, on a single lane originally intended for a railroad line that was never built.

Constructability was the primary concern when preliminary design began, and the added attention to that aspect resulted in a very efficient, cost-effective design. With assistance from National Steel Bridge Alliance, NDOR was able to evaluate the capabilities of fabricating shops in the surrounding states to determine the maximum length and height of girder sections to use. It was determined that the maximum-depth girder that area shops could handle

was 10 ft, and the maximum length for a girder section was 160 ft. With a six-span, launched girder design, using 280 ft for the four interior spans and 235 ft for the two end spans, a 166-ft girder section was needed in the end span from the abutment to the first field splice. All of the other girder sections could be 130 ft, 140 ft, or 150 ft. An optional field splice in the 166-ft section was provided to reduce the section length to less than 130 ft, if the contractor chooses to use it.

The superstructure is made up of seven lines of girders spaced at 11-ft 4-in. centers. The hybrid girders, which incorporate ASTM A709 Grade HPS70W steel for the flanges and Grade 50W steel for the webs, are 10 ft deep at the piers and 6.5 ft deep at midspan. The maximum flange plate thickness used was 2 in. to take advantage of increased market competition in the supply of Grade HPS70W 2 in. thick and under. These limits helped determine the best span arrangement to use for the bridge.

Preliminary plans were sent to the steel fabricating shops for review and comment. The only comment received was that it was a very clean and efficient design and should be very competitive with any other girder option.

Common practice in Nebraska is to design both concrete and steel options for girder bridges with spans greater than 50 ft, unless site conditions or other restrictions prohibit it. In the case of the Meridian Bridge replacement, the state prepared both sets of plans and received three bids—all for the steel option; no bids were received for a concrete girder option.

Once completed, the bridge deck will provide for two traffic lanes in each direction on a 74-ft clear roadway with an 18-ft painted median. The anticipated completion date is November 2009; however, the contractor expects to finish almost a year early because of the steel design.

The old bridge, meanwhile, is on the National Historic Register and will be maintained for use as a pedestrian bridge, connecting existing and planned foot and bike trails.

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Designer

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Fabricator

PDM Bridge, Eau Claire, Wisc. (AISC/NSBA Member)