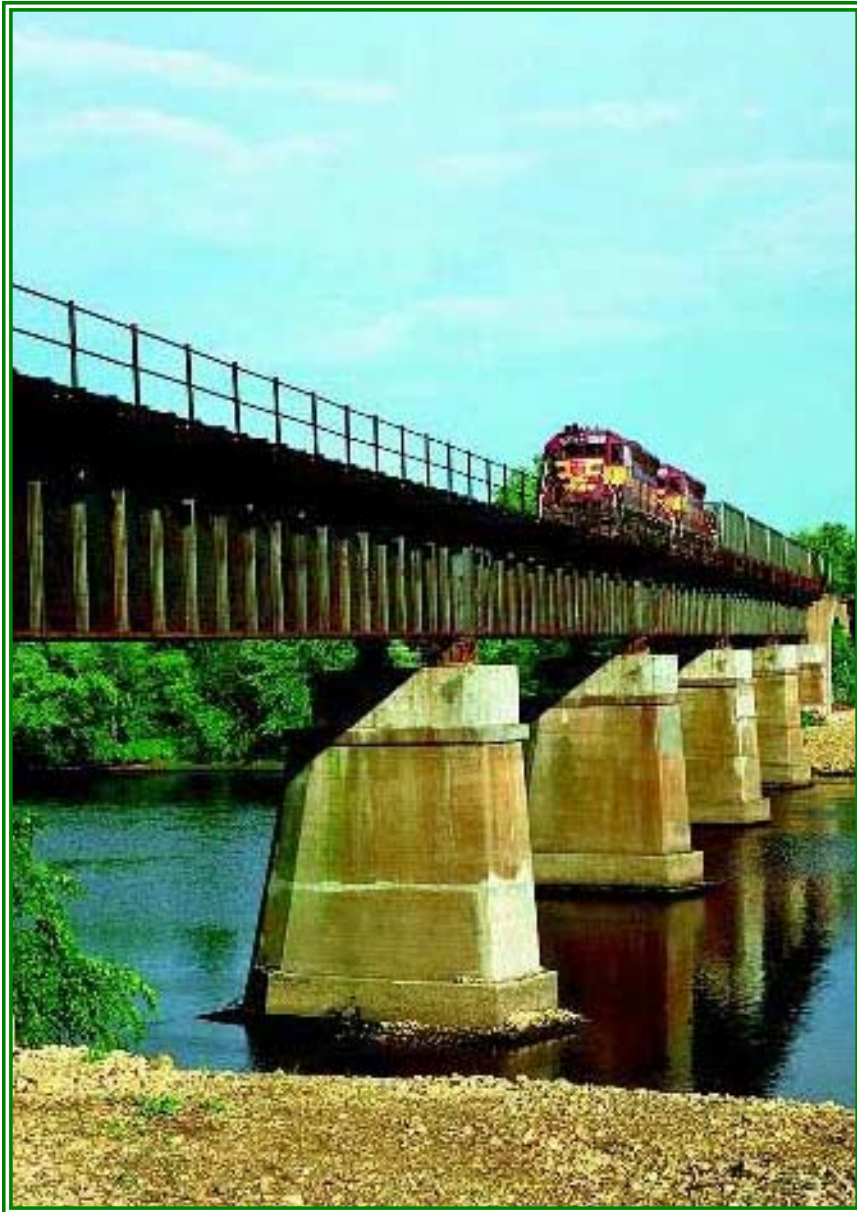


Merit Award: Railroad

BRIDGE No. 315A OVER CHIPPEWA RIVER



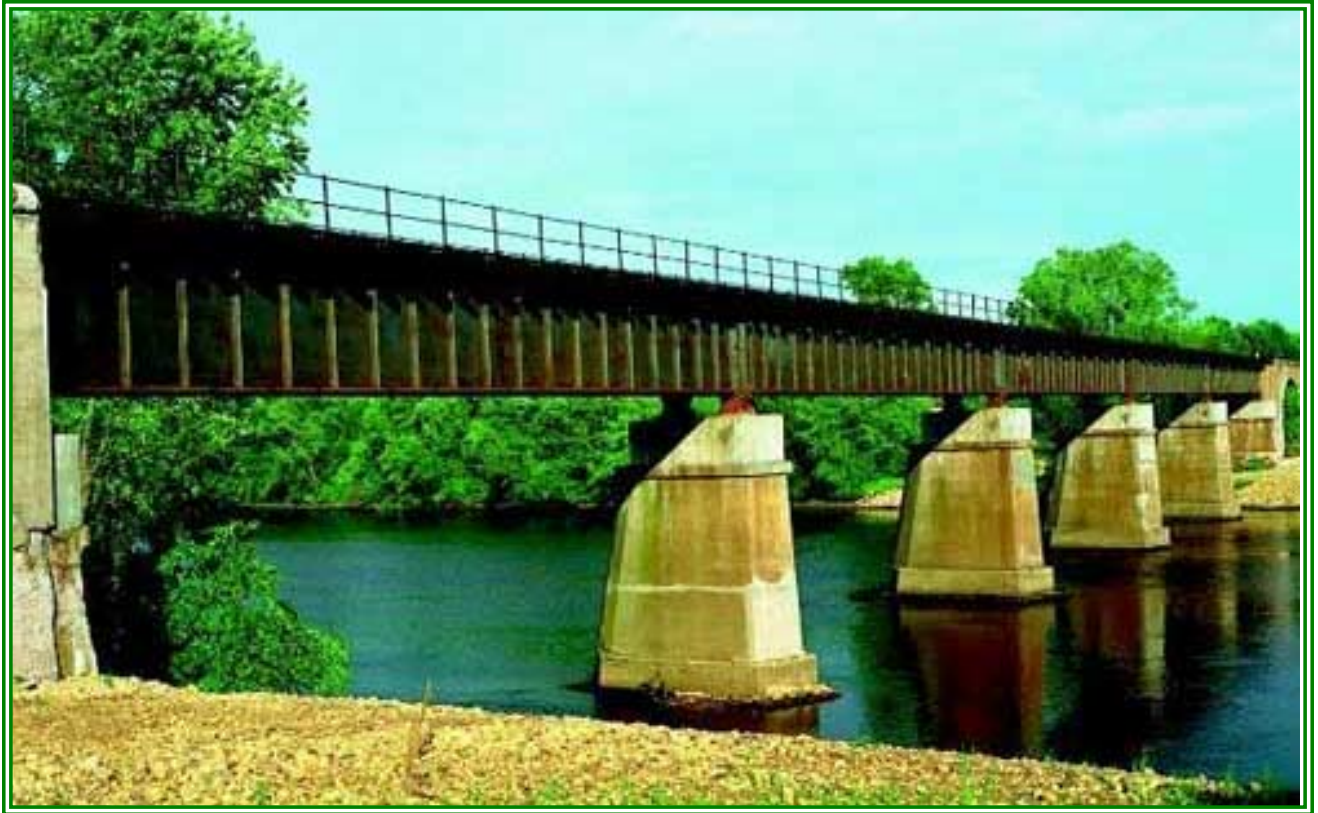
The Wisconsin Central Ltd. Bridge No. 315A over the Chippewa River in Chippewa Falls, WI, was partially reconstructed in March 1998.

The existing structure at this location consisted of five 115' single track, skewed riveted deck truss spans supported on concrete piers with concrete arch span approaches at each end of the bridge. The deck truss spans carried a timber open deck. The depth of construction from base of rail to the top of the substructure is approximately 18'. The bridge was originally constructed in 1917.

The reconstruction included the replacement of the existing railroad deck truss superstructure with five, 115' long welded deck plate girder spans using A709, Grade 50W structural steel. The existing bridge substructure was modified and reutilized.

ECONOMY/COST EFFECTIVENESS

The bridge was inspected in 1996 and the ensuing inspection report outlined severe corrosion in the upper and lower lateral systems, heavy section loss in the lower interior flange angles of the bottom chord, and deterioration of the fixed and expansion bearings. Additionally, cracks were discovered in the top chord cover plates and significant section loss was noted on the top chord flange angles. As a result of the inspection, comparative cost estimates were prepared for the repair of the existing deck truss spans versus replacing the entire superstructure. On the basis of the cost estimates and fatigue considerations regarding



the main load carrying tension members of the truss spans, the railroad opted to replace the existing superstructure.

DESIGN AND ENGINEERING SOLUTIONS

In order to avoid constructing additional substructure in the waterway, a welded deck girder system was chosen to span between the existing piers and abutments.

The new superstructure consists of two girders per track and carries a open timber deck with a walk and handrail on one side. The interior spans are skewed on both ends at the piers and the end spans have square ends at the abutments. The depth of the welded plate girders is 9.5'. The interior web stiffeners are bolted to the girder web and are connected to the bottom flange at the cross frames by welding the outstanding leg of the stiffener angle to a plate that is bolted to the bottom flange. The lifting weight of each span is approximately 110 tons. Innovation

The bridge carries an important mainline for the railroad and disruption to train traffic had to be held to a minimum during the reconstruction. This meant that one existing span had to be removed and replaced with a new span within a 12 hour work window, including the placement of the new deck. In order to compensate for the difference in depth between the existing truss spans and the new deck plate girders, prefabricated steel frame bents were positioned on the existing bridge seats to support the span bearings. After all of the spans were set, a concrete encasement was poured around the entire frame bent between the girder bearings and the pier tops and doweled into the existing substructure for added stability.

In order to facilitate the reconstruction a temporary causeway was built in the river to allow two erection cranes to traverse the length of the bridge to remove and set the spans from off to the side of the track.

BRIDGE No. 315A OVER CHIPPEWA RIVER

Owner:
Wisconsin Central Ltd.

Designer:
Alfred Benesch & Co.,
Chicago, IL

General Contractor:
Lunda Construction Co.,
Black River Falls, WI

Fabricator:
PDM Bridge Corp.,
Eau Claire, WI (NSBA
Member)

Erector:
Lunda Construction Co.,
Black River Falls, WI



The project was designed, fabricated and erected within a seven-month time frame. The fast turn-around is attributable to the utilization of a design-build partnering relationship involving the owner, general contractor, fabricator and designer. The successful completion of this project within a short time frame exemplifies what can be achieved when all parties work closely together for a common goal.

In order to expedite the fabrication process, steel plates for the welded girders were ordered prior to the completion of the final design drawings. The designer and fabricator worked closely together during the final design phase and the initial preparation of the shop drawings to ensure the timely completion of the structural steel fabrication.

The owner and the contractor worked hand-in-hand during the reconstruction to minimize disruptions to train traffic and meet a tight winter construction schedule.