Historic Metal Truss Bridges: Restoration and Reuse

Presented By Nels Raynor,
Bach Steel
Bach Steel specializes in the relocation and restoration of historic metal truss bridges, but also has many years of experience in general structural steel fabrication and erection work.
Case Study: State Street Bridge, Bridgeport, Michigan

Bridge before restoration. Due to failing pier, the spans were twisted slightly and at risk for eventual collapse.
Site Visit: Inspect Bridge and Identify Problems

Widespread areas of deterioration can be replicated.

Isolated or minor deterioration can be repaired.
Site Visit:
The Value of Experienced Engineers and Fabricators

• Know where hidden deterioration is located (reduce surprise restoration costs)
• Make accurate cost estimates (not too high, not too low)
• Propose creative repair procedures (can something be repaired for less cost than replacing it?)
Case Study: State Street Bridge, Bridgeport, Michigan

After deck removal, truss was removed from the substructure with cranes, and rolled to a nearby site to be dismantled and shipped to Bach Steel.
Case Study: State Street Bridge, Bridgeport, Michigan

Disassembled bridge at the shop. Deteriorated ends of vertical members and associated pin plates to be replaced with replicas.
A very common truss repair: Replicate and replace only the bottom portion of vertical members and end posts.
Case Study: State Street Bridge, Bridgeport, Michigan

Restoration of bridge parts at shop. Examples of work completed shown above. Replacing rivets with rivets during restoration is economical, reliable, and historically correct.
There are a lot of misconceptions about welding wrought iron. The reality is that wrought iron can be reliably welded.
Heat straightening can be done on historic truss bridges in a manner similar to that done for modern steel bridges.
Isolated and moderate section loss can be repaired by pad welding. This applies to a variety of bridge parts including plates, beams, and eyebars.
A restoration done by an experienced fabricator will be longer-lasting, look nicer, and reduce cost by getting it done right the first time.
Case Study: State Street Bridge, Bridgeport, Michigan

Reassembly of the bridge on the ground a short distance away.
Case Study: State Street Bridge, Bridgeport, Michigan

Placing the assembled truss on new abutment and pier followed by deck installation.
Case Study: State Street Bridge, Bridgeport, Michigan

A restored, functional historic bridge the community can be proud of!
Case Study: State Street Bridge, Bridgeport, Michigan

Before and After
2016: Notable Bridge Projects:
3 MDOT Riveting Projects

M-72 Ausable River, Grayling, MI
Rehabilitation of small riveted steel rigid-frame bridge on Business Loop 75 (M-72).
2016: Notable Bridge Projects: 3 MDOT Riveting Projects

M-72 Ausable River, Grayling, MI
First known riveting in historic bridge project for active highway use in Michigan.
2016: Notable Bridge Projects: 3 MDOT Riveting Projects

M-72 Bridge Hot Riveting In The Shop
2016: Notable Bridge Projects: 3 MDOT Riveting Projects

M-72 Bridge Hot Riveting In The Field (Tight Locations)
2016: Notable Bridge Projects:
3 MDOT Riveting Projects

Restoration/Relocation M-86 Prairie River
2016: Notable Bridge Projects: 3 MDOT Riveting Projects

- Restoration/Relocation M-86 Prairie River
  - Moving from busy State Trunkline Highway to quiet county road.

- Crystal Springs St., Dowagiac River

Map of Michigan showing the locations of the bridge projects.
2016: Notable Bridge Projects:
3 MDOT Riveting Projects

US-23 Cheboygan River Bascule Bridge
Rehabilitation of historic riveted bascule bridge on major US Highway.
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