HIGH Steel News

Information from High Steel Structures Inc.

Fall 2013

High Steel Crosses the Missouri River with Two Major Bridges

Missouri River Blanchette Bridge Repairs Done Ahead of Schedule

The Blanchette Bridge spans the Missouri River westbound on I-70 at St. Charles, Missouri, and has undergone much-needed repairs to keep traffic flowing.

Built in the late 1950s, the westbound I-70 bridge was requiring more and more frequent repairs. It finally became apparent that the 55-year-old bridge needed major repairs to keep it operational and safe.

As Missouri Department of Transportation District Engineer Ed Hassinger pointed out, major river crossings are designed to last 100 years with a significant overall needed at 50 years. Without these vital repairs, the risk is that the bridge would continue to fall into disrepair. That could pose a safety hazard to travelers, and lead to costly emergency repairs that would cause more extensive traffic closures.

With the $64 million rehabilitation of the westbound I-70 Blanchette Bridge the westbound bridge had been closed since November 2012 and reopened in late summer, far earlier than the original November date.

Courtesy of MODOT

Hassinger and City of St. Charles Mayor Sally Faith were pleased that the rehabilitation project was completed ahead of schedule, thanks to the hard work and commitment of the contractor and subcontractors.

continued on page 5

Riding the Rails on the 1,683- Foot Plattsmouth Bridge

The Burlington Northern Santa Fe Railway has traveled over the Missouri River at the Plattsmouth Bridge since 1882.

After numerous renovations and updates in more than a century, it was time to replace the railroad bridge as it crosses from Plattsmouth, Nebraska to Pacific Junction, Iowa.

At $25 million, replacing the truss bridge was necessary for safety in transporting nearly 50 trains, including coal, mixed freight, intermodal and Amtrak.

What makes the project unique is that the new bridge is being built side-by-side with the existing bridge, just 60 feet north. It has a concrete deck plate girder approach and is being stick-built on site on the new piers.

High Steel Structures Inc. is providing 1,213 tons of steel for the bridge truss—A588/GR50W Fracture Critical steel— that will provide the strength and weight capacity for the railroad river crossing.

High Steel began working on the production of the 400-foot truss bridge span

continued on page 3

The Gateway Arch
St. Louis, Missouri

The famous St. Louis landmark was completed in October 1965 and made of 900 tons of stainless steel. As high as it is wide, the arch stands 630 feet tall and 630 feet wide. Known as the Gate to the West, the Gateway Arch is the tallest habitable structure in Missouri and is part of the Jefferson National Expansion Memorial. The graceful, gleaming arch is meant to symbolize the Westward expansion of the U.S. with St. Louis as the gateway. Built to withstand high winds, the arch sways up to 18 inches on windy days, and about two inches in calm weather.

President Profile: Brian W. LaBorde, HSSI

For the past seven years of his career, Brian W. LaBorde spent every weekend flying back and forth from his home in Brentwood, Tennessee, to his job in Monclova, Mexico. On March 18, 2013, Brian traded in his wings to put down roots in Lancaster County, Pennsylvania.

As the newly-appointed President of High Steel Structures Inc, Brian brings vast experience in manufacturing and leadership, most recently serving as General Manager for Greenbrier Companies in Lake Oswego, Oregon. In this position, he was responsible for rail car production in Mexico, leading to the establishment of a new manufacturing operation and building a workforce of more than 2,000 employees.

Upon meeting Brian, it is clear that he is full of energy and enthusiasm. An innovator, he holds nine patents; five for auto servicing and wheel balancing equipment, and four for archery bows. Brian is a graduate of Louisiana Tech University with a Bachelor of Science degree in Mechanical Engineering. He also holds a Masters degree from the University of Arizona in Mechanical Engineering, and a Masters of Business Administration from the University of Gainesville, Florida.

When asked what drew him to Lancaster and a career with HSSI, Brian expressed an interest in working for a private company, saying, "I was intrigued with the Company's tremendous reputation and culture, as well as the camaraderie and teamwork I had witnessed among co-workers. The beautiful countryside, friendly community, and proximity to larger metropolitan areas made Lancaster County especially attractive."

A self-proclaimed collector of hobbies, Brian enjoys photography, woodworking (he built much of the furniture in his home), and European motorcycles. While he may have traded in his commercial airline wings, Brian did not give up flying entirely; he is an instrument-rated pilot in addition to flying his glider. He and his wife, Sarah, enjoy gourmet cooking, and are also avid scuba divers, traveling to Florida for a weekend dive whenever possible. Brian can be seen riding his bike alongside Sarah as she trains for marathons running the country roads of Lancaster County.

The LaBordes recently relocated from Tennessee to Lancaster County.

Fire Burns Bridge, City in Gridlock

by **Steve Bussanmas,** Senior Vice President of Sales & Marketing

That was the headline when a tanker overturned and caught fire on the elevated span connecting I-81 North with Route 22/322 West in Harrisburg, Pa. on May 9 of this year. The fire's heat damaged the steel girders of the bridge that carries approximately 12,000 cars daily in this heavily traveled corridor, causing not only the ramp to be closed but also I-81 for the better part of a week.

Tearing down the damaged part of the bridge, reopening I-81 and then rebuilding the State Route 22 eastbound bridge became an Emergency Project. Emergency projects are nothing new to High Steel.

Usually, the structural steel is critical to getting the damaged bridge back in service, so owners look to the steel fabricator to fabricate and deliver the steel in the shortest time possible. When High Steel becomes a part of an Emergency Project all the stops are pulled out.

High Steel has participated in Emergency Projects in Maryland, Michigan, New York, New Jersey as well as Pennsylvania in the last 12 years, turning the steel in a fraction of the time of a normal project. High Steel's sizable technical and production resources, includes four plants with over 700 co-workers, enabling us to react quickly when emergency projects arise.

For the SR 22 project, the Pennsylvania Department of Transportation was looking for steel in two months on a project that would normally require seven months. To meet that schedule would require the Owner, PennDOT, the Contractor, G.A. & F.C. Wagman, and High Steel to work in unison.

Back in 1976, High Steel provided the structural steel for the initial bridge. Since the original detail drawings were still available, High Steel and PennDOT engineers sat down and marked up the original drawings so that the two replacement steel box girders and 30 steel I-girders would meet today's construction codes. The steel mills supplied plate within a week, so that High Steel was able to have the structural steel ready for delivery in the two-month timeframe.

In all, 365 tons of steel were fabricated and delivered. High Steel's Field Operations Group was subcontracted by Wagman to erect the steel. This was completed in 11 work days, some of which were limited to five hour allotments at night when erecting over I-81. The project is still progressing, with the bridge's scheduled reopening slated for November.

in March 2012 and the last delivery was completed February 2013, according to project manager Mike Kennedy.

High Steel provided all of the truss bridge components, including the upper, lower, floor system, sway framing, upper bearing block and bridge inspection rails. At the customer's request, High Steel also preformed a check assembly of the rocker pin bearing assemblies in the Lancaster plant prior to shipment and installation in the field.

"It is an important project for High Steel in that we had three significant challenges to meet," said Kennedy.

Those challenges included completing the 100% check assembly on the truss sides at High Steel's Lancaster yard prior to disassembling and shipping to Nebraska. Delivery was coordinated with the project field assembly teams, with shipments leaving three days prior to the need- by dates at the site.

"We traveled through seven states and logged more than 1,200 miles to the site one way," noted Kennedy.

Weather was another concern. With winter approaching, deliveries started the last week of October 2012 and continued throughout the winter season until the last February delivery. That covered 13 weeks and more than 60 tractor trailer loads to deliver to the site by February.

The new 1,683-foot Plattsmouth Bridge provides approximately 400 feet of clearance for river traffic. The bridge was designed by Tom Westerman of TranSystems of Kansas City, Missouri. The contractor is Ames Construction of Burnsville, Minnesota.

It was one of two bridge projects by High Steel that were built along the Missouri River, the other the Blanchette Bridge, crossing 1-70 Westbound at St. Charles, Missouri.

While the Blanchette Bridge is a vehicle bridge, the Plattsmouth Bridge is a railroad bridge. The original location was constructed in 1882, with two Whipple Through-Truss spans, by the Burlington

and Missouri River Railroad to replace a ferry operation. In 1902, the next bridge was constructed. Then in 1976, the west approach was replaced and the alignment was straightened to eliminate a 12-degree curve by building a new deep cut.

The second bridge is being built 60 feet north of the existing bridge, which was 1,676 feet in length and single track. Lucky for the construction team, the winter was milder than most, and made the project run smoother than anticipated.

"The Plattsmouth Bridge project is approximately 75 percent complete," said Larry Woodley, director, Bridge Construction, in December 2012. "Crews began working on this project in February 2012. Bridge construction is expected to conclude in late summer. Track construction will take place in September, and we expect the bridge to be in service in October 2013."

As Woodley explained, constructing a new bridge was more cost- effective than restoring the existing bridge. To help improve velocity, switches will be installed on each end of the new bridge to allow empty trains to use the existing bridge.

JUST THE FACTS

Project Name:	BNSF Plattsmouth Bridge over the Missouri River
Location:	Missouri River between Plattsmouth, NE and Pacific Junction, Iowa
Owner:	BNSF Railroad, Fort Worth, Texas
Designer:	TranSystems, Kansas City, Missouri
Contractor:	Ames Construction, Burnsville, Minnesota
Total Contractor Bid:	$25 Million
Steel Tonnage	1,213
Material:	A588/GR50W

Skewed Steel Girder Bridge Erection: Tricks of the Trade

Bob Cisneros, Ronnie Medlock, Sue Steele, and Bobby Urban September 9, 2013

Erecting straight, skewed girder bridges presents special challenges that must be addressed to facilitate a successful project. Here are a few key items.

Skewed or Normal Cross Frames?

The cross frames on most straight, skewed bridges have cross frames that are normal (or square) to the girders and, except for abutment diaphragms, are not parallel to the supports. Designing the cross frames normal to the girders is better because skewed cross frames are longer and require more complex and expensive detailing. Further, normal cross frames facilitate erection.

Erected Fit or Final Fit?

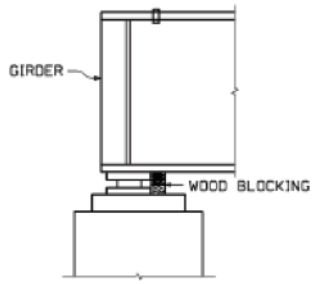
In detailing, the position of cross frames relative to girders are known as the "drops" – i.e., how far down do the cross frame connection bolt holes drop from the top of the girder? Fabricators (or their detailers) set these drops using the camber / deflection information in the plans. The drops can be set using full dead load, steel dead load, or no load camber, or even some pints in between. This is known as the fit condition – i.e., "final fit" using full dead load camber, or "erected fit" using the steel dead load camber. Both final fit and erected fit are common for skewed steel girder bridges (note, however, that final fit is not common for curved bridges).

Lateral Rotation and Bearings

Because there are differential deflections at each cross frame on skewed bridges, girders on skewed bridges rotate laterally as construction loads are added. For example, if the bridge is detailed to final fit, the girders will be laying over at erection but then will rotate to plumb (more or less) as the deck is poured. Conversely, if the bridge is detailed to erected fit, the girders will be nominally plumb at erection, but then lay over somewhat when the deck is poured. Either way the girders will rotate and affect the bearings. Note that most bearings on the skewed bridges erected by High Steel are a multi-rotational style, like a pot bearing.

High Steel uses blocking to facilitate erection; Figure 1 shows our common detail. First, girders are set on bearings; then, after the girders are tack-welded down, the wooden block is inserted. This allows the girders to "float" above the bearings and precludes the need for the bearings to react to girder movement as other members are erected. If the span is an expansion span, the abutment end will be tacked first. Later, when all fasteners are tightened (but before the deck is poured), the blocks are removed, and the girders settle into their bearings.

Figure 1



Tying Girders Down

On a skewed bridge, the forces associated with thermal expansion and with tying the girders and framing together cause the girders to want to move both laterally and transversely – a behavior known as walking. If the first girder walks, the following girders will walk more and make fit-up impossible. For example if the first girder walks ½", the next may walk 1", and the next 1 ½", etc. Hence, it is important to tie the girders down.

On a skewed bridge, the steel must be positively attached to the bridge supports. Depending upon the skew angle, this may be just the first girder or possibly more; subsequent girders will be held in place by tying them to the first through attachment of the framing. Figure two shows a common approach used by High Steel to keep girders from walking. Angles are attached to the abutment wall using cinch anchors, and then a come-along and a chain or cable is placed over the girders and tied to the angles. Once all the steel is set and the fasteners are tightened, the attachments can be removed.

Tightening

On a skewed bridge, it is essential that all fasteners are tightened before the deck is poured. This point is emphasized because it is common misperception that the bridge flexibility that facilitates the layover / lateral rotation behavior comes from loose connections, and this is wrong. The flexibility comes from the torsional flexibility of the girders, which behave a bit like noodles during erection. Loose girder-to-cross frame connections may result in compromised bridge geometry when the deck is poured.

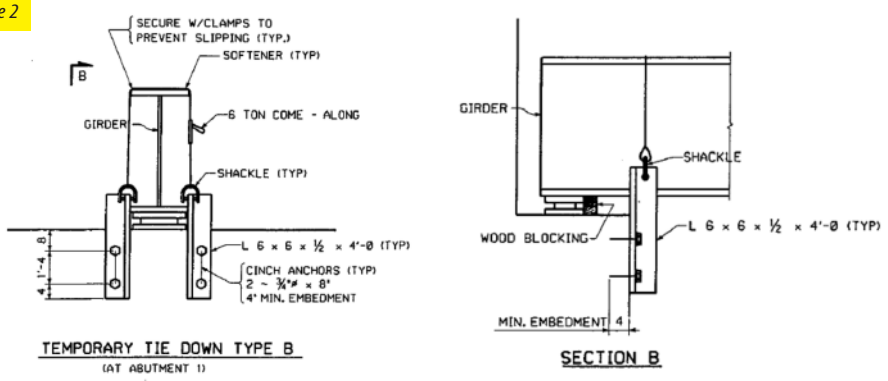
Welding Sole Plates

Fixed bearing sole plates are welded right away, as girders are erected, but expansion bearing sole plates may not be welded until all of the steel is erected. It is best to weld the sole plates before the deck is poured while it is still relatively easy to move the steel; if the owner or general contractor wants to wait until after the deck is poured to weld the sole plates, then High Steel will not do the jacking, unless this is requested as an extra. Welding can be accomplished in either the horizontal or over head positions, but it is much easier to weld horizontally. High Steel recommends that the bridge is detailed to facilitate this mode.

Summary

When a square structure bridge isn't feasible or practical, a skewed structure is a highly useful highway feature, and steel bridges accommodate this type of crossing very well. However, success of the steel on a skewed bridge takes experience – and knowledge of a few good tricks of the trade.

Figure 2



Missouri River Blanchette Bridge Repairs Done Ahead of Schedule *continued from page 1*

The bridge opened to traffic on August 24, nearly three months ahead of schedule," said Hassinger.

High Steel Structures Inc. is part of the team that put the bridge repairs on a faster track. High Steel supplied the entire steel structure above the bridge bearings, at more than 3,355 tons of steel.

"It is one continuous three span truss bridge measuring 1,360 feet long," reports High Steel's project manager Kevin Benner, noting that the steel is A572 Gr 50 with a shop primer.

The second and third coats of paint were applied in the field once the bridge was erected. The project was detailed utilizing 3D software by Candraft Detailing, Inc. High Steel fabricated with CNC equipment and was able to eliminate the set up and ream requirements with a small test assembly. As a result, Randy Durecka of Walsh Construction commended High Steel on overall quality and fit of the steel.

Benner noted that High Steel worked with Walsh Construction Co. and Jacobs Engineering Group Inc., also keeping in close communication with the detailing group.

"This is the second large truss we have supplied to Walsh," said Benner, noting that High Steel fulfilled its role in fabricating, painting and shipping the steel structure by March 2013.

"The toughest challenge was the aggressive schedule," said Benner. "That and transportation."

Transportation required considerable coordination by High Transit using its own drivers on some of the longer specialized trailer loads and a number of independent carriers to handle the high volume of loads and the long cycle time that was due to the travel distance to and from the project site.

"Typical truss bridge design reduces the cost of shipping freight as a larger percentage of members can be transported on conventional equipment without using escort vehicles," said Benner.

Walsh Construction installed the last major piece of structural steel for the bridge. Since March, crews have installed approximately 2,200 pieces of steel for a total weight of 6.5 million pounds of steel in the truss and 1.5 million pounds of steel girders.

Initially, Walsh faced the challenge of low water levels in the Missouri, which forced them to put in a longer causeway. Then during erection in early March the river levels rose over the causeway, which required switching back to erecting everything from barges.

Hassinger thanked Walsh and its subcontractors, including High Steel, for their commitment to getting the project done as quickly as possible. He also commended motorists, who adjusted well to the reduced lanes at the Blanchette Bridge, and showed patience and cooperation.

"We also want to thank the City of St. Charles for their team approach to this. Their cooperation and assistance with the local businesses has made this a smooth process for everyone," said Hassinger.

JUST THE FACTS

Project Name:	Blanchette Bridge, 1-70 Westbound over the Missouri River
Location:	St. Charles, Missouri
Owner:	Missouri Dept of Transportation
Designer:	Jacobs Engineering Group Inc.
Contractor:	Walsh Construction Co.
Project Cost:	$64 Million
Steel Tonnage	3,355
Material:	A572/GR50

Recent Contracts Awarded

I-89 / Lamolle River Bridges
Milton, VT
Tetra Tech Construction
1,252 Tons

Rte 295/42/I-76 Direct Connect, Contract 1
Camden and Gloucester County, NJ
PKF-Mark III, Inc.
2,268 Tons

I-95 Providence Viaduct Bridge #578
Providence, RI
Manafort Brothers, Inc.
2,717 Tons

Route 40 / Hoosic River
Rensselaer County, NJ
Harrison & Burrowes Bridge Constructors Inc.
888 Tons

Lycoming Valley RR Bridge #195/68
Montoursville, PA
Glenn O. Hawbaker, Inc.
795 Tons

SR 22 Section 061: PA DOT I-81 Emergency Project
Dauphin County, PA
PA Dept of Transportation (Fabrication)
G.A. & F.C. Wagman, Inc. (Erection)
365 Tons

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"Lay down a good weld and give good measure"

Sanford High 1931

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Fast Answers to Your STEEL Questions

Please address comments or requests for additional subscriptions to editor, Lisa Fulginiti, at LFulginiti@high.net

HIGH Steel News

In This Issue

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