

Welded Wire Reinforcement
WWR

Bridge Beams/Girders

Introduction

Simplifying Concrete Construction

Insteel Wire Products is the nation's largest manufacturer of steel wire reinforcing products for concrete construction applications. We manufacture and market prestressed concrete strand and welded wire reinforcement, including concrete pipe reinforcement, engineered structural mesh and standard welded wire reinforcement. Our products are sold primarily to manufacturers of concrete products that are used in nonresidential construction.



Machine Resistance Welding – Pressure and heat fuse the intersecting wires into a homogeneous section and fix all wires in their proper position with precise dimensional tolerance.

Insteel's industry-leading capabilities, including multiple manufacturing facilities, state-of-the-art production equipment and in-house engineering expertise, allow us to provide complete concrete reinforcing solutions to customers located throughout North America and abroad.

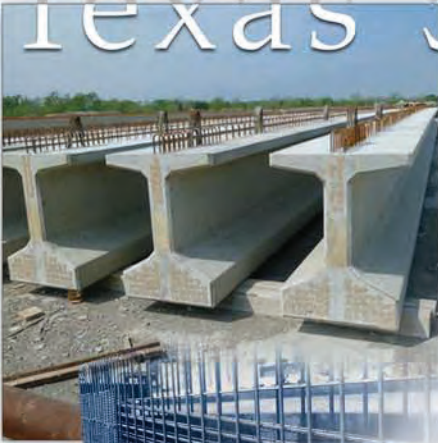
Welded Wire Reinforcement in Bridge Beams/Girders

The use of Welded Wire Reinforcement (WWR) has increased in recent years as precasters and contractors have gained more appreciation for the cost reduction opportunities and efficiency improvements that are attainable through the use of WWR. For example, the AASHTO LRFD Bridge Design Specifications were revised in 2007 to permit the use of WWR utilizing 75 ksi yield strength which results in a 20 percent reduction in steel area and substantially lower labor requirements while providing reinforcement equivalent to rebar at 60 ksi. Several states have adopted the AASHTO 75 ksi strength

for bridge girder applications, which has accelerated the substitution of WWR for rebar. Many leading edge precast concrete manufacturers were already benefiting from the labor cost reduction savings of WWR prior to the AASHTO changes and allowing 75 ksi yield provides additional value for all states to consider.

Department of Transportation (DOT) agencies can realize the value-added features of WWR by providing for its use as an alternative to rebar in state standards. Potential cost savings can be missed, however, when WWR is not specified as an alternative thereby requiring precast concrete manufacturers and contractors to undergo lengthy approval processes that may not comply with the tight time lines required for job bidding. When WWR is specified as an alternative reinforcement in the state standards, experience indicates that it quickly becomes the reinforcing solution of choice for bridge girder (flange and shear) applications.

Texas 54-Inch Girder



Texas 54-Inch Girder

Modifying state standards can be quite simple. The Texas DOT added the following note to the standard sheet (IGD-page 2 of 2) which applies to all depth Texas I-Girders:

“For Welded Wire Reinforcement (WWR) option, area of Bars R may be reduced in proportion to the increase in reinforcement yield strength over 60 ksi. Yield strength of WWR is limited to 75 ksi.”

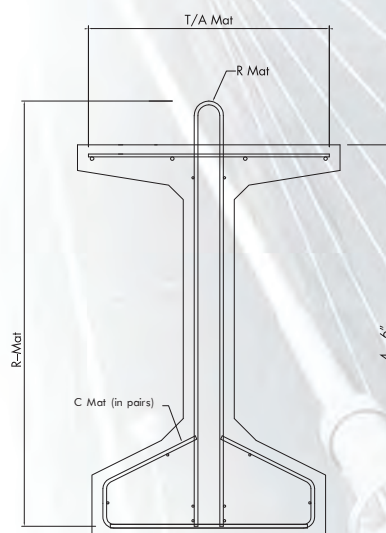
Similarly, the Florida DOT also allows 75 ksi in comparable R-Mats as well as the top flange reinforcing and AASHTO permits the use of 75 ksi standard for WWR. Several other states are considering using 75 ksi in WWR due to its cost and efficiency advantages.

“The use of WWR has resulted in tremendous time savings because WWR is two dimensional and eliminates tying of reinforcing. The use of WWR in the top flange alone eliminates approximately 2,000 ties as compared to rebar. A similar number of ties are eliminated in the shear reinforcing and the bottom flange reinforcing. WWR also saves inspection time due to consistent location of reinforcing once the WWR sheets are installed.”

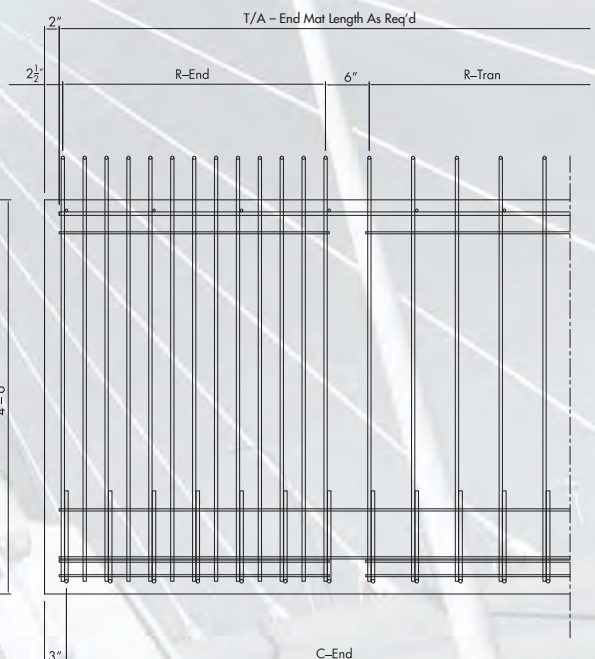
Allen Yamauchi
Valley Prestress Company – Texas

Experienced precast concrete manufacturers who have used WWR in thousands of bridge girder applications have benefited from significant reductions in direct labor, inspection time and lost-time accidents as well as increased productivity and lower overhead costs.

54-Inch Girder Section

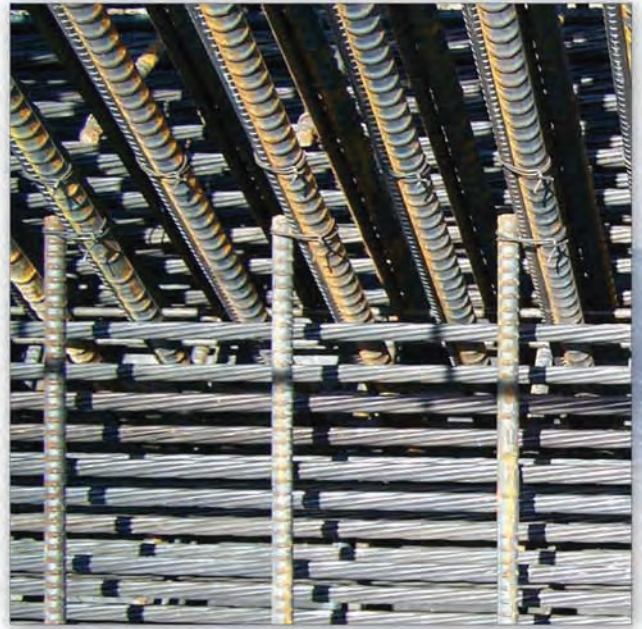


Elevation-End Of Girder

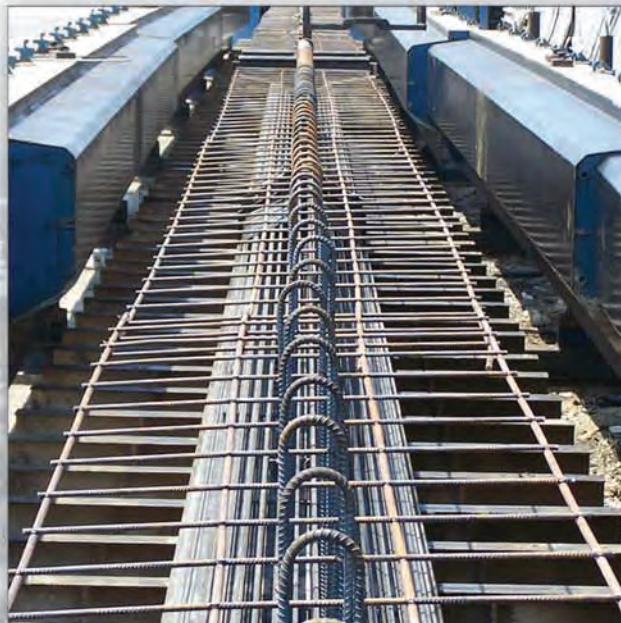


WWR Manufacturing

Texas Girder Photos Showing WWR In Form Prior to Manufacturing



These two photos illustrate the close proximity of the reinforcing near the ends of the beam and the consistency of Welded Wire Reinforcement (WWR) and ease with which other miscellaneous reinforcing can be tied to the WWR mats.



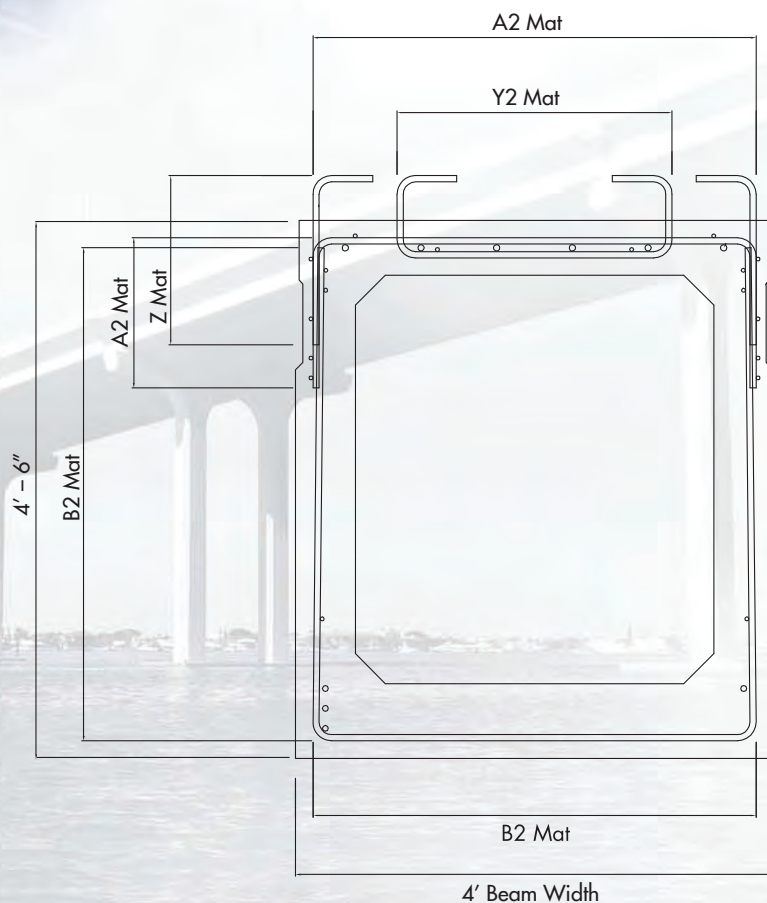
This photo illustrates how the top flange (T/A) mats fit over the shear (R) mats.

Texas Box Beam 4B54



Precasters casting box beams like the one below successfully use WWR to accelerate the fabrication process and reduce total cost. WWR sheets can be fabricated to close tolerances that place the steel in defined locations and thereby expedite the inspection process. The welded intersections provide stiffness and weld shear values that develop the full tensile strength of the larger of the two wires being welded, which minimizes congestion in the beam in cases where multiple sheets are required. Set up and casting times can be reduced by up to 50% by using rigid cages of WWR that are fabricated into the required shapes for easy handling and placement into forms.

Texas Box Beam 4B54





WWR Fabrication

Fabrication of WWR into various shapes is easy and flexible and can be accomplished by either Insteel (at the plant) or by the precaster. Setting tolerances for exact fit of the final desired shape is simple and straightforward. In many cases on-site fabrication by the precaster can enhance flexibility and reduce cost because small adjustments are easier to make for purposes of achieving a more precise fit in the form.



Allen Yamauchi with Valley Prestress Company prefers on-site fabrication to ensure that the assembled WWR mats fit precisely in the form:

“On time delivery of ready to place “fabricated sheets” to the form is much easier than placing and tying fabricated rebar. Beam manufacturing is a high labor product and the use of fabricated WWR significantly reduces this labor.”

Insteel engineers provide section and layout drawings for various beam shapes and, as required, bend drawings for individual sheets that require fabrication. All drawings provided for bent sheets specify tolerances to ensure proper fit in the forms for maximum productivity.



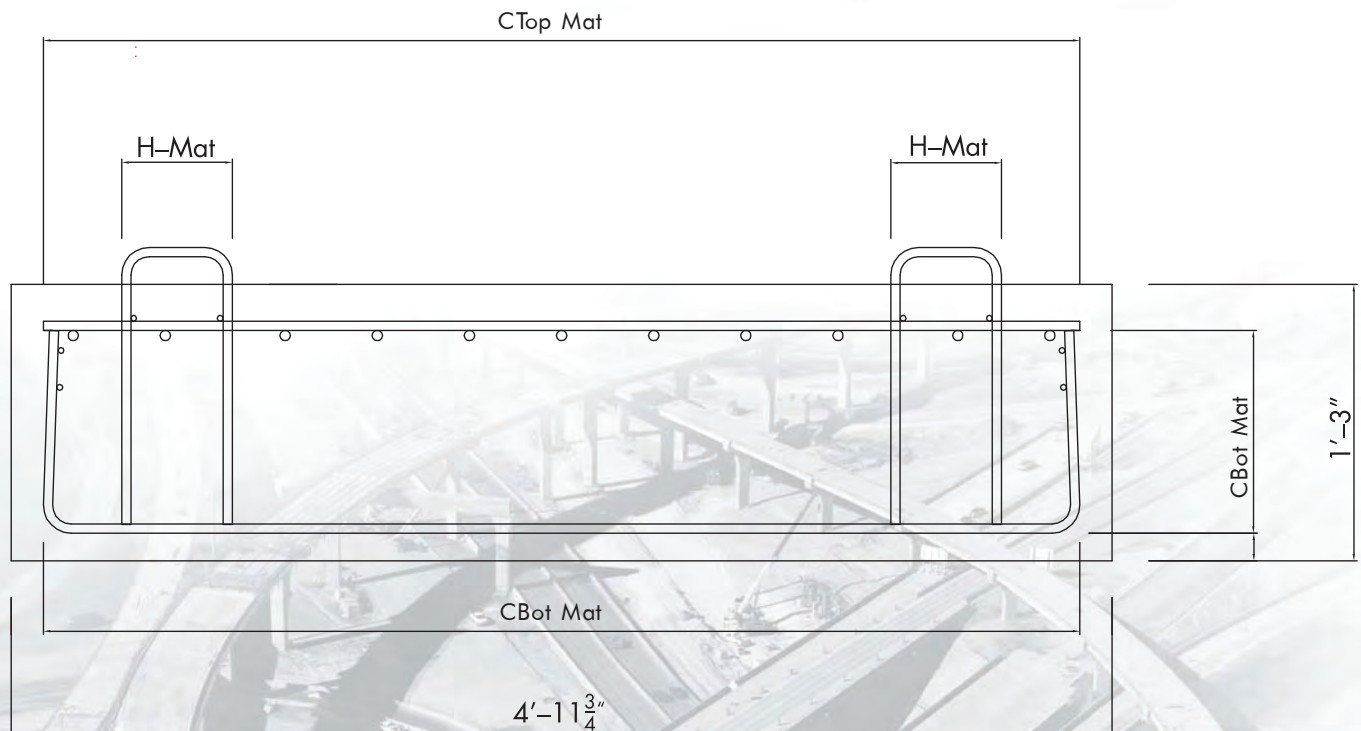


Texas PSB-5SB15

Slab beams are used extensively in all states for short to mid-range spans and to minimize form work for secondary slab pours. These beams can be produced more efficiently using WWR which can be placed in an orderly and consistent progression to maximize production and compress production schedules.

The slab beam below utilizes a C-shaped sheet for C-Bot and develops the transverse wires with two small holding wires welded at the top of the transverse legs. The C-Bot Mat is combined with the flat C-Top Mat to provide slab shear reinforcing. The H-Mat provides for horizontal shear reinforcing. The use of WWR reduces congestion and increases productivity on this widely used beam.

Texas – PSB – 5SB15 – 15"x60"x49.5' Long Slab Beam Equal Area Conversion of C1, D, And H Bars



Engineering Expertise Delivers Customized WWR Solutions

Insteel engineers have decades of experience working on demanding and complex construction projects. We create value by helping you to keep projects under budget and on schedule and by exceeding safety and quality requirements. Our customized reinforcing solutions provide a complete package that fully satisfies your requirements and simplifies your job.

Because we custom-manufacture every WWR product, our engineers can meet the most stringent building code requirements while satisfying your budgetary parameters. You can rely on Insteel to provide:

- Structural design conversions that incorporate the latest in WWR design efficiencies with the appropriate steel area and wires spaced precisely to meet your specific requirements
- Custom bent and arch-rolled WWR sheets delivered directly to your job-site
- Custom WWR designs that integrate varying wire diameters, wire lengths and wire spacing all on the same sheet
- Rigorous quality assurance procedures to assure reinforcement is delivered as ordered.

With plants strategically located across the United States, you can count on Insteel Wire Products to support your success by serving as a reliable value-added supplier of WWR products for all of your concrete construction needs.



- Welded Wire Reinforcing
- PC Strand



Welded Wire Manufacturing Facilities

Kingman, AZ

Jacksonville, FL

Hickman, KY

St. Joseph, MO

Mount Airy, NC

Hazleton, PA

Dayton, TX

800.334.9504

www.insteel.com

