

## PRE-FABRICATED BRIDGE SPECIFICATIONS

### 1.0 GENERAL

- 1.1 These specifications are for a fully engineered clear span bridge of welded steel construction and shall be regarded as minimum standards for design and construction as manufactured by **Pioneer Bridges**  
119 40<sup>th</sup> Street NE, Fort Payne, AL 35967. Contact: Skip Wilson, 866-708-5778, fax: 256-845-7775, email: swilson@pioneerbridges.com
- 1.3 The specific type of bridge required will be a:  
 Trailblazer,  Expedition,  Crossbow,  Cornerstone,  Guardian,  Apex,  Horizon,  Pinnacle style bridge as manufactured by **Pioneer Bridges**.

### 2.0 DIMENSIONS

- 2.1 Width: Inside clear width of bridge shall be \_\_\_\_\_ feet \_\_\_\_\_ inches.
- 2.2 Span: Center to center of bearing of bridge shall be \_\_\_\_\_ feet \_\_\_\_\_ inches.
- 2.3 Camber (choose one of the following options):  
 Bridge shall be cambered 2% of the total span length for spans < 60' and 1% for longer spans.  
or  Bridge shall be cambered \_\_\_\_\_% of the total span length.  
or  Bridge shall be cambered to offset dead load and appear flat.

### 3.0 DESIGN

- 3.1 Open truss bridges shall be designed by a professional engineer experienced in pony truss bridge design and top chord stability criteria elastic utilizing lateral restraints.

In addition to normal dead loads, the bridge shall be designed for the following:

- 3.2 Uniform Live Load: Pedestrian bridges shall be designed for an evenly distributed live load of 85 pounds per square foot in accordance with the AASHTO Guide Specification for the Design of Pedestrian Bridges.
- 3.3 Vehicle Load: Bridges will also be designed to withstand a moving vehicle load which weighs 1000 pounds per foot of width (up to 10,000 pounds) of bridge. This concentrated

load is in addition to a 20 pounds per square foot evenly distributed live load. The vehicle load shall be distributed such that 80% of the load is on the rear axle (per AASHTO).

- 3.4 Wind Load: All bridges shall be designed for a minimum wind load of 35 pounds per square foot (approximately 120 mph). The wind is calculated on the entire vertical surface of the bridge as if fully enclosed.
- 3.5 Design Criteria: The design of the bridge shall be in accordance with the "American Institute of Steel Construction"; 13th Edition. Tubular members and their connections shall be designed per the CISC "Hollow Structural Sections Connections Manual" latest edition or the AISC Manual 13th Edition.
- 3.6 Seismic: All bridges shall be designed for seismic loads of the intensity required by local codes.
- 3.7 Temperature: Bridge shall be designed to accommodate a temperature differential of 120 degrees Fahrenheit. Slip pads of UHMW polyethylene shall be placed between the smooth surface of this setting plate and the smooth bearing plate of the bridge. At least 1" clearance shall be provided between the bridge and concrete abutments.
- 3.8 Deflection: The vertical deflection of the bridge due to pedestrian live load shall not exceed 1/400 of the span length. The maximum deflection due to vehicular loads shall not exceed 1/800 of the span length. For pedestrian comfort, the load used for the deflection check be a minimum of 500 pounds per lineal foot of bridge or the uniform load used in Section 3.2, whichever is greater. The horizontal deflection due to lateral wind load shall not exceed 1/500 of the span length.
- 3.9 Complete design calculations and drawings signed and sealed by a professional engineer licensed in the state of the project shall be submitted to the owner for approval prior to fabrication.

#### 4.0 MATERIALS

4.1 All structural members shall have a minimum thickness of material of at least 3/16".

4.2 Type of steel

(select one of the following options):

**Unpainted Weathering Steel** bridges shall be fabricated from ASTM A242 or ASTM A588 steel for plates and structural shapes and ASTM A606 or ASTM A847 for tubular sections. Minimum yield (Fy) shall be greater than 50,000 psi.

or

**Painted Steel** bridges shall be fabricated from ASTM A36 or A572 and tubular sections from ASTM A500.

#### 4.3 Type of deck

(select one of the following options):

**Wood Decking** shall be No. 1 grade Southern Yellow Pine. Wood decking shall be treated to a minimum of .40 pounds of preservative per cubic foot of wood. The wood deck shall be designed for a 85 psf local loading condition. Floor planks shall be attached with at least two plated fasteners where planks cross supporting members. Planks shall be designed to carry a wheel footprint load per AASHTO.

or

**Concrete Floors** shall be completely formed by the bridge manufacturer with a minimum of 22 gauge galvanized composite floor deck. The floor deck shall be manufactured by a member of the Steel Deck Institute or have their deck properties certified by the Steel Deck Institute. The composite slab shall carry a 200 pounds per square foot superimposed live load. The pouring and finishing of 4000 psi lightweight concrete (no additives allowed) and the furnishing of the reinforcement shall be the responsibility of the contractor or owner. After the concrete has cured, an appropriate sealer should be applied by the contractor or owner.

or

**ADA Floor Grating:** The bridge shall be supplied with a weathering steel bar grating floor meeting ADA requirements with a maximum opening of 1/2". The grating shall be attached to the bridge by welding in accordance with the grating manufacturer's requirements. For painted bridges, the grating shall be galvanized in lieu of weathering steel and attached using grating clips or bolts as required by the grating manufacturer. Grating main bars shall span transverse to the primary direction of roadway travel.

4.4 Field splices shall be bolted with High Strength ASTM A325 bolts; type 3 bolts shall be used for weathering steel bridges.

4.5 Welding materials shall be in strict accordance with the American Welding Society (AWS). Structural welding code, D1.1 Filler metal as specified in 4.1 shall be used for the particular welding process required. Welders will be certified in accordance with AWS D1.1.

## 5.0 FABRICATION AND QUALITY CONTROL

5.1 Bridge fabricator shall be certified by the American Institute of Steel Construction to have the personnel, organization, experience, capability, and commitment to produce fabricated structural steel for Major Steel Bridge Structures with Fracture Critical and Sophisticated Paint Endorsements as set forth in the AISC Certification Program.

5.2 Workmanship, fabrication, and shop connections shall be in accordance with American Association of State Highway and Transportation Officials Specifications (AASHTO).

5.3 Welding operators shall be properly accredited experienced operators, each of whom shall submit satisfactory evidence of experience and skill in welding structural steel with the

kind of welding to be used in the work, and who have demonstrated the ability to make uniform good welds meeting the size and type of weld required.

- 5.4 All welding shall utilize E70 or E80 series electrodes. The weld process used shall be Flux Core Arc Welding (FCAW) or Gas Metal Arch Welding (GMAW).
- 5.5 The connection of bridge end post to top chord should be a mitered joint with the exposed welds ground smooth. The connection of the floor beam in a pony truss system shall not be solely into the side of a tubular bottom chord without the use of additional stiffeners to prevent chord ovalization.
- 5.6 All structural elements used in the bridge shall be identified by heat number of the steel member used. Specific mill test reports and individual welder certificates shall be tracked and kept on file to be provided at the request of the owner or engineer.
- 5.7 To ensure quality control during bridge fabrication, the bridge supplier shall be the designer and fabricator of the bridge and shall not assign, sublet, or subcontract any part of the bridge fabrication including painting.
- 5.8 The bridge design Professional Engineer shall inspect the bridge structure after fabrication and furnish a signed and sealed Conformance Report and Affidavit verifying that the bridge has been inspected by the Engineer and fabricated in accordance with the Engineer's design calculations and approved shop drawings. This inspection and report shall not be delegated to any other engineer or person. For weathering steel bridges, the report shall include a summary of computations of the corrosion index (per ASTM G101) for every heat number of structural steel used in the bridge to verify that the steel is of a weathering grade.
- 5.9 Each bridge shall be inspected by a Certified Welding Inspector that is qualified under the AWS QC-1 program. This inspection shall include as a minimum requirement the following: review of shop drawings, weld procedures, welder qualifications, and weld testing reports, visual inspection of welds and verification of overall dimensions and geometry of the bridge. A report shall be produced indicating the above items were reviewed and shall be signed and sealed by the CWI signifying compliance with AWS D1.1 codes.

## **6.0 RAILINGS & ACCESSORIES**

- 6.1 All railings shall have a smooth inside surface with no protrusions or depressions. All ends of angles and tubes shall be closed and ground smooth. In accordance with AASHTO, railings for
  - pedestrian use should be a minimum of 42" above the floor deck.
  - or  bicycle use should be a minimum height of 54" above the floor deck.

6.2 Safety Rails: Continuous rails shall be located on the inside of the trusses. The safety rails shall be

- horizontal safety rails with a maximum opening of \_\_\_\_\_ inches.
- or  vertical picket rails with a maximum opening of \_\_\_\_\_ inches.

(optional)

6.3  Toe Plate: A 5" steel channel shall be located 2" above the floor deck.

(optional)

6.4  Fencing: Chain link fencing shall be factory installed to meet AASHTO requirements for highway overpasses. The fence shall be located on

- both sides of the bridge up to a height of \_\_\_\_\_ feet.

or  both sides and the top of the bridge.

The chain link fencing shall be

- galvanized with a maximum opening of \_\_\_\_\_ inches.
- or  vinyl coated with a maximum opening of \_\_\_\_\_ inches.

## 7.0 FINISHES

(select one of the following)

All boldly exposed surfaces of weathering steel bridges shall be sand blasted in accordance with the Steel Structures Painting Council (SSPC) Surface Preparation Specification No. 7 "Brush Blast Cleaning".

or

Painted bridges shall be sand blasted in accordance with SSPC SPC-6 "Commercial Blast Cleaning". The bridge shall be painted with an epoxy primer followed by an Aliphatic Urethane Gloss Enamel topcoat or approved equal. Bridges shall be provided with paint for touch up after erection.

## 8.0 DELIVERY AND ERECTION

8.1 Bridges will be delivered by truck to a location nearest to the site accessible by roads. Hauling permits and freight charges are the responsibility of the manufacturer.

8.2 The manufacturer will notify the customer in advance of the expected arrival. Information regarding delays after the trucks depart the plant such as weather, delays in permits, re-routing by public agencies or other circumstances will be passed on to the customer as soon as possible but the expense of such unavoidable delays will not be accepted by the manufacturer.

8.3 The manufacturer will advise the customer of the actual lifting weights, attachment points and all necessary information to install the bridge. Unloading, splicing, bolting, and proper lifting equipment is the responsibility of others.

- 8.4 The owner shall procure all necessary information about the site and soil conditions. Soil tests shall be procured by the owner. The engineering design and construction of the bridge abutments, piers and/or footing shall be by the owner. The owner shall install the anchor bolts in accordance with the manufacturer's anchor bolt spacing dimensions. All grounding and lightning protection shall be the responsibility of the owner.

## **9.0 LIMITED WARRANTY**

- 9.1 The bridge supplier shall warrant their steel structure(s) to be free of design, material and workmanship defects for a period of ten years from the date of delivery. This warranty does not include decking, railing attachments on any other items not part of the steel truss structure. This warranty shall not cover defects in the bridge caused by abuse, misuse, overloading, accident, improper maintenance, alteration or any other cause not the result of defective materials or workmanship. This warranty shall be void unless owner's records can be supplied which shall indicate compliance with the minimum guidelines specified in the inspection and maintenance procedures. Repair or replacements shall be the exclusive remedy for defects under this warranty. The bridge supplier shall not be liable for any consequential or incidental damages for breach of any express or implied warranty on their structure(s).