



**SPECIAL PROVISIONS
FOR
PRE-ENGINEERED STEEL TRUSS RECREATIONAL TRAIL BRIDGE**

**Black Hawk County
EDP-1185(644)--7Y-07**

**Effective Date
June 19, 2012**

THE STANDARD SPECIFICATIONS, SERIES 2009, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE SPECIAL PROVISIONS AND THEY SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS

097046.01 DESCRIPTION.

- A.** These specifications are for an engineered truss bridge of welded steel construction and are minimum standards for design and construction.
- B.** Install an engineered truss bridge of welded steel construction manufactured by a company on the approved manufacturer's list in Materials I.M. 557, Appendix D.

097046.02 DESIGN AND MATERIALS.

A. Design.

1. Designer Qualifications.

- a.** No less than 5 years experience in design and fabrication of engineered bridge trusses. In addition, provide information regarding similar projects that were previously completed, including references.
- b.** Professional Engineer licensed in the State of Iowa.

2. Design Loads and General Requirements.

- a.** Load and Resistance Factor Design according to the *LRFD Guide Specifications for the Design of Pedestrian Bridges, December 2009* (Guide Specifications) adopted by AASHTO.
- b.** Vertical Loads:
 - 1)** Uniform Live Load: 90 pounds per square foot applied to the entire deck area shown in the contract documents.
 - 2)** Concentrated Live Load: 1000 pounds applied over a square area measuring 4 inches per side.
 - 3)** Vehicle Load: AASHTO H-10 vehicle (20,000 lbs.).
 - 4)** Uplift Wind Load: 20 pounds per square foot applied at the windward quarter point of the bridge width.

- c. Horizontal (Wind) Loads: Apply per the *AASHTO Guide Specifications*, with a minimum of 35 pounds per square foot applied to the entire truss as if fully enclosed.
 - d. Seismic Loads and Requirements: Applied according to the *AASHTO LRFD Bridge Design Specifications*, Fourth Edition, with 2008 and 2009 interims.
 - e. Bridge designed to accommodate a temperature differential of 150°F (75°F each way from 50°F).
 - f. Teflon or other approved slip pads placed between the expansion bearing and setting plates provided by the bridge manufacturer. Provide at least 1.5 inches of clearance between the bridge and the abutments.
 - g. Welded Tubular Connection Design: According to Chapter K of the *AISC Steel Construction Manual* (2005) or Section 2.20.6 of the *Structural Welding Code ANSI/AWS D1.1*.
 - h. Shop Drawings (Manufacturer's Standard Schematic Drawings and Diagrams):
 - 1) Unique drawings prepared to illustrate the specific portion of the project.
 - 2) All relative design information, such as member sizes, bridge reactions and general notes, clearly specified.
 - 3) Accurately prepared to be complete in every respect. Include cross-referenced details and sheet numbers. Signed and sealed by a Professional Engineer licensed in the State of Iowa.
 - 4) Submit shop drawings according to Article 1105.03 of the Standard Specifications.
 - i. Maximum vertical deflection due to unfactored pedestrian live load not to exceed $L/360$.
 - j. Maximum horizontal deflection due to unfactored wind load not to exceed $L/360$.
 - k. Vibration as specified in the *AASHTO Guide Specifications* referenced above.
- 3. Geometry.**
- a. Top chords with circular arch, as shown in the contract documents.
 - b. Truss hangers spaced 15 feet, 5 inches on center, measured horizontally. Interior bridge hangers and hangers at the approach trail oriented normal to the bridge camber. Exterior bridge hangers at the abutments oriented plumb.
 - c. Overhead (portal) bracing is required. Minimum vertical clearance above top of deck to bottom of overhead bracing shall be 8.0 feet at the gutter line.
 - d. Final bridge camber to be 1.98 feet based on a symmetrical circular curve. Camber to offset full dead load deflections.
 - e. Structure Depth: Maximum of 3 feet, 8 inches from top of deck to bottom of bottom chord (low steel).
 - f. Span Length: 185 feet 0 inches measured from centerline of abutment bearings.
 - g. Deck Width: 11 feet clear distance between curbs.
 - h. Skew: 0 degree skew as shown in the contract documents.
 - i. Bridge Seat: Bridge bearings must fit within the abutment bridge seat width and length dimensions as shown in the contract documents.
- 4. Decking.** Reinforced concrete deck is required. Apply Section 2412 of the Standard Specifications.
- a. **Design.**
 - 1) Concrete deck design to be provided by the manufacturer.
 - 2) Provide upper and lower layers of longitudinal reinforcing, one layer of transverse reinforcing for a deck thickness of 6 inches or less, and two layers of transverse reinforcing for a deck thickness greater than 6 inches.
 - 3) Minimum clear cover to be 2 inches at the top of deck and 1 inch to all other surfaces and forms.
 - c. Formwork: Formwork shall be removed following the completion of the deck pour.
 - d. Cross-slope: Superelevated with 2% transverse slope.
- 5. Bearing System.** Bearing systems and anchor bolts shall be designed by the manufacturer to resist the vertical and horizontal loading as specified above, and to provide structural

continuity of superstructure with the substructure. One bridge end shall be fixed and the other shall allow movement under thermal expansion and contraction.

B. Materials. All chords, verticals and bracing shall be fabricated from square and/or rectangular structural steel tubing. Floor beams may be steel W-shape members.

1. Structural Members.

- a. Structural Tubing: Minimum material thickness of 1/4 inch.
- b. All Other Structural Members: Minimum material thickness of at least 5/16 inch.
- c. Minimum yield (Fy) = 50,000 psi.

2. Coating System.

- a. All truss components shall be painted according to Article 2408.02, Q of the Standard Specifications for non-weathering structural steel applications.
- b. The color of the top coat shall be federal color number 14090.

3. Field Splices. Up to two bolted field splices will be allowed.

- a. Bolted with high strength bolts according to ASTM A 325.
- b. Field connection bolts tightened by the "turn-of-nut method" to obtain proper tension. See Article 2408.03, S, 5, b.

4. Welding.

- a. Materials: According to AWS.
- b. Welders: Certified according to AWS D1.1.

5. Decking. Use materials meeting the requirements of the respective materials in Division 41 of the Standard Specifications.

- a. Concrete: Normal weight concrete with a minimum 28-day strength (fc) of 3500 psi.
- b. Reinforcement: Grade 60 deformed bars.

6. Anchor Bolts. Use anchor bolts meeting the requirements of Article 2405.03, H, 1 of the Standard Specifications.

- a. Anchors shall be set in drilled holes, installed with a hydraulic cement grout or polymer grout in accordance with Article 2405.03,H.2 of the Standard Specifications, except that they may be preset in concrete when design forces require.
- b. Number, diameter and locations of anchors shall be designed by the bridge manufacturer.
- c. Anchors shall conform to ASTM F 1554.

097046.03 CONSTRUCTION.

A. Fabrication. Ensure quality, fabrication and shop connections comply with the *AASHTO LRFD Bridge Design Specifications*. Where water collection inside of structural tubing is possible during construction or service, weep holes shall be provided at low points.

B. Welding.

1. Welding. Comply with Article 2408.03, B. of the Standard Specifications.

2. Welding Operators. Properly accredited experienced operators, each of whom must:

- a. Submit satisfactory evidence of experience and skill in welding structural steel with the kind of welding to be used in the project, and
- b. Have demonstrated the ability to make uniform good welds meeting the size and type of weld required.

C. Quality Assurance. The manufacturer pays all costs associated with the following inspection requirements for fabrication and finishes:

1. Welded tubular connections qualified per AWS D1.1-94 using short-circuited gas metal arc process.
2. All welds to be visually inspected.
3. Base material certifications to be supplied by the material suppliers.

D. Weld Testing. Have nondestructive weld testing performed by an independent agency. The manufacturer pays for nondestructive weld testing.

1. Ten percent of all welds are to be magnetic particle tested.
2. Ultrasonic testing is to be performed on all top and bottom chord, full penetration welds.

E. Delivery and Erection.

1. Manufacturer's Responsibilities.

- a. Deliver the bridge by truck to a location nearest to the site accessible by roadways.
- b. Notify the Contractor in advance of the expected arrival time.
- c. Provide the Contractor information regarding delays after the truck departs the plant, such as inclement weather, delays in permits, rerouting by public agencies, or other circumstances, as soon as possible.
- d. Advise the Contractor of the actual lifting weights, attachment points, and all other pertinent information need to install the bridge.

2. Contractor's Responsibilities.

- a. Provide proper lifting equipment.
- b. Unload the bridge from the truck at the time of arrival.
- c. Splice and bolt the bridge components.
- d. Provide and install the abutment anchor bolts.
- e. Place the reinforced concrete deck.
- f. Install expansion devices and deck cover plates.
- g. Install railing.

097046.04 METHOD OF MEASUREMENT.

Measurement will be by count for each Pre-Engineered Steel truss Recreational Trail Bridge installed.

097046.05 BASIS OF PAYMENT.

A. The Contractor will be paid the contract unit price for each Pre-Engineered Steel Truss Recreational Trail Bridge installed.

B. Payment is full compensation for:

- Designing, manufacturing and delivering the unit complete as shown in the contract documents, including the coating system, and
- All bearing plates, pads, structural bolts, concrete deck, and any other materials, labor and equipment necessary to furnish the bridge as shown in the contract documents.