

ITEM 564.80nn 16 - PREFABRICATED PEDESTRIAN-BICYCLE SUPERSTRUCTURE

DESCRIPTION:

Under this item the Contractor is responsible for designing, detailing, fabricating and installing prefabricated bridge superstructures in the configuration and geometry and at the locations indicated on the Contract Plans. This includes the bridge deck, railings, joints, bearings and fencing. The Contractor's attention is directed to §106-01, Source of Supply, and §106-02, Quality Requirements, with regard to advising the Department of the sources of the proposed materials.

The Contractor is hereby advised that compliance with the requirements of this specification is likely to necessitate modifications to the standard design and configurations of the prefabricated bridge superstructures offered as stock items by various firms. The Contractor is responsible for all errors of detailing, fabrication and the correct fitting of structural steel members.

Examine Contract Documents for requirements that affect work of this Section. The contract plans may require specific deck types, railing, galvanizing, painting, or other details. Where this specification indicates "or as specified in the contract plans", this does not indicate a choice. It indicates that the contract plans control.

MATERIALS:

All materials for this work shall meet the requirements of the New York State Steel Construction Manual (SCM), NYSDOT Standard Specifications Construction and Materials, and modifications made herein. Some of the materials listed below will not be used in every bridge.

Manufacturers offering prefabricated superstructures which meet the basic geometric requirements indicated on the Contract Plans (span, width and camber) must, as a minimum, be AISC certified for simple steel bridge structures.

A list of Suppliers that have met these requirements appears below.

US Bridge

Contech Bridge Solutions

201 Wheeling Avenue
P.O. Box 757
Cambridge, OH 43725
(740)-432-6334

info@usbridge.com

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BIGR Bridge

2236 Bellflower Lane
New Hope, PA 18938
(267)-397-0583

jcarp@bigrbridge.com

www.bigrbridge.com

Wheeler

9330 James Avenue South
Bloomington, MN 55431
1-800-328-3986 Ext 237

www.wheeler-con.com

info@wheeler-con.com

Echo Bridge Inc.

PO Box 89
Elmira, NY 14902
(607)-734-9456

sales@echobridgeinc.com

Pioneer Bridges

A division of Bailey Bridges
119 40th Street NE
Fort Payne, AL 35967

www.pioneerbridges.com

Prefabricated bridge superstructure material shall conform to the following requirements:

Concrete for Bridge Decks, Class HP	§501
Steel Reinforcement	§556
Permanent Corrugated Metal Forms	S557
Paint	§708-01
Paint (on galvanized surface)	§708-06
Galvanizing	§719-01
Structural Steel	§715-01
High Strength Bolts, Nuts and Washers	§715-14
Permanent Corrugated Metal Forms for Bridge Slabs	§736-01
High Strength Bolts, Nuts and Washers	ASTM A325 M
Posts for Fencing	ASTM A500, Grade B
Structural Steel Shapes: thickness (minimum) 8 mm	ASTM A588 M or as

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Structural Steel Plate	specified in contract plans ASTM A709 Grade 345W.
Structural Tubing: thickness (minimum) 6 mm	ASTM A847 M (weathering) ASTM A 500, Grade B (painted)
Weld Material for welding tubes:	SCM and ANSI/AWS D1.1
Weld Material for plate steel	SCM and ANSI/AWS D1.5
Bearings	§716
Anchor Bolts	§723-60

Certified copies of test results conducted by the manufacturer shall be furnished to the Deputy Chief Engineer Structures (DCES) in accordance with the requirements of subsection 715-01, Structural Steel.

Properly mark and match-mark materials for field assembly. Fabricate for a delivery sequence which will expedite erection and minimize field handling of materials. Where finishing is required, complete assembly, including welding of units, before the start of finishing operations.

DESIGN:

A professional engineer shall be engaged to design and detail the prefabricated bridge superstructure. These services shall include any required consultation for interpreting the plans and for the resolution of problems which may arise during the performance of the work.

All design and details shall be in conformance with the current New York State Department of Transportation LRFD Bridge Design Specifications, the AASHTO LRFD Guide Specification for Design of Pedestrian Bridges, the Americans with Disabilities Act, and the current New York State SCM.

When structural steel is to be painted, ASTM A500 Grade B steel shall be used for painted steel applications. When structural steel is to be unpainted, weathering (A847) steel shall be used.

Span length and clear width between curbs and/or face of rails shall be as indicated on the Contract Plans. The superstructure depth from the bridge deck surface to bottom of steel shall be configured to maintain the minimum vertical clearance indicated on the contract plans.

The applied fatigue live load shall be in accordance with the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaries, and Traffic Signals. The design life shall be taken as 75 years for the purpose of calculating wind loading.

WF floorbeam to HSS vertical moment connections shall be in conformance with Chapter 5 of

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the AISC Specification for the Design of Steel Hollow Structural Sections. All “field” connections for the truss and floor system shall be through the use of high strength bolts, except that the connection of the truss to the bearings shall utilize fillet welds. The minimum fillet weld for the truss to bearing connection shall be 8 mm.

Vertical truss members shall be perpendicular to the bottom chord after the bridge is erected and the truss has deflected under all dead load or as specified in the contract plans.

Concrete decks shall be designed in accordance with the NYSDOT LFRD Bridge Design Specifications. Stay in place forms shall not be considered part of the reinforcement. Reinforcing steel shall be either epoxy coated or galvanized, and cover to top steel reinforcing shall be a minimum of 50 mm or as shown on the contract plans.

Welded tubular connections shall be designed in accordance with the Structural Welding Code - ANSI/AWS D1.1. When gusset plates are welded to tubular members the tube shall be oriented such that a weld will not be made over the seam in the tube. Slotted tubes with all-around welding of gusset plate will not be permitted.

Transversely loaded partial penetration welds are not allowed.

Welding of railing system or other appurtenances to truss tension members is not allowed.

Design loads for pedestrian and bicycle railing shall be as specified in the NYSDOT LFRD Bridge Design Specifications. Railing heights shall be in accordance with the same specification, or as specified in the contract plans.

Bearings shall be designed in accordance with the NYSDOT LFRD Bridge Design Specifications and the New York State Bridge Manual, and supplied in accordance to §565. Elastomeric Bearings are the preferred bearing type as they require the least amount of maintenance. When Steel Sliding Bearings with Teflon or stainless steel sliding surfaces are used, details shall be shown in the shop drawings and submitted to the DCES for approval.

Anchor bolts shall be designed to resist all longitudinal, horizontal, and uplift forces present under the standard AASHTO load cases, transferred by the superstructure to the supporting foundations. Anchor bolts shall be fully threaded A449 bolts, and may be either drilled and grouted, or cast-in-place.

When cast in place with a plate, they shall be set a minimum of 150 mm into the concrete.

When drilled and grouted, they shall be embedded a minimum of 300 mm into the concrete.

Slotted holes in masonry base plates are allowed only at expansion bearings.

Unless shown on the contract plans, the design of the deck joint system shall be the responsibility of the Fabricator. This joint system capable of handling the design expansion, and

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shall be designed and supplied by the bridge manufacturer.

DESIGN CALCULATIONS:

Two copies of design calculations shall be submitted concurrently with the shop drawings for review by the DCES. The calculations shall include, but not be limited to, the following:

- Analysis and code check with appropriate member connectivity and end conditions. A diagram showing joint coordinates and member indices shall be included.
- Half-thru truss or u-frame stiffness checks (when design does not include top lateral bracing).
- Member forces and stress checks.
- Deflection checks.
- End post and floorbeam design checks.
- Wind bracing design.
- Welded connection design.
- Bolted field splice design (when used).
- Bearing and anchor bolt design.
- Deck design.
- Railing system design.
- Vibration design check including fundamental frequency calculations.

SHOP DRAWINGS:

Shop drawings shall be submitted in accordance with Section 2 of the SCM. Electronic submittals shall be in accordance with SCM Section 202.5.

The DCES comments will be indicated on the returned copies. Should the proposed design not be approved, the reasons will be indicated with the return of the material. The Contractor shall then submit a revised design and drawings for approval, subject to the same terms as the first submission. Resubmission will not be considered legitimate reason to request an extension of time under Subsection 108-04, Extension of Time.

Final drawings shall be furnished to the DCES in accordance with the SCM. All work shall be done in accordance with the approved shop drawings. The Contractor shall have approved shop drawings prior to the start of any superstructure fabrication. The Contractor shall bear all cost damages which may result from the ordering of any materials or equipment, or the use of any preparatory labor prior to the start of any to the approval of the design and shop drawings.

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All connections shall be clearly shown, in detail, on shop drawings. The connection details shown on the drawings shall be consistent with the end condition assumptions made in the design. Any substitutions to the details shown in the contract plans shall be submitted to the DCES for review prior to shop drawing submission. Submitted substitutions must be clearly identified and noted as such. Reviewed substitutions, modifications and necessary changes in related portions of the work shall be coordinated by the fabricator and shall be accomplished at no additional cost to the State.

Provide drawings, templates and directions for installation and setting of anchor bolts and bearing plate assemblies to be installed by others. Each prefabricated bridge superstructure shall include all hardware necessary for complete installation including bearing devices and joint systems.

FABRICATION and INSPECTION:

All aspects of fabrication and inspection shall conform to the requirements of the SCM. The Fabricator shall be AISC certified, Category 1.

The Contractor shall be responsible for all errors of detailing, fabrication and for the correct fitting of structural steel members.

Welders for plate and shape fabrication shall be qualified in accordance to the SCM Section 8. Welders shall be qualified in accordance with AWS D1.1, pertaining to procedures involving tubular steel. The qualifying test shall have been within the last three years, and witnessed by an independent third party. The welder's qualification test report shall be submitted to DCES for review and approval.

Nondestructive testing personnel shall be qualified in accordance with Section 3 of the NYS Steel Construction Manual.

UT inspection shall be in accordance with Section 17 of the NYS SCM, with the following additions: Butt welds subject to tensile stress in bridge chords consisting of tubular members will be subject to ultrasonic inspection and shall meet the quality requirements in the SCM. UT shall be performed using a transducer which is appropriate for testing the corners of the square tubing. The transducer to be used should be listed in the UT procedure which shall be submitted to the DCES for review and approval prior to any UT testing.

RT inspection shall be in accordance with Section 16 of the NYS SCM. This requirement is not applicable for tubular materials.

Bridges which are not galvanized or painted shall be cleaned in accordance with Section 1302 of the New York State SCM after fabrication. When structural steel is to be painted, paint shall be

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applied in accordance with §572.

ERECTION DRAWINGS:

Erection drawings shall be submitted according to the NYSSCM Section 204 and shall be submitted a minimum of 30 days prior to erection.

CONSTRUCTION DETAILS:

When the structure is delivered and prior to any erection work being performed, the Engineer-in-Charge (EIC) will inspect and approve the bridge superstructure. Bridge superstructures not approved by the EIC shall be removed from the work site and replaced with a superstructure acceptable to the EIC at no additional cost to the State. Transportation, storage, and erection of the bridge superstructure shall conform to the requirements of the SCM Section 14.

Establish required leveling and plumbing measurements at mean operating temperature of structure. Make allowances for the difference between temperature at time of erection and mean temperature at which the structure will be when in service. Where parts cannot be assembled or fitted properly as a result of errors in fabrication or of deformation due to handling or transportation, such condition shall be immediately reported to the DCES along with the proposed method of correction. All repair procedures shall be approved by the DCES, and shall conform to the NYS SCM, before being applied to the pieces in question. Bent or damaged heat treated parts will be rejected.

A representative of the manufacturer of the prefabricated structure shall be present when the bridge is delivered and installation commences to ensure proper installation.

METHOD OF MEASUREMENT:

Measurement will be taken as each Prefabricated Pedestrian-Bicycle Bridge Superstructure installed and accepted by the engineer.

BASIS OF PAYMENT:

General: The unit price bid for each Prefabricated Pedestrian-Bicycle Bridge Superstructure shall include the cost of furnishing all engineering, labor, materials, paint, and equipment necessary to complete the work. The price bid shall also include, but not limited to, transportation and storage of materials; bolting and welding both in the shop and in the field.

Additional work: The requirements of Subsection 564-5.02, Additional Work, shall apply with the following modification:

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Where the phrase “price bid for structural steel” appears, it shall be replaced by “price bid for Prefabricated Pedestrian-Bicycle Superstructure”.

Note: nn denotes serialized pay item.