

Standard Specification for the Supply, Handling, Preparation, Fabrication and Delivery of Structural Steel and Vendor Supplied Bridge Superstructure Products

1.0 Applicable Design and Fabrication Standards

- 1.1 All components, materials composition and manufacturing process, including the supply or prefabricated or modular (portable bridge superstructures) products must conform to the requirements of CSA G40.20-13/G40.21-13, General Requirements for Rolled or Welded Structural Quality Steel / Structural Quality Steel.
- 1.2 All welded components identified within this request for quotation must be completed by a welding shop certified through the Canadian Welding Bureau to the requirements of CSA W47.1, Division 1 or 2.
 - 1.2.1 Proof of CSA - CWB certification to be submitted as part of this request for quotation.
- 1.3 Vendor must employ and be registered with an ISO certified Quality Management System The Registration must cover the Quality Management System for Welding and fabricating of portable bridges, structural steel and other general and custom fabrication.
 - 1.3.1 Proof of ISO accreditation to be submitted as part of this request for quotation.
- 1.4 In instances where the 'product' being supplied is a proprietary 'prefabricated bridge superstructure', the product must be clearly certified as complying with the CHBDC using the Ontario CL-625 truck loading configuration. Additionally, the following conditions are also applicable to this request for quotation:
 - 1.4.1 Vendor will be required to submit sealed General Arrangement and/or Shop Drawings verifying the products compliance with code and applicable standards.
 - 1.4.2 For all bridges located on Crown Land within Ontario, the prefabricated bridge superstructure products must be certified as complying with the 2008 Ministry of Natural Resources and Forestry "Crown Land Bridge Management Guidelines".
 - 1.4.3 For all bridges located within Ontario on roads identified within provincial regulation (provincial and municipal roadways) the vendor supplied (proprietary) superstructure products must be certified as meeting the requirements of the "2016 MTO Exceptions To The Canadian Highway Bridge Design Code, CSA S6-14, For Ontario"
- 1.5 Vendor will be required to submit sealed General Arrangement and/or Shop Drawings verifying the products compliance with the Crown Land Bridge Management Guidelines and/or the 2016 MTO Exceptions To The Canadian Highway Bridge Design Code, CSA S6-14, For Ontario.
- 1.6 Vendor supplied (proprietary) products must have minimum life expectancy of 75 years.

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2.0 Condition and Origin of Materials

- 2.1 All structural Steel to be new and will come complete with a certified mill material test report that verifies the material's chemical and physical properties and its compliance with applicable CSA/ISO/ANSI standards.
- 2.2 Reconditioned, repurposed or reused structural steel will not be accepted.
- 2.3 Unless otherwise noted, the following material properties shall be used for the supply of structural steel and structural bolts:

| DESCRIPTION | GRADES |
|--|----------------------------------|
| Girders and any material welded to girders; Any bracing member considered a primary component and bolted to the girders | CSA G40.21M-Grade 350W |
| Any bracing member considered a secondary component and bolted to the girders. | CSA G40.21M-Grade 350W |
| Bolts for weathering steel structural connections. | 22 mm diameter ASTM A325M Type 3 |

3.0 Materials Preparation, Processing and Finishes

- 3.1 To ensure proper adhesion of paint and non slip coatings, all main stringer beams to be cleaned and shot blasted in accordance with The Society for Protective Coatings standard "Joint Surface Preparation Standard SSPC-SP 6/NACE No. 3".
- 3.2 The structural steel members and vendor supplied (proprietary) products must be completely coated (minimum application of 75-100 micrometres or 3-4 mils) with a high performance universal primer.
- 3.3 On prefabricated products, the flat, exposed deck surface to have an approved anti-slip coating (minimum application of 75-100 micrometres or 3-4 mils).
- 3.4 All products to be shop assembled to ensure all components are true and square, fit properly and to avoid field assembly issues.
 - 3.4.1 The purchaser may wish to be present during shop assembly and/or may ask for photos of shop assembly to be submitted for review prior to shipment.
- 3.5 Upon completion of product fabrication the vendor will affix a bridge identification plate that will contain a serial number, weight (for transportation and handling), date of manufacture and structural capacity.
- 3.6 The vendor will supply the purchaser with a 'Certificate of Conformance' corresponding to the serial identification affixed to the proprietary 'prefabricated bridge superstructure'. The Certificate of conformance will be sealed and signed by the design Engineer and shall state the mill certificates have been reviewed and the vendor supplied (proprietary) bridge has been inspected to ensure conformity with sealed working drawings and applicable CWB standards.

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4.0 Compatibility For Use With Standard MNRF Substructures on Crown Land

- 4.1 All Vendor supplied (proprietary) bridge superstructure products must be compatible with MNRF standard substructures.
 - 4.1.1 Vendor will be required to submit sealed General Arrangement and/or Shop Drawings which includes notations that certify the prefabricated product is compatible with MNRF standard substructures.
 - 4.1.2 The purchaser may require Sealed calculations verifying the statement on the drawings related to 4.1.1
 - 4.1.3 Sealed drawings will also verify the dead weight of the superstructure and end reactions under ONT625L (design vehicle) loading conditions.

5.0 MTO Exceptions To The Canadian Highway Bridge Design Code, CSA S6-14, For Ontario

- 5.1 Vendor supplied (proprietary) bridge superstructure products to be installed on low volume roads under Provincial regulation must meet the requirements of the "2016 MTO Exceptions To The Canadian Highway Bridge Design Code, CSA S6-14, For Ontario"
 - 5.1.1 Vendor will be required to submit sealed General Arrangement and/or Shop Drawings which include notations that certify Vendor supplied (proprietary) bridge superstructure is compliant with the MTO exceptions.
 - 5.1.2 The purchaser may require Sealed calculations verifying the statement on the drawings related to 5.1.1
 - 5.1.3 Sealed drawings will also verify the dead weight of the superstructure, design deflection and end reactions under ONT625L (design vehicle) loading conditions.

6.0 Handling and Options

- 6.1 For Vendor supplied (proprietary) bridge superstructure products, each unit will come with a minimum of 4 main lifting points (2 each side, evenly located along the length of the product). Additional reinforced lifting points will also be provided at the end of each product length.
 - 6.1.1 New CSA load rated straps (with tags affixed) will be supplied by the vendor for each of the main lifting points.
- 6.2 Vendor supplied (proprietary) bridge superstructure products will come complete with secure cover plates for all exposed connection and bridge lifting openings.
- 6.3 For Vendor supplied (proprietary) bridge superstructure products, the purchaser may require bolted and/or laterally reinforced steel Guidepost pockets. All Guidepost pockets are to measure 8" x 8" and be spaced at 6' 3" O/C.
 - 6.3.1 Post pocket anchors (welded or bolted) for barrier posts must be certified to meet the lateral (impact) loading identified for either a TL1 or TL0 barrier as specified in Appendix A of the 2016 MTO Exceptions To The Canadian Highway Bridge Design Code, CSA S6-14, For Ontario.
- 6.4 Purchaser may require either a flat surface, square end or a tapered end on a vendor supplied (proprietary) prefabricated bridge superstructure product.
- 6.5 Vendor supplied (proprietary) bridge superstructure products shall be manufactured with closed ends for soil retention. The soil retention system shall either be fabricated into the bridge ends or be delivered with the bridge for field installation.

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7.0 Methodologies for Analysis

- 7.1 Over their service life, structural analysis of bridge superstructure installations will be required. To facilitate rapid and economical review and condition rating, the bridge products to be provided must be capable of being assessed using the simplified analysis procedure outlined in CSA S6-14 - Canadian Highway Bridge Design Code. Products designed using only Finite Element Analysis or other computer modeling methods may not be accepted, since:
- 7.1.1 Development of computer models by future structural evaluators will be at considerable cost;
 - 7.1.2 The property model may not be available to future structural evaluators, or
 - 7.1.3 The computer model used to confirm the compliance of the bridge superstructure design may not be compatible with modeling systems available to future structural evaluators.
 - 7.1.4 All bridges must be capable of analysis using "The Simplified method of analysis for longitudinal load effects" detailed in section 5.6 (page 237), and
 - 7.1.5 Conditions for use for the analysis of dead and live loads outlined in section 5.6.2 (page 237).
 - 7.1.6 Generally speaking, modular bridges must have an orthotropic deck (page 74) system to be considered for simplified analysis.

8.0 Summary of Deliverables

- 8.1 The following minimal submittals are required as part of this request for pricing:
- 8.1.1 Proof of CSA - CWB certification;
 - 8.1.2 Proof of ISO accreditation;
 - 8.1.3 Sealed General Arrangement and/or Shop Drawings verifying compliance of the prefabricated product with code and applicable standards;
 - 8.1.4 Pricing for product and cost of transportation; and
 - 8.1.5 Details related to shipping, delivery of the vendor supplied (proprietary) product.
- 8.2 The following minimum deliverables are required at time of purchase:
- 8.2.1 Vendor supplied (proprietary) bridge superstructure complete with load rated lifting straps, all structural bolts, cover plates and itemized assembly materials;
 - 8.2.2 Sealed General Arrangement and/or Shop Drawings of the prefabricated product with unique serial number of the vendor supplied (proprietary) product identified thereon;
 - 8.2.3 Vendor Instructions related to the purchase, including recommended maintenance procedures and schedules; and
 - 8.2.4 Sealed 'Certificate of Conformance' signed by the bridge designer.