

1 GENERAL

1.1 REFERENCE STANDARDS

- .1 American Association for State Highway and Transportation Officials (AASHTO)
 - .1 AASHTO Standard Specifications for Highway Bridges -17th Edition 2002].
- .2 ASTM International
 - .1 ASTM F3125 / F3125M-15a, Standard Specification for High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated, 120 ksi (830 MPa) and 150 ksi (1040 MPa) Minimum Tensile Strength, Inch and Metric Dimension.
- .3 CSA International
 - .1 CSA G40.20/G40.21-F13, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
 - .2 CAN/CSA G164-FM92, Hot Dip Galvanizing of Irregularly Shaped Articles.
 - .3 CAN/CSA S6-14, Canadian Highway Bridge Design Code.
 - .4 CSA S16-14, Design of Steel Structures.
 - .5 CSA S269.1-F16, Falsework for Construction Purposes.
 - .6 CSA W48-F14, Filler Metals and Allied Materials for Metal Arc Welding.
 - .7 CSA W59-F13, Welded Steel Construction, (Metal Arc Welding).

1.2 ADMINISTRATIVE REQUIREMENTS

- .1 Prior to start of Work arrange for site visit with Departmental Representative to examine existing site conditions adjacent to demolition work.
- .2 Ensure key personnel attend.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for structural steel and include product characteristics, performance criteria, physical size, finish and limitations.

- .2 Submit 1 copy of WHMIS MSDS in accordance with Section 01 35 29.06 - Health and Safety Requirements and 01 35 43.
- .3 Shop Drawings:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Ontario, Canada.
 - .2 Indicate shop and erection details including shop splices, cuts, copes, connections, holes, bearing plates, threaded fasteners, rivets and welds. Indicate welds by CSA W59, welding symbols.
 - .3 Proposed welding procedures to be stamped and approved by Canadian Welding Bureau.
 - .4 Submit description of methods, temporary bracing and strengthening, sequence of erection and type of equipment proposed for use in erecting structural steel.
- .4 Certificate
 - .1 The Contractor shall provide a certificate of conformity showing that it has verified the torque of ALL bridge connection bolts and nuts to ensure that they were properly tightened in accordance with the method submitted and approved by the Departmental Representative.

1.4 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver, store and handle in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Provide protective blocking for lifting, transportation and storing.
 - .1 Exercise care during fabrication, transportation and erection so as not to damage during work.
 - .2 Do not notch edges of members.
 - .3 Do not cause excessive stresses.
- .3 Ensure that no portion of steel comes into contact with ground.
- .4 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
 - .1 Ensure Departmental Representative has delivery schedules 7 days minimum prior to shipping.

1.5 QUALITY ASSURANCE

- .1 Preconstruction Testing:
 - .1 Provide suitable facilities and cooperate with inspection

organization in carrying out inspection and tests required.

2 PRODUCTS

2.1 MATERIALS

- .1 Structural steel: to CSA G40.20/G40.21, grade and types 350AT.
 - .1 Leave atmospheric corrosive resistant steel and connections material in unpainted, include bolts, nuts, washers and weld deposits of compatible weathering characteristics.
- .2 High strength bolts, nuts and washers: to ASTM A 325M. Bolts to ASTM A490M approved by Departmental Representative.
- .3 Anchor bolts, washers and nuts: to CSA G40.20/G40.21, grade 300W galvanized.
- .4 Hot dip galvanizing: to CAN/CSA G164, minimum zinc coating of 600 g/m².
- .5 Shrinkage compensating grout: premixed compound consisting of aggregate, cement, water reducing and plasticizing agents.

2.2 BRIDGE RAIL STEEL PLATES

- .1 Steel guide rail plates in accordance with drawing dimensions.
- .2 Holes shall be drilled in shop.
- .3 Finishing: galvanized.

2.2 SOURCE QUALITY CONTROL

- .1 Steel producer qualifications: certified in accordance with CSA G40.20/G40.21.

3 EXECUTION

3.1 EXAMINATION

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for structural steel installation in accordance with manufacturer's written instructions.
 - .1 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
 - .2 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.
 - .3 Any access device must come with an attestation signed on location by an engineer who is qualified, recognized or authorized to practice in the province of Ontario, Canada.

- .4 Tighten bolts in accordance with Contractor's method as approved by the Departmental Representative.

3.2 PREPARATION

- .1 Clean steel surfaces as directed by Departmental Representative when staining or defacing occurs.
- .2 Work near river banks or embankments in accordance with written instructions from Departmental Representative.

3.3 INSTALLATION

- .1 The Contractor shall use a temporary access device and/or implement a method giving access to the bridge while complying with applicable standards.
- .2 Do welding in accordance with CSA W59, except where specified otherwise.
 - .1 Do welding in shop unless otherwise permitted by Departmental Representative.
 - .2 Weld only at locations indicated by Departmental Representative.
- .3 High strength bolting: in accordance with CAN/CSA S6 CSA S16.
- .4 Allowable tolerance for bolt holes:
 - .1 Matching holes for bolts to line up so that bolt passes freely through assembled members at right angles to such members.
 - .2 Finish holes not more than 2 mm in diameter larger than diameter of bolt unless otherwise specified by Departmental Representative.
 - .3 Correct mispunched or misdrilled members only as directed by Departmental Representative.

3.4 PERFORMANCE

- .1 The Contractor shall tighten all bridge bolts.
- .2 The Contractor shall verify the torque of all bridge connection bolts and nuts to tighten all those that are loose and/or improperly tightened. The torqueing process must be performed in accordance with state-of-the-art procedures and with applicable standards.
- .3 The Contractor shall submit a work method to the Departmental Representative for approval at least five (5) working days before the beginning of work.
- .4 Provide for steel plates to install guide rails on the bridge as shown on drawings.
- .5 The Contractor must torque all bolts of the bracing frame, cord bolts, crossmember attachments, lower side bracings and cable tensioners connected with horizontal bracings, as well as other bolts or connections.

3.5 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Waste Management: separate waste materials for recycling in accordance with Section 01 00 10 - Generals Instructions.

END OF SECTION

1 GENERAL

1.1 REFERENCE STANDARDS

- .1 ASTM International
 - .1 ASTM A 53/A 53M-12, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
 - .2 ASTM A 307-14e1, Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
- .2 CSA Group
 - .1 CSA G40.20-F13/G40.21-F13, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
 - .2 CAN/CSA G164-FM92(R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.
 - .3 CSA S16-14, Design of Steel Structures.
 - .4 CSA W48-F14, Filler Metals and Allied Materials for Metal Arc Welding (Developed in co-operation with the Canadian Welding Bureau).
 - .5 CSA W59-F13, Welded Steel Construction (Metal Arc Welding).
- .3 Green Seal Environmental Standards (GS)
 - .1 GS-11-2011, Paints and Coatings.
- .4 ULC Standards
 - .1 UL 2768-2011, Architectural Surface Coatings.
 - .2 UL 2760-2011, Surface Coatings - Recycled Water-borne.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit 1 copy of WHMIS MSDS in accordance with Section 01 35 29.06 - Health and Safety Requirements and 01 35 43 - Environmental Procedures.
 - .1 For finishes, coatings, primers, and paints applied on site: indicate VOC concentration in g/L.

- .3 Shop Drawings:
 - .1 Submit drawings stamped and signed by an experienced professional engineer (P.Eng.) member of the Professional Engineer's of Ontario (PEO).
 - .2 Indicate materials, core thicknesses, finishes, connections, joints, method of anchorage, number of anchors, supports, reinforcement, details, and accessories.

1.3 QUALITY ASSURANCE

- .1 Test Reports: submit certified test reports showing compliance with specified performance characteristics and physical properties.
- .2 Certifications: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials off ground, in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Replace defective or damaged materials with new.

2 PRODUCTS

2.1 FABRICATION

- .1 Fabricate work square, true, straight and accurate to required size, with joints closely fitted and properly secured.
- .2 Use self-tapping shake-proof flat, round, oval, and headed screws on items requiring assembly by screws or as indicated.
- .3 Where possible, fit and shop assemble work, ready for erection.
- .4 Steel plate holes allowing to install rails to the bridge must be drilled in shop.
- .5 The Contractor shall ensure that all steel items integrated into or added to this project are galvanized in accordance with procedures recommended in applicable standards. This requirement also applies to connectors and to hardware.

- .6 Exposed welds continuous for length of each joint. File or grind exposed welds smooth and flush.

3 EXECUTION

3.1 EXAMINATION

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts acceptable for metal fabrications installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate in presence of Departmental Representative.
 - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 ERECTION - GENERAL

- .1 Do welding work in accordance with CSA W59 unless specified otherwise.
- .2 Erect metalwork square, plumb, straight, and true, accurately fitted, with tight joints and intersections.
- .3 Provide suitable means of anchorage acceptable to Departmental Representative such as dowels, anchor clips, bar anchors, expansion bolts and shields, and toggles.
- .4 Exposed fastening devices to match finish and be compatible with material through which they pass.
- .5 Supply components for work by other trades in accordance with shop drawings and schedule.
- .6 Make field connections with bolts to CSA S16.
- .7 Deliver items over for casting into concrete and building into masonry together with setting templates to appropriate location and construction personnel.
- .8 Touch-up galvanized surfaces with zinc rich primer where burned by field welding.
 - .1 Primer: maximum VOC limit 250 g/L to GS-11.

3.3 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.

- .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Waste Management: separate waste materials for recycling in accordance with Section 01 00 10 - Generals Instructions.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.4 PROTECTION

- .1 Repair damage to adjacent materials caused by metal fabrications installation.

END OF SECTION