

Part 1 General

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| 1.1 Related Requirements | .1 | Section 06 10 00 – Rough Carpentry. |
| | .2 | Section 03 30 00.01 – Cast-in-Place Concrete – Short Form |
| | .3 | Section 01 14 00 – Work Restrictions. |
| 1.2 References | .1 | ASTM International |
| | .1 | ASTM A325M-09, Standard Specification for Structural Bolts, Steel, Heat Treated 830 MPa Minimum Tensile Strength Metric. |
| | .2 | ASTM A588 / A588M – 10, Standard Specification for High-Strength Low-Alloy Structural Steel, up to 50 ksi (345 MPa) Minimum Yield Point, with Atmospheric Corrosion Resistance. |
| | .3 | ASTM A847 / A847M – 12, Standard Specification for Cold-Formed Welded and Seamless High-Strength, Low-Alloy Structural Tubing with Improved Atmospheric Corrosion Resistance |
| | .2 | CSA International |
| | .1 | CSA G40.20/G40.21-04(R2009), General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel. |
| | .2 | CAN/CSA G164-M92(R2003), Hot Dip Galvanizing of Irregularly Shaped Articles. |
| | .3 | CSA S16-09, Design of Steel Structures. |
| | .4 | CSA W48-06, Filler Metals and Allied Materials for Metal Arc Welding. |
| | .5 | CSA W59-03(R2008), Welded Steel Construction, (Metal Arc Welding). |
| 1.3 Action And Informational Submittals | .1 | Submit in accordance with Section 01 33 01 – Shop Drawings, Product Data, and Samples. |
| | .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 two copies of WHMIS MSDS in accordance with Section 01 35 33 - Health and Safety Requirements. |
| | .3 | Shop Drawings: |
| | .1 | Indicate shop and erection details including shop splices, cuts, |

- ropes, connections, holes, bearing plates, threaded fasteners, rivets and welds. Indicate welds by CSA W59, welding symbols.
- .2 Proposed welding procedures to be stamped and approved by Canadian Welding Bureau.
 - .3 Submit description of methods, temporary bracing and strengthening, sequence of erection and type of equipment proposed for use in erecting structural steel.
- 1.4 Delivery, Storage And Handling**
- .1 Deliver, store and handle materials in accordance with Section 01 61 10 - 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.
 - .1 Ensure Departmental Representative has delivery schedules 7 days minimum prior to shipping.
 - .3 Storage and Handling Requirements:
 - .1 Provide protective blocking for lifting, transportation and storing.
 - .1 Exercise care during fabrication, transportation and erection of girders, beams and trusses.
 - .2 Do not notch edges of members.
 - .3 Do not cause excessive stresses.
 - .2 Mark mass on members weighing more than 3 tonnes.
 - .3 Protect unpainted weathering steel, before erection, with waterproof covering.
 - .4 Ensure that no portion of steel comes into contact with ground.
 - .1 Replace defective or damaged materials with new.
 - .4 Packaging Waste Management: remove for reuse and return of pallets, crates, padding, packaging materials as specified in Construction Waste Management Plan in accordance with Section 01 74 19 - Waste Management and Disposal.
- 1.5 Quality Assurance**
- .1 Preconstruction Testing:
 - .1 Provide suitable facilities and cooperate with inspection organization and Departmental Representative in carrying out inspection and tests required.

- .2 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 Preparation

- .1 Clean steel surfaces as directed by Departmental Representative when staining or defacing occurs.
- .2 Verify location of substructure units, elevations of bearing seats and location of anchor bolts before erection of structural steel; report discrepancies to Departmental Representative.
- .3 Work near river banks or embankments in accordance with Section 01 14 00 - Work Restrictions.
- .4 Restrict drifting during assembly to minimum required to bring parts into position without enlarging or distorting holes, and without distorting, kinking or sharply bending metal of any unit.
 - .1 Enlarge holes if necessary by reaming only after receipt of written approval from Departmental Representative.
 - .2 Ensure reamed holes are 2 mm maximum larger than bolt size used.
- .5 Fabricate and install bearings as indicated.
- .6 Place anchor bolts at elevations and locations indicated.
 - .1 Protect holes against entry of water and foreign material.
 - .2 Provide heating and protection as directed by Departmental Representative and completely fill space around anchor bolts with grout.

3.3 Installation

- .1 Do falsework in accordance to CSA S269.1.
- .2 Do fabrication and erection of structural steel in accordance with CAN/CSA S6, Design of Highway Bridges.
- .3 Do welding in accordance with CSA W59, except where specified otherwise.
 - .1 For CSA G40.20/G40.21, grade 350AT steel, deposited weld metal to have Charpy V-Notch value not lower than that of steel.
 - .2 Do welding in shop unless otherwise permitted by Departmental Representative.
 - .3 Weld only at locations indicated.
- .4 High strength bolting: in accordance with CAN/CSA S6. Use 'turn-of-nut' tightening method.
- .5 Finish: members true to line, free from twists, bends, open joints, sharp corners and sharp edges.

- .6 Allowable tolerance for bolt holes:
- .1 Matching holes for bolts to line up so that dowel 2 mm less in diameter than hole 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 rivet or bolt unless otherwise specified by Departmental Representative.
 - .3 Centre-to-centre distance between any two holes of group to vary by not more than 1 mm from dimensioned distance between such holes.
 - .4 Centre-to-centre distance between any two groups of holes to vary not more than maximum of the following:

| Centre-to-Centre distance in metres | Tolerance in plus or minus mm |
|-------------------------------------|-------------------------------|
| less than 10 | 1 |
| 10 to 20 | 2 |
| 20 to 30 | 3 |
 - .5 Correct mispunched or misdrilled members only as directed by Departmental Representative.
- .7 Span length tolerances:
- .1 Girders and beams: plus or minus 6 mm
 - .2 Centre-to-centre of bearing stiffeners and bearing plates: plus or minus 3 mm.
- .8 Shop splices:
- .1 Use complete joint penetration groove welds finished flush.
 - .2 Details of butt joints to CSA W59.
 - .3 Use only as approved by Departmental Representative.
- .9 Shop erection:
- .1 Support each girder on its bearing points and measure and record deflection at same points indicated for measurement of camber.
 - .2 Measure deflections in plane of girder web or truss depth.
 - .3 Submit diagram to Departmental Representative showing deflection measurements for each girder or truss before delivery.
 - .4 Shop erection is not required for single span girders with no field splices.
- .10 Field splices: to approval of Departmental Representative.
- .11 Mark members in accordance with CSA G40.20/G40.21.
- .1 Do not use die stamping.
 - .2 Place marking at locations hidden when viewed from exterior

after erection when steel is to be left in unpainted condition.

- .12 Match marking: shop mark bearing assemblies and splices.

3.4 Field Quality Control

- .1 Manufacturer's Field Services:
 - .1 Obtain written report from manufacturer verifying compliance of Work, in handling, installing, protecting and cleaning of steel.
 - .2 Submit manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.
 - .3 Ensure manufacturer's representative is present before installation, during critical periods of installation and during construction of field joints and testing.
 - .4 Schedule site visits:
 - .1 After delivery and storage of products, and when preparatory Work, or other Work, on which the Work of this Section depends, is complete but before installation begins.
 - .2 Twice during progress of Work at 25% and 60% complete.
 - .3 Upon completion of the Work, after cleaning is carried out.

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 74 19 - Waste Management and Disposal.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION