

Part 1 General

1.1 DESCRIPTION

- .1 The work under this section will include the fabrication, supply and installation of all anchor bolts, machine bolts and all other miscellaneous bolts, nuts, washers, steel angle, plates and metal parts required to complete the work.
- .2 This section also includes supply and installation of the steel wale support frame for the timber fenders, the steel handrail at each end of the wharf and the mooring cleats.
- .3 This section also includes supply only of the approach slab edge protection angle.

1.2 RELATED WORK SPECIFIED ELSEWHERE

- .1 Steel Pipe Piles: Section 31 62 17
- .2 Dimension Timber: Section 06 10 10
- .3 Cast-in-Place Concrete: Section 03 30 00

1.3 REFERENCE STANDARDS

- .1 Do welding work to CSA W59 unless specified otherwise. Submit welder's certificate for review by Departmental Representative.
- .2 Do underwater welding to American Welding Society Standard AWS D3.6M, Class B.

1.4 MEASUREMENT FOR PAYMENT

- .1 With the exceptions of items 1.4.2, 1.4.3, 1.4.4 and 1.4.5 no separate payment shall be made for anchor bolts, machine bolts, ladder rungs, holdfasts, nuts and washers, pipe sleeves, inserts, steel strap, steel sections, angles, access opening assemblies, resin anchors, wharf guide rail posts, etc. Include cost of these items in items of work where applicable.
- .2 The galvanized steel support frame for timber fenders shall be measured as a lump sum. This price is to include all steel sections, plates angles, concrete inserts, rubber fender elements, UHMWPE pads, galvanizing, etc. as required to complete installation.
- .3 Mooring Cleats: to be measured for payment by the number of units acceptably supplied and installed including anchor bolts, surface preparation and painting.
- .4 Edge protection angle supplied to site will be measured by the lineal metre.
- .5 Protection Bollards: To be measured for payment by the number of units acceptably supplied and installed including galvanizing, reinforcing and concrete fill.

Part 2 Products

2.1 MATERIALS

- .1 Steel sections, bars, anchor dowels, plates and washers: to CSA G40.21, Type 300W.
- .2 Welding materials: to CSA W59.
- .3 Holdfasts, ladder rungs: to ASTM A307.
- .4 High Strength Bolts, Nuts and Washers: to ASTM A325-04, galvanized.
- .5 Machine bolts, anchor bolts, nuts washers: to ASTM F1554 Grade 36.
- .6 Cast Iron: to ASTM A48.
- .7 Steel Pipe: to ASTM-A53.
- .8 Resin anchorage cartridge: epoxy resin cartridge providing 120 kN ultimate tensile strength for size and depth of embedment shown on drawings.
- .9 Machine bolts:
 - .1 Machine bolts will have standard heads, nuts, and threads, and when in position will be of sufficient length to permit a full nut and two washers. Threads shall be the Coarse Thread Series as specified in the latest issue of ANSI B1-1 having a Class 2A tolerance.
 - .2 Standard cast iron washers suitable for the sizes of the bolts specified will be placed under the heads and nuts of all machine bolts bearing on timber surfaces unless noted otherwise on drawings. Ogee washers to Timber Design Manual issued by Laminated Timber Institute of Canada and as follows: ogee washers to be cast iron free from injurious defects or impurities.
 - .3 As an alternate to ogee washers, standard plate washers can be used. The washer is to be three times bolt diameter and a minimum thickness of 8 mm unless noted otherwise.
- .10 Galvanizing: hot dipped galvanizing with minimum zinc coating of 610 g/m² to CSA G164 latest edition.
- .11 Galvanized primer: to CGSB 1-GP-183M.
- .12 Mooring Cleats: cast iron cleats to ASTM A48 of the type shown on the drawings.
- .13 Mooring Cleat Paint:

- .1 Primer coat: Inorganic zinc to CGSB standard 1-GP-171M (min. 85% zinc in dry film);
 - .2 Intermediate coat: High build epoxy polyamide to CGSB standard 1-GP-193Ma;
 - .3 Top coat: High build epoxy polyamide to CGSB standard 1-GP-193Ma;
 - .4 All paint material to be compatible with surface to which it is being applied.
 - .5 Colour of intermediate and top coat of mooring cleats to be orange.
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- .14 Shear connector studs: End welded headed (H studs) to CAN/CSA-S16-01 standards. Minimum $F_u = 415$ MPa. Studs welded to embedded parts to be of the size shown on the drawings, to CSA W59-03, Clause 5.5.6, Appendix H.
 - .15 UHMWPE- Ultra High Molecular Weight Polyethylene (UHMWPE) as manufactured by Trelleborg and distributed by Polemar or equivalent.
 - .16 DD Fenders: Standard extruded marine fender units as manufactured by Trelleborg and distributed by Polemar or equivalent.
 - .17 Hollow Structural Sections (HSS): to ASTM A500, Grade C.
 - .18 Expansion Bolts: as specified on drawings.

2.2 FABRICATION

- .1 The fabrication of all structural steel shall conform to the requirements of CSA S16-01.
- .2 Fabricate steel parts based on field measurements to ensure proper fit in work and no alterations will be required after hot-dip galvanizing.
- .3 All steel members and assembled units shall be hot dip galvanized to CSA G164 (610 g/m²). All welded units are to be completed, prior to the units being hot dip galvanized. Pre-assembly of the framework shall be carried out to ensure no cutting, welding, or other fabrication will be necessary subsequent to hot dip galvanizing.

Part 3 Execution

3.1 ERECTION

- .1 Erect metalwork square, plumb, straight, and true, accurately fitted, with tight joints and intersections.
- .2 Provide suitable and acceptable means of anchorage, such as dowels, anchor clips, bar anchors, bolts and washers, etc., as shown on the drawings.
- .3 Touch-up galvanized surfaces with zinc primer where damaged.
- .4 All work to conform to CSA S16-01.

3.2 STEEL TO STEEL CONNECTIONS

- .1 All steel to steel bolted connections to have high strength steel bolts.
- .2 All high strength bolts to be 19 mm minimum diameter unless noted otherwise on the drawings.

3.3 INSTALLATION OF MACHINE BOLTS, SPIKES AND WASHERS

- .1 Machine bolts will have standard heads, nuts, and threads, and when in position will be of sufficient length to permit a full nut and two washers. Holes for machine bolts will be bored to the same diameter as that of the bolts.
- .2 Machine bolts will be placed in the work with their heads on the outside. The heads of machine bolts that interfere with succeeding parts of the work being placed, or where directed by the Departmental Representative, or shown on the drawings, will be countersunk.
- .3 Standard cast iron washers or steel washers of the sizes indicated will be placed under the heads and nuts of all machine bolts bearing on timber surfaces, except where specified otherwise.
- .4 Where indicated, use steel washers of size shown.
- .5 Holes for anchor dowels will be bored 1.5 mm smaller diameter than anchor dowel.

3.4 MOORING CLEATS

- .1 Set anchor bolt sleeves to the required locations for installation of cleats. Heads of bolts are to be installed on top.
- .2 Paint mooring cleats in accordance with Paragraph 3.6.
- .3 Install cleats at the locations indicated on the drawings.

3.5 EDGE PROTECTION ANGLE

- .1 Fabricate edge protection angle and supply to Section 03 30 00 for installation.

3.6 PROTECTION

- .1 Take necessary care in the handling, packing and shipping of all galvanized steel members to prevent damage to the galvanized coating. Evidence of damage to the galvanized members due to mishandling or lack of adequate protection shall be cause for rejection of the damaged members.

3.7 PAINTING OF MOORING CLEATS

- .1 Surface preparation:

- .1 Sand or grit blast in accordance with SSPC-SP5.
 - .2 When sandblasting is completed remove dust by brush or vacuum prior to painting.
 - .3 Apply first coating of paint same day as sand or grit blasting is completed.
 - .4 Remove oil, grease or organic matter, with approved solvents or detergents prior to painting.
- .2 Application:
- .1 Apply three coatings, each in accordance with manufacturer's recommendations.
 - .2 First coat, inorganic zinc primer applied to average .075 mm dry-film thickness and minimum .065 mm thickness.
 - .3 Second and third coatings, to an average single coat dry-film thickness of .18 mm. Ensure adhesion between coats.
 - .4 Coatings to be free from sags and runs.

END OF SECTION