

## **PART 1 - GENERAL**

### **1.1 DESCRIPTION**

- .1 This section specifies requirements for supply and installation of structural timber as follows:
  - .1 Supply and installation of treated dimension timber wheelguard, wheelguard blocking, coping, and associated painting.
  - .2 Supply and installation of untreated dimension hardwood timber fenders.
  - .3 Supply and installation of untreated timber hardwood ladders, ladder handgrips, and associated hardware and painting.

### **1.2 RELATED WORK**

- .1 Section 02 41 16 - Sitework Demolition & Removal.
- .2 Section 03 30 00 - Cast-in-Place Concrete.
- .3 Section 06 05 73 - Wood Treatment.
- .4 Section 31 53 13 - Timber Cribwork.

### **1.3 REFERENCES**

- .1 American Society for Testing and Materials (ASTM International).
  - .1 ASTM A307-07b, Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile.
  - .2 ASTM A123/A123M-09, Zinc (Hot-Dip Galvanized) coatings on Iron and Steel Products.
- .2 American Wood-Preserver's Association (AWPA).
  - .1 AWPA M4-06, Standard for the Care of Preservation - Treated Wood Products.
- .3 Canadian Standards Association (CSA International).
  - .1 CSA B111-1974 (R2003), Wire Nails, Spikes and Staples.
  - .2 CAN/CSA-G40.21-04, General Requirements for Rolled or Welded Structural Quality Steel/Structural Steel.
  - .2 CAN/CSA-O80 Series-97 (R2007), Wood Preservation.
- .4 Canadian Wood Council.
  - .1 Wood Design Manual.
- .5 National Lumber Grades Authority (NLGA).
  - .1 Standard Grading Rules for Canadian Lumber 2000 edition.

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**1.4 DIMENSIONS**

- .1 Check existing site dimensions and report discrepancies to Departmental Representative before commencing work.

**1.5 PROTECTION**

- .1 Avoid dropping, bruising or breaking of wood fibres.
- .2 Avoid breaking surfaces of treated timber.
- .3 Do not damage surfaces of treated timber by boring holes or driving nails or spikes into them to support temporary material or staging.
- .4 Treat cuts, breaks or abrasions on surfaces of treated timber with three (3) brush coats of preservative to CSA O80.
- .5 Treat bolt holes, cutoffs and field cuts in accordance with CSA O80.

**1.6 DELIVERY AND STORAGE**

- .1 Store timber horizontally, evenly supported and open piled to permit air circulation when stored for prolonged period.
- .2 When handling long timber, provide support at sufficient number of points, properly located to prevent damage due to excessive bending.
- .3 Handle treated timber with hemp, manila or sisal rope slings or other approved means of support that will not damage surface.
- .4 Do not use sharp pointed tools to handle treated timber. Any timber so handled will be rejected and be replaced at Contractor's expense.

**1.7 MEASUREMENT FOR PAYMENT**

- .1 Structural Timber:
  - .1 Treated Dimension Timber - The supply and installation of treated dimension timber for coping, wheelguard and wheelguard blocking, will be measured by the cubic metre (m<sup>3</sup>) of timber secured in place, including all timber, fastenings, plant, material, equipment, labour and painting of the wheelguard and wheelguard blocking, and wheelguard bolt hole levelling sealant.

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**1.7 MEASUREMENT FOR PAYMENT**  
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- .1 (cont'd)
- .2 Untreated Dimension Hardwood Timber - The supply and installation of untreated dimension hardwood timber for hardwood fenders, and ladders as specified will be measured by the cubic metre (m<sup>3</sup>) of timber secured in place, including all timber, fastenings, plant, material, equipment, labour, galvanized ladder rungs, galvanized wheelguard hand grips and painting of complete ladder uprights.
- .2 Payment for all dimension timber will be made on volume calculated from nominal sizes as indicated on drawing and specified, eg. 200 mm x 200 mm.

**PART 2 - PRODUCTS**

**2.1 TIMBER MATERIALS**

- .1 Timber: Use timber graded and stamped in accordance with applicable grading rules and standards of associations or agencies approved to grade lumber by Canadian Lumber Standards Administration Board of CSA.
- .2 Species:
  - .1 Wheelguard, wheelguard blocks, coping, wales, wale supports: Hemlock or Douglas Fir (CCA or ACA Treated).
  - .2 Hardwood fenders and ladder uprights: Birch or Maple (Untreated).
- .3 Grade: No. 1 Structural Grade.
- .4 Grading Authority: NLGA
- .5 Preservative Treatment: Treat to CSA O80, for coastal waters and Section 06 05 73. Timbers will be treated in the lengths required. Unnecessary field cutting will not be permitted.
- .6 Primer: Alkyd undercoat, exterior oil wood primer, similar to Pittsburgh 17-941NFC.
- .7 Paint: Alkyd/Oil Resin paint similar to Pittsburgh Paints "Safety Yellow" Product ID 7-808c. Paint to conform to CAN/CGSB-1.61-2004.

**2.2 MISCELLANEOUS STEEL AND FASTENINGS**

- .1 Miscellaneous Steel: All steel and fastenings to be CSA G40.21, Grade 300W, galvanized.

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**2.2 MISCELLANEOUS STEEL AND FASTENINGS**  
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- .2 Nails and Spikes: to CSA B111.
- .3 Machine Bolts and Nuts: to ASTM A307. All machine bolts and nuts to be galvanized.
- .4 Drift Bolts: to G40.21 from round stock button head and diamond or wedge point. All drift bolts to be galvanized.
- .5 Washers:
  - .1 Round plate washers: for 16 mm machine bolts will be 76 mm diameter by 6.4 mm thick, for 19 mm machine bolts will be 79 mm diameter by 7.9 mm thick, and have a hole diameter of 18 mm and 21 mm respectively. Washers to conform to G40.21. All washers to be galvanized.
  - .2 Plain Washers: to CSA B19.1, Class 2. All washers to be galvanized.
  - .3 Square washers are not permitted.
- .6 Galvanizing: will conform to ASTM A123/A123M-09.
- .7 Ladder Rungs and Hand Grips: to CSA G40.21, galvanized.
- .8 Lag Screws: to CSA B34 and be galvanized. Lag screw washers will conform to CSA B19.1.
- .9 Welding: in accordance with CSA Standards. The welders will be qualified to the appropriate classification as stated in CSA W47.1 "Certification of Companies for Fusion Welding of Steel Structures". Conform welding to all appropriate requirements and recommendations of CSA Standard W59 "Welded Steel Construction" (Metal Arc Welding).

**2.3 ANCHOR BOLTING SYSTEM**

- .1 Anchor bolts, where required, for anchoring coping and/or wheelguard to existing concrete deck will be 19 mm diameter resin cartridge anchors.
- .2 Submit shop drawings and manufacturer's specification for anchor bolts for approval.
- .3 Anchor bolts to be installed with strict adherence to manufacturer's specifications.

### **PART 3 - EXECUTION**

#### **3.1 PREPARATION**

- .1 Install structural timbers to details shown on drawings or as specified.

#### **3.2 WHEELGUARD AND WHEELGUARD BLOCKING**

- .1 Wheelguard timbers to be 200 mm by 200 mm and will be in minimum lengths of 6100 mm or as specially required with butt joints made over wheelguard blocking sized as shown on the drawings. Wheelguard timbers to be chamfered on top, 25 mm on each horizontal and vertical surface, as detailed on drawings.
- .2 Wheelguard blocks will be installed at 1500 mm on centre as support for wheelguard.
- .3 Wheelguard will be secured through wheelguard blocking, coping and two (2) crib or wale timbers below with two (2) 25 mm diameter drift bolts as shown on detail drawings.
- .4 The installation of wheelguard and wheelguard blocking as per detail.

#### **3.3 COPING**

- .1 Install 200 mm x 250 mm treated timber coping in minimum lengths of 7620 mm around perimeter of wharf as directed.
- .2 Secure coping to timber below with 19 mm diameter drift bolts spaced at 1500 mm on centre and to concrete deck with 19 mm diameter by 600 mm long machine bolts spaced 1500 mm on centre. The machine bolts will be countersunk on the exterior face; the nut will be installed on the outside and each bolt will be equipped with two (2) washers.

#### **3.4 FENDERS**

- .1 Horizontal Fenders:
  - .1 Install 100 x 150 mm hardwood timber horizontal fenders in minimum length of 4880 mm around top perimeter of wharf, as shown on drawings. Stagger joints in coping from joints in horizontal fender. Additional 100 x 150 mm hardwood timber horizontal fender to be installed along face of wharf at locations shown on the drawings, leaving 150 mm space.
  - .2 Top horizontal fender to be chamfered 25 mm on top, as shown on the drawings.
  - .3 Secure horizontal fender to coping or wale with 16 mm diameter lag screws, minimum of four (4) lag screws per fender piece, spaced at 1500 mm on centre. All lag screws will be countersunk on the exterior face.

**PART 3 - EXECUTION**  
**(CONT'D)**

**3.4 FENDERS**  
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- .2 Vertical Fenders:
  - .1 Install 100 x 150 mm hardwood timber fenders spaced at 300 mm on centre along face of the wharf, except for exterior corners where fenders will be closed face for 1500 mm as directed.
  - .2 Secure each fender with four (4) each 16 mm diameter lag screws evenly spaced from L.N.T. to underside of horizontal fender. All lag screws to be countersunk.
  - .3 All fenders to extend from underside of horizontal fender to 300 mm below L.N.T.
  - .4 Do not notch or cut fenders to provide straight wharf face. Continuous blocking will be installed behind fenders to provide straight face.

**3.5 LADDERS**

- .1 Install ladders on face of wharf in locations shown on drawings or as designated by Departmental Representative.
- .2 150 x 200 mm ladder uprights installed from 1100 mm below L.N.T. to wheelguard elevation. Uprights to be bevelled at 45° on top and painted as specified.
- .3 Construction details and steel hand-grips as per detail.
- .4 Secure each upright with four (4) evenly spaced 19 mm diameter galvanized lag screws. All lag screws to be countersunk.

**3.6 PAINTING**

- .1 Paint wheelguard, wheelguard blocking, and complete ladder uprights as directed by the Departmental Representative.
- .2 Use one (1) coat of exterior oil wood primer and two (2) coats of alkyd/oil resin paint as specified. Paint materials for each coat to be product of a single manufacturer as specified. Ensure previous coat of primer or paint is dry before second coat is applied.

**PART 3 - EXECUTION**  
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**3.7 BOLT SIZING**

- .1 Drift Bolts: Drift bolts used in the work will have a length equal to thickness of timbers being fastened less 50 mm unless otherwise specified. Holes for drift bolts will be bored 2 mm smaller diameter than size of steel used and for full length of bolts.
- .2 Machine Bolts: Machine bolts used in work will have a length equal to thickness of timbers being fastened plus thickness of washers plus 40 mm. Where bolts are countersunk, the length will be as above less depth of countersinking. Machine bolts will be threaded for 64 mm. Holes will be drilled same diameter as bolt.
- .3 Lag Screws: Lag screws used in work will have a length equal to thickness of timbers being fastened less 50 mm and the depth of countersinking. Holes for lag screws to be drilled same diameter as shank for shank portion of screw and to inside thread diameter for threaded portion of screw and for full length. All lag screws will be countersunk, screwed, not driven in place and will have one (1) standard washer under the head.
- .4 Countersink drift bolts and/or lag screws in hardwood fenders and ladders to the extent that the minimum distance from face of timber to head of bolt is 12 mm.
- .5 Bolting of timbers without properly drilled bolt holes will not be accepted.