

## SECTION 470 TIMBER STRUCTURES

### 470-1 Description.

Furnish and erect timber into various structures.

### 470-2 Materials.

Meet the following requirements:

Timber.....	Section 952
Preservative.....	Section 955

Use treated or untreated timber as specified in the plans.

### 470-3 Treated Timber.

**470-3.1 Handling:** Handle treated timber with rope slings, without sudden dropping, breaking of outer fibers, bruising, or penetration of the surface with tools. Do not use cant dogs, hooks, or pike poles.

**470-3.2 Cutting and Framing:** Before treatment, cut and frame all timbers which are shown by the plans to be furnished in special lengths or framed to detailed dimensions. Limit the cutting of treated timber to minor fitting which might be necessary and that is authorized by the Engineer. For all places where the surface is broken, by cutting or otherwise, thoroughly coat with the preservatives and by the methods specified in AWP A M4, Sections 1.512, 1.52, 1.521, and 1.522.

**470-3.3 Bolt Holes:** The Contractor may bore bolt holes in the field. Pour hot preservative oil into the bolt holes before the insertion of the bolts. Coat the entire surface of the holes with the preservative.

### 470-4 Untreated Timber.

In structures of untreated timber, thoroughly coat the following surfaces with a thick coat of hot tar, hot asphalt, or hot creosote before assembly:

- (a) heads of piles; ends, tops, and all contact surfaces of pile caps.
- (b) floor beams and stringer ends.
- (c) joints and all contact surfaces of truss members, laterals, and braces.
- (d) back face of bulkheads and all other timber to be in contact with earth.

### 470-5 Pile Caps.

Ensure that pile caps have full even bearing on all piles in the bent, and secure them to each pile by a 3/4 inch [20 mm] diameter drift bolt extending at least 9 inches [225 mm] into the pile. Where so shown in the plans, cover the tops and ends of pile caps with 10 ounce [3 kg/m<sup>2</sup>], minimum weight, copper sheet meeting the requirements of ASTM B 370.

### 470-6 Floors.

Attach the planks to each joist or nailing strip with at least two 8 inch [200 mm] nails for 3 inch [64 mm] planks, or two 10 inch [250 mm] nails for 4 inch [89 mm] planks. Use nails that are at least 1/4 inch [6 mm] in diameter. For treated timber floors where a bituminous wearing surface is to be applied, lay the planks with the best side up and with adjacent edges in contact. For untreated timber floors, lay the planks heart side down with 1/4 inch [6 mm] openings between adjacent planks. Grade the planks as to thickness before laying, and lay the planks so that no two adjacent planks vary in thickness more than 1/8 inch [3 mm]. Cut the floor to straight lines along the side of the roadway and walkway.

### 470-7 Framing.

Cut and frame truss and bent timbers to a close fit in such manner that they will have even bearing over the entire contact surface of the joint. Do not perform blocking or shimming of any kind in making the joints. The Engineer will not accept open joints.

**470-8 Holes for Bolts, Dowels, Rods, and Lag Screws.**

Bore holes to the diameters shown in the table.

Hole use	Hole diameter
drift bolts and dowels	1/16 inch [1.6 mm] less in diameter than the bolt or dowel to be used
machine bolts	same diameter as the bolt
rods	1/16 inch [1.6 mm] greater in diameter than the rod
Lag screws	not larger than the body of the screw at the base of the thread

**470-9 Stringers.**

The Contractor may use butt joints for outside stringers, but shall frame interior stringers to bear over the full width of floor beam or cap at each end. Separate the ends at least 1/2 inch [13 mm] to allow circulation of air, and securely fasten the ends to the timber on which they rest.

**470-10 Railings.**

Construct railings of untreated dressed lumber. Paint railings with two coats of paint meeting the requirements of 971-9.1 for Code W-1.

**470-11 Hardware.**

**470-11.1 General:** Use hardware, including bolts, driftpins, dowels, rods, nuts, washers, spikes, nails and all similar incidental metal items, necessary to complete the work in accordance with the details shown in the plans. Use common wire nails as commercially manufactured. Use ogee washers of cast or malleable iron. The Contractor may use other hardware of steel, iron, or any similar material ordinarily used in the manufacture of such articles.

**470-11.2 Bolts:** Use bolts of the sizes shown in the plans with square heads and nuts and with screw threads that make close fits in the nuts. Upon completion of the installation, check all nuts for tightness, and cut off protruding bolt ends so that not more than 1/4 inch [6 mm] extends beyond the nut.

**470-11.3 Galvanizing:** Use galvanized bolts, nuts, and washers. Refer to the plans for other articles that may require galvanizing. Meet the galvanizing requirements of ASTM A 153.

**470-11.4 Testing:** The Engineer will not require laboratory tests other than tests of the galvanizing, but will inspect and approve of hardware for quality of manufacture and accuracy of size.

**470-12 Countersinking.**

Perform countersinking wherever the heads of screws or bolts would otherwise interfere with the assembly of the work. Fill recesses formed by countersinking with hot asphalt.

**470-13 Method of Measurement.**

**470-13.1 General:** The quantity to be paid for will be the plan quantity, in feet board measure [cubic meters], of such timber actually incorporated in and forming a part of the completed structure.

**470-13.2 Method of Calculation:** For calculating the quantity of timber, the width and thickness will be taken as the actual sizes shown in the plans or ordered by the Engineer. Where special sizing is required, the width and thickness to be used will be that of the smallest commercial size from which the special piece could be cut. Lengths to be used in the calculations will be the overall lengths of the pieces as shown in the plans, except that, where the lengths actually incorporated in the structure are less than

the lengths shown in the plans, the lengths actually incorporated will be used in the calculations. Deductions will not be made for copes, scarfs, or crownings.

**470-14 Basis of Payment.**

Prices and payments will be full compensation for all the work specified in this Section, including all copper covering over pile heads, caps, etc., as shown in the plans, all hardware except such plates, lag screws, and other metal parts as may be shown in the plans to be paid for as structural steel and all paint materials and all excavation, painting, and incidentals necessary to complete the work.

Payment will be made under:

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|-------------------|---|
| Item No. 470- 1-  | Treated Structural Timber - per Thousand Board Measure  |
| Item No. 2470- 1- | Treated Structural Timber - per cubic meter.            |
| Item No. 470- 2-  | Untreated Structural Timber- per Thousand Board Measure |
| Item No. 2470- 2- | Untreated Structural Timber - per cubic meter.          |