

ITEM 456

TIMBER STRUCTURES

- 456.1 Description. This Item shall govern for the construction of all bridges, bulkheads, retaining walls, piers, bents, fenders or any portion thereof which involves the use of timber materials whether treated or untreated. This Item shall not include temporary construction, which is not part of the finished work.
- 456.2 Materials. All materials used in the construction of timber structures shall conform to the requirements of the Item 455 "Timber for Structures".
- 456.3 Preservative Treatment. Lumber and piling for Timber Structures shall be "Treated" or "Untreated" as shown on the plans. "Treated" lumber and piling shall be impregnated with the quantity of preservative as shown on the plans and in the manner specified in the Item 457 "Timber Preservative and Treatment" and other pertinent specifications.
- 456.4 Storage of Materials. Lumber and timber at the project work site shall be stored in the following manner:
- A. Untreated material shall be open-stacked at least 12 inches above the ground surface to prevent warping. It shall be protected from the weather by suitable covering.
 - B. Treated timber shall be close-stacked and piled to shed water and prevent warping.
- 456.5 Handling. Timber shall be carefully handled without sudden dropping, breaking of outer fibers or bruising. The surface of treated timbers shall not be penetrated with tools. Treated timbers shall be handled with rope slings or other approved methods. Use of cant dogs, hooks, or pike poles shall not be permitted.
- 456.6 Workmanship. Workmanship shall be first class throughout. Nails and spikes shall be driven with sufficient force to set the heads flush with the surface of the wood. Framing shall be true and exact. Deep hammer marks in wood surfaces shall be considered evidence of poor workmanship and sufficient cause for the removal of the workman causing them.
- All lumber and timber shall be accurately cut and framed to a close fit, in such a manner that the joints will have even bearing. Mortises shall be true to size for their full depth and shall make a snug fit.
- Countersinking shall be done whenever smooth faces are required.
- 456.7 Framed Bents. Mud sills shall be of treated or untreated timber and shall be of the material shown on the plans. Concrete pedestals for the support

of framed bents shall be carefully finished so that the sills or posts will take even bearing on them.

456.8 Sills. Sills shall have true and even bearing on piling or pedestals. When possible, all earth shall be removed from around sills so that there will be free air circulation around them.

456.9 Post Covers. The tops of posts in framed bents, if untreated material, shall be given a thick coat of hot tar, hot asphaltum or hot coal tar and covered with a sheet of roofing felt weighing 55 pounds per 100 square feet or 20 gage galvanized metal as indicated on the plan. The cover shall measure at least 6 inches more in each dimension than the diameter or side of the post. The edges shall be bent down over the post and fastened with large headed galvanized nails.

For treated materials, the top shall be thoroughly saturated with hot creosote oil. They shall then be covered with a coat of hot tar pitch over which shall be placed a cover as specified for untreated material.

456.10 Caps. Timber caps shall be placed so as to secure an even and uniform bearing over the tops of the supporting posts or piling and to secure an even alignment of their ends. All caps shall be secured to the posts or piling in accordance with the details shown on the plans. No shimming on tops of piling or posts will be permitted.

456.11 Bracing. Sway bracing shall be placed diagonally on bents and connected to the cap and all piling or posts as shown on the plans.

Sash bracing and longitudinal bracing shall be placed and fastened to the piling or posts as shown on the plans.

Bracing shall be fitted to the bents in a satisfactory manner without dapping or cutting the posts or piling.

456.12 Stringers. Stringers shall be sized to uniform depth at bearings and shall be placed in a position so that knots near the edges will be in the top portions of the stringers.

Stringers may have butt joints or lapped joints as shown on the plans. The lapped ends of untreated stringers shall be separated at least 1/2 inch to permit the circulation of air. When stringers are two panels in length, adjacent stringers shall be lapped at alternate bents. All stringers shall be securely fastened by bolts as shown on the plans.

456.13 Bridging. Diaphragms between stringers shall be given two coats of hot creosote oil before placing.

456.14 Flooring. Plank for single plank floors shall be placed with the heart side down with 1/4 inch opening between them for seasoned materials and with tight joints for unseasoned material. Unless otherwise provided, each plank shall be spiked to each stringer with not less than two spikes, the

length of which shall be at least 3 inches greater than the thickness of the plank. The ends of the plank shall be cut off on a straight line parallel with the centerline of the roadway. The planks shall be carefully selected according to thickness and so laid that no two adjacent planks shall vary in thickness more than 1/8 inch.

When double plank floors are indicated on the plans, the top course shall be laid diagonal or parallel to the centerline of the roadway as shown, and unless otherwise provided, each plank shall be spiked to the lower course at intervals of not more than two feet with two spikes, the length of which shall be at least 3 inches greater than the thickness of the plank. Joints shall be staggered at least 3 feet. Where the planks are placed parallel to or diagonally with the centerline of the roadway, special care shall be exercised to securely fasten the ends, and at the ends of the bridge, the ends of the plank shall be cut to a straight line parallel to the end of the bridge.

For laminated floors, the strips shall be placed on edge and at right angles to the center line of the roadway. The strips shall be full lengths. Random lengths will not be permitted. Unless otherwise provided, each strip shall be spiked to the adjacent strip at intervals of 2 feet, the spikes being staggered 8 inches in adjacent strips. The spikes shall be of sufficient length to pass completely through two adjacent strips and approximately half way through the third strip. In addition, the strips shall be toenailed to the stringer with spikes not less than 4 inches in length. The toenailing of successive strips shall be staggered so that the spacing of spikes along each stringer shall be not less than 6 inches. For strips 3 inches in thickness, spikes driven vertically through the strips and extending into the stringer not less than 3 inches may be substituted for toenailing.

456.15 Cutting, Framing Holes for Bolts, Dowels, Rods and Lag Screws. All cutting, framing and boring of treated timbers shall be done before treatment insofar as practicable. Holes for round drift bolts and dowels shall be bored with a bit 1/16 inch less than in diameter than the bolts or dowels to be used. The diameter of holes for square drift bolts or dowels shall be equal to the least dimension of the bolt or dowel.

Holes for machine bolts shall be bored with a bit of the same diameter as the bolt.

Holes for rods shall be bored with a bit 1/16 inch greater in diameter than the rod.

Holes for lag screws shall be bored with a bit no larger than the root of the thread and shall be 1/2 inch deeper than the penetration of the lag screws.

All cuts, abrasions, holes and holes from removal of nails and spikes which penetrate the treated zone in treated lumber and timber shall be

field treated in accordance with AWPA Standard M4 specified in Item 457 "Timber Preservative and Treatment".

456.16 Painting. After completion of the structure, all bolt heads, threads, nuts, washers and exposed portions of bolts shall be given a thorough coating of hot asphalt.

For Untreated timber structures, the following surfaces shall be thoroughly coated with a thick coat of red lead and oil, hot tar, hot asphaltum or hot coal tar creosote before assembling: the ends, tops and all contact surfaces of pile caps; floor beams and stringer ends; joints and all contact surfaces of truss members; and lateral braces. The back face of bulkheads and all other timber in contact with earth, shall be thoroughly coated with one of the materials specified above.

All bolts passing through non-resinous wood shall be painted with two coats of red lead and oil.

456.17 Measurement & Payment. No direct compensation will be made for "Timber Structures". The work performed under this Item, shall be incidental to the Item 455 "Timber for Structures".

There are no line code(s), description(s), or unit(s) for this Item.

NOTE: This Item requires other Standard Specifications
Item 455 "Timber for Structures"
Item 457 "Timber Preservative and Treatment"

END OF ITEM 456