ORIGINATION FORM

THE INFORMATION BELOW IS TO BE PROVIDED BY THE ORIGINATOR

☐ Modify Specification _____470_____.
Section/File number

☐ New Section _____.
Section number

Subject: Timber Structures

Origination date: July 26, 2007

Originator: Tom Malerk
Office/Phone: State materials Office (352) 625-6620
Email address/ tom.malerk@dot.state.fl.us
Userid: RT820TM

Problem statement: The use of alternative wood treatment preservatives has resulted in intensified corrosiveness to steel fasteners, connectors, and framing. Indications are that wood treated with CCA is approximately two times as corrosive as untreated wood and the alternative preservatives are considerably more than twice as corrosive to metal fasteners as wood treated with CCA. The increased deterioration rate of the steel fasteners and connectors potentially could reduce the life expectancy of a structure by a factor of four.

Information source: Ghulam Mujtaba (352) 625 -6685.
ARCH Company technical report dated June 6, 2007 and Structural Engineer magazine, dated April 2004.
Rodney Powers, Assistant State Corrosion Engineer
Brandon Hollier of Arch Treatment Technologies, Inc

Background data: Section 955 allows the use of CCA and other alternative wood treatment preservatives. The modified 470 specification addresses the compatibility of the fasteners and connectors with the chemical preservatives that are used in the treatment of wood structures.

Due to Florida high humidity environmental condition, the use of untreated timber will not be allowed in the permanent structures.

Recommended Usage Note:

Florida Department of Transportation

CHARLIE CRIST
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605 Suwannee Street
Tallahassee, FL 32399-0450

STEPHANIE KOPELOUSOS
SECRETARY

M E M O R A N D U M

DATE: September 13, 2007

TO: Specification Review Distribution List

FROM: Duane F. Brautigam, P.E., State Specifications Engineer

SUBJECT: Proposed Specifications Change: **4700000**

In accordance with Specification Development Procedures, we are sending you a copy of a proposed new specification change for Timber Structures.

This change was proposed by Tom Malerk of the State Materials Office to eliminate the use of untreated timber for permanent structures, and to specify the type of hardware to be used in the construction of timber structures to reduce corrosiveness.

Please share this proposal with others within your responsibility. Review comments are due within four weeks and should be sent to Mail Station 75 or to my attention via e-mail at SP965DB or duane.brautigam@dot.state.fl.us. Comments received after October 12, 2007 may not be considered. Your input is encouraged.

DFB/dr

Attachment

COMMENTS: _____

_____

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Submitted by: _____ Phone #: _____

TIMBER STRUCTURES.
(REV 9-06-07)

SECTION 470 (Pages 568 – 570) is deleted and the following substituted:

SECTION 470
TIMBER STRUCTURES

470-1 Description.

Furnish and erect *treated* 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:**~~ ***470-3 Timber 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**~~ ***470-4*** **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 AWPA M4~~, Sections 1.512, 1.52, 1.521, and 1.522~~.

~~**470-3.3**~~ ***470-5*** **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.~~

The Contractor may bore holes in the field.

~~**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~~5~~*6* 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 diameter drift bolt extending at least 9 inches into the pile. Where so

shown in the plans, cover the tops and ends of pile caps with 10 ounce, minimum weight, copper sheet meeting the requirements of ASTM B 370.

470-6*7* Floors.

Attach the planks to each joist or nailing strip with at least two 8 inch nails for 3 inch planks, or two 10 inch nails for 4 inch planks. Use nails that are at least 1/4 inch 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 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. Cut the floor to straight lines along the side of the roadway and walkway.

470-7*8* 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*9* Holes for Bolts, Dowels, Rods, and Lag Screws.

Bore holes to the diameters shown in the following table:

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

470-9*10* 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 to allow circulation of air, and securely fasten the ends to the timber on which they rest.

470-10*1* Railings.

Construct railings of treated dressed lumber.

470-11*2* Hardware.

470-11*2*.1 General: Use hardware, including bolts, drift pins, 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.

470-12.2 CCA, ACQ-D, and CA-B Treated Wood Structures: *Use grade 304 or 316 stainless steel with CCA, ACQ-D, and CA-B treated permanent wood structures, unless the structure is situated out of direct contact with standing water or rainwater. The use of hot dipped galvanizing fasteners, meeting the requirements of ASTM A153, is allowed with the wood structures that are out of direct contact with standing water or rainwater. Do not use aluminum in direct contact with the CCA, ACQ-D, and CA-B treated woods.*

For CCA and CA-B treated wood, use hot-dipped galvanized fasteners meeting the requirements of ASTM A 153, and connectors meeting the requirements of ASTM A 653, Class G185 Sheet, or better. For Permanent Wood Foundations and/or where salt spray is prevalent, use 304 or 316 stainless steel. Aluminum should not be used in direct contact with treated wood. In addition, for copper azole treated wood, while galvanized fasteners are preferable, the use of non-galvanized nails of sizes and types specified by the International Code Council (ICC) is acceptable when attaching joists, studs, or other framing to copper azole sill plate, provided the wood will remain dry in service, protected from weather and water. Under similar conditions, the use of standard galvanized strapping or mild steel anchor bolts ½" diameter and larger is also acceptable for fastening copper azole wood to foundations.

470-11~~.2~~*2.3* 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 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*2*.4 *Inspection*~~Testing~~: The Engineer will ~~not require laboratory tests other than tests of the galvanizing, but will~~ inspect ~~and approve of~~ *the* hardware for quality of manufacture and accuracy of size *prior to use on wood structures*.

470-12~~.~~*3* 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*4* Method of Measurement.

470-13*4*.1 General: The quantity to be paid for will be the plan quantity, in feet board measure, of such timber actually incorporated in and forming a part of the completed structure.

470-13*4*.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*5* 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:

Item No. 470-	1-	Treated Structural Timber - per Thousand Board Measure
~~Item No. 470-~~	~~2-~~	~~Untreated Structural Timber- per Thousand Board Measure~~

Estimated fiscal impact, if implemented: The use of the stainless steel hardware, initially, will increase the cost of the timber structures. But, this increased initial cost will be an investment for the durability of the structures. The contact of the conventional steel fasteners and connectors with alternative treated timber will reduce the life expectancy of the structures. The use of the specified fasteners will increase the durability of the structures.

Implementation of these changes, if and when approved, will begin with the July 2008 letting.