Florida Department of Transportation

**CHARLIE CRIST**
**GOVERNOR**

605 Suwannee Street
Tallahassee, FL 32399-0450

**STEPHANIE KOPELOUSOS**
**SECRETARY**

October 31, 2007

Dr. Leslie McCarthy, PhD, P.E.
Program Operations Engineer
Federal Highway Administration
545 John Knox Road, Suite 200
Tallahassee, Florida 32303

Re: Office of Design, Specifications Section
Proposed Specification: **4700000**

Dear Dr. McCarthy:

We are submitting, for your approval, two copies of a proposed Supplemental Specification 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 review and transmit your comments, if any, within two weeks. Comments should be sent via Email to SP965DB or duane.brautigam@dot.state.fl.us.

If you have any questions relating to this specification change, please call Duane F. Brautigam, State Specifications Engineer at 414-4110.

Sincerely,

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

DFB/dr
Attachment
cc: Gregory Jones, General Counsel
Florida Transportation Builders' Assoc.
State Construction Engineer

**TIMBER STRUCTURES.**
**(REV 10-30-07)**

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 drill holes in the field. For timbers originally treated with pentachlorophenol, creosote, creosote solutions, or waterborne preservatives, field treat all cuts, abrasions, bolt holes, and recesses that occur after treatment with two liberal applications of a compatible preservative in accordance with the requirements specified in AWPA standard M4, Standard for the Care of Pressure-Treated Wood Products.*

~~**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~~*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 Timber Structures:*** *Use the fasteners and connectors as described in the following table:*

| *TABLE – HARDWARE REQUIREMENTS FOR TREATED TIMBER* | | |
|---|---|---|
| *Environmental condition where structure will be located* | *Fasteners* | *Connectors* |
| *Permanent wood foundations and/or where salt spray if prevalent* | *304 or 316 Stainless Steel* | *304 or 316 Stainless Steel* |
| *Structures that will be exposed to standing water or rainwater* | *304 or 316 Stainless Steel* | *304 or 316 Stainless Steel* |
| *Structures that will be situated indoors and remain dry in service* | *304 or 316 Stainless Steel*<br>*Hot-dipped galvanized fasteners meeting ASTM A153 requirements* | *Hot-dipped galvanized connectors meeting the requirements of ASTM A653 Class G185 sheet or better* |

*Do not use aluminum in direct contact with treated wood.*

**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~~*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~~*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~~*4* Method of Measurement.**

**470-13~~4~~*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~~*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.

**470-145 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~~ |

**TIMBER STRUCTURES.**
**(REV 10-30-07)**

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 timber as specified in the plans.

**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.

**470-4 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.

**470-5 Bolt Holes.**

The Contractor may drill holes in the field. For timbers originally treated with pentachlorophenol, creosote, creosote solutions, or waterborne preservatives, field treat all cuts, abrasions, bolt holes, and recesses that occur after treatment with two liberal applications of a compatible preservative in accordance with the requirements specified in AWPA standard M4, Standard for the Care of Pressure-Treated Wood Products.

**470-6 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.

**470-7 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. 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.

**470-8 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.

**470-9 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 |

**470-10 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.

**470-11 Railings.**

Construct railings of treated dressed lumber.

**470-12 Hardware.**

**470-12.1 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 Timber Structures:** Use the fasteners and connectors as described in the following table:

| TABLE – HARDWARE REQUIREMENTS FOR TREATED TIMBER | | |
|---|---|---|
| Environmental condition where structure will be located | Fasteners | Connectors |
| Permanent wood foundations and/or where salt spray if prevalent | 304 or 316 Stainless Steel | 304 or 316 Stainless Steel |
| Structures that will be | 304 or 316 Stainless Steel | 304 or 316 Stainless Steel |

| | | |
|---|---|---|
| exposed to standing water or rainwater | | |
| Structures that will be situated indoors and remain dry in service | 304 or 316 Stainless Steel | Hot-dipped galvanized connectors meeting the requirements of ASTM A653 Class G185 sheet or better |
| | Hot-dipped galvanized fasteners meeting ASTM A153 requirements | |

Do not use aluminum in direct contact with treated wood.

**470-12.3 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.

**470-12.4 Inspection:** The Engineer will inspect the hardware for quality of manufacture and accuracy of size prior to use on wood structures.

**470-13 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.

**470-14 Method of Measurement.**

**470-14.1 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.

**470-14.2 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.

**470-15 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