SECTION 714 - STRUCTURAL TIMBER AND RELATED MATERIALS

714.01 Structural Timber and Lumber.

(A) General. Lumber and timber shall be of the Douglas Fir (coast or inland) or redwood species.

The Contractor shall submit a certificate of inspection from a recognized lumber inspection bureau with each shipment of lumber, timber or timber piling, whether treated or untreated.

Timber and lumber may be subject to inspection after arrival at the work site. The Contractor shall replace rejected pieces at no cost to the State.

Timbers used without preservative treatment shall contain more than eighty-five (85) percent heartwood on the girth or on each face, side or edge measured where the greatest quantity of sapwood occurs.

For pressure treated timbers, there will be no heartwood requirement. The Engineer will not limit the quantity of sapwood.

(B) Grading Rules. The Contractor shall grade the lumber and timber according to the "American Lumber Standards."

714.02 Preservatives. Timber preservatives shall conform to the following:

P2	Creosote Oil	AASHTO M 133
P3	Creosote Coal-tar solution	AASHTO M 133
	Creosote-petroleum solution	AASHTO M 133
	Wolman Salts (Tanalith)	AASHTO M 133
	Chromated Zinc Chloride	AASHTO M 133
P5	Chromated Zinc Arsenate (Boliden Salts)	AWPA P 5
P5	Ammonical Copper Arsenite (Chemonite)	AWPA P 5
	Osmosalt (Osmosar)	See Below
	Pentachlorophenol Petroleum Solution	See Below

Osmosalt (osmosar) shall conform to Wolman salts (Tanalith) according to AASHTO M 133 except that the dry salt shall have the following composition:

PERCENT BY WEIGHT, MOISTURE-FREE BASIS		
	Normal	Minimum
Sodium fluoride	34	32
Potassium bichromate	34	31
Disodium hydrogen arsenate	25	22
Dinitrophenol	7	5
Total	100	90

The pentachlorophenol petroleum solution includes between four and a half (4-1/2) percent and five and a half (5-1/2) percent of pentachlorophenol dissolved in a suitable petroleum solvent according to AASHTO M 133. The pentachlorophenol shall conform to AASHTO M 133.

714.03 Hardware for Timber Structures. Machine bolts, drift bolts and dowels may be wrought iron or medium steel. Washer may be cast O-gee or malleable castings or may be cut from medium steel or wrought iron plate.

Machine bolts shall have square heads and nuts. Nails shall be cut or round wire of standard form. Spikes shall be cut, wire or round wire of standard form. Spikes shall be cut, wire, or boat spikes.

The Contractor shall zinc-coat hardwares except malleable iron connectors for treated timber bridges according to Subsection 501.03(G) - Zinc-coating.

Metal connectors shall be one of the following according the contract:

(A) Split Ring Connectors. Split rings shall have inside diameters of two and a half (2-1/2) inch, four (4) inch, and six (6) inch. The manufacturer shall make split rings from hot rolled, low carbon steel conforming to Carbon Steel Blooms, Billets, and Slabs for Forging, ASTM A 711, Grade 1015. Each ring shall form a closed true circle with an outside cylindrical surface parallel to the axis of the ring. For the six (6) inch ring, the manufacturer shall bevel the inside surface from the median line toward the edges. The manufacturer shall cut the split rings through in one (1) place in its circumference to form a tongue and slot.

(B) Toothed Ring Connectors. The manufacturer shall stamp the toothed ring timber connectors cold from U.S. Standard No. 16 gage hot rolled sheet steel conforming to ASTM A 711, Grade 1015. The manufacturer shall bend the connectors cold to form a circular, corrugated, sharp toothed band and circle. The connectors shall be parallel to the axis of the

ring. The Contractor shall weld the central band fully to develop the strength of the band. Connectors with two (2) inch, two and five-eighths (2-5/8) inch, three and three-eighths (3-3/8) inch and four (4) inch diameters shall have a total depth of 0.94 inch and a depth of fillet of quarter (1/4) inch. *|

(C) Shear Plate Connectors. The manufacturer shall make pressed steel type shear plates of two and five-eighths (2-5/8) inch diameter from mild steel conforming to ASTM A 711, Grade 1015. Each plate shall be a true circle with a flange around the edge, extending at right angles to the face of the plate and extending from one (1) face only. The plate portion shall have a central bolt hole and small perforations on opposite sides of the hole and midway from the center circumference. *| *|

The manufacturer shall make four (4) inch malleable iron type shear plates according to ASTM A 47, Grade 35018 for Malleable Iron Castings. Each casting includes a perforated round plate with a flange around the edge extending at right angles to the face of the plate and projecting from one face only. The plate portion shall have a central bolt hole reamed to size with an integral hub concentric to the bolt hole and extending from the same face as the flange. *| *| *|

(D) Spike Grid Connectors. The manufacturer shall make spike grid connectors according to ASTM A 47 Grade 35018 for malleable iron castings. The connectors include four (4) rows of opposing spikes forming a four and one-eighth (4-1/8) inch square grid with sixteen (16) teeth held in place by fillets. Fillets for the flat grid shall be diamond shaped in cross section. Fillets for the single and double curve grids shall be increased in depth. *| *| *| *|

Circular grids of three and a quarter (3-1/4) inch diameter include eight (8) opposing spikes equally spaced around the outer circumference. Also, the Contractor shall hold the circular grids of in place by connecting fillets around the outer diameter and radial fillets projecting to a central circular fillet that forms a bolt hole opening of one and a quarter (1-1/4) inches. Fillets in cross section shall be diamond shaped except that the Contractor may flatten the inner circular fillet on one side to provide for manufacturer identification. *| *| *| *|

714.04 Timber Piles. Timber piles shall conform to AASHTO M 168 except as modified herein. *|

Untreated timber piles shall be of the Douglas Fir or redwood species. Treated timber piles shall be of the Douglas Fir species.

Redwood piles shall conform to the circumferences and diameters established for Cedar piles in Table 1 of AASHTO M 168.

Preservative treatment, if required, and the storage and handling of timber piles shall conform to Section 502 - Timber Structures. *|