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USACE / NAVFAC / AFCEC / NASA | UFGS-06 13 33 (November 2016)
Change 1 - 08/17

Preparing Activity: NAVFAC | Superseding
UFGS-06 13 33 (April 2006)

UNIFIED FACILITIES GUIDE SPECIFICATIONS

References are in agreement with UMRL dated July 2023
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SECTION 06 13 33

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11/16, CHG 1: 08/17

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SECTION 06 13 33

PIER TIMBERWORK
11/16, CHG 1: 08/17

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NOTE: This guide specification covers the requirements for timber piers and timber work on other than timber piers.

Adhere to UFC 1-300-02 Unified Facilities Guide Specifications (UFGS) Format Standard when editing this guide specification or preparing new project specification sections. Edit this guide specification for project specific requirements by adding, deleting, or revising text. For bracketed items, choose applicable item(s) or insert appropriate information.

Remove information and requirements not required in respective project, whether or not brackets are present.

Comments, suggestions and recommended changes for this guide specification are welcome and should be submitted as a Criteria Change Request (CCR).
****

****
NOTE: This specification also includes requirements for framing of timber bearing and fender piles to other pier work where required. Specification requirements for timber bearing and fender piles will be found in Section 31 62 19 TIMBER PILES for fresh water use and in Section 31 62 19.13 TIMBER MARINE PILES for marine use. Due to the severity of salt water environment, glued laminated wood is not included in this guide specification.
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NOTE: On the project drawings, show:

1. Location, size, thickness, and stress rating of timbers

2. Size and spacing of fasteners

3. Soil data, where required.

****

PART 1 GENERAL

1.1 REFERENCES

****

NOTE: This paragraph is used to list the publications cited in the text of the guide specification. The publications are referred to in the text by basic designation only and listed in this paragraph by organization, designation, date, and title.

Use the Reference Wizard's Check Reference feature when you add a Reference Identifier (RID) outside of the Section's Reference Article to automatically place the reference in the Reference Article. Also use the Reference Wizard's Check Reference feature to update the issue dates.

References not used in the text will automatically be deleted from this section of the project specification when you choose to reconcile references in the publish print process.

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The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN WOOD PROTECTION ASSOCIATION (AWPA)

AWPA A3	(2015) Standard Method for Determining Penetration of Preservatives and Fire Retardants
AWPA M4	(2023) Standard for the Care of Preservative-Treated Wood Products
AWPA M6	(2013) Brands Used on Preservative Treated Materials
AWPA P1/P13	(2019) Standard for Creosote Preservative
AWPA P2	(2019) Standard for Creosote Solutions
AWPA P5	(2015) Standard for Waterborne Preservatives
AWPA P34	(2014) Standard for Copper Naphthenate, Waterbone (CuN-W)
AWPA T1	(2023) Use Category System: Processing and Treatment Standard

AWPA U1	(2023) Use Category System: User Specification for Treated Wood

ASTM INTERNATIONAL (ASTM)

ASTM A123/A123M	(2017) Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
ASTM A153/A153M	(2023) Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
ASTM A307	(2021) Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength
ASTM A1023/A1023M	(2021) Standard Specification for Stranded Carbon Steel Wire Ropes for General Purposes
ASTM D5643/D5643M	(2012) Standard Specification for Coal Tar Roof Cement, Asbestos Free

U.S. DEPARTMENT OF DEFENSE (DOD)

MIL-P-21035	(1991; Rev B; Notice 2 2003; Notice 3 2021) Paint, High Zinc Dust Content, Galvanizing Repair (Metric)

U.S. GENERAL SERVICES ADMINISTRATION (GSA)

FS RR-W-410	(2022; Rev J) Wire Rope and Strand

WESTERN WOOD PRESERVERS INSTITUTE (WWPI)

WWPI Mgt Practices	(1996; R 2011) Best Management Practices for the Use of Treated Wood in Aquatic and Wetland Environments

1.2 SUBMITTALS

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NOTE: Review Submittal Description (SD) definitions in Section 01 33 00 SUBMITTAL PROCEDURES and edit the following list, and corresponding submittal items in the text, to reflect only the submittals required for the project. The Guide Specification technical editors have classified those items that require Government approval, due to their complexity or criticality, with a "G." Generally, other submittal items can be reviewed by the Contractor's Quality Control System. Only add a "G" to an item if the submittal is sufficiently important or complex in context of the project.

For Army projects, fill in the empty brackets following the "G" classification, with a code of up

to three characters to indicate the approving authority. Codes for Army projects using the Resident Management System (RMS) are: "AE" for Architect-Engineer; "DO" for District Office (Engineering Division or other organization in the District Office); "AO" for Area Office; "RO" for Resident Office; and "PO" for Project Office. Codes following the "G" typically are not used for Navy, Air Force, and NASA projects.

The "S" classification indicates submittals required as proof of compliance for sustainability Guiding Principles Validation or Third Party Certification and as described in Section 01 33 00 SUBMITTAL PROCEDURES.

Choose the first bracketed item for Navy, Air Force, and NASA projects, or choose the second bracketed item for Army projects.
****

Government approval is required for submittals with a "G" or "S" classification. Submittals not having a "G" or "S" classification are [for Contractor Quality Control approval.][for information only. When used, a code following the "G" classification identifies the office that will review the submittal for the Government.] Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

****
NOTE: Do not require shop drawings on new construction unless the contract drawings show insufficient detail. Generally, on repair construction, no shop drawings are needed, except where drawings contain no details.
****

Pier Timberwork; G[, [_____]]

Submit drawings of treated timber showing dimensions of cut, framed, or bored timbers.

SD-06 Test Reports

Preservative Treatment - Pier Timberworks; G[, [_____]]

The Contractor must provide the Contracting Officer's Representative (COR) with the inspection report of an independent inspection agency, approved by the Contracting Officer, that offered products comply with applicable AWPA standards.

Delivery Inspection List; G[, [_____]]

SD-07 Certificates

SDS and CIS; G[, [_____]]

Pesticide Applicator Company Self-Certification; G[, [_____]]

Best Management Practices (BMPs); G[, [_____]]

1.3 DELIVERY, STORAGE, AND HANDLING

Handle and store piles in accordance with AWPA M4. Follow precautions identified in SDS and CIS provided by the supplier of treated wood products.

Open-stack untreated timber and lumber material on skids at least 300 mm 12 inches above ground, in a manner that will prevent warping and allow shedding of water. Close-stack treated timber and lumber material in a manner that will prevent long timbers or preframed material from sagging or becoming crooked. Keep ground under and within 1.5 m 5 feet of such piles free of weeds, rubbish, and combustible materials. Protect materials from weather. Handle treated timber with ropes or chain slings without dropping, breaking outer fibers, bruising, or penetrating surface with tools. Do not use cant dogs, peaveys, hooks, or pike poles. Protect timber and hardware from damage.

1.4 QUALITY ASSURANCE

1.4.1 Preservative Treatment - Pier Timberworks

The Contractor must be responsible for the quality of treated wood products. The Contractor must provide the Contracting Officer's Representative (COR) with the inspection report of an independent inspection agency, approved by the Contracting Officer, certifying that the offered products comply with applicable AWPA standards. Identify treatment on each piece by the quality mark of an agency accredited by the Board of Review of the American Lumber Standard Committee. Inspect all preservative-treated wood visually to ensure there are no excessive residual materials or preservative deposits. Material must be clean and dry or it will be rejected because of environmental concerns.

1.4.2 SDS and CIS

Provide Safety Data Sheets (SDS) and Consumer Information Sheets (CIS) associated with timber pile preservative treatment. Contractor must comply with all safety precautions indicated on SDS and CIS.

1.4.3 Delivery Inspection List

Field inspect and submit a verification list of each treated timber member and each strapped bundle of treated lumber indicating the wording and lettering of the quality control markings, the species and the condition of the wood. Do not incorporate materials damaged in transport from plant to site. Inspect all preservative-treated wood, visually to ensure there are no excessive residual materials or preservative deposits. Material must be clean and dry or it will be rejected due to environmental concerns.

****

NOTE: Consult with appropriate environmental office for possible local regulations or policies that restrict pile installation of the use of preservative products at the project location.

****

[1.4.4 Regulatory Requirements

[_____].

]1.4.5 Pesticide Applicator Company Self-Certification

Provide the Contracting Officer, a statement signed by the responsible site supervisor or higher company representative, certifying that the contractor will comply with all pesticide label instructions. The certification should identify by name all individuals (applicators) who will be working with wood preserving pesticide products on site.

1.4.6 Best Management Practices (BMPs)

The producer of the treated wood products must provide certification that WWPI Mgt Practices for the use of Treated Wood in Aquatic and Wetland Environments were utilized including a written description and appropriate documentation of the BMPs utilized.

[As part of the BMPs for CCA treated pier timberwork, certification must be provided that documents that the Chromotropic Acid Test (AWPA A3- Methods for Determination of the Presence of Hexavalent Chromium in Treated Wood) was performed on the timber and adequate fixation of the CCA treatment has been achieved prior to installation.

]PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Lumber and Timbers

****

NOTE: Specify stress rating or assure that stress rating is shown on the drawings. Allow a design factor for reduction of tensile strength due to preservative treatment.

****

Provide solid sawn lumber and timbers of stress-rated Southern Pine, Douglas Fir-Larch, or Red Pine with a stress rating [of [_____] MPa ([_____] psi)] [as indicated], and identified by the grade mark of a recognized association or independent inspection agency using the specific grading requirements of an association recognized as covering the species used. The association or independent inspection agency must be certified by the Board of Review, American Lumber Standards Committee, to grade the species used. For secondary members use lumber or timbers rated No. 1 or better. Use commercial grade lumber for decking members.

2.1.2 Preservative Treatment

****

NOTE: Select preservative treatment of lumber or timber as follows (consult the nearest organizational Applied Biologist for specific requirements for specific locations):

1. Based on AWPA's Use Category System (UCS) wood and wood products exposed to salt or brackish water in U.S. Coastal Waters must fall under one of three

Use Categories for Marine Use:

UC5A MARINE USE Northern Waters
UC5B MARINE USE Central Waters
UC5C MARINE USE Southern Waters

Use Category requirements are based on the presence of specific marine organisms in the waters that require higher preservative loadings for control. Refer to AWPA's U1, Commodity Specification G: Marine (Salt Water) Applications to determine the approximate geographical location for each Use Category.

Recommended preservative treatment type (ACZA, CCA, and Creosote), minimum preservative penetration, and retention requirements must be as specified by AWPA U1, Commodity Specification G based on wood species and Use Category.

NOTE: Consult with appropriate environmental office for possible local regulations or policies that restrict the use of creosote at the project site.

2. Based on AWPA's Use Category System (UCS) wood and wood products not exposed to salt or brackish water must fall under one of five Use Categories:

UC3A ABOVE GROUND Protected
UC3B ABOVE GROUND Exposed
UC4A GROUND CONTACT General Use
UC4B GROUND CONTACT Heavy Duty
UC4C GROUND CONTACT Extreme Duty

Use Category selections must be based on biodegradation hazard and product service life expectations for specific products and exposure conditions. Refer to AWPA's U1, Commodity Specification A: Sawn Lumber Products to determine preservative type, minimum preservative penetration, and retention requirements based on wood species and Use Category.

****

Fabricate lumber and timbers before preservative treatment. Each piece of treated lumber or timber must be branded, by the producer, in accordance with AWPA M6. The type of preservative, retention, and penetration must be based on Use Category and species and in accordance with AWPA U1 and AWPA T1. The Contractor must be responsible for the quality of treated wood products.

For wood in contact with brackish water, salt water, or saltwater splash, lumber and timber preservative treatment must be [Creosote or creosote solution in accordance with AWPA P1/P13 or AWPA P2, respectively] [Waterborne preservative in accordance with AWPA P5 (ACZA - Ammoniacal Copper Zinc Arsenate, CCA - Chromated Copper Arsenate)] [Dual treatment of creosote or creosote solution plus waterborne preservative in accordance with AWPA P1/P13 or AWPA P2, and AWPA P5].

For wood not in contact with brackish water, salt water, or salt water splash, treatment must be in accordance with AWPA U1 Commodity Specification A: Sawn Products with [water-borne preservative (AWPA P5) except that chromated zinc chlorides, pentachlorophenol-ammoniacal systems, and alkyl ammonium compounds will not be allowed] [creosote (AWPA P2)].

2.1.3 Field Treatment

Piles must be field treated in accordance with AWPA M4. All cuts, holes and injuries such as holes from removal of spikes or nails which may penetrate the treated zone must be field treated with copper naphthenate conforming to AWPA P34 [and coal-tar roofing cement conforming to ASTM D5643/D5643M].

2.1.4 Hardware

****
NOTE: Give special attention to corrosion protection of hardware used with timber preserved with water-borne salts. Specify protection ranging from simple coatings to changing of the hardware metals dependent upon the required use and critical features of the hardware. Hot-dip galvanized hardware and fasteners will usually suffice in such cases.
****

Pile hardware must consisting of bolts with necessary nuts and washers, timber connectors, drift pins, dowels, nails, screws, spikes, and other fastenings. Bolts and nuts must conform to ASTM A307. Provide cast-iron ogee, malleable iron washers, or plate or cut washers where indicated. Provide bolts with washers under nut and head. Provide timber connectors and other metal fastenings of type and size indicated. Hot-dip galvanize all hardware specified or indicated in accordance with ASTM A123/A123M or ASTM A153/A153M, as applicable.

[2.1.5 Wire Rope and Fittings

Wire ropes must be in accordance with FS RR-W-410 [Type III, Class 2] [Type III, Class 3] [Type I, Class 2]. All wire ropes must be zinc coated in accordance with ASTM A1023/A1023M. [Provide staples of 10 mm 0.375 inch diameter zinc-coated steel at least 125 mm 5 inches long.] [Provide clips or clamps of zinc-coated steel.]

]PART 3 EXECUTION

3.1 INSTALLATION

Cut, bevel, and face timbers prior to plant preservative treatment. In addition to the contract clause entitled "Accident Prevention" provide protective equipment for personnel fabricating, field treating, or handling materials treated with creosote or water-borne salts. Refer to paragraph SDS AND CIS.

3.1.1 Framing

Cut and frame lumber and timber so that joints will fit over contact surface. Secure timbers and piles in alignment. Open joints are

unacceptable. Shimming is not allowed. Drill holes for drift pins and dowels with a bit 2 mm 1/16 inch less in diameter than the pin or dowel. Drill holes for truss rods or bolts with a bit 2 mm 1/16 inch larger in diameter than rod or bolt. Drill holes for lag screws in two parts. Make lead hole for shank the same diameter as shank. Make lead hole for the threaded portion approximately two-thirds of the shank diameter. Drill holes in small timbers for boat or wire spikes with a bit of the same diameter or smallest dimension of the spike to prevent splitting. Counterbore for countersinking wherever smooth faces are indicated or specified.

3.1.2 Fender Systems

Face fender piles to receive chocks. Use only full-length timbers for chocks and tightly fit against fender piles. Face fender piles to provide a flat bearing against wales. Splice wales in location in a manner [as existing] [as indicated]. Additional splicing of wales will not be permitted. Bevel tops of fender piles outboard as indicated. Wrap pile clusters with wire rope. Fasten wire rope with clips and staples.

3.1.3 Bulkheads

****

NOTE: Assure that the drawings show bulkheads of sufficient height and width to prevent damage from erosion both to the side and from beneath the bulkhead. Where soil pressure against the bulkhead is high, special anchorage measures may be needed, such as tiebacks with concrete or timber dead-men or bulkhead piles.

****

Make timber bulkheads at land end of pier of height and width indicated. Provide special anchorage such as bulkhead piles or dead-men, as indicated.

3.1.4 Framed Bents

3.1.4.1 Footings

Bed mudsills to bearing and tamp in place. Finish concrete pedestals for support of framed bents so that the sills will have even bearing.

3.1.4.2 Posts and Timbers

****

NOTE: Recommend use of 25 mm 1 inch diameter dowels, bolts, and drift bolts in underwater or splash zone conditions.

****

Provide even bearing for sills on mudsills, piles, or pedestals. Drift bolt sills to mudsills, piles, or pedestals with bolts of at least [20] [24] mm [3/4] [1] inch [the indicated] diameter that extend into mudsills, piles, or pedestals at least 150 mm 6 inches. Cast dowels or bolts into concrete pedestals. When indicated, remove earth from contact with sills to provide for free air circulation. Saw posts for framed bents to proper length (vertical or batter) and provide even bearing on pedestals or sills. Fasten posts to sills with dowels of at least [20] [25] mm [3/4] [1] inch [the indicated] diameter extending at least 150 mm 6 inches into

posts.

3.1.5 Bracing

****

NOTE: Recommend use of 25 mm 1 inch diameter dowels, bolts, and drift bolts in underwater or splash zone conditions.

****

Align bents before bracing is placed. Provide bracing of sufficient length to provide a minimum distance of 200 mm 8 inches between outside bolt and end of brace. Bracing and girts must bear firmly against piles or timber to which secured. Place fillers to avoid bending the bracing more than 25 mm 1 inch out of line when bracing bolts or other fastenings are drawn up tight. Built-up fillers will not be permitted. Make filler a single piece of the same treated lumber as that in the brace, with a width of at least 150 mm 6 inches and a length of at least 300 mm 12 inches. Bolt ends of bracing through pile, post, or cap with a bolt of at least [20] [25] mm [3/4] [1] inch [the indicated] diameter. Bolt or boat spike intermediate intersections as indicated.

3.1.6 Caps

****

NOTE: Recommend use of 25 mm 1 inch diameter dowels, bolts, and drift bolts in underwater or splash zone conditions.

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****

NOTE: This paragraph is based on timber caps on timber piles. Delete or modify this paragraph as necessary to accommodate other systems.

****

Prior to placing caps, treat tops of posts or piles with copper naphthenate per AWPA M4. Place timber caps to secure bearing over tops of supporting posts or piles and to secure even alignment of their ends. Secure caps by drift bolts of at least [20] [25] mm [3/4] [1] inch [the indicated] diameter extending at least 225 mm 9 inches into posts or piles. Place drift bolts in the center of pile or post.

3.1.7 Stringers

Place crown up and, if possible, the better edge of deck stringers down. Tops of stringers must not vary from a plane more than will permit bearing of the floor on stringers. Butt-joint and splice outside stringers, but lap interior stringers to take bearing over full width of cap or floor beam at each end. Break joints if stringers cover two spans. Toenail or drift bolt stringers as indicated. Stringers may be of sufficient length to cover two spans, except on sharp horizontal curves. Between stringers, frame and toenail cross-bridging or solid-bridging at each end with at least two nails for cross-bridging and four nails for solid-bridging. Make size and spacing of bridging as indicated.

3.1.8 Decking

Make decking of a single thickness of plank supported by stringers or

joists. Unless otherwise indicated, lay plank with heart side down and with tight joints. Spike each plank to each joist or nailing strip with at least two spikes. Provide spikes at least 101 mm 4 inches greater than the thickness of plank. Place spikes at least 63 mm 2-1/2 inches from edges of the plank. Cut ends of planks parallel to center line of pier. Grade planks as to thickness and lay so that adjacent planks vary less than 2 mm 1/16 inch.

3.1.9 Wheel Guard and Railing

Lay wheel guards in sections at least 3.6 m 12 feet long; bolt through floor plank and through outside stringer or nailing piece with 20 mm 3/4 inch bolts spaced 1.2 m 4 feet or less apart. Bevel wheel guards on pier side as shown. Provide wheel guard material surfaced on four sides (S4S) on the top edge and pier side. Provide surfaced (S4S) material for railings.

3.1.10 Fastening

Vertical bolts must have nuts on the lower end. Where bolts are used to fasten timber to timber, timber to concrete, or timber to steel, bolt members together when they are installed and retighten immediately prior to final acceptance of contract. Provide bolts having sufficient additional threading to provide at least 31 mm per m 3/8 inch per foot thickness of timber for future retightening. [Provide timber connectors of types indicated. Install split-ring and shear-plate connectors in pre-cut grooves of the dimensions [shown] [as recommended by the manufacturer]. Force toothed-ring and spike-grid connectors and clamping plates into the contact surfaces of timbers joined by means of proper pressure tools; at joints, embed connectors of these types simultaneously and uniformly.]

3.2 FIELD TREATMENT

3.2.1 Pier timberwork

Field treat all cuts, holes, bevels, notches, refacing, abrasions, and injuries such as abrasions or holes from removal of spikes or nails made in the field in treated piles or timbers in accordance with AWPA M4, SDS and CIS. Trim cuts and abrasions before field treatment. Depressions or openings around bolt holes, joints, or gaps including recesses formed by counterboring must be field treated with copper naphthenate conforming to AWPA P34; and after bolt or screw is in place, fill with coal-tar roofing cement conforming to ASTM D5643/D5643M.

3.2.2 Piling and Post Protection

After driving is completed, all piles must be "headed" or cut off normal at the cutoff elevation. Headed treated piles, including those to be capped with concrete, must be treated with copper naphthenate per AWPA M4. Piles driven in locations where they are constantly subject to water spray must be given this treatment immediately after they are cut off and before the cutoff surface has been wetted. Seal ends with a heavy application of coal-tar pitch or other appropriate sealer.

Cutoffs must become the property of the Contractor and must be removed at his expense.

3.2.3 Galvanized Surfaces

Repair and recoat zinc coating which has been field or shop cut, burned by welding, abraded, or otherwise damaged to such an extent as to expose the base metal. Thoroughly clean the damaged area by wire brushing and remove traces of welding flux and loose or cracked zinc coating prior to painting. Paint cleaned area with two coats of zinc oxide-zinc dust paint conforming to MIL-P-21035. Compound paint with a suitable vehicle in a ratio of one part zinc oxide to four parts zinc dust by weight.

-- End of Section --