

NAVSEA
STANDARD ITEM

FY-20

ITEM NO: 009-37
DATE: 01 OCT 2018
CATEGORY: II

1. SCOPE:

1.1 Title: General Procedure for Woodwork; accomplish

2. REFERENCES:

2.1 Standard Items

2.2 0900-LP-015-1010, Wood: A Manual for Its Use as a Shipbuilding Material, Basic Wood Technology Applicable to Boat and Shipbuilding

2.3 0900-LP-015-1020, Wood: A Manual for Its Use as a Shipbuilding Material, Techniques and Practices Applicable to Preservation and Storage

2.4 0900-LP-015-1030, Wood: A Manual for Its Use as a Shipbuilding Material, Technical Data Applicable to Boat and Ship Design

2.5 0900-LP-015-1040, Wood: A Manual for Its Use as a Shipbuilding Material, Boat and Ship Construction Techniques

2.6 MIL-STD-1623, Fire Performance Requirements and Approved Specifications for Interior Finish Materials and Furnishings (Navy Shipboard Use)

3. REQUIREMENTS:

3.1 Accomplish the requirements of 2.2 through 2.5 for performing general woodworking procedures.

3.2 Install flush fitted wood plugs/dowels in holes resulting from the removal of fasteners.

3.2.1 Drill out holes to sound wood and install plugs/dowels. Plugs/dowels **must** be set in a commercial grade phenol and resorcinol resin base adhesive.

3.2.2 Where deterioration and decay exists around the perimeter of the fastener holes and where through-bolt holes have been elongated, enlarge the holes by drilling to a size (diameter) that will remove the deterioration, decay, and elongation, prior to installing plugs/dowels.

3.2.2.1 Clean-bore drill bit diameter **must** not be more than one inch larger than the original fastener hole diameter, unless otherwise specified.

3.2.3 Plugs/dowels **must** be of the same wood species as the member being repaired, with their grain installed parallel with the grain of the existing wood, and then driven the full depth of the hole being repaired.

3.2.4 Soak plugs/dowels for a minimum of 10 minutes and saturate the exposed fastener holes with copper naphthenate wood preservative applied in accordance with manufacturer's instructions, and allow to dry to a moisture content of 15 percent or less prior to installation of plugs/dowels.

3.3 Install new fasteners in accordance with NAVSEA Standard Items 2.1. (See Note 4.2)

3.3.1 Aluminum and aluminum alloy components and structural members **must** be installed using CRES, Grade 304 or 316 fasteners.

3.3.1.1 Fasteners with compositions of copper alloys **must** not be used in contact with aluminum and aluminum alloy components and structural members.

3.3.1.2 Install non-metallic (epoxy plastic, phenolic, polyimide [nylon], Teflon) sleeves over CRES fasteners where they come in contact with the aluminum and aluminum alloy components and structural members.

3.3.1.3 Install insulation tape, minimum thickness 20 mils, conforming to MIL-I-24391 (2 thicknesses) between faying surfaces of aluminum/aluminum alloy-to-CRES to extend approximately 1/4-inch beyond the faying surfaces.

3.3.1.4 Ensure that the surfaces of aluminum and aluminum alloy components and structural members which will come in contact with wood members and CRES fasteners are protected with a minimum of 2 coats of epoxy polyimide primer conforming to MIL-PRF-23236.

3.3.1.5 Apply one coat of phenolic modified clear varnish on wood members which will come in contact with aluminum and aluminum alloy components and structural members. Refer to the Master Painters Institute (MPI) Approved Product List, MPI #28, for procurement of exterior marine spar varnish.

3.3.2 To avoid bi-metallic corrosion, fastener material composition **must** be the same material composition as that of the metal components and structural members that they are fastening except as noted in 3.3.1.

3.4 Accomplish installation of new fasteners as follows:

3.4.1 Drill pre-bored pilot holes for screws and fetter ring nails prior to installation to prevent damage to wood members.

3.4.1.1 Diameter of pilot holes **must** not exceed 70 percent of the root diameter of screws for soft woods, and 90 percent for hard woods. For screw shanks, the hole in the material to be fastened **must** be 100 percent shank diameter.

3.4.1.2 Maximum depth of pilot holes **must** not exceed 90 percent of the length of screws.

3.4.1.3 Holes for fetter ring nails **must** be pre-bored not to exceed 60 percent of the nail diameter.

3.4.2 Screws **must** not be impact driven. The last ¼-inch of screws **must** be hand-tightened.

3.4.2.1 Fasteners **must** be set snug but not so tight as to weaken the material by rupture of wood fibers adjacent to the fasteners.

3.4.3 Bolt holes **must** be drilled for a tight fit.

3.4.4 Where watertight integrity **must** be maintained, the fasteners **must** be body bound.

3.4.5 Through-bolts and hull plank fasteners **must** be bedded in marine oakum conforming to T-O-56 or caulking cotton, and a NAVSEA approved natural bedding compound such as Interlux 214 or Dolchem 3400.

3.4.6 Counterbore wood fastener holes to permit the installation of a wood plug (bung) over the fasteners, unless otherwise specified. Install wood plugs over fasteners.

3.4.6.1 The depth of counterboring is fixed by the thickness of the planking, which in turn fixes the depth of the wood plug (bung) used. The depth (thickness) of a bung plug **must** be one-half to two-thirds its diameter to ensure that it will stay in place. The rule for counterboring for bung plugs is that the plug diameter **must** be no larger than necessary to allow the largest part of the fastener to enter the hole.

3.4.6.2 Plugs **must** be of the same wood species as the member being plugged and their grain **must** be installed parallel with the grain of the existing wood.

3.4.6.3 Soak plugs for a minimum of 10 minutes and saturate the fastener holes with wood preservative conforming to copper naphthenate, applied in accordance with manufacturer's instructions, and allow to dry for a minimum of 4 days prior to installation of plugs.

3.4.6.4 Coat plugs on faying surfaces with a NAVSEA approved natural bedding compound such as Interlux 214 or Dolchem 3400, prior to

installation and cut level and smooth with surrounding surfaces, unless otherwise specified.

3.5 New wood materials **must** conform to the following requirements, unless otherwise specified.

3.5.1 Wood materials used for new interior finish materials and furnishings **must** conform to the requirements of MIL-L-19140 and 2.6.

3.5.2 Types, grades, and species of wood (lumber) **must** be as specified in the invoking Work Item.

3.5.3 Lumber **must** conform to the specified grade after seasoning to the required moisture content and after being sized to the approximate dimensions of the members to be fashioned from it.

3.5.4 New wood members **must** be finished smooth on each side.

3.5.5 Uncaulked seams, joints, and faying surfaces **must** be fair and in continuous contact when assembled, except where specifically exempted, such as for hull sheathing.

3.5.6 New wood members, when assembled in place, **must** show no rupture as a result of overstraining.

3.5.7 Laminated member construction **must** conform to MIL-W-15154 for red or white oak.

3.5.7.1 When bonding together wood surfaces which rely on mechanical fastening for main strength, commercial grade phenol and resorcinol resin base adhesive **must** be used.

3.5.8 Plywood **must** conform to MIL-P-18066, Class 3A.

3.5.9 Moisture content of new wood materials **must** fall within the following parameters.

3.5.9.1 New lumber **must** have a moisture content of 13 percent, plus or minus 5 percent, at the time of installation.

3.5.9.2 New plywood **must** have a moisture content of 10 percent, plus or minus 5 percent, at the time of installation.

3.6 New lumber and plywood **must** be soaked for 10 minutes in wood preservative after boring, shaping, and fairing operations have been completed.

3.6.1 Apply one soaking brush coat of wood preservative on bare wood surfaces exposed by removals and machining operations before surfaces are covered.

3.6.2 Wood preservative **must** conform to copper naphthenate, applied in accordance with manufacturer's instructions, unless otherwise specified.

3.6.3 Allow preservative-treated wood to dry to a moisture content of 15 percent or less prior to gluing and/or painting operations.

3.7 Apply a heavy coating of a NAVSEA approved natural bedding compound such as Interlux 214 or Dolchem 3400 on the top surfaces of deck beams, frames headers, fillers, planking side of frames, deck beam ends, seams, and butts (except those to be caulked), and other faying (joining) surfaces before the faying surfaces are covered, except as follows: In between inner and outer layers of hull planking of crafts that do not have caulking seams, a wood bedding/sealant compound conforming to 3M-5200 **must** be installed.

3.7.1 Install one layer of canvas conforming to PIA-C-419, Type III (8 ounces or heavier) between faying surfaces of new leveling foundation pads installed on weather decks, in addition to a NAVSEA approved natural bedding compound such as Interlux 214 or Dolchem 3400.

3.7.2 Remove surplus bedding/sealing compound after squeeze-out.

3.8 No new butt joints **must** be established in any planking strake (hull shell or deck) that will leave a portion that is less than 12 feet in length. No new portion of a planking strake **must** be installed which is less than 12 feet in length.

3.8.1 Butt joints in adjacent strakes **must** be separated by a minimum of 3 strakes.

3.8.2 Butt joints in the same frame space **must** be separated by a minimum of 3 frame spaces.

3.8.3 Planking strakes may be scarf-joined to maintain butt joint schedule. Scarfing **must** be in accordance with 2.2 through 2.5.

3.9 Wood members requiring caulking seams **must** be installed with their faying surfaces tight and with an outgauge (special bevel for caulking) in the side(s) to be caulked.

3.10 Accomplish the following work to ensure watertight integrity of caulked seams (including butt and rabbet seams).

3.10.1 Reef out by hand, defective caulking compound and loose and decayed caulking (cotton/oakum) from existing caulking seams requiring installation of new caulking and caulking compound.

3.10.1.1 Exercise care when reefing out caulking compound and caulking to preclude damage to existing caulking seams. Power tools **must** not be utilized for the reefing out process.

3.10.2 Where existing caulking is identified to be sound and in good condition, set the existing caulking deeper into the seam opening to ensure that it is driven solidly home and to make room for additional caulking.

3.10.2.1 Set the existing caulking by driving the caulking uniformly, to the same hardness in each seam. To prevent a wedging effect it **must** be set to a hardness that would not allow an awl to penetrate more than 3/8-inch.

3.10.3 Caulking seams **must** be clean and dry before installing new caulking and caulking compound.

3.10.4 Caulk deck planking caulking seams using treated caulking cotton and spun-type marine oakum conforming to T-O-56. Treat the caulking cotton as follows.

3.10.4.1 The untreated caulking cotton **must** be undyed, of not less than 3/4-inch staple length, and **must** be free from oil, fire-damaged or scorched cotton, added waste, and substantially free from linters.

3.10.4.2 The untreated caulking cotton **must** be soft and fully opened and contain no sizing. The amount or size of specks **must** not be objectionably noticeable upon casual examination.

3.10.4.3 The untreated caulking cotton **must** be well carded to form a sliver and **must** consist of not less than 9 nor more than 12 slivers laid parallel to form a composite untwisted strand. Each sliver untreated **must** measure approximately 500, plus or minus 50 feet, to the pound.

3.10.4.4 Treat the caulking cotton with a solvent solution of copper naphthenate-asphaltum to produce caulking cotton having a minimum of one percent metallic copper and 1-1/2 percent, plus or minus 1/2 percent, asphalt, based on the weight of the treated cotton. The copper **must** be uniformly distributed throughout the cotton.

3.10.4.5 The treated caulking cotton **must** be dry to the touch prior to installation.

3.10.5 Caulk hull shell planking caulking seams using treated caulking cotton conforming to the requirements outlined in 3.10.4.1 through 3.10.4.5 and spun-type marine oakum conforming to T-O-56.

3.10.5.1 Drive one to 2 strands of caulking cotton into the bottom of the seams, prior to installing marine oakum, to ensure that deep/tight seams are filled.

3.10.6 Caulking cotton and marine oakum caulking **must** be looped, tucked, and hard-driven to a depth that provides space for installation of seam caulking compound.

3.10.6.1 The size of the seam in width and depth determines the required amount of cotton/oakum caulking and **must** be filled to within 1/4-inch to 3/8-inch of the plank surface.

3.10.6.2 The amount of cotton/oakum caulking inserted **must** be carefully controlled to limit the possibility to "caulk off" a plank from its frames if too much is driven in and forced beyond the outgauge bevel.

3.10.6.3 The cotton/oakum caulking **must** be driven uniformly, to the same hardness and depth in each seam, to prevent a wedging effect. It **must** be set to a hardness that would not allow an awl to penetrate more than 3/8-inch.

3.10.6.4 Butt caulking seams **must** be caulked ahead of adjoining longitudinal caulking seams to ensure that short ends of caulking will be locked in place.

3.10.6.5 The ends of sound existing caulking and new caulking **must** be drawn out and tapered so as to be married in a continuous bulk and then be installed as stated in 3.10.6 through 3.10.6.4.

3.10.6.6 Hull shell planking caulking seams of heavy planked ships **must** have the caulking set firmly home by means of a heavy horsing iron driven into the seams with a heavy mallet known as a beetle. This is a 2-man operation that requires one man to hold the long-handled horsing iron while the second man swings the horsing beetle. This operation ensures that the caulking will be well seated, will not work loose, and is the final means to stiffen the hull.

3.10.7 Pay (fill) deck planking caulking seams with polyurethane caulking compound conforming to MIL-S-24340, Type I, or marine glue MIL-G-413, as specified in the invoking Work Item.

3.10.7.1 The depth of the seam caulking compound **must** be one to 1-1/2 times the width of the seam but no deeper than 3/8-inch.

3.10.7.2 Seal the surfaces of the seams and the installed cotton caulking with a seam primer that is compatible with the caulking compound.

3.10.7.3 Install one-inch wide masking tape on both sides of each caulking seam to keep the caulking compound from penetrating the open grain areas of the deck planking.

3.10.7.4 Remove the tape installed in 3.10.7.3 upon completion of caulking operations.

3.10.8 Pay hull shell planking caulking seams with caulking compound in accordance with the following requirements.

3.10.8.1 Pay underwater hull caulking seams with Interlux 30 brown underwater seam compound (oleoresinous material cut with an aromatic solvent).

3.10.8.2 Pay hull caulking seams above the waterline with Interlux 31 white seam compound (oleoresinous material cut with an aromatic solvent).

3.10.8.3 The depth of the seam caulking compound **must** be one to 1-1/2 times the width of the seam.

3.10.8.4 Paint the surfaces of the seams and the installed cotton/oakum caulking with anti-fouling paint conforming to MIL-PRF-24647, Type II, Class 1, prior to filling underwater hull shell planking seams with caulking compound.

3.10.8.5 Seal the surfaces of the seams and the installed cotton/oakum caulking with a seam primer that is compatible with the caulking compound on hull shell planking seams existing above the waterline.

3.10.9 Prior to paying the caulking compound installed in 3.10.7 and 3.10.8, seams **must** be thoroughly cleared and cleaned of foreign matter.

3.10.9.1 The caulking compound may be applied with a caulking gun but **must** be handworked into the seams to eliminate air pockets and voids in the seams.

3.10.9.2 Remove surplus caulking compound from surrounding surfaces.

3.10.9.3 Pay and complete seams daily, leaving no exposed cotton/oakum caulking at the end of each work shift to ensure the cotton/oakum caulking remains dry and clean.

3.10.9.4 When installing caulking compound and its compatible primer, the manufacturer's instructions **must** be strictly adhered to. Seams greater than 1/2-inch width **must** be payed in 2 applications spaced 24 hours apart.

3.11 Blank openings resulting from removals and relocations, unless otherwise specified, in accordance with the following.

3.11.1 Blank deck planking as follows:

3.11.1.1 Route a 3/8-inch deep indentation on both the top and underside of the deck planking, centered over the area to be blanked.

3.11.1.2 The routed area **must** extend a minimum of 3 inches beyond the perimeter of the area to be blanked.

3.11.1.3 Fit and install a Douglas Fir insert in the area to be blanked.

3.11.1.4 Fit and install a 3/8-inch thick plywood insert in each routed-out indentation.

3.11.1.5 Bed faying surfaces of the inserts with a NAVSEA approved natural wood bedding compound such as Interlux 214 or Dolchem 3400, and secure with round head bolts to ensure watertight integrity. Remove surplus wood bedding compound left after squeeze-out.

3.11.2 Blank plywood bulkheads and plywood decks as follows:

3.11.2.1 Enlarge the hole to be blanked to a minimum of 4 inches square.

3.11.2.2 Install a fitted plywood insert in the resulting opening in the deck or bulkhead.

3.11.2.3 Install a plywood lap cover on one side of and centered over the area to be blanked. The lap cover **must** extend a minimum of 3 inches beyond the perimeter of the area to be blanked.

3.11.2.4 Bed faying surfaces of the insert and the lap cover in a NAVSEA approved natural wood bedding compound such as Interlux 214 or Dolchem 3400, and secure with round head bolts to ensure watertight integrity. Remove surplus wood bedding compound left after squeeze-out.

3.11.3 Blank double-sheathed bulkheads as follows:

3.11.3.1 Enlarge the opening in the inner sheathing to a minimum of 4 inches square.

3.11.3.2 Enlarge the opening in the outer sheathing to a size that extends a minimum of 3 inches beyond the perimeter of enlarged inner sheathing opening.

3.11.3.3 Install a fitted plywood insert in each opening. The plywood inserts **must** be the same thickness as the sheathing.

3.11.3.4 Install one layer of canvas conforming to PIA-C-419, Type III (8 ounces or heavier), between the 2 inserts, the same size as the larger insert.

3.11.3.5 Bed faying surfaces of the inserts and the canvas in a NAVSEA approved natural wood bedding compound such as Interlux 214 or Dolchem 3400, and secure with round head bolts to ensure watertight integrity. Remove surplus wood bedding compound left after squeeze-out.

3.11.4 Sand new plywood blanks and disturbed surfaces to fair in with surrounding areas.

3.11.4.1 Accomplishment of cleaning and painting for bulkhead sheathing sanded surfaces **must** be in accordance with NAVSEA Standard items (See Note 4.1).

4. NOTES:

4.1 If cleaning and painting for bulkhead sheathing sanded surfaces of 3.11.4.1 is required; the use of Category II Standard item 009-32 "Cleaning and Painting Requirements; accomplish" of 2.1 will be specified in the Work Item.

4.2 Existing screws removed per this Standard Item are to be replaced with new, all other fasteners will be replaced per NAVSEA Standard Items 009-84 Threaded Fastener Requirements; accomplish.