Technical Note N-596

POLAR STRUCTURES - SPECIFICATIONS FOR THE NCEL WANOIGAMS

BY

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U.S. NAVAL CIVIL ENGINEERING LABORATORY
Port Hueneme, California

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Polar Structures - Specifications for the NCCL Wanigans

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Type C

by

G. E. Sherwood

Abstract

A family of wanigans was developed to provide portable shelters for use in polar regions. These wanigans are of two types: sled wanigans are mounted on cargo sleds for trail use; portable camp wanigans are built with a skid system for limited movement around a camp or work area. All of the wanigans are 20 feet long and 8 feet high. Both types are made in standard 8-foot widths for assembled air shipment, and in extra-wide 10-foot widths for flexibility in interior arrangement. Standard accessories for the wanigans are: a heating and ventilating system, an electrical harness, and a side-mounted fuel tank. This technical note contains the specifications for the NCCL wanigans presented in the Naval Civil Engineering Laboratory Technical Report R-309, "Polar Structures - NCCL Family of Wanigans."

Qualified requesters may obtain copies of this note from DDC
PORTABLE STRUCTURES CALLED \textit{wenigans} were developed to house facilities for polar trail parties and transient polar camps or work areas. These \textit{wenigans} are of modular sandwich panel construction. They are 20 feet long and 8 feet high. Sled \textit{wenigans} are mounted on sleds for trail use. Portable \textit{wenigans} are built on a skid system for movement around a camp or work area. Both types are made in standard 8-foot widths for assembled air shipment, and in extra-wide 10-foot widths which permit better interior arrangement. Accessories for the \textit{wenigans} include a heating and ventilating system, an electrical harness, and a side-mounted fuel tank.

This technical note contains the specifications for the NCEL family of \textit{wenigans} which are presented in Laboratory Technical Report R-309, "Polar Structures - NCEL Family of \textit{wenigans}." Standard specifications referenced in the text are listed in Appendix A.

DESCRIPTION OF \textit{wenigan} COMPONENTS

The NCEL family of \textit{wenigans} and their standard accessories are detailed in the drawings contained in Appendix B. The major components of the \textit{wenigans} are:

1. Panels. All panels are 4 feet wide and 2 inches thick. They are constructed of wood framing with 1/4-inch plywood skin on both sides. The inside plywood has aluminum backing to serve as a vapor barrier, and the panels are insulated with 1-1/2-inch fiberglass blankets. Panels are bolted together through gasketed lap joints.

2. Portable \textit{wenigan} Floor. The portable \textit{wenigan} floor is mounted on two steel skids. Timber cross members rest on the skids at 4-foot spacing and support the floor panels which are constructed of tongue and groove 2 by 6's. The \textit{wenigan} walls are attached to a 2 by 8 frame around the perimeter of the building. The skid system is provided with a tongue which can be attached to either end for towing.

3. Heating and Ventilating System. Heat for the \textit{wenigan} is
supplied by a 25,000 Btuh oil-fired space heater of the type commonly used in house trailers. A drip pan is provided under the heater, and a conventional vent pipe and roof jack are supplied. Copper tubing is used as a supply line from the fuel tank to the heater. An air intake blower is provided near the heater, and an air exhaust blower is provided as far as possible from the intake. Both blowers are mounted in fixtures with closures for adjusting the amount of fresh air and recirculated air.

4. Electrical Harness. The electrical harness provides general lighting and outlets for general purpose use. The fixtures and outlets are wired into a distribution panel. A house trailer-type connection is provided for connecting the distribution panel to the power source. No power source is included with the harness.

5. Side-Mounted Fuel Tank. The fuel tank is a special design for mounting on the sidewall of a wanigan. The mounting brackets match the bolts used for connecting panels together. The tank is 4 feet wide to conform to the building module, and only 8 inches thick so that it fits flat against the wanigan sidewall. The tank capacity is 80 gallons. It is provided with fittings for connecting a fuel line and for filling and draining the tank.

SPECIFICATIONS FOR THE WANIGANS

1. Scope. The work shall include the furnishing of all material and equipment, and performing all labor for the complete fabrication of the items indicated on the drawings and described and specified herein. The contractor's proposal shall be based on the drawings and specifications herewith and no deviations shall be accepted except as approved in writing by the Contracting Officer.

2. Materials

A. Wood

(1) Lumber. Kiln dried Douglas Fir, conforming to WCLA Grading Rules No. 15, Par. 183-b vertical grain for portable wanigan floor panels, and Par. 184-b flat grain for all other.

(2) Plywood. Plywood shall be Douglas Fir, exterior type, Grade AC with the A face on the outside of the panels, and shall conform to Specification MNL-P-530a.

B. Steel

(1) Sheet or Strip. Conform to Specification QQ-S-640, FS-1020.


C. Aluminum

(1) Cladding for Plywood. The aluminum cladding shall be alloy 3003H14, .015 inch thick with mill finish, no backing, and raw edges.

D. Fastenings

(1) Nails. The nails shall be steel, cement coated, either standard or countersunk head and size as indicated on the drawings, and shall conform to Specification FF-N-105.

(2) Screws. Wood screws shall be steel, of the size and type indicated on the drawings and shall conform to Specification FF-S-111b.

(3) Bolts, Nuts, Washers.

(a) Bolts, carriage, square neck, and nuts. Conform to Type C-2, Table X, of Specification FF-B-571a and nuts Type A-1, Table XII.

(b) Bolts and nuts, hexagonal. Conform to Specification FF-B-571a, Type B-1, Table V and nuts Type A-1, Table XII.

(c) Washers. The washers shall be standard commercial cut steel of the type and size indicated on the drawings.

(d) Finishes. All bolts, nuts, and washers shall be finished with a zinc coating conforming to Type II or III, Class 2 of Specification QQ-Z-325a or cadmium plating Type II or III, Class 2 of Specification QQ-P-416a.

(4) Adhesive. The adhesive used for adhering wood to wood (other than the manufacture of plywood) shall be "room temperature resorcinol glue" (synthetic resin type) applied in accordance with manufacturer's instructions, and shall conform to MIL-A-397B.

E. Gaskets

(1) Panel Joints. Gaskets for joints shall conform to
Specification MIL-C-3133, Class ES, Grade 41.

F. Insulation

(1) Panels. Insulation shall be 1-1/2-inch-thick fiberglass blanket with a density of 3/4 pound per cubic foot.

G. Coatings


(2) Cadmium Plating. Conform to Specification QQ-P-416a, Class I, Type II.

H. Paints

(1) Primer. The primer shall conform to Specification TT-P-636c.

(2) Enamel. The enamel shall conform to Specification TT-E-529a, Class A.

I. Hardware

(1) Hinges. Hinges shall conform to Specification FF-H-116c, Type 2171H.

(2) Door Latch Set. The door latch set shall be the type used in walk-in coolers. It shall be easily operated from either inside or outside the door by a person wearing polar-type mittens.

(3) Chain. All chain and chain attachments shall conform to Specification NR-C-271a.

J. Electrical Materials

(1) Miscellaneous. Materials listed below shall conform to specifications as noted:

<table>
<thead>
<tr>
<th>Materials</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) Wire connectors</td>
<td>W-S-610, Type IA, Style 1.</td>
</tr>
<tr>
<td>(b) Outlet boxes</td>
<td>W-J-800a, Type 3, Size H.</td>
</tr>
</tbody>
</table>
Materials | Specification
---|---
(c) Panelboards | W-P-131a(2), Class 1.
(d) Receptacles and plugs | W-C-596, Style A-4.

(2) **Conductors.** Conductors in buildings shall be copper, of size indicated, color coded; insulation to be of a type to withstand bending at -50 F without damage.

(3) **Lighting Fixtures.** Conform to Specification 9Th.

**K. Heating and Ventilating Materials and Equipment**

(1) **Space Heater.** Diesel oil fired, gravity type with float control and pot-type burner. It shall have an output of 25,000 Btuh.

(2) **Air Intake and Exhaust Blowers.** The blowers shall operate on 115 volt, 60 cycle, single-phase current and deliver a minimum of 60 cfm.

(3) **Fuel Line.** Supply line shall be copper tubing conforming to Specification WW-T-799a, Type K.

(4) **Vents and Vent Caps.** Joints shall be a snap-lock type, easily assembled and disassembled. All fittings and vent caps shall match vent and be of the same manufacture. Sizes as indicated on the drawings.

3. **Fabrication**

A. **Panels**

(1) **Frame.** All framing members shall be fabricated of one continuous piece (no splice), and lap joint construction shall be used at all corner intersections of framing members. All laminated framing members shall be glued and nailed with 3d zinc-coated nails. All rib joints shall be glued and toe-nailed to the frame with 6d finishing nails in pre-drilled holes of smaller diameter than the nail.

(2) **Plywood.** All plywood shall be secured to the frame and ribs with glue and 2d zinc-coated nails on 6-inch centers. When panels require widths of plywood greater than 4 feet, a scarf joint shall be used for the splice. Aluminum cladding shall be factory bonded to the plywood.
(3) **Insulation.** Insulation blankets shall be spot cemented to one face of the panels at four corners and at 12 inches on center along edges.

(4) **Joint Gaskets.** All bolted joints between panels shall contain a gasket fastened one side only with contact cement. Gasket shall be secured on outer lap of all lap joints and the outer lap side of all corner joints. Bolt holes shall be cut in the gasket after installation on the panel.

(5) **Paint.** One coat of primer and two coats of enamel shall be applied. All exterior surfaces shall be painted international orange. All interior surfaces shall be painted light green. All aluminum surfaces shall be unpainted. Metal surfaces shall be degreased before painting.

(6) **Marking.** Panels shall be stenciled for the mark number at the top of each face for wall panels, and at one end each face for roof and other panels.

D. **Portable Manigan Floor**

(1) **Welding.** All welding shall conform to A.W.S. Specifications.

(2) **Connectors.** All nuts and bolts, except carriage type, bearing on wood shall have flat washers.

(3) **Paint.** All surfaces shall be painted with one coat of primer and two coats of enamel. Floor panels shall be light green or gray. All other surfaces shall be international orange.
Appendix A

STANDARD SPECIFICATIONS

The standard specifications given in the following list or mentioned in the text shall govern in all cases where references to standard specifications are made. In case of difference between these standard specifications and this specification or its accompanying drawings, this specification or its accompanying drawings shall govern. Special care shall be exercised to refer in requests for quotations, in orders, and in subcontracts to the standard specifications and to all modifications thereof.

Military


MIL-C-3133 Feb. 14, 1950 Cellular rubber products, general purpose (except ebonite)

NAVDOCKS

97h Sept. 1956 Electrical apparatus, distributing systems, and wiring

Federal

W-C-596 Aug. 19, 1959 Connector, plug, electrical; connector, receptacle, electrical; plate, wall, electrical

W-F-406a June 9, 1960 Fittings for electrical cable and flexible metal conduit

W-J-800a Apr. 2, 1958 Junction box; extension, junction box; cover, junction box, (steel, cadmium or zinc-coated)
Panelboards; equipped with automatic circuit-breakers

Splice, conductor

Bolts, nuts, studs, and top rivets (and material for same)

Hinges, hardware, builder's

Nails, wire; and staples

Screws, wood

Plywood; flat panel

Flating, cadmium (electro-deposited)

Steel bars, carbon, cold finished and hot rolled (general purpose)

Steel; carbon, sheet and strip

Zinc coating, electro-deposited, requirements for

Enamel, alkyed, semi-gloss

Primer coating, synthetic, wood and ferrous metal

Tubing, copper, seamless (for use with soldered or flared fittings)

**Non-Government**

All of the following specifications shall be of latest date unless indicated otherwise:

American Society for Testing Materials

Douglas Fir Plywood Association

West Coast Lumberman's Association Grading Rules No. 15
Appendix D

**DRAWINGS FOR THE SHIP WATERSAFETY**

The original of the drawings listed below and shown at reduced scale are available at the U. S. Naval Civil Engineering Laboratory, Port Hueneme, California.

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<th>X-78 Drawing No.</th>
<th>Title</th>
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<td>993670</td>
<td>Standard portable cargo fabricator requirements</td>
</tr>
<tr>
<td>993671</td>
<td>Standard portable cargo assembly</td>
</tr>
<tr>
<td>993672</td>
<td>Extra-wide portable cargo fabricator requirements</td>
</tr>
<tr>
<td>993673</td>
<td>Extra-wide portable cargo assembly</td>
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<tr>
<td>993674</td>
<td>Standard small cargo fabricator requirements</td>
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<tr>
<td>993675</td>
<td>Standard small cargo assembly</td>
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<tr>
<td>993676</td>
<td>Extra-wide small cargo fabricator requirements</td>
</tr>
<tr>
<td>993677</td>
<td>Extra-wide small cargo assembly</td>
</tr>
<tr>
<td>993678</td>
<td>Standard portable cargo floor assembly</td>
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<tr>
<td>993679</td>
<td>Standard portable cargo floor skids and cross members</td>
</tr>
<tr>
<td>993680</td>
<td>Standard portable cargo floor frame, panels, and connectors</td>
</tr>
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<td>X60 Model No.</td>
<td>Title</td>
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<tr>
<td>993601</td>
<td>Standard portable vanigon floor tongue</td>
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<td>Extra-wide portable vanigon floor assembly</td>
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<td>993603</td>
<td>Extra-wide portable vanigon floor slides and cross members</td>
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<tr>
<td>993604</td>
<td>Extra-wide portable vanigon floor frame, panels, and connectors</td>
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<td>993605</td>
<td>Extra-wide portable vanigon floor tongue</td>
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<td>993606</td>
<td>Standard sled vanigon floor MX-26 and MX-30 panels</td>
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<td>993607</td>
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<td>993608</td>
<td>Extra-wide sled vanigon floor MX-1 and MX-3 panels</td>
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<td>993609</td>
<td>Extra-wide sled vanigon floor MX-2 panel</td>
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<td>993610</td>
<td>Vanigon sidewall MX-4 and MX-6 panels</td>
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<td>Extra-wide portable vanigon endwall MX-14 and MX-17 panels</td>
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<td>993615</td>
<td>Extra-wide portable vanigon endwall MX-18 panel</td>
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<td>993696</td>
<td>Standard sled wanigan endwall MK-31 and MK-32 panels</td>
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<td>Extra-wide sled wanigan endwall MK-8 and MK-10 panels</td>
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<td>Sled wanigan door MK-9 panel</td>
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<td>993699</td>
<td>Portable wanigan door MK-20 panel</td>
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<td>993701</td>
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<td>993703</td>
<td>Standard wanigan roof MK-24 panel and MK-7 gusset plate</td>
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<td>993706</td>
<td>Extra-wide wanigan roof MK-13 panel and MK-7 gusset plate</td>
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<td>993707</td>
<td>Wanigan accessories heating and ventilating system</td>
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<td>993708</td>
<td>Wanigan accessories electrical harness</td>
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<tr>
<td>993709</td>
<td>Wanigan accessories side-mounted fuel tank</td>
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