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From: Commander, Naval Facilities Engineering Command (NAVFAC Criteria Office)

Subj: INTERIM TECHNICAL GUIDANCE (ITG) – FACILITIES HOMEPORTING  
CRITERIA FOR NIMITZ CLASS AIRCRAFT CARRIERS

Encl: (1) Interim Technical Guidance (ITG) for Facilities Homeporting Criteria for Nimitz  
Class Aircraft Carriers

1. Purpose. The purpose of this guidance is to advise facility engineers, planners, and maintenance personnel of minimum facility planning and design criteria necessary to ensure efficient in-port operations of Nimitz class aircraft carriers. Use this document to support planned Military Construction (MCON) for facilities supporting these vessels. Existing sites may not meet all criteria and, therefore, perform less efficiently. However, future sites should incorporate the requirements stated herein. Retain this guidance until it is incorporated into the criteria noted in paragraph 5.

2. Background. Changes in homeporting assignments for Nimitz class aircraft carriers (CVN-68) have necessitated the construction of several new facilities to support these vessels. The Navy is constructing new CVN berths and industrial facilities at North Island Naval Air Station. Likewise, Puget Sound Naval Shipyard/Station is upgrading existing and constructing new facilities to support CVN homeporting. A third CVN homeport is expected at an undetermined location early next century. The Navy has used enclosure (1), in draft form, for the planning and design of the North Island and Puget Sound facilities. This ITG finalizes the draft criteria.

3. Discussion. This criteria is a compilation of lessons learned from existing CVN homeports, planning studies, COMNAVSEASYS COM, COMNAV A IRLANT, and COMNAV A IRL PAC. It includes state-of-the-art technology in vital facility areas such as mooring, dredging, shore steam, and oily waste collection. Congressional support for all new construction is dependent on specific planning and design criteria applied consistently throughout the Navy - hence, the need to formalize the criteria.

4. Technical Guidance. See enclosure (1).

5. Action.

a. Engineering Field Divisions (EFDs), Engineering Field Activities (EFAs), and Officers in Charge of Construction (OICCs) shall plan, design, and construct CVN homeports according

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to the criteria stated herein. This document shall be used in conjunction with Activity and Fleet site specific requirements.

b. NAVFAC Criteria Office will coordinate revisions of the following criteria to incorporate the ITG stated herein:

- (1) Military Handbook 1025/1, "Piers and Wharves,"
- (2) Military Handbook 1025/2, "Dockside Utilities for Ship Service"
- (3) Military Handbook 1025/6, "General Criteria for Waterfront Construction"
- (4) DM 26.1, "Harbors"
- (5) Military Handbook 1026/4, "Mooring Design" (currently in draft format)

5. Coordination. This ITG has been coordinated with COMNAVSEASYSKOM, COMNAVAILANT, COMNAVIRPAC and internally within NAVFACENGCOM.

6. Points of Contact. For clarification or additional information related to this subject, please contact the NAVFAC Criteria Office point of contact, David Curfman, P.E., DSN 262-4203, 757-322-4203, fax 4416, email address *curfmanrd@efdlant.navy.mil*.

P. N. BOLTON  
By direction

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**INTERIM TECHNICAL GUIDANCE -  
FACILITIES HOMEPORTING CRITERIA  
for  
NIMITZ CLASS AIRCRAFT CARRIERS  
3 November 1998**

**SECTION 1 – Command Issues**

**1-1. Scope**

a. This document provides minimum facility planning and design criteria for efficient homeport operations of active Nimitz class aircraft carriers. Existing ports, facilities, and berths may not meet all criteria and may, therefore, perform less efficiently, but do not necessarily require upgrade.

b. Piers and wharves at Homeports may be grouped into 3 categories:

- Type I – Fueling and Ammunition
- Type II – General Purpose
- Type III - Repair

The requirements are different for each type. This document focuses on the entire homeport operation. The ship will visit fueling and ammunition piers for short periods, but generally berth at general purpose berthing piers. Every 18 months the carrier will undergo a 6-month “Planned Incremental Availability (PIA)” at the repair berth. Ships in dry dock, at liberty ports, and in inactive status require specialized criteria that NAVFAC will provide as requested.

c. This document supplements basic criteria contained in the following documents:

- Military Handbook 1025/1, “Piers and Wharves,”
- Military Handbook 1025/2, “Dockside Utilities for Ship Service”
- Military Handbook 1025/6, “General Criteria for Waterfront Construction”
- Military Handbook 1026/4, "Mooring Design" (Draft)
- DM 26.1, “Harbors”
- NAVFAC P-80, “Facility Planning Criteria”

**1-2. Minimum Personnel and Support Facilities and Services**

Contact local NAVFAC representative for specific facilities and services required for each site such as police, fire, medical, MWR, administrative, housing, and family services.

### **1-3. Local Fire Regulations**

a. Fire aboard ship - The responsibility for fire prevention and protection for a ship in-commission rests fully with the Commanding Officer of the ship. However, all piers and wharves shall provide fire alarm systems or telephone connections to alert local fire department for truck and or tug supplemental support. Unless the berth will be used during full cold iron condition, such as for PIA, pressurized fire fighting water systems are not required. Berths designated for the PIA will require pressurized fire-fighting systems and salt water systems

b. Local fire protection systems may be called upon to support extensive ship board fires and augment fixed systems.

### **1-4. Disaster Control and Emergency Plans**

a. In an emergency, tugs may not be available. Therefore, the slip, berth, basin, and channels should allow the ship to get underway without assistance. See OPNAVINST 3040.5c.

b. Should the ship be unable to leave prior to heavy weather (such as during a PIA), a Heavy Weather Mooring plan should be established for winds from 34 knots (39 mph) to the predicted 100-year recurrence wind speed at the site. General purpose berths are normally designed for 64-knot (75-mph) winds. Therefore, winds in excess of 64 knots (75 mph) such as may be seen at repair berths require special considerations. NAVFACENGCOM expects to publish separate Heavy Weather Mooring Facility criteria in December 1998.

c. Design facility systems for continuous operation in the event of a power outage

### **1-5. Ship Characteristics**

a. Draft – use the limiting draft for the largest CVN in determining minimum water depth requirements; i.e., 40.8 ft.

b. Displacement – use the largest displacement expected of any CVN in determining berthing forces on the pier or wharf; i.e., 104,200 long tons.

c. Length – use the overall length for the longest CVN to determine pier and wharf length and utility locations; i.e., 1123 ft.

d. Breadth – use the widest to determine horizontal clearances and slip width; i.e., 280 ft. Note that the waterline beam for CVN 68-75 is 134 ft and the width of the flight deck structure (with antenna platforms, walkways, and portable flight deck sections removed) is 252 ft. Without removing these appurtenances, CVN 68 is 260 ft and CVN 76 is 280 ft wide.

e. Height – use the lightly loaded height of 215 ft above the waterline.

## **SECTION 2 - Navigation**

## **2-1. Channel Approaches (Outer Channels) – site specific criteria**

a. Coordinate dimensions of approaches with the NAVFAC Criteria Office, NAVSEASYS COM, and COMNAVAIRLANT N4, or COMNAVAIRPAC N4. Consideration should be given to traffic lanes, local commercial traffic, navigational aids, magnetic anomalies, electronic navigation aids, waves, winds, currents, use-frequency, pilotage and tugs. Contact the US Coast Guard for navigational marking requirements and bridge clearances.

b. The geometrics of the approaches (depth, width, and course) are dependent on many operational and environmental factors. The wave environment greatly affects the required depth to transit the approach. Local commercial traffic affects the width. Maneuverability is the primary driver for the course. Consequently, the planner must examine each channel approach separately. Contact the NAVFAC Criteria Office to assist in evaluating or designing channel approaches.

c. Contact the local NAVFAC representative, who will contact the US Army Corps of Engineers to address environmental and material disposal issues.

## **2-2. Entrances and Harbors – site specific criteria**

a. Entrance Restrictions – Entrance channels provide access between deep water subjected to a strong wave environment to sheltered harbors. Contact local Port Authority for any operational restrictions.

b. Entrance Currents - Strong currents greatly affect the usability of entrance channels. These currents should be quantified and the impact assessed during the planning stages.

c. Minimum Entrance Depth - CVN's require 50.0 feet of water during transit of channels (usually during mean to high tides) greater than 1000 ft. wide. Narrower channels require greater depths. Tides and waves should be quantified and the impact assessed to determine if a dredge depth of greater than 50.0 feet is required. Siltation occurs in most channels and shall be quantified initially. The design depth should then be deeper than the requirement to accommodate siltation. Expected siltation can be addressed through advance maintenance dredging or other means. More detail is contained in "ITG – CVN Dredge Depth Criteria," NAVFACENGCOM, dated 4 March 1997. That ITG includes NAVSEA ltr 11460 Ser 03D3/242, dated 3 Jan 95, "CVN 68 Class Water Depth Requirements".

d. Minimum Entrance Channel Width (outside breakwaters) – depends on wave and current environment but generally at least 800 ft. at toe of slope, assuming no bends in the channel and one way traffic during transit.

e. Vertical Bridge Clearances - 250 ft. Mean Higher High Water (MHHW) when ship is in light condition. Light condition occurs when ship has no aircraft, airwing, ammunition, and has 55% of JP-5, 10% of provisions and stores, 10% of potable water, aircraft handling vehicles, and 25% onboard discharge tank water. This height is based on the older CVs. If the facility is designed explicitly for Nimitz class, use 230 ft. MHHW.

f. Turning Basin Criteria – 2200 ft (optimal)/1650 ft (absolute minimum with full tug support) radius. Tug availability should be considered. Minimum depth = 49.5 ft. at Mean Lower Low Water (MLLW) and 45.5 ft at Extreme Low Water (ELW) with no waves as explained below.

g. Minimum Inner Channel Width (inside breakwaters) – 600 ft. min. at toe of slope, assuming no bends in the channel and no other traffic during transit. Narrower widths may create maneuverability difficulties, increase risk of grounding, and increase sinkage thus reducing efficient homeport operations.

### **2-3. Berths**

a. Minimum slip width - 600 ft. with no other ships, 800 ft with CVN on opposite berth. Add 100 ft to width if ships are berthed at the bow or stern also.

b. Minimum slip depth - 49.5 ft. min. at Mean Lower Low Water (MLLW) and 45.5 ft. min at Extreme Low Water (ELW). The requirement at MLLW is based on preventing fouling of sea chest intakes. The requirement at ELW is based on preventing grounding. Over time, siltation occurs in most slips and should be quantified initially. The design depth should then be deeper than the minimum to accommodate siltation. Siltation may be mitigated through advance maintenance dredging or other means. These depths provide protection against condenser fouling and grounding, and accommodate variability in displacement, list and trim. More detail is contained in “ITG – CVN Dredge Depth Criteria,” NAVFACENGCOM, dated 4 March 1997. The ITG includes NAVSEA ltr 11460 Ser 03D3/242, dated 3 Jan 95, “CVN 68 Class Water Depth Requirements”

c. Minimum slip length - 1300-1325 ft. min. This range in slip length provides adequate space for bow and stern lines, provides a safety clearance fore and aft of 100 ft., and facilitates emergency sorties without tug support. However, five to eight tugs should be available for berthing operations.

d. Arrangement – CVN’s are typically moored “starboard-side-to” to allow access to the ship’s three elevators for on/off loading.

### **2-4. Tides and Currents**

a. Tides - avoid locations subject to tides greater than 10 ft. Location subject to tides greater than 10 ft. are functional but incur increased operational costs due to increased line tending, utility connection fatigue, and fender degradation.

b. Currents - avoid locations subject to average broadside currents greater than 3 knots. Moorings on Naval vessels are typically designed to resist up to 3 knot current. Local eddies can also make mooring difficult.



c. Seiches - avoid locations subject to seiches (long-period waves of large amplitude). Extreme and unpredictable surge may part mooring lines and damage vessel.

d. Tsunamis - avoid locations subject to tsunamis (seismic sea waves). Extreme and unpredictable surge may part mooring lines and damage vessel.

## **2-5. Winds and Weather**

a. Winds - Moorings on Naval vessels are typically designed to resist wind speeds up to 50 knots (58 mph) coupled with a 3 knot current. Design facilities assuming the vessel is at the berth in winds up to 64 knots (75 mph). See also “Disaster Control and Emergency Plans” above.

b. Weather - Frequent fog and ice impact the efficiency of naval ports and sites should be selected with low occurrences.

## **2-6. Port Regulations**

Contact the Local Port Authority for regulations that may affect homeporting considerations. While regulations are dynamic, items such as environmental protection, oily waste and sewage collection, clean air regulations, garbage and trash disposal, recycling, and channel speed limits can affect the optimization of a homeport.

## **SECTION 3 - Repair**

### **3-1. Coordination of Repair**

Coordinate capability of local ship repair facilities and salvage operations with NAVSEASYS COM PMS 312 and Code 08, COMNAV A IRLANT N4, or COMNAV AIR PAC N4. The following facilities should be available within a reasonable distance from the homeport to minimize disruption to families and to allow an acceptable level of sailor quality of life as defined in PERSTEMPO requirements.

a. A Controlled Industrial Facility (CIF) or Radiological Work Facility used for the inspection, modification, and repair of radiological controlled equipment and components associated with Naval nuclear propulsion plants. It also provides facilities and equipment for the treatment, reclamation, and packaging for disposal of radiologically controlled liquids and solids. It includes non-radiologically controlled spaces for administration and other support functions.

b. A Ship Maintenance Facility (SMF) housing the machine tools, industrial processes and work functions necessary to perform non-radiological depot level maintenance on CVN propulsion plants. Non-radiological work is the primary burden of work during Nimitz availability.

c. A Maintenance Support Facility (MSF) housing both administrative and technical staff offices supporting CVN propulsion plant maintenance, as well as central area for receiving,

inspecting, shipping, and storing hazardous/mixed waste materials and maintenance materials, and controlled radiological tank storage.

d. Dry-dock facilities exist only in the Hampton Roads area. Aircraft carriers will be located to this location during periods when this service is required. Contact NAVSEA for specific requirements.

## **SECTION 4 - Logistics**

### **4-1. Pier and wharf width**

a. Wharves or piers with berths on one side = 90 ft min (20 ft bollards and utilities, 35 ft mobile crane ops, 15 ft. fire lane, 20 ft for loading area).

b. Piers with berths on both sides = 150 ft. min. (40 ft bollards and utilities, 70 ft mobile crane ops/loading area, 15 ft fire lane, 25 ft for loading area). This requirement is for carrier (CVN) berths or a combination of CVN/AOE berthed. Recommend 150-foot wide piers based on operational experience of existing facilities.

c. These widths provide adequate space for line handling, utility maintenance, ship maintenance, replenishment, and fire fighting access. Transformers are assumed off-deck or under-deck, deck mounted transformers require additional 25 ft. of pier width.

### **4-2. Pier and wharf length and height**

a. Pier and wharf length should be 1300-1325 ft. min.

b. Deck height must not conflict with CVN elevators. When lowered, the lowest projection of the elevator is 9.0 ft above the water for a fully loaded CVN. Generally deck height is set 2/3 the significant wave height + 3 ft. above Mean Higher High Water (MHHW). Camels, as mentioned later, generally provide enough standoff to prevent interference. However, camels of narrower width may result in interference.

### **4-3. Pier strength**

a. Live load = 800 psf min.

b. Mobile Crane load = 2-140 ton mobile cranes. Confirm crane sizes with those available at the location. During availability, cranes will periodically handle 60,000-pound tanks. Most lifts are in the 40,000-pound range.

c. Aircraft range in weight from 35,000 pounds to 74,000 pounds. Due to the 75-ft reach, use 75-ton portal cranes to remove aircraft from the flight deck. Contact local Activity to determine optimal lifting method. A portal crane has been used to lift a 90,000-pound mobile crane onto a carrier flight deck.

d. Bollards – For 64 knot wind capability, the pier should have at least 12-100 ton bollards at 100 ft centers and 4-200 ton storm bollards at each end of the berth.

**4-4. Supporting items - provide the following**

a. Camels - Three camels (one spare) of minimum width 55 ft. are required to prevent interference between the ship elevator and the pier deck. Naval Station Norfolk uses 32-ft wide camels but provides a 2 degree list. Naval Station Everett uses 60-ft wide camels. Camels may be barges or fabricated from NAVFACENGCOCM standard drawings and specifications. Structurally evaluate barge for severe weather conditions. Also consider crane lift ability in camel design and utility location. NAVSEA PMS 312 recommends 60-ft camels for new CVN homeports.

b. Aircraft Support - Aircraft require extensive support. Those requirements are not addressed herein.

c. Laydown Area - A minimum of 5 acres of laydown area in addition to pier/wharf space is desirable. The laydown area should be within ½ mile of the pier/wharf.

d. Brows – 2- 45 ft brows are usually placed on ship’s elevator #2 and 1-60 ft brow is placed between elevators #2 and #3 to the main deck.

e. Other Ship Use - CVN berths should generally be designed to accommodate a variety of surface combatants that may use the facilities.

f. Power - Ship-to-shore power/telecommunications cables.

g. Warehouse Space - General warehouse space accessible to large trucks and handling equipment.

h. Permit no pier interferences such as utilities and deck appurtenances in the zone of carrier elevators 1, 2, and 3.

#### 4-5. Shore Utility Requirements (per CVN) <sup>(5)</sup>

Utility	Quality	Peak Demand with Air Wing	Average Demand Without Air Wing
a. Steam	Certified Pure, 150 psi	50,000 pph (pounds per hour)	35,000 pph
b. Potable water	EPA Approved, 40 psi (residual)	1000 gpm (gallons per minute) and 185,000 gpd (gallons per day)	1000 gpm and 95,000 gpd
c. Pure water	Certified Pure	150 gpm and 20,000 gpd	150 gpm and 20,000 gpd
d. Fire fighting water <sup>(1)</sup>	Salt or nonpotable, 150 psi	4400 gpm	4400 gpm
e. Cooling/flushing water	Salt or nonpotable, 150 psi	4100 gpm	4100 gpm
f. Compressed air (portable or pier-based system)	125 psig	2400 scfm	2400 scfm
g. Shore power <sup>(2)</sup>	4160V	2880 amps (21,000 kVA)	1800 amps (13,000 kVA)
h. Sanitary sewer <sup>(3)</sup>	400 gpm pumps	310,000gpd	190,000 gpd
i. Telephones	Not applicable	200 twisted pairs with 60 pairs of active lines	Same
j. Telecommunications	Not applicable	IT-21 requirements under development, contact NAVFAC Criteria Office	Same
k. Oily waste collection <sup>(4)</sup>	200 gpm	80,000 gpd	35,000 gpd
l. High pressure air	Chaper 9490 NSTM	3000-4500 psi	3000-4500 psi

Notes:

- (1) Include salt water for fire fighting and cooling/flushing when potential exists for ship to be in cold iron status. Total demand equals fire fighting plus cooling/flushing flow.
- (2) Supplemental 480 V service is recommended on all CVN piers for use by other classes of ships.
- (3) There are two types of CVN sanitary sewage systems. CVN 68-71 has 7 tanks with 3 manifold discharge stations. Each station has 2-400 gpm pumps. CVN 72-76 has 2 tanks with 2 discharge stations. Each station has 2-400 gpm pumps.
- (4) Peak demand assumes emptying an 80,000 gallon shipboard oily waste holding tank (OWHT) at arrival.
- (5) For multiple CVN's at the pier, contact the NAVFAC Criteria Office for diversity factors for each utility system.