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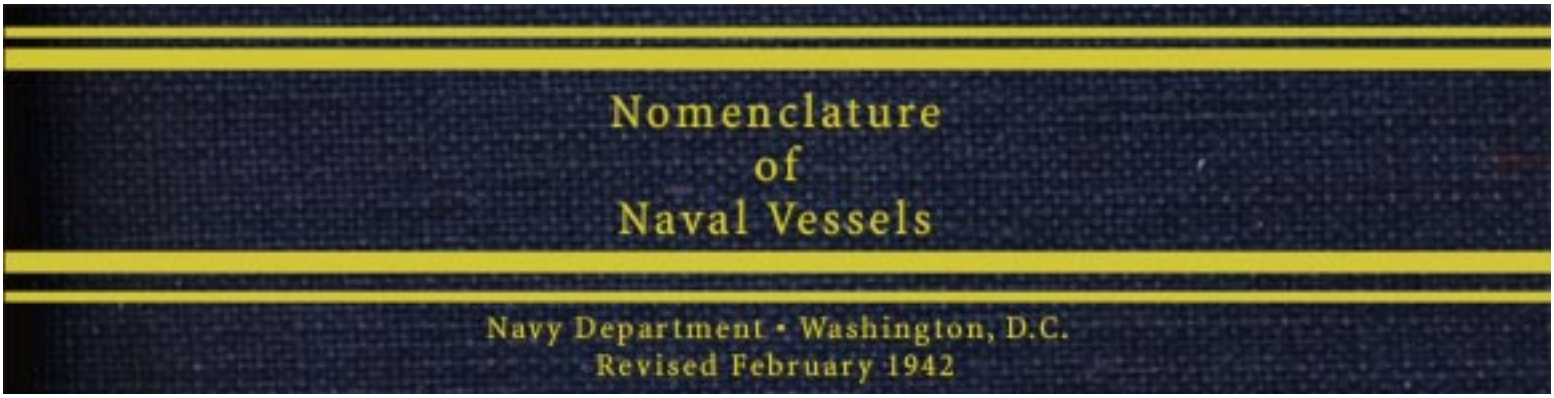

NAVY DEPARTMENT
WASHINGTON, D.C.
Revised February 1942

CONTENTS

A	**B**	**C**	**D**	**E**	**F**
G	**H**	**I**	**J**	**K**	**L**

M	N	O	P	Q	R
S	T	U	V	W	X Y Z

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Prepared by

THE DIVISION OF PERSONNEL SUPERVISION AND MANAGEMENT

WITH THE COOPERATION AND ASSISTANCE OF

THE BUREAU OF SHIPS

PREFACE TO THE SECOND EDITION

The requirements of navy yards and stations, private shipbuilding plants and vocational defense training schools for NOMENCLATURE OF NAVAL VESSELS, in connection with their training programs, have exhausted the first edition. However, in reprinting this pamphlet it has been revised to make it more complete, and to include the charts of ships' section which were developed at the Navy Yard, Philadelphia, Pennsylvania.

Charles Piozet,
Director of Personnel.

PREFACE TO THE FIRST EDITION

"Nomenclature of Naval Vessels" has been prepared primarily for use in the apprentice schools at the

various navy yards and stations. It is believed, however, that it will be found useful for reference purposes by engineers, draftsmen, inspectors, and others interested in the construction of naval vessels.

The materials developed in the courses of instruction for "in-service" training at the Navy Yards, Mare Island, Philadelphia, and Boston, have been used in the preparation of this book. The Design Division of the Bureau of Ships assisted in compiling and revising the material.

Charles Piozet,
Director of Personnel.

INTRODUCTION

In its construction, a ship or vessel, like a building, is started on its foundation and carried through to completion by the fitting and securing of its many parts together to form a designed shape. However, the nomenclature of the several members of which the ship is composed and the parts and spaces provided in its erection differs from that used for buildings.

The foundation of a ship is called the KEEL and extends FORE and AFT from BOW to STERN, which, when speaking of a building in a similar way, would be from front to back. The STEM is located at the very forward end of the keel and the STERN POST to which the RUDDER is attached is at the after end. The keel is the "backbone" of the ship, and extending outward from it to form the "ribs" or framing of the ship are the FRAMES, to which steel PLATES are welded or riveted to form the "skin" or SHELL of the ship.

The ship is divided into it many spaces by "walls" called BULKHEADS, and these spaces or rooms are called COMPARTMENTS or TANKS as the case may be. Corresponding to the floors of a building of several stories are the DECKS and PLATFORMS which are made of steel plates laid across steel beams called DECK BEAMS. The "windows" of a ship are called PORTHOLES, and entrance into compartments or tanks is gained through DOORS, HATCHWAYS, SCUTTLES, or MANHOLES. The "chimneys" are called STACKS or FUNNELS. The ship is driven through the water by the PROPELLER, sometimes called the WHEEL, and it is steered by the RUDDER.

Looking from the stern in a direction toward the bow, the right-hand side of the ship is called STARBOARD, the left-hand side, PORT. When a ship is being constructed, the frames are shown on blueprints and are numbered from the forward toward the stern commencing with the first frame at the bow of the ship. The zero point is taken at the

FORWARD PERPENDICULAR, which is a design point on the stem of the ship, the first frame aft of this point being called FRAME #1, the second, #2, and continuing consecutively to the AFTER PERPENDICULAR which is a design point located at the after end of the ship. Usually frames on a ship are

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evenly spaced; however, in some sections, as for example, the very bow of the ship, the frames are close together due to strength requirements. The various units placed aboard ship are located fore and aft, according to a position, relative to a certain distance from the closest frame; up or down relative to a certain distance above or below a particular deck or the base line; and port or starboard relative to a certain distance from the CENTER LINE of the ship.

The following expression is given as an example of ship terms, and shows how a workman would locate himself aboard ship to do a job assigned to him. He steps ABOARD ship from a "walk" called a GANGWAY, walks across the deck to either the PORT or STARBOARD side (as the case may be), goes (upstairs) ALOFT or TOPSIDE by means of a "stairs" called a LADDER to the DECK above (do not say upstairs or downstairs); or after crossing the DECK, he goes through a HATCHWAY below on the LADDER to the second deck, walks forward along a "hall" called a passageway, goes through another HATCHWAY and down the ladder to the first PLATFORM, walks along another passageway and removes a MANHOLE COVER to gain entrance to the COMPARTMENT below, which happens to be located between frames #26 and #35.

A naval vessel, when constructed with both an inner and an outer bottom, has a DOUBLE BOTTOM, the spaces between the inner and outer bottoms being called DOUBLE BOTTOM TANKS. This construction provides protection against flooding of compartments and possible sinking of the ship should a hole be torn in the outer bottom. BULKHEADS between compartments and other sections of the ship are made oiltight or watertight to prevent leakage should adjacent compartments be filled with oil or water, respectively. The HULL or SHELL must also be made watertight.

The shell plates are laid end to end in rows called STRAKES from stem to stern, some of the strakes being given special names; as, for example, the bottom strake port and starboard next to the keel is called the GARBOARD STRAKE. Plates are usually spoken of by weights instead of thicknesses, said weight being the weight for a square foot of plate surface of a given thickness. A 5-pound plate is a plate 1/8 inch thick, each square foot weighing 5 pounds, and using this as a factor, a 7 1/2-pound plate would be 3/16 inch thick, a 10-pound plate, 1/4 inch thick; a 20-pound plate, 1/2 thick, etc.

(VIII)

Various structural shapes are used for framing and strength members in ships. Some of the shapes (shown in cross section) are as follow:

(IX)

NOMENCLATURE OF DECKS AND NUMBERING OF WATERTIGHT COMPARTMENTS

There are two types of decks--complete decks and partial decks. A complete deck is a deck running the full length of the ship and a partial deck is a deck running only part of the length of the ship. Decks are named according to their location above or below the main deck, which is the highest deck extending from stem to stern.

A partial deck above the main deck at the bow is called the "forecastle deck"; at the stern, "poop deck"; admidships, "upper deck." The name "upper deck," instead of "forecastle deck" or "poop deck," is applied to a partial deck extending from amidships to either bow or stern. A partial deck above the main, upper, forecastle, or poop deck and not extending to the side of the ship is called the "superstructure deck."

A complete deck below the main deck is called the "second deck." Where there are two or more complete decks below the main deck, they are called the "second deck," "third deck," "fourth deck," etc. A partial deck above the lowest complete deck and below the main deck is called the "half deck." A partial deck below the lowest complete deck is called a "platform." Where there are two or more partial decks below the lowest complete deck, the one immediately below the lowest complete deck is called the "first platform," the next is called "second platform," and so on.

Decks which for protective purposes are fitted with plating of extra strength and thickness are further defined, for technical purposes, as "protective" and "splinter," in addition to their regular names. Where there is only one such deck, it is defined as "protective" and where there are two, the lower one is defined as "splinter" in addition to the regular names.

Watertight compartments are specified by letters and numbers. Compartments in each division are numbered beginning at the forward end of each division. The ship is considered as divided into three principle divisions, lettered, A, B, C, from forward aft.

Division A.-- This comprises all of the space between the stem and the forward transverse bulkhead of the forward machinery compartment.

Division B.-- This comprises all of the space between the forward transverse bulkhead of the forward machinery compartment and the after transverse bulkhead of the after machinery compartment.

Division C.-- This comprises all of the space aft of the after transverse bulkhead of the after machinery compartment.

The term "machinery compartment" is construed as meaning firerooms, boiler rooms, engine rooms, main motor rooms, main machinery

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spaces, and compartments in which auxiliaries of the main propelling machinery are located. Where the number of the compartments in the 1 to 100 series exceeds 100 in any principal division, the matter is referred to the Bureau of Ships. These divisions are considered as extending from the keel to the highest deck in the line of the bulkheads, or the bulkheads prolonged. In case the bulkheads do not extend to the highest deck, any space between decks that extends through two of the principal divisions is numbered as if it were situated entirely in the forward division of the two in which it is placed, and has this number only. Main compartments with permanent openings to the top side, such as boiler rooms, are considered as completely bounded by tight structure for numbering purposes.

All numbers in each division begin at the forward end of that division. Compartments on the starboard side of the ship have odd numbers; those on the port side, even numbers. All compartments and spaces that are completely bounded by watertight, oiltight, airtight, or fumetight structure are numbered. Where a watertight compartment located below the weather deck is divided into two or more airtight or fumetight spaces by airtight or fumetight bulkheads, the appropriate number is assigned the watertight compartment and each airtight or fumetight subdivision within the compartment is designated by the addition of a suffix to this number. Thus, if watertight compartment A-312L contains a fumetight or airtight longitudinal bulkhead, the space to starboard of this bulkhead is designated as A-312-1L and the space to port as A-312-2L.

Oiltight and watertight compartments in each division on the main deck are numbered from 101 to 199, and those on each successive deck or platform below the main deck are

number in the next higher hundred series; namely, those on the second deck are numbered from 201 to 299; on the third deck, from 301 to 399, etc. Watertight compartments on the next deck or platform above the main deck are numbered 0101 to 0199, and those on each successive deck or platform above the main deck are numbered in the next higher hundred series, prefixed with a zero. For example, a ship that has a superstructure, forecastle, main, second and third deck, and a first and second platform, the oiltight and watertight compartments are numbered as follows:

On superstructure deck	0201 to 0299
On forecastle deck	0101 to 0199
On main deck	101 to 199
On second deck	201 to 299
On third deck	301 to 399
On first platform	401 to 499
On second platform	501 to 599
In hold, if there are no more platforms	601 to 699

Upper inner bottom compartments are numbered from 801 to 899 and lower inner bottom compartments are numbered 901 to 999. It will be noted that the prefix zero of a compartment number indicates that the compartment is above the main deck. If there is not a third deck, the compartments on the first and second platforms and in the hold are numbered 301 to 399, 401 to 499, and 501 to 599, respectively. If there is a fourth deck, the compartments on the fourth deck and first and second platforms and hold are 401 to 499, 501 to 599, 601 to 699, and 701 to 799, respectively.

On modern destroyers the compartment numbers in each division are as follows:

On main deck	101 to 199
On first platform	201 to 299
On second platform	301 to 399
In hold	401 to 499

Compartments in each division with no decks, extending from inner bottom or outside plating through two or more deck spaces, such as those in protective layers, engine rooms, boiler rooms, deep peak tanks, fuel-oil tanks on certain battleships, cargo holds, etc., are

numbered from 1 up to 100. Boiler and engine rooms are given the lowest numbers, B-1, B-2, B-3, etc. Where there is a half deck owing to the sheer or other cause, or where there is a flat between regular decks, such as cofferdam flat over oil tank, no change in the hundred series in made on account thereof. The above scheme of numbering is intended to give an indication of the vertical location of the compartment which, in connection with the divisional fore and aft location, will give a very fair idea of the position of the compartment.

The number of a compartment is always prefixed with the letter indicating the general division of the ship in which it is placed and separated from the number by a hyphen, as A-21, B-3, etc.

To define further the contents or main use of a compartment, the compartment number is followed by a designating letter, as follows:

A for storerooms, including:

Band room.
Refrigerator compartments.
Storerooms proper.
Tool and supply rooms.
Unassigned compartments usable as storerooms.

B for battery compartments, including:

Secondary battery compartments.
Torpedo rooms.
All compartments within turrets, including turret-handling rooms.

C for ship control and fire control, including:

Central.
Coding room.
Interior communication.
Main communication station.
Plotting room.
Radio rooms.
Switchboard room (secondary battery).
Torpedo tracking room.

E for machinery compartments, including:

Blower room.
Boiler room.
Distribution room.
Evaporator room.
General workshop.
Gyro stabilizer room.
Ice-machine room.
Laundry.
Main engine room.
Main motor room.
Main operating room.
Pump room.
Searchlight rheostat room.
Shaft alley.
Steering gear room.
Storage battery room.
Thrust block room.
Windlass room and chain locker.

NOTE.--The E may be omitted from the main propelling machinery compartments, comprising main engine rooms, boiler rooms, and main motor rooms.

F for fuel compartments, including:

Fuel compartments.
Diesel oil compartments.
Relay tank rooms.

LUB for lubricating oil storage tanks.

GAS for gasoline compartments, including:

Gasoline storage tanks.
Gasoline tank compartments.

L for living compartments, including:

Crew's spaces.
Officers' quarters.
Prisons.
Water closet and wash rooms.

M for ammunition spaces, including:

Bomb magazines.
Catapult charge magazines.
Fixed ammunition magazines.
Handling rooms except turret.
Mine charge magazines.
Powder magazines.
Shell rooms.
Small-arms magazines.
Torpedo war head magazines.

V for void compartments, including:

Cofferdam compartments.
Void double-bottom compartments.
Void wing compartments.

W for water compartments, including:

Drainage tanks.
Fresh-water compartments.
Peak tanks.
Reserve feed compartments.

A double-bottom compartment used for feed water is designated B-910 W, for oil B-909

F, if void A-902 V. When a space is devoted to several main purposes, two or more designating letters are used. Thus a living compartment containing a secondary battery guns is designated B-115 B L.

NOMENCLATURE OF MACHINERY SPACES

Fireroom.-- A compartment containing boilers and the station for "firing" or operating same.

Boiler room.-- A compartment containing boilers but not containing station for "firing" or operating the boilers.

Boiler operating station.-- A station from which a boiler or boilers are operated.

Boiler central control station.-- A station for directing control of all boilers at boiler operating stations.

Boiler emergency station.-- A station for a chief water tender from which he may proceed with minimum delay to any fireroom, boiler operating station, or boiler room from which trouble has been reported.

Engine room.-- A compartment in which the main propelling unit or units are installed.

Engine operating station.-- A location or compartment from which a main propelling unit or units are operated.

Machinery spaces.-- A collective term designating all the major compartments in which machinery under the cognizance of the Bureau of Ships is located.

NUMBERING COMPARTMENTS

The number of compartments is shown by means of label plates and tags of two types--engraved and embossed. Doors, hatches, and manholes are also numbered by means of label plates and tags. The inscription on door, hatch, or manhole plates is combined with that of the compartment or several compartments to which they provide access. Label plates are placed in a conspicuous location where they may be readily seen. Specifications for labelling are described in the pamphlet "General Specifications--Appendix 10" issued by the Bureau of Ships.

The following is an example of an inscription taken from the label plate on a door:

4-16-2
C.P.O. Stores
A-412

The first line of the inscription is the number of the door, the second, the designation of the compartment, and the third, the compartment number to which the door gives access.

From the above it will be noted that the door, hatch, or manhole number consists of two or three parts, separated by hyphens. The first part corresponds to the deck number; the next part, the frame number just forward of the hinge of the door; and the last part, the number of the door, if there is more than one door on the same frame on the deck designated by the first part; if not, the third part may be omitted. For the first part of their numbers, hatches and manholes take the number of the deck through which they are cut. Odd numbers are used in the third part for doors located on the starboard side and even numbers on the port side. For example:

Door 3-24-1 is on the third deck, frame 24, or between frames 24 and 25, starboard side.

Door 3-24-2 is on the third deck, frame 24, or between frames 24 and 25, port side.

Hatch 3-24-2 is on the third deck at or immediately aft of frame 24 on the port side.

In the principle living compartments and elsewhere throughout the length of a ship as may be necessary to locate readily a particular place, every fifth frame is numbered in accordance with "General Specifications--Appendix 10." The numbers may be seen on the seen on the beams in a conspicuous place along passageways and other routes of travel and are located as near the bottom edge of a beam as practicable.

Abbreviations allowable when inscription are long are as follows:

Amm.	for ammunition.	Med.	for medical.
A.T.	for airtight.	M.T.	for flametight.
Aux.	for auxiliary.	Nav.	for navigation.
BH.	for bulkhead.	N.T.	for nontight.
Circ.	for circulating.	Offs.	for officers.
Compt.	for compartment.	Ord.	for ordnance.

Const.	for construction.	O.T.	for oiltight.
C.P.O.	for chief petty officers.	R.S. Mag.	for ready-service magazine.
Cu. ft.	for cubic feet.	Sal. Pwdr.	for saluting powder.
Dis.	for discharge.	S.D.	for supply department.
Elec.	for electric.	Sergt.	for sergeant.
Equip.	for equipment.	Stbd.	for starboard.
Evap.	for evaporator.	Suc.	for suction.
For'd.	for forward.	T.	for tons.
F.O.	for fuel oil.	Torp.	for torpedo.
Fr.	for frame.	Trans.	for transverse.
F.T.	for fumetight.	Vent.	for ventilation.
Ft.	for feet or foot.	V.T.	for voice tube.
F.W.	for fresh water.	W.	for weathertight.
Gals.	for gallons.	W.C.	for water closet.
In.	for inch.	W.L.	for waterline.
J.O.	for junior officers.	W.O.	for warrant officers.
L.O.	for lubricating oil.	W.R.	for wardroom.
Mag.	for magazines.	W.T.	for watertight.
M.H.	for manhole.		

A more definite idea of the various parts of the hull of a ship may be obtained by closely examining a ship model in the Apprentice School or Drafting Room, and the plates at the back of this book.

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25 August 2003

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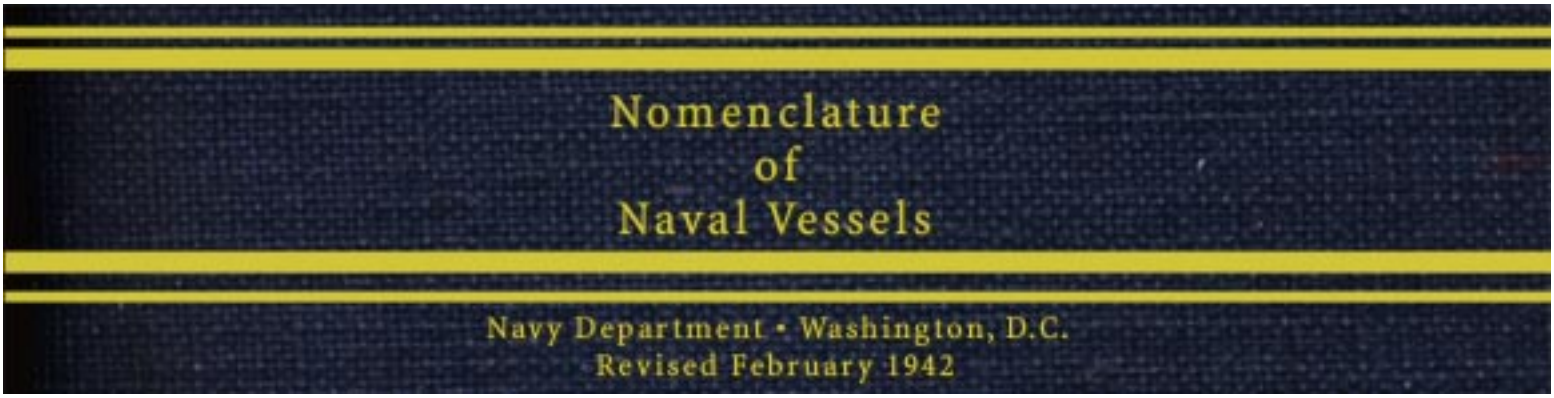

Abbreviations Used on Blueprints

A. L.
Accommodation Ladder.

A. P.
After Perpendicular.

A. S.
Angle Stiffener

Aft. B.
After Body.

Asst.
Assistant.

B. E.
Beveled Edge.

Bhd.

Bulkhead.

B. L.

Base Line.

Bat.

Batten.

Bev. Bd.

Bevel Board.

B. K.

Bilge Keel, same as **Rol. K.**

Bkt.

Bracket.

Boss. Fr. Aft.

Bossed Frames Aft.

Boss Plt.

Boss Plate.

Br. Dk.

Bridge Deck.

Bt. Dk.

Boat Deck.

C. Fr.

Cant Frame.

C. L.

Center Line.

C. P.

Coaling Port.

Ck.

Countersink.

Ck. O.

Countersink Other Side.

Car.

Carpenter

D. T.

Dust Tight.

Dia.

Diameter.

Diag. L.

Diagonal Line.

Div.

Division.

H. L.

Horizontal Line.

H. P.

Hawse Pipe.

H. R.
Half Round.
Hlf. Bdth.
Half Breadth.
I.
I-Beam.
Inb'd.
In-Board.
In. Bot.
Inner Bottom.
I. D.
Inside Diameter.
Jog.
Joggle.
K.
Keel.
K. P.
King Post.
L.
Line.
L. B. P.
Length Between Perpendiculars.
L. Dk.
Lower Deck.
L. L. L.
Light Load Line.
L. O. A.
Length Over All.
L. W. L.
Load Water Line.
Ldg.
Landing.
Lkr.
Locker.
Long'l.
Longitudinal.
Mld. Bdth.
Molded Breadth.
Mld. Dpth.
Molded Depth.
M. Dk.
Main Deck.
M. L.

Molded Line.

M. P.

Mooring Pipe.

Dk.

Deck.

Dr.

Door.

Eng. Rm. Bhd.

Engine Room Bulkhead

Elev.

Elevation.

Emerg.

Emergency.

Eng.

Engine.

Exp. T.

Expansion Tank.

F. B.

Flat Bar.

F. Cant.

Forward Cant Frames.

F. K.

Flat Keel.

F. P.

Forward Perpendicular.

Freebd.

Freeboard.

Fl. Pl.

Flange Plate.

F. P.

Fore Peak.

Focstle. Dk.

Forecastle Deck.

Ford.

Forward.

Fr.

Frame.

Garbd. Stk.

Garboard Strake.

Gird.

Girder.

Marg. Plt.

Margin Plate.

Mk.
Mark.
Mld.
Molded.
Out Bd.
Out Board.
O. D.
Outside Diameter.
O. T.
Oil Tight.
Op.
Operator
P. Dk.
Poop Deck.
P. Mk.
Pitch Mark.
Pant. Stg'r.
Panting Stringer.
Perp.
Perpendicular.
Prot. Dk.
Protective Deck.
Qtrs.
Quarters.
Rad.
Radius.
Rm.
Room.
Rivs.
Rivets.
S. P.
Stern Post.
S. R.
State Room.
S. A.
Shaft Alley.
Scr. Bhd.
Screen Bulkhead.
Set. Tk.
Settling Tank.
Shltr. Dk.
Shelter Deck.
Sq.

Square.

St. M.
Set Mark.

Stgr.
Stringer.

Stiffr.
Stiffener.

Sw. Pl.
Swash Plates.

Temp.
Template.

Tk.
Tank.

Trans. Gird.
Transverse Girder.

T.
Top.

T. S.
Top Side.

T. T.
Tank Top.

Up. Dk.
Upper Deck.

V. K.
Vertical Keel.

Vert.
Vertical.

W. L.
Water Line.

W. T.
Watertight.

W. T. Flt.
Watertight F.

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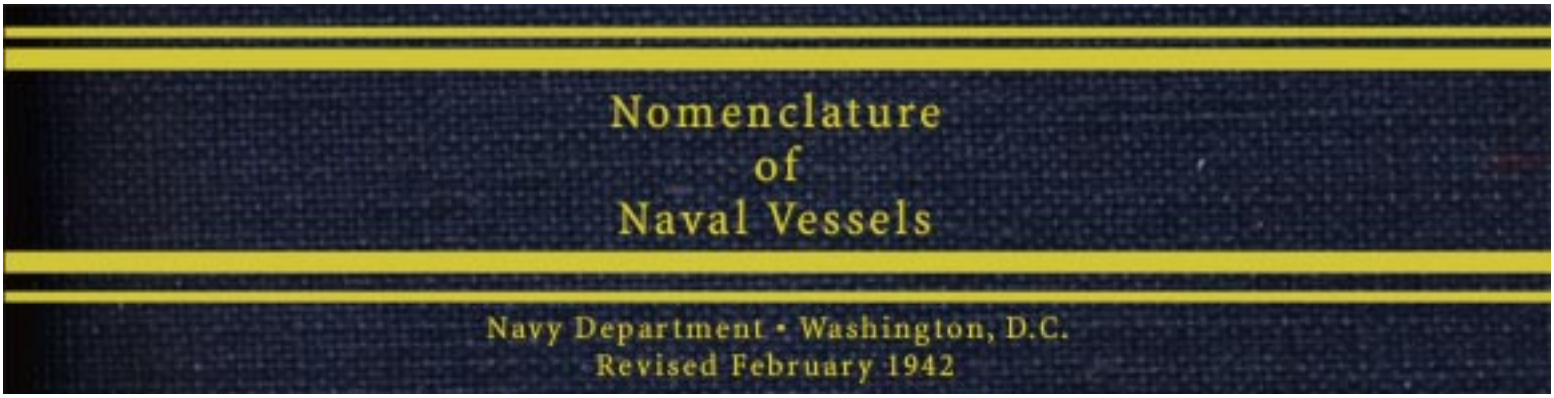
25 August 2003

Return to the Naval Historical Center Home Page



Illustrations

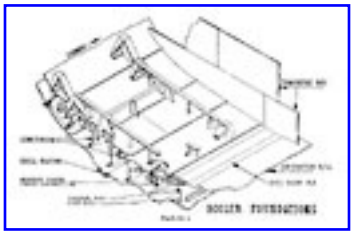


Plate No. 1: Boiler Foundations

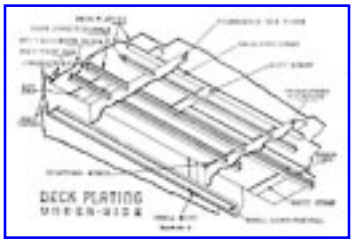


Plate No. 2: Deck Plating Underside

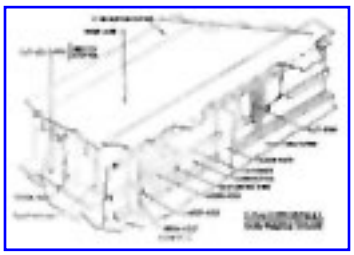


Plate No. 3: Longitudinal, Non-Watertight

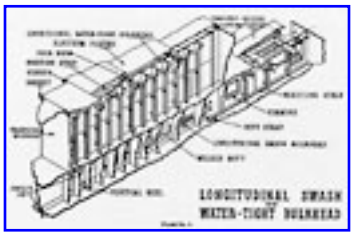


Plate No. 4: Longitudinal Swash and Watertight Bulkhead

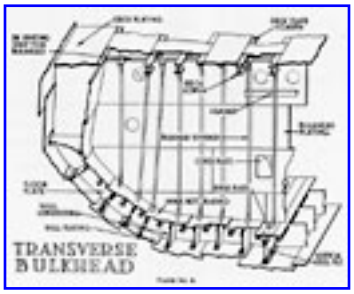


Plate No. 5: Transverse Bulkhead

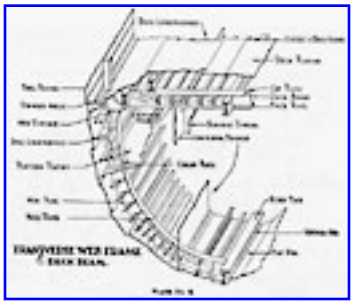


Plate No. 6: Transverse Web Frame and Deck Beam

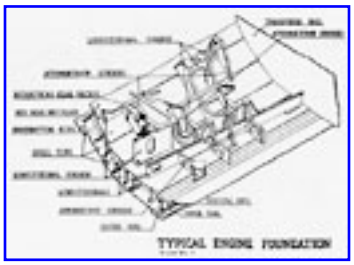


Plate No. 7: Typical Engine Foundation

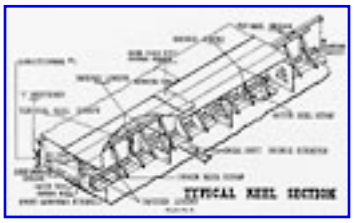


Plate No. 8: Typical Keel Section

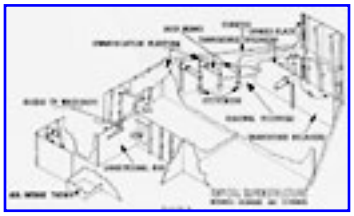


Plate No. 9: Typical Superstructure

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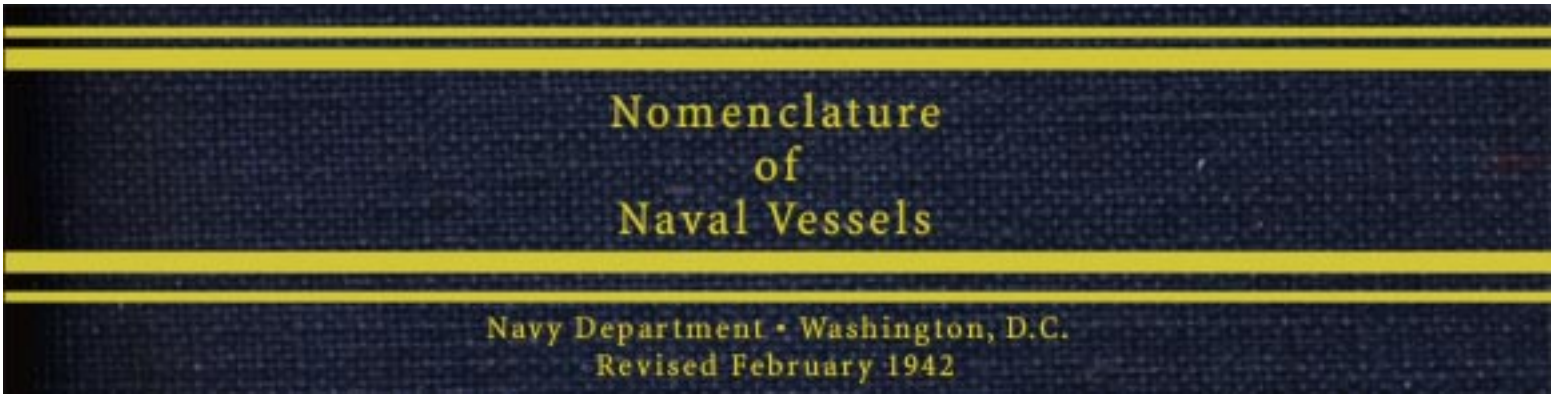
25 August 2003

Return to the Naval Historical Center Home Page



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ABAFT
: Toward the stern of a ship; back; behind; back of; further aft than.

ABEAM
: At right angles to the keel.

ABOARD
: On or in a ship.

ABREAST
: Side by side; over against; opposite to.

ACCOMMODATION LADDER
: Stairs slung at the gangway, leading down the vessel's side to a point near the water, for ship access from small boats.

AFT
: Near the stern; toward the stern.

AFTER BODY

That portion of a ship's body aft of the midship section.

AFTER FRAMES

Frames aft of amidships, or frames near the stern of the ship.

AFTER PEAK

The aftermost tank or compartment forward of the stern post.

AFTER PERPENDICULAR

A line perpendicular to the base line intersecting the after edge of the stern post at the designed water line. On submarines or ships having a similar stern, it is a vertical line passing through the point where the designed water line intersects the stern of the ship.

AIR CASING

A ring-shaped plate coaming surrounding the stack and fitted at the deck just below the umbrella, to protect the deck from heat and to help ventilate the fireroom.

AIRCRAFT CARRIER

A vessel designed to carry aircraft and fitted with a flying deck from which aircraft are launched and on which they land. A floating flying field which usually operates as a unit of a fleet.

AIR PORT

An opening in the side or deck house of a vessel, usually round in shape and fitted with a hinged frame in which a thick glass is secured. The purpose of the air port is to provide light and ventilation to and vision from the interior of the ship. In some instances the air port is also provided with an additional solid metal hinged cover for purposes of protection of the interior should the glass be damaged or to prevent light from showing from within.

ALOFT

In the top or upper rigging; on the yards; above the decks.

AMIDSHIPS

In the vicinity of the middle portion of a vessel as distinguished from her ends. The term is used to convey the idea of general locality but not that of definite extent.

ANCHOR

A heavy iron or steel implement attached to a vessel by means of a rope or chain cable for holding it at rest in the water. When an anchor is lowered to the bottom, the drag on the cable causes one or more of the prongs, called flukes, to sink into or engage the ground which provides holding power.

ANCHOR, BOWER

The large anchors carried in the bow of a vessel. Three are usually carried, two (the main bowers) in the hawse pipes, or on bill boards, and a third (spare) lashed on deck or elsewhere about the vessel for use in the event either of the main bowers is lost. The weight varies with the size and service of the ship.

ANCHOR, KEDGE

A small anchor used for warping or kedging. It is usually planted from a small

boat, the vessel being hauled up toward it. The weight varies, being usually from 900 to 1,200 pounds.

ANCHOR, SEA

This is not a true anchor, as it does not sink to the bottom. It is a conical-shaped canvas bag required by the Steamboat Inspection Service to be carried in each lifeboat. When placed overboard it serves a double purpose in keeping the boat head-on into the sea and in spreading a vegetable or animal oil from a container placed inside the bag. It is sometimes called an oil spreader.

ANCHOR, STREAM

An anchor weighing from about one-fourth to one-third the weight of the main bowers and used when mooring in a narrow channel or harbor to prevent the vessel's stern from swinging with the current or the tide.

ANGLE

Same as angle bar.

ANGLE BAR

A bar of angle-shaped section used as a stiffener and for attachment of one plate or shape to another.

ANGLE BULB

A structural shape having a bulb on one flange of the angle, used as a frame, beam, or stiffener.

ANGLE COLLAR

A collar or band made of one or more pieces of angle bar and fitted tightly around a pipe, trunk, frame, longitudinal, or stiffener intersecting or projecting through a bulkhead or deck for the purposes of making a watertight or oiltight joint. See **Stapling**.

ANNEAL

To heat a metal and to cool it in such a fashion as to toughen and soften it. Brass or copper is annealed by heating to a cherry red and dipping suddenly into water while hot. Iron or steel is slowly cooled from the heated condition to anneal.

APPENDAGES

Relatively small portions of a vessel extending beyond its main outline as shown by transverse and water plane sections, including such items as shafting, struts, bossings, docking and bilge keels, propellers, rudder, and any other feature, extraneous to the hull and generally immersed.

APRON

A reinforcing timber bolted to the after side of the stem.

ARBOR

The principal axis member, or spindle, of a machine by which a motion of revolution is transmitted.

ARCHING

Sometimes used in lieu of "**hogging**".

AREA OF SECTIONS

The area of any cross section of the immersed portion of a vessel, the cross section

being taken at right angles to the fore and aft centerline of the vessel.

ASTERN

Signifying position, in the rear of or abaft the stern; as regards motion, the opposite of going ahead; backwards.

ATHWART

Across, from side to side, transverse, across the line of a vessel's course.

ATHWARTSHIP

Reaching across a vessel, from side to side.

AUXILIARIES

Various winches, pumps, motors, engines, etc., required on a ship, as distinguished from main propulsive machinery (boilers and engines on a steam installation).

AWNING

A rooflike canopy of canvas suspended above a vessel's decks, bridges, etc., for protection against sun and weather.

--B--

BACK BAR

Used for the same purpose but on the opposite side to a bosom bar.

BACK BOARD

A portable back support nicely designed and fitted on the after side of the stern thwart in a small motor or row boat.

BACK STAY

Stays which extend from all mast levels, except the lower, to the ship's side at some distance abaft the mast. They serve as additional supports to prevent the masts going forward and also contribute to the lateral support, thereby assisting the shrouds.

BAFFLE

A plate or structure placed in the line of flow of fluids or gases to divert the flow in order to obtain greater contact with heating or cooling surfaces.

BALANCED RUDDER

A rudder with its axis between the forward and after edge.

BALK

A piece of timber from 4" to 10" square.

BALLAST

Any weight carried solely for the purpose of making the vessel more seaworthy. Ballast may be either portable or fixed, depending upon the condition of the ship. Fixed or permanent ballast in the form of sand, concrete, lead, scrap, or pig iron is usually fitted to overcome an inherent defect in stability or trim due to faulty design or changed character of service. Portable ballast, usually in the form of water pumped into or out of the bottom, peak, or wing ballast tanks, is utilized to

overcome a temporary defect in stability or trim due to faulty loading, damage, etc., and to submerge submarines.

BALLAST TANKS

Tanks provided in various parts of a ship for introduction of water ballast when necessary to add weight to produce a change in trim or in stability of the ship, and for submerging submarines.

BALLAST WATER

Sea water, confined to double bottom tanks, peak tanks, and other designated compartments, for use in obtaining satisfactory draft, trim, or stability.

BALLASTED CONDITION

A condition of loading in which it becomes necessary to fill all or part of the ballast tanks in order to secure proper immersion, stability, and steering qualities brought about by consumption of fuel, stores, and water or lack of part or all of the designed cargo.

BALSA

A light wood; a South American raft made of light wood.

BARGE

A craft of full body and heavy construction designed for the carriage of cargo but having no machinery for self-propulsion.

BATTEN

Long, thin, strips of wood, steel, or plastic, usually of uniform rectangular section used in the drafting room and mold loft to lay down the lines of a vessel, but sometimes thinned down in the middle or at the ends to take sharp curves. A strip of wood or steel used in securing tarpaulins in place. To secure by means of battens, as to "batten down a hatch."

BATTENS, CARGO

A term applied to the wood planks or steel shapes that are fitted to the inside of the frames in a hold to keep the cargo away from the shell plating; the strips of wood or steel used to prevent shifting of cargo.

BATTENS, SEAM

Wood seamstraps which connect the edges of small boats having a single thickness of planking. They give additional stiffness to the plank, are continuous, and frames are notched out to fit over them.

BATTLE CRUISER

A naval vessel having high speed, wide radius of action, guns of large size and range, and moderate protection; often defined as a ship cruiser speed and battleship armament, with full protection against cruisers and smaller vessels and capable of operation in all weather.

BATTLESHIP

A naval vessel having a large displacement, good speed, large radius of action, maximum armament, maximum protection against gun fire, bombs, and torpedoes, ability to keep at sea in all weathers and to bear the brunt of sea fighting as a line-of-battle ship.

BEAM

The extreme width of a ship. Also an athwartship or longitudinal member of the ship's structure supporting the deck.

BEAM KNEE

A bracket between a frame or stiffener and the end of a beam; a beam arm.

BEAM LINE

A line showing the points of intersection between the top edge of the beam and the molded frame line, also called "**molded deck line**".

BEAM, TRANSOM

A strong deck beam situated in the after end of the vessel connected at each end to the transom frame. The cant beams which support the deck plating in the overhang of the stern are attached to and radiate from it.

BEAM, PLATE ANGLE

A beam made from a flat plate, with the flange bent at right angles as by an angle-bending machine.

BEARDING LINE

A term applied to the intersection of the molded line of planking or plating and the stem, stern post, and keel, usually in connection with wood shipbuilding.

BEARER

A term applied to foundations, particularly those having vertical web plates as principal members. The vertical web plates of foundations are also called bearers.

BEARING

A block on or in which a journal rotates; a bearing-block.

BELL

In pipe fitting, the recessed or enlarged female end of a pipe into which the male end of the next pipe fits. In plumbing, the expanded female portion of a wiped joint.

BELL MOUTHED

A term used to signify the open end of vessel or pipe when it expands or spreads out with an increasing diameter, thus resembling a bell--also called trumpet mouthed.

BELOW

Underneath the surf the water. Underneath a deck or decks.

BENDING ROLLS

A large machine used to give curvature to plates by passage in contact with three rolls.

BENDING SLAB

Heavy cast-iron blocks with square or round holes for "dogging down," arranged to form a large solid floor on which frames and structural members are bent and formed.

BERTH

A term applied to a bed or a place to sleep. Berths, as a rule, are permanently built into the structure of the staterooms or compartments. They are constructed singly

and also in tiers of two or three, one above the other. When single, drawers for stowing clothing are often built in underneath. Tiers of berths constructed of pipe are commonly installed in the crew space. Also, a place for a ship.

BETWEEN DECKS

The space between any two, not necessarily adjacent, decks. Frequently expressed as "Tween Decks."

BEVEL

A term for a plane having any other angle than 90 degrees to a given reference plane. Also, a small tool similarl to a try square except that the blade is adjustable to taking bevels.

BEVEL, CLOSED

A term applied where one flange of a bar is bent to form an acute angle with the other flange.

BEVEL, OPEN

A term applied where one flange of a bar is bent to form an obtuse angle with the other flange. Frame bars in the bow and the stern of a vessel are give an open bevel to permit access for riveting to shell and to keep the standing flange parallel to the deck beams.

BIBB

A cock or valve with a bent outlet; strictly, the bent outlet.

BIGHT

A loop or bend in a rope; strictly, any part between the two ends may be termed the bight.

BILGE

The rounded portion of a vessel's shell which connects the bottom with side. To open a vessel's lower body to the sea.

BILGE PLATES

The curved shell plates that fit the bilge.

BILGES

The lowest portion of a ship inside the hull, considering the inner bottom where fitted as the bottom hull limit.

BILL BOARD

An inclined platform, fitted at the intersection of the forward weather deck and the shell, for stowing an anchor. It may be fitted with a tripping device for dropping the anchor overboard. Seldom fitted since the stockless anchor has come into general use.

BINNACLE

A stand or case for housing a compass so that it may be conveniently consulted. Binnacles differ in shape and size according to where used and the size of the compass to be accommodated. A binnacle for a ship's navigating compass consists essentially of a pedestal at whose upper end is a bowl-shaped receptacle having a sliding hoodlike cover. This receptacle accommodates the gimbals supporting the compass. Compensating binnacles are provided with brackets or arms on either

side, starboard and port, for supporting and securing the iron cylinders or spheres used to counteract the quadrantal deviation due to the earth's magnetization of the vessel. This type of binnacle is usually placed immediately in front of the steering wheel, having its vertical axis in the vertical plane of the fore-and-aft centerline of the vessel.

BITTER END

The inboard end of a vessel's anchor chain which is made fast in the chain locker.

BITTS

A terms applied to short metal or wood columns extending up from a base plate secured to a deck or bulwark rail or placed on a pier and to timbers extended up through and a short distance above a deck for the purpose of securing and belaying ropes, hawsers, cables, etc. Also called bollards.

BITUMASTIC

A black tarlike composition largely of bitumen or asphalt and containing such other ingredients as rosin, portland cement, slaked lime, petroleum, etc. It is used as a protective coating in ballast and trimming tanks, chain lockers, shaft alleys, etc.

BLEEDER

A small cock, valve, or plug to drain off small quantities of fluids from a container or system.

BLIND PULLEY

A circular block of hard wood with rounded edges perforated by several holes having grooves running from them to one side of the block. One of these blocks is secured to an end of a part of the standing rigging, as a shroud, and another to the chain plate or to some part of the ship and the two are connected to one another by a lashing passing through the holes. Commonly called "**dead eyes**".

BLINKER LIGHTS

Two electric lanterns secured at the ends of the signal yard and operated by controllers and a telegraph key for use in night signaling by code.

BLOCK

The name given to a pulley or sheave, or a system of pulleys or sheaves, mounted in a frame or shell and used for moving objects by means of ropes run over the pulleys or sheaves. The prefixes, single, double, triple, etc., indicate the number of pulleys or sheaves in the block. The five principal parts of a block are *(a)* the shell, or outside frame, *(b)* the sheave, on which the rope runs, *(c)* the pin, on which the sheave turns, *(d)* the strap, by which the hook is held in position and which provides bearing for the pin, and *(e)* the hook, which may be open, sister, or shackle and fixed or swivel. The opening between the top of the sheave and the shell is called the swallow, that between the bottom of the sheave and the shell is called the breech, and the device attached to the bottom of the block opposite the hook for securing the standing part of the fall to the block is called the becket.

BLOCK, CHEEK

A half shell block with a single sheave bolted to a mast or other object which

serves as the other half shell or cheek. Usually used in connection with halyards.

BLOCK, FIDDLE

A block having two sheaves of different diameters placed in the same plane one above the other.

BLOCK, SNATCH

A single sheave block having one side of the frame hinged so that it can be opened to allow the bight of a rope to be placed on the sheave, thus avoiding the necessity of threading the end of the rope through the swallow of the block. Usually employed as a fair lead around obstructions.

BLOWER

A mechanical device used to supply air under low pressure for artificial ventilation and forced draft, usually of the centrifugal type.

BOARDING

The act of going on board a ship.

BOBSTAYS

The chains or ropes attached underneath the outer end of the bowsprit and led aft to the stem to prevent the bowsprit from jumping up. Where two are fitted they are called the *inner* and the *cap* bobstays; when three are fitted they are called the *inner*, the *middle*, and the *cap* bobstays.

BODY PLAN

A plan consisting of two half transverse elevations or end views of a ship, both having a common vertical center line, so that the right-hand side represents the ship as seen from ahead, and the left-hand side as seen from astern. On the body plan appear the forms of the various cross sections, the curvature of the deck lines at the side, and the projections, as straight lines of the water lines, the bow and buttock lines, and the diagonal lines.

BOILER

Any vessel, container, or receptacle that is capable of generating steam by the internal or external application of heat. The two general classes are fire tube and water tube.

BOILER CASING

Walls forming a trunk leading from the boiler room to the boiler hatch, which protect the different deck spaces from the heat of the boiler room, etc.

BOILER ROOM

A compartment in the hold, in the middle or after section of a vessel, where the boilers are placed.

BOLLARDS

See "bits".

BOLSTER PLATE

A piece of plate adjoining the hawse hole, to prevent the chafing of the hawser against the cheek of a ship's bow. A plate for support like a pillow or cushion. A piece of timber used as a support. A temporary foundation.

BOLT

A metal rod used as a fastening. With few exceptions, such as drift bolts, a head or shoulder is made on one end and a screw thread to carry a nut is cut on the other.

BOLTING UP

Securing by means of bolts and nuts parts of a structure in proper position for permanent attachment by riveting or welding. A workman employed on this work is called a "**bolter-up**".

BONJEAN CURVES

Curves of areas of transverse sections of a ship. The curves of the moments of these areas above the base line are sometimes included.

BONNET

A cover used to guide and enclose the tail end of a valve spindle.

BOOBY HATCH

An access hatch from a weather deck protected by a hood from sea and weather. The hood is often fitted with a sliding cover to facilitate access.

BOOM

A term applied to a spar used in handling cargo, or to which the lower edge of a fore-and-aft sail is attached.

BOOM TABLE

An outrigger attached to a mast or a structure built up around a mast from the deck to support the heel bearings of booms and to provide proper working clearances when a number of booms are installed on or around one mast.

BOOT TOPPING

An outside area on a vessel's hull from bow to stern between certain waterlines to which special air, water, and grease-resisting paint is applied; also the paint applied to such areas.

BORING BAR

A portable, heavy duty tool, used for boring, counter boring, reboring, facing, grooving, etc., where true alignment is of primary importance.

BOSOM

The inside of an angle bar.

BOSOM BAR

An angle fitted inside another.

BOSOM PLATE

A plate bar or angle fitted in the bosoms of two angle bars to connect the ends of the two angles as if by a butt strap.

BOSS

The curved, swelling portion of the ship's underwater hull around the propeller shaft.

BOSS PLATE

The plate that covers the boss.

BOTTOM

That portion of a vessel's shell between the keel and the lower turn of the bilge.

BOTTOM, OUTER

A term applied to the bottom shell plating in a double bottom ship.

BOTTOM PLATING

That part of the shell plating which is below the water line. More specifically, the immersed shell plating from bilge to bilge.

BOW

The forward end of the ship. The sides of the vessel at and for some distance abaft the stem, designated as the right-hand, or starboard bow, and the left-hand, or port bow.

BOW LINES

Curves representing vertical sections parallel to the central longitudinal vertical plane of the bow end of a ship. Similar curves in the aft part of a hull are called buttock lines. Also, a rope leading from the vessel's bow to another vessel or to a wharf for the purpose of hauling her ahead or for securing her.

BOWSPRIT

A spar projecting forward over the bow for the purpose of holding the lower ends of the head sails.

BRACE

A rope attached to the yard arm, used to alter the position of the yard arm in a horizontal plane. The operation is known as trimming the sail.

BRACKET

A steel plate, commonly of triangular shape with a reinforcing flange on its free edge, used to connect two parts such as deck beam to frame, frame to margin plate, etc.; also used to stiffen or tie beam angles to bulkheads, frames to longitudinals, etc.

BRAILS

Ropes rove through blocks fastened to a spar and attached to the leech of sail. The overhauling of these ropes gathers the sail up against the spar.

BRAZING

The joining of certain metals by the use of a hard solder.

BREADTH, EXTREME

The maximum breadth measured over plating or planking, including beading or fenders.

BREADTH, MOLDED

The greatest breadth of the vessel measured from heel of frame on one side to heel of frame on other side.

BREADTH, REGISTERED

Measured amidships at its greatest breadth to outside of plating.

BREAK OF FORECASTLE or POOP

The point at which the partial decks known as the forecastle and poop are discontinued.

BREAKWATER

A term applied to plates or timbers fitted on a forward weather deck to form a **V**-shaped shield against water that is shipped over the bow.

BREAST HOOK

A triangular-shaped plate fitted parallel to and between decks or side stringers in the bow for the purpose of rigidly fastening together the peak frames, stem, and outside plating; also used, in conjunction with the above duties, to fasten the ends of side stringers firmly together.

BRIDGE

A high transverse platform, often forming the top of a bridge house, extending from side to side of the ship, and from which a good view of the weather deck may be had. An enclosed spaced called the pilot house is erected on the bridge in which are installed the navigating instruments, such as the compass and binnacle, the control for the steering apparatus, and the signals to the engine room. While the pilot house is generally extended to include a chartroom and sometimes staterooms, a clear passageway should be left around it. As the operation of the ship is directed from the bridge or flying bridge above it, there should also be a clear, open passage from one side of the vessel to the other. The term is also applied to the narrow walkways, called connecting bridges, which connect the bridge deck with the poop and forecastle decks. This type of bridge is usually found on tankers and is desirable whenever bulwarks are not fitted.

BRIDGE HOUSE

A term applied to an erection or superstructure fitted about amidship on the upper deck of a ship.

BRIDGE, NAVIGATING, or FLYING

The uppermost platform erected at the level of the top of the pilot house. It generally consists of a narrow walkway supported by stanchions, running from one side of the ship to the other and the space over the top of the pilot house. A duplicate set of navigating instruments and controls for the steering gear and engine room signals are installed on the flying bridge so that the ship may be navigated in good weather from this platform. Awnings erected on stanchions and weather cloths fitted to the railing give protection against sun and wind.

BROKEN BACKED

Said of a vessel when, owing to insufficient longitudinal strength, grounding, or other accident, her sheer is reduced or lost, thereby producing a drooping effect at both ends.

BROW

A gangplank, usually fitted with rollers at the end resting on the wharf to allow for the movement of the vessel with the tide. See **watershed**.

BUCKLE

A distortion, such as a bulge; to become distorted; to bend out of its own plane.

BUCKLER

Generally, but not exclusively, applied to various devices used to prevent water from entering turret gun ports, hawse and chain pipes, etc.

BUCKLING

The departure of a plate, shape, or stanchion from its designed plane or axis when

subjected to load or to strains introduced during fabrication, thereby reducing its ability to carry loads.

BUILDING SLIP

An inclined launching berth where the ship is built.

BULKHEAD

A term applied to any one of the partition walls which subdivide the interior of a ship into compartments or rooms. The various types of bulkheads are distinguished by the addition of a word or words, explaining the location, use, kind of material or method of fabrication, such as fore peak, longitudinal, transverse, watertight, wire mesh, pilaster, etc. Bulkheads which contribute to the strength and seaworthiness of a vessel are called strength bulkheads, those which are essential to the watertight subdivision are watertight or oiltight bulkheads, and gastight and fumetight bulkheads serve to prevent gas or fumes from leaving or entering certain parts of a vessel.

BULKHEAD, AFTER PEAK

A term applied to the first transverse bulkhead forward of the stern post. This bulkhead forms the forward boundary of the after-peak tank and should be made watertight.

BULKHEAD, COLLISION

The foremost transverse watertight bulkhead in a ship which extends from the bottom of the hold to the freeboard deck. It is designed to keep water out of the forward hold in case of collision damage. Usually, this is the fore peak bulkhead at the after end of the fore peak tank.

BULKHEAD, JOINER

Wood or light metal bulkhead serving to bound staterooms, offices, etc. and not contributing to the ship's strength. Included under this head are corrugated metal, pressed panel, pilaster, aluminum, stainless steel, etc.

BULKHEAD STIFFENER

Members attached to the plating of a bulkhead for the purpose of holding it in a plane when pressure is applied to one side. The stiffener is generally vertical, but horizontal stiffeners are used and both are found on same bulkheads. The most efficient stiffener is a **T** section; flat bars, angles, channels, zees, **H** and **I** sections are commonly used.

BULKHEAD, SWASH

A strongly built, nontight bulkhead placed in oil or water tanks to slow down the motion of the fluid set up by the motion of the ship.

BULKHEAD, WIRE MESH

A partition or enclosure bulkhead, used largely in store rooms, shops, etc., made of wire mesh panels.

BULLDOZER

A machine, usually hydraulic or electric, for bending bars, shapes or plates while cold.

BULWARK

A term applied to the strake of shell plating or the side planking above a weather deck. It helps to keep the deck dry and also serves as a guard against losing deck cargo or men overboard. Where bulwarks are fitted, it is customary to provide openings in them which are called freeing ports, to allow the water that breaks over to clear itself.

BULWARK STAY

A brace extending from the deck to a point near the top of the bulwark, to keep it rigid.

BUMPED

A term applied to a plate which has been pressed or otherwise formed to a concave or convex shape. Used for heads of tanks, boilers, etc.

BUNK

A built-in berth or bed.

BUNKER

A compartment used for stowage of coal or oil fuel.

BUOYANCY

Ability to float; the supporting effort exerted by a liquid (usually water) upon the surface of a body, wholly or partially immersed in it.

BUOYANCY, RESERVE

The floating or buoyant power of the unsubmerged portion of the hull of a vessel. Usually referred to a specific condition of loading.

BURDEN

The carrying capacity of a vessel expressed in long tons.

BURNERS

Men who operate gas torches for burning plates and shapes to proper sizes for assembly into the structure.

BURR

The rough, uneven edge of a sheared or burned plate or around a punched or burned hole. Also a washer shaped piece of metal through which the rivet is inserted and against which the rivet point is riveted over.

BUTT

That end or edge of a plate or timber where it comes squarely against another piece, or, the joint thus formed. The long edge of a plate is called the edge and the short edge is called the end.

BUTTOCK

The rounded-in overhanging part on each side of the stern in front of the rudder, merging underneath in the run.

BUTTOCK LINES

The curves shown by taking vertical longitudinal sections of the after part of a ship's hull parallel to the ship's keel. Similar curves in forward part of hull are "**bow lines**".

BUTT STRAP

A term applied to a strip of plate serving as a connecting strap between the butted

ends of the plating. The strap connections at the edges are called seam straps.

--C--

CABIN

The interior of a deck house, usually the space set aside for the use of officers and passengers.

CAISSON

A watertight structure used for raising sunken vessels by means of compressed air. Also the floating gate to close the entrance to a drydock.

CALIBER

The term applied to the inside diameter of a cylinder, tube, or pipe. The length of a naval gun is frequently expressed in terms of its caliber.

CALKING

The operation of jamming material into the contact area to make a joint watertight or oiltight.

CAM

A projective part of a wheel or other simple moving piece in a machine, shaped to give predetermined variable motion in repeating cycles to another piece against which it acts.

CAMBER, ROUND OF BEAM

The weather decks of ships are rounded up or arched in an athwartship direction for the purpose of draining any water that may fall on them to the sides of the ship where it can be led overboard through scuppers. The arching or rounding up is called the camber or round of the beam and is expressed in inches in connection with the greatest molded breadth of the ship in feet, thus, "the main deck has a camber of 10 inches in 40 feet." It is measured at the center line of the ship at the greatest molded breadth and is the distance from the chord to the top of the arch.

CAMEL

A decked vessel having great stability designed for use in lifting sunken vessels or structures. A submersible float used for the same purpose by submerging, attaching, and pumping out. See also **caisson**.

CANT

A term signifying an inclination of an object from a perpendicular; to turn anything so that it does not stand perpendicular or square to a given object.

CANT FRAME

A frame the plane of which is not square to the keel.

CAPPING

The fore and aft finishing piece on top of the clamp and sheer strake at the frame heads in an open boat; called a covering board, margin plank, or plank sheer in a decked-over boat.

CAPSTAN, STEAM

A vertical drum or barrel operated by a steam engine and used for handling heavy anchor chains, heavy hawsers, etc. The engine is usually nonreversing and transmits its power to the capstan shaft through a worm wheel. The drum is fitted with pawls to prevent overhauling under the strain of the hawser or chain when the power is shut off. The engine may be disconnected and the capstan operated by hand through the medium of capstan bars.

CARGO

Merchandise or goods accepted for transportation by ship.

CARGO BOOM

A heavy boom used in loading cargo. See "**boom**".

CARGO HATCH

A large opening in the deck to permit loading of cargo.

CARGO MAT

A mat, usually square and made of manila rope, used to protect the deck covering while taking stores, etc., on board.

CARGO NET

A square net, made in various sizes of manila rope or chain, and used in connection with the ship's hoisting appliances to load cargo, etc., aboard the vessel.

CARGO PORT

An opening, provided with a watertight cover or door, in the side of a vessel of two or more decks, through which cargo is received and discharged.

CARLINGS

Short beams forming a portion of the framing about deck openings. Also called headers when they support the ends of interrupted deck beams.

CASINGS, ENGINE and BOILER ROOMS

The walls or partitions forming trunks above the engine and boiler spaces, providing air and ventilation and enclosing the uptakes. They extend somewhat above the weather deck, or superstructure deck if fitted, and are of sufficient size to permit installation and removal of engines and boilers. Doors are fitted at the several deck levels to permit access to the gratings and ladders.

CAVIL

A heavy timber fastened to the forward or after bitts about midway between the base and top to form a cleat. The bitt so built.

CEILING

A term applied to the planking with which the inside of a vessel is sheathed. Also applied to the sheet metal or wood sheathing in quarters and storerooms.

CEILING, FLOOR

Planking fitted on top of the floors or double bottom in the cargo holds.

CEILING, HOLD

Thick strakes of planking fastened to the inside flanges or edges of the framing in the cargo holds.

CENTER LINE

The middle line of the ship from stem to stern as shown in any water line view.

CENTER OF BUOYANCY

The geometric center of gravity of the immersed volume of the displacement or of the displaced water, determined solely by the shape of the underwater body of the ship. It is calculated for both the longitudinal location, forward or aft of the middle perpendicular, and the vertical location above the base line or below the designed waterline.

CENTER OF FLOTATION

The geometric center of gravity of the water plane at which the vessel floats, forward or aft of the middle perpendicular. It is that point about which a vessel rotates longitudinally when actuated by an external force without change in displacement.

CENTER OF GRAVITY

The point at which the combined weight of all the individual items going to make up the total weight of the vessel may be considered as concentrated; generally located longitudinally forward or aft of the middle perpendicular and vertically above bottom of keel or below a stated waterline.

CENTER OF LATERAL RESISTANCE

The point through which a single force could act and produce an effort equal to the lateral resistance of the vessel. It is ordinarily assumed to coincident with the center of gravity of the immersed central longitudinal planes.

CENTER OF PRESSURE

The point in a sail or an immersed plane surface at which the resultant of the combined pressure forces acts.

CENTRAL LATERAL PLANE

The immersed longitudinal vertical middle plane of a vessel.

CHAFING PLATE

A plate fitted to take the wear due to dragging moving gear or to protect ropes from wearing where they rub on sharp edges. Also fitted on decks under anchor chains.

CHAIN LOCKER

Compartment in forward lower portion of ship in which anchor chain is stowed.

CHAIN LOCKER PIPE: CHAIN PIPE

The iron-bound opening or section of pipe leading from the chain locker to the deck, through which the chain cable passes.

CHAIN PLATE

A bar or plate secured to the shell of a vessel to which the standing rigging is attached.

CHAINS

Usually refers to heavy chains attached to the anchor. Also applied to the lower parts of standing rigging which are attached to the chain plates.

CHAIN STOPPER

A device used to secure the chain cable when riding at anchor, thereby relieving the strain on the windlass, and also for securing the anchor in the housing position

in the hawsepipe.

CHAMFER

A bevel surface formed by cutting away the angle of two intersecting faces of a piece of material.

CHART HOUSE

A small room adjacent to the bridge for charts and navigating instruments.

CHINE

The line formed by the intersection of side and bottom in ships having straight or slightly curved frames.

CHINSING

The inserting of oakum or cotton between the plank edges of boats to secure watertightness. Also called calking.

CHIPPER

A workman who chips, cuts, or trims the edges of plates, shapes, castings or forgings, using either hand or pneumatic tools, in order to secure a good calking edge, fit or finish.

CHOCK

A term applied to oval-shaped castings, either open of closed on top, and fitted with or without rollers, through which hawsers and lines are passed. Also applied to blocks of wood used as connecting or reinforcing pieces, filling pieces, and supports for life boats. Also applied to the brackets fitted to boiler saddles to prevent fore and aft motion and to small brackets on the webs of frames, beams and stiffeners to prevent tipping of the member.

CLAMP

A metal fitting used to grip and hold wire ropes. Two or more may be used to connect two ropes in lieu of a short splice or in turning in an eye. Also a device, generally operated by hand, for holding two or more pieces of material together, usually called a "C" clamp. In small boats, the main longitudinal strength member at the side and under the deck beams in decked-over boats, and at the gunwale in open boats.

CLEATS

Pieces of wood or metal, of various shapes according to their uses, usually having two projecting arms or horns upon which to belay ropes. The term Cavil is sometimes applied to a cleat of extra size and strength.

CLINCH

To spread or rivet the point of a pin or bolt upon a plate or ring to prevent it from pulling out; to turn the point of a nail back into the wood to give it greater holding power.

CLINOMETER

An instrument used for indicating the angle of roll or pitch of a vessel.

CLIP

A four- to six-inch angle bar welded temporarily to floors, plates, webs, etc. It is used as a hold-fast which, with the aid of a bolt, pulls objects up close in fitting.

Also, short lengths of bar, generally angle, used to attach and connect the various members of the ship structure.

CLOSE BUTT

A riveted joint in which the ends of the connected members are brought into metal-to-metal contact by grinding and pulling tight by clips or other means before the rivets are driven.

CLUB-FOOT

A fore foot in which displacement or volume is placed near the keel and close to the forward perpendicular, resulting in full water lines below water and fine lines at and near the designed water line, the transverse sections being bulb-shaped. Also called a bulb or bulbous bow.

COAMING, BULKHEAD

A term applied to the top and bottom strakes of bulkheads, which are usually made thicker than the remainder of the plating and which act as girder web plates in helping to support the adjacent structure.

COAMING, HATCH

A frame bounding a hatch for the purpose of stiffening the edges of the opening and forming the support for the covers. In a steel ship it generally consists of a strake of strong vertical plating completely bounding the edges of a deck opening.

COAMING, HOUSE

A term applied to the narrow vertical plates bounding the top and bottom of a deck house, made somewhat thicker than the side plating and forming a frame for the base and top of the house. Also applied to the heavy timbers which form the foundation of a wood deck house.

COAMING, MANHOLE

The frame worked around a manhole to stiffen the edges of the plating around the opening and to provide a support for the cover.

COCK

A valve which is opened or closed by giving a disc or a tapered plug a quarter turn. When a plug is used it is slotted to correspond with the ports in the valve.

COCKPIT

A term used in connection with small boats to refer to an uncovered, sunken place or pit, usually for the accommodation of passengers.

COFFERDAMS

Void or empty spaces separating two or more compartments for the purpose of insulation, or to prevent the liquid contents of one compartment from entering another in the event of the failure of the walls of one to retain their tightness.

COLLAR

A piece of plate or a shape fitted around an opening for the passage of a continuous member through a deck, bulkhead, or other structure to secure tightness against oil, water, air, dust, etc.

COLLIER

A vessel designed for the carrying of coal, which may or may not be fitted with

special appliances for coal handling.

COLLISION MAT

A large mat used to close an aperture in a vessel's side resulting from a collision.

COMPANION

The cover over a **companionway**.

COMPANIONWAY

A hatchway or opening in a deck provided with a set of steps or ladders leading from one deck level to another for the use of personnel.

COMPARTMENT

A subdivision of space or room in a ship.

COMPASS

The compass is the most important instrument of navigation in use on board ship, the path of a ship through the water depending on the efficient working and use of this instrument. There are two types of navigational compasses, the magnetic, which has long been in use, and the gyroscopic, which has been developed within recent years. The former is actuated by the earth's magnetism, the latter by that property of a rapidly rotating body by which, when it is free to move in different directions, it tends to place its axis parallel to the earth's axis, that is, north and south.

COMPASS, GYROSCOPIC

The gyroscopic compass may have one or more gyroscopes. It is usually located as nearly at the rolling axis of the ship as possible and in a protected place. The directive force of a gyroscope, while 100 times more powerful than that of the magnetic needle, is still further amplified by an auxiliary electric motor sufficiently powerful to operate the compass card in azimuth. Repeater compasses, installed wherever desired about the ship, are operated by the master compass containing the gyroscopes by a simple electric follow-up system. The gyroscopic compass is not affected by magnetism from any source. It points to the true north, not the magnetic pole, and hence required no calculations for corrections. It is not affected by cargo or any type of magnetic field which may surround it and it is not disturbed by jars. It has become standard equipment in navies and is coming into more general use on commercial vessels.

COMPASS, MAGNETIC

There are two kinds of magnetic compasses, the Dry Card Compass and the Liquid Compass. The Dry Compass consists essentially of a number of magnetic needles, suspended parallel to each other, and fastened to the rim of a circular disc that has a paper cover upon which are marked the points of the compass and the degrees. This card rests upon a pivot centered in the compass bowl, which in its turn is suspended by gimbals in the binnacle or stand, the latter having means for lighting the card at night and for adjustment of compass errors due to magnetism of the ship. In the Liquid Compass, the bowl is filled with alcohol and water or with oil. The needles are sealed in parallel tubes and form a framework which connects the central boss with the outer rim, the whole resting upon a pivot in the compass

bowl. Upon the rim are printed the points and degrees. The liquid compass is less susceptible to vibration and shock. The "Standard Compass" on board ship is a magnetic compass.

COMPASS, RADIO

This apparatus is used to determine the direction from which a radio wave is sent and the location of the sending station. It consists of a coil of wire wound around a frame and mounted on a vertical shaft which can be rotated. The radio wave is received by the operator, being loudest when the coil is at right angles to the wave and ceasing when the coil is parallel to the wave. Positions are determined by plotting the bearings to two known sending stations. The apparatus is especially valuable when a vessel is sufficiently close to the shore to contact two sending stations.

COMPOSITE VESSEL

A vessel with a metal frame and a wooden shell and decks.

CORDAGE

A comprehensive term for all ropes of whatever size or kind on board a ship.

COTTER, KEY

A solid key or wedge used to secure a wheel on a shaft or the like.

COTTER, SPRING

A round split pin used to lock a nut on a bolt. The pin is passed through a hole in the bolt outside of the nut and the ends of the pin opposite its head are forced apart by a chisel or similar tool, thus preventing the cotter from slipping out.

COUNTER

That part of a ship's stern which overhangs the stern post, usually that part above the water line.

COUNTERSINK

A term applied to the operation of cutting the sides of a drilled or punched hole into the shape of the frustrum of a cone. Also applied to the tool with which countersinking is done.

COUNTERSUNK HOLE

A hole tapered or beveled around its edge to allow a rivet or bolt head or a rivet point to seat flush with or below the surface of the riveted or bolted object.

COUNTERSUNK RIVET

A rivet driven flush on one or both sides.

COUPLING

A device for securing together the adjoining ends of piping, shafting, etc., in such a manner as will permit disassembly whenever necessary. Flanges connected by bolts and pipe unions are probably the most common forms of couplings.

CRADLE

A support of wood or metal shaped to fit the object which is stowed upon it.

CRADLE, BOAT

The heavy wood or metal supports for a ship's boat, cut to fit the shape of the hull of the boat and usually faced with leather, in which the boat is stowed.

CRADLE, LAUNCHING

The structure of wood, or wood and steel, which is built up from the sliding ways, closely fitting the shell plating, which supports the weight of the ship and distributes it to the sliding ways when a ship is being launched. The extent of the cradle and the number of sections into which it may be divided depends on the weight and length of the ship.

CRADLE, MARINE RAILWAY

The carriage on which the ship rests when being docked on a marine railway.

CRANE

A machine used for hoisting and moving pieces of material or portions of structures or machines that are either too heavy to be handled by hand or cannot be handled economically by hand. Bridge, gantry, jib, locomotive, and special purpose cranes are used in shipyards.

CRIBBING

Foundations of heavy blocks and timbers for supporting a vessel during the period of construction.

CROSS-SPALL

A temporary horizontal timber brace to hold a frame in position. Cross-spalls are replaced later by the deck beams.

CROSS TREES

A term applied to athwartship pieces fitted over the trees on a mast. They serve as a foundation for a platform at the top of a mast or as a support for outriggers.

CROWN

Term sometimes used denoting the round-up or camber of a deck. The crown of an anchor is located where the arms are welded to the shank.

CROW'S NETS

A lookout station attached to or near the head of a mast.

CRUISER

A high speed vessel designed to keep at sea for extended periods and in which protection against gun fire is subordinated to speed and long radius of action. Light cruisers and heavy cruisers are so designated in accordance with the calibre of the guns carried. Used largely for scouting and convoy work.

CRUTCH

A term applied to a support for a boom. Also applied to the jaw of a boom or gaff.

CUDDY

A galley structure on deck; a small cabin.

CUTWATER

The forward edge of the stem at or near the water line is called the cutwater.

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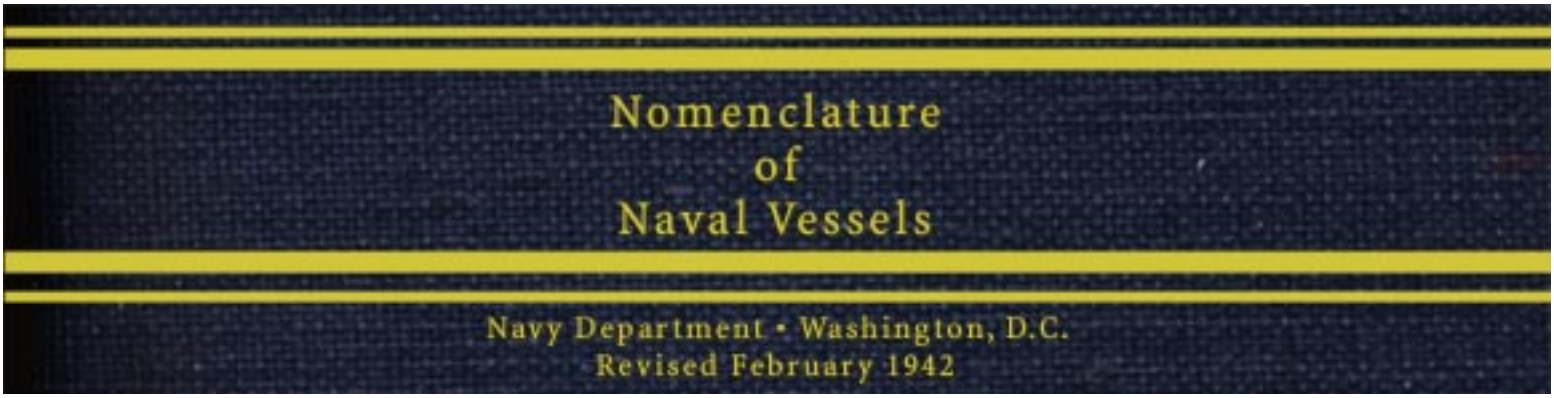
25 August 2003

Return to the Naval Historical Center Home Page



--D--

DAGGER

A piece of timber that is fastened to the poppets of the bilgeway and crosses them diagonally to keep them together. Dagger applies to anything that stands in a diagonal position in a fore and aft plane.

DAGGER PLANK

One of the planks which unite the heads of the poppets or stepping-up pieces of the cradle on which the vessel rests in launching.

DAVIT

A device used to lower and raise ship's boats and sometimes for other purposes. The rotary, or most common type, consists of a vertical pillar, generally circular in section, with the upper portion bent in a fair curve and having sufficient outreach to clear the side of the ship plus a clearance. Each ship's boat has two davits, one near its bow and one near its stern; they both rotate, lifting the boat, by means of

blocks and falls suspended from the overhanging end, from its stowage position on deck and swinging it clear of the ship's side. This type of davit is usually stepped in a socket attached to the side of the vessel or on the deck next below the boat deck near the side and held in place at the boat deck by a keeper or bearing.

DEAD EYE

See "Blind Pulley".

DEAD FLAT

The midship portion of a vessel throughout the length of which a constant shape of cross section is maintained.

DEADLIGHT

A applied to a port lid or cover; a metal shutter fitted to protect the glass in a fixed or port light. Often incorrectly applied to a fixed light in a deck, bulkhead or shell.

DEAD RISE

The angle which the straight portion of the bottom of the floor of the midship section makes with the base line. It is expressed by the number of inches rise above the base line in the half-beam of the vessel.

DEADWEIGHT

The difference between the light displacement and the full load displacement of a vessel; the total weight of cargo, fuel, water, stores, passengers, and crew and their effects that a ship can carry when at her maximum allowable draft.

DEADWEIGHT CARGO

The number of tons remaining after deducting from the deadweight the weight of fuel, water, stores, dunnage, and crew and their effects necessary for use on a voyage. Also called "**useful**" or "**paying deadweight**", "**deadload**", and "**burden**".

DEADWOOD

The reinforcing structure built in between the keel and keelson in the after body of a ship or back of the joint between the stem and the keel in the fore body.

DECK

A deck in a ship corresponds to a floor in a building. It is the plating, planking, or covering of any tier of beams above the inner bottom forming a floor, either in the hull or superstructure of a ship. Decks are designated by their location as upper deck, main deck, etc., and forward lower deck, after superstructure deck, etc. The after portion of a weather deck was formerly known as the quarter deck and on warships is allotted to the use of the officers.

DECK BOLT

A special type of bolt used to secure the planks of a wood deck to the frames or deck plating.

DECK, BULKHEAD

The uppermost continuous deck to which all main transverse bulkheads are carried. This deck should be watertight to prevent flooding adjacent compartments if a compartment is bilged.

DECK, FREEBOARD

The deck to which the classification societies require the vessel's freeboard to be

measured. Usually the upper strength deck.

DECK HEIGHTS

The vertical distance between the molded lines of two adjacent decks.

DECK HOUSE

A term applied to a partial superstructure that does not extend from side to side of a vessel as do the bridge, poop, and forecastle.

DECK LINE

See "Beam line".

DECK MACHINERY

A term applied to capstans, windlasses, winches, and miscellaneous machinery located on the deck of a ship.

DECK PLANKS, or PLANKING

A term applied to the wood sheathing or covering on a deck. Oregon pine, yellow pine, and teak are most commonly used. The seams between the planks should be thoroughly caulked.

DECK PLATING

A term applied to the steel plating of a deck.

DECK STRINGER

The strip of deck plating that runs along the outer edge of a deck.

DECK, TURTLE

A term applied to a weather deck that is rounded over from the shell of the ship so that it has a shape similar to the back of a turtle. Used on ships of the whaleback type and on the forward weather deck of torpedo boats.

DEEP FLOORS

A term applied to the floors at the ends of a ship which are deeper than the standard depth of floor at amidships.

DEEP TANKS

Tanks extending from the bottom or inner bottom of a vessel up to or higher than the lowest deck. They are fitted with hatches so that they may be used for cargo when the vessel is loaded in lieu of the ballast water carried when the vessel is "light." They are placed at either end or both ends of the machinery space as deemed necessary.

DEEP WATERLINE

The waterline at which the vessel floats when carrying the maximum allowable load.

DEPTH MOLDED

The vertical distance from the molded base line to the top of the uppermost strength deck beam at side, measured at midlength of the vessel.

DERRICK

A device consisting of a kingpost, boom with variable topping lift, and necessary rigging for hoisting heavy weights, cargo, etc.

DESTROYER

A naval vessel of small displacement and high speed, armed with light, rapid-fire

guns and deck torpedo tubes, used for convoy and scouting work and as a protection to capital ships [originally "torpedo boat destroyer"]. Larger vessels of this type are called destroyer leaders.

DIAGONAL LINE

A line cutting the body plan diagonally from the frames to the middle line in the loft lay-out and usually a mean normal to a group of frames of similar curvature, representing a plane introduced for line fairing purposes.

DISHED PLATES

Plates, generally of circular shape, which have been furnaced or pressed into a concave form.

DISPLACEMENT

The volume of fluid displaced by a freely floating and unrestrained vessel, the weight of which exactly equals the weight of the vessel and everything on board at the time the displacement is recorded. Displacement is expressed in either cubic feet or in tons of salt or fresh water.

DISPLACEMENT CURVES

Curves drawn to give the displacement of the vessel at varying drafts. Usually these curves are drawn to show the displacement in either salt or fresh water, or in both, the salt water curves being based on 35 cubic feet to a ton and fresh water curves on 36 cubic feet to a ton. Corrections are made from these basic standards for variable density of the water.

DISPLACEMENT, DESIGNED

The displacement of a vessel when floating at her designed draft.

DISPLACEMENT, FULL LOAD

The displacement of a vessel when floating at her greatest allowable draft as established by the classification societies. In warships, an arbitrary full load condition is established.

DISPLACEMENT, LIGHT

The displacement of the vessel complete with all items of outfit, equipment, and machinery on board, but excluding all cargo, fuel, water, stores, passengers, dunnage, and the crew and their effects. Naval and merchant practice differs in one particular; in the former the machinery weights are dry, while the merchant light condition includes the water and oil in the machinery with boilers at steaming level.

DOCK

A basin for the reception of vessels. Wet docks are utilized for the loading and unloading of ships. Dry docks are utilized for the construction or repair of ships.

DOCKYARD

A shipyard or plant where ships are constructed or repaired.

DOG

A short metal rod or bar fashioned to form a clamp or clip and used for holding watertight doors, manholes, or pieces of work in place.

DOG SHORES

Diagonal braces placed to prevent the sliding ways from moving when the shores and keel blocks are removed before launching. Dog shores are the last timbers to be knocked away at a launching. Also called "**daggers**" or "dagger shores".

DOLLY BAR

A heavy steel bar used to hold against the heads of rivets while the points are being clinched when the space is not sufficient to permit the use of a regular holding-on tool.

DOLPHIN

A term applied to several piles that are bound together, situated either at the corner of a pier or out in the stream and used for docking and warping vessels. Also applied to single piles and bollards on piers that are used in docking and warping.

DONKEY ENGINE

A small gas, steam, or electric auxiliary engine set on the deck and used for lifting, etc.

DOOR, AIRTIGHT

A door so constructed that when closed it will prevent the passage of air under a small pressure. Used on air locks to boiler rooms under forced draft and in similar locations.

DOOR FRAME

The frame surrounding a door opening on which the door seats.

DOOR, JOINER

A light door fitted to staterooms and quarters where air and watertightness is not required. Made of wood, light metal, and metal-covered wood. Metal joiner doors with pressed panels are extensively used.

DOOR, WATERTIGHT

A door so constructed that, when closed, it will prevent water under pressure from passing through. A common type consists of a steel plate, around the edges of which a frame of angle bar is fitted, having a strip of rubber attached to the reverse side of the flange that is fastened to the door plate. The strip of rubber is compressed against the toe of the flange of an angle-iron door frame by dogs or clamps.

DOOR, WEATHERTIGHT

A term applied to outside doors on the upper decks which are designed to keep out the rain and spray.

DOUBLE BOTTOM

A term applied to the space between the inner and outer skins of a vessel called respectively the "**inner bottom**" and "**shell**", usually extending from bilge to bilge and for nearly the whole length of the vessel fore and aft, and subdivided into water or oil tight compartments. In some cases, and generally in warships, the inner bottom is carried above the bilges to a deck at or near the waterline. Where more than one inner skin is fitted, as is sometimes the case, the two spaces are known as the "**lower bottom tank**" or "**void**" and the "**upper bottom tank**". The outer skin is known as the "**shell**", the skin next to it as the "**lower inner bottom**", and the

third skin as the "**upper inner bottom**".

DOUBLING PLATE

An extra plate secured to the original plating for additional strength or to compensate for an opening in the structure.

DOWEL

A pin of wood or metal inserted in the edge or face of two boards or pieces to secure them together.

DRAFT, DRAUGHT

The depth of the vessel below the waterline measured vertically to the lowest part of the hull, propellers, or other reference point. When measured to the lowest projecting portion of the vessel, it is called the "**draft, extreme**"; when measured at the bow, it is called "**draft, forward**"; and when measured at the stern, the "**draft, aft**"; the average of the draft, forward, and the draft, aft is the "**draft, mean**", and the mean draft when in full load condition is the "**draft load**".

DRAFT MARKS

The numbers which are placed on each side of a vessel near the bow and stern, and often also amidships, to indicate the distance from the number to the bottom of the keel or a fixed reference point. These numbers are six inches high, are spaced twelve inches bottom to bottom vertically, and are located as close to the bow and stern as possible.

DRAG

The designed excess of draft, aft, over that forward, measured from the designer's waterline. The drag is constant and should not be confused with trim.

DRIFT

When erecting the structure of a ship and rivet holes in the pieces to be connected are not concentric, the distance that they are out of line is called the drift. This should be corrected by reaming the holes, but common practice, which is prohibited in naval work, is to drive tapered pins, called "drift pins", into the unfair holes to force them into line.

DRIFT PIN

A conical-shaped pin gradually tapered from a blunt point to a diameter a little larger than the rivet holes in which it is to be used. The point is inserted in rivet holes that are not fair, and the other end is hammered until the holes are forced into line.

DRY DOCK, FLOATING

A hollowing floating structure of **L**- or **U**-shaped cross section, so designed that it may be submerged to permit floating a vessel into it, and that it may then raise the vessel and itself so that the deck of the dock and consequently the bottom of the vessel is above the level of the water. The bottom of a floating dry dock consists of one or more pontoons or rectangular-shaped vessels with high wing structure erected on one or both sides according to whether the section is to be **L**- or **U**-shaped. The deck of the pontoon is fitted with stationary keel blocks and movable bilge blocks which can be pulled under a vessel from the top of the wing structure.

Pumps are fitted in the wings by which the dock can be quickly submerged or raised. Floating dry docks are used for repairing and painting the under-water portions of vessels and for docking a damaged vessel.

DRY DOCK, GRAVING

A basin excavated at a waterway and connected thereto by gates or a caisson which may be opened to let a vessel in or out and then closed and the water pumped out. The dock is fitted with stationary keel blocks and movable bilge blocks, which usually are fitted on rack tracks, allowing them to be pulled under a vessel before the water is pumped out. Graving docks are common in navy yards, and although more expensive to construct than floating dry docks, they are practically permanent and supply a more rigid foundation for supporting a ship. The gate of a graving dry dock is usually a caisson which is a complete vessel in itself, having a strong rectangular-shaped keel and end posts which bear against the bottom sill and side ledges at the entrance of the dry dock. The caisson is designed so that its draft may be adjusted by water ballast until it bears against the sill and ledges and is equipped with flood valves and power pumps to make this adjustment. When a ship is to be docked, sluice valves in the caisson or in the deck structure are opened until the water in the dock reaches the same level as the water outside. The caisson is then floated to one side, allowing a vessel to enter the dock. The caisson is then floated back to close the entrance, completely separating the basin from the waterway, and after the vessel is lined up over the keel blocks the water is pumped out of the dry dock.

DRY DOCK, RAILWAY

A railway dock consists of tracks built on an incline on a strong foundation and extending from a distance in-shore sufficient to allow docking a vessel of the maximum size for which the dock is built, to a distance underwater sufficient to allow the same vessel to enter the cradle. The cradle running on the tracks may be of wood or steel fitted with keel and bilge blocks and sufficiently weighted to keep it on the track when in the water. A hoisting engine with a winding drum or wild cat is fitted at the in-shore end of the railway which operates the cradle by a cable or chain. This type of dry dock is used for docking small ships. It is commonly called a "**marine railway**".

DUCTILITY

That property of a material which permits its being drawn out into a thread of wire.

DUNNAGE

Any material, such as blocks, boards, paper, burlap, etc., necessary for the safe stowage of stores and cargo; also used in reference to staging, etc., used by workmen during building or repair operations.

DUPLICATING PIPE

A piece of tubing, generally brass, used with paint to transfer rivet hole layout from template to plate. The end of the pipe is dipped in paint, and while still wet is pushed through each template hole, leaving an impression on the plate. Also called a "marker".

DUTCHMAN
: A piece of wood or steel fitted into an opening to cover up poor joints or crevices caused by poor workmanship.

--E--

ECCENTRIC
: A form of crank in which a circular disk set eccentrically upon a shaft forms both the crank web and the crank pin and converts circular to rectilinear motion. This rectilinear travel is usually short relative to the diameter of the shaft so that an ordinary form of crank is impractical.

EDGE
: An abrupt border or margin, a bounding or dividing line, the part along the boundary.

EDGE, SIGHT
: That edge of a strake of plating which laps outside another strake and is, therefore, in plain sight.

ELASTIC LIMIT
: The limit of stress intensity within which a material will return to its original size and shape when the load is removed and hence not take a permanent set.

ELBOW-ELL
: A pipe fitting that makes an angle between adjacent pipes, always 90 degrees unless another angle is stated.

ELECTRODE
: Either a positive or negative pole or terminal in an electric circuit. See "polarity".

ENGINE ROOM
: Space where the main engines of a ship are located.

ENTRANCE
: The forward underwater portion of a vessel at or near the bow. The angle formed between the center line of the ship and the tangent to the designed waterline is called the angle of entrance.

EQUILIBRIUM, NEUTRAL
: The state of equilibrium in which a vessel inclined from its original position of rest by an external force tends to maintain the inclined position assumed after that force has ceased to act.

EQUILIBRIUM, STABLE
: The state of equilibrium in which a vessel inclined from its original position of rest by an external force tends to return to its original position after that force has ceased to act.

EQUILIBRIUM, UNSTABLE
: The state of equilibrium in which a vessel inclined from its original position of rest

by an external force tends to depart farther from the inclined position assumed after that force has ceased to act.

ERECTION

The process of hoisting into place and joining the various parts of a ship's hull, machinery, etc.

EVAPORATOR

An auxiliary for supplying fresh water, consisting of a salt water chamber heated by coils or nests of tubing through which live steam is circulated, converting the water into steam which is passed to a condenser or distiller to make up loss of boiler feed water or for other purposes requiring fresh water.

EVEN KEEL

When a boat rides on an even keel, its plane of flotation is either coincident with or parallel to the designed waterline.

EXPANSION JOINT

A term applied to a joint which permits linear movement to take up the expansion and contraction due to changing temperature or ship movement.

EXPANSION TANKS

Overflow tanks used to provide for expansion, overflow, and replenishment of oil in stowage or cargo tanks.

EXPANSION TRUNK

A trunk extending above a hold which is intended for stowage of liquid cargo. The surface of the cargo liquid is kept sufficiently high in the trunk to permit of expansion of the liquid without danger of excessive strain on the hull or of overflowing, and of contraction of the liquid without increase of the free surface and its accompanying effect upon the stability of the vessel.

EXTRA STRONG

The correct term or name applied to a certain class of pipe which is heavier than standard pipe and not as heavy as double extra strong pipe. Often, but less correctly, called extra heavy pipe.

EYE

A hole through the head of a needle, pin, bolt, etc. or a loop forming a hole or opening through which something is intended to pass, such as a hook, pin, shaft, or rope. A "worked eye" is one having its edges rounded off like a ring, while a "shackle eye" is drilled straight through, permitting an inserted bolt or pin to bear along its entire length.

EYE BOLT

A bolt having either a head looped to form a worked eye or a solid head with a hole drilled through it forming a shackle eye.

EYES

The forward end of the space below the upper deck of a ship which lies next abaft the stem where the sides of the ship approach very near to each other. The hawse pipes are usually run down through the eyes of a ship.

--F--

FABRICATE

To shape, assemble, and secure in place the component parts in order to form a complete whole. To manufacture.

FACE PLATE

A flat plate fitted perpendicular to the web and welded to the web plate, or welded or riveted to the flange or flanges of a frame, beam stiffener, or girder to balance the continuous plating attached to the opposite flange of the member.

FACTOR OF SAFETY

The ratio between either the ultimate strength of the elastic limit of the material and the allowed working stress. The former is usually referred to as the "nominal factor of safety" and the latter as the "real factor of safety". Elastic materials may have both nominal and real factors of safety, while for those materials having approximately the same values for ultimate strength and elastic limit, the distinction between real and nominal factors of safety is nonexistent.

FAIR CURVES

Curves which do not in any portions of their entire lengths show such changes of direction as to mark those portions as out of harmony in any respect with the curves as a whole or with the other portions of the curves.

FAIR or FAIR UP

To so draw the lines of a vessel that the defined surfaces will show no irregularities throughout their entire extent. To line up the frames of a vessel under construction to their proper position. Rivet holes are said to be fair when corresponding holes in the members joined are concentric.

FAIRLEADER

A fitting or device used to preserve or to change the direction of a rope, chain, or wire so that it will be delivered fairly or on a straight lead to a sheave or drum without the introduction of extensive friction. Fairleaders, or fairleads, are fixtures as distinguished from temporary block rigs.

FAIRWATER

A term applied to plating fitted to form a shape similar to a frustrum of a cone around the ends of shaft tubes and strut barrels to prevent an abrupt change in the streamlines. Also applied to any casting or plating fitted to the hull of a vessel for the purpose of preserving a smooth flow of water.

FAKE

To lay a rope or chain down in long bights side by side or in coils in regular order so that it will run out clear or can be easily and rapidly paid out. Also one complete circle of a coil of rope.

FALL

By common usage, the entire length of rope used in a tackle, although a strict

adherence to the term would limit its application to that end to which the power is applied. The end secured to the block is called the standing part, the opposite end, the hauling part.

FANTAIL

The overhanging stern section of vessels which have round or elliptical after endings to uppermost decks and which extend well abaft the after perpendicular.

FASCIA

A strip of wood used on covering openings in joiner work.

FAST

A rope or chain used to moor a vessel to a wharf, designated in accordance with the end of the boat with which it is used as bow-fast or stern-fast. See "Painter".

FATHOM

A nautical unit of length used in measuring cordage, chains, depths, etc. The length varies in different countries, being six feet in the United States and in Great Britain.

FELLOES

Pieces of wood which form the rim of a wheel.

FENDER

The term applied to various devices fastened to or hung over the sides of a vessel to prevent rubbing or chafing against other vessels or piers. On small craft, as tug boats, fenders of timber faced with hardwood or flat steel plate, or of steel structure run fore and aft on the outside of the vessel above the waterline and are firmly secured to the hull. Wood spars, bundles of rope, woven cane, or rope-covered cork are hung over the sides by lines when permanent fenders are not fitted.

FID

A wood or metal bar used to support the weight of a topmast or a top-gallant mast when in position, being passed through a hole or mortise at its heel and resting on the trestle trees or other support. Also a hardwood tapering pin or tool, used by sailmakers and riggers to open the strands of a rope, eye, grommet, etc., A "hand fid" is rounded at the ends, a "standing or cringle fid" is larger than a hand fid and has a flat base.

FIDLEY

Framework built around a weather-deck hatch through which the smoke pipe passes.

FIDLEY DECK

A partially raised deck over the engine and boiler rooms, usually around the smokestack.

FIDLEY HATCH

Hatch around smokestack and uptake.

FIFE RAIL; PIN RAIL

A term applied to a rail worked around a mast and fitted with holes to take belaying pins for securing the running gears.

FILLET

A term applied to the metal filling in the bosom or concave corners where abrupt changes in direction occur in the surface of a casting, forging, or weldment.

FIN

A projecting keel. A thin plane of metal projecting from hull, etc.

FIRE CONTROL

Pertaining to the direction, the control, and the firing of the vessel's batteries.

FITTINGS, PIPE

A term applied to the connections and outlets, with the exception of valves and couplings, that are attached to pipes.

FIXED LIGHT

A thick glass, usually circular in shape, fitted in a frame fixed in an opening in a ship's side, deck house, or bulkhead to provide access for light. The fixed light is not hinged. Often incorrectly called a dead light.

FLAGSTAFF

Flag pole, usually at the stern of a ship; carries the ensign.

FLAM

A term used to express the same meaning as flare, but more properly used to denote the maximum curl or roll given to the flare at the upper part, just below the weather deck.

FLANGE

The turned edge of a plate or girder which acts to resist bending. The turned edge of a plate or shape for tying in intersecting structural members. A casting or forging attached to or worked integral with a pipe to form a disk, normal to the axis of an exterior to the pipe, for connecting lengths of pipe,

FLARE

The spreading out from a central vertical plane of the body of a ship with increasing rapidity as the section rises from the water line to the rail. Also a night distress signal.

FLAT

A small partial deck, built without camber.

FLOATING POWER

The sum of the utilized and the reserve buoyancy of a vessel, or the displacement of the completely watertight portion of the vessel when fully submerged. The utilized buoyancy is that buoyancy required to support the weight of the vessel.

FLOODABLE LENGTH

The length of a vessel which may be flooded without sinking her below her safety or margin line. The value of the floodable length of a given vessel varies from point to point throughout her length due to change in form. Similarly at a given point it varies from time to time, depending upon the condition of loading and the permeability of the cargo.

FLOOR

A plate used vertically in the bottom of a ship running athwartship from bilge to bilge usually on every frame to deepen it. In wood ships, the lowest frame timber

or the one crossing the keel is called the floor.

FLUKES

The palms or broad holding portions at the arm extremities of an anchor, which penetrate the ground.

FLUX

A fusable material or gas used to dissolve or prevent the formation of oxides, nitrides, or other undesirable inclusions formed in welding and brazing.

FOOTINGS

Bottom boards of walking flats attached to the inside of the frames of small boats where deep floors are not fitted.

FORE

A term used in indicating portions or that part of a ship at or adjacent to the bow. Also applied to that portion and parts of the ship lying between the midship section and stem; as, fore body, fore hold, and foremast.

FORE AND AFT

Lengthwise of a ship.

FORECASTLE

A short structure at the forward end of a vessel formed by carrying up the ship's shell plating a deck height above the level of her uppermost complete deck and fitting a deck over the length of this structure. The name applied to the crew's quarters on a merchant ship when they are in the fore part of the vessel.

FOREFOOT

The lower end of a vessel's stem which is stepped on the keel. That point in the forward end of the keel about which the boat pivots in an endwise launching.

FOREHOOK

See "breast hook".

FORE PEAK

The extreme forward end of the vessel below decks. The forward trimming tank.

FORGING

A mass of metal worked to a special shape by hammering, bending, or pressing while hot.

FORK BEAM

A half beam to support a deck here hatchways occur.

FORWARD

In the direction of the stem.

FORWARD PERPENDICULAR

A line perpendicular to the base line and intersecting the forward side of the stem at the designed waterline.

FOUL

A term applied to the underwater portion of the outside of a vessel's shell when it is more or less covered with sea growth or foreign matter. It has been found that even an oily film over the vessel's bottom will retard the speed, while sea growth will reduce a vessel's propulsive efficiency to a large extent. Also, obstructed or

impeded by an interference, etc.

FOUND

To fit and bed firmly. Also, equipped.

FOUNDER

To sink as the result of entrance of water.

FRAME

A term generally used to designate one of the transverse ribs that make up the skeleton of a ship. The frames act as stiffeners, holding the outside plating in shape and maintaining the transverse form of the ship.

FRAME, BOSS

A frame that is bent to fit around the boss in the way of a stern tube or shaft.

FRAME LINES

Molded lines of a vessel as laid out on the mold loft floor for each frame, showing the form and position of the frames.

FRAME SPACING

The fore-and-aft distances between frames, heel to heel.

FREEBOARD

The vertical distance from the waterline to the top of the weather deck at side.

FREEING PORTS

Holes in the lower portion of a bulwark, which allow deck wash to drain off into the sea. Some freeing ports have swinging gates which allow water to drain off but which are automatically closed by sea-water pressure.

FURNACED PLATE

A plate that requires heating in order to shape it as required.

FURRINGS

Strips of timber, metal, or boards fastened to frames, joists, etc., in order to bring their faces to the required shape or level, for attachment of sheathing, ceiling, floor, etc.

FUTTOCKS

The pieces of timber of which a frame in a wood ship is composed. Starting at the keel they are called the first futtock, second futtock, third futtock, and so on.

--G--

GAFF

A spar to which the top of a fore-and-aft sail is attached. It is usually fitted with a jaw at the mast end to clasp the mast.

GAGE, DRAFT

An installation comprising a graduated glass tube, connected at the bottom end with the sea and with the top end open to the air, on which the draft of the vessel is shown by the level of water in the tube.

GALLEY

The space on a vessel in which the food is prepared and cooked.

GALVANIZING

The process of coating one metal with another, ordinarily applied to the coating of iron or steel with zinc. The chief purpose of galvanizing is to prevent corrosion.

GANGBOARD, GANGPLANK

A term applied to boards or a movable platform used in transferring passengers or cargo from a vessel to or from a dock.

GANGWAY

The term applied to a place of exit from a vessel. Gangways are fitted in the sides of a vessel in the shape of ports requiring means of closure or may be movable portions of bulwarks or railing on the weather decks.

GANTLINE or GIRTLINE

A rope reeving through a single block aloft and used for hoisting or lowering rigging, drying clothing and hammocks, etc.

GARBOARD

The strakes of outside plating next to the keel. These strakes act in conjunction with the keel and are usually thicker than the other bottom strakes.

GASKETS

Packing materials, by which air, water, oil, or steam tightness is secured in such places as on doors, hatches, steam cylinders, manhole covers, or in valves, between the flanges of pipes, etc. Such materials as rubber, canvas, asbestos, paper, sheet lead and copper, soft iron, and commercial products are extensively used.

GEAR

A comprehensive term in general use on shipboard signifying the total of all implements, apparatus, mechanism, machinery, etc., appertaining to and employed in the performance of any given operation, as "cleaning gear," "steering gear," "anchor gear," etc.

GEARING

A term applied to wheels provided with teeth that mesh, engage, or gear with similar teeth on other wheels in such manner that motion given one wheel will be imparted to the other.

GIB

A metal fitting to hold a member in place or press two members together, to afford a wearing or bearing surface, or to provide a means of taking up wear.

GIMBALS

A device by which a ship's compass, chronometer, etc., is suspended so as to remain in a constant horizontal position irrespective of the rolling or pitching of the vessel. It consists of two concentric brass hoops or rings whose diameters are pivoted at right angles to each other on knife-edge bearings.

GIRDERS

On ships this term is used to define a structural member which provides support for more closely spaced members, such as beams, frames, stiffeners, etc., which are at

right angles to it and which either rest upon it or are attached to its web. It may be longitudinal or transverse, continuous or intercoastal, and is usually supported by bulkheads and stanchions. The term is also used to designate the longitudinal members in the double bottom.

GIRTH

The distance measured on any frame line, from the intersection of the upper deck with the side, around the body of the vessel to the corresponding point on the opposite side.

GOOSENECK

A swivelling fitting on the keel or mast end of a boom for connecting the boom to the mast. Also called a Pacific iron.

GRAB, HAND

A metal bar fastened to a bulkhead, house side, or elsewhere, to provide means of steadying a person when the ship rolls or pitches.

GRAPNEL

An implement having from four to six hooks or prongs, usually four, arranged in a circular manner around one end of a shank having a ring at its other end. Used as an anchor for small boats, for recovering small articles dropped overboard, to hook on to lines, and for similar purposes. Also known as a Grappling Hook.

GRATINGS

A structure of wood or metal bars so arranged as to give a support or footing over an opening, while still providing spaces between the members for the passage of light and the circulation of air.

GRIPE

The sharp forward end of the dished keel on which the stem is fixed. A curved piece of timber joining the forward end of the keel and the lower end of the cutwater. A lashing, chain, or the like, used to secure small boats in the chocks and in sea position in the davits.

GROMMET

A wreath or ring of rope. Fibre, usually soaked in red lead or some such substance, and used under the heads and nuts of bolts to secure tightness. A worked eye in canvas.

GROUND TACKLE

A general term for all anchors, cables, ropes, etc., used in the operation of mooring and unmooring a ship.

GROUNDWAYS

Timbers fixed to the ground and extending fore and aft under the hull on each side of the keel, to form a broad surface track on which the ship is end-launched. "Groundways" for a side launching embody similar basic features.

GUDGEONS

Lugs cast or forged on the stern post for the purpose of hanging and hinging the rudder. Each is bored to form a bearing for a rudder pintle and is usually bushed with lignum vitae or white bearing metal.

GUNWALE

A term applied to the line where a weather deck stringer intersects the shell. The upper edge of the side of an open boat.

GUNWALE BAR

A term applied to the bar connecting a stringer plate on a weather deck to the sheer strake.

GUSSET PLATE

A bracket plate lying in a horizontal, or nearly horizontal, plane. The term is often applied to bracket plates.

GUTTER EDGE

A bar laid across a hatchway to support the hatch cover.

GUYS

Wire or hemp ropes or chains to support booms, davits, etc., laterally, employed in pairs. Guys to booms that carry sails are also known as backropes.

GYPSY

A small auxiliary drum usually fitted on one or both ends of a winch or windlass. The usual method of hauling in or slacking off on ropes with the aid of a gypsy is to take one or more turns with the bight of the rope around the drum and to take in or pay out the slack of the free end.

--H--

HALF-BREADTH PLAN

A plan or top view of one-half of a ship divided by the middle vertical plane. It shows the waterlines, cross section lines, bow and buttock lines, and diagonal lines of the ship's form projected on the horizontal base plane of the ship.

HALF MODEL

A model of one-half of a ship divided along the middle vertical plane.

HALYARDS

Light lines used in hoisting signals, flags, etc. Also applied to the ropes used in hoisting gaffs, sails, or yards.

HAMPER, TOP HAMPER

Articles of outfit, especially spars, rigging, etc., above the deck, which, while ordinarily indispensable, may become in certain emergencies both a source of danger and an inconvenience.

HARD PATCH

A plate riveted over another plate to cover a hole or break.

HARPINGS; HARPINS

The fore parts of the wales of a vessel which encompass her bows and are fastened to the stem, thickened to withstand plunging. The ribbands bent around a vessel under construction to which the cant frames are temporarily secured to hold them

in their proper position.

HATCH, HATCHWAY

An opening in a deck through which cargo may be handled, machinery or boilers installed or removed, and access obtained to the decks and holds below. Hatch is properly a cover to a hatchway but is often used as a synonym for hatchway.

HATCH BAR

A term applied to flat bars used for securing and locking hatch covers. A bar over the hatch for rigging a tackle.

HATCH BATTENS

A term applied to flat bars used to fasten and make tight the edges of the tarpaulins that are placed over hatches. The batten and the edge of the tarpaulin are wedged tightly in closely-spaced cleats.

HATCH BEAMS

A term applied to the portable beams fitted to the coamings for the purpose of supporting the hatch covers.

HATCH, BOOBY

An access hatchway leading from the weather deck to the quarters. A small companion which is readily removable in one piece. A wooden, hoodlike covering for a hatchway, fitted with a sliding top.

HATCH CARRIER

The supports which are attached to the inside of the coaming to take the ends of the hatch beams.

HATCH CLEATS

A term applied to the clips attached to the outside of the hatch coaming for the purpose of holding the hatch battens and wedges which fasten the edges of the tarpaulin covers.

HATCH COVERS or HATCHES

Covers for closing the hatchway, in cargo ships usually made of wood planks in sections that can be handled by the crew. In naval ship, steel hatch covers are used. The wood cover is made tight against rain and the sea by stretching one or more tarpaulins over them, secured at the edges by the hatch battens.

HATCH RESTS

A term applied to the shelf fitted inside and just below the top of the coaming for the purpose of supporting the hatch covers.

HATCHWAY TRUNK

A term applied to the space between a lower deck hatchway and the hatchway or hatchways immediately above it when enclosed by a casing. A trunk may be either watertight or nonwatertight.

HAWSE

The hawse hole; also the part of a ship's bow in which the hawse holes for the anchor chains are located.

HAWSE BAG

A conical-shaped canvas bag, stuffed with sawdust, oakum, or similar material,

and fitted with a lanyard at apex and base, used for closing the hawse pipes around the chain to prevent shipping water through the pipes; also called a "**jackass**", "**hawse plug**", or "**hawse block**".

HAWSE BOLSTER

A timber or metal bossing at the ends of a hawse pipe to ease the cable over the edges and to take the wear.

HAWSE HOLE

A hole in the bow through which a cable or chain passes.

HAWSE PIPES

Tubes leading the anchor chain from the deck on which the windlass is located down and forward through the vessel's bow plating.

HAWSER

A large rope or a cable used in warping, towing, and mooring.

HEAD LEDGE

A term applied to the forward or after end coaming of a hatch, more frequently used in connection with wood coamings.

HEAD OF A SHIP

The fore end of a ship which was formerly fitted up for the accommodation of the crew. A term applied to a toilet on board of a ship. A ship is trimmed by the head when drawing more water forward and less aft than contemplated in her design.

HEEL

The convex intersecting point or corner of the web and flange of a bar. The inclination of a ship to one side, caused by wind or wave action or by shifting weights on board.

HEEL PIECE, HEEL BAR

A bar that serves as a connecting piece between two bars which butt end-to-end. The flange of the heel bar is reversed from those of the bars it connects.

HELM

The term applied to the tiller, wheel, or steering gear, and also the rudder.

HOG

A scrub broom for scraping a ship's bottom under water.

HOG FRAME

A fore-and-aft frame, forming a truss for the main frames of a vessel to prevent bending.

HOGGING

A term applied to the distortion of a vessel's hull when her ends drop below their normal position relative to her midship portion.

HOG SHEER

The sheer curve of the deck on a vessel, constructed so that the middle is higher than the ends.

HOIST

To raise or elevate by manpower or by the employment of mechanical appliances; any device employed for lifting weights.

HOLD

The space or compartment between the lowermost deck and the bottom of the ship, or top of the inner bottom if one is fitted. The space below decks allotted for the stowage of cargo.

HOLD BEAMS

Beams in a hold similar to deck beams but having no decking or planking on them.

HOME

Close up; snugly in place; as, to drive home a bolt.

HOOD

A shelter over a companionway, scuttle, etc. It is generally built of canvas spread over an iron frame. It may also be constructed of light metal plating.

HOODS

A term applied to those plates placed at the extreme forward or after ends of a ship.

HOODING END

The endmost plate of a complete strake. The hooding-ends fit into the stem or stern post.

HORNING

Setting the frames of a vessel square to the keel after the proper inclination to the vertical due to the declivity of the keel has been given.

HORSE TIMBER

The after longitudinal strength member (often called counter timber) fastening the shaft log or keel and the transom knee together. A small boat term.

HORSING

(In naval architecture). Calking planking with oakum with a large maul or beetle and wedge-shaped iron.

HOUSING

A term applied to an inclosure partially or wholly worked around fittings or equipment. That portion of the mast below the surface of the weather deck. Applied to topmasts, that portion overlapping the mast below.

HULL

The framework of a vessel, together with all decks, deck houses, and the inside and outside plating or planking, but exclusive of masts, yards, rigging, and all outfit or equipment.

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Return to the Naval Historical Center Home Page

Nomenclature of Naval Vessels

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Table of Contents

--I--

INBOARD
: Toward the center; within the vessel's shell and below the weather decks.

INBOARD PROFILE
: A plan representing a longitudinal section through the center of the ship, showing deck heights, transverse bulkheads, assignment of space, machinery, etc., located on the center plane or between the center and the shell of the far side.

INITIAL STABILITY
: The stability of a vessel in the upright position or at small angles of inclination. It is usually represented by the metacentric height.

INNER BOTTOM
: A term applied to the inner skin or tank top plating. The plating over the double bottom.

INTERCOSTAL
: Occurring between ribs, frames, etc., The term is broadly applied, where two members of a ship

intersect, to the one that is cut.

ISHERWOOD SYSTEM

A system of building ships which employs close spaced, relatively light, longitudinal main framing supported on widespread transverse members of comparatively great strength instead of transverse main framing.

--J--

JACK LADDER

A ladder with wooden steps and side ropes.

JACK ROD

A term applied to a pipe or rod to which the edges of awnings or weather cloths are secured.

JACKSTAFF

Flagpole at the bow of a ship.

JACOB'S LADDER

A ladder having either fiber or wire rope or chain sides with wood or metal rungs attached at regular intervals. One end is usually fitted with sister hooks or shackles for hooking on.

JOGGLED

A term applied where a plate or bar is offset in the way of a lapped joint. The object of the joggle is to permit a close fit of the attached member without the use of liners under alternate strakes of plating.

JOINT, BUTT

A term applied where a connection between two pieces of material is made by brining their ends or edges together (no overlap) and by welding alone, or by welding, riveting, or bolting each to a strip of strap that overlaps both pieces.

JOINT, LAPPED

A term applied where a connection between two pieces of material is made by overlapping the end or edge of one over the end or edge of the other and by fastening the same by bolts, rivets, or welding.

JOURNAL

That portion of a shaft or other revolving member which transmits weight directly to and is in immediate contact with the bearing in which it turns.

JURY

A term applied to temporary structures, such as masts, rudders, etc. used in an emergency.

--K--

KEEL

A center-line strength member running fore and aft along the bottom of a ship and often referred to as the backbone. It is composed either of long bars or timbers scarfed at their ends or by flat plates connected together by riveting or welding.

KEEL, BILGE

A fin fitted on the bottom of a ship at the turn of the bilge to reduce rolling. It commonly consists of a plate running fore and aft and attached to the shell plating by angle bars. It materially helps in steadying a ship and does not add much to the resistance to propulsion when properly located.

KEEL, BLOCKS

Heavy timber blocks piled one above the other on which the keel of a vessel is supported when being built, or when she is in a dry dock. They are placed under the keel from bow to stern and a sufficient distance apart to allow working between them.

KEEL, DOCKING

In dry docking, the weight of a ship is carried almost entirely on the keel and bilge blocks. The keel and keelson provide the means of distributing the pressure on the center line, and docking keels composed of doubling strips of plate or a heavier plate or built-up girders are sometimes fitted on the bottom at a distance from the center line corresponding to the best position for the bilge block. The docking keels are fitted in the fore and aft direction, generally parallel or nearly so to the keel.

KEELSON, VERTICAL CENTER

The lower middle-line girder which, in conjunction with a flat plate keel on the bottom and a rider plate on top, forms the principal fore-and-aft strength member in the bottom of a ship. In addition to its importance as a "backbone" or longitudinal strength member, it serves to distribute and equalize the pressure on the transverse frames and bottom of the ship when grounding or docking occurs. In steel ships this keelson usually consists of a vertical plate with two angles running along the top and two along the bottom. The girder, however, may be made up of various combinations of plates and shapes. This member should continue as far forward and aft as possible. Usually called the Vertical Keel.

KENTLEDGE

Pig iron used either as temporary or permanent ballast or as a weight for inclining a vessel.

KERF

The slit made by the cut of a saw. Also the channel burned out by a cutting torch.

KING POST

A strong vertical post used to support a derrick boom. See Samson Post.

KNEE

A block of wood having a natural angular shape or one cut to a bracket shape and used to fasten and strengthen the corners of deck openings and the intersections of timbers, and to connect deck beams to the frames of wood vessels. The term is also applied to the ends of steel deck beams that are split, having one leg turned down and a piece of plate fitted between the split portion, thus forming a bracket or knee.

KNOT

A unit of speed, equalling one nautical mile (6,080.20 feet) an hour, as when a ship goes ten nautical miles per hour, her speed is ten knots.

KNUCKLE

An abrupt change in direction of the plating, frames, keel, deck, or other structure of a vessel.

--L--

LADDER

A framework consisting of two parallel sides, connected by bars or steps which are spaced at intervals suitable for ascending or descending. On shipboard the term ladder is also applied to staircases and to other contrivances used in ascending or descending to or from a higher or lower level.

LADDER, ACCOMMODATION

A staircase suspended over the side of a vessel from a gangway to a point near the water to provide easy access to the deck from a small boat alongside.

LADDER, COMPANION

A staircase fitted as a means of access from a deck to the quarters.

LADDER, SEA

Rungs secured to the side of a vessel to form a ladder from the weather deck to the water.

LAGGING

A term applied to the insulating material that is fitted on the outside of boilers, piping, etc.

LANDING, LANDING EDGE

That portion of the edge or end of a plate over which another plate laps. The covered-up edge.

LANYARD

The present use of this term is generally limited to a piece of rope or line having one end free and the other attached to any object for the purpose of either near or remote control.

LAP

A term applied to the distance that one piece of material is laid over another; the amount of overlap, as in a lapped joint.

LAPSTRAKE

A term applied to boats built on the clinker system in which the strakes overlap each other. The top strake always laps on the outside of the strake beneath.

LAUNCH

A term applied to a small power or motor boat. See launching.

LAUNCHING

A term applied to the operation of transferring a vessel from the building ways into the water. End launching and side launching methods are employed; the former method is used when the vessel is built at an angle, usually at right angles, to the waterfront and the vessel is launched stern first, while in side launching the vessel is built parallel to the waterfront and launched sidewise. In preparing for an end launching, usually groundways, made of heavy timbers are laid with an inclination of about 1/2" and 5/8" to the foot parallel to the center line of the ship one on either side of the keel, and spaced about one-third of the beam of the vessel apart. These groundways run the length of the vessel and for some distance out under the water. On top of the

groundways are placed the sliding ways, also heavy timbers, and between these two ways is placed a coating of launching grease. The sliding ways are prevented from sliding on the greased groundways by a trigger or similar device and dog or dagger shores. Cradles are built up to fit the form of the vessel, and between the sliding ways and the cradle, wedges are driven and the weight of the ship thus transferred from the building blocks to the sliding ways. After the building blocks and shores are removed, the trigger is released and gravity causes the vessel to slide down the inclined ways. In some cases hydraulic jacks are set at the upper end of the groundways to exert pressure on the sliding ways to assist in overcoming initial friction along the ways. A similar procedure is followed in the case of side launchings, except that more than two groundways are usually used, depending on the length of the ship, and the inclination of the ways is steeper.

LAYING OFF

A term applied to the work done by a loftsman in laying off the ship's lines to full size in the mold loft and making templates therefrom. Also known as laying down.

LAYING OUT

Placing the necessary instructions on plates and shapes for shearing, planing, punching, bending, flanging, beveling, rolling, etc., from templates made in the mold loft or taken from the ship.

LEADING EDGE

That edge of a propeller blade which cuts the water when the screw is revolving in the ahead direction. That edge of a rudder, diving plane, or strut arm which faces toward the bow of the ship.

LENGTH BETWEEN PERPENDICULARS

The length of a ship measured from the forward side of the stem to the aft side of the stern post at the height of the designed water line. In naval practice, the total length on the designed water line.

LENGTH OVER ALL

The length of a ship measured from the foremost point of the stem to the aftermost part of the stern.

LIFT A TEMPLATE

To construct a template to the same size and shape as the part of the ship involved, from either the mold loft lines or from the ship itself, from which laying out of material for fabrication may be performed.

LIFTING

Transferring marks and measurements from a drawing, model, etc., to a plate or other object, by templates or other means.

LIGHT, PORT

An opening in a ship's side, provided with a glazed lid or cover.

LIGHTENING HOLE

A hole cut out of any structural member, as in the web, where very little loss of strength will occur. These holes reduce the weight and in many cases serve as access holes. This condition is particularly true in floor plates and longitudinals in double bottoms.

LIGHTER

A full-bodied, heavily-built craft, usually not self-propelled, used in bringing merchandise or

cargo alongside or in transferring same from a vessel.

LIMBER CHAINS

Chains passing through the limber holes of a vessel, by which they may be cleaned of dirt.

LIMBER HOLE

A hole or slot in a frame or plate for the purpose of preventing water from collecting. Most frequently found in floor plates just above the frames and near the center line of the ship.

LINE

A general term for a rope of any size used for various purposes: small cords such as long line, lead line, or small stuff as marlin, ratline, houseline, etc.

LINER

A piece of metal used for the purpose of filling up a space between a bar and a plate or between two plates; a filler.

LINES

The plans of a ship that show its form. From the lines drawn full size on the mold loft floor are made templates for the various parts of the hull.

LIST

The deviation of a vessel from the upright position due to bilging, shifting of cargo, or other cause.

LOAD LINE

The line on the "lines plan" of a ship representing the intersection of the ship's form with the plane of the water's surface when the vessel is floating with her designed load on board. Also applied to the actual intersection of the surface of the water with a vessel's side.

LOCK NUT

A thin nut which is turned down over the regular nut on a bolt to lock the regular nut against turning off. Also applied to a thin nut placed on a pipe to hold packing at a joint or used on both sides of a bulkhead through which a pipe passes to secure tightness.

LOCKER

A storage compartment on a ship.

LOFTSMAN

A man who lays off the ship's lines to full size in the mold loft and makes templates therefrom.

LONGITUDINALS

A term applied to the fore-and-aft girders in the bottom of a ship. These girders are usually made up from plates and shapes and are sometimes intercostal and sometimes continuous.

LOUVER

A small opening to permit the passage of air for the purpose of ventilation, which may be partially or completely closed by the operation of overlapping shutters.

--M--

MAGAZINE

Spaces or compartments devoted to the stowage of ammunition. Often specifically applied to

compartments for the stowage of powder as a distinction from shell stowage spaces.

MAIN BODY

The hull proper, without the deck houses, etc.

MAIN DECK

The principal deck of the hull, usually the highest extending from stem to stern and providing strength to the main hull.

MANGER

A term applied to the manger-like space immediately forward of the manger plate which is fitted just abaft the hawse pipes to prevent water entering through the pipes from running aft over the deck.

MANHOLE

A round or oval hole cut in decks, tanks, boilers, etc. for the purpose of providing access.

MANIFOLD

A casting or chest containing several valves. Suction or discharge pipes from or to the various compartment, tanks, and pumps are led to it, making it possible for a pump to draw from or deliver to any one of several compartments.

MANTLET PLATE

A thin plate for the protection of personnel, fitted over bolt or rivet heads to act as a screen to prevent the heads flying about when the structure is subjected to impact.

MARGIN PLANK

A plank forming the boundary or margin of the deck planking.

MARGIN PLATE

The outer boundary of the inner bottom, connecting it to the shell plating at the bilge.

MARINE RAILWAY

See drydock, railway.

MARLINE SPIKE

A pointed iron or steel tool used to separate the strands in splicing rope, and as a lever in marling or putting on seizings. The wire rope spike has a flat, rounded end and the manila rope spike has a sharp point.

MARLIN

A double-threaded, left-handed tarred cord, about 1/8" diameter, made of a good grade of American hemp.

MAST

A long pole of steel or wood, usually circular in section, one or more of which are usually located, in an upright position, on the center line of a ship. Originally intended for carrying sails, they are now used more as supports for the rigging, cargo and boat-handling gear and wireless equipment.

MAST COLLAR

A piece of wood or a steel shape formed into a ring and fitted around the mast hole in a deck.

MAST HOUNDS

The upper portion of the mast at which the outrigger or trestle trees are fitted. Also applied to that portion at which the hound band for attaching the shrouds is fitted on masts without outrigger or trestle trees.

MAST PARTNERS

A term applied to wood planking or steel plating worked around a mast hole to give side support to the mast.

MAST STEP

A term applied to the foundation on which a mast is erected.

MAST TABLE

See Boom Table.

MESSROOM

A space or compartment where members of the crew eat their meals; a dining room. A dining room in which officers eat their meals is called a wardroom messroom.

MIDSHIP BEAM

A deck beam of the transverse frame located at the midpoint between the forward and after perpendiculars. Also applicable to the transverse dimension of the hull at the same point.

MIDSHIP FRAME

The frame located at the midpoint between the perpendiculars.

MIDSHIP SECTION

The vertical transverse section located at the midpoint between the forward and after perpendiculars. Usually this is the largest section of the ship in area. Also, applied to a drawing showing the contour of the midship frame upon which is depicted all the structural members at that point with information as to their size and longitudinal extent.

MIDSHIPS

Same as Amidships.

MITRED

Cut to an angle of 45 degrees or two pieces joined to make a right angle.

MOCK UP

To build up of wood or light material to scale or full size a portion of the ship before actual fabrication of the steel work. Used to study arrangement, methods of fabrication, workability, etc.

MOLD

A pattern or template. Also a shape of metal or wood over or in which an object may be hammered or pressed to fit.

MOLDED LINE

A datum line from which is determined the exact location of the various parts of a ship. It may be horizontal and straight as the molded base line, or curved as a molded deck line or a molded frame line. These lines are determined in the design of a vessel and adhered to throughout the construction. Molded lines are those laid down in the mold loft.

MOLDED EDGE

The edge of a ship's frame which comes in contact with the skin, and is represented in the drawings.

MOLD LOFT

A space used for laying down the lines of a vessel to actual size and making templates therefrom for laying out the structural work entering into the hull.

MOORING

A term applied to the operation of anchoring a vessel in a harbor, securing her to a mooring buoy,

or to a wharf or dock by means of chains or ropes.

MOORING LINES

The chains or ropes used to tie up a ship.

MOORING PIPE

An opening through which mooring lines pass.

MORTISE

A hole cut in any material to receive the end or tenon of another piece.

MOTORSHIP

A ship driven by some form of internal combustion engine. Not generally applied to small boats driven by gasoline engines which are usually called motorboats.

MULLION

The vertical bar dividing the lights in a window.

MUSHROOM VENTILATOR

A ventilator whose top is shaped like a mushroom and fitted with baffle plates so as to permit the passage of air and prevent the entrance of rain or spray. Located on or above a weather deck to furnish ventilation to compartments below deck.

--N--

NAUTICAL MILE

See knot.

NIBBING PLANK

A margin plank that is notched to take the ends of regular deck planks and insure good calking of the joint.

NIGGERHEAD

A small auxiliary drum on a winch. See Gypsy.

NIPPLE

A piece of pipe having an outside thread at both ends for use in making pipe connections. Various names are applied to different lengths, as close, short, long, etc.

NORMALIZE

To heat steel to a temperature slightly above the critical point and then allow it to cool slowly in air.

NORMAN PIN

A metal pin fitted in a towing post or bitt for belaying the line.

NOSING

The part of a stair tread which projects beyond the face of the riser.

--O--

OAKUM

A substance made from soft vegetable fibre such as hemp and jute impregnated with pine tar. It is principally used for calking the planking on wood decks of steel vessels and for calking all the planking on wood ships where watertightness is desired. It is also for calking around pipes.

OFFSETS

A term used by draftsmen and loftsmen for the coordinates in ship curves. Also applied to joggles in plates and shapes of structural shapes.

OGEE

A molding with a concave and convex outline like an **S**.

OILTIGHT

Having the property of resisting the passage of oil.

OLD MAN

A heavy bar of iron or steel bent in the form of a **Z** used to hold a portable drill. One leg is bolted or clamped to the work to be drilled and the drill head is placed under the other leg which holds down the drill to its work.

ON BOARD

On or in a ship; aboard.

ON DECK

On the weather deck, in the open air.

ORLOP DECK

The term formerly applied to the lowest deck in a ship; now practically obsolete.

OUTBOARD

Away from the center toward the outside; outside the hull.

OUTBOARD PROFILE

A plan showing the longitudinal exterior of the starboard side of a vessel, together with all deck erections, stacks, masts, yards, rigging, rails, etc.

OVERBOARD

Outside, over the side of a ship into the water.

OVERHANG

That portion of a vessel's bow or stern which projects beyond a perpendicular at the waterline.

OVERHAUL

To repair or put in proper condition for operation; to overtake or close up the distance between one ship and another ship moving in the same direction.

--P--

PACKING

A general term applied to a yielding material employed to effect a tight joint, also called gasket material.

PAD EYE

A fitting having one or more eyes integral with a plate or base to provide ample means of securing and to distribute the strain over a wide area. The eyes may be either "worked" or "shackle." Also known as lug pads, hoisting pads, etc.

PAINTER

A length of rope secured at the bow of a small boat for use in towing or for making it fast. Called also a bow-fast.

PALM

The fluke, or more exactly, the flat inner surface of the fluke of an anchor; a sailmaker's protector for the hand, used when sewing canvas; a flat surface at the end of a strut or stanchion for attachment to plating, beams, or other structural member.

PANTING

The pulsation in and out of the bow and stern plating as the ship alternately rises and plunges deep into the water.

PANTING BEAMS

The transverse beams that tie the panting frames together.

PANTING FRAMES

The frames in the fore peak, usually extra heavy to withstand the panting action of the shell plating.

PARAVANE

The paravane is a special type of water kite which, when towed with wire rope from a fitting on the forefoot of a vessel, operates to ride out from the ship's side and deflect mines which are moored in the path of the vessel, and to cut them adrift so that they will rise to the surface where they may be seen and destroyed.

PARCELLING

Narrow strips of canvas which are tarred and wound around ropes, following the lay and overlapping in order to shed water. The parcelling is applied after worming, preparatory to serving.

PARTNERS

Similar pieces of steel plate, angles, or wood timbers used to strengthen and support the mast where it passes through a deck, or placed between deck beams under machinery bed plates for added support.

PAULIN

A term applied to a pliable canvas hatch cover, and also to pieces of canvas used as a shelter for workmen or as a cover for deck equipment.

PAWL

A term applied to a short piece of metal so hinged as to engage in teeth or depressions of a revolving mechanism for the purpose of preventing recoil. Fitted to capstans, windlasses, etc. Also called Pall.

PAYING

The operation of filling the seams of a wood deck, after the calking has been inserted, with pitch, marine glue, etc. Also applied to the operation of slackening away on a rope or chain.

PEAK, FORE AND AFTER

The space at the extreme bow or stern of a vessel below the decks.

PEAK TANK

Compartments at the extreme fore and aft ends of the ship for any use either as void spaces or as trimming tanks. When used for the latter purpose, water is introduced to change the trim of the vessel.

PEEN

To round off or shape an object, smoothing out burrs and rough edges.

PEEN

The lesser head of a hammer, and is termed ball when it is spherical, cross when in the form of a rounded edge ridge at right angles to the axis of the handle, and straight when like a ridge in the plane of the handle.

PELICAN HOOK

A type of quick releasing hook used at the lower end of shrouds, on boat grips, and in similar work where fast work may be necessary.

PELORUS

A navigational instrument, similar to a binnacle and mariner's compass, but without a magnetic needle, used in taking bearings, especially when the object to be sighted is not visible from the ship's compass. Also known as a **Dumb Compass**.

PERIOD OF ROLL

The time occupied in performing one double oscillation or roll of a vessel as from port to starboard and back to port.

PERISCOPE

An instrument used for observing objects from a point below the object lens. It consists of a tube fitted with an object lens at the top, an eye piece at the bottom and a pair of prisms or mirrors which change the direction of the line of sight. Mounted in such a manner that it may be rotated to cover all or a part of the horizon or sky and fitted with a scale graduated to permit of taking bearings, it is used by submarines to take observations when submerged.

PILLAR

A vertical member or column giving support to a deck. Also called a stanchion.

PILOT HOUSE

A house designed for navigational purposes. It is usually located forward of the midship section and so constructed as to command an unobstructed view in all directions except directly aft along the center line of the vessel where the smokestack usually interferes.

PIN, BELAYING

A small iron or tough wood pin, made with a head, shoulder, and shank. It is fitted in holes in a rail and is used in belaying or making fast the hauling parts of light running gear, signal halyards, etc.

PINTLES

A term applied to the pins or bolts which hinge the rudder to the gudgeons on the stern post.

PITCH

A term applied to the distance a propeller will advance during one revolution, the distance between the centers of the teeth of a gear wheel, the axial advance of one convolution of the thread on a screw, the spacing of rivets, etc. Also applied to pine tar, asphalt and coal pitch used in paying seams of a deck.

PITCHING

The alternate rising and falling motion of a vessel's bow in a nearly vertical plane as she meets the crests and troughs of the waves.

PITTING

The localized corrosion of iron and steel in spots, usually caused by irregularities in surface finish, and resulting in small indentations or pits.

PIVOTING POINT

That point during the progress of a launching at which the moment of buoyancy about the fore poppet equals the moment of the vessel's weight. At this point the stern begins to lift and the vessel pivots about the fore poppet.

PLAN

A drawing prepared for use in building a ship.

PLANKING

Wood covering for decks, etc. The shell of wood boats.

PLATFORM

A partial deck.

PLATING, SHELL

The plating forming the outer skin of a vessel. In addition to constituting a watertight envelope to the hull, it contributes largely to the strength of the vessel.

PLIMSOLL MARK

A mark painted on the sides of vessel designating the depth to which the vessel may, under the maritime laws, be loaded in different bodies of water during various seasons of the year.

POLARITY

The property possessed by electrified bodies by which they exert forces in opposite directions. The current in an electrical circuit passes from the positive to the negative pole.

PONTOON

A scow-shaped boat used in connection with engineering and military operations such as transporting men and equipment, bridge construction, supports for temporary bridges, salvage work, etc. Also applied to cylindrical air and watertight tanks or floats used in salvage operations.

POOP

The structure or raised deck at the after end of a vessel.

POPPETS

Those pieces of timber which are fixed perpendicularly between the ship's bottom and the bilgeways at the foremost and aftermost parts of the ship, to support it when being launched. They are parts of the cradle.

PORT

The left-hand side of a ship when looking from aft forward. Also an opening.

PORT, AIR

See air port.

PORT FLANGE

See watershed.

PORT GANGWAY

An opening in the side plating, planking, or bulwark for the purpose of providing access through

which people may board or leave the ship or through which cargo may be handled.

PORTHOLE

See air port.

PORT LID

See deadlight.

PROOF STRAIN

The test load applied to anchors, chains, or other parts, fittings, or structure to demonstrate proper design and construction and satisfactory material.

PROOF STRENGTH

The proof strength of a material, part, or structure is the strength which it has been proved by tests to possess.

PROPELLER

A propulsive device consisting of a boss or hub carrying radial blades, from two to four in number. The rear or driving faces of the blades form portions of an approximately helical surface, the axis of which is the center line of the propeller shaft.

PROPELLER ARCH

The arched section of the stern frame above the propeller.

PROPELLER GUARD

A framework fitted somewhat below the deck line on narrow, high-speed vessels with large screwss so designed as to overhang and thus protect, the tips of the propeller blades.

PROPELLER THRUST

The effort delivered by a propeller in pushing a vessel ahead.

PROPORTIONAL LIMIT

The stress within which stresses and deformations are directly proportional. Within this limit, on removing stress, there is no permanent set.

PROW

An archaic term for the bow of a ship.

PUDDENING, PUDDING

Pads constructed of old rope, canvas, oakum, etc., sometimes leather covered, in any desired shape and size and used to prevent chafing of boats, rigging, etc., on the stem of a boat to lessen the force of a shock.

PUNCH

A machine for punching holes in plates and shapes.

PUNCH, PRICK

A small punch used to transfer the holes from the template to the plate. Also called a "**center punch**".

PUNT

A flat bottom boat with square ends, used in painting and cleaning a vessel's sides when in port.

PURCHASE

Any mechanical advantage which increases the power applied.

PYROTECHNICS

Flares, rockets, powder, etc., used for giving signals or for illumination, more generally used as distress signals.

--Q--

QUADRANT

A reflecting hand navigational instrument constructed on the same principle as the sextant but measuring angles up to 90 degrees only. Also known as an **octant**. One-fourth of the circumference of a circle. A fitting in the shape of a sector of a circle secured to the rudder stock and through which the steering leads turn the rudder. The rim is provided with two grooves to take the steering chains or ropes and is of sufficient length of arc so that the leads are tangential to the rim at all rudder angles.

QUARTER

The upper part of a vessel's sides near the stern; also portions of the vessel's sides about midway between the stem and midlength and between midlength and the stern. The part of a yard just outside the slings.

QUARTERMAN

An underforeman, a term generally restricted to navy yards.

QUARTERS

Living spaces for passengers or personnel. It includes staterooms, dining salons, mess rooms, lounging places, passages connected with the foregoing, etc.; individual stations for personnel for fire or boat drill, etc.

QUAY

An artificial wall or bank, usually of stone, made toward the sea or at the side of a harbor or river for convenience in loading and unloading vessels.

--R--

RABBET

A groove, depression, or offset in a member into which the end or edge of another member is fitted, generally so that the two surfaces are flush. A rabbet in the stem or keel would take the ends or edges of the planking or shell plating.

RACKING

Deformation of the section of a ship, generally applied to a transverse section, so that one set of diagonals in the plane of action is shortened while those at right angles thereto are lengthened.

RADIO ROOM

A room, usually sound-proofed, used for sending and receiving radio messages.

RAFT, LIFE

A frame work fitted with air chambers to support a number of people in case of accidents. Carried on deck and light enough to be handled without mechanical means.

RAIL

The upper edge of the bulwarks. Also applied to the tiers of guard rods running between the top rail and the deck where bulwarks are not fitted.

RAKE

A term applied to the fore and aft inclination from the vertical of a mast, smokestack, stempost, etc.

RALLY

The action of gangs of men uniting in driving wedges between the cradle and the sliding ways preparatory to launching or similar activities.

RANGE, GALLEY

The stove, situated in the galley, which is used to cook the food. The heat may be generated by coal, fuel oil, or electricity.

RAT GUARD

A dished, circular piece of metal made in two parts and fitted closely on hawsers and lines to prevent rats boarding or leaving a ship while at a dock or wharf. The concave side is placed toward the shore to prevent boarding, and the guard is reversed to prevent rats leaving the ship.

RATLINES

Short lengths of ratline stuff secured to the shrouds parallel to the waterline and serving as ladder rungs for the crew to ascend or descend.

REAMING

Enlarging a hole by the means of revolving in it a cylindrical slightly tapered tool with cutting edges running along its sides.

REDUCTION GEAR

An arrangement of shafts and gears such that the number of revolutions of the output shaft is less than of the input shaft--generally used between a motor or a steam turbine shaft and the propeller shaft.

REEVING

The act of passing the end of a rope or chain through an opening, as passing a rope through a block.

REVERSE FRAME

An angle bar or other shape riveted to the inner edge of a transverse frame to reinforce it.

RIBBAND

A fore-and-after strip or heavy batten used to support the transverse frames temporarily after erection.

RIBS

A term applied to the transverse frames of a boat.

RIDE

To float in a buoyant manner while being towed or lying at anchor.

RIDER PLATE

A continuous flat plate attached to the top of a center line vertical keel in a horizontal position. Its under side is attached to the floors, and when an inner bottom is fitted, it forms the center strake.

RIGGING

A term used collectively for all the ropes and chains employed to support the masts, yards, and

booms of a vessel, and to operate the movable parts of same.

RISE OF BOTTOM

See deadrise.

RISER

The upright board of a stair. A pipe extending vertically and having side branches.

RISINGS

The fore and aft stringers inside a small boat, secured to the frames, and on which the thwarts rest.

RIVET

A metal pin used for connecting two or more pieces of material by inserting it into holes punched or drilled in the pieces and upsetting one or both ends. The end that bears a finished shape is called the head and the end upon which some operation is performed after its insertion is called the point. Small rivets are "driven cold," i.e., without heating, and large ones are heated so that points may be formed by hammering.

RIVETING

The art of fastening two pieces of material together by means of rivets.

RIVETING, CHAIN

A term applied to an arrangement of the rivets in adjoining rows where the center of the rivets are opposite each other and on a line perpendicular to the joint.

RIVETING, STAGGERED or ZIG-ZAG

A term applied to an arrangement of the rivets in adjoining rows where the rivets in alternate rows are one-half the pitch or spacing ahead of those in the other rows.

RIVETS, LINE OF

A term applied to a continuous line of rivets whose centers fall on a line perpendicular to the joint.

RIVETS, ROW OF

A term applied to a continuous row of rivets whose centers fall on a line parallel to the joint. Joints made by one row of rivets are known as single-riveted joints; by two rows, as double-riveted joints; by three rows, as treble-riveted joints; by four rows, as quadruple-riveted joints; etc.

ROLL

Motion of the ship from side to side, alternately raising and lowering each side of the deck.

ROLLING CHOCKS

Same as keel, bilge.

ROPE

The product resulting from twisting a fibrous material, such as manila, hemp, flax, cotton, coir, etc., into yarns or threads which in turn are twisted into strands and several of these are laid up together. Fiber rope is designated as to size by its circumference. Wire rope is made of iron, steel, or bronze wires, with and without a fiber core or heart, twisted like yarns to form strands which are laid up to form the rope. Wire rope is designated as to size both by its diameter and by its circumference.

ROPE LAY

The direction in which a rope is twisted up.

ROPE, RIDGE

A rope running through the eyes at the heads of the awning stanchions to which the edge of an awning is hauled out and stopped. The term "center ridge rope" is applied to the rope supporting the center of an awning.

ROPE WORMING

Filling in the contlines of a rope with marline. The marline should run with the lay of the rope.

ROSES

Perforated metal plates, fitted over the outside of injection sea cocks to prevent entrance of foreign substances to the ship's pumps and piping system.

ROWLOCK

A **U**-shaped fitting with a shank or a socket which is attached to the gunwale of a boat and used as a fulcrum for oars in rowing, sculling, or steering.

RUBBING STRIP

A plate riveted to the bottom of the keel to afford protection in docking and grounding. A strip fastened to the face of a fender or to the shell plating where contact is likely to occur.

RUDDER

A device used in steering or maneuvering a vessel. The most common type consists of a flat slab of metal or wood, hinged at the forward end to the stern or rudder post. When made of metal, it may be built up from plates, shapes, and castings, with or without wood filling, or it may be a casting. The rudder is attached to a vertical shaft called the rudder stock, by which it is turned from side to side.

RUDDER, BALANCED

A rudder having the leading edge of a whole or a part of its area forward of the center line of the rudder stock, thus advancing the center of pressure of the water on the rudder and reducing the torque.

RUDDER BANDS

The bands that are placed on each side of a rudder to help brace it and tie it into the pintles.

RUDDER CHAINS

The chains whereby a rudder is sometimes fastened to the stern. They are shackled to the rudder by bolts just above the water line, and hang slack enough to permit free motion of the rudder. They are used as a precaution against losing a rudder at sea. These chains are also called "**rudder pendants**".

RUDDER FRAME

A term applied to a vertical main piece and the arms that project from it which form the frame of the rudder. It may be a casting, a forging, or a weldment.

RUDDER PINTLES

See pintles.

RUDDER POST

See Stern post.

RUDDER STOCK

A vertical shaft having a rudder attached to its lower end and having a yoke, quadrant, or tiller fitted to its upper portion by which it may be turned.

RUDDER STOPS

Fittings attached to the ship structure or to shoulders on the rudder post to limit the swing of the rudder.

RUDDER TRUNK

A watertight casing fitted around a rudder stock between the counter shell plating and a platform or deck, usually fitted with a stuffing box at the upper end.

RUDDER, UNDERHUNG

A rudder that is not hinged to or stepped on the stern post, but is supported entirely by the rudder stock and the rudder stock bearings.

RUN

The underwater portion of a vessel aft of the midship section or flat of the bottom. That portion of the after hull that tapers to the stern post.

RUNNING RIGGING

Ropes which are hauled upon at times in order to handle and adjust sails, yards, cargo, etc., as distinguished from standing rigging which is fixed in place.

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25 August 2003

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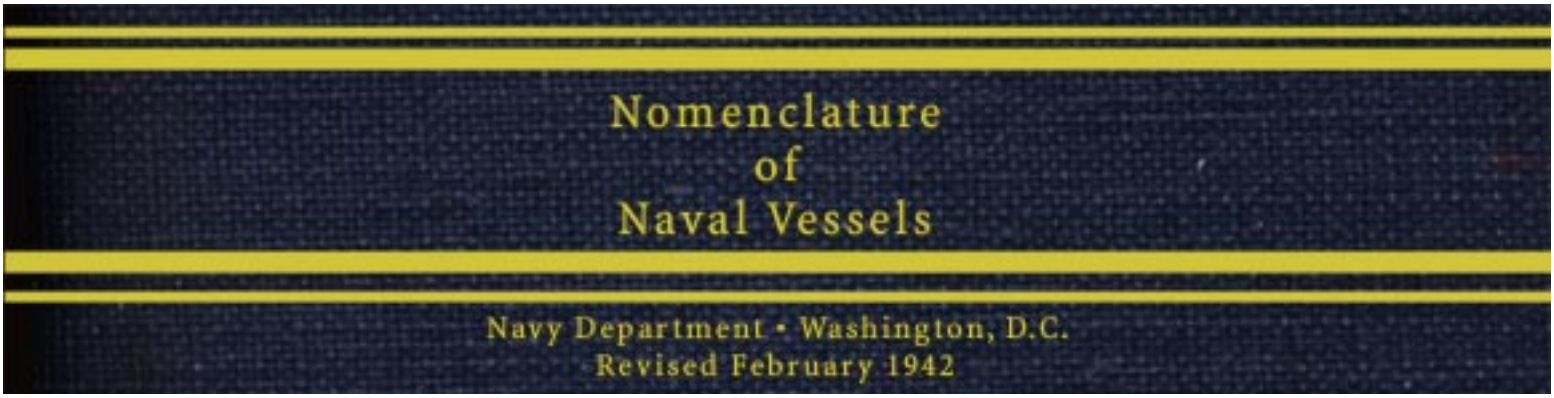

--S--

SAFETY TREADS
: A special nonslipping metal plate fitted to the deck at the foot of a ladder or stairway and often fitted on the upper surface of the steps of ladders and stairs. Steps made of safety treads are called safety steps.

SAGGING
: The deformation or yielding caused when the middle portion of a structure or ship settles or sinks below its designed or accustomed position. The reverse of hogging.

SAIL TRACKS
: A device fitted on the after side of a mast in which slides, secured to the forward edge of a fore-and-aft sail, travel up and down the mast as the sail is hoisted or lowered; used in lieu of mast hoops.

SAMSON POST
: A strong vertical post that supports cargo booms. See king posts.

SCANTLINGS

A term applied to the dimensions of the frames, girders, plating, etc., that enter into a ship's structure.

SCARF

An end connection made between two pieces of material by tapering them so that they will fit together in a joint of the same breadth and depth as the pieces.

SCREEN BULKHEAD

A light bulkhead used as a shelter from an excess of heat, cold, or light, or to conceal something from sight.

SCRIEVE BOARD

A large board made of soft, clear, planed lumber, sometimes a section of the mold loft floor, on which a full-sized body plan of a ship is drawn. The lines were formerly cut in by the use of a scriving knife, which made a small **U**-shaped groove, to prevent them from being obliterated. Pencil lines have taken the place of cutting to a large extent. It is used in making templates of frames, beams, floors, etc., and in taking off dimensions. It is sanded smooth after it has served its purpose.

SCUPPER PIPE

A pipe conducting the water from a deck scupper to a position where it is discharged overboard.

SCUPPERS

Drains from decks to carry off accumulations of rain water or sea water. The scuppers are placed in the gutters or waterways on open decks and in corners of enclosed decks, and connect to pipes leading overboard.

SCUTTLE

A small opening, usually circular in shape and generally fitted in decks to provide access. Often termed **escape scuttles**, and when fitted with means whereby the covers can be removed quickly to permit exit, are called **quick acting scuttles**.

SCUTTLE BUTT

The designation for a container of the supply of drinking water for the use of the crew.

SEA CHEST

An arrangement for supplying sea water to condensers and pumps, and for discharging waste water from the ship to the sea. It is a cast fitting or a built-up structure located below the waterline of the vessel and having means for attachment of the piping. Suction sea chests are fitted with strainers or gratings.

SEA COCK, SEA CONNECTION

A sea valve secured to the plating of the vessel below the waterline for use in flooding tanks, magazines, etc., to supply water to pumps, and for similar purposes.

SEAM

A term applied to an edge joint.

SEAMSTRAP

A term applied to a strip of plate serving as a connecting strap between the butted

edges of plating. Strap connections at the ends are called **buttstraps**.

SEARCHLIGHT

A powerful electric lamp placed at the focus of a mirror, which projects the light in abeam of parallel rays.

SET IRON

A bar of soft iron used on the bending slab as a form to which to bend frames into the desired shape.

SERVE

To wrap any small stuff tightly around a rope which has been previously wormed and parcelled. Very small ropes are not wormed.

SET, PERMANENT SET

The permanent deformation resulting from the stressing of an elastic material beyond its elastic limit.

SETSCREW

A machine screw with either a slotted or a square head used to hold a part in place.

SET UP

To tighten the nut on a bolt or stud; to bring the shrouds of a mast to a uniform and proper tension by adjusting the rigging screws or the lanyards through the dead eyes.

SHACKLE BOLT

A pin or bolt that passes through both eyes of a shackle and completes the link. The bolt may be secured by a pin through each end, or a pin through one end and through the eye, or by having one end and one eye threaded or one end headed and a pin through the other.

SHAFT, SHAFTING

The cylindrical forging, solid or tubular, used for transmission of rotary motion from the source of power, the engine, to the propellers.

SHAFT ANGLE

The angle between the center line of the shaft and the center line of the ship is the horizontal angle and the angle between the center line of the shaft and either the base line or the designed waterline is the vertical angle.

SHAFT ALLEY

A watertight passage, housing the propeller shafting from the engine room to the bulkhead at which the stern tube commences. It provides access to the shafting and its bearings and also prevents any damage to the same from the cargo in the spaces through which it passes.

SHAFT COUPLING

The means of joining together two sections of a shaft, usually by means of bolts through flanges on the ends of the sections of the shafts.

SHAFT PIPE

See Stern Tube.

SHAFT STRUT

A term applied to a bracket supporting the outboard after end of the propeller shaft

and the propeller in twin or multiple-screwed vessels having propeller shafts fitted off the center line. It usually consists of a hub or boss, fitted with a bushing, to form a bearing for the shaft, and two streamlined arms connecting it to the side of the ship. The inboard ends of the arms are fitted with palms for attachment to the shell or to interior framing.

SHAKES

Splits or checks in timbers which usually cause a separation of the wood between annular rings. A ring shake is an opening between annular rings; a through shake is an opening which extends between two faces of a timber.

SHAPE

A bar of constant cross section such as a channel, **T**-bar, angle bar, etc., either rolled or extruded.

SHAPING

Cutting, bending, and forming a structural member.

SHEARS

Large machines for cutting plates or shapes.

SHEAR LEGS

A rig for handling heavy weights, consisting of an **A**-frame of timber or steel with the top overhanging the base, having the lower ends fixed or pivoted and the top ends held either by fixed stays or by topping lifts which permit change of slope of the legs. Tackles are secured at the top of the frame through which the hoisting rope or cable is run. Sometimes called **sheers**.

SHEATHING

A term applied to the wood planking fitted over a steel deck, to the planking fitted over the underwater portion of a steel hull, and to the copper or alloy sheets with which the bottom of a wood ship, or a steel ship sheathed with wood, is covered.

SHEAVE

A wood or metal disk, having a groove around its cylindrical surface to permit a rope or chain to run over it without slipping off and a bushing for bearing on the pin or bolt on which it revolves.

SHEAVE HOLES

A term applied to apertures in masts, booms, and spars in which sheaves are installed.

SHEER

The longitudinal curve of a vessel's rails, decks, etc. the usual reference being to the ship's side; however, in the case of a deck having a camber, its center line may also have a sheer. The amount by which the height of the weather deck at the after or forward perpendicular exceeds that at its lowest point.

SHEER PLAN

A side elevation of the ship's form.

SHEER STRAKE

The topmost continuous strake of the shell plating, usually made thicker than the side plating below it.

SHELF

A wood ship term applied to the fore and aft timber that is fastened to the frames to form a support for the ends of the beams. See clamp.

SHELL EXPANSION

A plan showing the shapes, sizes, and weights of all plates comprising the shell plating, and details of the connections.

SHELL LANDINGS

Points marked on the frames to show where the edges of the shell plates are to be located.

SHELTER DECK

A term applied to a deck fitted from stem to stern on a relatively light superstructure.

SHIFT OF BUTTS

An arrangement of butts in longitudinal or transverse structural members whereby the butts of adjacent members are located a specified distance from one another, measured in the line of the members.

SHIM

(In naval architecture). A piece of wood or iron let into a slack place in a frame, plank, or plate to fill out a fair surface or line. Also applied to thin layers of metal or other material used to true up a bed plate or machine or inserted in bearings to permit adjustment after wear of the bearing.

SHIPSHAPE

A nautical term used to signify that the whole vessel, or the portion under discussion, is neat in appearance and in good order.

SHOAL

A small of timber or plank placed under the heel of a shore.

SHORES

Pieces of timber placed in a vertical or inclined position to support some part of a ship, or the ship itself, during construction or while in dry dock.

SHORE, SPUR or SIDE

A piece of timber placed in a nearly horizontal position with one end against the side of the ship and the other against the side of a dry dock or dock to keep the vessel at a desired distance from the face of the dock.

SHROUD

A principal member of the standing rigging, consisting of hemp or wire ropes which extend from or near a masthead to the vessel's side, or to the rim of a top, to afford lateral support for the mast.

SICK BAY

A name applied to the space on board a ship where members of the crew and passengers are given medical service and includes the dispensary, operating room, wards, etc.

SIDE PLATING

A term applied to the plating above the bilge in the main body of a vessel. Also to

the sides of deck houses, or to the vertical sides of enclosed plated structures.

SIDING OF A FRAME

The fore and aft dimension of a frame.

SISTER HOOK

A hook made in halves and set on eyes facing each other in such a manner that it may be made to function as a link.

SKEG

The extreme after part of the keel of a vessel, the portion that supports the rudder post and stern post.

SKIN

The term usually applied to the outside planking or plating forming the watertight envelope over the framework. It is also applied to the inner bottom plating when it is called an **inner skin**.

SKYLIGHT

An erection built on a deck, having glass lights in its top and fitted over an opening in the deck for the purpose of admitting light and air to a compartment below.

SLACK

The opposite of taut; not fully extended as applied to a rope; to "slack away" means to pay out a rope or cable by carefully releasing the tension while still retaining control; to "slack off" means to ease up, or lessen the degree of tautness.

SLEEPERS

Timbers placed upon the ground or on top of piling to support the cribbing, keel, and bilge blocks.

SLEEVE

A casing, usually of brass, fitted over line or other shafting for protection against wear or corrosion, or as a bearing surface.

SLIDING WAYS

See launching.

SLING

A length of chain or rope employed in handling weights with a crane or davit. The rods, chains, or ropes attached near the bow and stern of a small boat into which the davit or crane tackle is hooked. The chain or rope supporting the yard at the masthead.

SLIP

The difference between the pitch of a propeller, or the mean circumference of a paddle wheel, and the advance of the ship through the water corresponding to one revolution. An inclined launching berth. A space between two piers for berthing a vessel.

SLIPWAY or BERTH

The space in a shipyard where a foundation for launching ways and keel blocks exists and which is occupied by a ship while under construction. The term berth is more properly applied to the space a ship occupies pier or at an anchorage.

SLUICE

An opening in the lower part of a bulkhead fitted with a sliding watertight gate, or small door, having an operating rod extending to the upper deck or decks. It is used to permit liquid in one compartment to flow into the adjoining compartment.

SLUSH

Grease, formerly obtained from the meat boiled in the coppers, used for lubrication and for slushing the spars after scraping them.

SMOKESTACK

A metal chimney or passage through which the smoke and gases are led from the uptakes to the open air.

SNUBBING

Drawing in the waterlines and diagonals of a vessel abruptly at their ends. The checking of a vessel's headway by means of an anchor and a short cable. The checking of a line or cable from running out by taking a turn about a cleat, bitts, or similar fitting.

SNY

To twist a plate into an uneven warped shape on a mold.

SOFT PATCH

A temporary plate put on over a break or hole and secured with tap bolts. It is made watertight with a gasket such as canvas saturated in red lead.

SOLE PLATE

A plate fitted to the top of a foundation to which the base of a machine is bolted. Also a small plate fitted at the end of a stanchion.

SOUNDING PIPE

A vertical pipe in an oil or water tank, used to guide a sounding device when measuring the depth of liquid in the tank. Also called a **Sounding Tube**.

SOUNDNESS OF STEEL CASTINGS

Absence in a casting of cavities or blow holes formed by air bubbles.

SPAN

The distance between any two similar members, as the span of the frames. The length of a member between its supports, as the span of a girder. A rope whose ends are both made fast some distance apart, the bight having attached to it a topping lift, tackle, etc. A line connecting two davit heads so that when one davit is turned the other follows.

SPANNER

A form of open-head wrench for use with special fittings whose character is such as to preclude the use of the ordinary type of wrench.

SPAR

A term applied to a pole serving as a mast, boom, gaff, yard, bowsprit, etc. Spars are made of both steel and wood.

SPECIFIC GRAVITY

The ratio of the weight of a given volume of any substance to the weight of an equal volume of distilled water. Since the distilled water weighs approximately 62.4 pounds per cubic foot, any substance, a cubic foot of which weighs less that

this, has a specific gravity of less than one, and will float on water. Any substance of greater weight per cubic foot has a specific gravity of more than one and will sink. Specific gravity of gases is based in a like manner on the weight of air.

SPECTACLE FRAME

A single casting containing the bearings for and furnishing support for the ends of the propeller shafts in a twin screw vessel. The shell plating is worked outboard so as to enclose the shafts and is attached at the after end to the spectacle frame. Used in place of shaft struts.

SPIKE

A stout metal pin headed on one end and pointed at the other, made of either square or round bar, and used for securing heavy planks and timbers together.

SPILING

The curve of a plate or strake as it narrows to a point.

SPLICE

A method of uniting the ends of two ropes by first unlayering the strands, then interweaving them so as to form a continuous rope.

SPOT FACE

To finish off the surface around a bolt hole in a plane normal to the axis of the hole to provide a neat seat for the nut of washer.

SPRING

The deviation from a straight line or the amount of curvature of a sheer line, deck line, beam camber, etc., an elastic body or device which recovers its original shape when released after being distorted.

SPROCKET, SPROCKET WHEEL

A wheel on whose periphery are teeth or cogs designed to engage with the links of a pitch or sprocket chain through which motion is transmitted to a second sprocket.

SQUATTING

The increase in trim by the stern assumed by a vessel when running at high speed over that existing when she is at rest.

STABILITY

The tendency which a vessel has to return to the upright position after the removal of an external force which inclined her away from that position. To have stability, a vessel must be in a state of stable equilibrium.

STABILITY, RANGE OF

The number of degrees through which a vessel rolls or lists before losing stability.

STAGE

A floor or platform of planks supporting workmen during the construction or the cleaning and painting of a vessel, located either inside or outside the vessel.

STAGING

Upright supports, fastened together with horizontal and diagonal braces forming supports for planks which form a working platform or stage.

STAGGER

To zigzag rivet holes in adjacent rows.

STANCHIONS

Short columns or supports for decks, hand rails, etc. Stanchions are made of pipe, steel shapes, or rods, according to the location and purpose they serve.

STANDING RIGGING

Rigging that is permanently secured and that is not hauled upon, as shrouds, stays, etc.

STAPLING

Plates or angles fitted closely around or against continuous members passing through a watertight or oiltight member and caulked or welded to maintain the water or oil tightness of the structure.

STARBOARD

The right-hand side of the ship when looking from aft forward. Opposite to port.

STATEROOM

A private room or cabin for the accommodation of passengers or officers.

STAYS

The ropes, whether hemp or wire, that support the lower masts, topmasts, top-gallant masts, etc. in a fore and aft direction.

STEALER

A strake of shell plating that does not extend completely to the bow or stern.

STEERING GEAR

A term applied to the steering wheels, leads, steering engine, and fittings by which the rudder is turned.

STEM

The bow frame forming the apex of the intersection of the forward sides of a ship. It is rigidly connected at lower end to the keel.

STERN

The after end of a vessel; the farthest distant part from the bow.

STERN FRAME

A large casting or forging attached to the after end of the keel to form the ship's stern. Includes rudder post, propeller post, and aperture for the propeller in single-screw vessels.

STERN PIPES

A round or oval casting, or frame, inserted in the bulwark plating at the stern of the vessel through which the mooring hawser or warping lines are passed. Also called **Stern Chock**.

STERN POST

The main vertical post in the stern frame upon which the rudder is hung. Also called the **Rudder Post**.

STERN TUBE

The bearing supporting the propeller shaft where it emerges from the ship. It consists of a hollow cast-iron or steel cylinder fitted with brass bushings, which in turn are lined with lignum vitae, white metal, etc., bearing surfaces upon which the propeller shaft, enclosed in a sleeve, rotates.

STIFF, STIFFNESS

The tendency of a vessel to remain in the upright position, or a measure of the rapidity with which she returns to that position after having been inclined from it by an external force.

STIFFENER

An angle bar, **T**-bar, channel, etc., used to stiffen plating of a bulkhead, etc.

STOCKS

A general term applied to the keel blocks, bilge blocks, and timbers upon which a vessel is constructed.

STOP WATER

A term applied to canvas and red lead, or other suitable material, placed between the facing surfaces of plates and shapes to stop the passage of oil or water. Also applied to a wooden plug driven through a scarph joint between timbers to insure water tightness.

STRAIN

The measure of the alteration of form which a solid body undergoes when under the influence of a given stress.

STRAND

An element of a rope, consisting, in a fiber rope, of a number of rope yarns twisted together and, in a wire rope, of a primary assemblage of wires.

STRAKE

A term applied to a continuous row or range of plates. The strakes of shell plating are usually lettered, starting with A at the bottom row or garboard strake.

STRAKE, BILGE

A term applied to a strake of outside plating running in the way of the bilge.

STRAKE, BOTTOM

Any strake of plating on the bottom of a ship that lies between the keel and the bilge strakes.

STRENGTH MEMBER

Any plate or shape which contributes to the strength of the vessel. Some members may be strength members when considering longitudinal strength but not when considering transverse strength, and vice versa.

STRETCHERS

Athwartship, movable pieces against which the oarsmen brace their feet in pulling a small boat.

STRESS

The intensity of the force which tends to alter the form of a solid body; also the equal and opposite resistance offered by the body to a change of form.

STRINGER

A term applied to a fore-and-aft girder running along the side of a ship and also to the outboard strake of plating on any deck. The side pieces of a ladder or staircase into which the treads and risers are fastened.

STRINGER PLATES

A term applied to the outboard plates on any deck, or to the plates attached to the top flanges of a tier of beams at the side of a vessel.

STRUM BOX

The enlarged terminal on the suction end of a pipe which forms a strainer to prevent the entrance of material liable to choke the pipe. Also called **Rose Box**.

STRUT

A heavy arm or brace.

STUD

A bolt threaded on both ends, one end of which is screwed into a hole drilled and tapped in the work, and is used where a through bolt cannot be fitted.

STUDDING

The vertical timbers or framing of a wooden deck house, fitted between the sill and the plate.

STUFFING BOX

A fitting designed to permit the free passage or revolution of a rod or a pipe while controlling or preventing the passage by it of water, steam, etc.

SUBMARINE

Beneath the surface of the sea. A vessel which is capable of service both below and on the surface of the water.

SUNK FORECASTLE, SUNK POOP

A forecastle or poop deck which is raised only a partial deck height above the level of the upper or weather deck.

SUPERSTRUCTURE

A structure built above the uppermost complete deck; a pilot house, bridge, galley house, etc.

SWAGE

To bear or force down. An instrument having a groove on its under side for the purpose of giving shape to any piece subjected to it when the swage is struck by a hammer.

SWALLOW

A term applied to the oval or round opening in a chock or mooring ring. See Block.

SWASH BULKHEADS

Longitudinal or transverse nontight bulkheads fitted in a tank to decrease the swashing action of the liquid contents. Their function is greatest when the tanks are partially filled. Without them the unrestricted action of the liquid against the sides of the tank would be severe. A plate serving this purpose is called a **swash plate**.

SWIVEL

A special link constructed in two parts which revolve on each other, used to prevent fouling due to turns or twists in chain, etc.

--T--

TACKLE

Any combination of ropes and blocks that multiplies power. Also applied to a single whip which does not multiply power but simply changes direction.

TAFF RAIL

The rail around the top of the bulwark or rail stanchions of the after end of the weather deck, be it upper, main, raised, quarter, or poop.

TAIL SHAFT

The aft section of the shaft which receives the propeller.

TANKS

Compartments for liquids or gases. They may be formed by the ship's structure as double bottom tanks, peak tanks, deep tanks, etc., or may be independent of the ship's structure and installed on special supports.

TANK TOP

The plating laid on the bottom floors of a ship, which forms the top side of the tank sections or double bottom.

TARPAULIN

A term formerly applied to a paulin which was usually tarred.

TAUT

The condition of a rope, wire, or chain when under sufficient tension to cause it to assume a straight line, or to prevent sagging to any appreciable amount.

TEE BAR

A rolled or extruded structural shape having a cross section shaped like the letter **T**.

TELEGRAPH

An apparatus, either electrical or mechanical, for transmitting orders, as from a ship's bridge to the engine room, steering gear room, or elsewhere about the ship.

TELEMOTOR

A device for operating the valves of the steering engine from the pilot house by means of either fluid pressure or electricity.

TEMPLATE

A mold or pattern made to the exact size of a piece of work that is to be laid out or formed, and on which such information as the position of rivet holes, size of laps, etc., is indicated.

TENON

The end of a piece of wood cut into the form of a rectangular prism, designed to be set into a cavity or mortise of a like form in another piece.

TENSILE STRENGTH

The measure of a material's ability to withstand a tensile, or pulling stress without rupture, usually measured in pounds or tons per square inch of cross section.

TEST HEAD

The head or height of a column of water which will give a prescribed pressure on the vertical or horizontal sides of a compartment or tank in order to test its

tightness or strength or both,

THOLES

The pins in the gunwale of a boat which are used for oarlocks.

THREAD

The spiral part of a screw.

THWARTS

Boards extending across a rowboat just below the gunwale to stiffen the boat and to provide seats.

TIE PLATE

A single fore-and-aft or diagonal course of plating attached to deck beams under a wood deck to give extra strength.

TILLER

An arm attached to the rudder head for operating the rudder.

TOE

The edge of a flange on a bar.

TOGGLE PIN

A pin having a shoulder and an eye worked on one end, called the head, and whose other end, called the point, has its extremity hinged in an unbalanced manner so that after being placed through a hole, it forms a **T**-shaped locking device to keep the pin from working out or being withdrawn without first bringing the hinged portion into line with the shaft of the pin.

TONGUE AND GROOVE

The term applied to a plank or board which has one edge cut away to form a projection, or tongue, and the opposite edge cut out to form a groove, the tongue of one plank fitting into the groove of the adjoining plank.

TONNAGE, GROSS

The entire internal cubic capacity of a vessel expressed in "tons" taken at 100 cubic feet each. The peculiarities of design and construction of the various types of vessels and their parts necessitate certain explanatory rulings in connection with this term.

TONNAGE, NET

The internal cubic capacity of a vessel which remains after the capacities of certain specified spaces have been conducted from the gross tonnage. Tonnage should not be confused with displacement.

TOP BREADTH

The width of vessel measured across the shelter deck.

TOPPING LIFT

A rope or chain extending from the head of a boom or gaff to a mast, or to the vessel's structure, for the purpose of supporting the weight of the boom or gaff and its loads, and permitting the gaff or boom to be raised or lowered.

TOPSIDE

That portion of the side of the hull which is above the designed waterline. On or above the weather deck.

TORQUE

The moment of a system of forces that causes rotation, as of a shaft or a rudder stock.

TRANSOM

A seat or couch built at the side of a stateroom or cabin, having lockers (**transom lockers**) or drawers underneath.

TRANSOM, TRANSOM BOARD

The board forming the stern of a square-ended row boat or small yacht.

TRANSOM FRAME

The last transverse frame of a ship's structure. The cant frames, usually normal to the round of the stern, connect to it.

TRANSVERSE

At right angles to the ship's fore-and-aft center line.

TRANSVERSE FRAMES

Vertical athwartship members forming the ribs.

TREADS

The steps or horizontal portions of a ladder or staircase upon which the foot is placed.

TREENAILS

Wooden pins employed instead of nails or spikes to secure the planking of a wooden vessel to the frames.

TRIM

The arithmetic sum of the drafts forward and aft above and below the mean water-line. The angle of trim is the angle between the plane of flotation and the mean water-line plane. A vessel "trims by the head" or "trims by the stern" when the vessel inclines forward or aft so that her plane of flotation is not coincident with her mean water-line plane. See Drag.

TRIPPING BRACKETS

Flat bars or plates placed at various points on deck girders, stiffeners, or beams as a reinforcement to prevent their free flanges from tipping.

TRUNK

A vertical or inclined shaft formed by bulkheads or casings, extending one or more deck heights, around openings in the decks, through which access can be obtained, cargo, stores, etc., handled, or ventilation provided without disturbing or interfering with the contents or arrangements of the adjoining spaces.

TUMBLE HOME

The decreasing of a vessel's beam above the waterline as it approaches the rail. Opposite of flare.

TURNBUCKLES

Used to pull objects together. A link into whose opposite ends two threaded bars, one left-handed, the other right-handed, are inserted.

TURRETS

Structures designed for the mounting and handling of the guns and accessories

(usually main battery guns) of a war vessel. Turrets are constructed so as to revolve about a vertical axis usually be means of electrical or hydraulic machinery.

--U--

UMBRELLA

A metal shield in the form of a frustrum of a cone, secured to the outer casing of the smokestack over the air casing to keep out the weather.

UNSHIP

To remove anything from its accustomed or stowage place; to take apart.

UPPER DECK

Generally applied to the uppermost continuous weather deck.

UPPER WORKS

Superstructures or deck erections located on or above the weather deck. Sometimes applied to the entire structure above the waterline.

UPTAKE

A sheet-metal conduit connecting the boiler smoke boy with the base of the smokestack. It conveys the smoke and hot gases from the boiler to the stack and is usually made with double walls, with an air space between to prevent radiation of heat into adjacent spaces.

--V--

VALVE

A mechanical device used for controlling or shutting off the passage of a fluid or gas into or out of a container or through a pipe line.

VANE

A fly made of bunting and carried at the masthead or truck, which, being free to rotate on a spindle, indicates the direction of the wind.

VANG

Ropes secured to the outer end of a cargo boom, the lower ends being fastened to tackles secured to the deck, used for guiding and swinging and for holding the boom in a desired position. Also applied to ropes secured to the after end of a gaff and led to each side of the vessel to steady the gaff when the sail is not set.

VENTILATION

The process of providing fresh air to the various spaces and removing foul or heated air, gases, etc., from them. This may be accomplished by natural draft or by mechanical means.

VENTILATORS, BELL-MOUTHED or COWL

Terminals on open decks in the form of a 90-degree elbow with enlarged or bell-shaped openings, so formed as to obtain an increase of air supply when facing the wind and to increase the velocity of air down the ventilation pipe.

VISOR

A small inclined awning running around the pilot house over the windows or air ports to exclude the glare of the sun or to prevent rain or spray from coming in the openings when the glazed frames are dropped or opened. They may be of canvas or metal.

VOICE TUBE

A tube designed for the carriage of the human voice from one part of the ship to another. In its simplest form the voice-tube system includes a speaking connection between the pilot house and engine room only. In large war vessels the system becomes very complicated. Voice tubes are generally made up to about four inches in diameter and fitted with appropriate speaking and listening terminals. Telephones have largely replaced them.

--W--

WALES

The side planking on a wood ship lying between the bottom and the top-side planking.

WARP

A light hawser or tow rope; to move a vessel along by means of lines or warps secured to some fixed object.

WARDROOM

A room or space on shipboard set aside for use of the officers for social purposes and also used as their mess or dining room.

WASH PLATES

Plates fitted fore and aft between floors to check the rush of bilge water from side to side when the ship is rolling.

WATER LINE

A term used to describe a line drawn parallel to the molded base line and at a certain height above it, as the 10-foot water line. It represents a plane parallel to the surface of the water when the vessel is floating on an even keel, i.e., without trim. In the body plan and the sheer plan it is a straight line, but in the plan view of the lines it shows the contour of the hull line at the given distance above the base line. Used also to describe the line of intersection of the surface of the water with the hull of the ship at any draft and any condition of trim.

WATERSHED

A fitting on the outside of the shell of a ship over an air port, a door, or a window

to prevent water which runs down the ship's side from entering the opening. One over an air port is also called a **Brow** or a **Port Flange**.

WATERTIGHT COMPARTMENT

A space or compartment within a ship having its top, bottom, and sides constructed in such a manner as to prevent the leakage of water into or from the space unless the compartment is ruptured.

WATERWAY

A narrow channel along the edge of the deck for the collection and disposal of water occurring on the deck.

WATERWAY BAR

An angle or flat bar attached to a deck stringer plate forming the inboard boundary of a waterway and serving as an abutment for the wood deck planking.

WAYS

See launching

WEATHER DECK

A term applied to the upper, awning, shade, or shelter deck, or to the uppermost continuous deck, exclusive of forecastle, bridge, or poop, that is exposed to the weather.

WEB

The vertical portion of a beam; the athwartship portion of a frame; the portion of a girder between the flanges.

WEB FRAME

A built-up frame to provide extra strength consisting of a web plate with flanges on its edges, placed several frame spaces apart, with the smaller, regular frames in between.

WEDGES

Wood or metal pieces shaped in the form of a sharp **V**, used for driving up or for separating work. They are used in launching to raise the vessel from the keel blocks and thus transfer the load to the cradle and the sliding ways.

WELDING

For all welding definitions see "General Specifications for Inspection of Material, Appendix VII, Welding, Part A, Section A-1, Welding Nomenclature and Definitions," issued by the Navy Department.

WHIP

A term loosely applied to any tackle used for hoisting light weights and serves to designate the use to which a tackle is put rather than to the method of reeving the tackle.

WILDCAT

A special type of drum whose faces are so formed as to fit the links of a chain of given size.

WINCH

A hoisting or pulling machine fitted with a horizontal single or double drum. A small drum is generally fitted on one or both ends of the shaft supporting the

hoisting drum. These small drums are called gypsies, niggerheads, or winch heads. The hoisting drums either are fitted with a friction brake or are directly keyed to the shaft. The driving power is usually steam or electricity, but hand power is also used. A winch is used principally for the purpose of handling, hoisting, and lowering cargo from a dock or lighter to the hold of a ship and vice versa.

WINDLASS

An apparatus in which horizontal or vertical drums or gypsies and wildcats are operated by means of a steam engine or motor for the purpose of handling heavy anchor chains, hawsers, etc.

WIND SCOOP

A scoop-shaped fitting of sheet metal which is placed in an open air port with the open side forward for the purpose of catching air and forcing it into a cabin, stateroom, or compartment.

WING, WINGING

A term used to designate structural members, compartments, sails, and objects on a ship that are located a considerable distance off the fore-and-aft center line.

WORM, WORM SHAFT

A threaded shaft designed to engage the teeth of a wheel lying in the plane of the shaft axis. This type of gear is used for the transmission of heavy loads at low speeds.

WORMING

Filling the contlines of a rope with tarred small stuff preparatory to serving, to give the rope a smoother surface and to aid in excluding moisture from the interior of the rope.

WRENCH

A hand tool used to exert a twisting strain, such as setting up bolts, nuts, etc.

WRINKLING

Slight corrugations or ridges and furrows in a flat plate due to the action of compressive or shear forces.

--Y--

YARD

A term applied to a spar attached at its middle portion to a mast and running athwartship across a vessel as a support for a square sail, signal halyards, lights, etc.

YARDARM

A term applied to the outer end of a yard.

YIELD POINT

The stress at which a piece of material under strain yields markedly, becoming permanently distorted without increase of load.

YOKE

A frame or bar having its center portion bored and keyed or otherwise constructed for attachment to the rudder stock. Steering leads to the steering gear are connected to each end of the yoke for the purpose of turning the rudder. **Yoke lanyards** are lines extending from the ends of the yoke to the stern sheets of a small boat for use in steering.

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25 August 2003