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Lookout Training Handbook

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PREFACE

Special Publications (SPs) are manuals or catalogs that provide information of general benefit and career development. SPs have **no** associated assignments or tests.

Lookout Training Handbook provides a basic reference for naval lookouts. *Lookout Training Handbook* is available ONLY in electronic Portable Document Format from the following web site: https://www.advancement.cnet.navy.mil

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Sailor's Creed

"I am a United States Sailor.

I will support and defend the Constitution of the United States of America and I will obey the orders of those appointed over me.

I represent the fighting spirit of the Navy and those who have gone before me to defend freedom and democracy around the world.

I proudly serve my country's Navy combat team with honor, courage and commitment.

I am committed to excellence and the fair treatment of all."

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CHAPTER 1

INTRODUCTION TO LOOKOUT TRAINING

In this United States Navy with its nuclear-powered warships, computerized guidance systems, and the most accurate search radars in the world, you, the lookout, play a critical role in safe ship operations. Your trained human eye is far superior to the most sophisticated equipment. As a lookout, you are the eyes and ears of the ship, and your alertness and skill ensures the safety of the ship. In the naval service there is probably no Rule of the Road more conscientiously observed than Rule 5 of the *Navigation Rules,* Commandant Instruction M16672.2, which states:

> "Every vessel shall at all times maintain a proper look-out by sight and sound as well as by all available means appropriate in the prevailing circumstances and conditions so as to make a full appraisal of the situation and of the risk of collision."

In this manual, we will discuss visual search and contact reporting procedures, ship/aircraft recognition, Rules of the Road, buoy systems, special sea detail, restricted visibility steaming, man-overboard procedures, and Marine Species Awareness, along with other material which will assist you in your capacity as a lookout.

CHAPTER 2

THE LOOKOUT

A lookout is a person detailed to observe everything within an assigned sector and to report everything seen in or heard from that sector to the officer of the deck (OOD) and the combat information center (CIC) watch officer. The safety and efficiency of the ship depend to a great degree on the alertness and effectiveness of lookouts.

Lookouts on watch are under the direct supervision of the OOD. However, the OOD will usually delegate this authority to the Boatswain's Mate of the Watch (BMOW). The BMOW assigns the lookouts to their stations, making sure they are properly instructed, clothed, equipped, and relieved. Lookouts are trained in their duties by the CIC officer.

The chances are great that the lookout will be the first to observe danger. A faint wisp of smoke on the horizon may be the first indication of an approaching enemy surface unit. A single flash of sunlight on a wingtip may be the only notice of approaching enemy aircraft that can attack at a speed of 500 yards per second. A split-second glimpse of a periscope may be the only warning of an impending submarine attack. Failure to see a mere pinpoint of light on the horizon may mean that a buoy has been missed and a ship grounded.

Lookout Stations

Lookouts man stations as assigned by the OOD and perform duties under the ship's lookout doctrine. The number of stations vary according to the type of ship and whether in peacetime or wartime. Large ships usually have more lookout stations than smaller ships. More lookouts are required in wartime than in peacetime.

The normal peacetime lookout organization has three people in each watch section. Two persons are located on the bridge or atop the pilothouse; one searches to port, the other to starboard. Their sectors extend from just abaft the beam forward to dead ahead. The third person is stationed aft and is called the after lookout or life-buoy watch and is responsible for the sector extending from the starboard beam aft and around to the port beam (Figure 2-1).

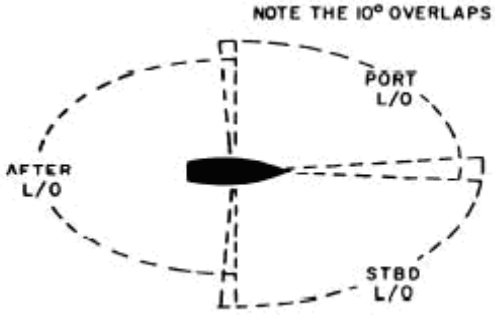

Figure 2-1: Assigned Lookout Sectors

In addition to reporting all objects behind the ship, the after lookout is responsible for throwing overboard a lifebuoy and smoke-float promptly when a person falls over the side.

When you are on lookout watch, always report everything you see or hear. Trash in the water may seem unimportant to you, but it may indicate a vessel has passed that way. In wartime, such a disclosure could lead to the sinking of the vessel. Discolored water may mean the ship is entering a shoal area or it may be an indication of a recent CHT discharge or a fuel or oil spillage which may present a danger to your ship. The OOD will never reprimand you for reporting objects, but you will surely be reprimanded if you do not report them. Never let the OOD spot something before you do.

A special watch, called the low visibility lookout, is stationed as far forward and aft in the ship as possible during fog or other conditions of poor visibility. The low visibility lookout watch consists of two people. One person wears sound-powered (S/P) phones for communication with the bridge; the other looks and listens.

You often can hear sounds at night without seeing their source. Usually you can determine the bearing of the sound and, sometimes, an estimate of its distance. When in a fog, however, sound sources are difficult to determine, because the sound may seem to come from several different directions. For this reason you must be especially vigilant in fog. Report all sounds, and do your utmost to determine their direction.

Lookout Duties and Responsibilities

As a lookout, your primary responsibility is sighting, identifying, and accurately reporting to the responsible authority all objects. To carry out this responsibility effectively, you must do the following:

1. Use correct scanning procedures.
2. Sight and report everything observed in your sector. A normal tendency is to hesitate until you are certain an actual contact has been sighted. Do not hesitate. Many important sightings have been made on hunches. Everything, including previously sighted objects, should be reported when it enters your sector unless it is an object which you have been specifically ordered not to report.
3. Estimate relative bearing, range, position angle, and target angle of sighted objects.
4. Handle, operate, and care for binoculars properly and use them wisely.
5. Send accurate reports of all visual information to the bridge and combat information center (CIC) as rapidly as you can.
6. Use correct procedures during restricted-visibility conditions caused by adverse weather conditions.

Many electronic devices are now in use for detecting and locating the enemy and as aids in navigating. These delicate instruments, however, can malfunction. Under some conditions they are turned off entirely so your ship cannot be detected by the enemy. The availability of these devices in no way relieves you of your responsibility to see everything in your sector within range of vision and to report everything you see. Remember, the safety of the ship is dependent on the eyes and ears of every lookout.

CHAPTER 3

LOOKOUT EQUIPMENT

Proper equipment for a lookout includes sound-powered (S/P) telephones or Internal Voice Communication Network headset, binoculars, binocular filters, sunglasses, Night Vision Goggles, and various articles of foul-weather gear.

Sound-Powered Telephones

Sound-powered (battle) telephones are just what their name implies; instead of a battery or generator, the voice provides the power for the circuit. Failure of the electrical power system has no effect upon the sound-powered phones although one or more stations can be knocked out by damage to the circuit. Every sound-powered phone receiver is also a transmitter, and vice versa. In other words, if one earpiece on a sound-powered headset is inoperative, you normally can continue to both talk and receive through the other earpiece. The same holds true for the mouthpiece.

The primary battle sound-powered telephone circuits provide communication between selected battle stations grouped on established circuits. No dialing is necessary. When you plug into one of these circuits, you can immediately communicate with anyone who is plugged in on the same circuit. Additional stations not on the circuit may be cut in or cut out by a switchboard.

That there may be a number of stations on the same circuit indicates the importance of strict compliance with standard telephone talker procedures and terminology. The duties of a telephone talker and procedures employed when a sound-powered telephone is used are covered both in *Basic Military Requirements,* NAVEDTRA 14325, and *Sound-Powered Telephone Talkers' Training Manual,* NAVEDTRA 14232.

JL is the designation given to the circuit over which the lookouts report. It is an important channel of vital information to the bridge, CIC, and gun control. In wartime the JL circuit is manned under all cruising conditions. In peacetime it is manned when circumstances require extra lookout precautions, but it may then be combined with other circuits.

Integrated Voice Communications Network (IVCN)

IVCN (Integrated Voice Communications Network) combines the features of sound powered telephones, dial telephones, and intercommunications into one system and it can interface with other shipboard communications systems.

The IVCN provides a Navy-wide common voice solution through a fully integrated, flexible, supportable and survivable voice system. The IVCN provides the communications medium through which all command and control, weapons control,

aircraft control, engineering, and damage control functions are coordinated and exercised. It is capable of satisfying current and projected shipboard voice, data, and video requirements, and is potentially applicable to all USN ships. IVCN includes and standardizes existing fleet Ship Service Telephone Systems (SSTS) and earlier integrated voice systems such as the Integrated Voice Network (IVN) and the Integrated Communications and Advanced Network (ICAN) voice systems.

Few ships are currently equipped with IVCN. Yours may be one of them.

Night Vision Goggles (NVG's)

NVG's use ambient light to illuminate the darkness. Ambient light in most cases comes from the moon and stars. The more ambient light there is, the lighter green and clearer the picture is for the user. All light, including color light, will stand out with the use of NVG's. The light is magnified to make it appear brighter than it really is. For example, a lit cigarette will look like a torch or bright flash light. Color light is picked up by NVG's very easily, however the user will not be able to distinguish what color is being seen. NVG's reflect color light the same as white light. Red light will be a somewhat weaker to pick up. The brighter the actual light, the brighter it appears through NVG's sometimes blinding the user and making it nearly impossible to determine the source of the light.

NVG's are a 2D (2 Dimensional) device, and thereby handicap the user through a loss of depth perception. Without depth perception, the user is prevented from judging distance accurately without some type of marker. Ambient light causes the view to be more like a digital picture. The further away the object is, the more distorted the view will be. For example, a known person standing 1 to 5 yards away is recognizable. When the person moves beyond five yards, the digital view becomes more distorted, and facial features become more unrecognizable. Beyond ten yards the person becomes totally unrecognizable. Distance causes a problem with shadows and shades when using NVG's. The moon causes the shadows and shades, just like the sun does in the daytime. NVG's can only provide a view of areas that are lit. Where there are shadows, no view is available. As the moon moves, the shadow and shades will move. The greater the distance, the darker the shadow and shade, which makes it very difficult to see.

When using flares, colored smoke, signal panels, aviation panels, colored lights, or any other type of device which requires the use of colors as a means of communication or recognition it is not advisable to use NVG's. As stated earlier, NVG's are unable to distinguish color, they will reflect clearly the burning of flares and smoke canisters, signal panels and aviation panels.

Chemical Warfare Directional Detector (AN/KAS-1, AN/KAS-1A)

The AN/KAS-1, AN/KAS-1A Chemical Warfare Directional Detector (CWDD) is a passive infrared (IR) imaging sensor that provides the capability for detection of Chemical Warfare (CW) nerve agents. The CWDD uses spectral filters to detect IR radiation emitted by nerve agents and detects these chemical agent attacks against battle group units, assault units proceeding ashore and assault forces in the vicinity of the landing area. Chemical warfare agent cloud detection can be accomplished against a sky background for all conditions under which CW attacks may be expected to occur. Detection of CW activity against a land background can also be accomplished with some degradation of effectiveness. As a secondary function, the CWDD is also useful in periods of low-visibility and night area surveillance due to the characteristics of the IR sensor. The CWDD operator can detect and obtain relative bearing to prominent land features or structures, and has the capability of detecting small objects floating on the water surface. The AN/KAS-1A CWDD also has the capability to remote the sensor's video to various locations on the ship, and receive video simulations for operator training (the AN/KAS-1 does not offer this capability).

If your ship is equipped with the CWDD, it typically can be found mounted on either Pilot House Bridge wing or on the Signal Bridge. It may be mounted on a pedestal to the deck, on the railing, or on a bulkhead.

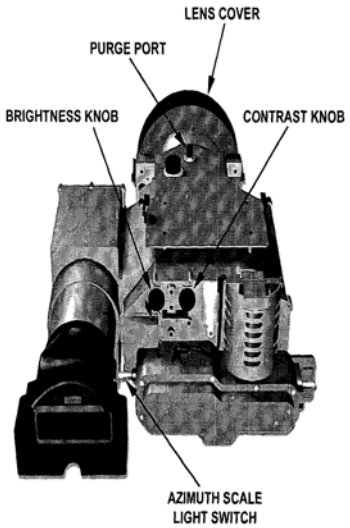

Figure 3-1: Sensor Unit Controls (back view)

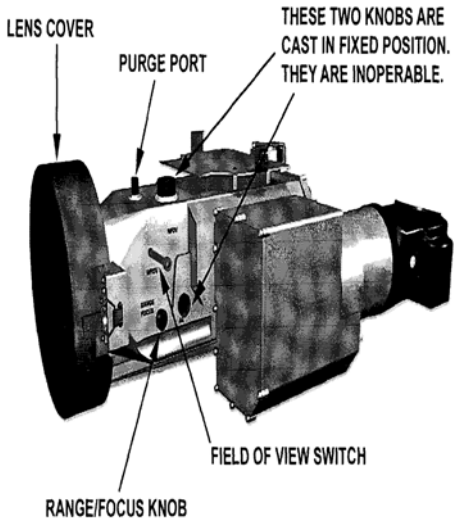

Figure 3-2: Sensor Unit Controls (side view)

Binoculars

The most commonly used optical equipment is a set of binoculars (Figure 3-3). The size of binoculars deemed most useful for marine work is 7 x 50; that means the glasses have a magnification of 7 power and an objective lens 50 mm in diameter. This ratio of magnification is a satisfying compromise between the need for magnification and the reduction of angle, or field of view, that results as the magnification is increased. Large objective lenses have excellent light-gathering characteristics, making them particularly suitable for night use.

Figure 3-3: 7 X 50 Binoculars

ADJUSTMENTS

Binoculars

To gain maximum benefit from the light-gathering quality of binoculars, you must adjust the binoculars to obtain proper focus and correct distance between lenses. To obtain proper focus, observe the following steps:

1. Set both eyepieces to the +4 mark.
2. Place the binoculars firmly against the eyebrows and locate a small, well-defined object about l/2-mile distant.
3. Cover one lens (do not touch the glass).
4. Slowly turn the other eyepiece until you see a sharp image, then back off as far as possible without losing the sharpness. (Keep both eyes open; closing one will give an incorrect focus.)
5. Note the reading on the scale, and then repeat the above procedure two or three times to obtain the exact setting.
6. Follow the same procedure for the opposite eye.

The final adjustment is to establish the interpupillary distance (IPD), which is the distance between your eyes. Move the barrels up and down until you see a single circle, as shown in Figure 3-4, then note the reading on the IPD vernier between the barrels. An incorrect IPD setting will strain the eyes and waste part of the binoculars' light-gathering ability.

Figure 3-4: IPD Settings

You will not have your own personal binoculars—they are passed from watch to watch—so it is important that you know your focus and IPD settings so that the binoculars may be properly adjusted at night or when there are no objects on which to focus in the daytime. For nighttime use, the focus setting is one mark less than for daytime.

USE

Binoculars

Contrary to widespread opinion, it is not always better to search with binoculars instead of using the naked eye. Several factors govern when and how binoculars should be used. In fog, for instance, they should be used only to identify a previously sighted contact; at night, they should be used quite often.

Daytime use of binoculars depends upon the type of search being conducted. Surface lookouts should use them to scan across their sector, then use the naked eye on return sweeps. Sky lookouts should use them only to identify a target detected with the naked eye.

At night the binoculars should be used more frequently than during daylight, but searches should still be made with the naked eye. You often can see objects, particularly moving ones, out of the corner of your eye, whereas they might not be detected with the binoculars because of their narrow field of view.

Binoculars should never be used to scan in fog, rain, snow, or thick haze, but may be used to identify a contact detected by the naked eye.

CARE

Binoculars are fairly delicate instruments; they cannot stand much knocking about. Therefore, keep them on a short strap and always wear them around the neck with one hand maintaining positive control. Keep the lenses dry, otherwise you will not be able to see properly. Do not let them become overheated; the cement around the lenses may melt, allowing moisture to cause the lenses to fog or bubble.

Above all, keep them clean. You must be careful, however, not to damage the lenses. First, blow off loose dust, then breathe on the lenses (except in freezing weather), and gently clean them with lens paper. Rags, plain paper, handkerchiefs, your sleeve or shirttail should not be used as they will scratch the lens.

CHAPTER 4

VISUAL SEARCH PROCEDURES

Effective visual searching does not come naturally; a lookout must learn through practice. In the daytime a person's eyes must stop on an object in order to see it. Try moving your eyes across the water rapidly from object to object and note that as long as your eyes are in motion, you see almost nothing. Now allow your eyes to move in short steps from object to object and you can really see what is there. This is known as the step-by-step method (Figure 4-1).

Figure 4-1: Scanning using the step-by-step method

A ship's lookout cannot be too well-trained, too alert, or too much on the job. Remember—the safety of the ship and the personnel on board depend on the lookout. By seeing things and reporting them quickly and accurately, you might prevent the crew's having to swim the cold waters of the North Atlantic or the shark-infested waters of the South Pacific. The key phrase for all lookouts is BE ALERT!!

In good weather, well-trained lookouts can easily spot planes at 15 miles with the naked eye. With binoculars, and in unusually clear weather, lookouts have detected planes at 50 miles. At night, skilled lookouts can detect objects that the untrained lookout would never suspect were there.

SURFACE SEARCHING

Surface lookouts scan the water from the ship to the horizon and are responsible for all contacts in their sector. In searching the assigned sector, always start at the forward part of the sector and search aft (Figure 4-2). To search and scan, hold the binoculars steady so the horizon is in the top third of the field of vision. Direct the eyes just below the horizon and scan for 5 seconds in as many small steps as possible across the field seen through the binoculars. Search the entire sector in 5° steps, pausing between steps for approximately 5 seconds to scan the field of view. At the end of your sector, lower the glasses and rest the eyes for a few seconds, then search back across the sector with the naked eye.

When you sight a contact, keep it in the binoculars' field of vision, moving your eyes from it only long enough to determine the relative bearing.

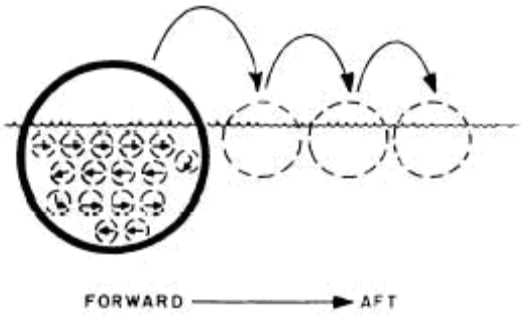

Figure 4-2: Surface Searching

SKY SEARCHING

Sky lookouts scan from the horizon to the zenith, aided only by sunglasses for protection from glare. Binoculars should only be used when needed to identify a contact that has been sighted with the naked eye.

Scanning of the assigned sector should be accomplished by moving the eyes in quick steps (about 5°) across the sector just above the horizon. Shift the eyes upward about 10° and move them back in quick steps, continuing this type of search from horizon to zenith (Figure 4-3). When the zenith is reached, rest your eyes by blinking them for a few seconds, then start over.

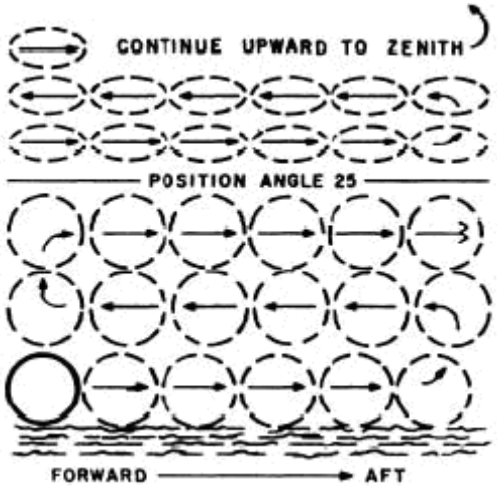

Figure 4-3: Sky Searching

DARK ADAPTATION

If you were to go on night watch directly from a lighted compartment, you would be almost blind for a few minutes. This reaction is similar to that you experience when you walk from a lighted theater lobby into a darkened theater. As your eyes become accustomed to the weak light, your vision gradually improves. After 10 minutes you can

see fairly well. After 30 minutes you reach your best night vision. This improvement of vision in dim light is called dark adaptation.

Effective dark adaptation must be planned well in advance. Exposure to excessive glare during the day will hamper the ability of the eyes to adapt to the dark at night. This effect may last for several days if the exposure has been severe; therefore, lookouts scheduled for night watches should wear sunglasses as much as possible in the daytime.

Dark adaptation before going on watch consists of spending at least 30 minutes in darkness or with the eyes protected by red goggles. Wearing red goggles is effective because red light does not affect the eyes. To complete adaptation for a night watch, spend 5 minutes on deck before relieving the watch. These 5 minutes allow the eyes to adjust to the amount of illumination in which they will work.

NIGHT LOOKOUT TECHNIQUES

Dark adaptation alone is not sufficient to ensure the highest visual keenness in the dark. Learning to use the eyes at night is like learning to use a precision instrument; you must practice to acquire the needed ability. In night lookout work, don't sweep the sky or horizon with the eyes. The eyes do not see well when they are moving. Scan the horizon in a series of movements which will allow your eyes to come to periodic rests as they scan the sector. When you are using night eyes, always look a little to one side and out of the corners of your eyes. Pay attention to the things on the outer edges of your field of vision. A faint object may not be recognizable until your gaze has been directed toward it a number of times. Likewise, direct your eyes slightly above or below the horizon, as there are times when you cannot see the actual horizon unless your line of vision is purposely elevated or depressed. One of the greatest aids to night vision is contrast between object and background. Therefore, a good technique is to concentrate on the point where the sky appears to meet the water. Here objects may loom above the darker water and be seen against the lighter sky.

To summarize dark adaptation and night lookout techniques, remember these things:

1. Protect your eyes from light before going on night duty and while you are out.
2. Don't look directly at any light or illuminated object.
3. Use the corners of your eyes.
4. Keep your eyes moving. Quick short movements and short pauses are better than long sweeping movements and long pauses.
5. Practice what you know about seeing at night until it becomes second nature for you to use your eyes to their best advantage.

CHAPTER 5

CONTACT REPORTING PROCEDURES

Lookouts supplement the information received from radar and other electronic equipment to provide a clearer and more complete picture of the air and surface situations. Visual sightings are the only means available to guard against contacts slipping in through blindspots and holes in the radar coverage. Many times the ship will be operating under electronic silence conditions and must depend entirely on your information.

Always report everything you see, hear, or believe you see or hear. By reporting doubtful targets, more eyes are brought to bear on them, resulting in improved chances of identification. At night and in poor visibility, report even the faintest hunches. At such times, a hunch that you have seen something often means you really have. Do not delay the report while you try to get a better look—the main thing is speed.

INITIAL REPORT

Give the initial report when you first sight a contact. Usually the contact is too far away for a positive identification, but do not delay the report. Include in the initial report:

1. WHAT YOU SEE: Describe the contact quickly and briefly. Name the type or class of ship or aircraft if you recognize it; otherwise, simply report "ship," "plane," and so forth.
2. BEARING: Always report contacts in relative bearings. These are given as three digits, spoken digit by digit.
3. RANGE: Ranges are reported in yards/miles and spoken digit by digit, except that multiples of hundreds and thousands are spoken as such.
4. TARGET ANGLE: Report target angle on all ships. It will be given in three digits, spoken digit by digit.
5. POSITION ANGLE: Report position angle on all aircraft. It will be given in one or two digits, spoken as a whole, not digit by digit.
6. MOVEMENT: Report whether the contact is moving from right to left, left to right, opening, closing, paralleling, high speed, slow speed, dead in the water, and so forth.

BEARINGS

The direction of an object from a ship is called the bearing. Bearing is measured in degrees clockwise around a circle, from 000° to 360°. Relative bearings have the ship's bow as a reference point; true bearings use true, or geographic north, as a reference point; magnetic bearings use the magnetic North Pole as their reference point. All three types of bearings may sometimes coincide, but such a situation is rare and of a temporary nature. Lookouts report objects in degrees of relative bearing.

Figure 5-1 shows the relative bearings around a ship. An object dead ahead is bearing 000°; one on the starboard beam is at 090°, and so on. Study the illustration. Practice pointing to various objects and compare your estimates of their bearing to what they really are. With practice you will be able to report a contact within 10° of its actual bearing.

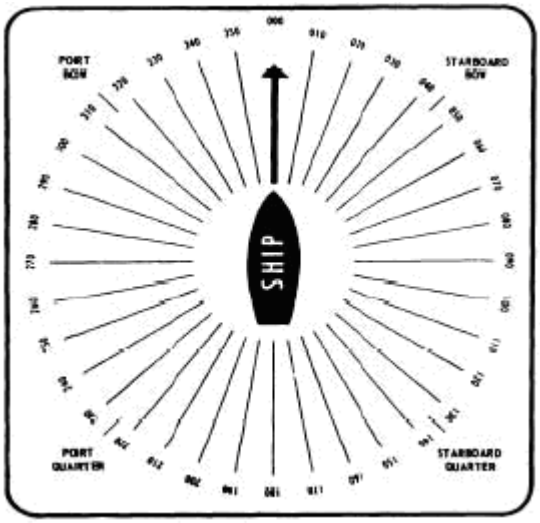

Figure 5-1: Relative Bearing

To prevent confusion, the Navy has established a definite procedure for reporting bearings, ranges, and so forth. The accompanying list shows how numerals are to be spoken.

Numeral Pronounced

0 . . . . . ZE-RO
1 . . . . . WUN
2 . . . . . TOO
3 . . . . . TREE
4 . . . . . FOW-ER
5 . . . . . FIFE
6 . . . . . SIX
7 . . . . . SEV-EN
8 . . . . . AIT
9 . . . . . NIN-ER

Bearings are always reported in three digits, and spoken digit by digit, except that objects dead ahead or astern (000°, 180°); on either beam (090°, 270°); or on either bow (045°, 315°) or quarter (135°, 225°) may be indicated as such. For example, a ship bearing 315° could be reported as being broad on the port bow, although the bearing itself can be used.

Do not become excited and neglect to report the bearing. If you say, “There's a periscope ahead,” when it actually is to one side, valuable time can be lost while the OOD tries to spot it. But if you say, “Periscope bearing Tree Fife Ze-ro,” the OOD will have no

difficulty determining in which direction to look. Note that the word "relative" was not included in our sample report. It is understood that lookouts report only relative bearings.

POSITION ANGLE

Position angle is the angle, measured in degrees, between the line of sight to the horizon and the line of sight to the detected aircraft. The OOD does not have time to search from the horizon (0°) to the zenith (directly overhead—90°) for a contact reported without a given position angle. A position angle will quickly locate the target for the OOD and the antiaircraft gun directors.

Position angles should be given on all aircraft in one or two digits and spoken as a whole, not digit by digit. The reference "position angle" is always spoken before the numerals.

Position Angle Spoken

0 . . . . . Position angle Ze-ro
5 . . . . . Position angle Fife
15 . . . . . Position angle Fifteen
27 . . . . . Position angle Twenty Sev-en
85 . . . . . Position angle Eighty Fife
90 . . . . . Position angle Ninety

As the aircraft shown in Figure 5-2 approaches the ship, the position angle increases. Inform all stations when the angle changes more than 20°. Use the aids shown in Figure 5-3 to help you more accurately determine an aircraft's position angle.

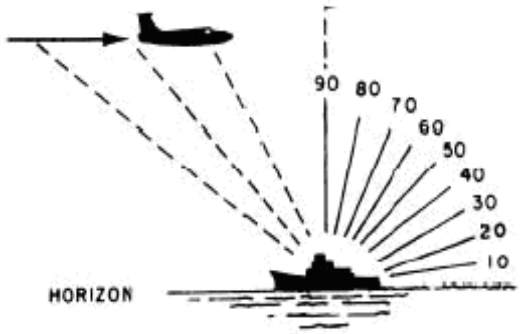

Figure 5-2: Position Angles

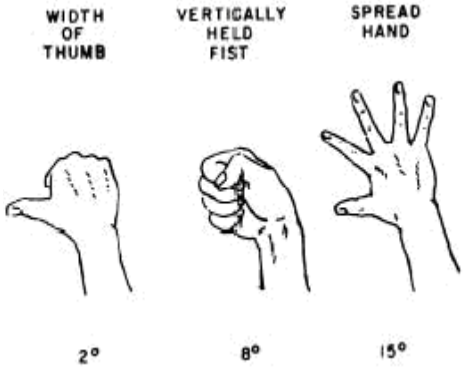

Figure 5-3: Position Angle Aids

TARGET ANGLE

Target angle is the relative bearing of your ship from another ship. You may wonder why you should care what your ship bears from another ship, but it can be of great help to the OOD if you include target angle in your report.

The OOD uses target angle as an aid in determining the course of action to take when another ship is encountered. Target angle is also useful in gunnery and antisubmarine

operations. Assume that you are the starboard lookout and you detect a ship on your starboard bow heading at right angles across your course (Figure 5-4). You report to the OOD

SHIP BROAD ON THE STARBOARD BOW (OR 045°)—TARGET ANGLE 315.

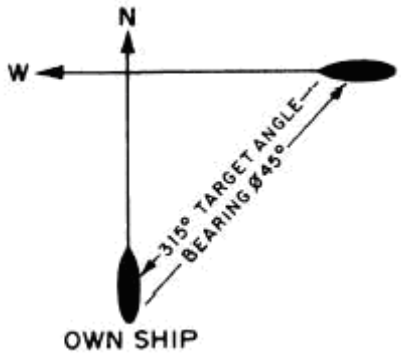

Figure 5-4: Target Angle

Assuming your course to be due north, the OOD knows the other ship's course is due west. Depending on the speeds of the two ships, if they continue on their present course, a collision may result. Under the International Rules of the Road, this condition is known as a crossing situation, and in a crossing situation the ship to port is the give-way vessel and must keep clear of the other (stand-on) vessel. Your target angle report has alerted the OOD that a change of course or speed, or both, may be needed and there is now time in which to plan appropriate actions. A change in target angle means that the target has changed course. Following are some examples of initial reports:

BRIDGE—PORT LOOKOUT—SURFACE CONTACT BEARING TWO EIGHT ZERO—TWO THOUSAND YARDS—TARGET ANGLE ZERO NINER ZERO—MOVING FROM LEFT TO RIGHT SLOWLY.

BRIDGE—STARBOARD LOOKOUT—DESTROYER BEARING ONE ZERO ZERO—SIX MILES—TARGET ANGLE ZERO ONE ZERO—CLOSING RAPIDLY.

BRIDGE—STARBOARD LOOKOUT—F-14 JET FIGHTER BEARING ZERO FOUR ZERO—POSITION ANGLE THIRTY THREE—MOVING FROM RIGHT TO LEFT VERY RAPIDLY.

AMPLIFYING REPORT

An amplifying report is made when any change occurs or more accuracy can be given to a previous report. Such cases include:

- When the ship or aircraft alters course or changes speed. These changes can be detected by the human eye much faster than with electronic devices.
- When a more positive identification can be made. You can now see what the nationality of the ship is, or its hull number, or other identifying features.
- When anything unusual occurs. A ship may sound its whistle, make smoke, drop the anchor, display additional lights, and so forth.

RANGE ESTIMATION

A range in yards for each contact reported would be invaluable, but estimating ranges over water is very difficult for the inexperienced lookout because distances are deceptive. Only with a lot of on-the-job experience will you become proficient in estimating ranges to contacts. Question CIC concerning the radar ranges to visual contacts and compare them with your estimated range.

The only readily available reference point you can use when estimating ranges is the horizon. Knowing your height above the waterline will help you estimate ranges because the distance to the horizon varies with the height of the eye (Figure 5-5).

HEIGHT OF EYE	RANGE TO HORIZON	
FEET	YARDS	MILES
10	7,200	3.6
20	10,200	5.1
30	12,600	6.3
40	14,400	7.2
60	17,800	8.9
80	20,600	10.3
100	23,000	11.5

Figure 5-5: Range – Height Table

At a height of 50 feet, for example, the distance to the horizon is about 16,000 yards (8 miles); at a height of 100 feet, the distance is about 23,000 yards (11-1/2 miles). Practice estimating ranges to other vessels in company whose distances are known or can be easily determined. If your ship does much formation steaming, you will become pretty good at judging distances such as 500, 1,000, and 2,000 yards. Until you become proficient at estimating distances, use such phrases as “close aboard,” “on the horizon,” “hull down,” and so forth (Figure 5-6).

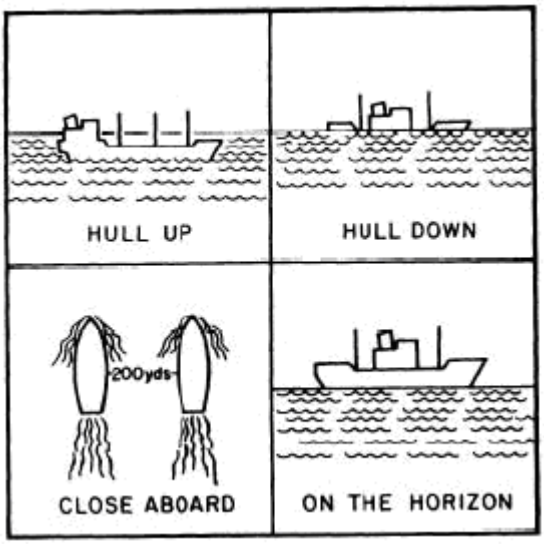

Figure 5-6: Range Supplements

HULL UP The ship is in from the horizon.

HULL DOWN The ship is over the horizon. Only a part of the superstructure can be seen, but the hull is not yet visible on the horizon.

ON THE HORIZON The waterline of the ship's hull appears to be on or near the horizon.

CLOSE ABOARD The contact reported is extremely close to own ship.

In addition to ranges and range references given, any geographic references available can be used to aid the bridge and CIC in locating the ship sighted. Fixed objects such as buoys, small islands, coves, bridges, and piers are helpful in referring to a contact's location. Here are some examples:

2500 YARDS—VERY CLOSE AND TO THE RIGHT OF RED BELL BUOY NUMBER 4.

4 MILES—PASSING THROUGH THE BRIDGE OPENING AT THIS TIME

6 MILES—ABOUT 500 YARDS TO THE LEFT OF THAT EARLIER REPORTED DESTROYER

NOTE: Though ranges are given and reported in yards/miles, it is also in your interest to learn to convert these distances to the metric system; that is, meters/kilometers. One meter equals approximately 1.1 yard; 1 kilometer (1,000 meters) equals approximately 0.6 mile.

SPEED ESTIMATION

Speeds can be either easy or difficult to estimate, depending on how far away the contact is. Just as references are needed for ranges, speed references are also needed. Knowing your own-ship's speed at all times can be a valuable aid in estimating other ship's speeds. A question to ask yourself is "How fast is the ship going in relation to me?" If your ship is steaming at 10 knots and is overtaking a ship on your starboard side, steaming a few knots slower than you are, it is safe to estimate the other ship's speed at about 5 to 8 knots. If a ship on your port side is overtaking you, steaming a few knots faster than you are, it is safe to estimate that the other ship's speed is about 12 to 15 knots.

A readily visible aid in estimating speed is a ship's bow wave and stern wake. A bow wave is the wave of water the bow of a ship makes as it travels through the water. As a ship travels faster, the bow wave becomes larger (Figure 5-7). A stern wake is the phosphorus trail that a ship leaves as it travels through the water. Unlike the bow wave, it is a calm, whitecolored water. As a ship travels fast, the stern wake increases in length; when the ship slows down, the stern wake decreases.

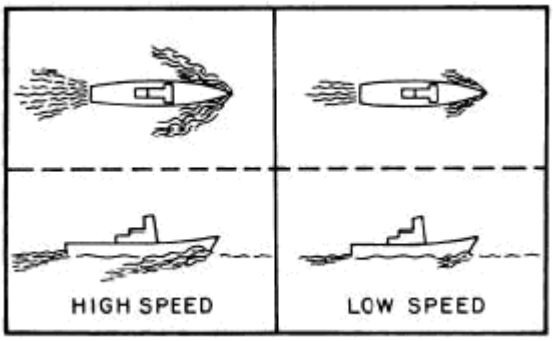

Figure 5-7: Bow Wave and Stern Wake

The bridge and CIC do not expect accurate, to the exact knot speed, reports from you. However, a good estimate is always valuable and can be used as a reference for CIC's courses and speeds sent to the bridge. Use the following terms in reporting speeds:

Very High speed: 50 knots or greater

High speed: 25 knots to 49 knots

Medium-high speed: 20 to 24 knots

Medium speed: 15 to 19 knots

Medium-low speed: 10 to 14 knots

Low speed: 9 knots or less

Dead in the water: Not moving

Increasing your skill at estimating ranges and speeds can only be done one way—by constant practice. An easy way to check your accuracy is by estimating a ship's range and speed, reporting it to all stations, and then asking CIC for its radar range and computed speed. CIC will be glad to help you develop your estimating skills because you are a part of the team.

CHAPTER 6

MAN OVERBOARD

Man-overboard situations require extremely rapid action on the part of the entire Bridge and CIC watch teams. You are an integral part of both teams. Saving the life of a person who falls overboard depends on the speed with which reports are made and rescue action taken. How long can a person fully clothed and without a life jacket stay in the water without drowning? The answer to that question is a difficult one because it depends on many factors. What is the sea state? How cold is the water? Is the person a good swimmer? The person has a good chance of being recovered if the lookout knows exactly what to do and then does it without hesitation.

LIFE-BUOY WATCH

The life-buoy watch (usually the after lookout) is a special watch which carries the primary responsibility of detecting and reporting man-overboard incidents, providing a life ring to the person in the water, and marking the spot where the incident occurred. The number of persons assigned to this watch and the location of their stations will vary with different types of ships. For example, on most ships the life-buoy watch is assigned to the regular lookouts aft. The life-buoy watch area assigned to a particular lookout includes the decks of the ship and water area immediately around the ship. This area must be kept under constant surveillance to detect the first indication that a person has fallen overboard. Binoculars should be used only after initial detection of the person has been made. One earpiece of your sound-powered/IVCS phone headset must be left off because the first indication of a person overboard may be a shout or a splash. During conditions of restricted visibility, this watch will be augmented by one person who will be the sound-powered/IVCS phone talker.

LOOKOUT PROCEDURES

The life-buoy watch or anyone else who sees a person fall overboard must shout as loudly as possible, without hesitation, "MAN OVERBOARD, STARBOARD (PORT) SIDE." This call must be repeated until the conning officer takes necessary action or indicates in some way that the word has been received. A life ring with a small lighted buoy attached (Figure 6-1) and a marine location marker or smoke float (Figure 6-2) should be thrown over upon hearing "MAN OVERBOARD," regardless of whether or not the person is seen.

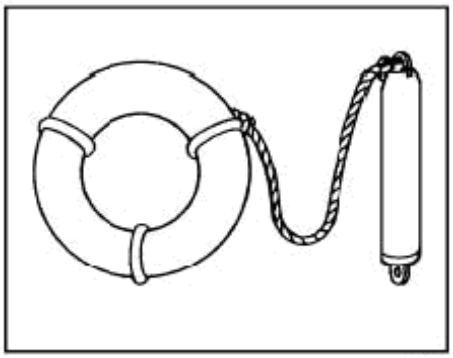

Figure 6-1: Life Ring with Lighted Buoy

Figure 6-2: Mk 58 Marine Location Marker

When launching a Mk 58 marine location marker, (1) remove tear tape over the water ports and (2) throw the marker over the side. The tear tape must be removed before throwing over the side. This allows the seawater to activate the battery to start the process of igniting the pyrotechnic candle.

If the ship is fueling or highly volatile fuel such as gasoline or jet fuel is in the water do not use a smoke float or flare.

SHIP PROCEDURES

Every underway watch is organized to handle the man-overboard emergency. The officer of the deck, upon receipt of information of a man overboard, maneuvers the ship according to prescribed doctrine to reach a recovery position. The OOD has the following word passed twice: "MAN OVERBOARD PORT (STARBOARD) SIDE. SECTION(S) 1, (2, 3,) MAN THE RESCUE DETAIL." The OOD also announces whether the recovery will be made by boat or whether it is to be made with the ship. Further, the ship will sound six or more short blasts on the whistle and, by day, break flag OSCAR. By night (in peacetime) two pulsating red lights are displayed vertically or one white rocket (or one white marine illumination signal) is fired. In addition, the officer of the deck notifies the ships in company and the officer in tactical command (OTC) and informs the commanding officer, the executive officer, the navigator, and the flag duty officer when embarked. The OOD keeps the deck recovery detail informed of the recovery side of the ship. Searchlights must be used with care and only when directed by the OOD because premature use might impair the night vision of the OOD and the lookouts.

CHAPTER 7

SPECIAL SIGNAL FLAGS

Special signal flags (Figure 7-1) are used to attract attention to special operations or to request assistance. Frequently they imply the necessity to stand clear by an approaching vessel. It is important to recognize and report them quickly.

Flags Usage

BRAVO . . . . . Engaged in fueling, rearming, or handling dangerous cargo

FOXTROT . . . . . Indicates flight operations

HOTEL . . . . . Indicates helicopter operations

OSCAR . . . . . Indicates man overboard

FIVE . . . . . Indicates breakdown or a ship not under control

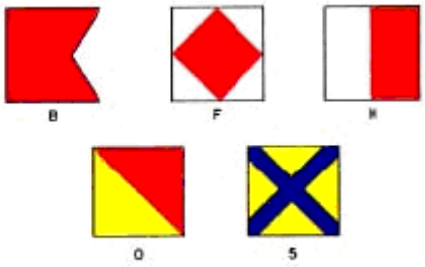

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Figure 7-1: Special Signal Flags

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DISTRESS SIGNALS

The following signals, used or exhibited either together or separately, indicate distress and need of assistance under both International and Inland rules:

1. A gun or other explosive signal fired at intervals of about a minute
2. A continuous sounding with any fog-signaling apparatus
3. Rockets or shells, throwing red stars fired one at a time at short intervals
4. A signal made by light, radio, or by any other signaling method consisting of the group • • • - - - • • • (SOS) in the Morse code
5. A signal sent by radiotelephone consisting of the spoken word “Mayday”

6. The International Signal Code of distress indicated by flying signal code flags N and C together (NOVEMBER CHARLIE).
7. A signal consisting of a square flag having a ball below it either flown separately or shown against an international orange background.
8. Flames on the vessel (as from a burning tar barrel, oil barrel, etc.)
9. A rocket parachute flare or a hand flare showing a red light
10. A smoke signal giving off orange-colored smoke
11. Slowly and repeatedly raising and lowering arms outstretched to each side
12. Dye marker of any color in the water.

In addition, Inland Rules stipulate that a high intensity white light flashing at regular intervals from 50 to 70 times a minute may be used. There is no basis in the Rules for the popular notion that our national ensign, hoisted upside down, is a recognized signal of distress. No man-of-war would ever subject the colors to that indignity. But if you should see a private craft with the ensign hoisted upside down, it may be in distress and you should report it without delay.

SPECIAL SUBMARINE SIGNALS

The following signals, though not part of the Rules of the Road, are prescribed for submerged submarines in emergency situations involving rising to periscope depth or surfacing.

1. A yellow smoke flare fired into the air from a submarine indicates that the submarine is coming to periscope depth to carry out surfacing procedures. Ships should clear the immediate vicinity, but should not stop propellers.
2. A red smoke flare fired into the air from a submarine is a signal that the submarine is in serious trouble and will surface immediately if possible. Smoke flares of any color, fired into the air at short intervals, mean that the submarine requires assistance. All ships in the vicinity should stand by to give aid.

CHAPTER 8

RESTRICTED-VISIBILITY STEAMING

Restricted visibility is defined as anything that restricts regular visibility to a degree that endangers safe navigation. Many people think of restricted visibility as just fog, but restricted visibility can be caused by many other things; rain, smoke, heavy seas, snow, and so forth. During periods of restricted visibility, the importance of the lookout's job increases. Now the lookout is not only the “eyes” but also the “ears” of the ship. The job now requires a special skill which must be based on a thorough knowledge of what to do and how to do it.

RESTRICTED VISIBILITY LOOKOUTS

This watch is stationed during fog or conditions of reduced visibility. The watch is stood in those locations where approaching ships can best be seen or heard (Figure 8-1). It is the duty of the Restricted Visibility Lookout to stand a vigilant watch and to detect and report everything within sight or hearing. A lookout's hearing must not be impaired by S/P telephones. Accordingly, the lookout is assisted by a phone talker who is in direct communication with the Bridge and the lookout talker/plotter in CIC. The Restricted Visibility Lookout's sectors of responsibility are as follows:

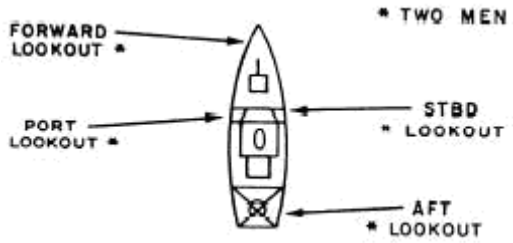

Figure 8-1: Restricted Visibility Stations

FORWARD LOOKOUT: Stationed as far forward and as close to the waterline as possible. Sector extends 30° on each side of the bow (330° - 030°).

STARBOARD LOOKOUT: Stationed on the starboard bridge wing. Sector extends from the forward lookout's boundary to the starboard beam (030° - 090°).

AFT LOOKOUT: Stationed as far aft and as close to the waterline as possible. Sector extends from the starboard beam clockwise to the port beam (090 ° - 270°).

PORT LOOKOUT: Stationed on the port bridge wing. Sector extends from the port bow to the forward lookout's boundary (270° - 330°).
During Restricted Visibility conditions, conduct a moderately fast search without binoculars, but have them within reach in case conditions suddenly change.

SOUND SIGNALS

During restricted visibility, all ships continually sound fog signals in accordance with *Navigation Rules, International - Inland* (Table 8-1). Most contacts will have to be reported by hearing prior to the actual sighting. Sounds that might be heard and must be reported are bell and whistle buoys, small craft motors, fog signals, wash of water on another ship's hull, and any other unusual sounds. You must constantly be alert and concentrate on the job at hand to hear these sounds.

SITUATION	SIGNAL	MAXIMUM INTERVAL
POWER-DRIVEN VESSEL U/W WITH WAY ON	−	2 MINUTES
POWER-DRIVEN VESSEL U/W BUT NO WAY ON	− −	2 MINUTES
VESSEL NOT UNDER COMMAND	−..	2 MINUTES
VESSEL RESTRICTED IN ABILITY TO MANEUVER		
VESSEL CONSTRAINED BY ITS DRAFT		
SAILING VESSEL		
VESSEL ENGAGED IN FISHING		
VESSEL ENGAGED IN TOWING OR PUSHING ANOTHER VESSEL AHEAD		
VESSEL TOWED	−...	2 MINUTES
VESSEL AT ANCHOR	X	1 MINUTE
ADDITIONAL SOUND SIGNAL THAT AN ANCHORED VESSEL MAY SOUND TO GIVE WARNING OF ITS POSITION	.−.	
VESSEL AGROUND	3X3	1 MINUTE
PILOT VESSEL WHEN ENGAGED ON PILOTAGE DUTY MAY GIVE THIS ADDITIONAL IDENTITY SIGNAL	....	

NOTES:
− REPRESENTS A PROLONGED BLAST (4-6 SECONDS IN DURATION)
. REPRESENTS A SHORT BLAST (ABOUT 1 SECOND IN DURATION)
3 REPRESENTS THREE DISTINCT STROKES ON THE BELL
X REPRESENTS RAPIDLY RINGING THE BELL FOR 5 SECONDS AND ON VESSELS 100 METERS OR LONGER RAPIDLY RINGING A GONG IN THE AFTER PART OF THE VESSEL FOR 5 SECONDS AFTER THE BELL

Table 8-1: Table of Sound Signals

REPORTS

Report sound signals using the following format:

1. WHAT IS HEARD: One prolonged blast, a rapid ringing bell, two short whistles, and so forth.
2. WHERE YOU HEAR IT: Use relative bearings. Be as accurate as possible.
3. SOUND STRENGTH: Weak, medium, or loud.
4. INTENSITY: Sound getting stronger, weaker, or remaining the same.
5. BEARING DRIFT: Sound is drifting from left to right, right to left, or remaining steady on same bearing.

The following is a sample of a sound signal report made by the forward lookout:

> ALL STATIONS—FORWARD LOOKOUT—I HEAR TWO WEAK PROLONGED BLASTS—BEARING 015—WITH A RIGHT BEARING DRIFT.

CHAPTER 9

SPECIAL SEA DETAIL

Whenever a ship gets under way from a pier or anchorage and goes to sea, or returns from sea to an anchorage or mooring, the special sea detail is set. Moving a ship in and out of crowded harbors is a big job that requires a lot of experience and skill. For that reason, the special sea detail is comprised of persons that have been well-trained and know exactly what their assigned duties are.

PREPARATION

Preparations to enter or leave a harbor begin several hours before the special sea detail is actually set. There are hundreds of things which must be done by different departments to ensure that the evolution is completed safely. Charts must be laid out and the ship's proposed track must be determined and plotted. Gyros must be tested, radio checks must be conducted, and so forth.

In addition to the duties of the regular underway lookout, the special sea detail lookout must perform additional duties. During sea detail the lookouts provide information to two separate groups—piloting and shipping. The piloting team is mainly concerned with navigating in and out of the harbor, while the shipping team is concerned with the surface contact picture. The piloting team ensures that the ship gets where it is supposed to go. The shipping team makes sure the ship does not hit anything on the way. The lookout has to provide the following information to each respective team:

Piloting Team

1. The port and starboard lookouts report buoys when they are first seen and exactly as they pass on the beam.
2. The aft lookout tells CIC when the stern of the ship is clear of the end of the pier.
3. When asked, all lookouts must be alert to give accurate bearings and ranges to geographic landmarks (bridges, lighthouses, and so forth).

Shipping Team

1. Be especially alert for small craft operating in the vicinity of the harbor.
2. Report all tugs upon sighting them.
3. Report course and speed changes of ships as soon as possible.

Getting a large ship under way or bringing it to anchor can be a simple and quiet operation when all hands know their jobs and do them well.

CHAPTER 10

RULES OF THE ROAD

Just as a driver must know traffic signals and laws governing speed, the crews who handle ships and boats must know the seagoing traffic rules. The nautical traffic rules are contained in *Navigation Rules* and are provided for a definite purpose—to prevent ship collisions. When collisions do occur, damage can run into many thousands of dollars, even if one or both ships do not sink. Even worse is the possibility that lives will be lost.

Rules of the Road are divided into two distinct sections: Inland Rules and International Rules. The boundary that divides the area where International and Inland rules apply is called the line of demarcation. The line of demarcation is not marked; it is generally drawn across the mouths of harbors, bays, and inlets. (Figure 10-1).

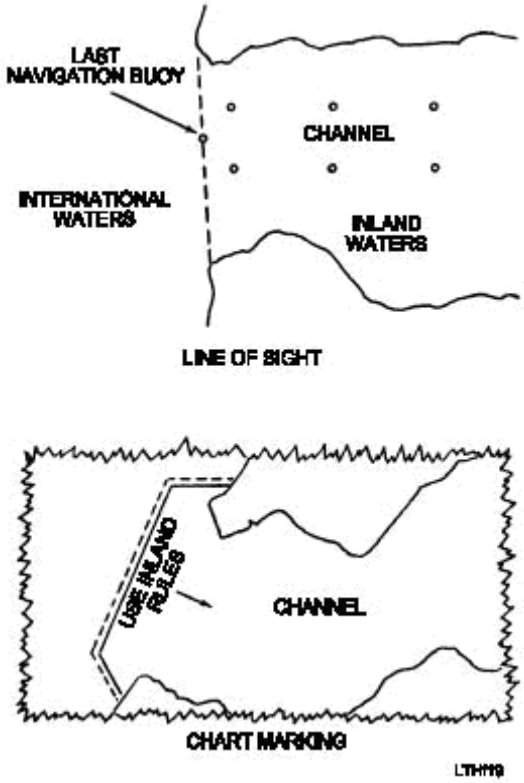

Figure 10-1: Rule Boundaries

INTERNATIONAL WHISTLE SIGNALS

International Rules of the Road must be obeyed by all public and private vessels of the United States navigating upon the high seas. These laws were established after a thorough study and an agreement made by most of the maritime nations of the world. These rules became effective for the United States after passage of an act of Congress. Most of the signals shown below are signals of execution. The first two are rudder signals to be given when actually changing course when another vessel is within sight.

A short blast is equal to about 1 second in duration; a prolonged blast, 4 to 6 seconds in duration.

Signal	Meaning
One short blast	I am altering my course to starboard
Two short blasts	I am altering my course to port
Three short blasts	I am operating astern propulsion
Five or more short blasts	Danger signal
One prolonged blast	I am approaching a blind bend in the channel

INLAND WHISTLE SIGNALS

Inland Rules of the Road are to be followed by all vessels navigating upon certain inland waters of the United States. The whistle signals listed below generally are signals of intent. The first two signals must be answered by the other vessel in sight making the same signal before the proposed action is taken.

Signal	Meaning
One short blast	I intend to leave you on my port side
Two short blasts	I intend to leave you on my starboard side
Three short blasts	I am operating stern propulsion
Five or more short blasts	Danger signal
One prolonged blast	I am approaching a blind bend in the channel or I have gotten underway

The "bend" signal is the only one made "blind." It is answered by the same signal by a ship around the bend. Then, when in sight, the danger signal, or a signal of proposal, is sounded, depending on circumstances. Remember, under International Rules, whistle signals generally are signals of execution or action; under Inland Rules they are signals of intent or proposal.

LIGHTS AND SHAPES

Navigation Rules states that all seagoing vessels must show certain lights from sunset to sunrise, whether at anchor or under way, and during daylight in restricted visibility. The basic purpose of these lights is to warn vessels of the presence of other vessels. Lights also aid in determining the course and aspect of vessels under way. In some cases, lights indicate a vessel which is restricted in its ability to maneuver, either because of physical characteristics or because of

the activity in which it is engaged. The prescribed shapes serve the same purpose during the day (Figure 10-2).

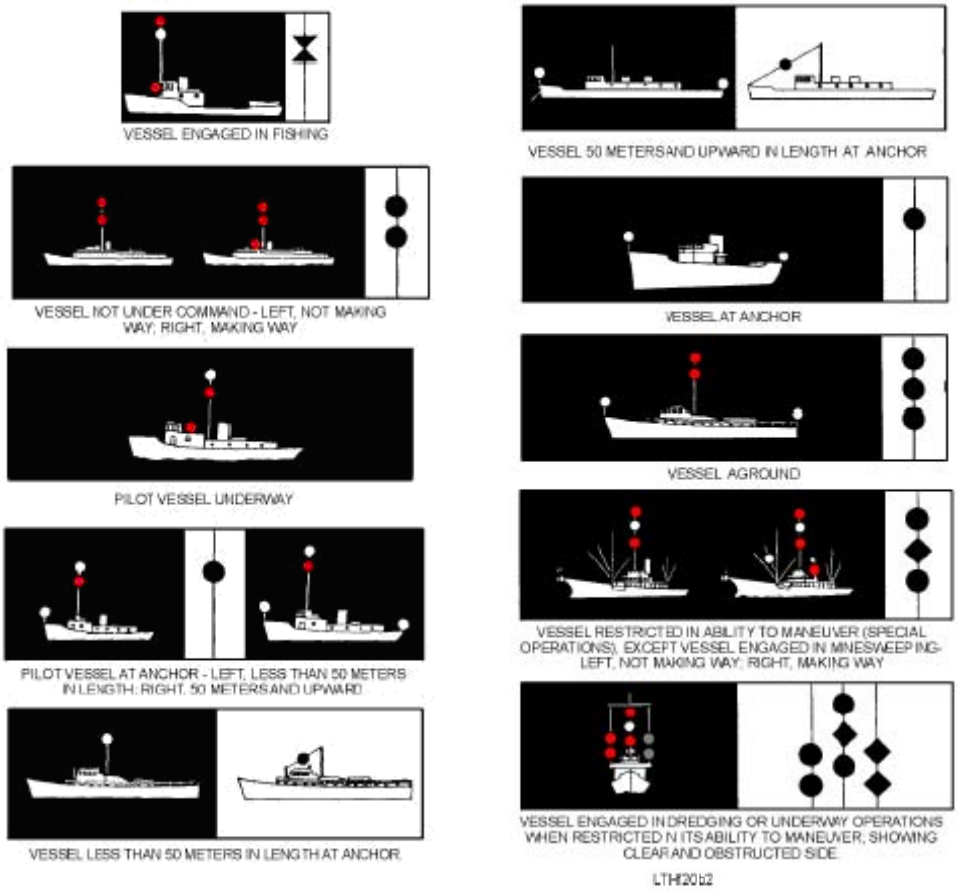

Figure 10-2: Lights and shapes.

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RUNNING LIGHTS

All power-driven vessels are required to carry white, red, and green running lights when under way (Figure 10-3). Running lights consist of a white masthead light in the forward part of the ship (a second masthead light, abaft and higher than the forward one, is required on vessels 50 meters or more in length), sidelights (red on the portside, green on the starboard side), and a white stern light.

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Figure 10-3: Running Lights

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Running lights are fixed so they display an unbroken arc of light over certain portions of the horizon, making them readily identifiable. Running lights and their degree of arc are as follows:

Running Lights	Degree of Arc
Masthead light	225°
Sidelights	112.5°
Stern light	135°

BUOYS

Buoys are moored floating markers placed so as to guide ships in and out of channels, warn them of hidden dangers, and lead them to anchorage areas, etc. Buoys may be of various sizes and shapes. Regardless of their shapes, however, their distinctive coloring is the chief indication of their purposes.

Large automatic navigational buoys (LANBYs) are major aids to navigation, and they provide light, sound signal, and radio beacon service, much the same as lightships. Some LANBYs are replacing lightships in U.S. waters. The LANBY is an all steel disk-shaped hull 40 feet in diameter. The light, sound signal, and radio beacon are located on the mast.

Although buoys are valuable aids to navigation, they must never be depended upon exclusively. Buoys frequently drag their moorings in heavy weather, or they may be set adrift when run down by passing vessels. Lights on lighted buoys may go out of commission. Whistles, bells, and gongs actuated by the sea's motions may fail to function in smooth water.

INTERNATIONAL BUOYAGE REGIONS

To reach agreement with all maritime countries to bring all buoyage into one system with the least amount of money and time expended, two international buoyage regions were established. Figure 10-4 outlines International Buoyage Regions A and B. Navigational charts produced and/or printed after 1983 should indicate the buoyage region to which the chart refers.

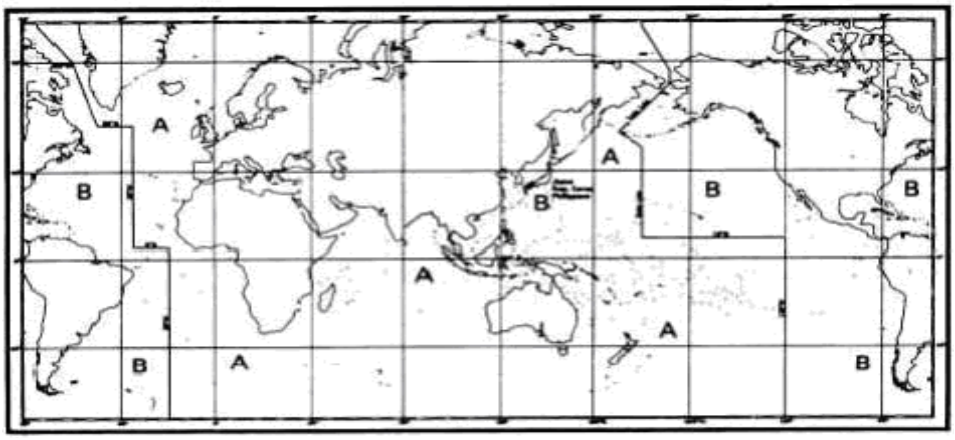


Figure 10-4: IALA Maritime Buoyage System, Regions A and B

MARITIME BUOYAGE SYSTEM

Until recently, as many as 30 different buoyage systems were in use around the world. In 1982, most of the maritime nations of the world signed an agreement sponsored by the International Association of Lighthouse Authorities (IALA). This agreement adopted a system known as the IALA Maritime Buoyage System and provides rules that apply to all fixed and floating marks other than lighthouses, sector lights, range lights, lightships, and large automatic navigational buoys (LANBYs).

The Maritime Buoyage System provides five types of marks that may be used in any combination. The five types of marks are lateral, cardinal, isolated danger, safe water, and special. Each will be discussed briefly here.

1. Lateral marks—indicate the port and starboard hand sides of channels as the harbor is entered from seaward. Within the Maritime Buoyage System there are two international buoyage regions where lateral marks differ.
2. Cardinal marks—used in conjunction with the compass, indicate that the navigable water lies to the named side of the mark.
3. Isolated danger marks -- erected on, or moored directly on or over, dangers of limited size.
4. Safe water marks—used to indicate that there is water safe for navigation all around the position (examples: midchannel and fairways).
5. Special marks—call attention to an area or specific feature. Explanation of special marks may be found on the navigational chart you are using, in *Sailing Directions,* or in *Coast Pilots.*

MEANING OF DISTINGUISHING MARKS

The meaning of the mark depends upon one or more of the following features:

1. By day—color, shape, and topmark
2. By night—light color and phase characteristics

Color

The colors used for lateral marks in Region A are red (port side), green (starboard side), green with one red horizontal band (preferred channel to port), and red with one green horizontal band (preferred channel to starboard).

The colors used for lateral marks in Region B are green (starboard side), red (port side), red with one green horizontal band (preferred channel to port), and green with one red horizontal band (preferred channel to starboard).

Shape

There are five basic buoy shapes (Figure 10-5); can, nun, spherical, pillar, and spar. With the exception of pillar and spar buoys, the shape of the buoy indicates the correct side on which to pass. Can buoys may sometimes be referred to as cylindrical and nun buoys

referred to as conical. The term *pillar* is used to describe any buoys that is smaller than a lighthouse buoy and that has a tall, central structure on a broad base. Lighted buoys in the United States are referred to as pillar buoys.

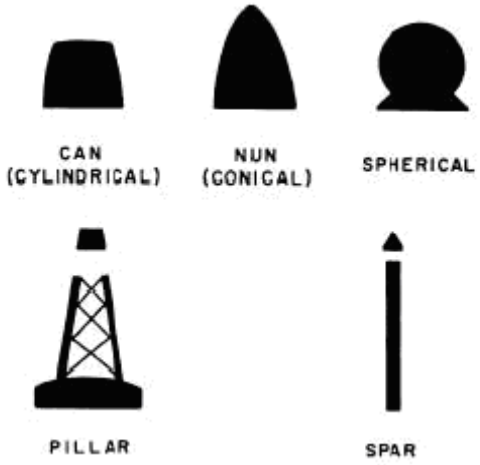


Figure 10-5: Basic Buoy Shapes

Topmarks

The IALA Maritime Buoyage System makes use of can, nun, spherical, and X-shaped topmarks only. Topmarks on pillar and spar buoys are particularly important to indicate the side on which they will be passed and will be used wherever practical.

Lights

Where marks are lighted, red and green lights are reserved for port and starboard or starboard and port lateral marks. Yellow lights are for special marks, and white lights are used for other types of marks.

Phase Characteristics

Lights, when fitted, may have any of the following phase characteristics (or frequency of duration): flashing, quick flashing, very quick flashing, long flashing, composite group flashing, group flashing, isophase or occulting.

CHAPTER 11

SHIP RECOGNITION AND IDENTIFICATION

As stated earlier, sighting contacts and reporting them to the bridge and CIC are the primary duties of the lookout. However, your job as lookout does not end there: the contact must be identified. Ships normally should be identified while they still are distant enough to present only a silhouette to the observer. The types/classes of ships can be determined from silhouettes long before their hull numbers or names can be distinguished. The first determination to be made is whether a vessel is a merchant (civil) or naval ship. Visual identifications will be plotted and logged in CIC so it is important for you to be able to recognize a friend or foe quickly and accurately. If you do not know the exact identity of the contact, the thing to do is to describe it.

A critical goal of the lookout is to quickly categorize the visual surface contact into one of a few major categories. The principal categories are warships, merchants, and pleasure craft.

Warships include large combatants like carriers, cruisers, and destroyers, amphibious ships, frigates and larger patrol craft, small patrol craft, and various support vessels.

Merchants can be classed by the type of cargo they carry; liquid tankers, container carriers, roll-on roll-off, dry cargo, passenger ships, and ferries. In parts of the world a more common traditional merchant ship can be categorized as a dhow. A dhow is a traditional Arab sailing vessel with one or more triangular sails, called lateens. A modern dhow can be motorized. It is indigenous to the coasts of the Arabian Peninsula, India, and East Africa. A larger dhow may have a crew of approximately thirty with capacity for 400 tons of cargo while smaller dhow may have crews typically ranging around twelve.

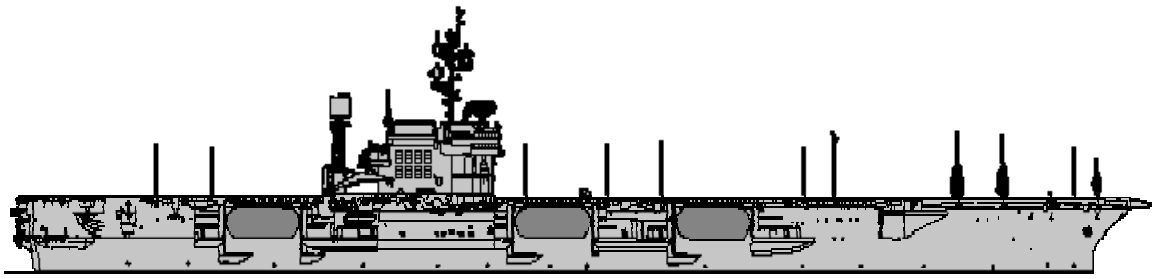
Pleasure craft can be identified as powered cruiser sporting vessels, personal watercraft, or sailing vessels used to enjoy the water.

Often non-military craft have been involved in military or paramilitary applications like smuggling, surveillance, terrorism, and asymmetrical warfare. Non-traditional methods of attack are now used to offset traditional military superiority. These methods include use of deception, and concealment within the normal shipping lanes, fishing fleets, and small boat concentrations. Lookouts must be ever vigilant for unusual activities, fishing gear not used or in disrepair, or uncharacteristic behavior for the vessel type.

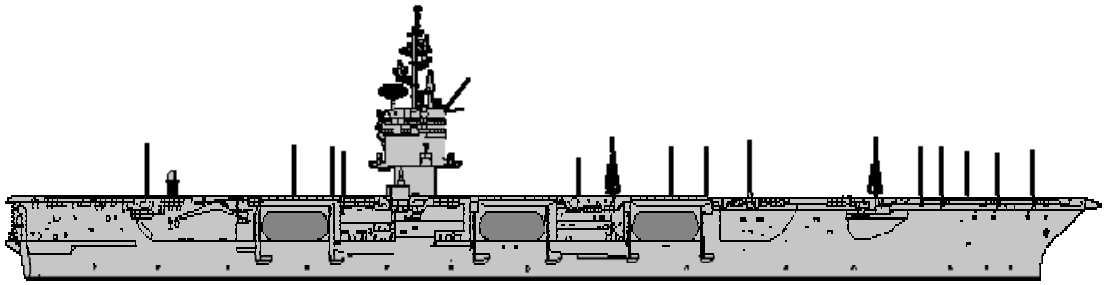
The navies of the world include many various types of warships and support vessels of all sizes and specialties, and would take enormous volumes to display, in fact too many to include in this manual. This manual will provide only US Navy ships. Foreign navies, both allied and non-allied silhouettes are available in Foreign Recognition Guides – World (ONI-1250-003-99), and should be obtained for study prior to entering a specific theater of operations. These guides area also available in CD-ROM format from the Office of Naval Intelligence (ONI) and the National Maritime Intelligence Center (NMIC) and are available online at nmic.navy.smil.mil.

The following figures will help with ship recognition.

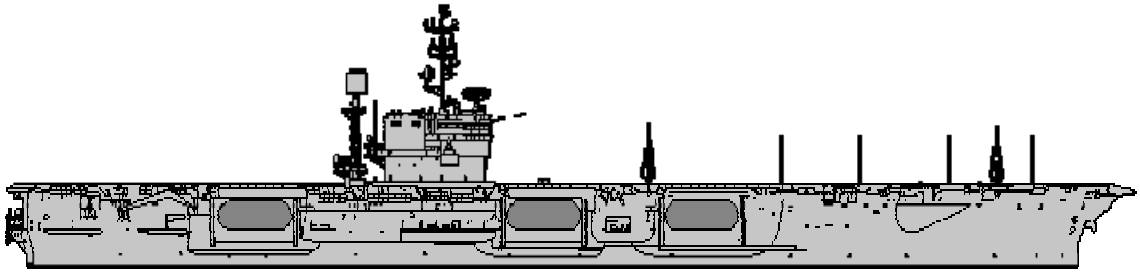
U. S. AIRCRAFT CARRIERS



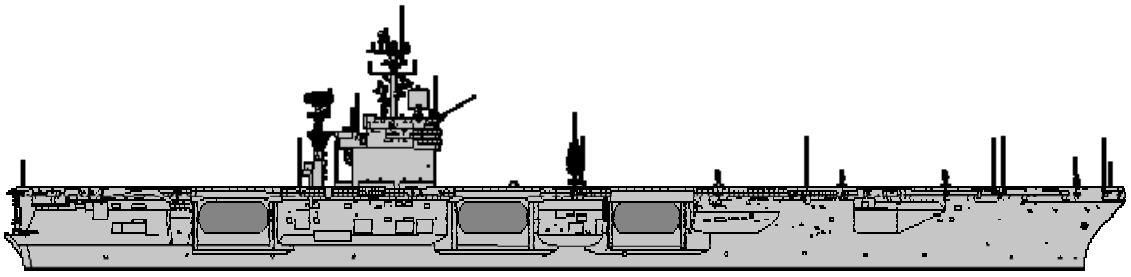
KITTY HAWK CLASS (CV 63)



ENTERPRISE CLASS (CVN 65)



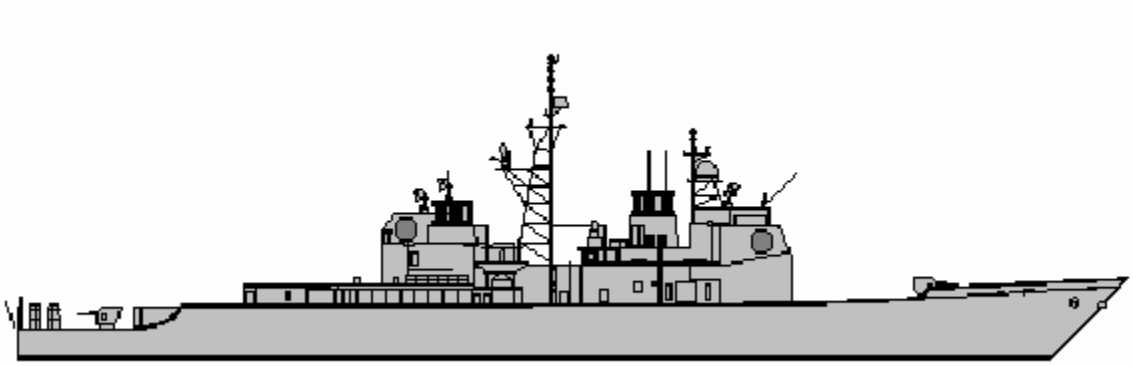
JOHN F. KENNEDY CLASS (CV 67)



NIMITZ CLASS (CVN 68)

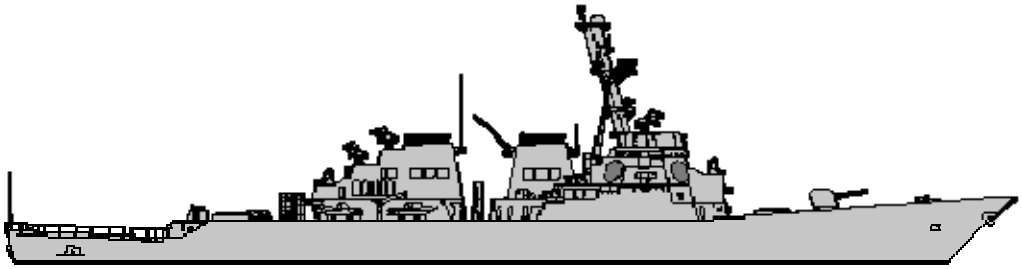
Figure 11-1: U.S. Navy ship types

U. S. CRUISERS

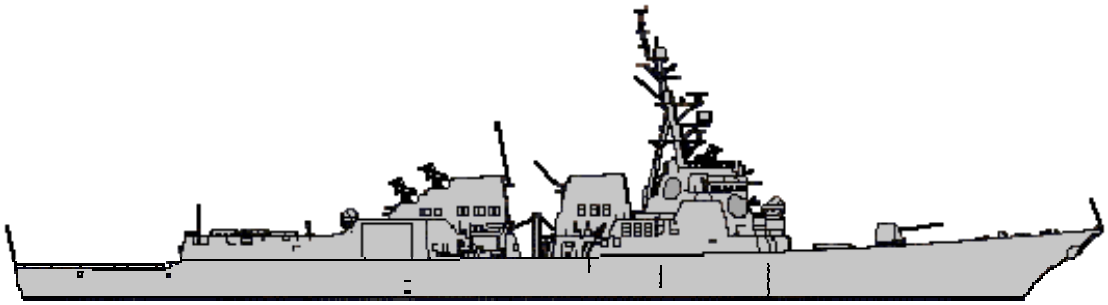


TICONDEROGA CLASS (CG 52-73)

U. S. DESTROYERS



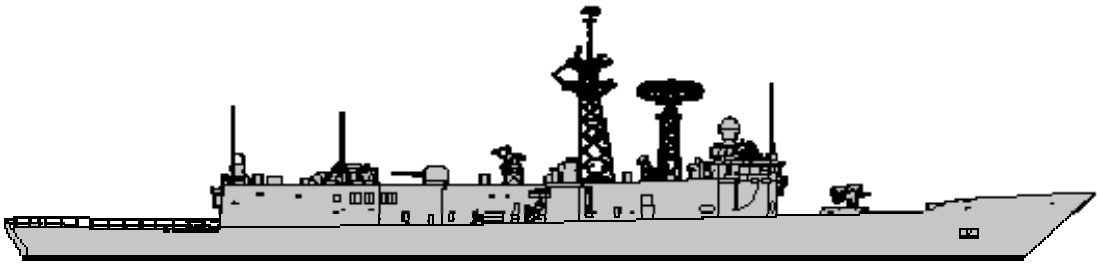
ARLEIGH BURKE CLASS (DDG 51 – 78)



OSCAR AUSTIN CLASS (DDG 79 – 107)

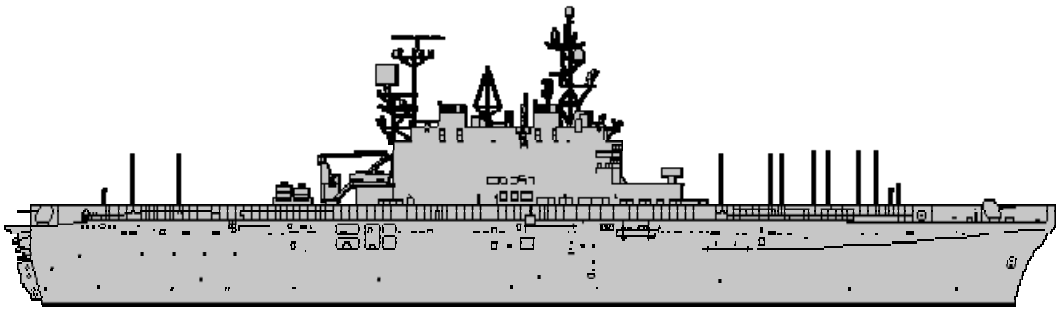
Figure 11-1: U.S. Navy ship types

U. S. FRIGATES

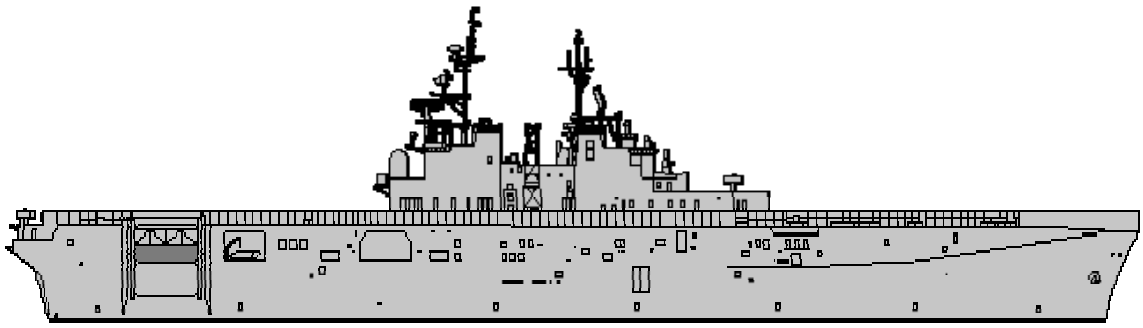


OLIVER HAZARD PERRY CLASS (FFG 7)

U. S. AMPHIBIOUS ASSAULT WARFARE SHIPS



TARAWA CLASS (LHA 1)



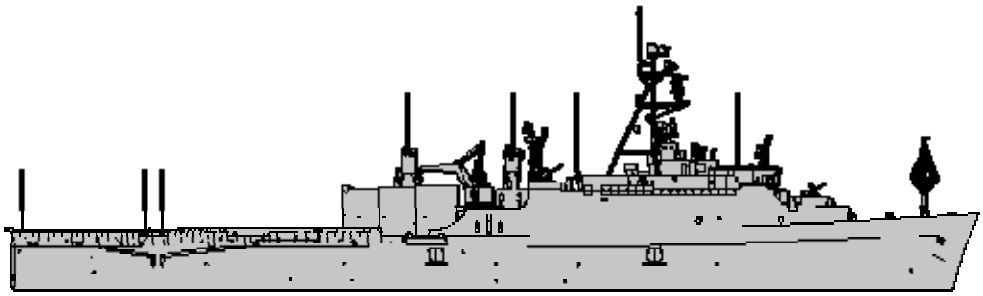
WASP CLASS (LHD 1)

PHOTO NOT AVAILABLE. LHD 8 IS SCHEDULED FOR COMMISSIONING IN 2007. SIDE VIEW IS VERY SIMILAR TO WASP CLASS AND IS SAME LENGTH OF 844 FEET.

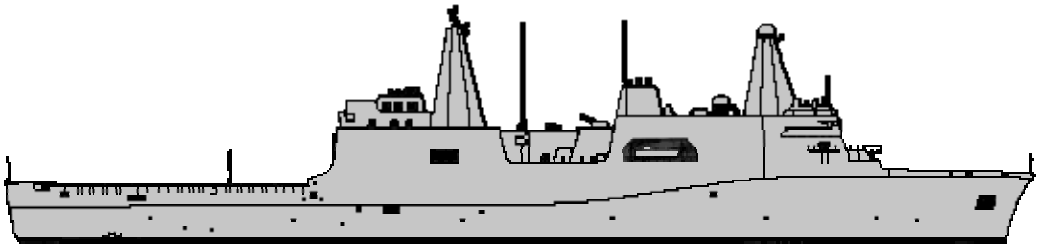
MAKIN ISLAND CLASS (LHD 8)

Figure 11-1: U.S. Navy ship types

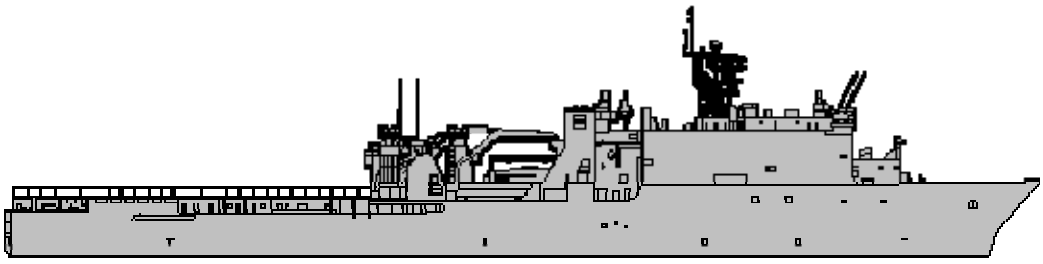
U. S. AMPHIBIOUS WARFARE SHIPS



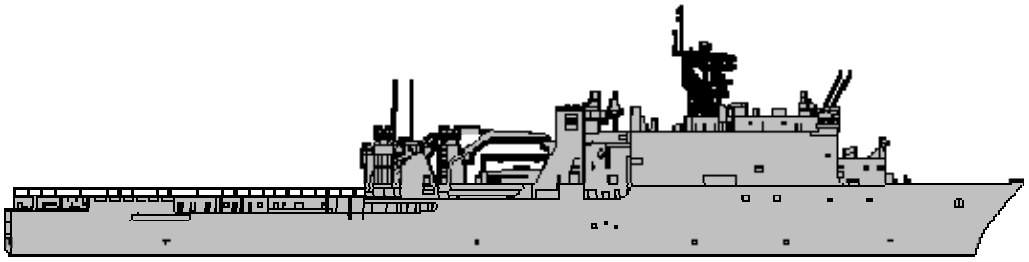
AUSTIN CLASS (LPD 4)



SAN ANTONIO CLASS (LPD 17)



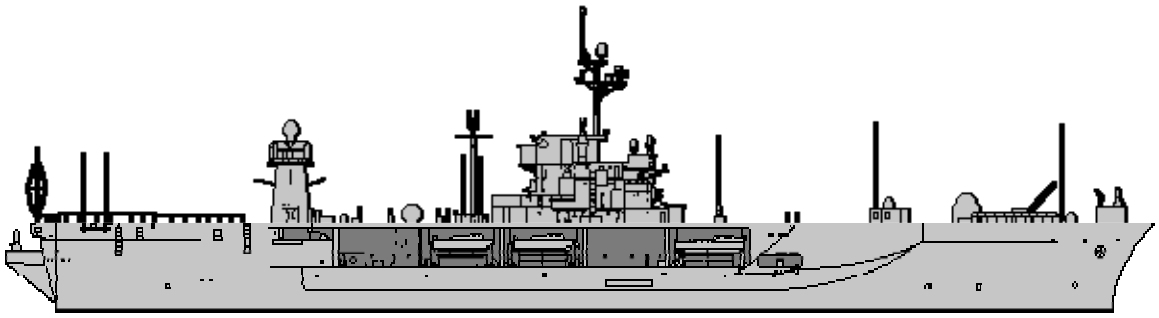
WHIDBEY ISLAND CLASS (LSD 41)



HARPERS FERRY CLASS (LSD 49)

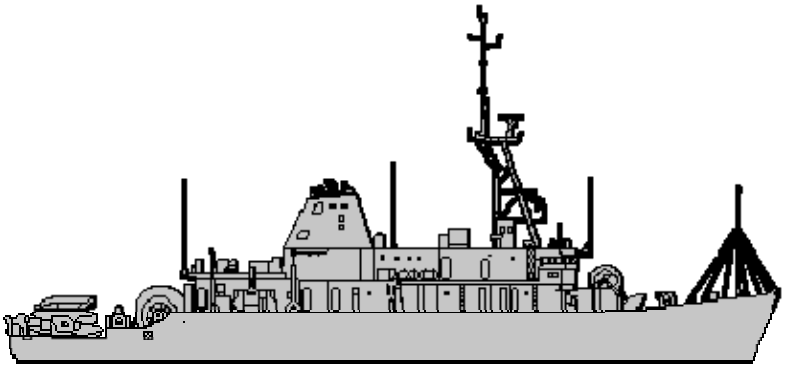
Figure 11-1: U.S. Navy ship types

U. S. AMPHIBIOUS WARFARE SHIPS

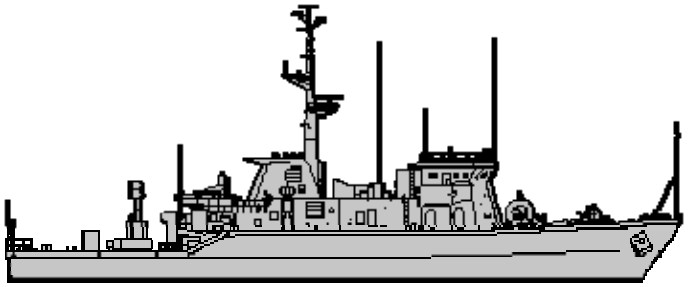


BLUE RIDGE CLASS (LCC 19)

U. S. MINE WARFARE SHIPS



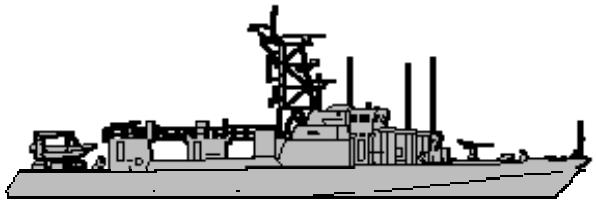
AVENGER CLASS (MCM 1)



OSPRY CLASS (MHC 1)

Figure 11-1: U.S. Navy ship types

SMALL FIGHTING VESSELS



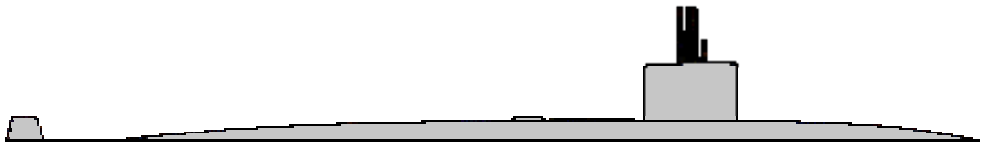
CYCLONE CLASS (PC 1)

Figure 11-1: U.S. Navy ship types

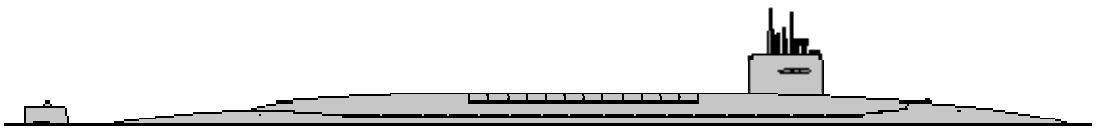
U. S. SUBMARINES

LOS ANGELES CLASS (SSN 688)

SEAWOLF CLASS (SSN 21)



VIRGINIA CLASS (SSN 774)

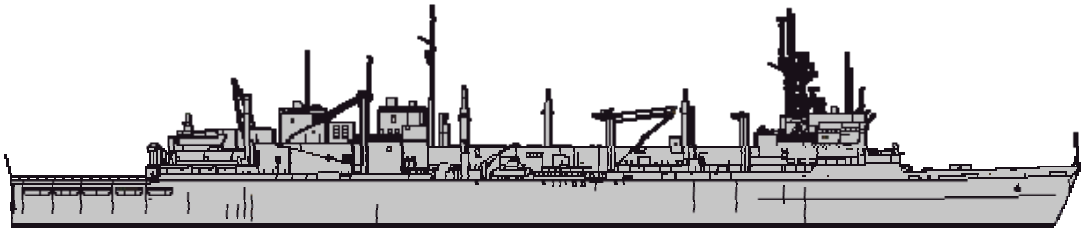


OHIO CLASS (SSBN 725)

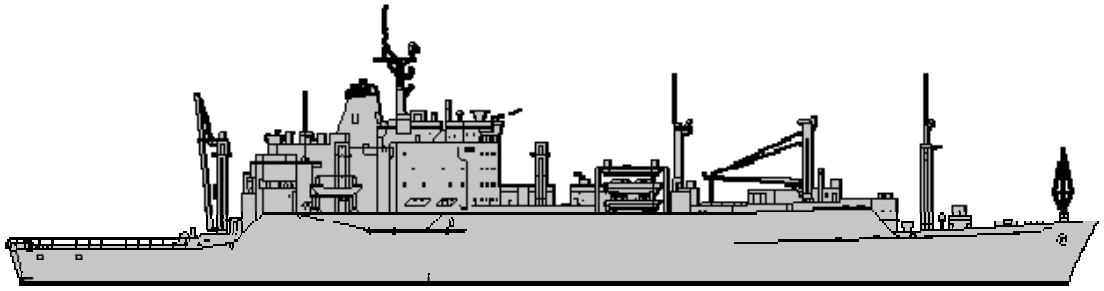
Four SSBN 725 Class Submarines have been converted to SSGN Class replacing the 24 Trident Missile capabilities with 154 Conventional Cruise Missile capabilities. The exterior appearance of the SSGN is unchanged.

Figure 11-2: U.S. Navy submarines

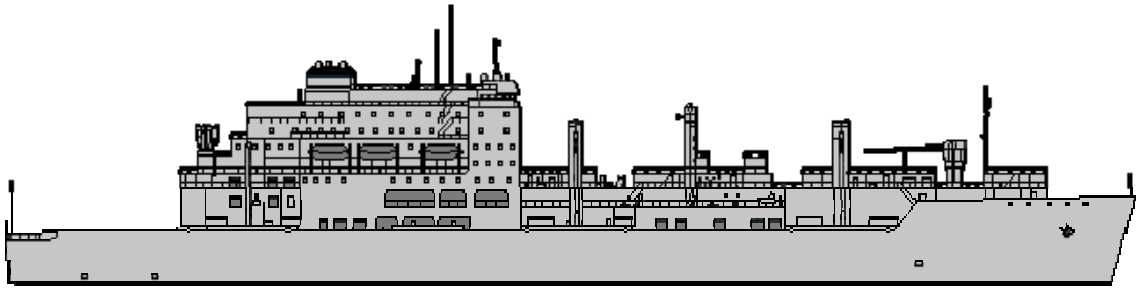
MILITARY SEALIFT COMMAND VESSELS



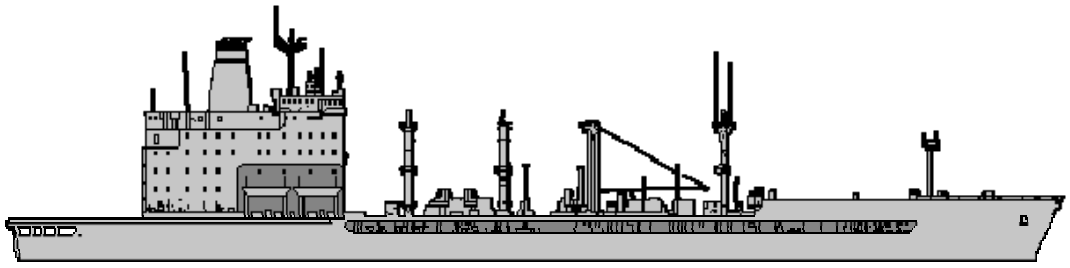
SUPPLY CLASS (T-AOE 6)



KILAUEA CLASS (T-AE 26)



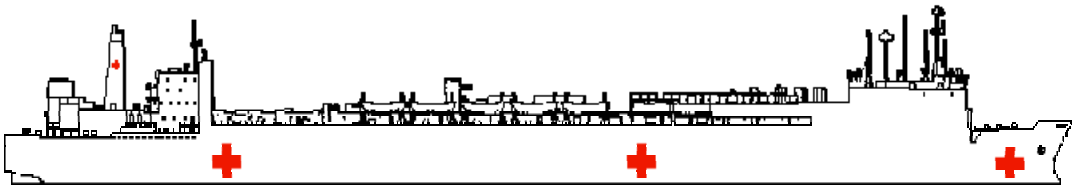
LEWIS AND CLARK CLASS (T-AKE 1)



HENRY J. KAISER CLASS (T-AO 187)

Figure 11-3: Military Sealift Command ships

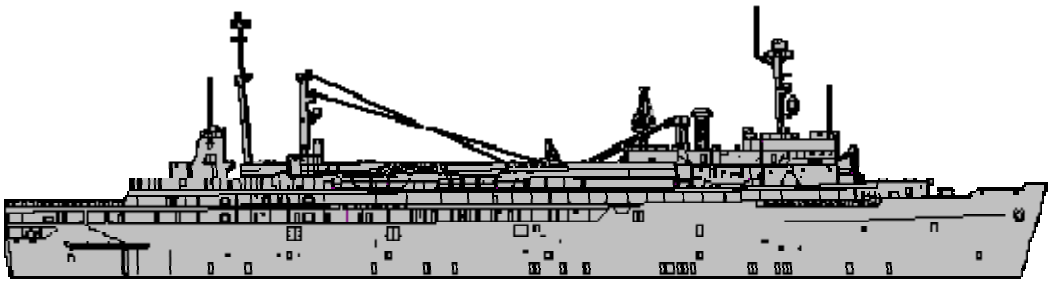
MILITARY SEALIFT COMMAND VESSELS



MERCY CLASS (T-AH 19)

Figure 11-3: Military Sealift Command ships

AUXILIARY VESSELS



EMORY S. LAND CLASS (AS 39)

Figure 11-4: U.S. Auxiliary ships

MERCHANT SHIPS

As a lookout, you must be able to identify and report the various types of merchant ships. The purpose of this section is to acquaint you with the primary identification features unique to merchant ships. The primary publication that will help you in your identification of merchant ships is the *Merchant Marine Identification Guide.*

Any system used for identifying and reporting merchant ships during peacetime must be adaptable to wartime as well. Such ordinary aids to identification as stack markings, hull and superstructure paint combinations, striping, and house flags (all of which are of great assistance in peacetime identification) are easily camouflaged or painted over. Consequently, we must rely on those physical characteristics that are readily seen and difficult to alter or disguise.

Armament

An indication of the merchant/naval character of a vessel is the presence of visible weapons. The absence of guns may have little significance, but their presence almost certainly indicates a naval vessel. You should start forward and work aft (Figure 11-5) to identify the following armament:

1. Guns
2. Missiles/directors
3. ASROC
4. Torpedoes
5. Depth charges
6. Aircraft and helicopters on board

Figure 11-5: Ship armament**.**

Identification Procedures

To identify a merchant ship, you must classify it by appearance group, hull type, and upright sequence. The appearance group is determined by the size, shape, and location of the superstructure. The hull type is determined by the shape of the hull and the number and location of islands. The upright sequence includes the identification and location of the masts, gantries, king posts, cranes, and funnels. Using these features and consulting *Merchant Marine Identification Guide—World* and *Communist Merchant Marine Identification Guide,* you can identify a merchant ship quickly and accurately.

Appearance Group

The size, shape, and location of the superstructure on merchant ships depend on the functions of the ship. This identification feature is used to place the ship in one of three appearance groups (Figure 11-6).

1. **Group 1** is the large superstructure appearance group. The superstructure exceeds one-third the overall length of the ship. Passenger ships generally belong in this group.
2. **Group 2** is the composite superstructure. The composite superstructure is located amidships and is less than one-third the overall length. These ships generally have a small blocklike superstructure with deck spaces devoted to cargo-handling equipment and hatches.

3. **Group 3** is stack aft. Stack aft means ships with funnels located within the after-third of the ship. However, if the superstructure exceeds one-third the overall length, the ship will be in appearance group 1.

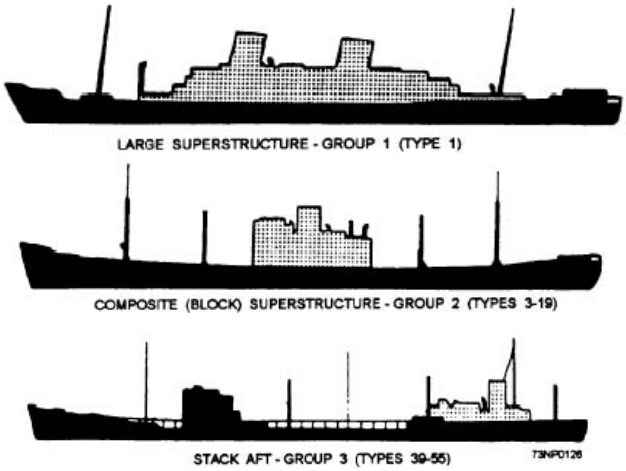


Figure 11-6: Appearance groups.

Hull Type

It is unlikely that the hull will be sufficiently distinct at a distance to enable an accurate initial report to be made. However, once the vessel is well above the horizon, distinctive features begin to appear, such as stems and sterns. These features can be added to your amplifying report. By numbering the castles from forward to aft, as in Figures 11-6 and 11-7, an indication of the hull type can be given. For example, a three-island ship is described as having hull type l-2-3, and ships that have no raised castles are classed as flush-decked vessels.

A ship with a single weather deck extending from bow to stern is called a flush-deck ship. An additional deck spanning the breadth of the ship, but not extending from bow to stern, forms the island. Islands may be located at the bow, amidships, at the stern, or in a combination of these locations. However, any raises in the after-third of the ship but not extending to the stern are disregarded in determining the appearance type.

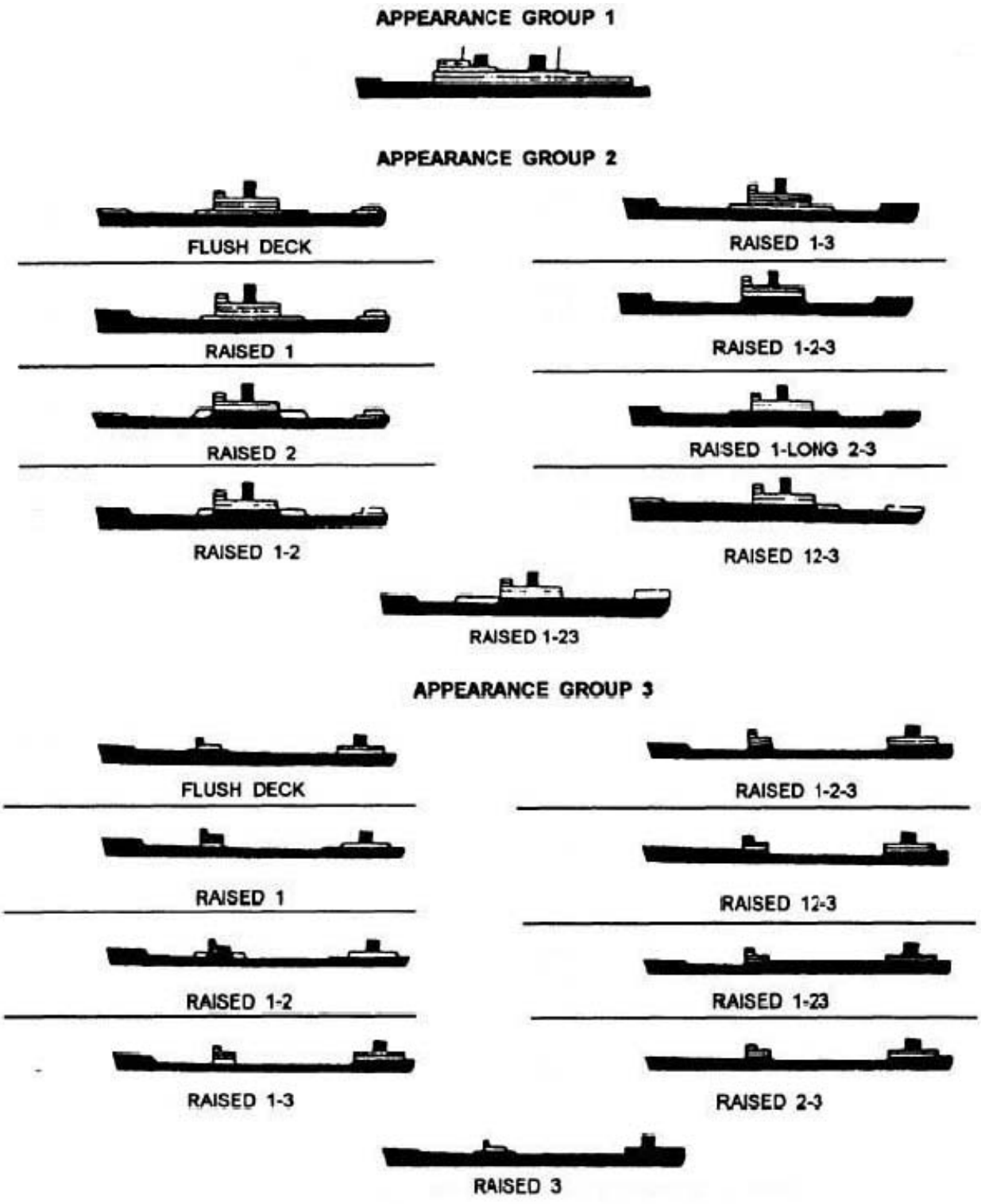


Figure 11-7: Hull type selector.

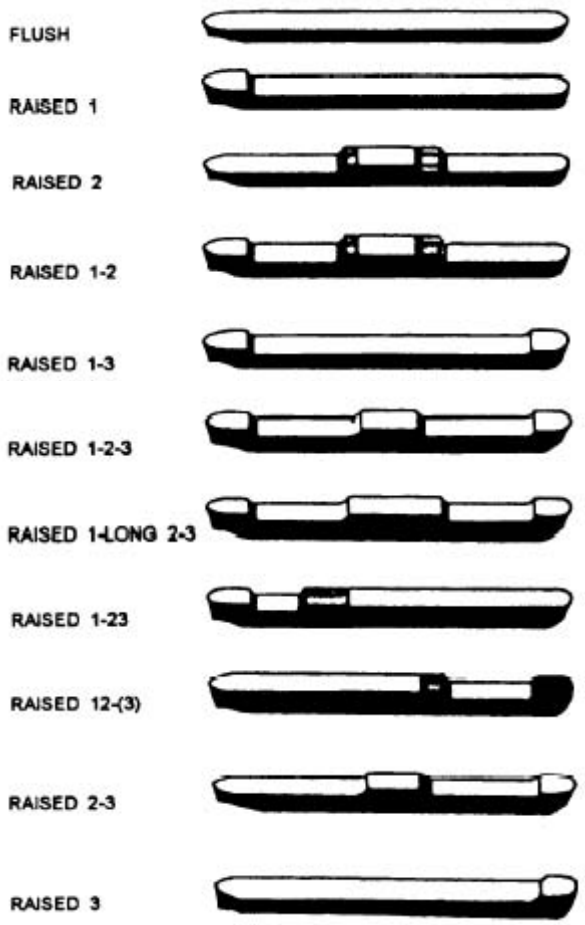


Figure 11-8: Variations and locations of raises.

Islands are numbered according to their position from bow to stern. For example, the hull type of a ship with an island at the bow is raised 1, and an island amidships is raised 2. A ship with an island at both the bow and amidships is a raised 1-2; a well between islands is represented by a dash. The common three-island, well-deck-type ship is a raised 1-2-3. Two islands may be combined to form a continuous deck from the bow to the after end of the superstructure. This is referred to as a raised 12. A few ships with this configuration also have a raise aft and is called a raised 12-3. On some ships with a raise astern, the deck extends into the amidships section. On these ships, the after raise is considered a raised 23. When the deck does not extend to the amidships section, it is a raised 2-3. Then there are ships that have an enclosed superstructure at the stern of the ship. The first two-thirds of the deck is flush, and the main deck is raised. Such ships are raised 3.

Figure 11-9: Differences between deckhouse and island.

Deckhouses are not raised. An island extends the full width of the ship's hull. Deckhouses are structures built on deck level but do not extend the full width of the ship. At times, the distinction between the deckhouse and the island is difficult to establish.

Bulwarks are not considered raises. A *bulwark* is the stake of shell plating that is above the weather deck and is designed to keep the deck dry and guard against losing deck cargo and personnel overboard. A bulwark may occasionally be difficult to distinguish from a raised island. A raise is generally from 2 to 3 meters high; a bulwark is generally about 1 meter high. Occasionally, a bulwark will be as high as a raise. It is then almost impossible to distinguish the bulwark from the raise unless there is an opening in the bulwark. This opening is a definite indication of a bulwark. A rail on top a raised section of the hull usually indicates a raise instead of an bulwark. Scuppers, or freeing ports, which permit rain and seawater to run off the deck, indicate a bulwark.

Bows and sterns can also assist in the identification of ships. For recognition purposes bows and sterns are grouped into three designs, although there are variations or modifications of most of them.

Bow types (Figure 11-10)

1. Straight plumb or vertical. The oldest type, it offers the most resistance to the sea.
2. Raking or sloping, and curved and raking. Angle varies greatly. Clipper or cable bows come within this group.
3. Maier. An outward curve, all rounded and not "sitting" on the water.

Stern Types (Figure 11-10)

1. Counter. The stern is hooked and curved inward.
2. Cruiser. The stern is butted and straight, rounding only at the bottom.
3. Spoon. The stern is angled greatly. A particular feature of German or Russian built ships.

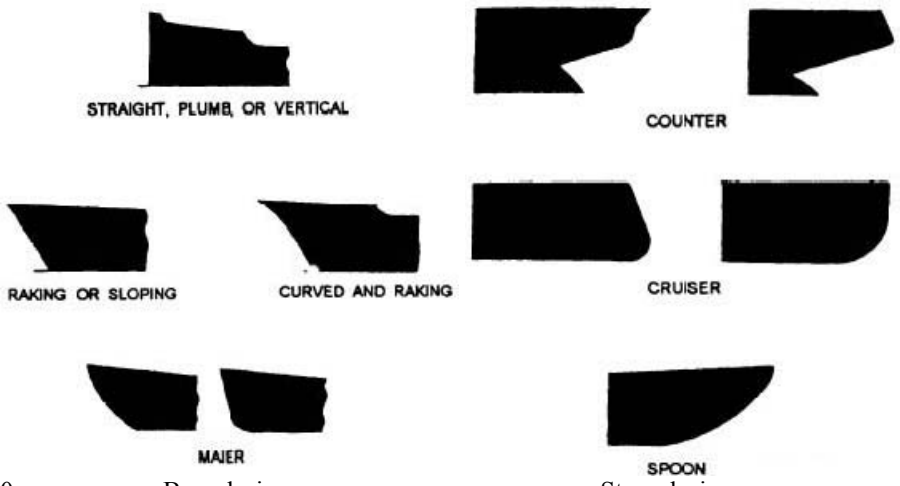


Figure 11-10 Bow designs Stern designs.

Sequence of Uprights

The coding of uprights (cranes, funnels, gantries, king posts, and masts) is the third step in identifying merchant ships. The vessel must be studied according to a definite plan, starting forward and working aft noting the prominent features in sequence, as listed below.

1. Cranes (C) – Cargo-handling devices; whole unit pivots about its base.
2. Funnels (F) – Engine exhaust.
3. Gantry (G) – Large crane extending width of ship; moves on rails.
4. Kingpost (K) – An upright with cargo-handling devices.
5. Masts (M) – A post that has no cargo-handling gear.

The presence of these verticals is indicated by the letters *C,* for crane; *F,* for funnel; *G* for gantry; *K,* for king post; and *M,* for mast as they are located on the ship, starting at the bow. For example, the upright sequence for the ship (Figure 11-11) would be coded MKKMMFM.

Figure 11-11: Coding of uprights.

CHAPTER 12

AIRCRAFT RECOGNITION AND IDENTIFICATION

The different types of aircraft presently in use by military and naval powers are so numerous that only an expert can be expected to know and recognize them all. Bombers, fighters, fighter-bombers, and reconnaissance planes may be propeller-driven or jet, single- or multi-engine, straight-wing, delta-wing, swept-wing, or combinations of these, and various other descriptions.

Instruction in identification of aircraft should consist primarily of classroom lectures, slides, and motion pictures, together with on-the-job instruction when aircraft are operating in the ship's vicinity. References on recognition and identification are available from many sources, but probably the most popular is *Jane's All the World's Aircraft*.

With each advance in aeronautical engineering and design, aircraft are able to fly higher and faster. High-speed characteristics tend to make aircraft of different nations look very much alike, thus increasing the difficulty of in-flight identification. For the foregoing reasons, shipboard recognition training should stress ability to recognize aircraft likely to be seen in a local rather than a worldwide area of deployment. Determination of the friendly or unfriendly character of aircraft is a prime function of the ship's installed IFF system, which can be used to interrogate aircraft long before the craft are within visual range. Exact names and designations may prove unimportant but personnel should be taught to distinguish between the various classes of aircraft—bombers, fighters, reconnaissance, transport, pilotless, and so forth.

Airplanes, like automobiles and people, do differ, and their underlying differences can be detected. Basic aircraft recognition features follow:

1. Fuselage. The fuselage is the main body of the aircraft where all equipments required for control are located and to which the wings and tail units are attached. The foremost part of the fuselage is the nose. Various types of noses and fuselages are shown (Figure 12-1 and 12-2).

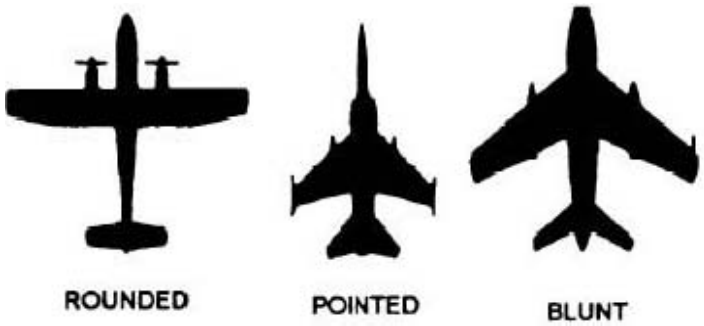


Figure 12-1: Nose shapes.

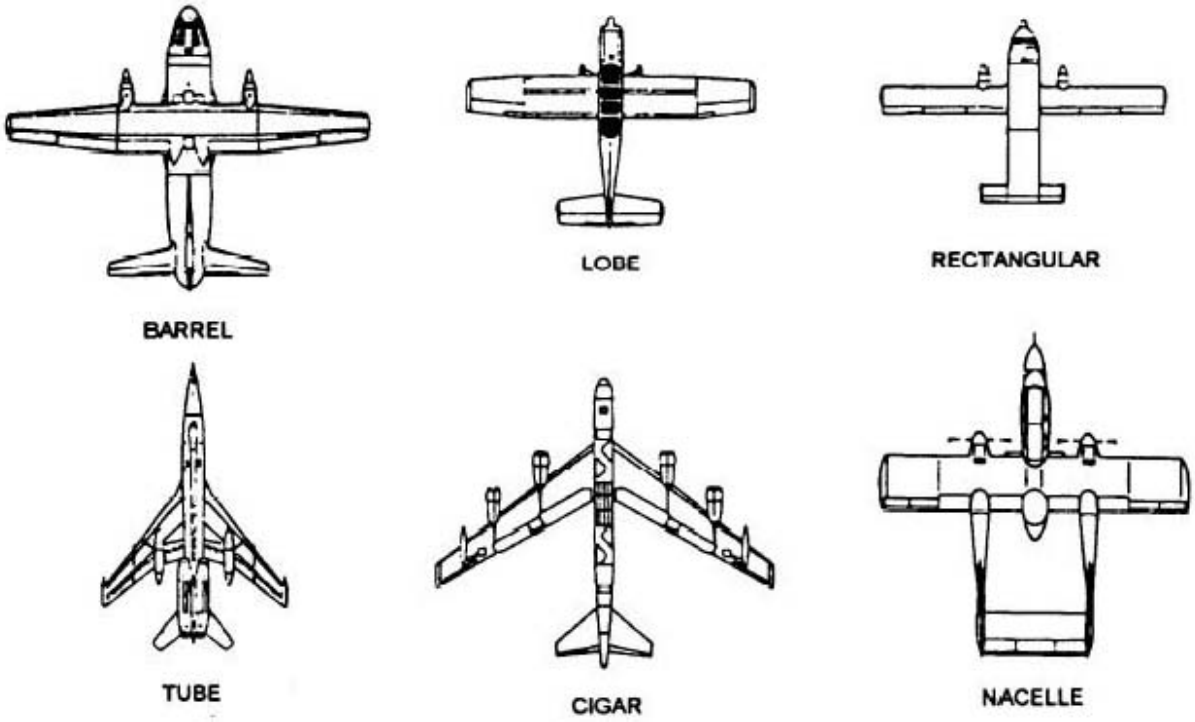


Figure 12-2: Fuselage shapes.

2. Wing. The main supporting surface, or airfoils, of an airplane are the wings. Figure 12-3 shows the most common wing types and positions. The type and degree of wing dihedral angles are shown in Figure 12-4.

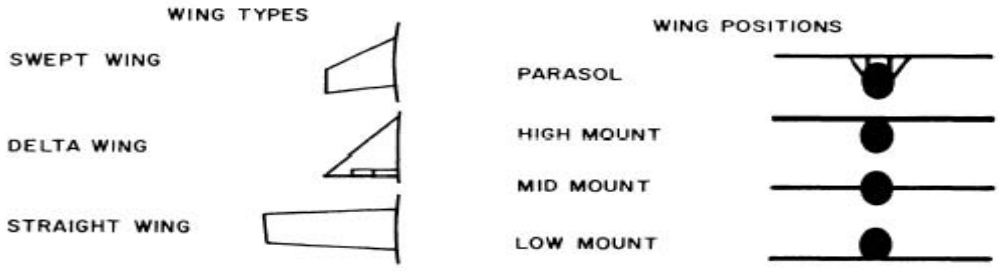


Figure 12-3: Wing types and positions.

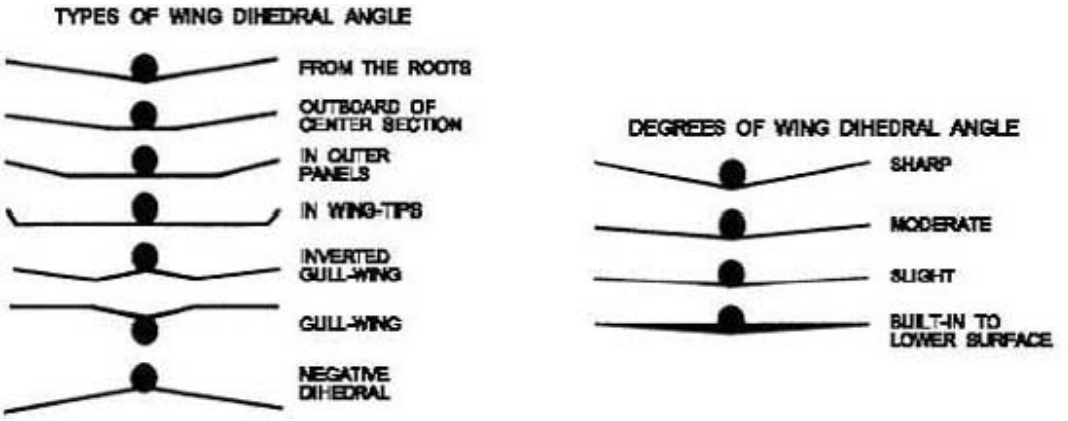


Figure 12-4: Wing dihedral angle.

3. Tail. The tail is the after part of an aircraft and generally consists of stabilizers, elevators, fin, and rudder. See Figures 12-5 and 12-6 for the various types of horizontal and vertical stabilizers of the tail assembly. Figure 12-7 shows the different positions of the horizontal stabilizer.

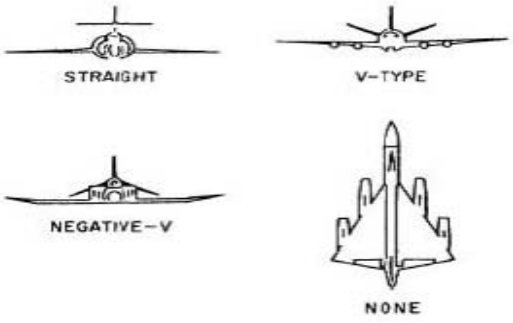


Figure 12-5: Horizontal stabilizers

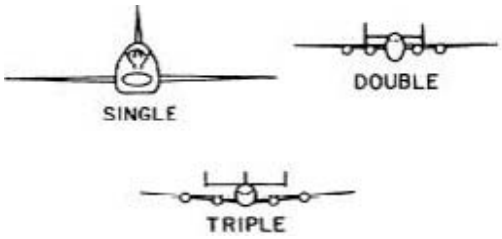


Figure 12-6: Vertical stabilizers

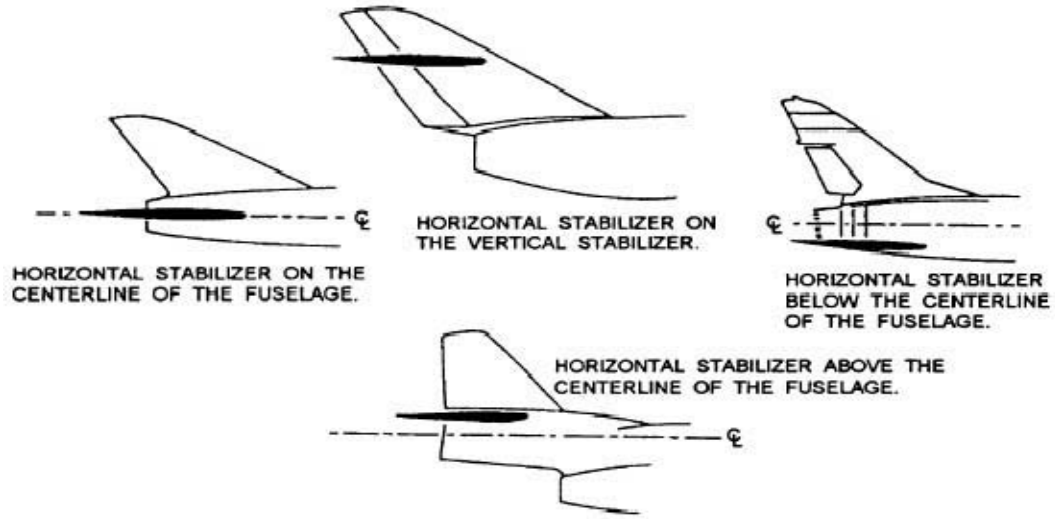


Figure 12-7: Position of the horizontal stabilizer.

The F-117A Nighthawk (Figure 12-8) is the world's first operational aircraft designed to exploit low-observable stealth technology. The unique design of the single-seat F-117A

provides exceptional combat capabilities. About the size of an F-15 Eagle, the twin-engine aircraft is powered by two General Electric F404 turbofan engines and has quadruple redundant fly-by-wire flight controls. Air refuelable, it supports worldwide commitments and adds to the deterrent strength of the U.S. military forces. The F-117A can employ a variety of weapons and is equipped with sophisticated navigation and attack systems integrated into a state-of-the-art digital avionics suite that increases mission effectiveness and reduces pilot workload. Detailed planning for missions into highly defended target areas is accomplished by an automated mission planning system developed, specifically, to take advantage of the unique capabilities of the F-117A.

The B-2 Spirit (Figure 12-9) is a multi-role bomber capable of delivering both conventional and nuclear munitions. The B-2 provides the penetrating flexibility and effectiveness inherent in manned bombers. Its low-observable, or "stealth," characteristics give it the unique ability to penetrate an enemy's most sophisticated defenses and threaten its most valued, and heavily defended, targets. Its unrefueled range is approximately 6,000 nautical miles (9,600 kilometers). The B-2's low observability is derived from a combination of reduced infrared, acoustic, electromagnetic, visual and radar signatures. These signatures make it difficult for the sophisticated defensive systems to detect, track and engage the B-2. Many aspects of the low-observability process remain classified; however, the B-2's composite materials, special coatings and flying-wing design all contribute to its "stealthiness." The B-2 has a crew of two pilots, an aircraft commander in the left seat and mission commander in the right.

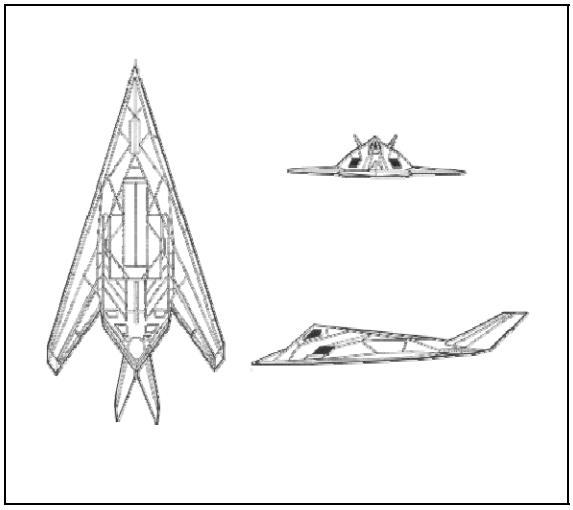


Figure 12-8: F-117A Stealth Bomber

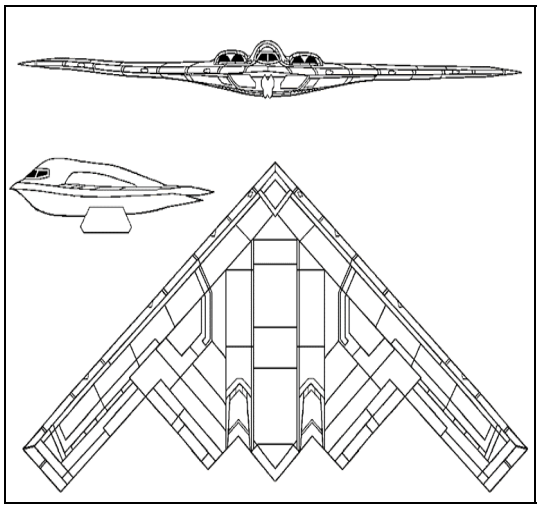


Figure 12-9: B-2 Stealth Bomber

Helicopters are among the most easily recognizable military equipment. The primary recognition features used in helicopter identification are the rotor system and the number of rotor blades (never less than two). After determining the type of rotor system and the number of blades, you should refer to the appropriate aircraft book for final determination of the model. *Jane's All the World's Aircraft* is a good source.

Other factors that will assist you in helicopter identification are the shapes of the fuselage and tail boom and the presence or absence of wings (Figure 12-10).

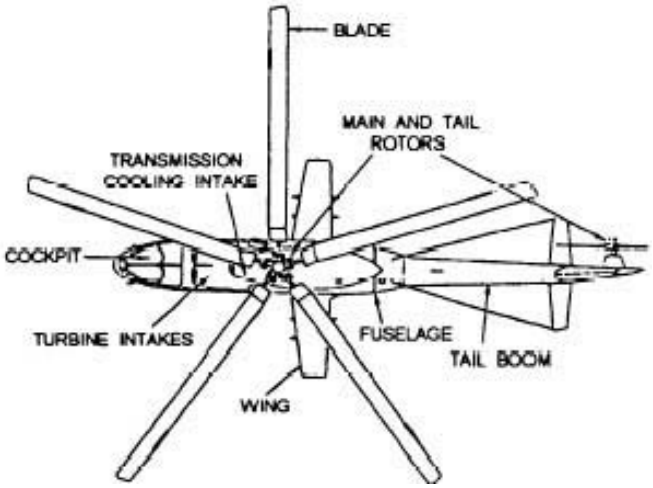


Figure 12-10: Helo recognition features.

CHAPTER 13

MARINE SPECIES AWARENESS

The Department of the Navy (DoN) is required by the National Environmental Policy Act (NEPA) and Presidential Executive Order 12114 "Environmental Effects Abroad of Major Federal Actions" to consider the potential environmental impacts of major federal actions on the environment. Therefore, the Department of the Navy reviews possible environmental impacts from conducting at-sea training. The Executive Order furthers the purpose of the National Environmental Policy Act consistent with the foreign policy and national security policy of the United States. The Executive Order also directs that all federal agencies are responsible for their impacts on global environmental resources and must take measures to avoid damaging these resources. The Navy is also bound to adhere to the Endangered Species Act (ESA) and the Marine Mammal Protection Act (MMPA), which are federal laws that protect species that are federally listed as endangered or threatened and all marine mammals, respectively.

The Navy conducts many events that can affect the environment, including live weapon firing at sea. These events are part of a training plan to ensure the U.S. Military is the best trained, prepared, and equipped military force in the world. Sailors participating in these at-sea events must be ever vigilant for sea life or signs of sea life that may be encountered during the operation, and report the presence of such to responsible command personnel in order to avoid any negative consequences of interaction.

The Lookout Training Handbook will prepare watchstanders to be observant of the at-sea environment, be aware of the serious nature of the Lookout's duties, and the direct relationship to the Commanding Officer's responsibility to operate the ship in accordance with federal regulations.

NOTICE: A recently developed video training tool entitled “Marine Species Awareness Training” will soon be released and posted on Navy Knowledge Online. You can locate it on the Boatswain’s Mate (BM) Communities of Practice page within the Center for Surface Combat Systems Learning Center homepage. The viewing of this training is mandatory for all Navigation and CS/CIC Watch Team members.

MARINE SPECIES TERMINOLOGY

1. Marine Mammal Protection Act (MMPA) - The MMPA established a moratorium, with certain exceptions, on the taking of marine mammals in U.S. waters and by U.S. citizens on the high seas, and on the importing of marine mammals and marine mammal products into the United States. The MMPA defines taking as “harassing, hunting, capturing, killing, or attempting to harass, hunt, capture, or kill any marine mammal” (16 U.S.C. 1312[13]). The Marine Mammal Protection Act of 1972 (MMPA) was most recently reauthorized in 1994. In passing the MMPA in 1972, Congress found that: Certain

species and population stocks of marine mammals are, or may be, in danger of extinction or depletion as a result of man's activities; such species and population stocks should not be permitted to diminish beyond the point at which they cease to be a significant functioning element in the ecosystem of which they are a part, and, consistent with this major objective, they should not be permitted to diminish below their optimum sustainable population level; measures should be taken immediately to replenish any species or population stock which has diminished below its optimum sustainable level; there is inadequate knowledge of the ecology and population dynamics of such marine mammals and of the factors which bear upon their ability to reproduce themselves successfully; and marine mammals have proven themselves to be resources of great international significance, aesthetic and recreational as well as economic.

2. Endangered Species Act (ESA) - The ESA provides for the conservation of species which are in danger of extinction throughout all, or a significant portion of, their range and the conservation of the ecosystems on which they depend. "Species" is defined by the Act to mean a species, a subspecies, or, for vertebrates only, a distinct population. Section 7 of the ESA requires all Federal agencies to use their authorities to conduct conservation programs and to consult with National Marine Fisheries Service (NMFS) or Fish and Wildlife Service (FWS) concerning the potential effects of their actions on any species listed under the ESA. Critical habitats necessary for the continued survival of species are designated.

3. Coral Reefs - Executive Order 13089. All Federal agencies whose actions may affect U.S. coral reef ecosystems shall:

a. identify their actions that may affect U.S. coral reef ecosystems;
b. utilize their programs and authorities to protect and enhance the conditions of such ecosystems
c. to the extent permitted by law, ensure that any actions they authorize, fund, or carry out will not degrade the conditions of such ecosystems.

4. Zone of influence - The zone of influence (ZOI) refers to the distance from a sound source within which a marine mammal or sea turtle may experience harassment. For example, the ZOI for a single 5-inch round is about 641 yards.

5. Protective measures - Marine resource protective measures have been developed to ensure operational capability and flexibility while maximizing navy’s protection of, and avoidance of potential effects to, important marine resources. Protective measures articulated by the Protective Measures Assessment Protocol (PMAP) shall form the minimum standard protective measures suitable for use for activities that do not have specific environmental protective measures in place.

6. Avoidance – While whales are highly maneuverable and generally detectable (in daylight) at long range by onboard watch-standers, collisions do occur. This seems to be more common in species with surface feeding or “logging” behavior (floating nearly motionless at the surface). While sea turtles may be migrating through an OPAREA

seasonally, they often attempt to avoid oncoming boats by diving, turning, or swimming away. Ships are expected to operate at safe speeds during exercises and have posted lookouts. If whales or sea turtles are detected in the vicinity of the exercise, Navy vessels will increase vigilance and take reasonable and practicable actions to avoid collisions and activities that might result in close interaction between Navy assets and protected cetaceans and sea turtles. Actions may include changing speed and/or direction as safety and environmental factors permit. Naval vessels would avoid approaching any whale head on, and would maneuver to keep at least 1,500 ft away from any observed whale.

ENVIRONMENTAL PROTECTIVE MEASURES FAMILIARIZATION

Command responsibilities - Commands shall comply with applicable statutes, regulations, and executive orders and will strive to protect the environment, prevent pollution, and protect natural, historic, and cultural resources. Environmental compliance is a command responsibility and applicable throughout the chain of command. Ship requirements when conducting training and operations that may be hazardous to marine mammals and sea turtles are defined by the following terms:

1. Protective Measures Assessment Protocol (PMAP) - PMAP is an IT-21 certified CDROM based tool that provides commanding officers with environmental situational awareness and protective measures to minimize potential impacts on marine resources. These procedures are to be implemented during routine Unit Level Training (ULT) and exercises. These standardized operating procedures are protective measures that are dependent on the type of training or exercise being performed and the geographic location where the exercise is taking place.

2. PMAP briefs – The commanding officer will receive a situational awareness brief describing the required protective measures detailed by PMAP prior to executing any of the CNO designated exercises, which include:

a. Surface to surface GUNEX
b. Surface to air GUNEX
c. Air to surface GUNEX
d. TORPEX
e. Small arms training
f. Surface to air MISSILEX
g. Air to air MISSILEX
h. Air to surface MISSILEX
i. Practice bombing (explosive)
j. Practice bombing (non-explosive)
k. Mine countermeasures (mechanical mine avoidance/mine sweeping)
l. Mine countermeasures (acoustic mine avoidance/mine sweeping)
m. Mine countermeasures (explosive)
n. Anchor operations (training only)
o. Ship and submarine mid-frequency active sonar usage (training only)
p. Explosive Echo Ranging (EER) training operations
q. Helicopter dipping sonar training operations

3. PMAP reports – These reports are generated by the PMAP application based on event type and location. The reports will be distributed to applicable watch stations for ready use throughout the event to ensure Protective Measure compliance. The ships PMAP Officer will maintain a copy of each PMAP report for exercises that were conducted. PMAP reports are to be retained onboard for two contiguous years. Per Navy message 311914ZMAR06, PMAP tool is available to download or request a mailed copy via HTTPS://GEONET.SPAWAR.NAVY.MIL/PMAP.

TOOLS TO HELP IN SPECIES RECOGNITION

Identification of marine mammal and sea turtle species at sea is sometimes very difficult even for professional whale scientists. The Navy has developed the "Whale Identification Wheel." The Whale Wheel is intended to be an aid for whale identification as well as a tool to improve overall marine mammal awareness. It includes descriptors for identification of some of the more common whale species as well as beaked whales, which may be particularly sensitive to noise from Navy operations. The Whale Identification Wheel is Navy publication number OPNAV P-45-118-8-01. Having a good field guide, a whale wheel, a camera, and a pad and paper in hand to take notes and make sketches will be very useful as you try to identify the different marine animals at sea.

MARINE ANIMALS AND HABITATS

The following is a list of animals that deserve special attention by species and typical habitats where they can be found.

Sea Turtles - All sea turtles are listed as threatened or endangered under the ESA. Sea turtles are not restricted to tropical or warm-temperate waters and can be found as far north as Newfoundland on the east coast and Alaska on the west coast. Immature turtles are often found in sagassum rafts and kelp mats. Most sea turtle feeding and nesting areas are found in tropical waters, though they also nest on sandy beaches along the coasts of the Carolinas, Georgia, Florida, Texas, and California. They will migrate long distances from their feeding grounds to their nesting beaches. The hatchlings usually hatch at night and make their journey to the sea. Juvenile sea turtles of most species migrate to bays, estuaries, and shallow coastal waters but can be found in deeper offshore waters. Adults are often found on rocky ledges and reefs in shallow coastal waters, but they are also found in deeper offshore waters (Figure 13-1).

Cetaceans – Whales, dolphins, and porpoises all belong to the same taxonomic order called cetacea. All cetaceans are protected under the MMPA, and most large whale species are listed as endangered under the ESA. Cetaceans can be found virtually in every ocean of the world. Depending on the species, certain habitats are better than others for marine animals. Coastal areas, estuary openings, areas with high bottom relief such as underwater canyons or seamounts, edges of the continental shelf, and regions with marked dynamics such as temperature gradients, regions of high primary productivity or upwelling, and areas of strong tidal runs can all be good habitat for marine species. Extra vigilance should be exercised in these areas.

Whales are divided into two suborders: Baleen (Mysticete), and Toothed (Odontocete) (Figure 13-2).

1. Baleen - Baleen whales have baleen plates instead of teeth, which they use to filter small particles of food. Baleen is a sieve-like device made of keratin (the same substance that fingernails and hair are made of). Baleen is a series of stiff, flexible material that hang from the upper jaw. The inside of the baleen is edged with hairy plates that filter krill (tiny crustaceans), plankton (small animals and plants that float with ocean currents), and small fish. They are larger than the toothed whales and have two blowholes.

a. Right Whales - North Atlantic right whales receive special attention because they are critically endangered, with only around 300 left in existence. They seem to be particularly susceptible to vessel collisions – probably because they spend a lot of time at the surface, don't seem to hear or get out of the path of oncoming vessels, and use the same nearshore habitats where most of the vessel traffic along the East Coast occurs. Like most baleen whales, Right whales are seasonally migratory. They inhabit colder waters for feeding in the summer, then migrate to warmer waters for breeding and calving in the winter. Most sightings are concentrated within five high-use areas: coastal waters of the southeastern U.S. (Georgia and Florida), Cape Cod and Massachusetts bays, the Great South Channel, the Bay of Fundy, and the Nova Scotian Shelf. Three of these areas are designated as right whale critical habitats: the calving area off the coast of Georgia and Florida, Cape Cod Bay, and the Great South Channel. Right whales are known to migrate along the East Coast in the spring and fall and are most often sighted within 30nm of shore and in waters less than 25 fathoms deep while migrating through the mid-Atlantic area. While they are known to venture into deep offshore waters, this seems to be rare.

b. Gray Whales - There are two populations of Gray whales: the Eastern North Pacific population and the Western North Pacific population, also known as the Korean population. The Eastern North Pacific population is found along the west coast of the North American continent. The Western North Pacific population is found from the Sea of Okhotsk in Russia through the Sea of Japan and the South China Sea. They are usually found in coastal waters and when migrating usually pass within 1 1/3 nmi of the shoreline.

Rorqual – One family of Baleen whales is the Rorquals. This family of whales includes the Blue, Bryde's, Fin, Minke, Sei, and Humpback whales. Rorquals have 25-100 parallel, pleated throat grooves (ventral grooves) that extend from the throat to the flippers. When these whales eat, these grooves expand, allowing them to take huge gulps of water, forcing it through their short baleen to filter out tiny organisms during filter feeding. Rorquals have a small dorsal fin in the rear third of their back. It is often difficult to distinguish them by species at sea, particularly those that share the long, sleek, and streamlined body type – the blue, Bryde's, fin, minke and sei whales .

a. Humpback Whales - Humpback whales are found in all of the world's oceans. They generally are found during the summer on high-latitude feeding grounds and during the winter in the tropics around islands, over shallow banks, and along continental coasts, where calving occurs. Most humpback whale sightings are in nearshore and continental shelf waters. It is likely that at least some part of the migration is through the open ocean

b. Fin Whales - Fin whales are found in all oceans of the world in both continental shelf and deep waters. They are believed to follow the typical baleen whale migratory pattern, spending summer months at feeding grounds in the northern latitudes and moving south to tropical and sub-tropical waters for mating and calving during winter months.

c. Sei Whales - Sei whales are found in all oceans, but are more restricted to mid-latitude temperate waters than other rorquals. Like other rorquals, they undertake long migrations during spring and fall. Sei whales appear to prefer regions of steep bathymetric relief, such as the continental shelf break, canyons, or basins situated between banks and ledges. .

d. Minke Whales - Minke whales are found in polar, temperate, and tropical waters. They can be seen offshore but are more often seen in coastal and inshore areas.

e. Blue Whales - Blue whales are found from the ice edge to the subtropics. They are primarily found in deeper, offshore waters and are rare in shallower shelf waters.

2. Toothed – These whales have teeth and a single blowhole. The number of teeth varies by species; it ranges from 2 (in some beaked whales) to 250 (some dolphins). They are smaller than baleen whales. Many species live in pods. Toothed whales have well developed echolocation that they use to locate food (fish, squid, marine mammals, etc.) and other whales. Toothed whales have asymmetrical skulls.

a. Sperm Whales - Sperm whales are found from tropical to polar waters in all oceans of the world. They show a strong preference for deep waters and are most often sighted in waters with bottom depths greater than 550 fathoms. They are known to make deep dives lasting as long as an hour.

b. Pilot Whales - In general, pilot whales are found worldwide, from subpolar to tropical waters in offshore areas and some coastal waters.

c. Beaked Whales - Beaked whales typically inhabit deep ocean waters (>1100 fathoms) or continental slopes (100 to 1100 fathoms) and are rarely observed in coastal areas. Beaked whales also appear to aggregate around islands where there is steep bathymetry and essentially no shelf. Beaked whales are very deep divers, some staying submerged for 45 min or longer, and are difficult to sight

because they spend so little time at the surface and are known to dive to avoid vessels.

d. Killer whales - This is a cosmopolitan species found throughout all oceans and contiguous seas, from equatorial regions to the polar pack-ice zones. Though found in tropical waters and the open ocean, killer whales as a species are most numerous in coastal waters and at higher latitudes.

e. Dolphins and porpoises– Dolphins and porpoises can be found in almost all seas and oceans in the world. There are many different species, which use a wide variety of habitats.

Manatees - Sightings of manatees are primarily limited to warm freshwater, estuarine, and extremely near shore coastal waters. Shallow grass beds with ready access to deep channels are preferred feeding areas in coastal and riverine habitats. Manatees often use secluded canals, creeks, embayments, and lagoons, particularly near the mouths of coastal rivers and sloughs, for feeding, resting, mating, and calving. Estuarine and brackish waters and natural and artificial freshwater sources are sought by manatees.

Pinnipeds – (Seals, Sea Lions and Walrus). The word pinnipedia translates from Latin as "fin foot," referring to their often large fin-like flippers. All pinnipeds must come ashore to breed, give birth and nurse their young, though some species are at sea for several months at a time while others return to the shore every day. Seals include elephant seals, several species of ice seals (some are found in fresh water lakes) and the harbor seal of temperate coastlines. Sea Lions, are found in temperate colder waters and are associated in tropical latitudes with cold water upwelling currents. Walruses are found in both Pacific and Atlantic Arctic ice pack areas.

Sea otters - There are three species of sea otters, two of which are located within the United States - the Southern or California sea otter and the Northern sea otter. The Northern sea otter is found in the waters off Washington, Alaska, and Canada. Sea otters usually stay close to shore and often are found in groups or families. Sea otters feed in shallow shoreline areas.

Coral reefs - Coral reefs are the most complex, species-rich and productive marine ecosystems. Reefs cover 0.2% of the ocean’s area and yet they provide home to one-third of all marine fish species and tens of thousands of other species. Coral reefs provide essential fish habitat, support endangered and threatened species, and harbor protected marine mammals and turtles. Coral reef fisheries yield 6 million metric tons of fish catch annually, with one quarter of the total worldwide fish production in developing countries with coral reefs. On U.S. reefs, over 500 commercially valuable coral reef fishes and invertebrate are under federal management, including four candidate ESA species. Coral reefs provide critical protection to coastlines from storm damage, erosion and flooding by reducing wave action. Coral reefs are crucial sources of income and resources through their role in tourism, fisheries, building materials and as an important source of pharmaceutical compounds.

OBSERVATION CLUES TO MARINE MAMMAL PRESENCE AND THE LIKELIHOOD OF DANGER

1. Dorsal fin orientation – The dorsal fin is the fin on the dorsal side or "back" of the animal. Noting this feature is important in determining what direction the animal is headed. Note which way the tip is pointing. Since it points in the direction of the tail, you can be reasonably certain the animal(s) are moving in the opposite directionn. This is important for you to note so that you can determine if the animal is traveling toward or away from the ship or target area. Since many marine mammals travel in groups or "pods," there may be more that one present, even if you only see one dorsal fin. The dorsal fin shape, size, and placement on the animal's body are all important to note if you are trying to identify species.

2. Fluke - The fluke refers to the tail of the whale, porpoise, or dolphin. Fluking is the display of the tail as a whale goes under for a dive. The orientation of the fluke can give you a clue whether the animal is going down for a long deep dive, a shallow dive, or if the whale is engaged in some sort of social behavior – such as lobtailing. If the fluke is held straight up when going down, the whale is probably down for a long dive. Because whales generally stay down from 6 to 10 minutes and some even as long as an hour, you may not see them again. Whether a whale lifts its flukes high in the air before a dive or at all, and the shape of the flukes could also help you identify which species it is. Sperm whales and beaked whales dive for long periods of time and may make a series of short dives or spend time at the surface before submerging for an hour or more. Another sign of possible whale presence is a "flukeprint" on the surface of the water. This is a calm, circular slick, which may look like an eddy current, on the surface. This is the result of the downward thrust of the whale's tail. This flukeprint will often be visible on the surface of the water for 10 to 15 seconds after the animal submerges – so if you see something like this, you will want to stay very alert and on the lookout for when the whale resurfaces. Also, in some cases you can follow the fluke prints to see which direction the animal is traveling underwater.

3. Blow/Spout - Since all marine mammals need air to breath, they must come to the surface to exhale or "blow" which is done through the blow hole at the top of the head. The blow is the water vapor that is exhaled from the whales' blowhole(s). You will often see the blow long before the animal itself, because it is shot into the air and can be seen from a long distance away in the right weather conditions. This is an important point to remember when on lookout. It may look like a gradual puff of smoke, a small cloud, or a flash of white just at the surface of the water and could be your first indication a whale is present. Occasionally, you can hear the blow before you see the whale – it sounds just like a loud exhale. If you see a series of blows close together, the animal may be getting ready for a long dive. Take care to note if the whale did this and then "fluked up," which would indicate a long dive. The blow shape, frequency, and tilt are important characteristics to note if you are trying to identify the species.

4. Behavior - Some behaviors are demonstrated by one or two species, such as the jumps made by Humpback whales. It is important to note these behaviors since they may enable you to later identify the marine mammal species encountered (Figure 13-3).

a. Diving - Did the whale flip its tail up ("fluke up") when it dove? Whales usually only fluke up before a deep dive. So, if you see a whale a couple times at the surface, maybe for a series of blows, then it flukes up, that almost always means it is going for a deep dive and will be down for 6 to 10 minutes and sometimes even as long as an hour. The whale won't always continue going in the same direction that it is when diving, but it is very likely that it will.

b. Spyhopping - is where the whale raises its head just out of the water while vertical, seemingly to "take a look" and then just sinks back down without making much of a splash.

c. Logging - Logging is when a whale or pod of whales just float or move slowly at the surface. This activity seems to be a form of rest or sleep for whales. One key thing to note is that when logging, whales may be unaware of ships moving in their direction and will generally not get out of the way. So, it is very important to steer clear of logging whales and if possible, move around in the direction of the tail. Fortunately, a pod of logging whales will be relatively easy to see in the right sighting conditions.

d. Breaching – Breaching typically involves a whale exploding through the surface, twisting in the air, and then returning to the water with a loud splash.

e. Flipper Slapping – This is when a whale lies on its back or side and slaps its pectoral fin (the fins on the side of the animal, also known as flippers) on the surface of the water.

f. Skimfeeding – This is when a whale moves along the surface of the water with its mouth open, "skimming" the water and filtering the food out with the baleen plates.

g. Porpoising – This refers to the way smaller whales and dolphins may leap clear of the water when traveling at a rapid pace.

NAVY REQUIREMENTS FOR REPORTING INTERACTION WITH MARINE MAMMALS AND SEA TURTLES

1. Strikes - All confirmed or unconfirmed ship strikes of marine mammals must be reported up the chain of command. See the OPNAV instruction 3100.6H for amplifying guidance and reporting requirements.

2. Dead or injured animals - Certain sightings of dead or injured marine mammals must also be reported up the chain of command. OPNAV instruction 3100.6H Appendix C lists more details on what types if incidents must be reported and how to report these incidents. For example, any Navy unit that becomes aware of the following types of events must submit a report:

a) Any stranding that involves a Northern Right Whale or Beaked Whale.

b) Any other stranding that is reported by a Navy ship or aircraft in which the unit knows that naval operations, exercises or training involving active sonar or weapons impact have occurred within 50 nautical miles of the stranding and within three days prior to the sighting.

c) Stranding for which a request for information on naval operations has been received from Congress, National Marine Fisheries Service (NMFS), or the media.

d) Stranding for which naval operations have been implicated, or are likely to be implicated, as causing the event.

e) Claims of unusual marine mammal behavior reported in the media, or by National Marine Fisheries Service, a private party or non-governmental entity in which naval operations, exercises or training have been implicated.

3. Other interactions - Navy vessels and aircraft are also encouraged to report other direct interactions with whales and sea turtles, such as instances where naval units assist animals entangled in nets.

SUMMARY

An alert, proficient lookout team is a vital asset to the safety of ship and crew. Many nautical disasters have been avoided because of a vigilant lookout; many have occurred because there was no proper lookout. You can clearly see how important the lookout is as part of the ship's operating team

Sea Turtle Identification

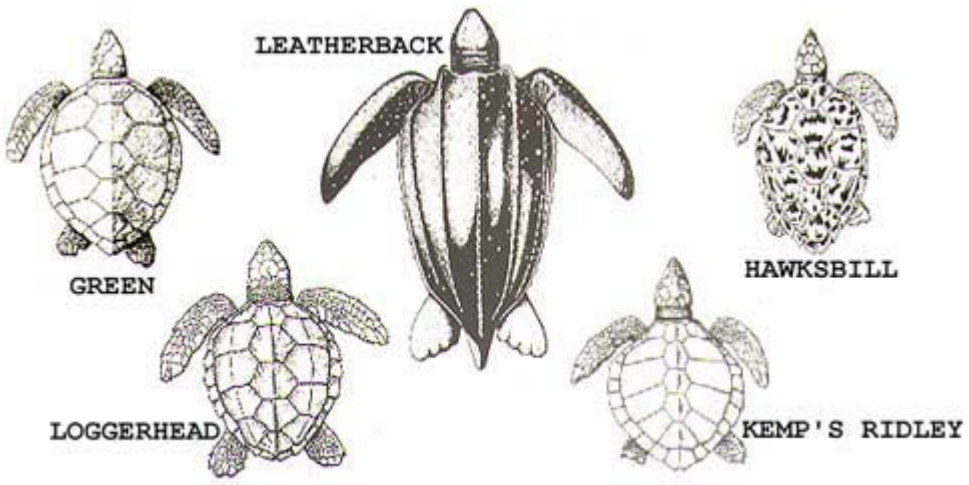
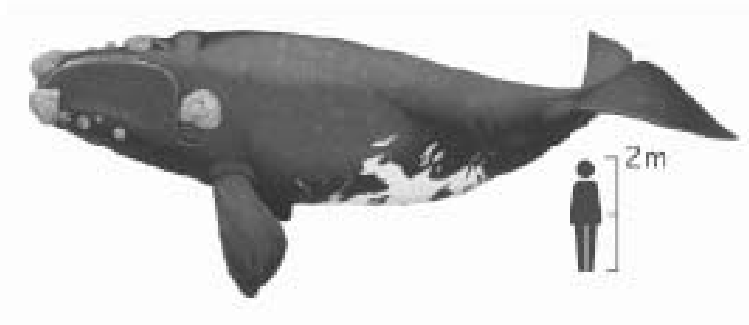


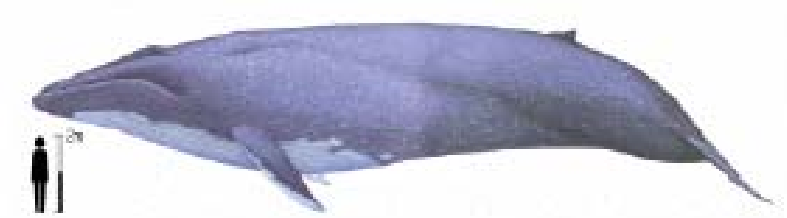
Figure 13-1: Species of Sea Turtles

Whale Identification



Right Whale (Baleen)

Gray Whale (Baleen)

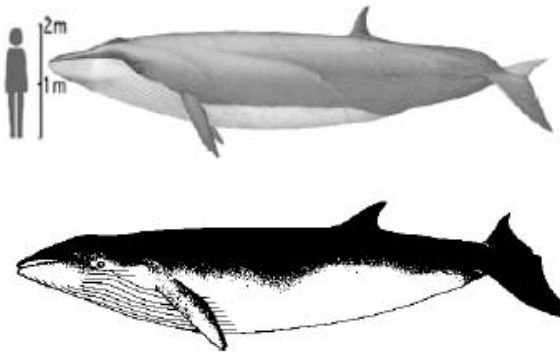


Humpback Whale (Rorqual Baleen)

Fin Whales (Rorqual Baleen)

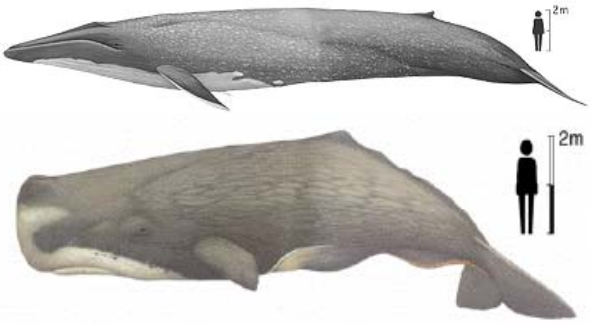
Figure 13-2: Species of Whales

Whale Identification (Continued)



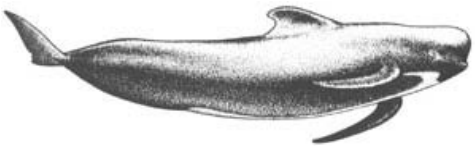
Sei Whale (Rorqual Baleen)

Minke Whale (Rorqual Baleen)



Blue Whale (Rorqual Baleen)

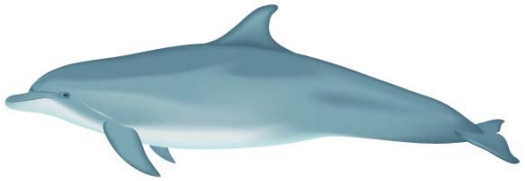
Sperm Whale (Toothed)



Pilot Whale (Toothed)

Beaked Whale (Toothed)

Harbor Porpoise (Toothed)



Dolphin (Toothed)

Figure 13-2: Species of Whales

Whale Observations and Behavior

Spouts

Spyhopping

Figure 13-3: Observations and Behaviors

Angled Spouts

Fluke

Figure 13-3: Observations and Behaviors