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Lookout Training Handbook

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Although the words “he”, “him,” and “his” are used sparingly in this manual to enhance communication, they are not intended to be gender driven nor to affront or discriminate against anyone reading this material.

PREFACE

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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, your eyes are the eyes of the ship, and on your alertness and skill rest 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 hearing 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. When the required number of people is available in peacetime—and always in wartime—three basic types of lookout watches are established. They are (1) surface lookouts who search from the ship to the horizon, (2) low-sky lookouts who search from the horizon to 5° above it, and (3) high-sky lookouts who search from the horizon to the zenith (directly overhead). Additionally, several people may be assigned to each search, each person being responsible for a specified sector. Adjacent sectors have about a 10° overlap, so no area will go unsearched.

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 1).

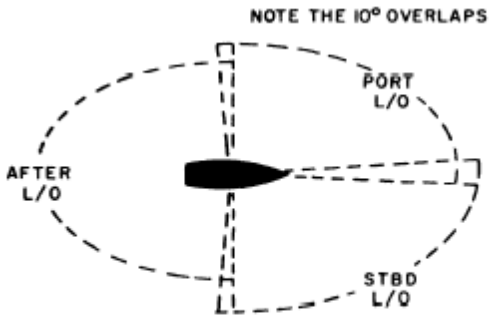

Figure 1.—Sectors assigned.

In addition to reporting all objects behind the ship, the after lookout is responsible for throwing overboard a lifebuoy 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. 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 fog lookout, is stationed as far forward in the ship as possible during fog or other conditions of poor visibility. The fog lookout watch consists of two people. One person wears soundpowered (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.

4. Handle 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 fog, rain, snow, and so forth.

Many electronic devices are now in use for detecting and locating the enemy and as aids in navigating. These delicate instruments, however, can malfunction. They are not infallible. 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 of one or more human beings.

CHAPTER 3

LOOKOUT EQUIPMENT

Proper equipment for a lookout includes soundpowered (S/P) telephones, binoculars, binocular filters, sunglasses, dark adaptation 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 soundpowered 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.

Binoculars

The most commonly used optical equipment is a set of binoculars (figure 2). 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.

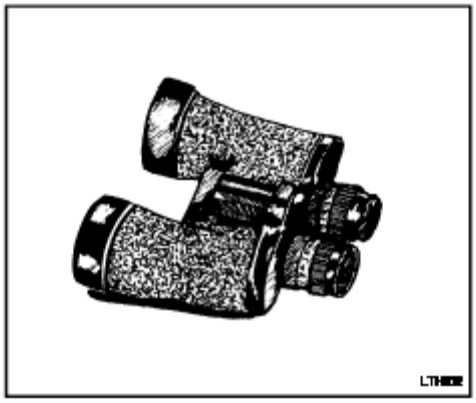

Figure 2.—7 x 50 binoculars.

ADJUSTMENTS

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, 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, 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.—Proper IPD setting.

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

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 when wearing them to prevent their banging against solid objects. 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, or your sleeve or shirttail should not be used, as they might 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. (See figure 4.)

Figure 4.—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. (See figure 5.) 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.

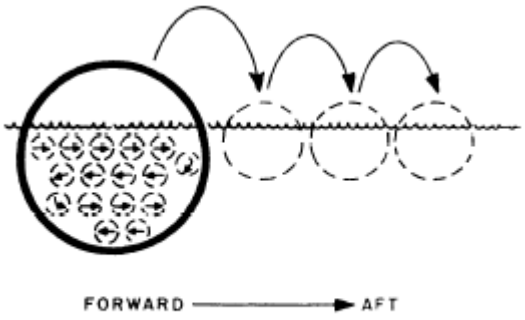

Figure 5.—Surface searching.

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. (See figure 6.) When the zenith is reached, rest your eyes by blinking them for a few seconds, then start over.

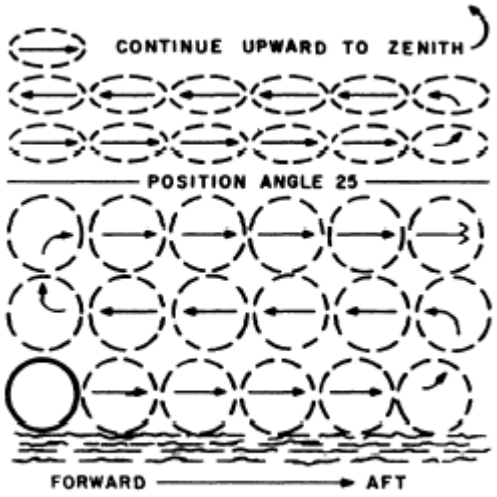

Figure 6.—Sky searching.

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 7 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.

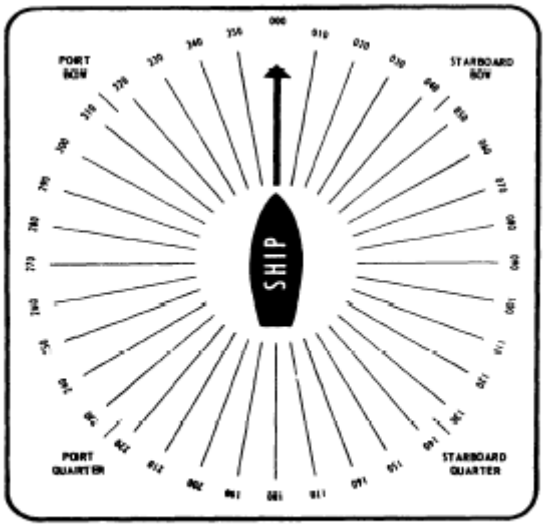

Figure 7.—Relative bearings.

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 8 approaches the ship, the position angle increases. Inform all stations when the angle changes more than 20°. Use the aids shown in figure 9 to help you more accurately determine an aircraft's position angle.

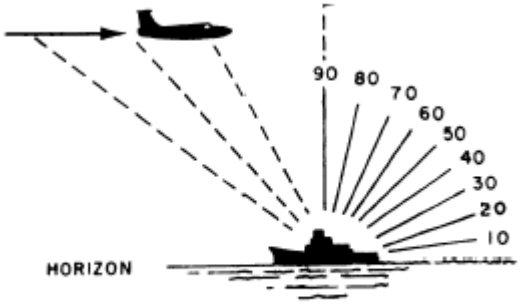

Figure 8.—Position angle.

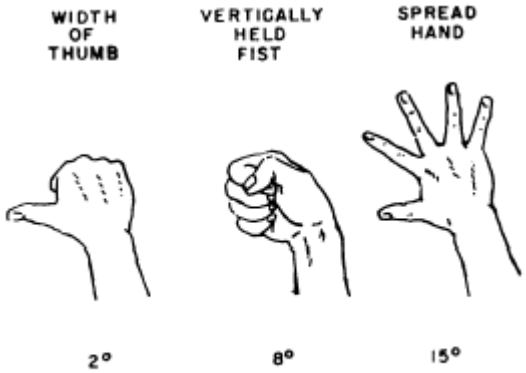

Figure 9.— Position angle aids.

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 10). You report to the OOD

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

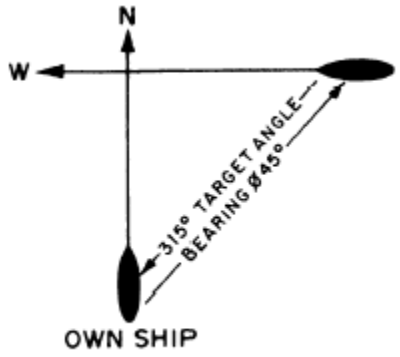

Figure 10.—Target angle.

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. (See figure 11.)

HEIGHT OF EYE FEET	RANGE TO HORIZON 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 11.—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. (See figure 12.)

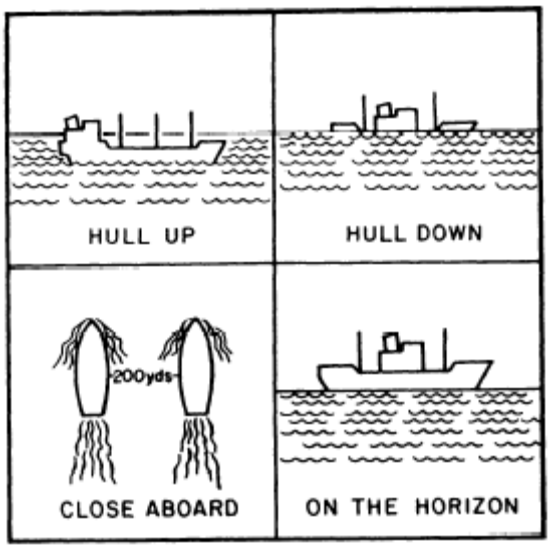

Figure 12.— Range supplements.

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 13). 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.

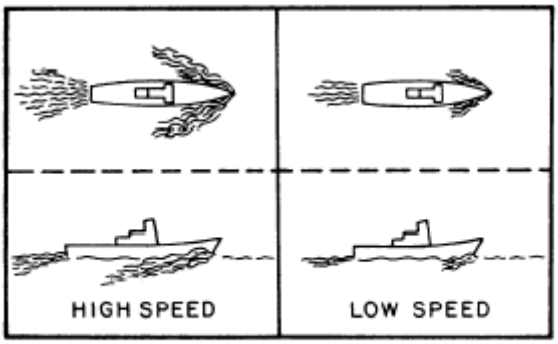

Figure 13.—Bow wave and stern wake.

The bridge and CIC do not expect accurate, to-theexact- 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:

High speed	25 knots or greater
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 officer of the deck and all assistants. Consider yourself one of these assistants. 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 responsibility for 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 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 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 14) and a marine location marker (figure 15) should be thrown over on hearing "MAN OVERBOARD," regardless of whether or not the person is seen.

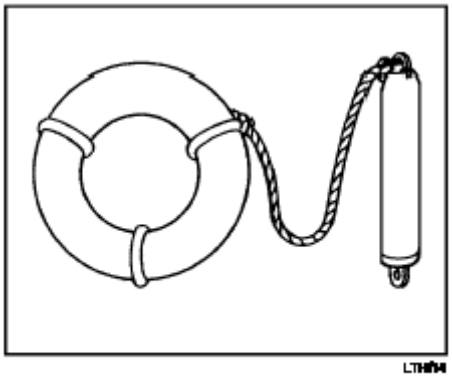

Figure 14.—Life ring and lighted buoy.

Figure 15.—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 and highly volatile fuel such as gasoline or jet fuel is in the water, or if under darkened ship condition, 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 16) are used to attract attention to special operations or to request assistance. Frequently they imply the necessity to stand clear by an approaching vessel, so 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

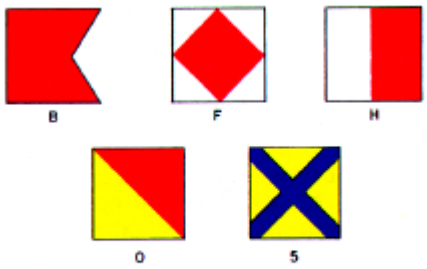

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Figure 16.—Special signal flags.

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DISTRESS SIGNALS

Distress signals under both International and Inland Rules are as follows:

The following signals, used or exhibited either together or separately, indicate distress and need of assistance:

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 Code Signal of distress indicated by N.C. (NOVEMBER CHARLIE)
7. A signal consisting of a square flag having above or below it a ball or anything resembling a ball
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. The radiotelegraph alarm signal
13. The radiotelephone alarm signal
14. Signals transmitted by emergency position-indicating radio beacons

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.

FOG 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. (See figure 17.) It is the duty of the fog lookouts 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 or indirect communication with the OOD and the lookout talker/plotter in CIC. The fog or restricted-visibility lookout's sectors of responsibility are as follows:

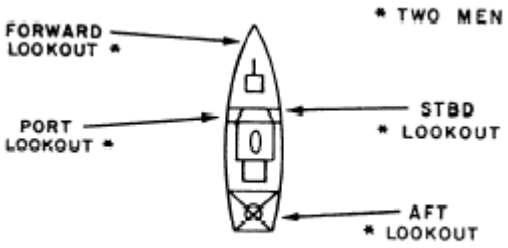

Figure 17.—Restricted-visibility stations.

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 the fog suddenly lifts.

SOUND SIGNALS

During restricted visibility, all ships continually sound fog signals in accordance with *Navigation Rules, International - Inland.* (See figure 18.) 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 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

Figure 18.—Fog signals; International and Inland.

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, loud, or medium.
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—THIS IS 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 assigned to a special CIC team. Persons assigned to man the sea detail must be 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 forward lookout tells CIC when the bow 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 boundaries that separate the areas where International Rules and Inland Rules apply are usually marked on each of the nautical charts. If the boundary lines are not marked on the chart, they may be drawn, as a general rule, across the mouths of harbors, bays, and inlets. (See figure 19.)

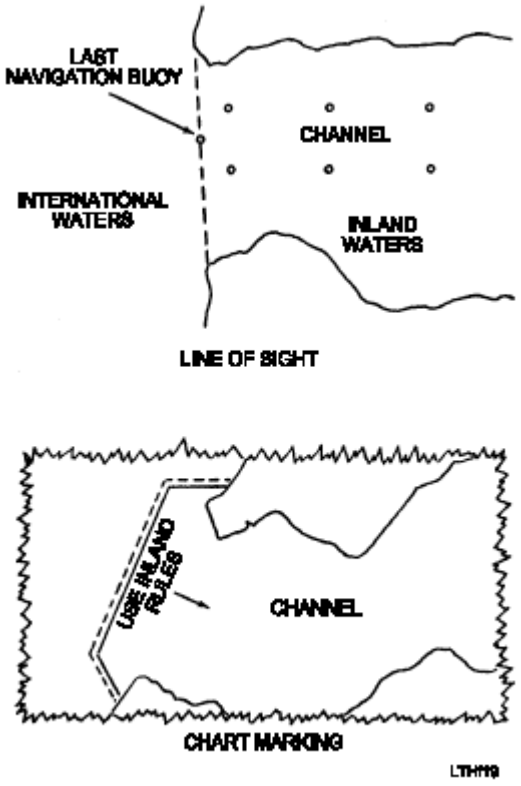

Figure 19.—Rule boundaries.

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 propose a port-to-port passage
Two short blasts	I propose a starboard-to-starboard passage
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 leaving a pier

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. (See figure 20.)

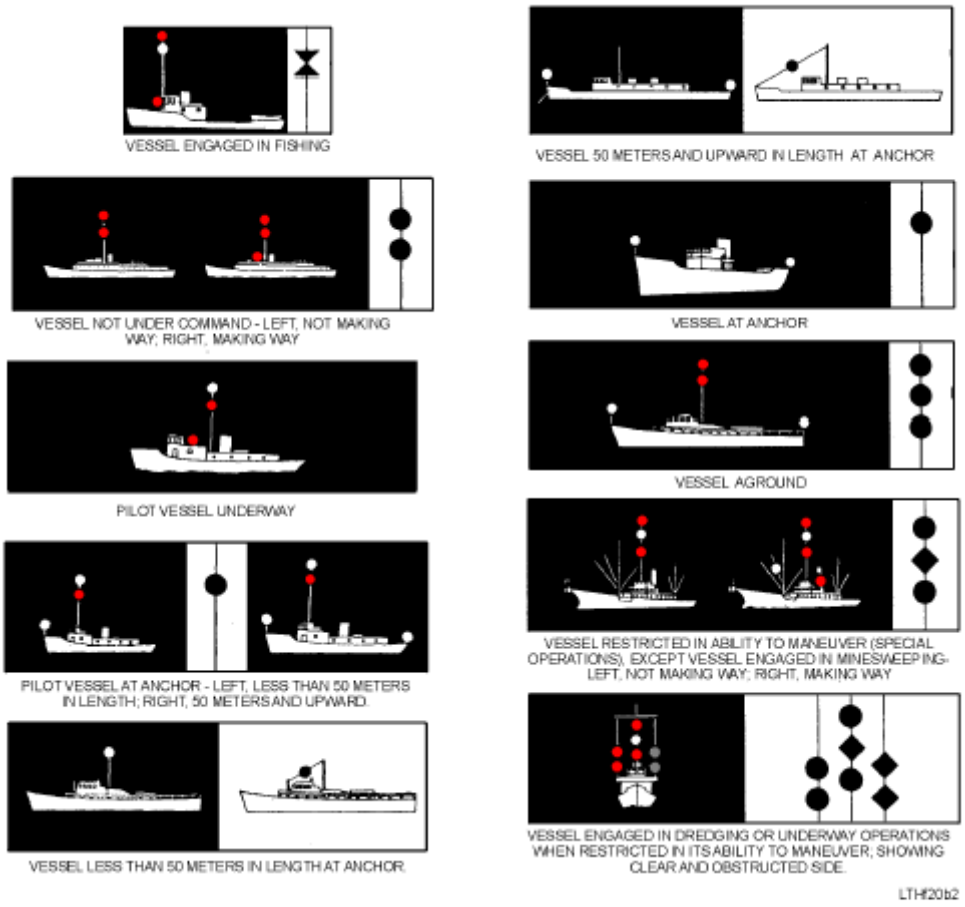

Figure 20.—Lights and shapes.

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RUNNING LIGHTS

All power-driven vessels are required to carry white, red, and green running lights when under way. (See figure 21.) 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.

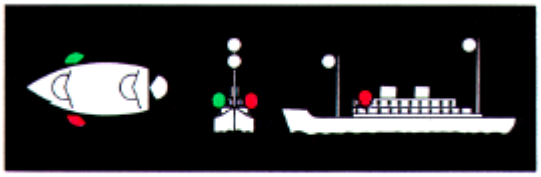

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Figure 21.—Running lights.

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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 away from 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 22 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.

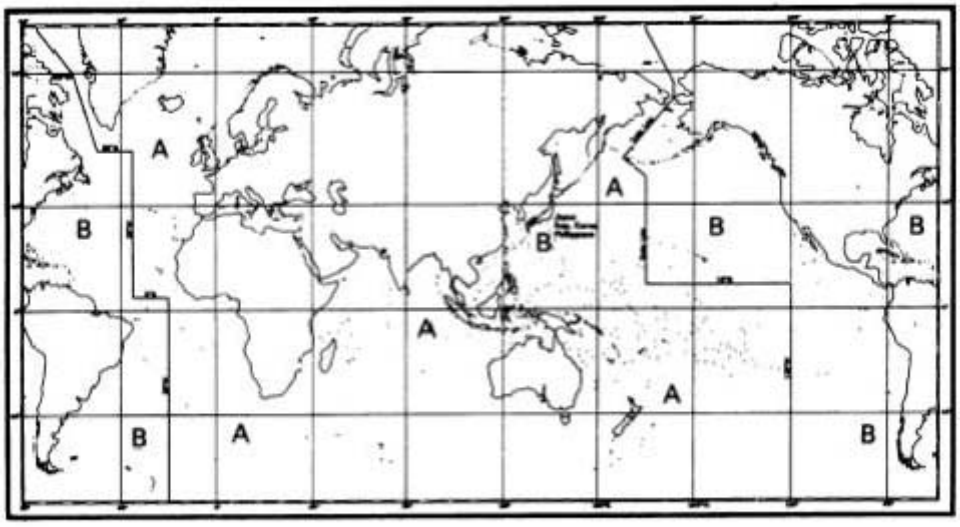


Figure 22.—IALA Maritime Buoyage System; buoyage regions A and B.

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. 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, green, green with one red horizontal band, and red with one green horizontal band.

The colors used for lateral marks in Region B are green, red, red with one green horizontal band, and green with one red horizontal band.

Shape

There are five basic buoy shapes (fig. 23); 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.

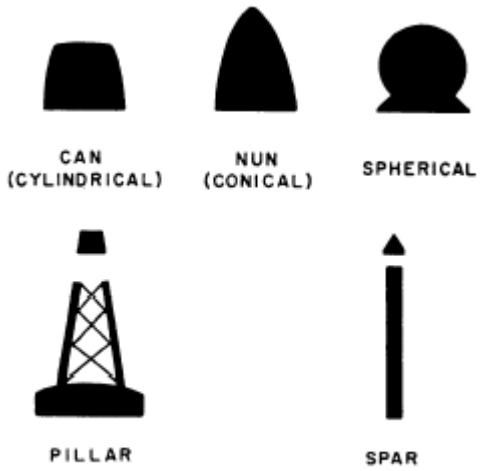


Figure 23.—Basic buoy shapes.

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. (See figures 24 and 25) 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 Penninsula, India, and East Africa. A larger dhow may have a crew of approximately thirty with capacity for 400 tons of cargo while smaller dhow 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.

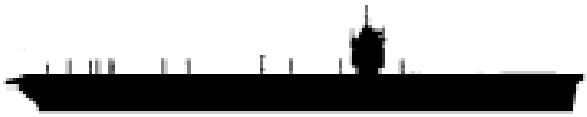
Often non-military craft have been involved in military or paramilitary applications like smuggling, surveillance, terrorism, and asymmetrical warfare. Non-traditional methods of attack are now used to offset traditional military superiority. These methods include use of deception, and concealment within 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 volume of pages of silhouettes, in fact too many to include in this manual. **This manual will provide US Navy ship silhouettes only**. 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 guidelines will help in ship recognition.

U.S. AIRCRAFT CARRIERS

NIMITZ CLASS (CVN 68)



ENTERPRIZE CLASS (CVN 65)

JOHN F. KENNEDY CLASS (CV 67)

KITTYHAWK CLASS (CV 63)

U.S. CRUISERS

TICONDEROGA CLASS (CG 47-51)

TICONDEROGA CLASS (CG 52-73)

U.S. DESTROYERS

ARLEIGH BURKE CLASS (DDG 51 – 78)

ARLEIGH BURKE CLASS (DDG 79 – 92)

SPRUANCE CLASS (DD 963)

U.S. FRIGATE

PERRY CLASS (FFG 7)

Figure 24 – Silhouettes of U.S. Navy ship types

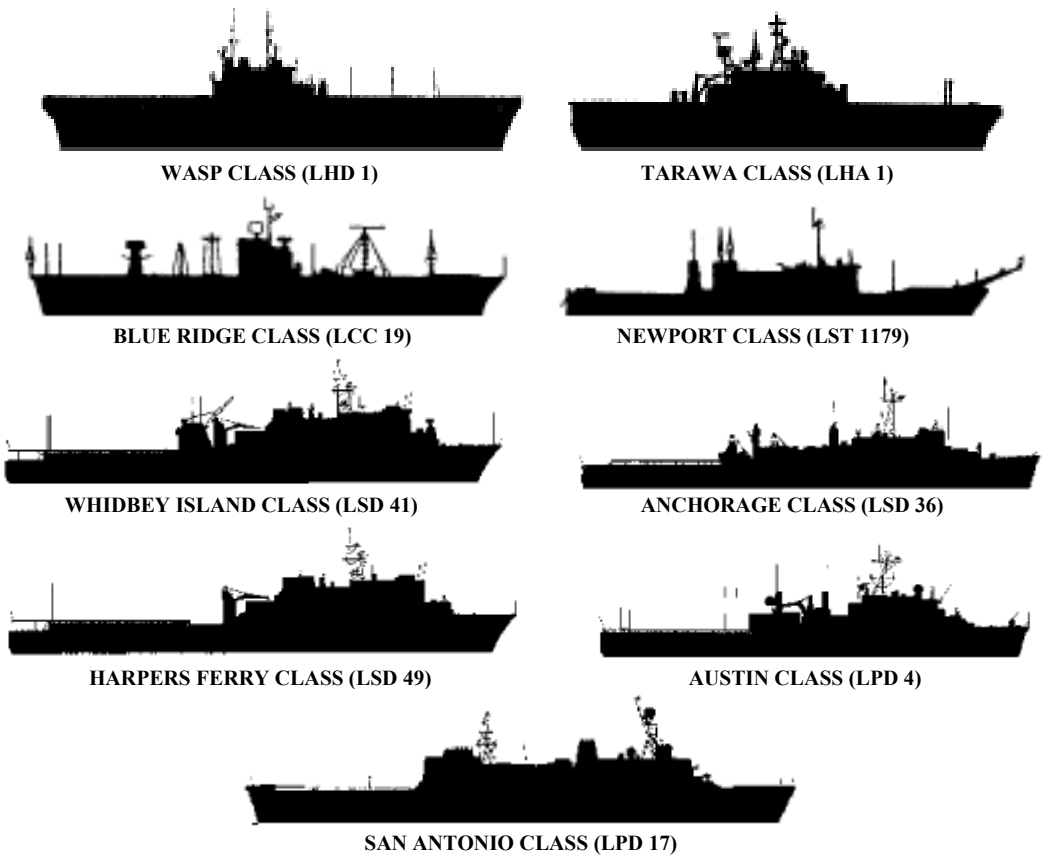


Figure 24 – Silhouettes of U.S. Navy ship types

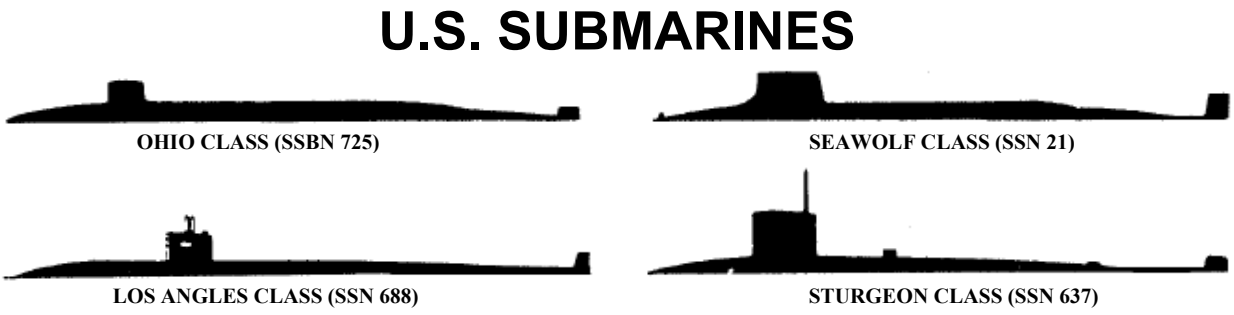


Figure 25 – Silhouettes of U.S. Navy submarines.

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 two primary publications that will help you in your identification of merchant ships are *Merchant Marine Identification Guide—World* and the *Communist 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 (see figure 26) to identify the following armament:

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

Figure 26 – 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 (See figure 27.)

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.

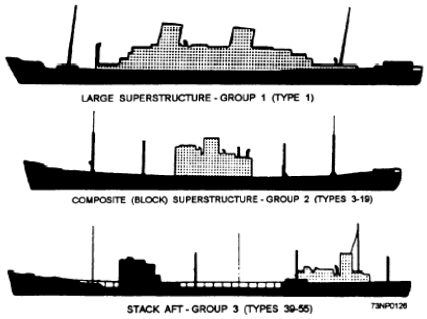


Figure 27 – Appearance groups.

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 figure 28 and figure 29, 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.

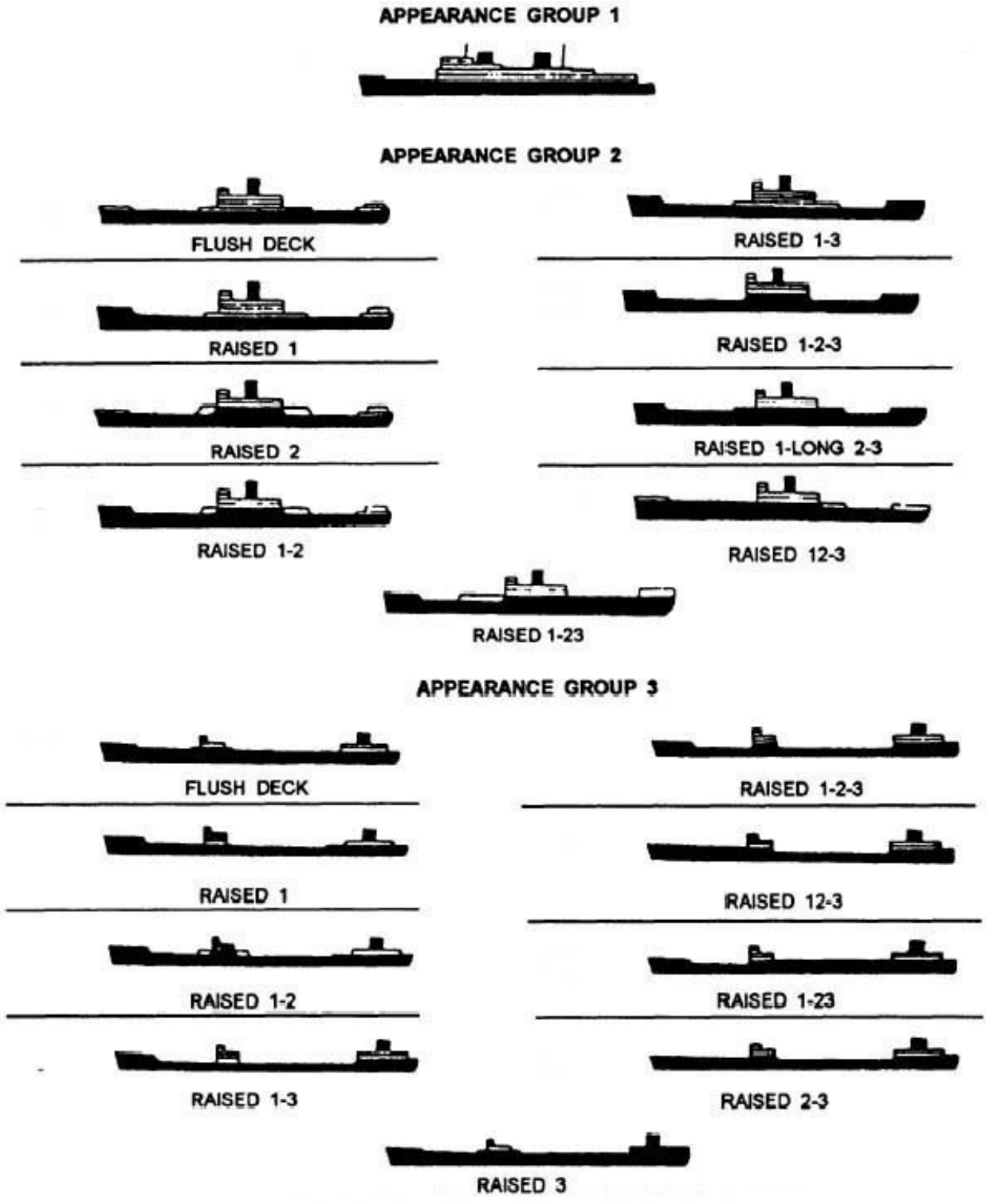


Figure 28 – Hull type selector.

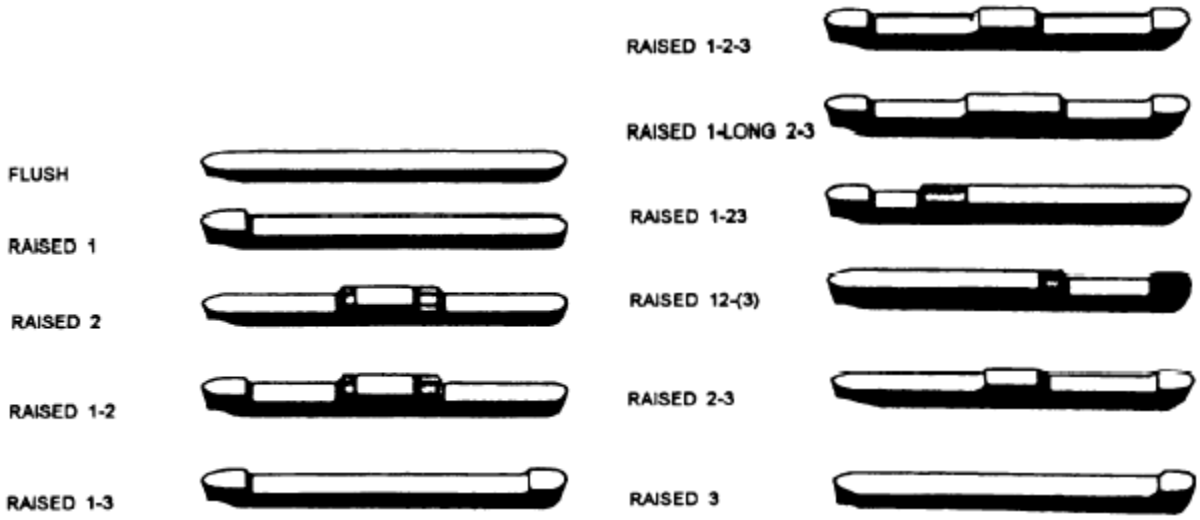


Figure 29 – Variations and locations of raises.

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 30 – 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 31)

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 32)

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.

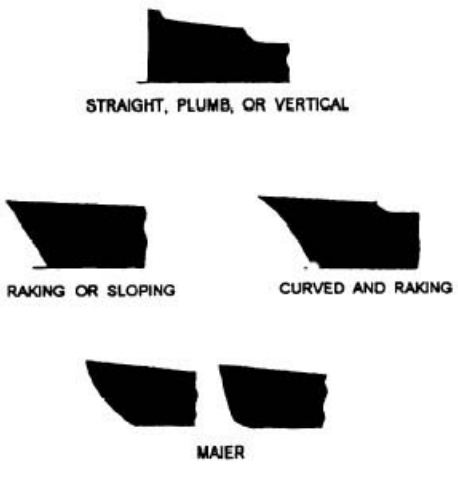


Figure 31 – Bow designs.

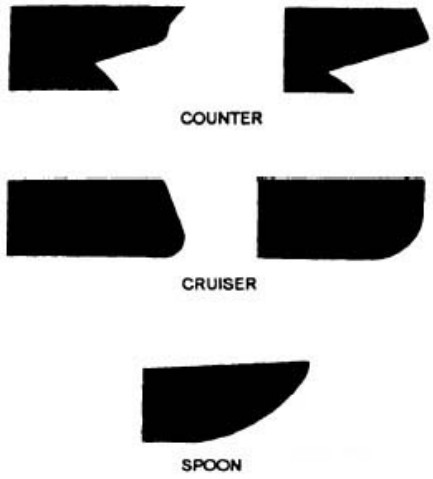


Figure 32 – Stern designs.

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 shown in figure 33 would be coded MKKMMFM.

Figure 33 – 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 in figure 34 and figure 35.

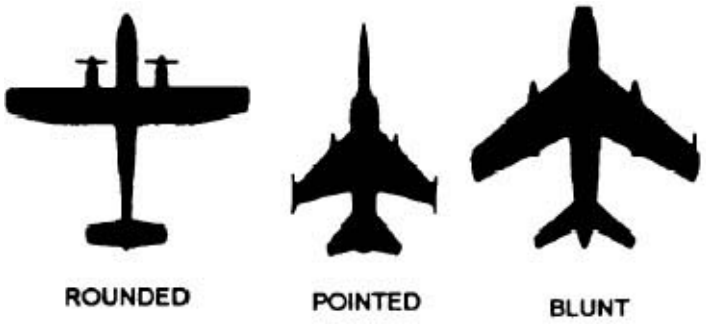


Figure 34 – Nose shapes.

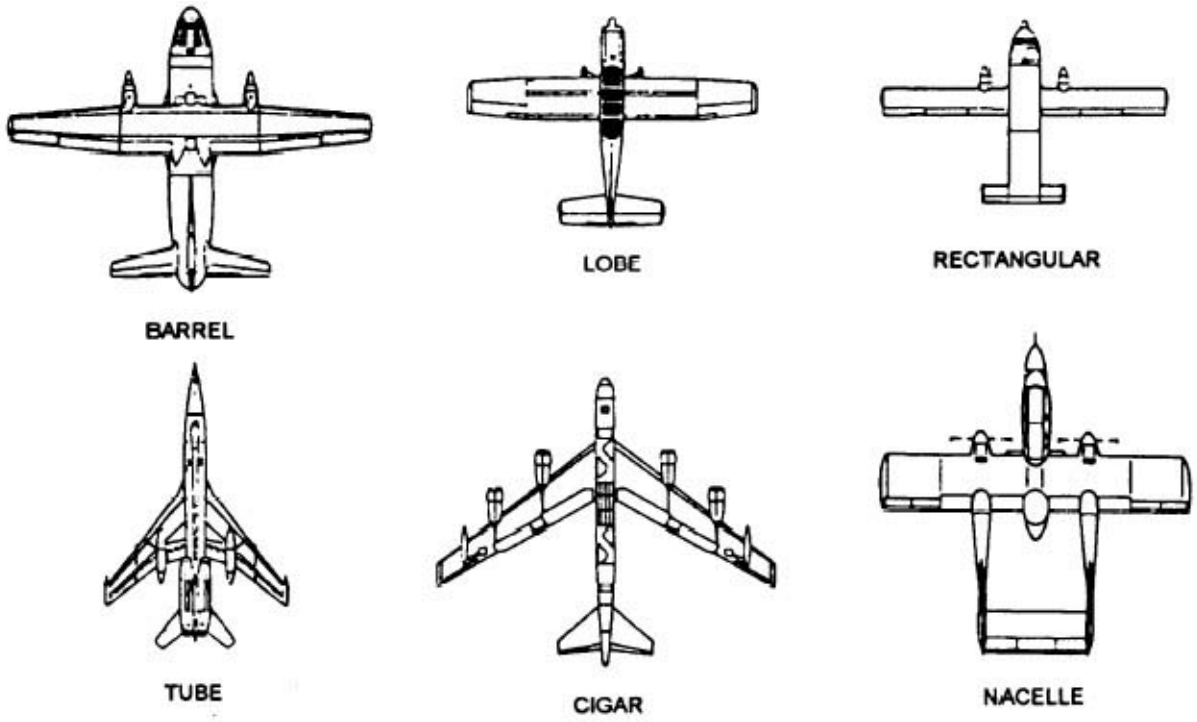


Figure 35 – Fuselage shapes.

2. Wing. The main supporting surface, or airfoils, of an airplane are the wings. Figure 36 shows the most common wing types and positions. The type and degree of wing dihedral angles are shown in figure 37.

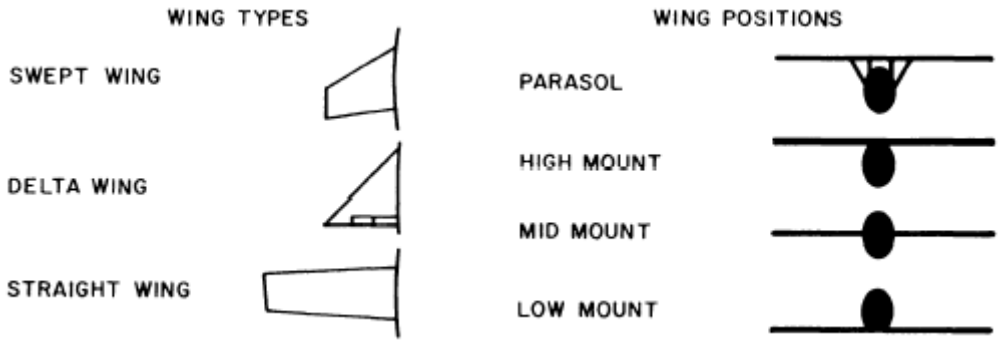


Figure 36 – Wing types and positions.

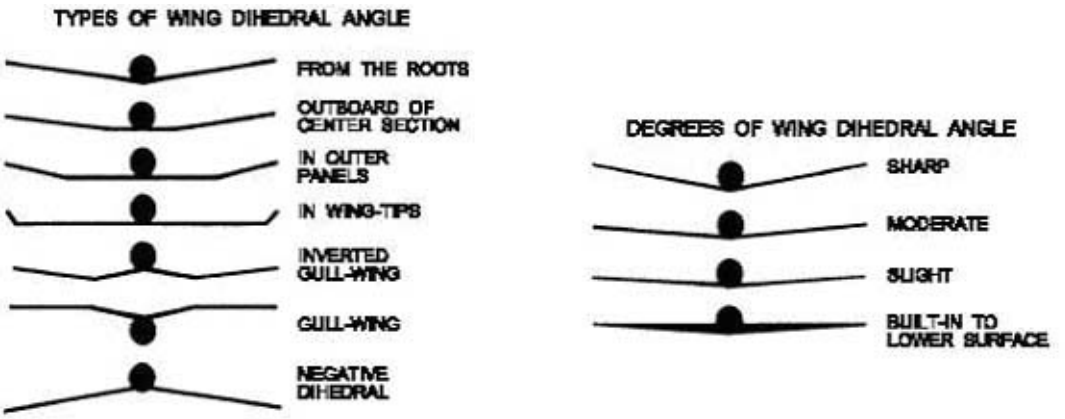


Figure 37 – Wing dihedral angle.

3. Tail. The tail is the after part of an aircraft and generally consists of stabilizers, elevators, fin, and rudder. See figures 38 and 39 for the various types of horizontal and vertical stabilizers of the tail assembly. Figure 40 shows the different positions of the horizontal stabilizer.

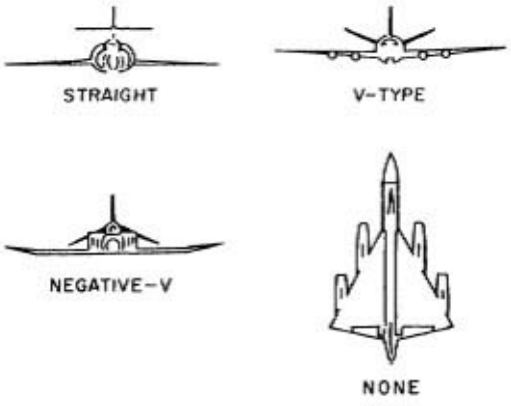


Figure 38 – Horizontal stabilizers.

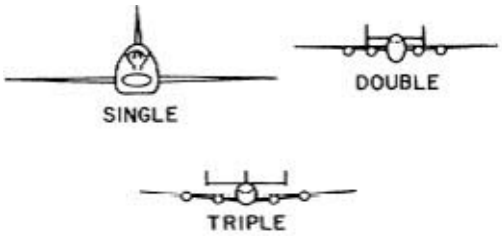


Figure 39 – Vertical stabilizers.

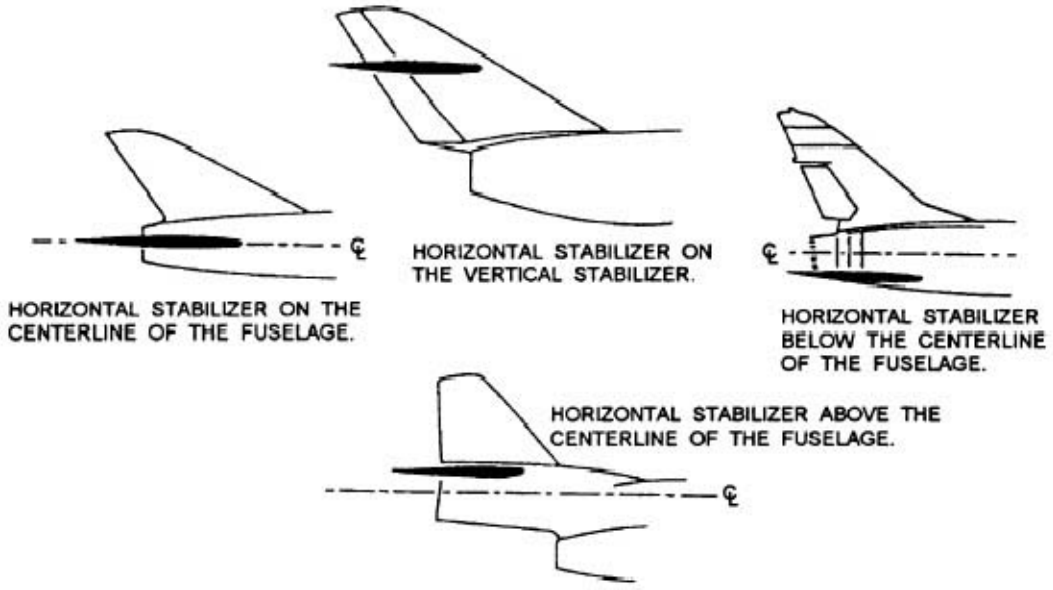


Figure 40 – Position of the horizontal stabilizer.

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. (Refer to figure 41)

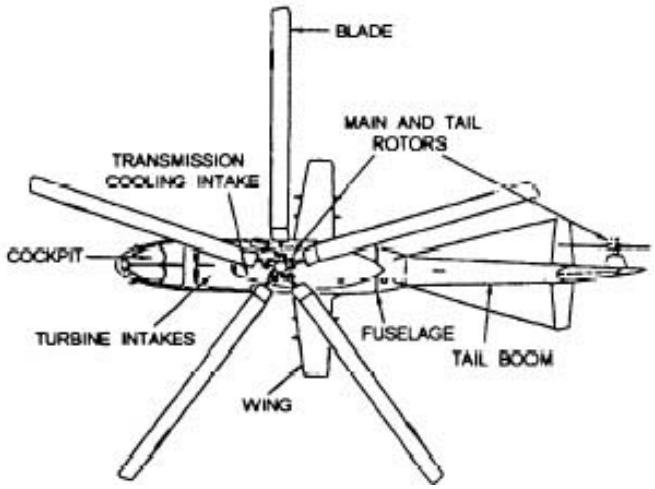


Figure 41 – Helo recognition features.

CHAPTER 13

MARINE SPECIES AWARENESS

The Department of the Navy (DoN) is required by Presidential Executive Order 12114 "Environmental Effects Abroad of Major Federal Actions" to consider the potential environmental impacts of major federal actions on the global environment. Therefore, the Department of the Navy reviews possible environmental impacts from conducting routine 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 protecting species that are either endangered or threatened with extinction throughout all or a significant portion of their range, and the conservation of the ecosystems on which they depend, making it illegal to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect any of the listed species.

The Navy conducts many events that can effect 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.

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 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 endangerment or 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. Take - The term "take" is statutorily defined to mean "to harass, hunt, capture, or kill, or attempt to harass, hunt, capture or kill any marine mammal.

5. Harrass - Congress statutorily defined and divided the term "harassment" to mean any act of pursuit, torment, or annoyance which –
    - Level A Harassment - has the potential to injure a marine mammal or marine mammal stock in the wild; or
    - Level B Harassment - has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption or behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering.

6. Zone of influence - The radius of the Zone Of Influence (ZOI) for a single 5-inch round is about 641 yards based on PSI and sound wave expansion of the detonation of an 8 lb net explosive weight HE projectile, the speed of the animal away from the impact, and the error in target location and aimpoint accuracy.

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

8. 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 a floating nearly motionless behavior at the surface referred to as "logging". 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:

9. Protective Measures Assessment Protocol (PMAP) - PMAP is an IT-21 certified CD-ROM based situational awareness tool and database collection method for navy operations that may have an adverse environmental effect. Additionally, it provides standard, approved mitigation procedures to commanding officers to aid in conducting those operations with minimal environmental impact. 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.

10. 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:
    a. Surface to surface GUNEX
    b. Surface to air GUNEX
    c. Air to surface GUNEX
    d. TORPEX
    e. Small arms training
    f. Surface to surface MISSILEX
    g. Air to surface MISSILEX
    h. Practice bombing (explosive)
    i. Practice bombing (non-explosive)
    j. Mine countermeasures mechanical mine avoidance/mine sweeping
    k. Mine countermeasures (acoustic mine avoidance/mine sweeping)
    l. Mine countermeasures (explosive)
    m. Anchor operations (training only)
    n. Ship and submarine mid-frequency active sonar useage (training only)
    o. Explosive Echo Ranging (EER) training operations
    p. Helicopter dipping sonar training operations

11. 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.

TOOLS TO HELP IN SPECIES RECOGNITION

Identification of marine mammal and sea turtle species at sea is sometimes very difficult for even 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.

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 that they can be found.

Sea Turtles - All sea turtles are listed as threatened or endangered under the ESA. Sea Turtles are usually found in continental shelf waters between the shoreline and depths of 200 meters. Immature turtles are often found in sagassum rafts and kelp mats. Sea turtles nest and lay their eggs on sandy beaches along the coasts of South Carolina, Georgia, Florida, 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. (See figure 42)

Cetaceans – Cetaceans (whales, dolphins, and porpoises) are migratory animals that can be found virtually in every ocean. All cetaceans are protected under the MMPA, and most large whale species are listed as endangered under the ESA. Depending on the species, certain habitats are better than others for marine animals. Coastal areas, over underwater canyons or seamounts, on the edge of the continental shelf, in a region of upwelling, around strong tidal runs, and estuary openings can all be good habitat for marine species. Extra vigilance should be exercised in these areas.

Whales can be divided into two separate classes: Baleen (Mysticete), and Toothed (Odontocete). (See figure 43)

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, then, migrate to warmer waters for breeding and calving. Although they may move far out to sea during their feeding seasons, Right whales give birth in coastal areas.
   b. Gray Whales - Gray whales inhabit shallow coastal waters of the eastern North Pacific. The gray whale makes one of the longest of all mammalian migrations, averaging 10,000-14,000 miles (16,000-22,530 km) round trip. In October, the whales begin to leave their feeding grounds in the Bering and Chukchi Seas and head south for their mating and calving lagoons in Baja California, Mexico. The southward journey takes 2-3 months. The whales remain in the lagoons for 2-3 months. The return trip north takes another 2-3 months. Mothers and calves travel very near shore on the northbound migration. There are some individual gray whales that are found year round in the Straits of Juan de Fuca between the State of Washington and Vancouver Island, Canada, and some that are seen during the summer months off the northern California coast.

   Rorqual Baleen - A sub-family of the Baleen whales that 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. They have long, sleek bodies, a median notch, and a small dorsal fin in the rear third of their back. Rorqual is Norwegian for furrow.

a. Humpback Whales - Found in all the world's oceans, most populations of Humpback whales follow a regular migration route, summering in temperate and polar waters for feeding, and wintering in tropical waters for mating and calving.
b. Fin Whales - Fin whales are found in all oceans of the world. They may migrate to subtropical waters for mating and calving during the winter months and to the colder areas of the Arctic and Antarctic for feeding during the summer months; although recent evidence suggests that during winter fin whales may be dispersed in deep ocean waters.
c. Sei Whales - Sei whales are found near the Antarctic, and go as far north as Iceland in the North Atlantic. Bryde's whales rarely venture beyond 40 degree north or south, and are most common in tropical and sub-tropical waters. Most rorquals are migratory, and Sei whales show a seasonal movement pattern.
d. Minkes Whale - Minkes are found in all oceans, though they are rarely observed in the tropics. They seem to prefer icy waters.
e. Blue Whales - Blue whales may be found in all oceans of the world. They migrate to tropical-to-temperate waters during winter months to mate and give birth to calves. They can feed throughout their range, in polar, temperate, or even tropical waters. 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 in all oceans of the world. The males, alone or in groups, are found in higher latitudes. From time to time they migrate toward lower latitudes, and only the largest mature males appear to enter the breeding grounds close to the equator. Females, calves, and juveniles remain in the warmer tropical and subtropical waters of the Pacific, Atlantic, and Indian Oceans year round.
b. Pilot Whales - In general, Pilot whales are found in both the northern and southern hemispheres, in tropical and temperate waters throughout the world.
c. Cuvier's Beaked Whales - They prefer deep water of over 3,300 feet (1,000 m) and avoid shallow coastal areas. Cuvier's beaked whales are one of twenty recognized beaked whale species. Cuvier's are almost never seen at sea, so we know very little about their habits. Beaked whales can be identified by their distinctive "beak" shaped nose. Generally, beaked whales 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. Porpoises – A toothed whale similar to dolphins. The major differences are that porpoises have laterally compressed spade shaped teeth while dolphins have teeth that are conical in shape. Porpoises tend to have small, triangular shaped dorsal fins as compared to their dolphin relatives. The dorsal fins of dolphins are taller and tend to have a greater curvature to their trailing edge. Porpoise generally have a more rounded body shape, including the lack of a distinct "beak" like those found on many species of dolphins.
e. Dolphins – A toothed whale closely related to beak whales. Distinctive with their beak "noses" and single blow hole. The Killer Whale is the largest dolphin species.

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. They have external ear flaps giving them the distinction of being called "eared seals". The walruses are currently found in both Pacific and Atlantic Arctic ice pack areas, but in colonial times they were found as far south as Sable Island off Nova Scotia.

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 – Which way is the tip of the dorsal fin pointing? You may only see the whale once. But, if you can tell which way the tip of the fin is pointing (towards the whales tail), you know which way the whale is traveling – and whether it is moving towards or away from the ship.

2. Fluke prints and splashes - Be aware of unusual disturbances on the water's surface. Sometimes your first clue that a whale is present is simply an area that looks different than the surrounding water surface. For example, whales leave "fluke prints" as they are traveling. A fluke print is created by the motion of the whales tail under water, and will appear as a large slick on the water, appearing like an eddy current. Follow the fluke prints and you will know what direction the whale is traveling under water – even if you cannot see the whale. Or, you might just see a splash or a body part sticking up out of the water, indicating a whale at the surface. Paying attention to these small clues may give you more time to alert the bridge or pilot that a marine mammal is present.

3. Blow/Spout - The blow is the water vapor that is exhaled from the whales' blowhole(s) (nostrils). Depending on the type of whale, the blow is very differently shaped. When looking at the blow (spout), it is important to notice things like whether its tall, short, puffy, or canted to one side. These clues are important because certain whales have distinctive blows that are diagnostic to their species. Toothed whales (e.g. sperm whales, killer whales) only have one blowhole, so their blow looks different from baleen whales (e.g. fin, blue, minke, right), which have two blowholes. For example, sperm whales only have one blowhole that is on the forward left side of the head. Therefore, their blow is canted forward and to the left, making their blow appear to be on a very distinctive angle.

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. (Refer to figure 44)
   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 up to 60 minutes. 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 and dives when a vessel approaches.
c. Logging - Certain species, such as sperm and right whales, spend a lot of time at the surface "logging." Logging is when a whale floats quietly at the surface - like a log. Whales often do this when in a big group (sperm whales) or when a calf is present (right and gray whales). The whales will often stop their logging behavior.

NAVY REQUIREMENTS FOR REPORTING INTERACTION WITH MARINE MAMMALS AND SEA TURTLES

1. Strikes - All ship strikes of marine mammals must be reported up the chain of command. See the OPNAV instruction 5090 series, chapter 19 for details on how to report ship strikes.

2. Dead or injured animals - Certain sightings of dead or injured marine mammals must also be reported up the chain of command. For example, any Navy unit that becomes aware of the following types of events must submit a report:
    a) Dead or injured North Atlantic right whale or beaked whale
    b) Dead or injured whale that is within 50 nm of a training event that took place no more than 3 days prior to the sighting and involved active sonar or weapons that impact the water.
    c) Stranding - Units may also be contacted for information regarding incidents for which Navy operations have been implicated as the cause of a stranding or injury or if the Navy has received a request for information from Congress, NMFS, or the media.

OPNAV instruction 3100.6H Appendix E lists more details on what types if incidents must be reported and how to report these incidents.

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

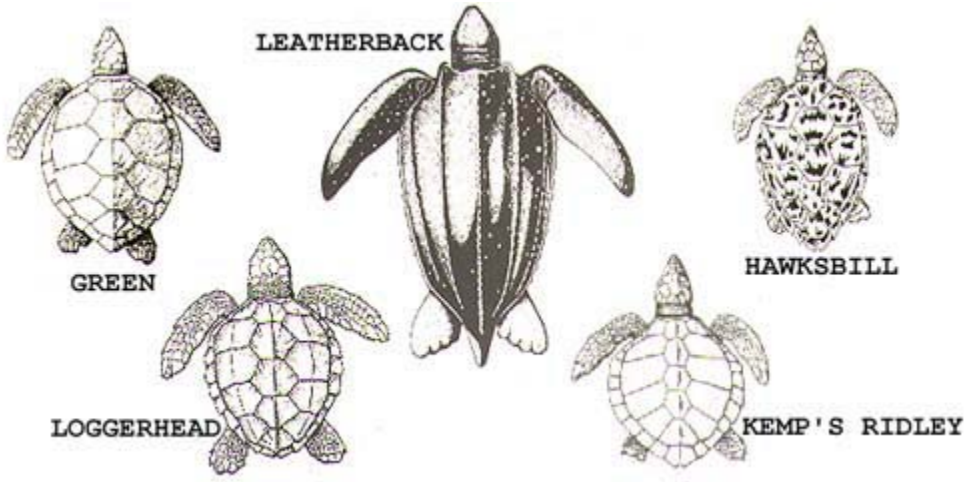
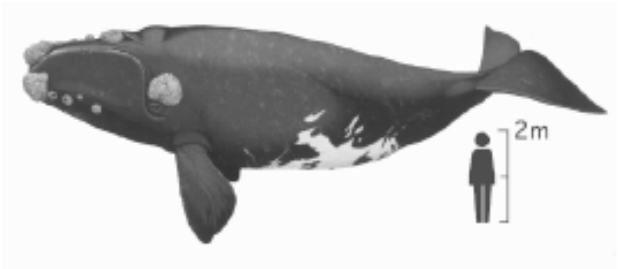
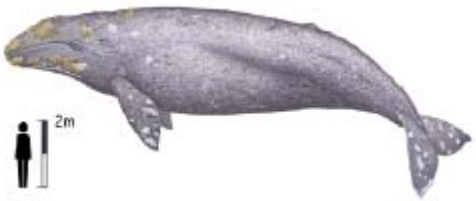


Figure 42 – Species of Sea Turtles

Whale Identification



Right Whale (Baleen)



Gray Whale (Baleen)

Humpback Whale (Rorqual Baleen)

Fin Whales (Rorqual Baleen)

Figure 43 – Species of Whales

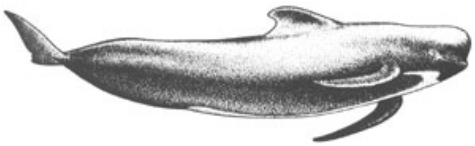
Whale Identification (Continued)

Sei Whale (Rorqual Baleen)

Minke Whale (Rorqual Baleen)

Blue Whale (Rorqual Baleen)

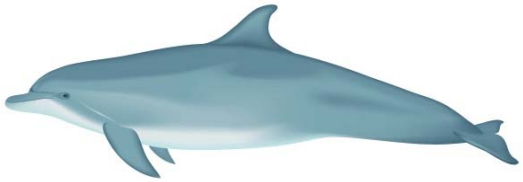
Sperm Whale (Toothed)



Pilot Whale (Toothed)

Beaked Whale (Toothed)

Harbor Porpoise (Toothed)



Dolphin (Toothed)

Figure 43 – Species of Whales (Continued).

Whale Observations and Behavior

Spouts

Spyhopping

Angled Spouts

Fluke

Figure 44 – Observations and Behaviors