



SIGNALMAN 3 & 2

NAVAL EDUCATION AND TRAINING COMMAND
RATE TRAINING MANUAL AND NONRESIDENT CAREER GUIDE

NAVEDTRA 10135 E

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 *Signalman 3 & 2*, NAVEDTRA 10135-E.



SIGNALMAN 3 & 2

NAVEDTRA 10135-E



*1982 Edition Prepared by
SMC Vincil T. Clark*



PREFACE

This rate training manual and nonresident career course (RTM/NRCC) form a self-study package that will enable Signalmen to help themselves fulfill the requirements of their rating.

Designed for individual study and not formal classroom instruction, the RTM provides subject matter that relates directly to the occupational standards of the Signalman rating. The NRCC provides the usual way of satisfying the requirements for completing the RTM. The set of assignments in the NRCC includes learning objectives and supporting items designed to lead students through the RTM.

This training manual and nonresident career course were prepared by the Naval Education and Training Program Development Center, Pensacola, Florida, for the Chief of Naval Education and Training. Technical assistance was provided by the U.S. Fleet Training Center, Norfolk, Virginia; Fleet Training Group, Guantanamo Bay, Cuba; Service School Command, Naval Training Center, Orlando, Florida; and Fleet Training Group, San Diego, California.

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THE UNITED STATES NAVY

GUARDIAN OF OUR COUNTRY

The United States Navy is responsible for maintaining control of the sea and is a ready force on watch at home and overseas, capable of strong action to preserve the peace or of instant offensive action to win in war.

It is upon the maintenance of this control that our country's glorious future depends; the United States Navy exists to make it so.

WE SERVE WITH HONOR

Tradition, valor, and victory are the Navy's heritage from the past. To these may be added dedication, discipline, and vigilance as the watchwords of the present and the future.

At home or on distant stations we serve with pride, confident in the respect of our country, our shipmates, and our families.

Our responsibilities sober us; our adversities strengthen us.

Service to God and Country is our special privilege. We serve with honor.

THE FUTURE OF THE NAVY

The Navy will always employ new weapons, new techniques, and greater power to protect and defend the United States on the sea, under the sea, and in the air.

Now and in the future, control of the sea gives the United States her greatest advantage for the maintenance of peace and for victory in war.

Mobility, surprise, dispersal, and offensive power are the keynotes of the new Navy. The roots of the Navy lie in a strong belief in the future, in continued dedication to our tasks, and in reflection on our heritage from the past.

Never have our opportunities and our responsibilities been greater.

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CHAPTER 1

INTRODUCTION TO VISUAL COMMUNICATIONS

So you have decided you want to be a Signaller. Your choice is a good one. The Signaller rating is one of the oldest in the Navy, and visual communications—the first form of nautical communications—continues undiminished in importance to the present day. You will find your work interesting, rewarding, and full of the satisfaction that comes of service to the Navy and the United States. At the level of the operating forces, communications, as you will learn, is truly the voice of command in a visible and tangible way. The communication organization aboard ship is under the direct and positive control of the commanding officer. In the transmission and reception of signals and messages, communicators actively participate in the exercise of command.

The fleet needs capable personnel in all ratings because an effective naval force is only as good as the people who man the ships. Even with the most modern equipment, the force is seriously handicapped without competent personnel to operate and maintain that equipment. Good people are plentiful, but their capability depends chiefly on their training.

This book contains the basic knowledge you need for advancement in the Signaller rating. Skills in personnel advancement requirements (PARs) also are required, but these can be developed only through practice and experience.

As a part of the Navy's training program, this self-study rate training manual is designed to help you meet the occupational standards for advancement to Signaller 3 and Signaller 2.

To become an expert in your chosen specialty represents quite a challenge, and you will derive

considerable satisfaction from mastering the art of signaling. Through study, practice, and hard work, the time will come when your shipmates will look upon you as an expert.

THE SIGNALMAN RATING

All the planning, organization, and training that go into the makeup of a signal gang are designed for one purpose—to perfect the Signaller's ability to transmit and receive messages vital to the operation of the ship. The Signaller mans the visual communication link with semaphore flags, flaghoists, and searchlights.

In addition to visual communications, a Signaller also must be proficient in navigation, be able to help pilot a ship in restricted waters, and be familiar with the Rules of the Road and navigational aids. The Signaller must know how to use navigational instruments, and how to read, stow, and correct charts. In addition, the Signaller must be skilled in voice radio operation and procedures; be able to properly render honors and ceremonies; be experienced in the principles of recognition and be quick to recognize personal flags and pennants of U.S. and foreign officers; and demonstrate know-how in many other related skills.

As a Signaller, you can expect to serve on a variety of ships—from the largest carrier to the smallest patrol craft—and at various shore stations. Aboard smaller ships such as destroyers and mine craft, you may have to help with the navigation, in addition to your visual signaling duties. On larger ships (cruisers, carriers, and tenders) you might practice only your visual

signaling skills. Another billet for Signalman is on the staff of a unit commander. Here you could expect to use not only your visual and navigational knowledge, but also perform administrative work.

Now you know, in a general way, what is required of a Signalman. But you might ask, "What must I do to become a Signalman?" The demands are a **WILLINGNESS TO LEARN** and **TO WORK**. Together, these qualities can take you a long way in the Navy.

The signal bridge, where you will spend your working hours, is a platform high in the superstructure of a ship. All visual signaling takes place from this point. The size of the bridge and its location vary according to the type of ship. On some ships the bridge is on the same deck as the navigation bridge, where the conning officer is stationed. On others it is on the flag bridge level or on the open (flying) bridge.

A cruiser has a large bridge, providing ample space for the signal gang to operate. On the other hand, the bridge of a destroyer cannot offer nearly as much signaling space. Some ships are equipped with divided signal bridges, port and starboard. Regardless of how the signal bridge is laid out, it always is designed to give the best possible vision from ship to horizon.

In many respects flaghoist, semaphore, and flashing light communications are far superior to radio. Especially is this true when the mission of the unit or force demands electronic silence; that is, when security considerations silence all radio communications. With radio silence in effect, only visual signals may be used to convey messages. Visual signaling is employed widely even in peacetime when security often is not a major issue. Flaghoist is used almost exclusively by task force commanders to maneuver their ships during daylight hours.

Close-in visual communications—secure, rapid, effective—is the speciality of the ship's signal gang.

As a Signalman 3 or 2, you must have the ability to send and receive messages and recognition signals by flashing light, semaphore, and flaghoist. You must learn to prepare the headings and addresses for outgoing messages and become proficient in the correct procedures for handling, routing, and filing messages.

Among your duties will be the maintenance of visual signaling equipment, rendering passing honors to ships and boats, and the proper display of ensigns and personal flags during salutes and during personal and national honors.

GETTING ORIENTED

One of your first steps in becoming a Signalman is to learn all you can about the organization in which you will work. Obviously, no book can anticipate or cover all the questions you will have about your new job; so when questions arise, check with your division petty officer. Make it a point to learn something new each day about your job and your ship. On a modern day naval ship, ignorance is a very real danger to all.

Become familiar with all the different spaces of your ship and what their functions are. Put particular emphasis on the communication spaces, such as the communication center, radio central, and the signal bridge. Learn the quickest, shortest, and alternate routes to each from different sections of the ship.

Another thing to learn is that Signalmen are generally considered the very smartest in military appearance. Therefore, always be in a clean, neat, and proper uniform. Also, the spaces in which you work should be the cleanest and most orderly aboard ship.

RECORDING MESSAGES

One of your first jobs after joining the signal gang will be to record visual messages. Probably, your first day on the bridge, you heard one of the operators call out, "Standby to record." You may have noted that the operator went directly to the signal light and began to receive a message, while another signalman, maybe a striker like yourself, grabbed a message blank and began to record the information the operator called out.

PHONETIC ALPHABET

Some of the words called out may not have made much sense to you—words like **ALFA**, **YANKEE** and **DELTA**. To the experienced

communicator they mean the letters A, Y, and D. The Signalman was using the phonetic alphabet, a system set up where each letter of the alphabet has a word equivalent. It is used widely in naval communications to avoid mistaking

letters that sound alike, such as B and C or M and N. You will have to know this alphabet before you can go any further in communications, so study the alphabet and the proper pronunciation as shown in figure 1-1. It is not

Letter	Phonetic Alphabet	Pronunciation Guide	International Morse Code
A	ALFA	<u>AL</u> FAH	• —
B	BRAVO	<u>BRAH</u> VOH	— • • •
C	CHARLIE	<u>CHAR</u> LEE/ <u>SHAR</u> LEE	— • — •
D	DELTA	<u>DEL</u> TAH	— • •
E	ECHO	<u>ECK</u> OH	•
F	FOXTROT	<u>FOKS</u> TROT	• • — •
G	GOLF	GOLF	— — • •
H	HOTEL	HOH <u>TELL</u>	• • • •
I	INDIA	<u>IN</u> DEE AH	• •
J	JULIETT	<u>JEW</u> LEE <u>ETT</u>	• — — —
K	KILO	<u>KEY</u> LOH	— • —
L	LIMA	<u>LEE</u> MAH	• — • •
M	MIKE	MIKE	— —
N	NOVEMBER	NO <u>VEM</u> BER	— •
O	OSCAR	<u>OSS</u> CAH	— — —
P	PAPA	PAH <u>PAH</u>	• — — •
Q	QUEBEC	KEH <u>BECK</u>	— — • —
R	ROMEO	<u>ROW</u> ME OH	• — •
S	SIERRA	SEE <u>AIR</u> RAH	• • •
T	TANGO	<u>TANG</u> GO	—
U	UNIFORM	YOU NEE FORM/ <u>OO</u> NEE FORM	• • —
V	VICTOR	<u>VIK</u> TAH	• • • —
W	WHISKEY	<u>WISS</u> KEY	• — —
X	XRAY	<u>ECKS</u> RAY	— • • —
Y	YANKEE	<u>YANG</u> KEY	— • — —
Z	ZULU	<u>ZOO</u> LOO	— — • •

Number	Phonetic Alphabet	International Morse Code
1	WUN	• — — — —
2	TOO	• • — — —
3	TREE	• • • — —
4	FOW-ER	• • • • —
5	FIFE	• • • • •
6	SIX	— • • • •
7	SEV-EN	— — • • •
8	AIT	— — — • •
9	NIN-ER	— — — — •
0	ZE-RO	— — — — —

Figure 1-1.—Phonetic and Morse code alphabet.

very difficult; and you should not have any trouble mastering it in a few days.

LETTERING

The accuracy of communications, especially of coded messages, depends on exact adherence to procedures and on legibility of writing. For this reason it is necessary that all letters and numerals be distinctly and legibly made, not only so that you can read them but also so that they can be easily read by anyone else. If you write a letter or numeral and it is mistaken for some similar letter or numeral, confusion will result. Often one mistake can change the entire meaning of a message. This can be disastrous when lives and ships are at stake.

Figures 1-2, 1-3, and 1-4 show how letters and figures should be formed and what sequence should be followed in making the various strokes.



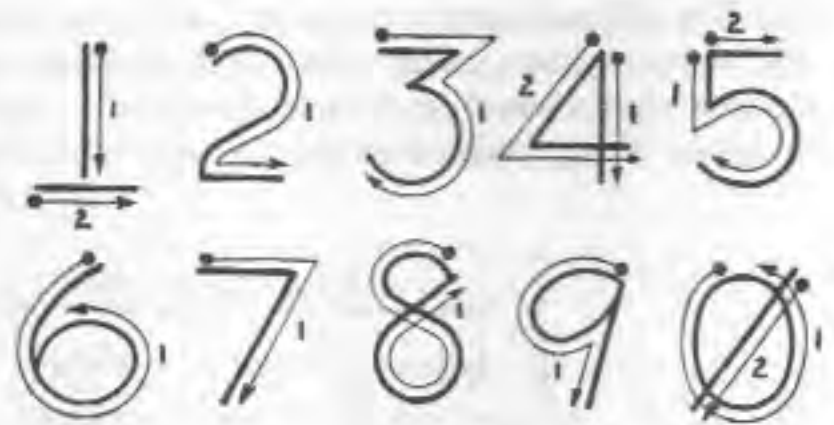
101.8

Figure 1-2.—Straight-line lettering.



101.8

Figure 1-3.—Circular lettering.



101.8

Figure 1-4.—Numerals.

To ensure uniformity, it is necessary that letters and numerals be printed and that you learn the following system of lettering.

1. A straight line is the foundation stroke. The letters E, H, and F have the center horizontal stroke slightly above the middle. The strokes of the letters X, Y, and K join slightly above the middle.

2. The letters O, Q, C, and G are made as circles. The letter B is slightly smaller at the top and has the center horizontal part slightly above the middle. The letters R and S are slightly smaller at the top.

3. The top of 5 and 7, and the bottom of 2 are straight lines. The figure 1 also has a straight line under it, slightly below the stem, to distinguish it from the letter l, and the zero has a bar diagonally through it (Ø) to distinguish it from the letter O. A horizontal bar through the riser of the letter Z helps prevent its being mistaken for the numeral 2.

The heavy dot at one end of each of the light lines, which parallel each letter and figure, indicates the starting point for the stroke. This dot and the arrow indicate the direction in which the letter or figure is drawn. The numerals 1, 2, and 3 placed just beside each of the light lines indicate the number and the sequence in which strokes of a letter or figure are made.

Practice printing the 26 alphabet letters and 10 numerals until you can make each character

easily and legibly. Use a pencil with a good point, print each character carefully and accurately, and take care to have your printing evenly spaced. REMEMBER, the key to legible writing is practice.

THE MESSAGE BLANK

Once you have mastered the phonetic alphabet and practiced the principles of legible printing, the next step is to learn about the visual message blank. As illustrated in figure 1-5, a typical signal bridge message blank has spaces

for the different parts of the message (the call, addressees, text, etc.). It is also broken down so that each group (e.g., complete word or code group) of the text has a separate space. This facilitates the counting of the groups. The well-trained recorder can tell at a glance if the message is complete.

Before starting to record a message, the recorder should always make certain that the correct number of copies and carbons is properly inserted. You should have a sufficient number of blanks made up in advance, so you

VISUAL MESSAGE									
OPNAV FORM 2110-30 (10-58)									
Reorder from FPSO Cag. "I" stock points									
CALL UP									
HEADING									
									5
									10
									15
									20
									25
									30
									35
									40
									45
									50
									55
									60
FROM:						DATE		RELEASED BY	
TO:						SYSTEM		PRECEDENCE	
						OPERATOR		SUPERVISOR	
INFO:						TOE TOO			VISUAL NR.
FLAG	C OF S	CAPT	OOO	COMM. CEN.				DFO	

Figure 1-5.—Visual message blank.

will not have to keep the operator waiting. With a little practice, you will soon be confident enough to handle the recorder's job with ease.

COMMUNICATIONS PUBLICATIONS

A variety of special publications is necessary in signal work. You will be using these pubs daily, so you may as well familiarize yourself with them at the start.

Basic Operational Communication Doctrine, NWP 4, forms the basic communication plan for the operating forces.

Naval Telecommunication Procedures Fleet Communications (NTP 4) supports and amplifies NWP 4. It contains substantially the same procedures and instructions promulgated in the JANAP (Joint Army Navy Air Force Publication) and ACP (Allied Communications Publication) series. In cases of conflict between NTP 4 and the JANAP/ACP series, NTP 4 will govern for intra-U.S. Navy use.

NTP 4 furnishes instructions for the employment of all phases of naval communication on both the command and operator levels. Additional instructions for joint operations are contained in JANAPs, while the ACPs contain instructions for the proper use of communication in joint, allied, and combined operations.

Although there are a large number of JANAP/ACP publications, the publications which contain the final word about communication procedures are the JANAP/ACP 121 through 134 series. They are known as the communications instructions group.

Specifically, ACP 129, *Communication Instructions, Visual Signaling Procedures*; ACP 121, *Communication Instruction, General Procedures*; and ACP 125, *Communication Instructions, Radiotelephone Procedure*, should be thoroughly understood by signal bridge personnel.

The *Allied Maritime Tactical Signal Book*, ATP 1(B) Volume II is a Confidential publication supplied to naval vessels. It contains maneuvering signals, standard operational signals, and the more common administrative signals. A thorough knowledge of the instructions in chapter 1 is a must for all Signalmen.

An excellent source of information on all matters connected with flags and pennants is NTP 13, *Flags, Pennants, and Customs*.

The International Code of Signals, PUB 102, contains signals for use with merchant vessels of all nationalities. A knowledge of the instructions in the front of this book is also a must for a member of the signal gang.

ACP 131, *Communication Instructions, Operating Signals*, and ACP 168, *Pyrotechnic Signals*, also contain valuable information for visual communicators.

You should also familiarize yourself with the uses and contents of the following joint call sign books:

ACP 113, *Call Sign Book for Ships*

JANAP 119, *Joint Voice Call Sign Book*

ACP 112, *Task Organization Call Signs*

ACP 100 Series, *U.S./Allied Call Sign and Address System*

These publications are made available to you through the technical publications librarian or the registered publications custodian, with the exception of Pub 102, which is distributed by the Defense Mapping Agency Hydrographic Center (DMAHC).

As a Signalman, you should also be familiar with the system used for correcting and stowing nautical charts and related publications.

Each correction or change to a publication will have instructions for making the correction included with it. These instructions adequately describe the procedure to use. Read and thoroughly understand the instructions before you make the actual entry.

Normally a change to a publication will furnish new pages, which replace the entire page of the basic "pub." Once these new pages have been entered in the basic pub, two important steps remain. Supplied with the change is a List of Effective Pages. You must go through the book and check each page against this list to ensure that none of the pages is missing. Also, located in the front of the pub, is a Record of Correction page. An entry must be made on it to the effect that the correction has been entered, the date, and by whom it was entered.

Never use red ink when entering pen-and-ink corrections. Normally, the only type of light you will use at night on the bridge is a red light. This light would render the red ink invisible and you would be unable to read the corrections. If you have a lengthy pen-and-ink correction to make, it is better, both for neatness and legibility, to type it on a separate piece of paper and paste or tape it in. When you have a cutout correction to make (where you paste or tape the change to the old page of the main pub) delete the superseded portion with pen and ink before you paste or tape in the cutout.

After you enter a pen-and-ink correction, or a cutout correction, make a notation in the margin adjacent to the entry as to the source of the correction. Example: (NMC 7/3).

LOOKOUT DUTIES

On every Navy ship the lookout has an extremely important job. A Signalman's duties also require keeping a sharp lookout. As a matter of pride, the Signalman should be first to sight and identify objects.

A good lookout has to be plenty sharp on a lot of things. Not only must lookouts be able to sight and identify objects, but they must be able to report them correctly, using relative bearings, distances, and in the case of aircraft, position angles.

Navy radar is the best that can be built, but there are many things that even radar cannot always detect, such as small buoys, planes low

on the water, small life rafts and flares, and many other kinds of dangers to navigation. Within recent years there has been a number of occasions where persons have fallen overboard and have been saved because of the timely action of a good lookout.

Also, as a Signalman, you must be familiar with the international distress signals (covered in chapter 6). Recognition of ships and planes, both U.S. and foreign, is another important part of your duties. In connection with recognition, there are a number of publications that may be on board, such as *Jane's Fighting Ships* and several Naval Intelligence Command (formerly ONI) manuals. If the ship has such documents available, they are accessible to bridge personnel, and may be stowed in the vicinity of the signal bridge.

You also have to know the different aids to navigation and their purposes, and naturally, as a Signalman you must also keep a sharp eye on the other ships in company for any signals they may want to send to your ship. It sounds like a tough job and if done correctly, it is. But remember that thousands of others have done it and so can you, if you apply yourself.

If you were to go on night watch directly from a lighted compartment, you would find that you would be almost blind for a few minutes. Gradually your vision would improve as your eyes became accustomed to the weak light. After 10 minutes, you would think you could see fairly well; but it takes at least 30 minutes before you reach your best night vision. This improvement of vision in dim light is called dark adaptation.

A method of adapting your eyes to darkness involves wearing special red goggles called dark-adaptation goggles for half an hour before going on watch. These goggles prepare your eyes for darkness while you wear them. Even after you have worn the goggles for 30 minutes, it still takes an additional 5 minutes in darkness to develop your best night vision.

Once you have your eyes adapted to the darkness, be very careful that you do not ruin

the effect by looking into a white light. If you have to use a light to record a message or make an entry in the log, always use a flashlight with a red lens. Dim red light does not spoil your night vision.

Lookout duties and reporting procedures are discussed in the rate training manual *Basic Military Requirements* and *Lookout Training Handbook*.

ENERGIZING EQUIPMENT

The energizing of the signal searchlights, infrared and other related equipment will be covered in chapter 3. However, as a Signaller, you should also know how to locate and operate the switches for your ship's running lights. You should be able to do this in the dark. The light panel illustrated in figure 1-6, is located in the pilothouse and controls the switches for the port and starboard running lights, towing lights, mast head, and stern lights. This particular type of panel provides an audible and visible signal when the primary filament in any one of the five running lights burns out, and at the same time automatically switches to the secondary filament so that the defective light will remain in service. Although the light remains in service on the secondary filament, the electrician should be notified so the defective lamp can be replaced at the first opportunity. Besides the running light control panel, there is a signal and anchor light supply and control panel, also located in the pilothouse. The supply switches for these lights are individual ON-OFF rotary snap switches. This panel normally controls the aircraft warning lights, blinker lights, not under command lights, steering lights, stern light (blue), and wake light.

The not under command light switch is fitted with a crank handle to facilitate pulsating when the lights are used as a man-overboard signal.

Learn where each individual switch is, and also where the master switch is located. In the event of an emergency you must be able to turn the correct switch at the proper time.



77.42

Figure 1-6.—Supply, control, and telltale panel.

PETTY OFFICER RESPONSIBILITIES

Now that you have a general idea of your professional duties, let us discuss some of your military duties as a petty officer.

Often, the difference between a "good" or "bad" petty officer is leadership.

When you become a petty officer you become a link in the chain of command between your officers and your subordinates. Your responsibilities then will be more than giving orders and seeing that work is done. You will also have to share your knowledge with others. When you earn a promotion, the Navy expects you to bear some of the burden of training others.

Many books have been written on the subject of leadership, and many traits have been listed as a necessary part of the makeup of a leader. Whether you are a successful leader will be decided not by compiled lists of desirable traits but by the success with which you stimulate others to work willingly under your supervision.

Self-confidence is one of the keys to leadership, but it must be backed up by enthusiasm and by knowledge (especially the latter). For example, you not only must be able to supervise lower rated personnel in their communication duties but, as necessary, you also must be ready to pitch in and help do the job. Your subordinates will respect you as a person who has demonstrated know-how, skill, and a sense of responsibility.

A cooperative attitude is also a requirement of leadership. Do not let your experience in the SM rating make you unreasonable and overbearing with lower rated personnel whom you may have to instruct. Your reactions will have a definite effect upon their attitudes and actions.

Be competent in your instruction of others. The opportunity to acquire knowledge and to master new skills was not given to you solely for

your own benefit, but for the benefit of the Navy as a whole. As new types of signaling equipment become available, or changes in communication procedures develop, you should be the first to learn about them. And do not begrudge passing this information and training along to others.

A good working relationship with others is of great importance to the success of a petty officer's work and the mission of the unit. In your day-to-day working relationships, you must learn to cooperate with others. This requirement is true not only within your own division but with personnel in other divisions. Ability to get along with others is, within itself, a definite skill. This skill can be developed in much the same manner as a technical skill; that is, the many different skills you must possess may each be studied and developed. Some of these skills are understanding another person's job, related problems, and abilities. You should develop the ability to instruct, lead, and (in some instances) inspire personnel with whom you work. Detailed information to help you develop these skills is given in the training manual *Military Requirements for Petty Officer 3 & 2*, NAVEDTRA 10056.

CHAPTER 2

SIGNAL EQUIPMENT

Before Signalmen can perform their jobs, they must know the equipment with which they will work and how to operate it. Although equipment may differ in size or vary slightly among ships, signal gear generally is standard throughout the Navy.

In this chapter we will discuss the principles of operation, maintenance procedures where applicable, and safety precautions pertaining to signal lights, infrared equipment, flags and halyards, and optical equipment.

You will not be permitted to use signal equipment until you have been instructed in the operation of all signal devices. The necessary permission must come from the communication (or signal) officer or the petty officer in charge of the signal bridge.

You must be able to locate, even under conditions of total darkness, all light switches for electrical visual signal equipment controlled from the signal bridge and conning station. Usually this is simply a matter of familiarization. On the signal bridge most switches are on or within reach of the equipment. When you first report aboard ship, explore the conning station and the bridge to see where the signal equipment switch panels are located. Do this before your first watch. This practice will prove helpful should your watch be during hours of darkness.

SIGNAL SEARCHLIGHTS

Searchlights are placed aboard naval ships for two purposes—illumination and communications. The use of a searchlight is called the

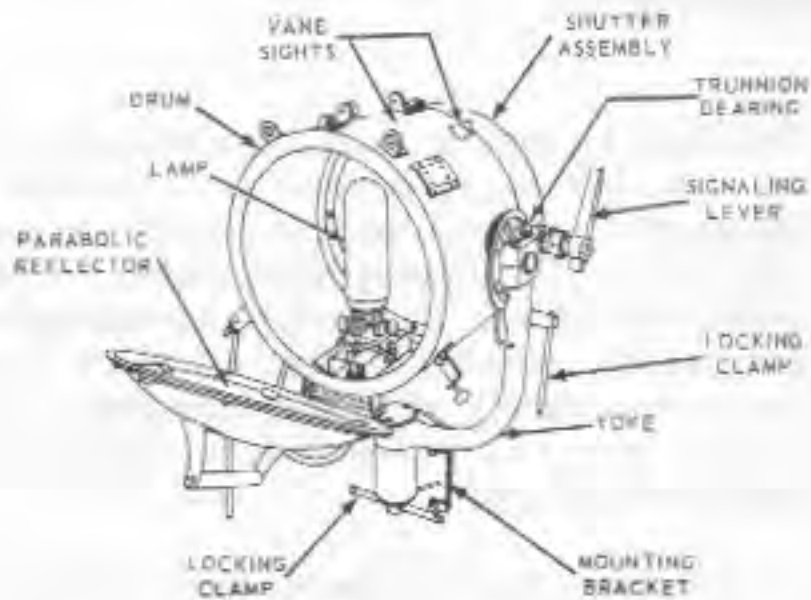
directional method in visual communications, as the light has to be pointed at the receiver. Searchlights are classified according to size and light source. The three general classes are the 24-inch, the 12-inch, and the 8-inch searchlights. The 24-inch searchlight is the carbon-arc type; the 12-inch light is either an incandescent or inert-gas type; and the 8-inch light is the sealed-beam inert-gas type.

Signalmen normally operate the searchlights. Searchlights come under the cognizance of the Naval Sea Systems Command (NAVSEASYS-COM), and the ship's engineer officer is responsible for their repair. That does not, however, relieve the Signalman of the full responsibility for observing the instructions for the proper use and routine maintenance of the searchlights. Operating the various types of searchlights properly will do away with trouble. The life of a searchlight depends upon the care given it. Preventive maintenance and daily cleaning will keep your searchlight ready for instant use.

Searchlights used in the Navy normally use a shutter to interrupt the light beam and permit signaling. The patterns of light caused by opening and closing the shutter are the basis for transmitting messages by Morse code. (See Appendix I.)

12-INCH INCANDESCENT SEARCHLIGHT

The 12-inch incandescent searchlight is used primarily for signaling and secondarily for illumination.



101.1

Figure 2-1.—12-inch incandescent searchlight.

Figure 2-1 shows a 12-inch incandescent searchlight consisting of the mounting bracket, lamp-supporting yoke, and high-power (1000 watt) incandescent lamp housed in a drum. By using a brace or extension between the mounting bracket and the yoke, the light can be swung in an arc to clear fixed portions of the ship's structure.

Besides holding the lamp, the drum provides a mounting for the signaling shutters. On top of the drum are vane sights used to aim the light. The front and rear doors are hinged, allowing access to the drum interior. The parabolic reflector is mounted on the rear door. Levers on either side of the drum open and close the shutters to permit signaling up to 15 words per minute, depending on the manufacturer's technical manual.

The drum is mounted on the yoke with trunnion bearings so that the light can be elevated or depressed. Locking clamps on the yoke secure the light in elevation; locking clamps beneath the mounting bracket lock the light in train.

There is very little to operating this type of light. You can learn in a short time the proper procedure for turning the lamp on and off, positioning it horizontally or vertically, and

operating the shutters. Train the searchlight directly on the receiver in daytime, but not at night, for it might blind the receiver. At night, train the searchlights slightly under or above the receiver.

Operation

A remotely mounted rotary switch controls power to the lamp. To open the signaling shutter, use pressure on the signaling lever to overcome spring pressure. When you release pressure on the signaling lever, the spring forces the shutter closed. Two leather bumpers cushion the return of the signaling lever, protecting the shutter from damage.

Do not keep the searchlight switched on longer than necessary. When not in use, lock the searchlight in the fore-and-aft position.

When the signal bridge is secured, as during overhaul or inclement weather, place a protective canvas cover over lights not in use.

Maintenance

Maintain searchlights the same way you would all electrical and mechanical equipment. Electrical contacts must be kept clean and bright. Electrical leads should be checked daily and replaced as soon as defects appear. Depending on the amount of time they are used, moving parts such as trunnion bearings and stanchion socket must be lubricated at intervals. Vane hinges and links should be lubricated once a month, or more frequently if required, with a mixture of graphite and diesel oil (diesel oil floats the graphite into places needing lubrication). Shutters should be operated for a few minutes after lubrication with the door glass and cover open to allow the diesel oil to evaporate. The lubrication mixture is applied sparingly to prevent its clouding the glass or reflector.

At regular intervals, the two shutter stop screws, located next to the handles, are adjusted to take up wear in the leather bumpers that cushion the shock of the shutters' closing. To prevent twisting the shaft, the bumpers should

just touch the stop adjustment when the vanes are closed. Shutter vanes are checked often to ensure that all screws are tight.

Clean the reflector at least weekly to remove dust. Remove salt spray from the lens and reflector whenever needed. To clean the reflector:

1. Ensure that the surface is cool.
2. Use standard Navy brightwork polish.
3. Use cotton or a soft clean cloth.
4. Use radial motion from center toward rim of reflector. Do not use circular motion.

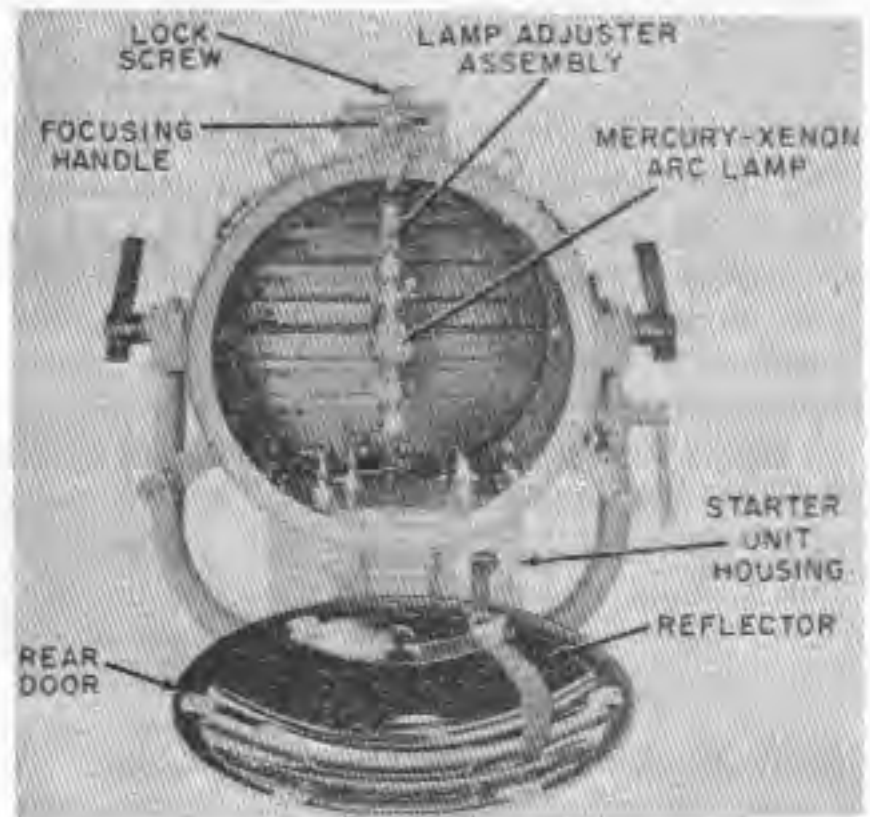
Never paint a bearing surface or the working member of any part of the light. Do not paint bolts, locking nuts, or other parts necessary for access to the interior. Do not paint over nameplates, and keep oiling cups and holes free of paint.

Replacing the lamp and focusing should be done only by qualified Electrician's Mates unless a member of the signal gang is qualified and authorized to do so.

12-INCH MERCURY-XENON ARC SEARCHLIGHT

The mercury-xenon (pronounced ZEE-non) arc searchlight uses a modified 12-inch incandescent searchlight drum to house the mercury-xenon lamp. (See figure 2-2.) The 1000-watt lamp produces a beam intensity about 10 times that of the incandescent lamp.

Mercury-xenon lights have a shutter unit that permits sending at 15 words per minute, depending on the manufacturer's technical manual. When cold, the mercury-xenon bulb is pressurized to between 3 and 5 times atmospheric pressure and contains a small quantity of liquid mercury and gaseous xenon. When the lamp is operating, internal pressure increases to about 20 times atmospheric pressure, or 294 pounds per square inch. The lamp does not produce full light output until this pressure is reached and all mercury is vaporized.



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Figure 2-2.—12-inch mercury-xenon arc searchlight (rear view), showing lamp.

A ballast unit, lamp adjuster assembly, and starter unit are used with the mercury-xenon light.

The ballast unit is a separately mounted unit designed to reduce line voltage to lamp-operating voltage and to maintain constant current during operation. Normally it is mounted in a location protected from the sea. Because the unit generates heat, place nothing on or near it that would interfere with natural circulation of air; the unit may be damaged or fire may result.

The lamp adjuster assembly, which focuses the light beam, protrudes from the top of the searchlight drum (as the focusing handle) and extends inside to hold the lamp. The starter unit, containing electrical components necessary for starting and operating the lamp, is mounted on the underside of the drum.

Operation

To start the light, close the remote manual switch, then turn the starter switch counter-clockwise on the rear of the starter unit. (See

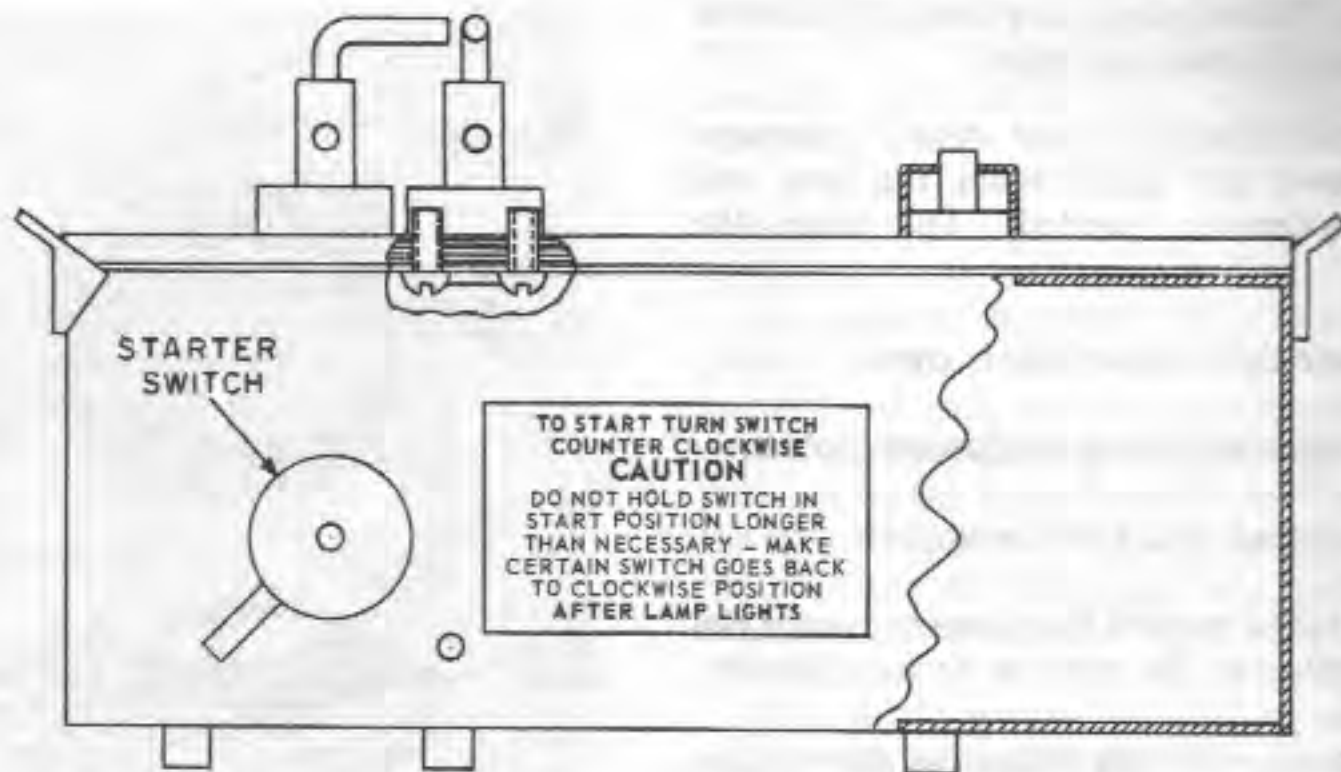


Figure 2-3.—Starter unit for 12-inch mercury-xenon searchlight.

101.2

figure 2-3.) Release the starter switch as soon as the lamp arcs. Be sure the starter switch returns to its previous position, otherwise higher current required to start the lamp may damage electrical components.

Initially, the lamp burns only at about 25 percent of designed intensity. It takes 2 to 3 minutes to reach maximum brilliance.

The light should not be elevated or depressed more than 10° for extended periods of time, because the life of the lamp is reduced considerably at extreme angles. Operate the shutters the same as you would the incandescent lamp shutters. To turn off the lamp, open the remote manual switch.

Maintenance

Mechanical maintenance of the mercury-xenon light is essentially the same as for the incandescent light; clean regularly, check for loose screws, and lubricate periodically.

Electrical maintenance should be left to the electricians unless a member of the signal gang is qualified by the engineer officer.

Because the lamp contains gas under pressure, take care when handling it or when

cleaning the interior of the drum. The lamp shell is quartz, not glass. Keep it free of oil or grease, and do not handle it without the protective metal case provided. Grease or oil may, at lamp-operating temperatures, set up stresses in the quartz and cause the lamp to explode. If the lamp should be soiled in any way, wash it off with alcohol or other grease-free solvent, then dry it carefully with a clean cloth.

Before opening the drum, ensure that the power is off and cannot be turned on. This can be done by turning the remote switch OFF and then removing the power cable plug from the starter unit.

When you remove or replace the lamp, wear the face guard and gloves provided. Place the protective metal guard over the lamp, disconnect the lamp leads from the binding post on top of the starter unit, loosen all wing nuts holding the lamp in the lamp adjuster assembly, then remove the lamp.

CAUTION: Even when it reaches the end of its useful life, a mercury-xenon lamp is potentially dangerous. Turn it in to the mercury control officer or representative for disposal.

When installing a new lamp, do not touch the quartz with your fingers. Keep the protective case around the lamp until it is in place.

Hold the lamp by the protective cover with the longer of the two leads pointing up, and insert them in the two vee-slots on the lamp supports. Fasten the lamp in place with the clamps and wing nuts, then connect the power leads to the binding post, ensuring that they do not touch any other metal parts.

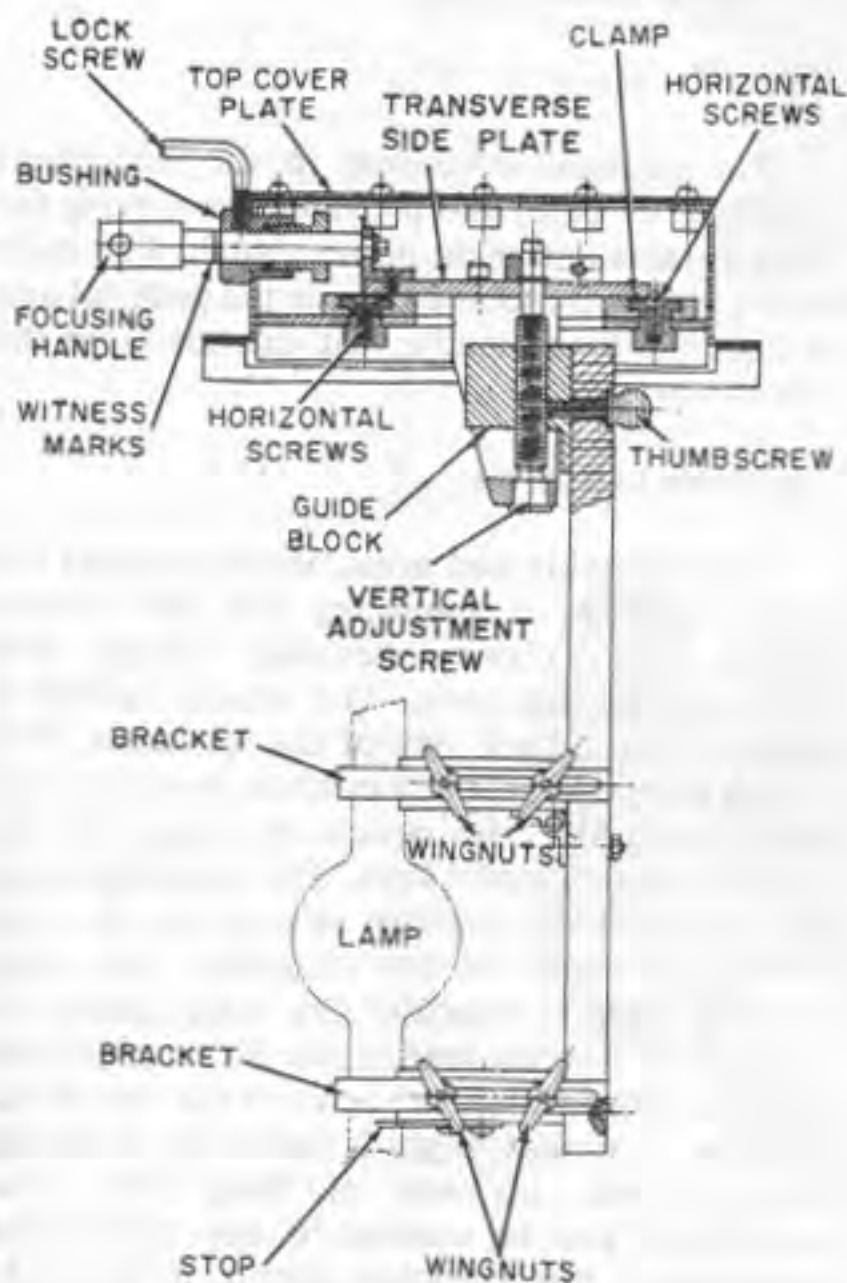
For signaling at the greater designed ranges, more accuracy in aim is required. To align the sights with the beam, aim the light at a wall or

bulkhead 50 to 100 feet away. Focus the lamp for the narrow beam. Look through the sights. The beam should be in the center.

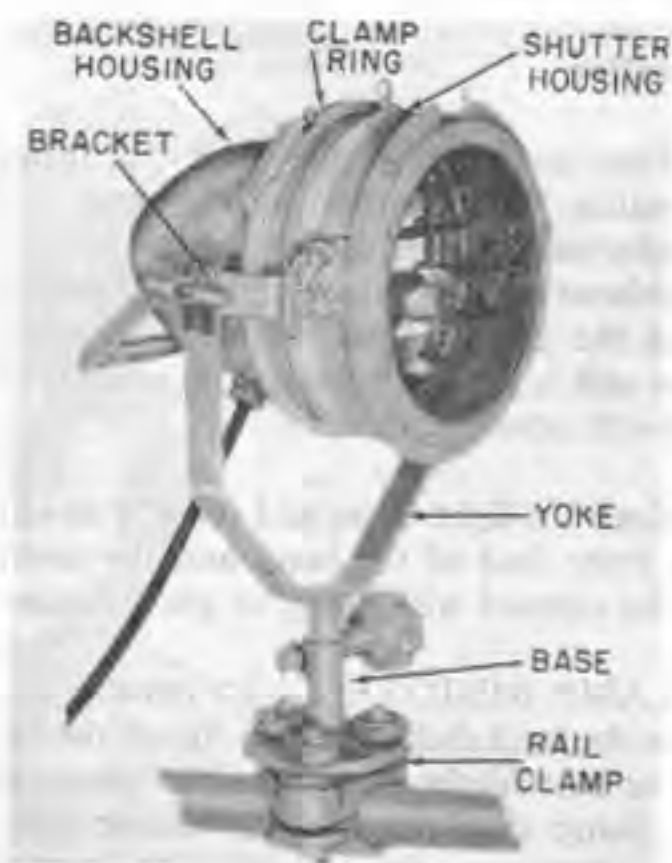
If the beam is not centered, remove the top cover plate of the lamp adjuster assembly. (See figure 2-4.) If the beam is low or high, loosen the thumbscrew and turn the vertical adjustment screw to raise or lower the lamp. When you have it adjusted, tighten the thumbscrew. If the beam is off to one side, loosen the four horizontal screws on the transverse sliding plate, slide the plate by hand to center the beam, and retighten the screws.

8-INCH SEALED-BEAM SEARCHLIGHT

The 8-inch sealed-beam signaling searchlight (figure 2-5) is designed mainly for use aboard submarines and small craft; it can withstand high-vibratory shock and adverse humidity conditions. The lamp is mounted in a sealed-beam bulb, 8 inches in diameter. This design ensures proper focus and a clean reflector at all



77.60
Figure 2-4.—12-inch mercury-xenon lamp adjuster assembly.



77.62
Figure 2-5.—8-inch sealed-beam searchlight.

times, thereby maintaining maximum light output for the life of the lamp.

The searchlight consists of three major assemblies: mounting assembly, backshell housing, and shutter housing. The shutter and backshell housing assemblies are fastened with a clamp ring. Although the light usually is mounted in the yoke of the mounting assembly, it may also be used as a portable searchlight.

The backshell housing provides an enclosure for the 115/23-volt transformer.

The shutter assembly consists of the shutter vanes and their operating mechanism. A sight for aiming and a trigger for operating the searchlight are on the outside of the shutter housing.

The mounting assembly consists of a yoke, a base that holds the yoke and permits it to swivel, and a rail clamp for mounting the entire light to the rail. The mounting assembly permits training the searchlight through 360°, elevating to 90° above the horizontal, and depressing 45° below the horizontal.

Operation

This searchlight may be furnished for operation with either a 60-hertz 115-volt transformer to step the voltage down to 23 volts, or without a transformer to operate on 115 volts using the proper rated sealed-beam unit. The same unit is available for use on small craft with a 28-volt power source.

Keep the light clean and painted at all times. The front face of the lamp and the cover glass can be cleaned with water or glass cleaner.

LAMP REMOVAL.—To remove the lamp from the backshell housing, tip up the rear end of the searchlight and lock it in place. Release the clamp ring toggle and remove the clamp ring. Remove the backshell assembly by disengaging it from the hook and tab.

LAMP REPLACEMENT.—When replacing a lamp in the backshell housing, align the word

TOP, which is marked on the lamp and on the basket. Ensure proper positioning of the lamp contact on the lamp terminals.

CAUTION: Never open the searchlight housing without first disconnecting the power cable.

24-INCH CARBON-ARC SEARCHLIGHT

The 24-inch carbon-arc searchlight (figure 2-6) is used primarily for signaling and secondarily for illumination purposes. It consists of a (1) stationary pedestal, (2) turntable with arms, (3) drum with iris and signaling shutters, and (4) carbon-arc lamp.

Pedestal

The pedestal is secured to the searchlight platform, or base, and provides a mounting for the turntable and main power switch. The main power switch is mounted inside the pedestal and is operated by a handle that extends from the switch cover.

Turntable and Arms

The turntable and arms, which support the drum, provide a mounting for the shutter switch, train clamp, elevation clamp, and elevation stowing lock. The shutter switch is located on the back side of the turntable. This switch must be in the ON position to operate the signaling-shutter mechanism by means of the local or remote signal keys. The searchlight can be secured in any position of train by the train clamp, mounted on the turntable. The train stowing lock is opposite the train clamp. It consists of a spring-loaded pin that engages one of four slots located 90° apart in the top of the pedestal. The searchlight is locked by dropping the pin into any one of these slots. The searchlight can be secured in any position of elevation by the elevation clamp on the right turntable arm. The elevation stowing lock is near the clamp. It consists of a spring-loaded pin (similar to the train stowing lock) for locking the searchlight in either the horizontal (normal) or vertical position.

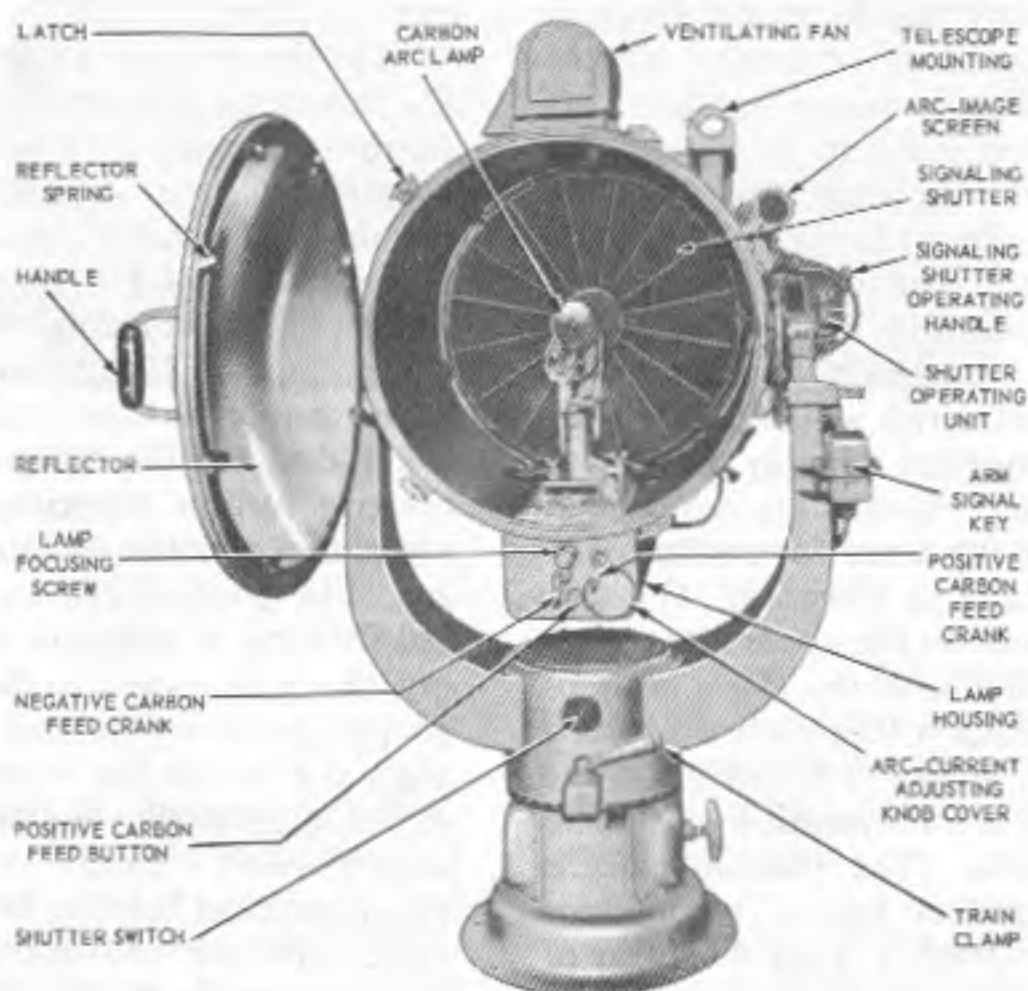
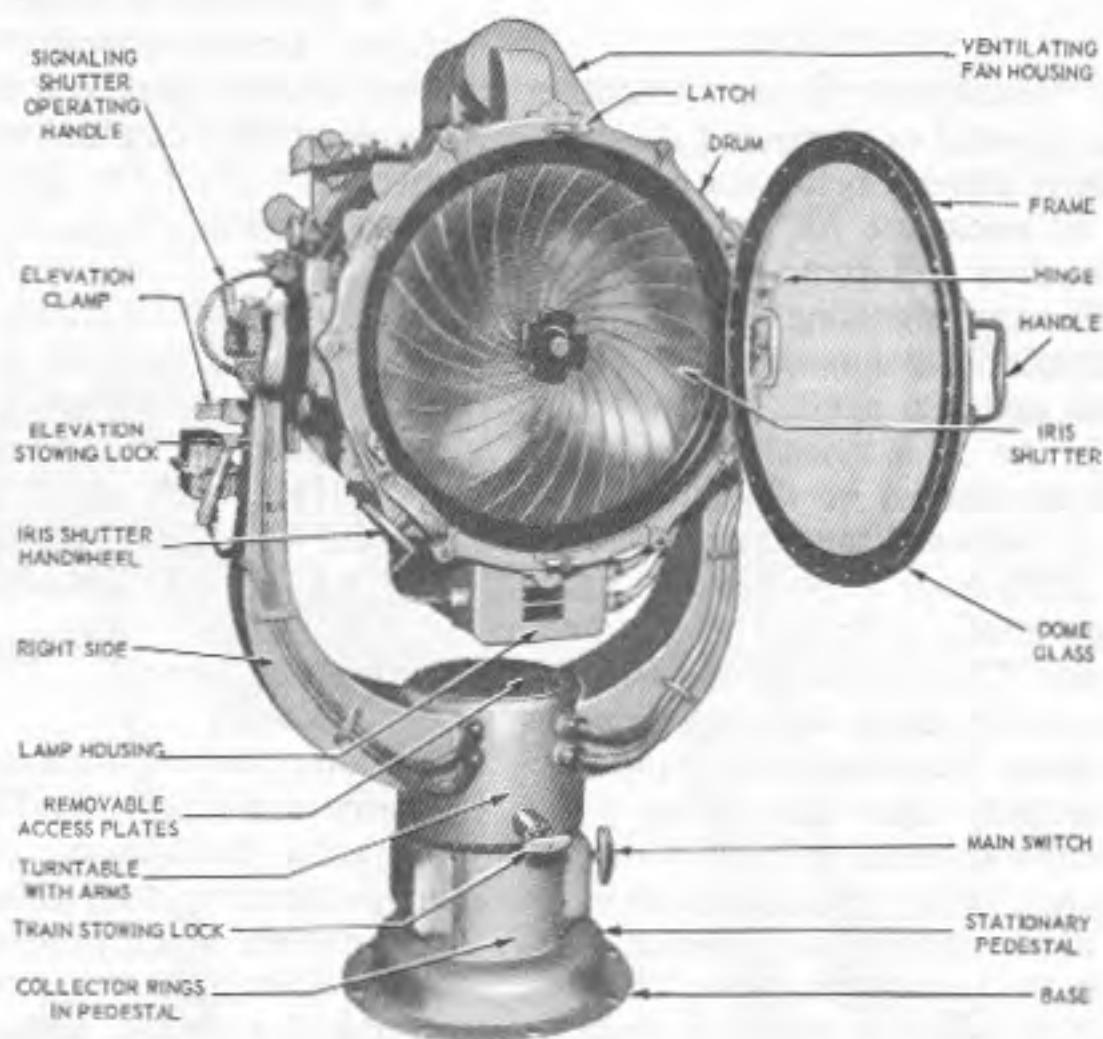


Figure 2-6.—24-inch carbon-arc searchlight (front and rear views).

Drums

The drum is trunnioned on the turntable arms and can be elevated or depressed through angles of 110° above and 30° below the horizontal. It provides an enclosure for the (1) lamp housing, (2) front door and dome glass, (3) iris shutter, (4) sector-vane (signaling) shutters, (5) rear door and reflector, and (6) ventilating system. The front and rear doors are mounted on hinges. They can be latched in the fully opened position or secured in the (normally) closed position. A heat-resistant dome glass is mounted in the front door to protect the light source, and a parabolic reflector is mounted inside the rear door. The iris shutter is mounted as a removable assembly inside the drum directly behind the front door. The iris shutter maintains the drum substantially light-tight when it is desired to shut off the beam of light without extinguishing the arc. It can be used also to vary the size of the drum opening and, hence, the amount of light in the searchlight beam. The iris shutter must NOT be used as a signaling shutter.

The signaling shutter is a radial-vane shutter mounted inside the drum behind the iris shutter. It is spring-actuated to close and is manually opened by an operating handle on the forward right-hand side of the drum. It can be opened automatically by local and remote signaling keys in the shutter-operating circuit. If the shutter switch is in the ON position, the signaling shutter will open when the signal key is depressed. The shutter can be latched in the opened position when the light is used for illumination. The parabolic reflector is constructed from a material which is relatively unaffected by arc fumes and is highly resistant to corrosion by salt water. Handles are provided at the front and rear of the drum for swinging the searchlight in train and in elevation. The arc-image screen is located on the upper right-hand side toward the rear of the drum. It is a ground-glass screen upon which a lens system projects an image of the arc. A line is inscribed on the screen to indicate the correct position of the end of the positive carbon. (The function of the positive carbon is described later.) The operator at the rear of the searchlight can see the image of the arc on a mirror mounted on the inside of its cover.

A peepsight is located below the arc-image screen, directly opposite the arc. It contains a dense-colored glass light filter through which the source of light can be seen. The peepsight has a cover to protect the glass and to prevent light from escaping. Keep the cover closed at all times.

The ventilating system is mounted on top of the drum. Its function is to remove the gases produced by the arc and to prevent deterioration of the parts exposed to the intense heat of the arc. **THE LAMP MUST BE EXTINGUISHED IF THE VENTILATING SYSTEM DOES NOT OPERATE SATISFACTORILY.**

Carbon-arc Lamp

Components inside the drum include the positive head, the negative head, and the lamp-operating mechanism. (See figure 2-7.) The lamp-operating mechanism holds and controls the carbons which produce the source of light. The automatic features of rotating and feeding the positive carbon, feeding the negative carbon, starting the arc, and providing ventilation are accomplished by the lamp (feed) motor and associated equipment contained in the lamp base.

The light source is formed by a high-intensity arc between special cored carbon electrodes. The positive carbon is 18 inches long and the negative carbon is 8-3/4 inches long. The burning time for a set of these carbons is approximately 1-3/4 hours. In operation, the negative carbon burns away to a taper and is continuously and automatically fed forward to maintain constant voltage between the electrodes. On the other hand, the core of the positive carbon vaporizes and forms a hollow crater that contains an intensely luminous ball of gas. The positive carbon is also automatically fed forward to maintain the crater at the proper position with respect to the reflector. When in its proper position, the end of the carbon will be aligned with the line inscribed on the arc-image screen as previously mentioned. It is also rotated continuously about its axis to prevent unsymmetrical burning of the carbon around the crater and the consequent spilling out of the luminous ball, which is the major source of light.

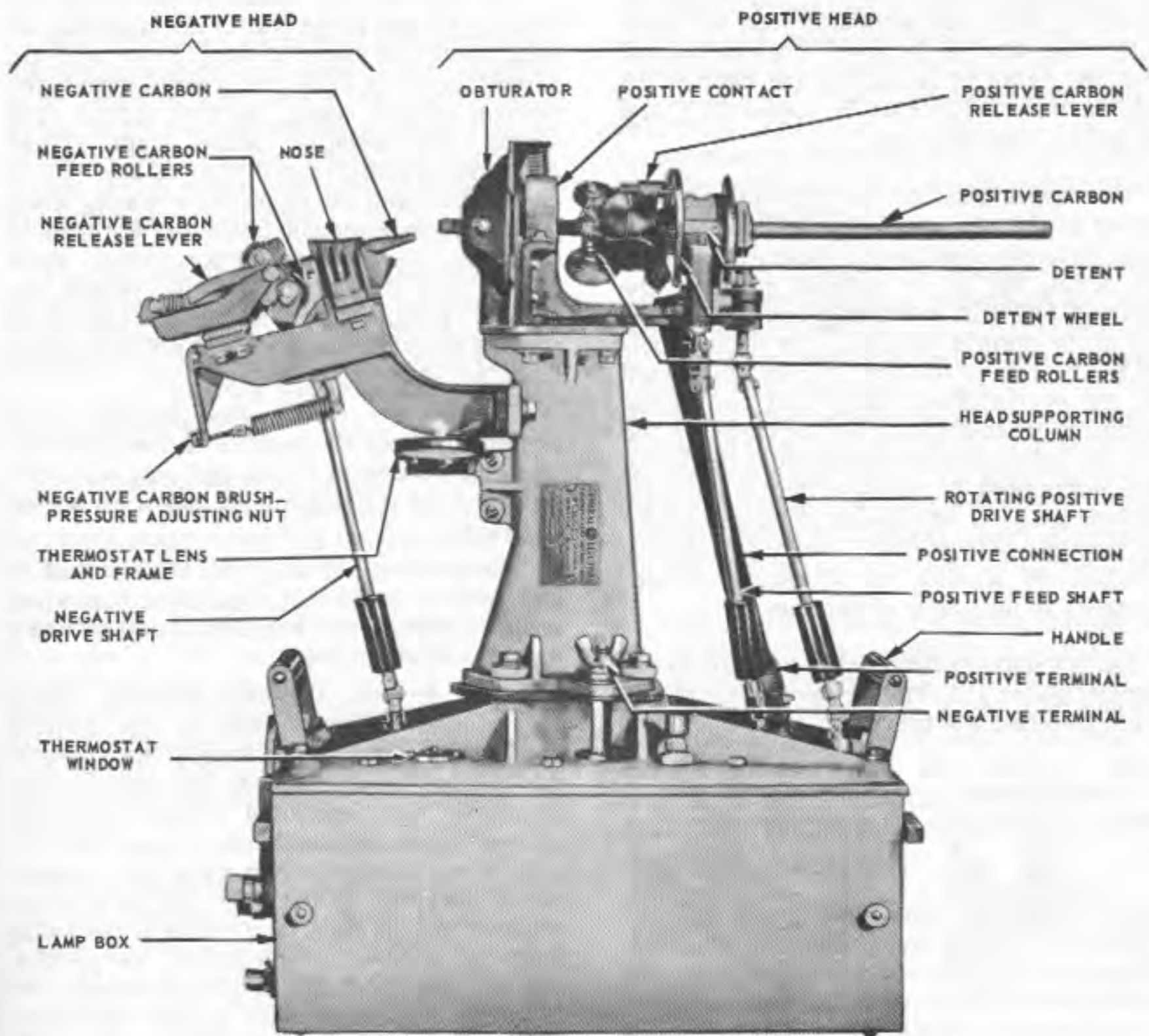


Figure 2-7.—Carbon-arc lamp.

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Operation

To start the arc with the automatic control, turn the main switch to ON. The ventilating fan motor and the lamp motor start to run immediately and continue as long as the carbon-arc lamp circuit is energized. As soon as the voltage is applied to the lamp terminals, the arc

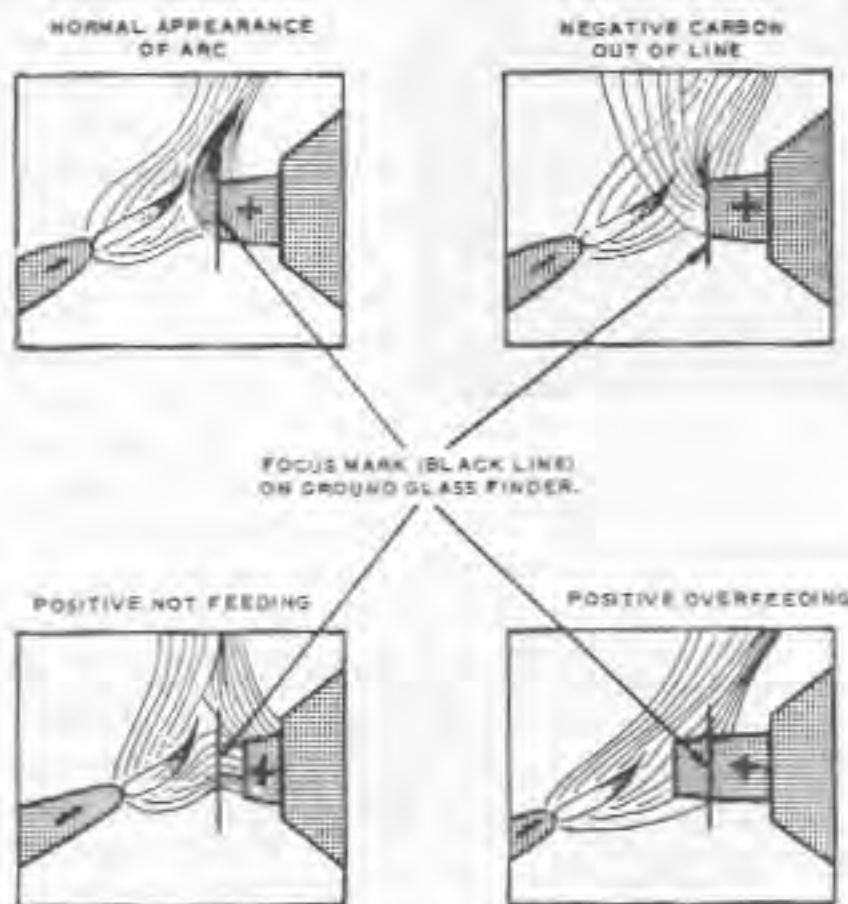
current regulator will cause the negative carbon to be fed into contact with the positive carbon. This completes the arc circuit, after which the negative carbon retracts and extends the arc to its proper length.

When the arc has been established, observe the position of the tip of the positive carbon with respect to the focal line on the arc image screen.

If it is slightly ahead or back of the line, do not disturb it, since the automatic feed will soon bring it into line. If the positive carbon is more than one-eighth of an inch to the right of the line, the main switch must be turned OFF, and the carbon manually reset.

The appearance of the high-intensity arc viewed in the arc image screen (when burning under different conditions) is illustrated in figure 2-8. When the arc is burning properly, the luminous ball is in a vertical plane through the axis of the positive carbon. If the flame shoots off to one side or the other, instead of toward the top of the drum, check and correct the alignment of the heads. If the arc current is too low, the appearance of the luminous ball is not very pronounced. If the arc current is too high, the luminous ball will appear to extend toward the negative carbon. Excessive arc current is indicated by a thick black tongue of soot appearing in the center of the flame.

Do not start the lamp unless the carbons are properly placed and firmly gripped by the rollers which automatically feed them.



77.52

Figure 2-8.—Appearance of high-intensity arc.

The lamp can be manually operated by the controls located at the rear of the lamp box. In addition to the lamp focusing screw and arc current adjusting knob, the controls include the positive carbon crank, positive carbon feed button, and negative carbon crank. These controls are spring-loaded and are held out of engagement with the motor-drive gearing when the lamp is in automatic operation. For manual operation, the positive carbon crank, when pushed in and rotated clockwise, rotates the positive carbon. (For automatic operation, rotating the crank disengages the positive carbon from the motor drive gearing.)

The positive carbon feed button, when pushed in, feeds the positive carbon forward. The positive carbon can be fed only when the positive head is being rotated and it cannot be retracted.

The negative carbon crank, when pushed in and rotated, feeds the negative carbon when turned clockwise and retracts the carbon when turned counterclockwise.

When operating the lamp manually, adjust the positive carbon so that its tip projects approximately nine-sixteenths of an inch beyond the positive head. Energize the main power switch; if the ventilating system does not operate, secure the searchlight. To start the arc, push in the positive carbon crank and rotate it slowly clockwise. At the same time, push in the negative carbon crank and rotate it clockwise until the negative carbon strikes the positive carbon. Then, immediately reverse the rotation of the negative carbon crank to draw out the arc and reduce the current. Excessive current will cause the arc to sputter and give off black soot.

Continuously rotate the positive carbon crank and note the position of the positive carbon tip on the arc image screen. The positive carbon can be fed into the arc by holding IN the positive carbon feed button as the positive carbon crank is rotated. Thus, the tip of the positive carbon is maintained at the focal line on the arc image screen. The positive carbon crank must be continuously rotated, whether feeding is desired or not.

To extinguish the arc, turn the power switch to the OFF position.

Maintenance

When operating the carbon-arc searchlights, Signalmen must be careful not to let the positive carbon burn so short that it cannot be gripped by the feed rollers and fed toward the arc. If the positive carbon burns after this condition occurs, the arc burns closer to the obturator and will finally cause it to melt.

Operators must frequently observe the arc of an operating searchlight through the peepsight. They should renew the carbons when the positive carbon is no longer being fed forward or when its tip projects less than one-half inch beyond the obturator.

To renew the carbons, turn the power switch to the OFF position. Place the drum in the horizontal position and lock the searchlight both in train and elevation. Open the rear door until the latch engages. Make sure that the components are cool before touching with the bare hands. Lift the negative carbon release lever upward and remove the negative carbon by pushing it out through the rear of the negative head. Lift the positive carbon release lever and remove the stub by pulling it out over the negative head. If the stub is hot, use pliers to remove it.

With the reamers provided, ream the positive and negative heads before each recarboning. This action removes material deposited by the preceding carbons. Carbons are always renewed in pairs to ensure optimum performance of the searchlight. Release the carbon-feed rollers before you insert the reamers. Insert the positive head reamer from the front end, and the negative head reamer from the back, or release-lever end. Be careful that the cutting edges of the reamers do not come in contact with the rollers. Do not use reamers while the heads are still hot. If it becomes necessary to ream while the heads are still hot, turn the reamer continuously to prevent seizure by cooling and contraction of the metal parts.

When the reaming is completed, run the new set of carbons through the heads to be certain they do not jam. Crooked carbons or those

having long cracks or loose cores should be discarded. Rough spots and blisters can be removed with sandpaper. Adjust the protrusion of the positive carbon from the nose cap, and adjust the arc length following the values specified for the equipment in the manufacturers' instruction books. The carbons must be centered in their heads and must not touch the nose caps.

After the carbons are renewed, wipe the reflector, front door glass, thermostat lens, and thermostat window with a clean, dry cheesecloth to remove any carbon deposit. Close the lamp housing, turn the power switch to the ON position, and operate the searchlight for about 5 minutes to form the crater in the positive carbon and establish a normal arc. The first 5 minutes is the critical period of operation after a carbon renewal. During this interval, closely observe the arc and all lamp parts for any malfunctioning.

After every extended run of the searchlight, and at least once each week for those lights not in use, brush and wipe the interior of the drum and the lamp mechanism. Clean the reflector and front door glass each week. The reflector can be cleaned with any standard Navy brightwork polish, using the same procedures as described for the 12-inch incandescent searchlight.

After long use, and particularly when exposed to salt spray, the surface of the reflector may become coated in spots with a white deposit which cannot be removed by the use of brightwork polish. In this event, prepare a warm 5 percent solution of nitric acid (1 part by volume of concentrated acid and 19 parts by volume of water) and apply it with absorbent cotton. Following this treatment, wash the reflector with hot water and dry it with absorbent cotton. Nitric acid cleaning is necessary only in unusual cases, and only after routine methods have repeatedly failed.

Do not attempt to clean the reflector or door glass when either is hot. Never use red rouge or any other polish containing abrasives, or attempt to remove specks with a tool. Waste or cloth which may scratch or otherwise harm the

finish must never be used. Bird's-eye cloth and lens paper are the best and safest, provided they are clean and oil-free. Before wiping the reflector, remove any carbon or other particles with the fingernail or a piece of soft wood. If this is not done, the particles may become embedded in the wiping cloth and scratch the reflecting surface.

The exterior parts of the drum, trunnion arms, and base of all searchlights must be painted to preserve the metal. Paint must not be applied to bearings, working members of any part, or to any bolt, locking nut, or part that must be removed for access to the interior. Nameplates, oil cups, and oil holes must be kept free from paint. The interior surfaces of the drum, including the signaling-shutter blades, must be painted a dull black to minimize stray light.

On some ships the Signalmen renew the carbons when it becomes necessary. On all ships they handle the routine cleaning and upkeep of the searchlights. However, repairs are accomplished only by Electrician's Mates who are specially assigned to such work by the engineer officer.

Safety Precautions

Before starting the lamp mechanism, ensure that the carbons are properly placed (the carbons should not be touching, except in the older types of searchlights equipped with a hinged-negative head) and firmly gripped by the feed rollers.

Do not operate the lamp if the ventilating system does not function properly. When operating the lamp, frequently observe the arc image screen to determine that the positive carbon is properly focused to avoid damage to either head. Never look directly at the arc; always view it through the peepsight or arc image screen.

Under normal conditions, the drum must be kept tightly closed during operation of the arc. Make sure that the drum is in the horizontal position and locked securely in train and elevation before opening the front or rear doors.

Be certain that the power switch is in the OFF position before changing carbons. When recarboning, always replace both the positive and negative carbons. The carbons must be kept dry and protected from any jarring that may cause them to crack or to loosen the cores.

Searchlights that are not in use must be locked in their secured positions by means of the brakes and stowing locks. In case of heavy weather at sea, searchlights must be secured with the front door glasses turned inboard.

YARDARM SIGNALING BEACONS

Yardarm signaling beacons, called blinkers, are 32-point (360°) white lights, located either on the yardarms or on separate supports on the mast. (See figure 2-9.) The fixtures are spraytight and fitted with screens at their bases to prevent glare or reflection that may interfere with navigation. The lights are limited in range and can be used effectively only during hours of darkness.

Yardarm blinkers permit simultaneous nondirectional transmissions to a number of stations. These lights are operated from signal keys located on each side of the signal bridge. Some new construction also have a key in the signal shelter.

Normally, beacon maintenance is a responsibility of the ship's Electrician's Mates. Cleanliness and upkeep of the light exteriors are tasks for the Signalmen.

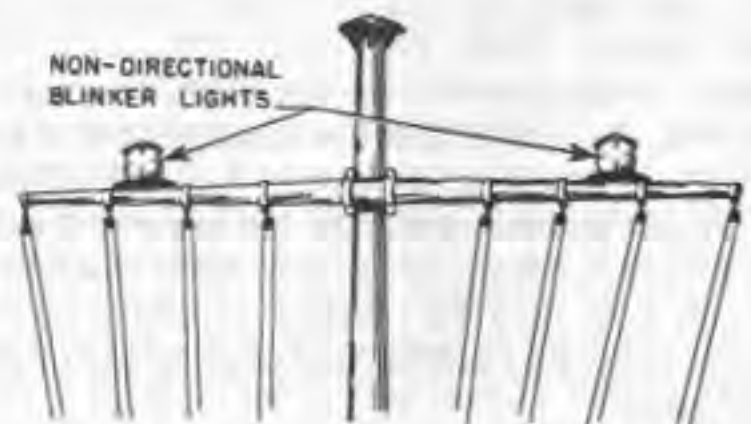
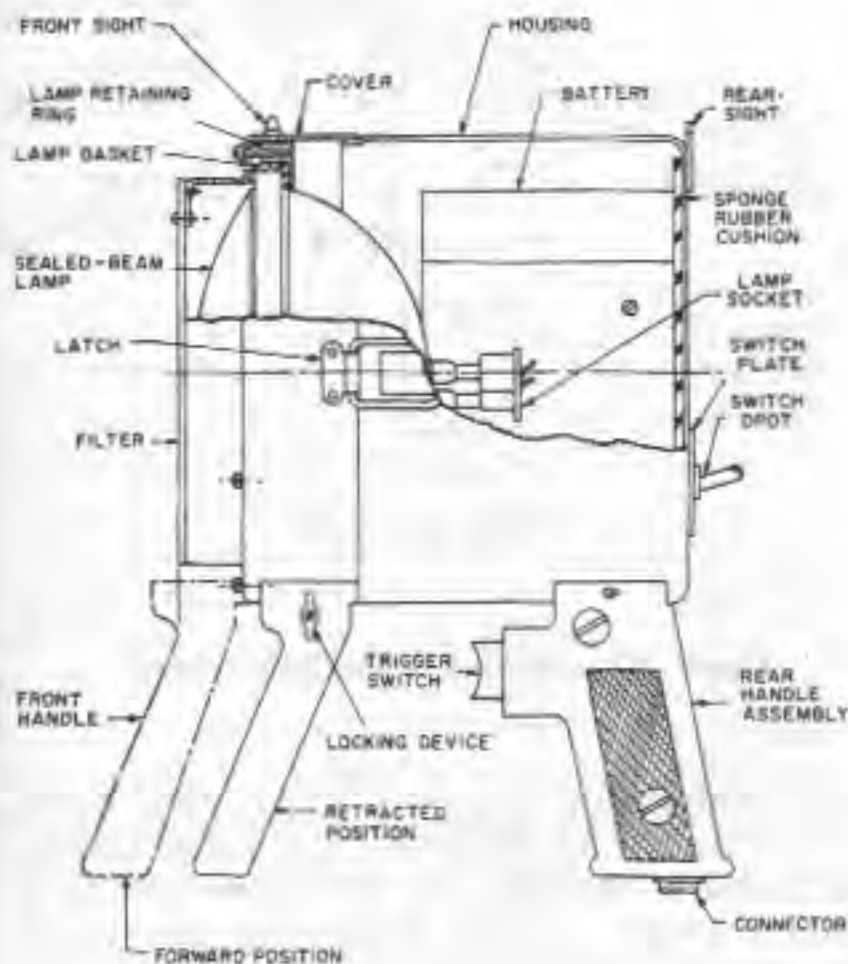


Figure 2-9.—Yardarm bunkers.

MULTIPURPOSE SIGNAL LIGHT

The portable multipurpose signal light (figure 2-10) produces a high intensity beam of light suitable for use as a spotlight or as a blinker (by means of a trigger switch located on the rear handle) for visual communications. The light is designed to operate from an internal battery (three type BA-2 dry cells connected in parallel), or from the 120-volt a.c. ship's supply via a 120/20-volt transformer mounted in the stowage box. The front handle is adjustable to assure a steady position when signaling, and front and rear sights provide for holding the beam on the desired target.

Supplied with the light, in addition to the stowage box, are red, green, and yellow lenses, 15-foot power cable for supplying power from the ship's a.c. source to the stowage box, a 25-foot cable for supplying power from the stowage box to the light, and the manufacturer's technical manual.



101.5

Figure 2-10.—Multipurpose signal light.

For signaling, the lamp may be held in the hand and operated with the trigger in the pistol-grip handle. It has an effective signaling range of 4000 yards and is designed to send up to 12 words a minute.

INFRARED EQUIPMENT

White light actually is a combination of light waves of many frequencies and colors. Infrared (infra is a prefix meaning below) rays are those which, lying just beyond the visible red rays, are invisible to the naked eye. Infrared equipment, popularly known as Nancy gear, makes it possible to visually detect the infrared rays of the light spectrum. For example, an infrared filter on a signal searchlight effectively blocks all visible light rays, permitting only infrared light waves to penetrate the filter. Special receivers are used to detect and "read" the transmitted infrared signal, thus providing a measure of communication security.

Like visible light, infrared rays are limited in range to the horizon, and range is reduced by adverse weather to about the same extent as white light.

For directional infrared signaling, the most widely used transmitting equipment is the standard 12-inch signal light fitted with a type-H hood containing the special filter lens. The lens itself resembles a sheet of red glass. The light is operated in the usual manner, but train must be more accurate. A hood also is available for use with the 8-inch light.

Nondirectional infrared transmitting beacons, like blinkers, usually are mounted in pairs. They are located either inboard of the blinkers or on a separate support on the mast, as in figure 2-11. When used for signaling, they are operated in the same manner as yardarm beacons. They also are used as a point-of-train (POT) light to assist the sender in locating the receiving station and in keeping the light properly trained. The point-of-train light is turned on to indicate that a station is communicating or is ready to communicate with infrared. It is turned off at other times.

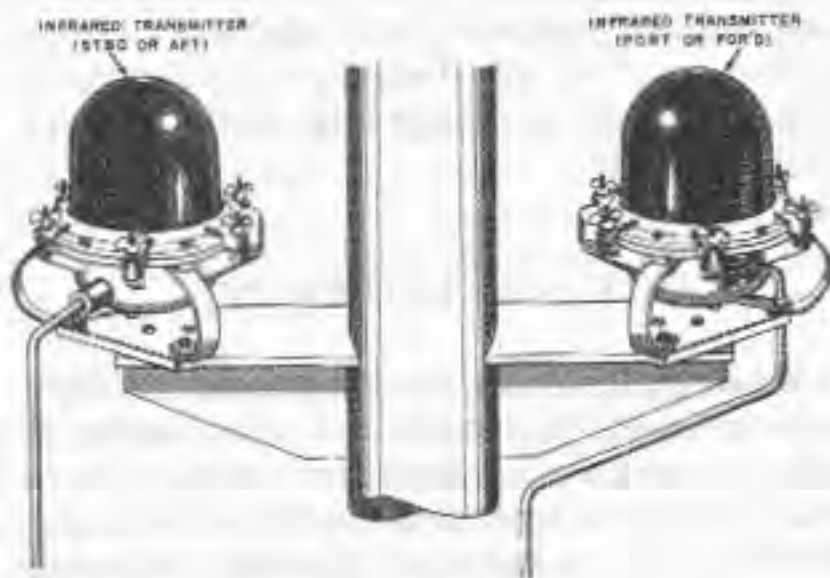


Figure 2-11.—Infrared beacons.

101.6

INFRARED VIEWERS

Infrared viewing sets electronically convert infrared radiation to visible light by means of a fluorescent screen seen through the eyepiece of the viewer. Infrared transmissions are used mainly for communicating, but they also can be used for observation and reconnaissance. For signaling purposes, the viewer is simply focused on the infrared-filtered signal searchlight. For observation and reconnaissance, the area to be observed is illuminated by the infrared-filtered light, and the viewing set is trained on the reflected infrared radiation.

Before operating a viewing set at night, your eyes should be dark-adapted. To accomplish this, remain in total darkness for 30 minutes before starting operations or wear dark-adaptation goggles for 20 minutes and remain in total darkness for another 10 minutes.

Always handle infrared viewing sets with the same care as any other precision optical or electronic devices; they are extremely delicate instruments. Before operating a set for the first time, if at all possible, carefully study the technical publication for that type of set.

There are two types of infrared viewing sets in general use: AN/SAR-7 and 7A (figure 2-12). Both the SAR-7 and 7A are issued with

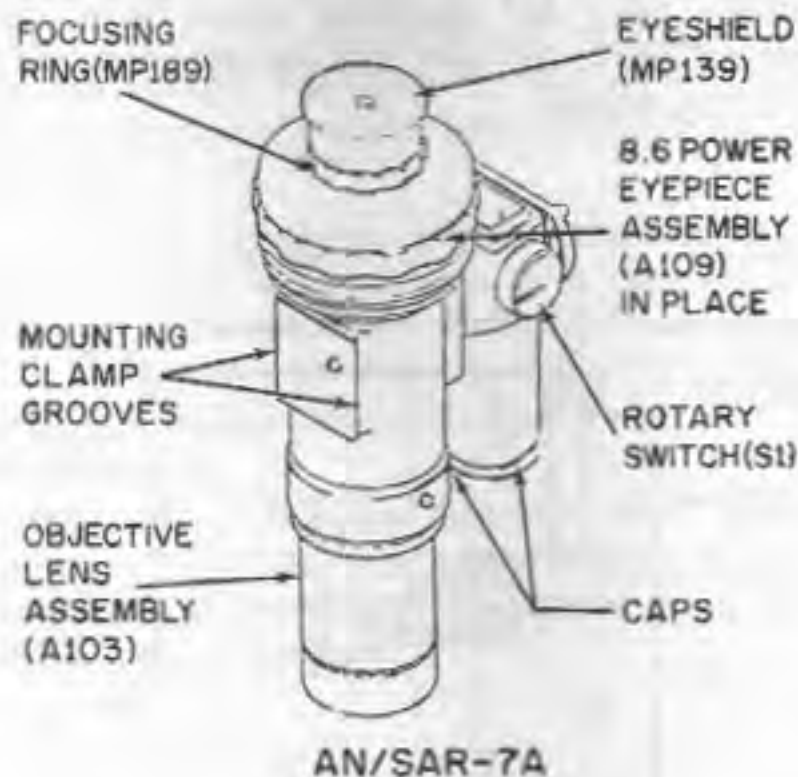
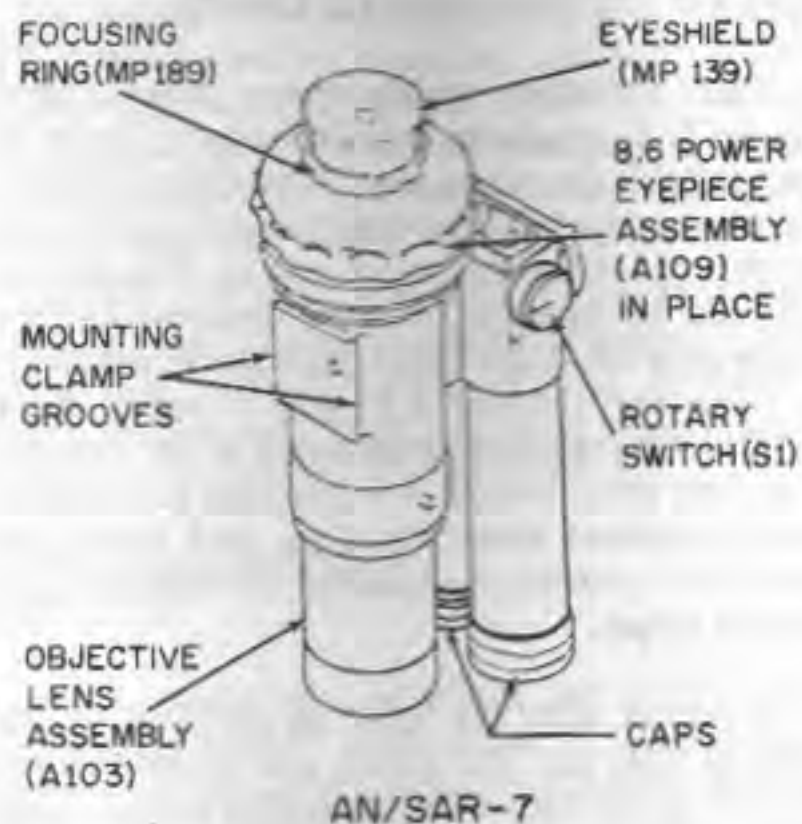


Figure 2-12.—Infrared viewer (SAR-7 series).

62.11

interchangeable 4-power (4X) and 8.6X eyepieces. The 4X assembly, used for signaling, preliminary scanning, and prolonged viewing is large enough so that both eyes can focus simultaneously, making it less fatiguing to the eyes than the 8.6X. In general, reserve the higher powered 8.6X assembly for situations requiring greater magnification and sensitivity. Eyepiece

assemblies are changed by removing, in a counterclockwise direction, the one in use and attaching the other by threading it on clockwise until it rests against the stop ring. Do not use force or tools.

When operating a viewer, observe the following precautions:

1. Never point the objective end of the viewer toward the Sun or any other source of intense visible or infrared light. To do so will damage the image converter tube.

2. Do not turn the eyepiece toward the area being observed. The glow of the fluorescent screen may be visible to enemy observers.

3. Keep your eye(s) as close to the eyepiece as possible to prevent light reflections off the fluorescent screen from illuminating your face.

4. If the viewer is being used in conjunction with an infrared-filtered searchlight, carefully scan the area for enemy infrared illumination before turning on the light.

Operation

The principles of operation are the same for both the SAR-7 and 7A.

The SAR-7 and 7A consist of only three elements—the viewer and two interchangeable eyepiece assemblies. The power source is entirely self-contained. The original version of the -7 is energized either by a rechargeable nickel-cadmium battery with self-contained charger, or, for emergency operation, two type D (flashlight size) dry cell batteries. Improved models are powered by a single type C dry cell battery. If the unit is to be used in conjunction with a signal searchlight, a mounting clamp must be fabricated locally according to instructions in the appropriate technical manual.

To prepare the SAR-7 for use—

1. Remove the viewer from its carrying case. If desirable, replace the 8.6X lens with a 4X lens.
2. Set rotary switch to OFF.

3. If necessary, remove battery receptacle cap(s), insert battery(ies), and replace cap(s). Insert each dry cell battery positive end (end with center post) first, as you would place it in a flashlight. When using the rechargeable battery, insert contact-ring end first.

To operate the set, proceed as follows:

1. Turn rotary switch ON. Wait 15 seconds for warmup.

2. Energize the searchlight if the viewer is to be used to receive signals.

3. Adjust the focus by rotating the entire objective lens assembly so the observed object will be clear.

To either shut down the equipment temporarily or secure it, turn rotary switch OFF and stow the viewer and 4X lens (separately) in its carrying case. When the set is to be stored for an indefinite period, remove the batteries and place them in the battery compartment of the carrying case. It is unnecessary (although permissible) to remove the rechargeable battery during storage.

The nickel-cadmium battery must be recharged periodically from a regular 60-cycle, 110 to 115-volt a.c. power source. When possible, it should be recharged for a few hours after each use, or at least once a month if the equipment has been used very lightly. If the battery loses power, it must be recharged for at least 14 hours, or replaced.

Maintenance

When the viewer is used daily, it should be maintained daily. It need not be maintained as often during its inactive periods.

Following are daily maintenance procedures:

1. Inspect and clean all lenses.
2. Inspect threads for damage. Grease sparingly with antiseize compound.

3. Ensure that the image tube lights when the switch is ON. Leave switch on for a few seconds to be sure the image does not grow dim.

4. Ensure that batteries are properly charged. Recharge nickel-cadmium battery or replace dry cell batteries as necessary.

NEVER ATTEMPT TO REPAIR AN INFRARED VIEWER AND NEVER DISASSEMBLE THE VIEWER OR OPEN THE 4X LENS ASSEMBLY. The viewer and 4X eyepiece assembly are sealed units filled with dry nitrogen under pressure. To disassemble them allows moisture to enter and destroy the set's usefulness.

Abnormal sounds or odors may indicate moisture condensation in the main housing. When this occurs (and in any event for all repairs) return the entire set to the nearest authorized repair facility as listed in the appropriate technical manual for the type of viewer involved.

CHEMICAL WARFARE DIRECTIONAL DETECTOR

The AN/TAS-6 (modified) Chemical Warfare Directional Detector (CWDD) provides fleet units with the capability of detecting and identifying air release of certain chemical nerve agents which will permit the initiation of personnel and unit (collective) defensive measures to minimize the impact of the chemical warfare attack. The inherent characteristics of the CWDD are also useful in low visibility/night pilotage and general area surveillance. The CWDD will be employed in all ship classes, with initial emphasis on LCC, LHA, LPD, LST, and LPH class ships.

The CWDD is a passive infrared imaging sensor that provides U.S. Navy ships with the capability for the detection and identification of chemical warfare agent attack. The CWDD consists of a low-cost, portable AN/TAS-6 Night Observation Device, Long Range (NODLR) modified with a spectral filter wheel. The CWDD can be used to detect nerve agent attacks against sister ships in a task force,

against waves of amphibious assault ships/boats proceeding ashore, or against assault forces in the vicinity of the landing area. Chemical warfare (CW) cloud detection and identification can be accomplished against a sky background for all conditions under which CW attacks may be expected to occur. Detection of CW activity against a land background can be accomplished less effectively.

The inherent characteristics of a forward looking infrared receiver (FLIR) make the CWDD useful in low-visibility/night pilotage and area surveillance. The CWDD operator can detect and provide relative bearings to prominent land features (lighthouses, water towers, etc.) and buoys. Detection of personnel on the water surface (man-overboard) can also be provided by the CWDD.

The CWDD consists of a modified U.S. Army AN/TAS-6 Night Observation Device, Long Range (NODLR), power conversion unit, interconnecting cable, pivot mount, foul weather cover, carrying/stowage case, maintenance kit, and overboard lanyard. Table 2-1 provides a listing of component weights.

This unit consists of the in-service (U.S. Army) AN/TAS-6 modified to include a spectral filter wheel for nerve agent identification and a Sterling cycle electric cooler to replace the Joule-Thompson gas cooler. That eliminates the requirement for high pressure gas cylinders.

The power conversion unit provides operating power to the AN/TAS-6 (modified) sensor unit (5 volts d.c. and 16.5 volts d.c.) from the ship's 115-volt a.c. supply. Press-to-test switches/lights are included to verify presence of input and output voltages. The unit (figure 2-13) consists of an electronics tray contained in a watertight protective housing.

The interconnecting cable provides electrical connection/power transfer from the power conversion unit to the AN/TAS-6 (modified) sensor unit through a coiled, double shielded cable. Connections are made at both units with environmentally qualified connectors.

The pivot mount provides the mechanical interface between the CWDD sensor unit and

Table 2-1.—Estimated CWDD Weight

UNIT	WEIGHT
SENSOR UNIT	26 LBS
INTERCONNECT CABLE	2
PIVOT MOUNT	12
FOUL WEATHER COVER	1
SENSOR/MOUNT ASSY	41 LBS
CARRYING/STOWAGE CASE	10
LOADED CARRYING CASE	51 LBS
PCU ELECTRONICS TRAY	12 LBS
PCU HOUSING	8
PCU TOTAL	20 LBS

the standard Mk 37 night observation device mounts already installed in CWDD-candidate ships. The pivot mount provides a minimum movement of -35° to $+45^{\circ}$ in elevation and an azimuth travel in excess of 360° , limited only by the length of the interconnecting cable. Bicycle-type handles are provided for operator positioning of the sensor unit.

A foul weather cover for protection of the sensor and pivot mount (when not in use) must be fabricated from waterproof canvas.

A case is provided for transportation/stowage of the CWDD. Space is provided for the simultaneous stowage of the sensor unit, pivot mount, interconnecting cable, overboard lanyard, CWDD maintenance kit, and foul weather cover.

A maintenance kit (stowed inside the carrying/stowage case) is provided for

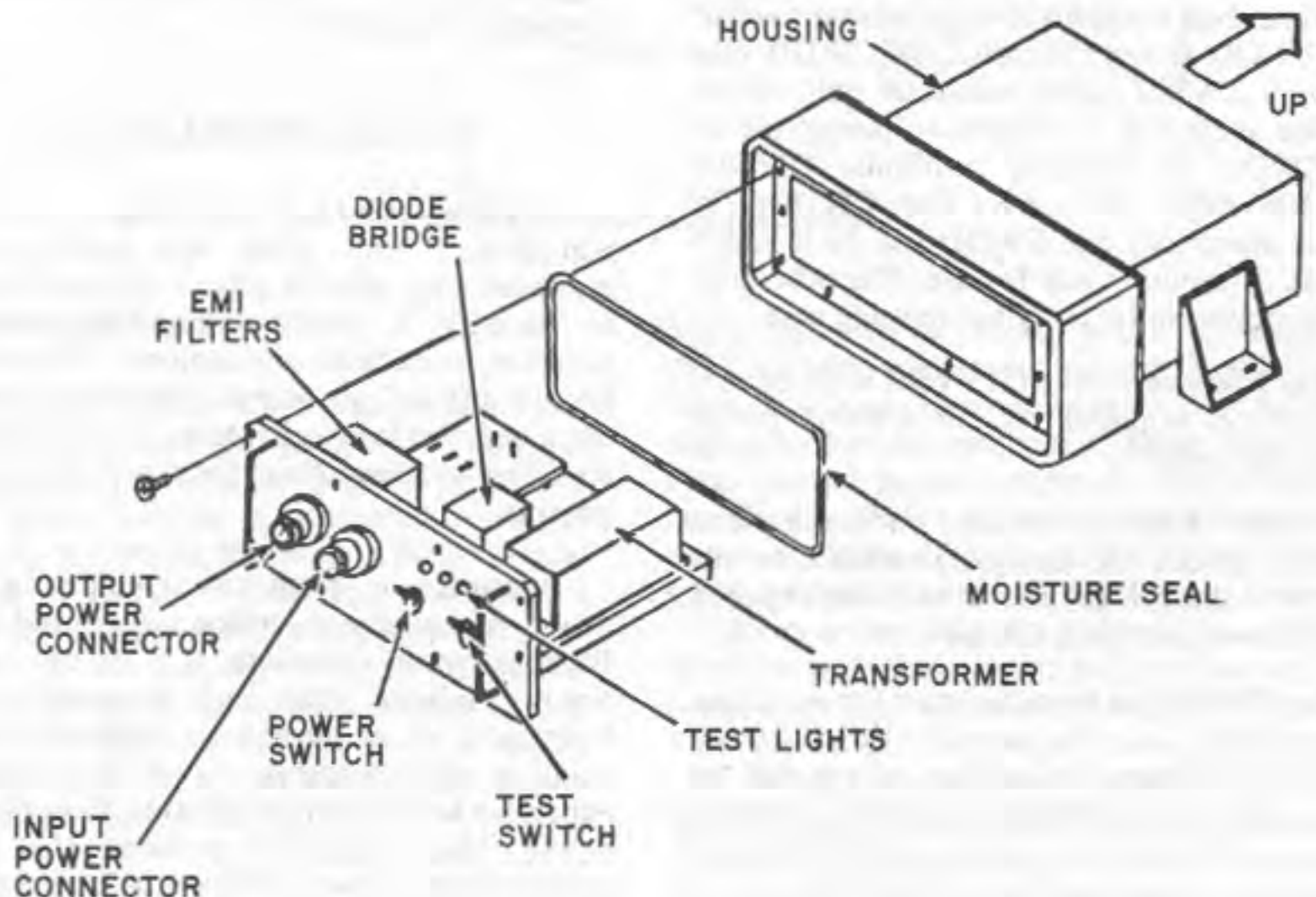


Figure 2-13.—Power conversion unit.

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each CWDD. The maintenance kit consists of:

- (1) Expendable nitrogen gas cartridges (six) to purge the sensor unit of moisture (monthly requirement).
- (2) Purge kit regulator/connector assembly.
- (3) Lens cleaning solution.
- (4) Lens wipers.

An overboard lanyard (vinyl covered stainless steel cable) is used to secure the sensor/pivot mount unit to an eyelet on the power conversion unit prior to the installation of the CWDD unit in the Mk 37 NOD mount. The overboard lanyard and associated procedures prevent the accidental over-the-side loss or severe damage (due to a fall to a lower deck) during installation/removal of the CWDD in/from the Mk 37 NOD mount.

A typical shipboard installation of the CWDD is illustrated in figure 2-14. CWDD-candidate ships normally have from four to eight Mk 37 NOD mounts installed. In CWDD ship classes, a CWDD power converter unit will be installed at six Mk 37 mounts to permit use of the CWDD at multiple positions. CWDD-candidate ships will receive two CWDDs. In normal operation, one CWDD will be installed in a Mk 37 mount ready for use. The other unit will be stowed in its carrying/stowage case.

Ship's service power (115 volts a.c., 60 Hz, 10 amps) is required for all CWDD power conversion units.

Interior communication outlets (sound powered) on the 1JL (lookout) circuit from the CWDD to the bridge (pilot house) are required for effective use of the CWDD.

The CWDD has been designed for minimum maintenance at the organizational level. Scheduled maintenance consists of purging the sensor unit with nitrogen (monthly), periodic cleaning of the exterior optics, and freshwater washdown when required. Scheduled maintenance procedures will be detailed on maintenance requirement cards (MRCs). Corrective maintenance consists of removal and replacement of the sensor/pivot unit or the power

conversion unit when a failure occurs. Procedures will be listed on unscheduled maintenance cards (UMCs). Failed CWDD units are shipped to the depot for repair.

Depot level repair facilities have been established at the CWDD contractor (Texas Instruments) on an interim basis pending interservice arrangements to permit the depot level repair functions to be provided by the U.S. Army Repair Depot at Sacramento, Calif. Repaired/reworked units will be forwarded to U.S. Navy supply depots for distribution to fleet units.

Ships will be deployed with two CWDDs. Normally, one will be installed in a Mk 37 NOD mount ready for use, and the other will be stowed in the signal bridge area in its carrying/stowage case. During operations in hostile areas, where intelligence indicates a threat of chemical warfare activity, the Signalmen will be assigned the collateral duty of operating the CWDD.

FLAGS AND HALYARDS

Working with flags is an integral part of the Signalman's job. Flags are used to send messages and tactical signals during daylight, to identify a ship's nationality, and, on occasion, to indicate the seniority of an officer or civil official on board. Individual flags are discussed in later chapters. This section is confined to describing flags and halyards in general.

Bunting, the cloth from which flags are made, is available in cotton, wool, and nylon. Because cotton costs less, it is usually used in simply designed flags and pennants. Cotton bunting is not as durable as wool and will not stand as much weathering, but it is often less expensive to wear out two cotton flags than one woolen flag. Flags and pennants that are in almost constant use, however, usually are made of wool or nylon. Wool also is used in flags of complicated design when the original cost of material is less important than the labor involved.

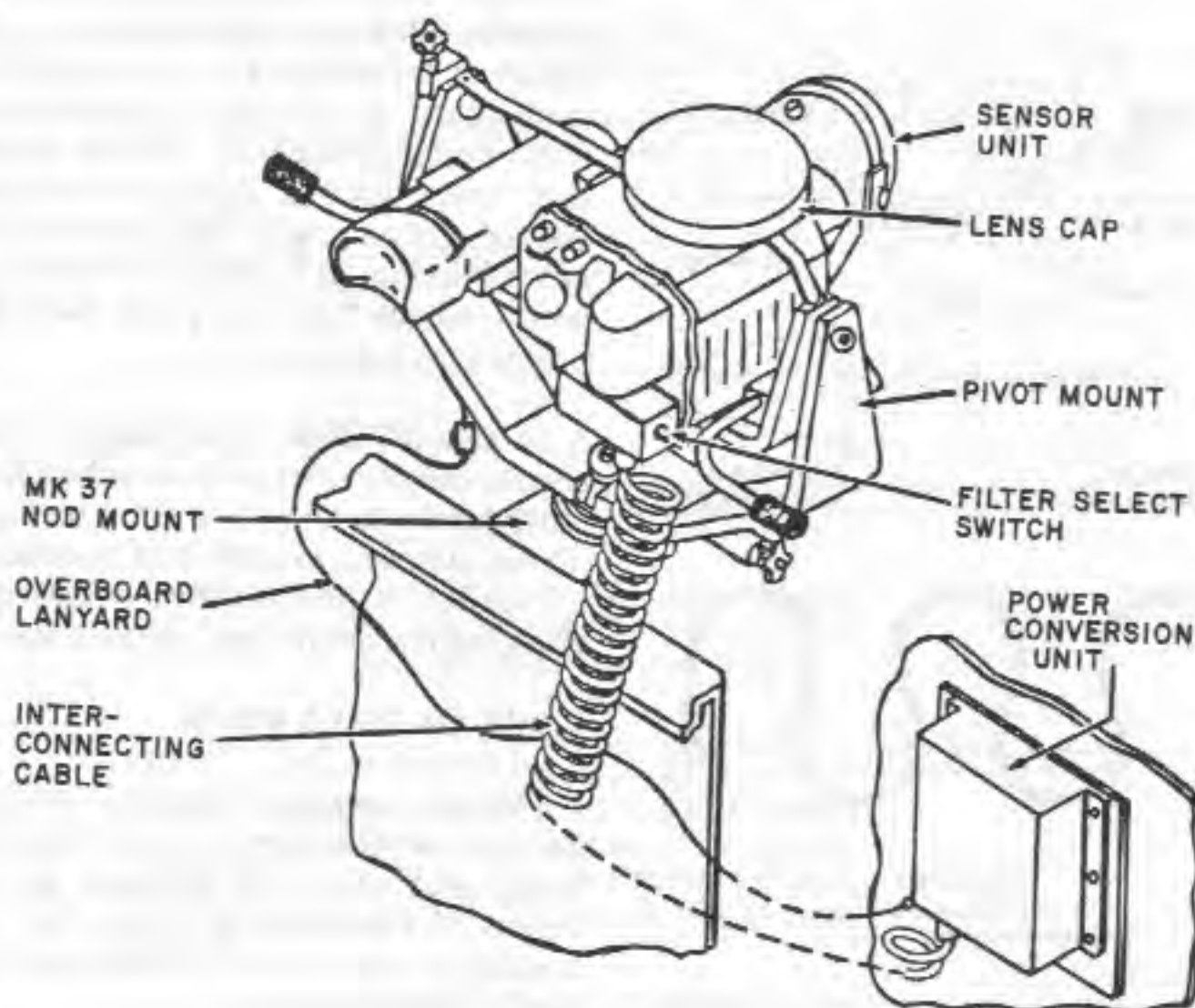


Figure 2-14.—CWDD system installation.

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FLAG NOMENCLATURE

The various types of flags and pennants and their parts are shown in figure 2-15. The fly is the horizontal length of the flag; the hoist is its vertical width. Tabling, a reinforced border of light duck, is stitched to the edge of the flag at the hoist. A length of line leads through the tabling, at the top of which a ring is spliced. The other end of the line, extending several inches below the tabling, is the tail line. A snap hook is spliced to it. The tail line serves as a spacer between flags, and the snap and ring are used to secure flags to each other in a hoist.

CARE OF FLAGS

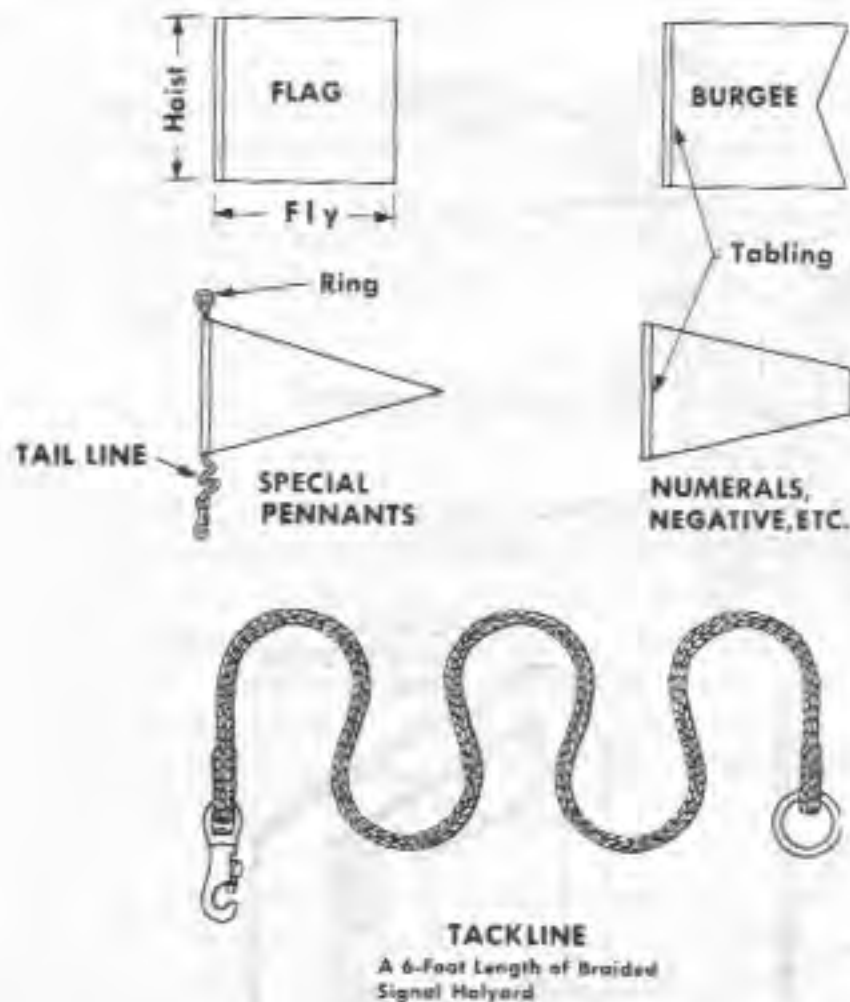
Wind and moisture cause flags to deteriorate rapidly. Unless stowed promptly and carefully handled, they quickly become dirty. The flag

bag is designed to provide proper stowage for the flags and rapid access to them. It also keeps them clean and, with the canvas cover in place during inclement weather, it keeps flags dry. Flags should be washed in the ship's laundry periodically. Only mild soap and warm (not hot) water should be used for cleaning flags. Grease spots can be removed with drycleaning solvents.

Damp or wet flags are mildew-prone. When flags are wet, they should be dried as soon as possible by hoisting them on signal halyards. This should not be done when underway or when in high winds. In some ports, bunting may be aired on certain days or with permission of the senior officer present.

REPAIR OF FLAGS

Although most ships carry spare sets of flags, Signalmen strikers or third class petty officers



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Figure 2-15.—Parts of flags and pennants.

may be assigned to repair bunting. If a bunting repair space is available, it will contain a sewing machine, bunting, thread, tapes, and tabling material. If a bunting repair space is not provided, repairs may be made by using a privately owned machine or a machine located in the supply or deck space if available.

When repairing flags, never mix materials. Wool and cotton shrink differently and combinations invariably become misshapen after the first wetting. For correct dimensions refer to NTP 13, *Flags, Pennants and Customs*.

HALYARDS

Signal halyards are made of either nylon or natural color braided cotton line treated with a preservative oil. The braided cotton line is no longer used aboard ship because it could not hold up under the effects of ships' high speeds, stack temperatures, and gases. Ashore,

however, cotton halyards are still used. Double-braided, 1-1/8 inch nylon rope is required by the Board of Inspection and Survey (INSURV) and is standard equipment on aircraft carriers and some new construction. Double-braided, 1-1/2 inch nylon rope is permitted alternately with twisted nylon rope for dressing lines. The twisted nylon and double-braided nylon ropes withstand the heat and gases much better than braided cotton line.

Halyard blocks are single, roller-bushed sheave blocks. They are attached by means of sister hooks to U-bolts welded to the yardarms. Those attached to stays and mastheads may be of other construction, adapted to the construction of the stay or masthead.

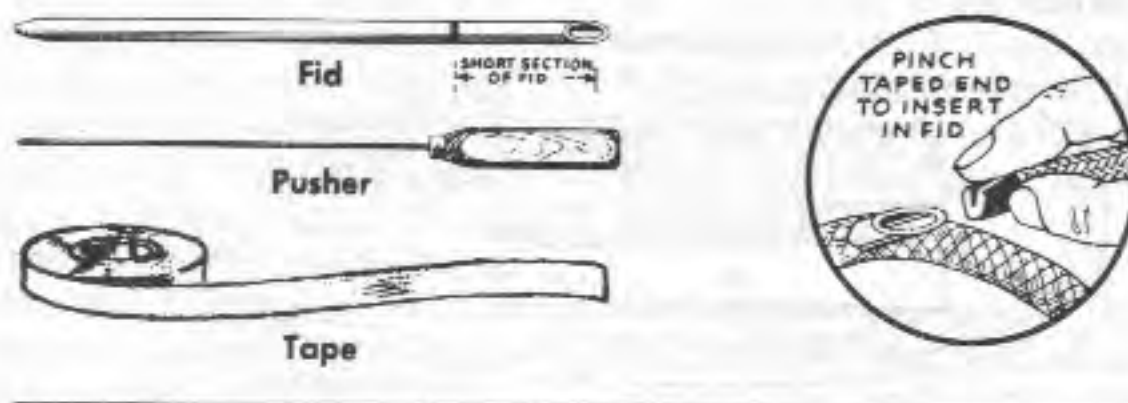
CARE OF HALYARDS

When reeving halyards through signal halyard blocks, always reeve forward to aft. Rings and snaps on halyards are put on by means of a halyard eye splice. Splicing double-braided nylon rope is explained and illustrated in the following section.

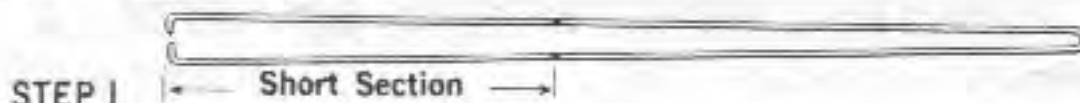
At night and during inclement weather, ease off the halyards to prevent unnecessary strain caused by shrinkage. At other times, however, keep halyards clear and taut to give the signal bridge a shipshape appearance. Carefully check the condition of the halyards. Replace them before they become too worn.

SPLICING DOUBLE-BRAIDED LINE

When splicing double-braided nylon line, the end must be worked into the center, and special tools are needed for the job. For line 3 inches in circumference and below, a fid and a pusher are used. For line larger than 3 inches in circumference, only a wire fid is used. See figure 2-16. Stamped on each fid is a number indicating the size of line for which the fid was made. Fids also serve as rules to measure with while splicing, as will be explained. The wire fid lengths in figure 2-17 are in 1/2 and 1/3 scale. Friction or masking tape and a soft lead pencil, crayon, or, preferably, a wax marking pencil are needed.



HOW TO USE WIRE FID



STEP 1

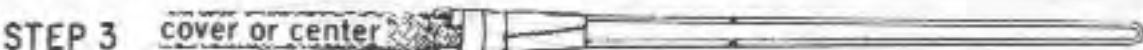
To insert with the wire fid, tightly tape end of braided cover or center after extraction (step 2); press prongs of fid into cover or center just behind tape. See Step 2.

Tape



STEP 2

Tape wire fid to braid by wrapping tape in a tight, smooth, spiral, starting on the braid and wrapping in the direction of the round tip of the fid. Keep tape smooth and avoid bunching as it will be easier to pass fid through braid. See Step 3.



STEP 3

The round end of the fid can then be inserted and pushed through without a pusher.

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Figure 2-16.—Fids used for splicing double-braided line.

Sharp-pointed shears also are handy. The splices described here, and the line on which they are used, were developed by the Samson Cordage Works of Boston, Massachusetts.

Standard Eye Splice in New Double-Braided Line

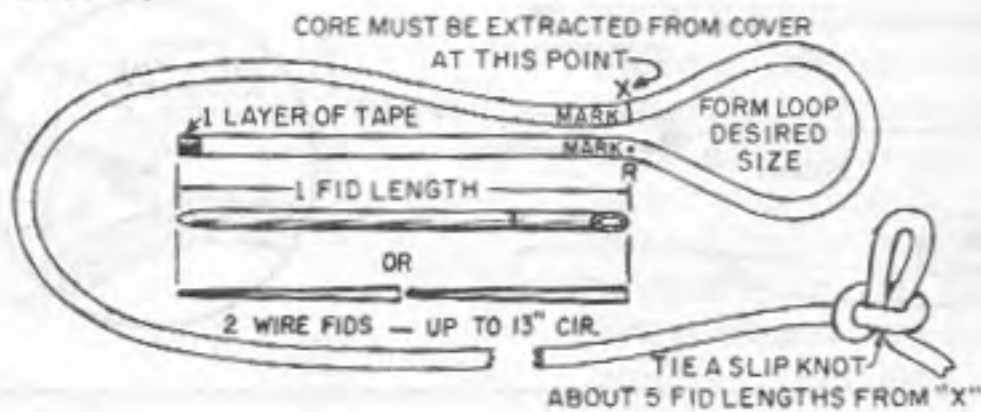
The standard eye splice can be performed on new line only. This splice retains up to 90 percent of the average new line strength. Until you have become familiar with splicing this material, follow each step carefully. Figure 2-16 shows the fids and pushers used for splicing; steps 1 through 3 explain how to secure the wire fid to the line that is to be spliced. Refer to

figure 2-17 while you follow this explanation of how to mark the line and extract the core.

1. Tape the end to be spliced with one thin layer of tape. Then measure one tubular fid length (two wire fid lengths because wire fid is 1/2 size) from the end of the line and mark. (This is point R (reference), step 1.) From R form a loop the size of the eye desired and mark. This is point X where you extract the core from inside the cover.

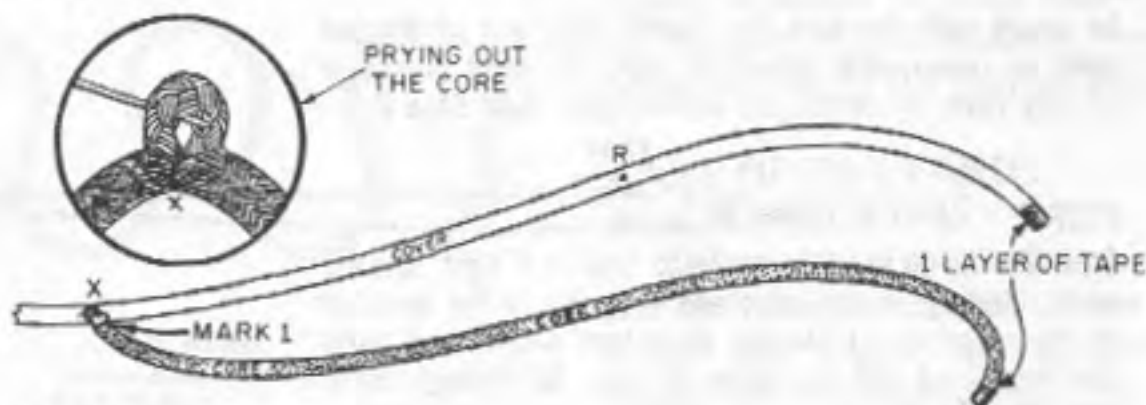
2. Tie a tight slipknot approximately five fid lengths from X. This must be done to keep the core and cover from becoming uneven. Bend the line sharply at X. With the pusher or any sharp tool such as an ice pick, awl, or marlinespike,

STEP 1.

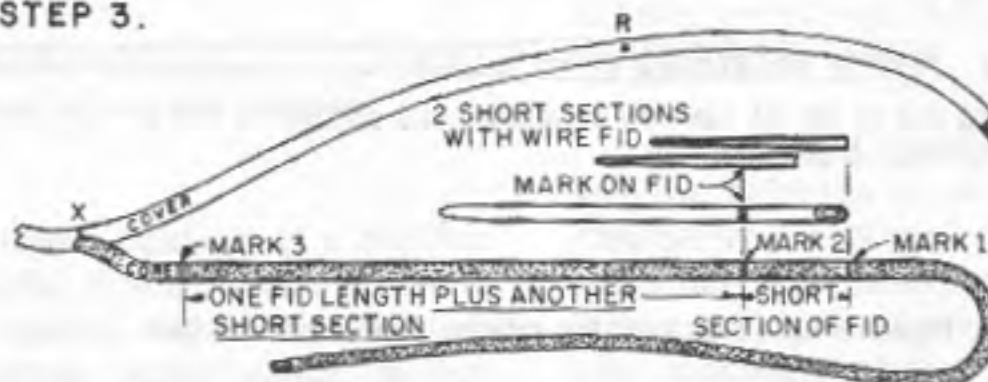


ON ROPE OVER 1" DIAMETER, IT IS OFTEN EASIER TO PASS A SPIKE OR SIMILAR OBJECT THROUGH THE ROPE INSTEAD OF TYING A SLIPKNOT.

STEP 2.



STEP 3.



STEP 4.

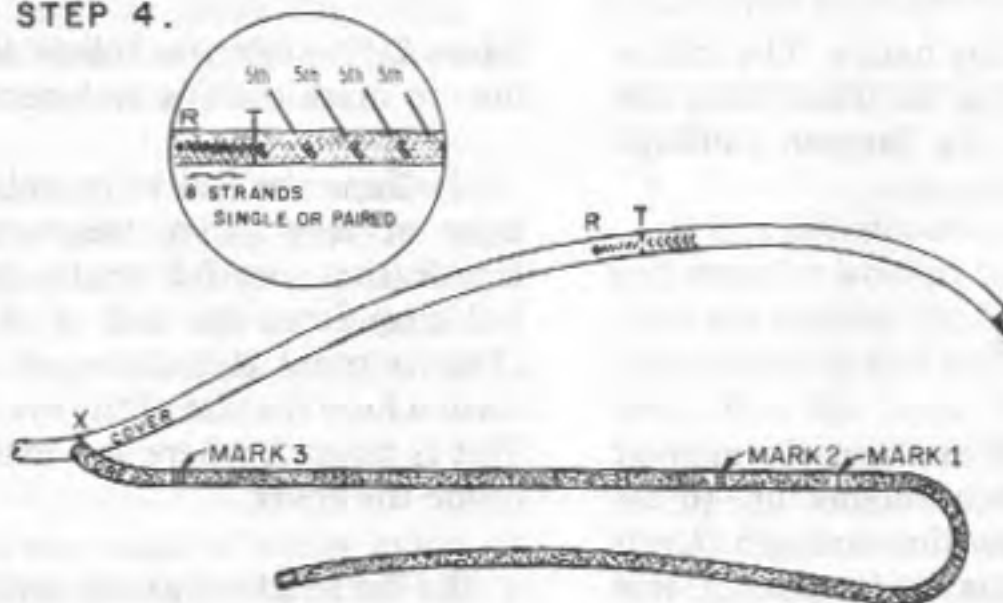


Figure 2-17.—Measuring and tapering.

spread the cover strands to expose the core (step 2). First pry, then pull the core completely out of the cover from X to the taped end of the line. Put one layer of tape on the end of the core. DO NOT pull cover strands away from the line when spreading the cover as this will distort the line unnecessarily. To assure correct positioning of mark 1, do the following: Holding the exposed core, slide the cover as far back toward the tightly tied slipknot as you can. Then, firmly smooth the cover back from the slipknot toward the taped end. Smooth again until all cover slack is removed. Then mark the core where it comes out of the cover. This is mark 1.

3. Again slide the cover toward the slipknot to expose more core. From mark 1, measure along the core toward X a distance equal to the short section of tubular fid (two short sections with wire fid) and make two heavy marks. This is mark 2, step 3. From mark 2, measure in the same direction one fid length plus another short section of the fid (with wire fid double measurements) and make three heavy marks. This is mark 3, step 3.

4. Note the nature of the cover braid—it is made up of strands; either one or two (pair). Notice that half the pairs revolve to the right around the rope and half revolve to the left. Beginning at R and working toward the taped end of the cover, count eight consecutive strands (single or pairs) which revolve to the right (or left). Mark the eighth strand. This is mark T, step 4. Make mark T go completely around the cover. Starting at T and working around the taped cover end, count and mark every fifth right and left strand (single or paired) until you have progressed down to the end of the taped cover. (Refer to figure 2-18 for the remainder of our explanation.)

5. Insert the fid into the core at mark 2. Slide it through and out at mark 3 (step 1). Add extra tape to the tapered cover end, then jam it tightly into the hollow end of the fid (see insert). Hold the core lightly at mark 3; place the pusher point into the taped end; push the fid and cover through from mark 2 and out at mark 3. With the wire fid, first press prongs into cover, then tape over. Then after the fid is on, milk the braid

over the fid while pulling the fid through from mark 2 to mark 3. Take the fid off the cover. Continue pulling the cover tail through the core until mark R on the cover emerges from mark 3. Then remove the tape from the end of the taped cover (step 2).

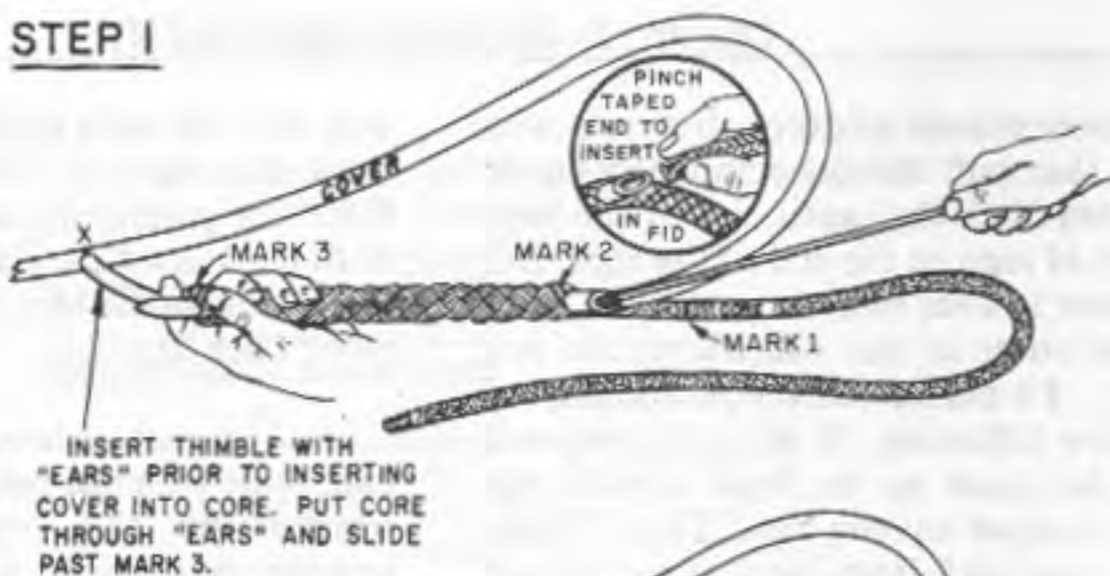
6. Make sure tape is removed from cover end. Start with last marked pair of cover strands toward the end; cut and pull them out completely (step 3). Cut and remove the next marked strands and continue with each right and left marked strand until you reach point T. (DO NOT cut beyond this point.) The result should be a gradual taper ending in a point (step 4). Very carefully pull cover back through core until point T emerges from mark 2 of the core. From point X on the cover, measure approximately one-half fid length toward the slipknot on the line and mark this as point Z (step 5).

7. You are now ready to put the core back into the cover from T to Z (step 5). Insert your fid at T, jam the taped core end tightly into the end of the fid. With the pusher, push the fid and core through the cover "tunnel" past point X to and through the cover at point Z. (When using the wire fid, attach the fid to the taped core.) After the fid is on, milk the braid over the fid while pulling through from T to Z. When pushing the fid past X to Z, make sure the fid does not catch any internal core strands.

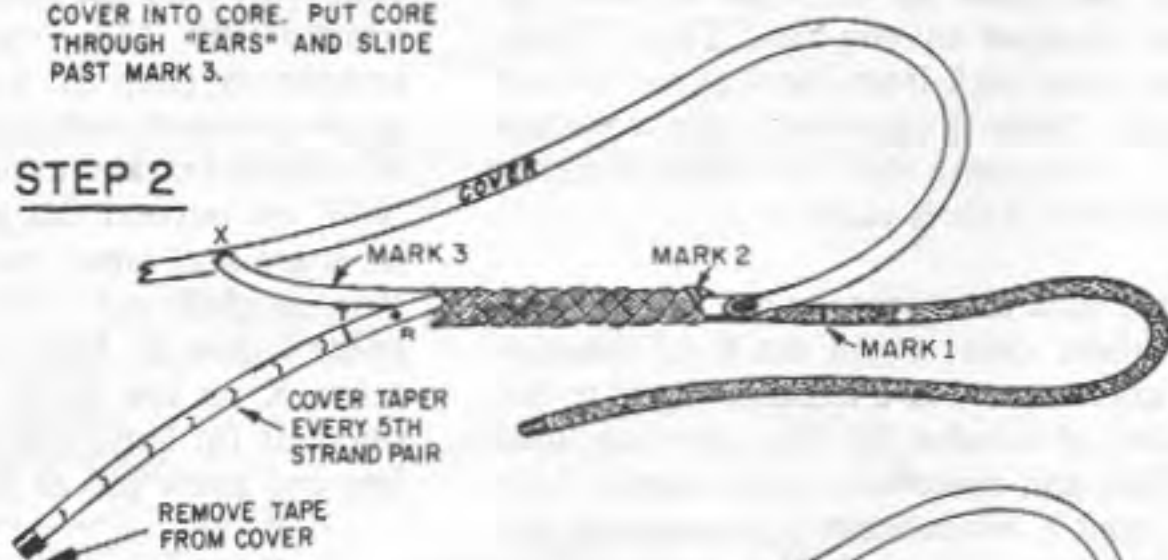
NOTE: Depending on eye size, the fid may not be long enough to reach from T to Z in one pass. If not, bring the fid out through the cover, pull the core through, and reinsert the fid into the exact hole it came out of. Do this as many times as needed to reach point Z.

8. Alternately pull on core tail at Z, then pull on tapered cover at mark 3 (step 6). The crossover should be tightened until the crossover is equal to the diameter of the line. Remove all the slack from the eye area by smoothing the cover from T toward X. Mark the core tail through cover at point X. Pull core tail out until mark just made on core is exposed at Z. The diameter of the core must now be reduced by cutting and removing one strand at each group around the complete circumference. Measure

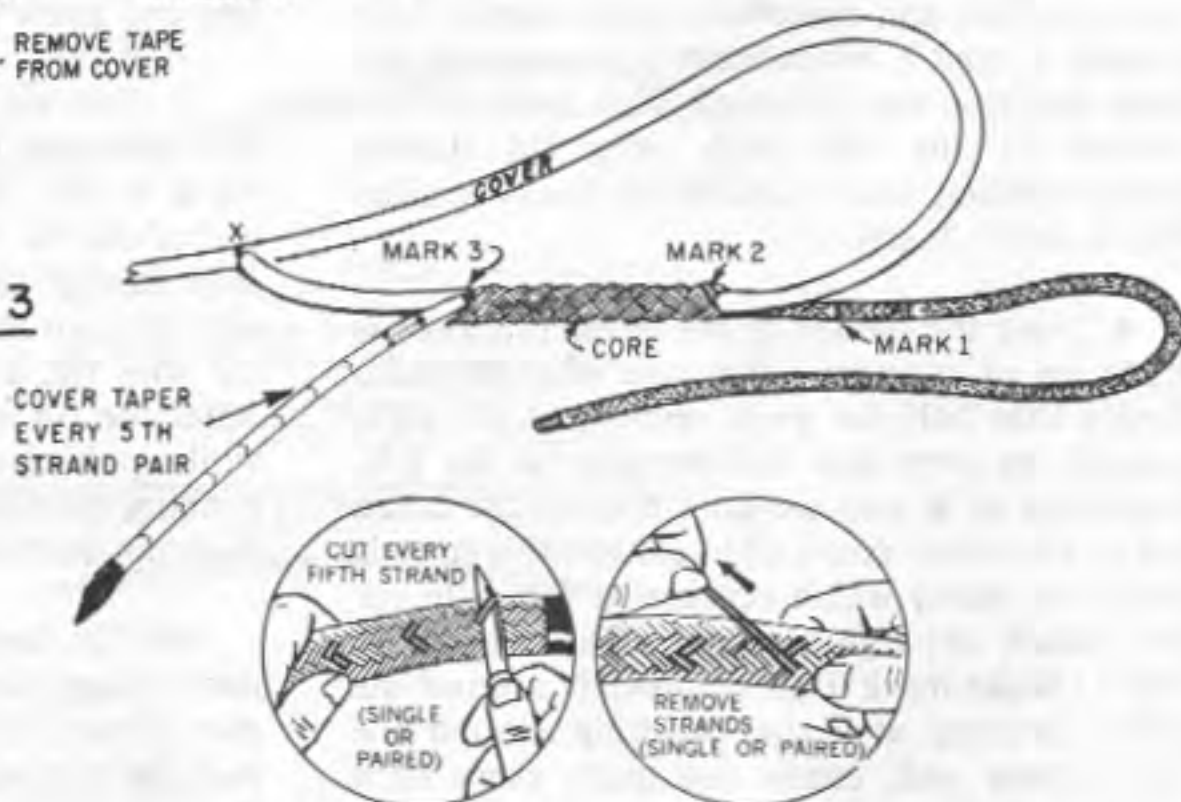
STEP 1



STEP 2



STEP 3



STEP 4

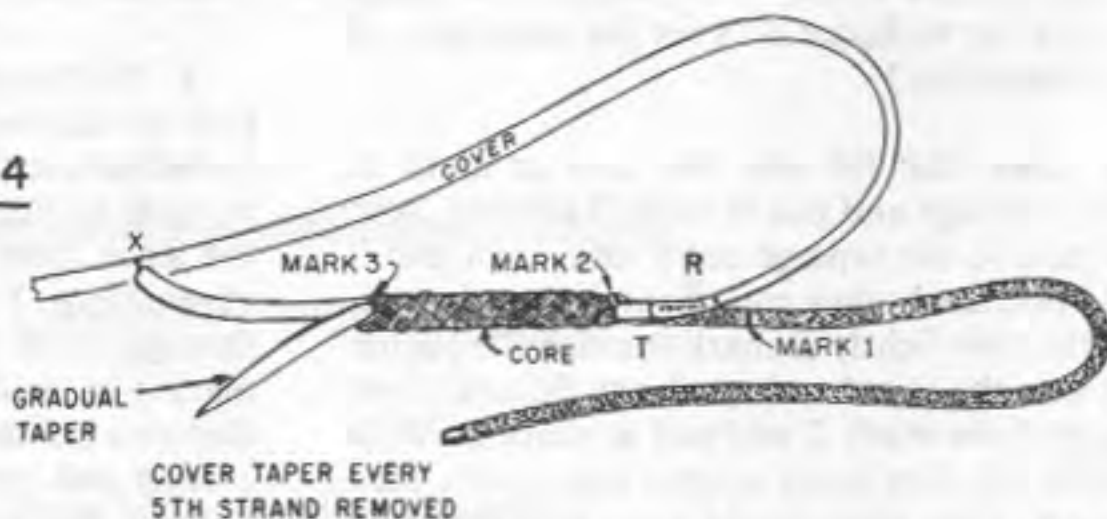


Figure 2-18.—Completing the double-braided eye splice.

one-third fid length from the first reduction cut toward the end and mark. Cut off remaining tail at this point. Make the cut on a 45° angle to prevent a blunt end. With one hand, hold crossover (mark T). Smooth cover section of eye firmly and completely from crossover toward mark X. Reduced volume core tail should disappear into cover at Z. Smooth out the core section from crossover toward mark 3 and cover taper will disappear into core. Hold rope at slipknot and with other hand milk cover toward splice, gently at first, then more firmly (step 7). Cover will slide over mark 3, mark 2, the crossover, T, and R. (It may be necessary to occasionally smooth out the eye during milking to prevent the reduced volume tail from catching in the throat of the splice.)

If bunching occurs at crossover preventing full burying, smooth cover from T to X. Grasp crossover at T with one hand and firmly smooth cover slack (female side of eye) with the other hand toward throat (X). Repeat as necessary until bunching disappears. Continue milking until all cover slack between knot and throat of eye has been removed.

NOTE: Before burying the cover under the crossover, anchor the loop of the slipknot to a stationary object before starting to bury. You can then use both hands and the weight of your body to more easily bury the cover over core and crossover. Holding the crossover tightly, milk all excess cover from R to X.

Flex and loosen the line at the crossover point during the final burying process. Hammering the cover at point X will help loosen the strands.

With larger ropes, it is helpful to securely anchor the slipknot, attach a small line to the braided core at the crossover, and mechanically apply tension with either a block and tackle, capstan, come-a-long, or power winch. Tension will reduce the diameter of the core and crossover for easier burying.

9. Before whipping the splice, it is to your advantage to stitch-lock it to prevent no-load opening. You will need approximately one fid length of nylon or polyester whipping twine. The

twine should be about the same size as the strands of line you are stitching. (Strands cut from the line may be used.) To begin the lock stitch, pass the twine (A) through the line as shown in step 1, figure 2-19. Reinsert the twine

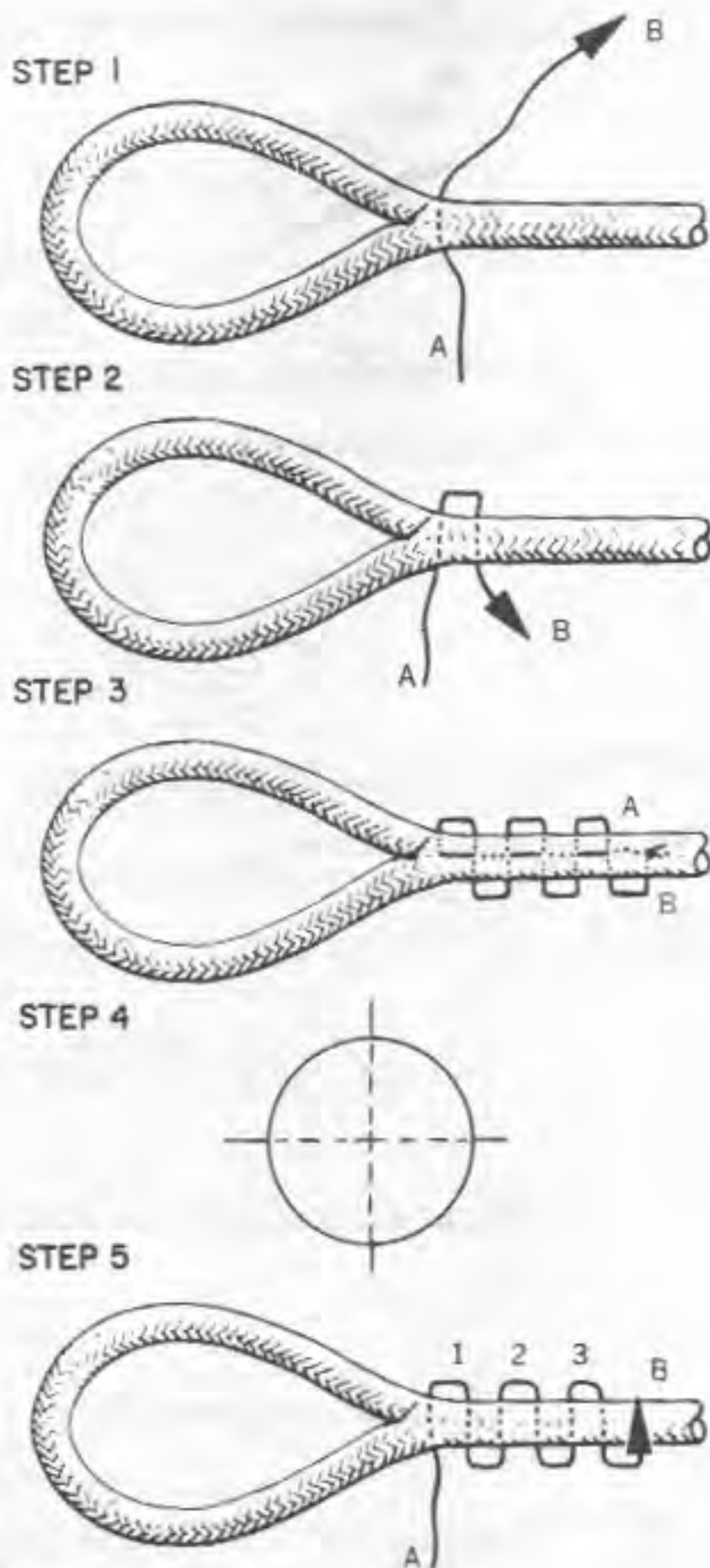


Figure 2-19.—Making the lock stitch.

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as in step 2. (Ensure that all stitching is just snug. **DO NOT TIGHTEN.**) Continue until you have four complete stitches. After you have four stitches, turn the line 90° and pass the remaining end (B) through the line perpendicular to the original stitches to make four more stitches. The line should now look like step 4. Now take ends A and B, tie a square knot, and bury it in between the cover and the core. You may now whip the line or leave it as it is.

NOTE: Manufacturer's instructions should be retained for additional assistance in splicing double-braided line. Sometimes the instructions that come with the splicing kit are easier to understand and use than those in the rate training manual.

Eye Splice in Plain-Laid Manila or Synthetic Ropes

To make an eye splice in plain-laid manila or synthetic ropes, unlay (untwist) the strands in the end of your line as far as you think necessary, and splice them into the standing part of the line by tucking the unlay strands from the end into the standing part. Learn to estimate the length of line you need to unlay for your complete splice so that you will not finish short nor waste a lot of line by cutting it off. An original round of tucks, plus three more complete rounds, are enough for an ordinary eye splice.

With large lines you must whip the ends of the strands before you start, otherwise they will unravel and become troublesome. Large lines also must be seized at the point where the unlaying stops, or you will have trouble working them. With any line up to about 2 inches, you can open the strands in the standing part with your fingers.

Your first round of tucks must be taken in proper order to avoid getting fouled up. Separate the strands in the end and hold them up as indicated in the first view in figure 2-20. The middle strand **ALWAYS** tucks first. Be sure to keep the left-hand strand, in the second view, on the side of the line that is away from you. Tuck that one next, **OVER** the strand you just tucked the other one under, and under the strand just below it.

Now turn the whole thing over. In the fourth view you can see that you now have only one strand from the end left untucked, and only one strand in the standing part that doesn't already have a strand under it. Tuck the last strand from inboard away from you.

The first round of tucks is the key to making perfect eye splices; the rest is easy. Simply tuck each strand over one strand of the standing part and under the next strand below that one, until you tuck each strand twice more besides the original tuck. Three tucks to each strand is sufficient.

GOING ALOFT

No matter how careful you are of your halyards, flags, and the like, sooner or later it will be necessary to go aloft, perhaps to reeve new halyards or take down an Irish pennant. Whatever the reason, each ship has a special procedure for requesting permission to go aloft. Guidance for and a copy of the man aloft request should be included in the signal bridge standing orders. Power to all electrical and electronic equipment must be secured and the control panels tagged out. All equipment that rotates must be shut down, locked into place, and appropriately tagged. After all cognizant personnel have taken the appropriate action, the officer of the deck will grant permission to go aloft.

You must also have an assistant, use a safety belt, and, if the work warrants it, a safety line. Don't load yourself with tools when you go aloft. All tools and equipment must be secured with preventer lines. Be sure that you have good footing and a firm grasp at all times. Don't work with two hands; remember the old seafarers' expression, "One hand for the ship and one hand for yourself." Be sure your assistant wears a helmet or hard hat and does not stand directly beneath your work area.

OPTICAL EQUIPMENT

You were born with the finest optical equipment you will ever use—your own eyes.

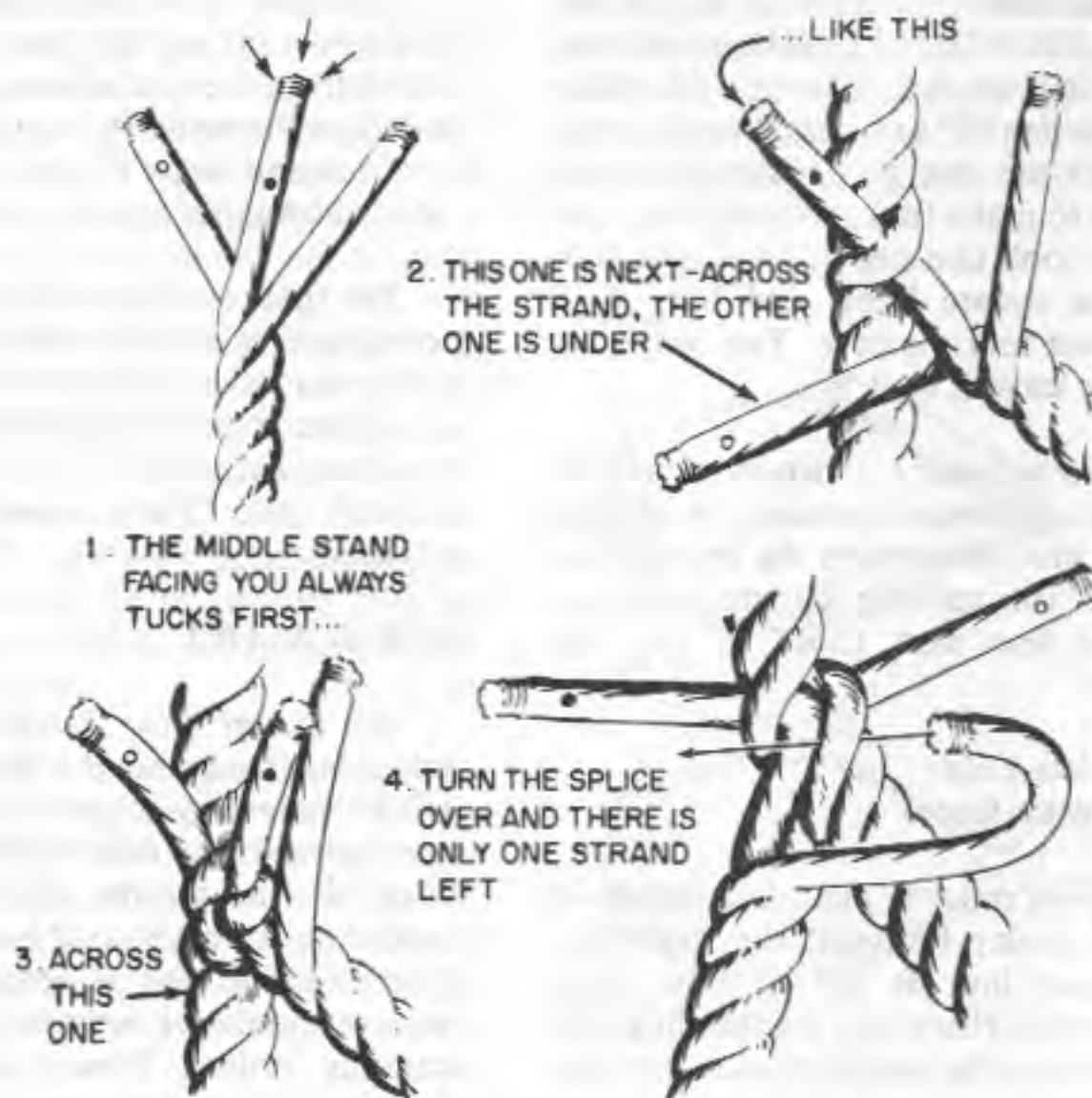


Figure 2-20.—Making an eye splice.

118.15

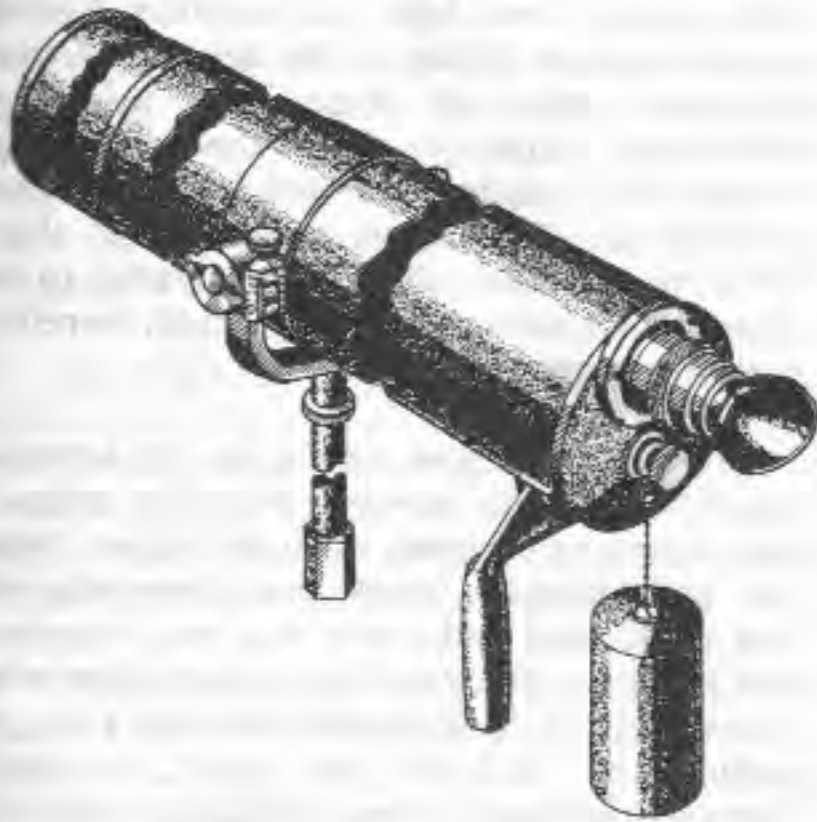
But even if you have 20-20 vision, it often is impossible to read flaghoist and other signals accurately with the naked eye. To magnify distant signals, some of the following aids to vision are carried on every Navy ship.

SHIP'S TELESCOPE

The ship's telescope (figure 2-21) on all except the smallest Navy ships, is used mainly for spotting flaghoists and other signals. It is a variable-power instrument and comes with four different eyepieces so that magnification may be 13, 21, 25, or 32 times. It is mounted in a yoke, which enables it to be turned 360°. The unoccupied eye should be closed while the focus is being adjusted, but both eyes may be kept open while actually viewing.

LONG GLASS

Two types of long glasses are in use in the Navy. The OOD's long glass (spyglass) is a small 10-power instrument. The Quartermaster's glass is a 16-power instrument used for reading flaghoists when the magnifying power of binoculars is inadequate. It is not as powerful as the ship's telescope, but it is more versatile, because it can be moved easily from place to place. To use the Quartermaster's long glass, grasp it close to the forward end with one hand, as shown in figure 2-22, then rest that hand on something firm, so the glass won't waver. Your other hand should grasp the glass at the focusing ring and hold the instrument to your eye. Again, as in using the ship's telescope, you may keep both eyes open while viewing.



37.2

Figure 2-21.—Variable power ship's telescope.



37.3

Figure 2-22.—The quartermaster's long glass.

BINOCULARS

Binoculars are the most commonly used of all optical equipment. Although normally only seven power, they give a wide range of vision

and are best suited for searching over a wide area or for following a swiftly moving target. They require the use of both eyes and, because both eyes do not always have the same vision, it is better to adjust the focus for each lens individually. Proper focus is essential. If the focus is off, eyestrain is increased greatly, and you will not get maximum efficiency from your optics.

To obtain the proper focus for each eye, turn both scales to the +4 setting. Hold the binoculars firmly against your eyebrows. To get the focus for the left eye (only one eye can be focused at a time), cup the right hand over the right lens, cutting out all the light to that eye. Be sure to keep both eyes open, however, because closing one eye will give an incorrect focus. Train the binoculars on a small, well-defined object. Slowly turn the eyepiece from its +4 setting until the object stands out in sharp detail.

The reading on the scale gives you the correct focus for your left eye. Now do the same for the right eye. The chances are the setting will be different. Repeat this focusing process for each eye several times just to make sure it is right.

Once you get the glasses focused properly, remember the settings so you can focus your binoculars on a very dark night. The correct night focus usually is a minus 1 setting from your day focus for each eye.

The other adjustment for binoculars is the interpupillary distance (IPD) adjustment. All Navy binoculars have the IPD scale on the hinge between the barrels. Find out what your IPD is and remember it. It may be already recorded in your health record. If not, have a medical officer measure it for you. When you have set your correct IPD on the scale, you will see a circle like this ○, never overlapping circles like this ○○. At night, if you have the wrong IPD setting, you will cut out a lot of light that should be going to your eyes.

Take a look through a pair of binoculars not adjusted for your eyes, and then look through a pair that is adjusted properly. Notice the difference. If possible, always use the same binoculars.

Most glasses are treated scientifically to reduce glare, but there are times when the direct rays of the Sun are so strong that it is almost impossible to distinguish shapes and colors. To overcome this handicap, glasses usually have colored lens filters that can be inserted over the regular lenses, reducing glare considerably.

SHIP'S BINOCULARS

In many vessels, ship's binoculars (figure 2-23) are used in conjunction with the ship's telescope. Later models have variable density polarizing filters and adjustable focusing. Eyepiece magnification is 20 power. The binoculars are supported in yokes that are mounted either in bulkhead brackets or on deck stands. For the latter type, an adjustable carriage (elevating gear) is used for increasing or decreasing binocular elevation.

CARE OF OPTICS

Optical instruments require great skill and precision in their manufacture. They are both delicate and expensive. As with all precision equipment, careless handling can render them out of adjustment or useless.



69.18

Figure 2-23.—Ship's binoculars.

Your optics have many enemies. The major ones are dust, heat, light, and moisture. A severe shock, such as falling to the deck, may cause breakage either of lenses and prisms or mechanical parts. A sharp shock invariably causes the prisms and reticles to become misaligned. For some reason, the ship's telescope in many ships is mistreated to the extent that it is constantly fogged and, therefore, useless for immediate use.

Prevent dust from getting on the lenses as much as possible. Always leave the optics in their cases, or covered, when not in use. When dust gathers on the lenses, clean them only with lens paper, and make sure that your supply of lens paper is kept clean. Don't clean a lens when it doesn't need it. Repeatedly cleaning a lens, no matter how skillfully you do it, eventually damages the glass. Strong sunlight discolors the cement, and excessive heat softens cemented lenses and filters and may allow them to separate. Moisture in any form, whether salt spray or the perspiration from your fingers, causes film and chemical deterioration of the optical glass.

To have a useful piece of optical equipment when you need it, follow these few simple rules:

1. Handle your optical equipment carefully. Don't let it bang against other objects.
2. When not in use, keep it stowed in its proper place.
3. Keep it dry and out of the weather as much as possible.
4. Keep it clean, but use only lens paper to clean the glass.
5. Don't hang optical gear over the side and, when using binoculars, always keep the strap around your neck.
6. Don't attempt to repair optical equipment yourself. Send it to a repair ship or tender where Opticalmen have the proper equipment to make repairs.

NIGHT OBSERVATION DEVICES

Night observation devices (NODs) belong to a family of precision instruments which use electronic optics for observation, surveillance, and navigation and which are similar to the infrared equipment discussed previously in this chapter.

Developed by the Army, NODs are used to aid a properly trained viewer to scan an area accurately and to detect enemy movement, to observe friendly forces, or to accomplish various other tasks associated with night operations. The NODs are used on most ships in the Navy.

Normally NODs will be operated on Navy ships from the bridge level by bridge watch personnel. As a Signaller, you will be required to maintain and operate the NODs.

This section will acquaint you with the principles of operation, organizational maintenance, and safety precautions for night observation devices.

VISION

With visible light, the naked eye can see and perceive objects surrounding it. Most visible light is so common that we seldom think about it either as light or as electromagnetic radiation.

Normal vision at night is severely limited even with bright moonlight. To be fully useful, this natural light (ambient radiation) must be tremendously amplified if a usable visible image is to be presented to the viewer.

IMAGE INTENSIFYING/ NIGHT VISION DEVICES

Image intensifying/night vision device (II/NV) is a technique that uses the low light of natural light radiations emanating from the night sky which are reflected by the target under observation. Since natural ambient illumination is used, and there is no artificial light source, the system is a passive one.

A low light level image intensifier viewer is essentially the same as an infrared viewer. The only difference between the image tubes is that different photoemissive (light emitting) surfaces are used in the image tubes. The visible light tube uses a photoemissive surface whose response is primarily that of visible light, although it does have some sensitivity to infrared.

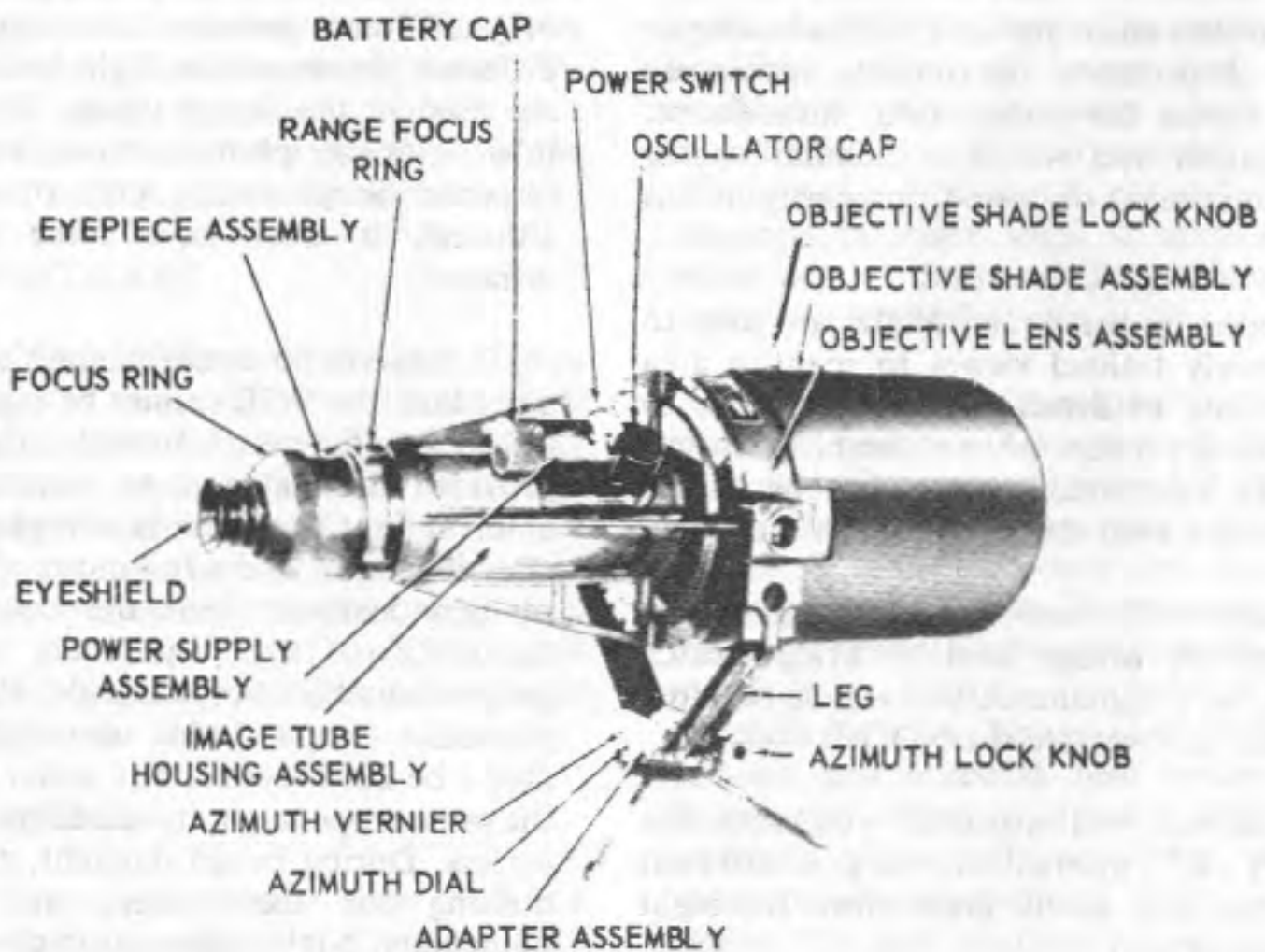
If there is no available ambient light to be amplified, the NOD cannot be expected to work unless sufficient artificial illumination is provided to enable it to function. The best ambient light condition is one which has a clear sky, no clouds, and a full moon. As the amount of light decreases from the ideal, the viewing capability of the equipment will decrease proportionately. For example, the range of a particular scope under moonlight conditions might be 2000 meters, but under overcast skies the same scope might have a range of 200 meters or less. During broad daylight, the NOD does nothing for the viewer, with or without binoculars. Night observation devices have one main advantage over other types of night vision devices such as searchlights and infrared viewers; instead of requiring an artificial light source, they use natural light radiation of a very low level to produce a useful, visible light. Since the devices do not project or require a visible or infrared light, they reduce the possibility of enemy detection.

DESCRIPTION OF NIGHT OBSERVATION DEVICES

Night observation devices fall into two basic categories: tripod-mounted and hand-held.

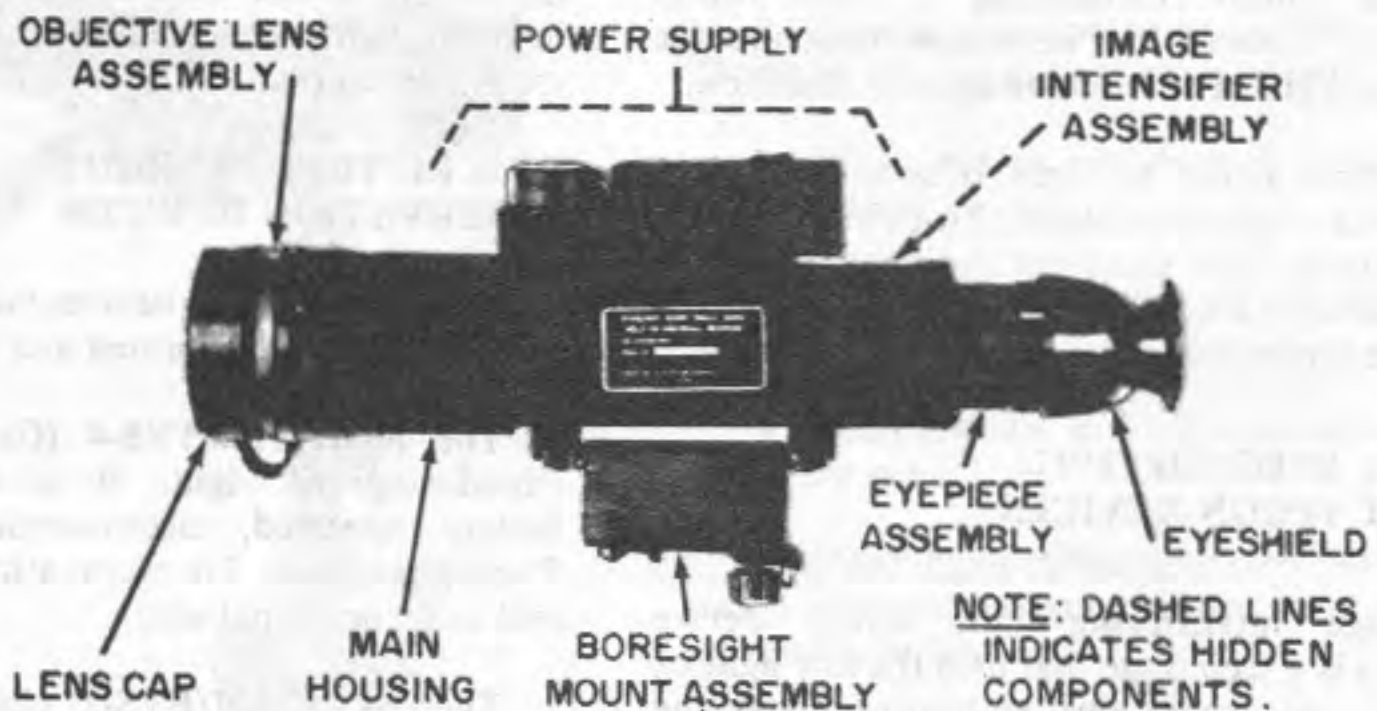
The NOD AN/TVS-4 (figure 2-24) is a tripod-mounted sight. It is a seven-power, battery operated, electro-optical instrument. The sight is used for observation, surveillance, and as navigational aids.

The NOD AN/PVS-2 (figure 2-25) and AN/PVS-2A are four-power, battery operated, electro-optical instruments. These hand-held sights are used for surveillance, observation, and navigation, and may be weapon-mounted.



137.544

Figure 2-24.—Night observation device, AN/TVS-4.



137.546

Figure 2-25.—Night observation device, AN/PVS-2.

The NOD equipments presently in use are all basically the same. They consist of a power supply and four major components: main housing or container, objective lens assembly, image intensification assembly, and eyepiece assembly. Components vary in size and configuration but the theory and method of operation are identical. Descriptions and technical data on each of the several equipments are contained in the applicable technical manuals.

The main housing of each device is made of lightweight metals generally of tubular construction which hold all the assemblies and components of the device.

Objective Lens Assembly

The objective lens assembly is mounted in the front portion of the main housing. Its function is to focus and project an image of the scene being viewed upon the image intensification (amplifier) assembly. This is accomplished by the objective lens gathering and concentrating the ambient night light reflected by the object and surrounding terrain or background being viewed, and transferring this light to the front element of the image intensifier tube. To prevent moisture from entering and fogging the elements, the entire assembly is sealed in an atmosphere of nitrogen gas at a pressure of 5 pounds per square inch.

Image Intensification Assembly

The image intensifier tube assembly is located inside the main housing between the objective lens and the eyepiece. It consists of three similar stage modules. Each module consists of a fiber optic, a photocathode, a focusing cone, and a phosphor screen on a second fiber optic.

The amount of light produced by one of these modules is still too small for viewing by the human eye. To amplify this light to the degree

necessary requires that three modules be coupled together. With three modules amplifying the available light, sufficient brightness is achieved to present a viewable picture. It intensifies the low levels of ambient night light gathered by the objective lens assembly and amplifies this light up to 50,000 times. This presents a well-lit image of the scene, through the eyepiece, to the viewer.

Eyepiece Assembly

The eyepiece assembly, which consists of five glass elements, is mated to the second fiber optic of the third module in the image intensifier. It serves two main purposes for night vision equipment: (1) it magnifies the small image from the intensifier to a viewable picture, and (2) it provides an optical adjustment so the user can effectively use the optical system without wearing glasses or suffering from undue eye strain. Like the objective lens assembly, the eyepiece assembly is sealed in an atmosphere of nitrogen gas at a pressure of 5 pounds per square inch. Attached to the assembly is a rubber eyeshield which protects the eye from shock. The rubber eyeshield also aids in security by providing the operator with a means of covering the areas around the eye, therefore preventing light leaks on other areas of the face caused by the visible glow emitted from the rear of the eyepiece assembly.

Power Supply

The power supply system for the device consists of a 6.75-volt mercury cell battery, a high voltage oscillator, wiring, and a toggle switch. (See figure 2-26.) Power is supplied from the battery, through the switch, to the oscillator (inverter), and then fed to a voltage multiplier in the image intensifier assembly.

The battery can provide a useful life of approximately 100 hours of operation. The battery is placed into the battery compartment of the main housing with the positive end first. Care should be used when installing the battery. If it is installed with the negative end first, the

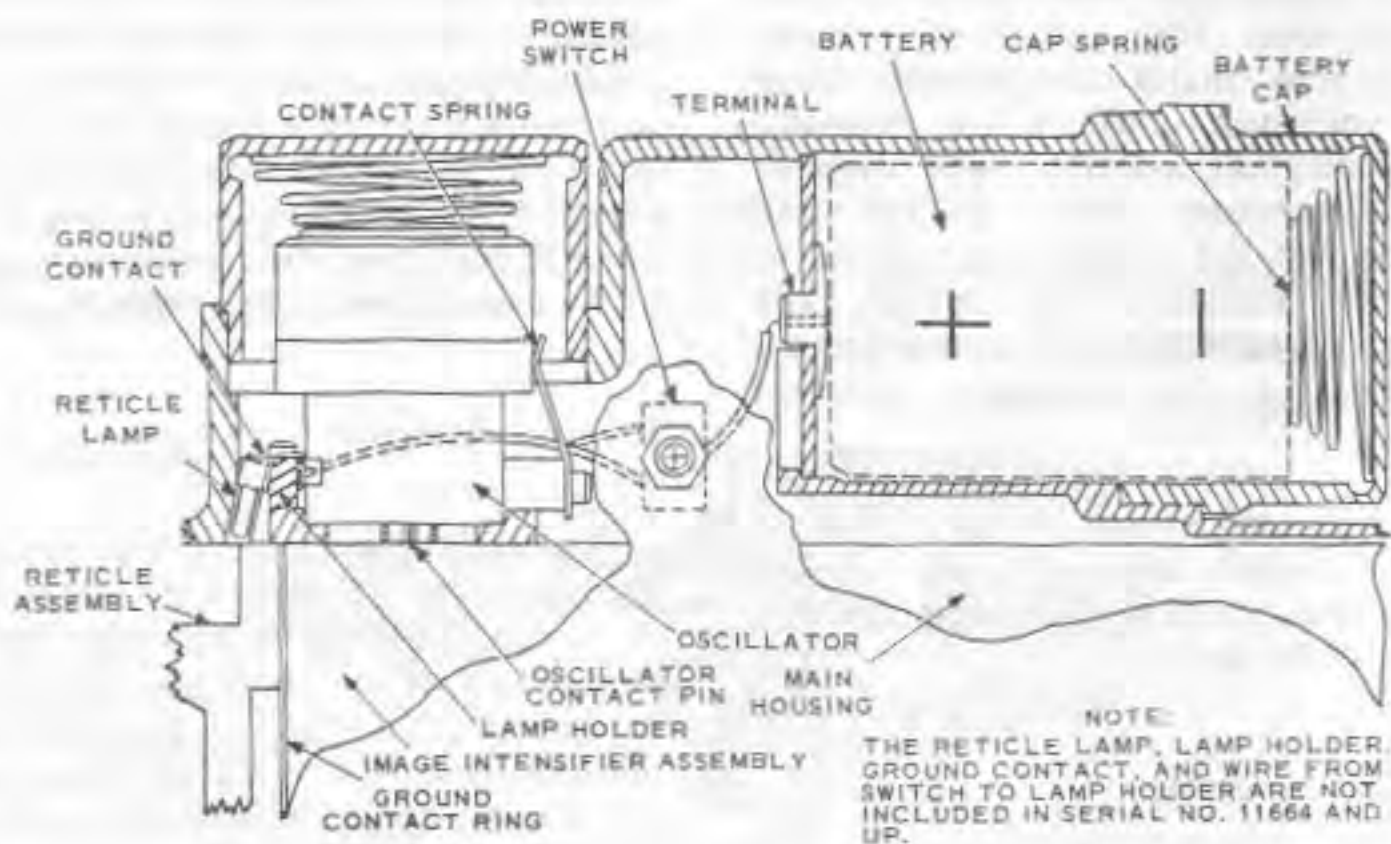


Figure 2-26.—Power supply system for night observation devices.

101.32

equipment may be damaged. The positive end of the battery is easily identified, even in the dark, by its slightly raised center.

The toggle switches are single pole, two- or three-position switches. Equipments having a separate lighted reticle (scale indicator) use a three-position switch. All other units use a two-position switch.

The inverter is a product improvement over the original oscillator. However, the oscillator is still used in the devices you will be operating. The oscillator supplies 2800 volts d.c. to the voltage multiplier on the image intensifier assembly. The voltage multiplier ensures that each of the three stages of the image intensifier assembly receives the required voltage for operation.

The oscillator is fully sealed and cannot be repaired. Oil from an individual's fingers, dirt, or other foreign matter can make the oscillator inoperative and appear defective. When the oscillator becomes inoperative, it must be replaced. Because of the high cost involved, take care to determine that the oscillator is in fact defective before replacing it.

Equipment Preparation

Instructions concerning preparing equipment for operation, including unpacking, are adequately covered in the applicable technical manuals. Various visual checks are required before equipment operation begins:

1. Examine all external parts and surfaces for dust, cracks, chips, warpage, or abrasions.
2. Ensure that all nameplates, dials, verniers, and other markings are readable.
3. Examine the lenses in the eyepiece assembly and objective housing assembly for fogging or other signs of moisture.
4. Check battery cover for damage and battery ends for damage and corrosion.
5. Examine the oscillator to see that the housing and connectors are free of foreign material and corrosion, that the input pin is straight and perpendicular to its support, that the socket is not distorted and is flush with the insulator, and that the insulator is not distorted or loose on the oscillator body.

Operation

The operator needs knowledge and skill in adjusting and focusing the lens within the parameters of the device design, replacing defective components (oscillator and batteries), and making preventive maintenance tests of battery and oscillator.

There are two important focusing requirements necessary to achieve clarity and comfort when using all night vision devices.

1. **Objective Lens Focus.** Objective lens focusing is as important with night vision as it is with a telescope or a pair of binoculars. The lenses can be focused to cover distances from as little as a few meters to infinity. Because the method of focusing each of these devices differs with the type of device, refer to the applicable technical manual to learn how to focus each of the objective lens assemblies.

2. **Eyepiece Focus.** Proper eyepiece focusing is of utmost importance. Incorrect eyepiece focusing results in severe eye fatigue in a matter of 15 minutes or less and, in some cases, can result in nausea to the point of vomiting. A properly focused eyepiece will definitely eliminate any tendencies to become ill and will reduce eye fatigue to negligible proportions. Such eye fatigue as some individuals may experience can be readily overcome with practice and by occasionally alternating the use of each eye.

SCANNING PROCEDURE

A well-trained operator will see more than an inexperienced one. Targets which are readily identifiable by a trained observer will invariably escape detection by the untrained eye. You must learn to scan through practice. Detailed information to help you develop scanning skills is given in *Basic Military Requirements*, NAVEDTRA 10054 series, chapter 14.

NIGHT BLINDNESS

Night blindness occurs when you are looking at a well-lighted object and the light suddenly disappears.

Night observation devices will cause night blindness unless you exercise caution, because the light from the device will be much brighter than the normal ambient light. Most people have a tendency to close the unused eye when looking through a monocular type of device. When you remove the device from your eye, you will tend to suffer night blindness.

To overcome night blindness when using night vision devices, you should always keep the eye that is not fixed to the device open. By doing this, at least one of your eyes will always be adjusted to normal ambient light conditions.

SAFETY PRECAUTIONS FOR NODs

Night vision devices are precision electro-optical instruments and must be handled carefully at all times.

Direct sunlight or other bright light sources will damage the image intensifier assembly. Keep the objective lens cover in place, except when using the equipment at night.

The image intensifier assembly contains highly toxic phosphor material. If an assembly is broken, be careful. Avoid inhalation of the phosphor material. Do not allow any of it to enter your mouth or an open skin wound. If you get phosphor material on your skin, wash it off with soap and water as soon as possible.

Do not remove the eyepiece or objective lens with the power switch in the ON position. The image intensification assembly is electrically charged with 45,000 volts when power is applied.

When the image intensifier assembly is removed from the main housing, it will have a capacitive high voltage of 45,000 volts. This residual voltage must be discharged immediately. This can be done by grounding the metal contact ring on the face of the assembly of the main housing or any good metallic ground. Failure to discharge this potential can be dangerous.

MAINTENANCE

Preventive and routine maintenance at the organizational level is performed by Quartermasters and Signalmen.

Organizational maintenance consists primarily of systematic care and inspection, operational checks, limited troubleshooting, servicing, lubrication, and replacement of minor parts and components.

Scheduled preventive maintenance is performed using PMS documentation, and unscheduled corrective maintenance is performed based on instructions contained in the applicable technical manual. If inspection reveals deficiencies that cannot be corrected at the organizational maintenance level, the device should be turned over to an intermediate maintenance activity for repair or replacement.

SHIPS' MAINTENANCE AND MATERIAL MANAGEMENT (3-M) SYSTEMS

Although this chapter points out that Electrician's Mates generally are responsible for electrical repairs of signal equipment, signal bridge personnel do perform routine upkeep and maintenance functions on assigned equipment. Periodic checks and adjustments must be made, for example, and there are stipulated times when equipment should be lubricated for best performance.

To achieve maximum efficiency in the use of material as well as manpower, the Navy implemented the Ships' Maintenance and Material Management (3-M) Systems. The basic purpose of the systems is to increase operational readiness of fleet units through a planned system of scheduled preventive maintenance. The 3-M Systems standardizes preventive maintenance requirements, procedures, and reports on a fleet-wide basis.

Although the 3-M Systems consists of several segments, the important elements at the petty officer 3 and 2 level are the Planned Maintenance System (PMS) and Maintenance Data System (MDS). The former involves mainly the scheduling and actual performance of preventive maintenance. The MDS is, in part, an information feedback arrangement whereby type commanders and systems commanders (for example, Commander, Naval Sea Systems Command) receive, in a relatively short time, designated information concerning planned and corrective maintenance actions.

The basic source of information on the 3-M Systems is the *Maintenance and Material Management (3-M) Manual*, OPNAVINST 4790.4, volumes I, II, and III. Other sources include OPNAV instructions and directives issued by type commanders.

CHAPTER 3

MESSAGES

A message can be defined simply as a communication sent from one person to another. The Navy defines a message as "Any thought or idea briefly expressed in plain or cryptic language, prepared in a form suitable for transmission by established means of rapid communication." The visual message, with which you are most concerned, is prepared for transmission by means of flashing light, flaghoist, or semaphore. Incidentally, a message which contains the names of signal flags in its text, regardless of the method by which it is transmitted, is a signal.

ORIGINATOR AND DRAFTER

Messages are released by an individual designated to authorize the transmission of a message for and in the name of the originator. The command by whose authority a message is sent is called the originator. The person who actually composes the message for release by the originator is the drafter.

ADDRESSEES

Most messages have at least one addressee responsible for taking action on the contents and for originating any necessary reply. Other addressees with an official concern in the subject of the message, but who do not have the primary responsibility for acting on it, receive the message for information. Do not be confused by the term "information addressee." Even though an information addressee usually is concerned only indirectly with a message, frequently action of some nature must be taken within the

command. Some messages have only information addressees.

Messages may be divided into types, according to the way they are addressed, as—

- | | |
|----------------------|--------------------------------|
| 1. Single address. | |
| 2. Multiple address. | |
| 3. Book. | Normally received
by radio. |
| 4. General. | |

A single address message is sent to one addressee only, and may be either for action or information.

A multiple address message is sent to two or more addressees, each of whom is aware of the other addressee(s). Each addressee is designated either as action or information.

A book message is sent to two or more addressees and is of such a nature that no addressee needs to know who the others are. Each addressee is informed whether the message is for action or information. The station sending a book message divides addressees into groups according to the relay stations serving them, and a separate message is prepared and transmitted to each relay station.

A general message has a wide standard distribution to all commands in an area under one command, or to types of commands and activities. General messages are of many types, each of which carries an identifying title and is intended for a standard set of addressees, such as All Commands Pacific (ALCOMPAC). All messages of a given general message title are numbered serially through the calendar year; for example, ALNAV 12-81, signifying the 12th ALNAV sent during 1981.

Other general messages are originated by fleet, force, and ship type commanders to publish information within their respective commands.

PROSIGNS

Procedure signs, or prosigns, consist of one or more letters that convey, in shortened standard form, frequently used orders, instructions, requests, reports, and information related to communications. Figure 3-1 is a list of authorized prosigns and their meanings. Overscores indicate that the prosign is signaled as one character (no pause between letters).

NAVAL MESSAGE FORMAT

Figure 3-2 shows a message copied as received by flashing light. Figure 3-3 represents the standard format of Navy messages. Study the table and compare it with the message.

All Navy messages (except flaghoist, discussed in chapter 5) have three parts: heading, text, and ending. Each part is divided into components which, in turn, are broken down into elements. Notice that certain components and elements of the standard format are missing from the visual message in figure 3-2. That is because not all components and elements of the standard format are needed in each message.

Of the three parts of a message, the most complex (as figure 3-3 would indicate) is the heading. Based on heading content, messages may be drawn up in one of three forms: plaindress, as in figure 3-2; abbreviated plaindress, featuring a shortened heading; and codress, used for encrypted messages. We will point out the differences following the discussion of the plaindress message.

PLAINDRESS MESSAGES

The heading of a plaindress message is made up of four components: procedure, preamble, address, and prefix. These components provide

Prosign	Meaning
AA.....	Unknown station (flashing light only)
AA.....	All after
AB.....	All before
AR.....	End of transmission
AS.....	Wait
B.....	More to follow
BT.....	Long break (separates text from other parts of message)
C.....	Correct
C.....	Answer sign (semaphore only)
D.....	Reduce brilliancy or use smaller light
DE.....	From
EEEEEEEE.....	Error
F.....	Do not answer
FM.....	Originator's sign (i.e., From)
G.....	Repeat back
GR (numeral).....	Group count
GRNC.....	Groups not counted
HM FM HM.....	Emergency silence sign
II.....	Separative sign
IMT.....	Repeat
INFO.....	Information addressee sign
INT.....	Interrogatory
IX.....	Execute to follow
IX (5-second flash).....	Executive signal
J.....	Verify with originator and repeat
K.....	Invitation to transmit
L.....	Relay or relayed (flashing light and semaphore only)
NEGAT.....	Exempted addressee sign (flaghoist only; equivalent of XMT)
NH.....	Number
OL.....	Show steady dim light (flashing light only)
PT.....	Call sign follows (flashing light and semaphore only)
R.....	Received
T.....	Transmit to
TO.....	Action addressee sign
W.....	Information addressee sign (flaghoist only)
W.....	Your light is unreadable (flashing light only)
WA.....	Word after
WB.....	Word before
XMT.....	Exempted addressee sign
Z.....	FLASH precedence
O.....	IMMEDIATE precedence
P.....	PRIORITY precedence
R.....	ROUTINE precedence

Figure 3-1.—Authorized prosigns and their meanings.

VISUAL MESSAGE					
OPNAV FORM 3110-20 (10-38)					
Revised from FPMO Cig. "T" stock print					
CALL UP		OHWZ DE NQHS			
T P 171933Z AUG 81 FM NQHS TO OHWZ INFO XGHL XMT NFZV GR30 BT					
UNCLAS	TROOP	MOVEMENT	1	EXPECT	5
DEBARK	GROUPS	180830H	AUG	81	10
AT	IWAKUNI	2	BUS	TRANSPORTATION	
ARRANGED	3.	NEW	GROUP	TO	20
ARRIVE	181330H	AUG	81	4.	25
REQUEST	COMPOSITION	OF	NEW	GROUP	30
BT	C	WA	DEBARK	TROOPS	35
		XHWL			40
		DE			45
		OHWZ	FL		50
		2041/17AUG 81			55
					60
FROM: USS BLUE RIDGE			DATE: 17 AUG 81		RELEASED BY:
TO: COMPHIBRON 3			SYSTEM: FL		PRIORITY: PRIORITY
			OPERATOR: JLR		SUPERVISOR: JLM
INFO: PHIBRON 3 XMT USS OGDEN			TIME: 2005Z		VISUAL NR: 10
PLAB	C OF S	CAPT	DOB	COMM. CDR	
			171933Z AUG 81		

31.47-30

Figure 3-2.—Plaindress visual message.

operating personnel with necessary information for transmitting, identifying, delivering, and accounting for each message.

Procedure Component

In visual messages, the procedure component consists of three elements: call, transmission identification, and transmission instructions. The call contains call signs of the station(s) called and the calling station. Transmission identification is not normally used in visual communications except in messages being relayed. Transmission instructions are

concerned with routing, relaying, and delivering a message.

The beginning procedure component of the message in figure 3-2 is OHWZ DE NQHS T. Of this portion, OHWZ DE NQHS constitutes the entire call element.

The call sign of the station called is OHWZ. For illustrative purposes, OHWZ is assumed to be the call sign for Commander Amphibious Squadron Three. Call signs in Navy messages reduce the length of transmission. Each ship, station, and command of the Navy (and of the

SIGNALMAN 3 & 2

Parts	Components	Elements	Contents	Remarks
H E A D I N G	Procedure	Handling Instructions.	Routing indicators.	Used in tape relay procedures only.
		Call.	Prosign F; station(s) called; prosign AA; prosign XMT; exempted calls; prosign DE and station calling.	Prepared by communication personnel.
		Transmission identification.	Station serial number.	Prepared by communication personnel.
		Transmission instructions.	Prosigns T, G, F, L; operating signals; call signs; address groups; plain language address designators.	Prepared by communication personnel.
	Preamble	Precedence; date-time group; message instructions.	Precedence prosigns; date and time expressed in digits, and zone suffix followed by month indicated by the first three letters, and if required by national authorities, the year indicated by the last two digits. Operating signals; prosign IX.	Precedence assigned by originator; date-time group and message instructions normally assigned by communication personnel.
	Address	Originator's sign; originator.	Prosign FM; originator's designation (address group, call sign, or plain language address designator).	Addressees determined by originator. Communication personnel provide call signs, address groups, and appropriate prosigns.
		Action addressee sign; action addressee.	Prosign TO; action addressee designation (address groups, call signs, or plain language, address designator).	
		Information addressee sign; information addressee.	Prosign INFO; information addressee designation (address groups, call signs, or plain language designators).	
		Exempted addressee sign; exempted addressee.	Prosign XMT; exempted addressee designation (address groups, call signs, or plain language address designators).	
	Prefix	Accounting information; group count.	Accounting symbol; Prosign GR (numerals) or GRNC.	Determined by communication personnel.
SEPARATION			Prosign BT.	
T E X T	Text	Subject matter.	Security classification or UNCLAS as appropriate when required; the abbreviation SVC; internal instructions; thought or idea as expressed by the originator.	First group of text contains classification of message, or UNCLAS; and SVC (service message).
SEPARATION			Prosign BT	
E N D I N G	Procedure	Time group.	Hours and minutes expressed in digits, and zone suffix.	Determined by communication personnel.
		Final instructions.	Prosigns AS, B, C, G, IMI, GR (numerals), IX (5 second flash), operating signals.	
		Ending sign.	Prosign K or AR.	

Figure 3-3.—Basic format for standard Navy messages.

other services) has one or more call signs which are listed in various communication publications. Call signs are discussed in more detail later in this chapter.

The prosign DE in the message stands for "from." It is used only in the call. Its complete meaning is, "This transmission is from the station whose designation follows." It indicates the station actually transmitting the message or signal and only indicates the originator when the call is serving as the address.

In the example, the calling station is NQHS, the international call sign of USS *Blue Ridge* (LCC 19). International call signs for U.S. Navy and Coast Guard ships begin with the letter N.

In figure 3-2, transmission instructions consist of prosign T, meaning "Station called transmit this message to all addressees appearing in the address component." OHWZ, therefore, is responsible for delivering the message to XGHL. If the T were immediately followed by call signs or address designations, it would assume the meaning of "Station called transmit this message to the addressees whose address designations follow." Similarly, if the T were preceded and followed by call signs, it would mean "Station preceding T transmit this message to those addressees whose address designations follow T."

Other prosigns that may appear in transmission instructions are G ("Repeat back"), F ("Do not answer"), and L ("Relay"). Prosign G is used by a transmitting station to ensure that the receiving station has received the message as transmitted, particularly if the message is of great importance or of a type difficult to send or receive. If G appears alone in the transmission instructions, all stations called repeat back the message; if G is preceded by call signs, it means that stations whose call signs precede G repeat back the message. Prosign F means "Do not answer." It is used in a method of visual signaling discussed in chapter 4. Prosign L is the relay sign. Its meaning is similar to T, but is not as specific. In transmission instructions, L means "Relay to those addressees for whom you are responsible." Its use also requires that the

station called report to you that the message has been relayed. The elements of the procedure component are assigned by communications personnel to effectively deliver the message or signal. The elements of the preamble, address, and prefix component which follow are released by the originator and are not altered by communications personnel.

Preamble

The preamble of a plaindress message shows its relative importance, contains the date-time group by which most messages are identified, and provides information relating to the message. The preamble in figure 3-2 is P 171933Z AUG 81. P is a precedence prosign, and the remainder is the date-time group, including month and year of transmission.

The precedence assigned by an originator reflects a judgment as to the speed required to deliver it to the addressee. By misusing the precedence system you defeat its purpose, which is to assure rapid handling of message traffic over available facilities with a minimum of backlog and delay resulting from competing messages. The importance of a message does not necessarily imply urgency. Figure 3-4 shows the precedence categories, their speed of service objectives, and examples of their assignments.

Messages having both action and information addressees may be assigned a single or dual precedence. If a single precedence is assigned to a multiple address message, the precedence indicates the relative importance to all addressees. If assigned two precedences, one for action addressees and a lower precedence for information addressees, it is apparent that the message is of greater importance to the action addressees.

If the message in figure 3-2 were assigned dual precedence, the preamble would read P R 171933Z AUG 81. This would show that the message should be treated as a priority message for delivery to OHWZ and as a routine message when delivered to XGHL. Dual-precedence messages, in visual signaling, normally are handled as single-precedence messages because

PROSIGN	DESIGNATION	DEFINITION AND USE	HANDLING REQUIREMENTS
Z	F L A S H	FLASH precedence is reserved for initial enemy contact messages or operational combat messages of extreme urgency. Brevity is mandatory. Examples: (1) Initial enemy contact reports. (2) Messages recalling or diverting friendly aircraft about to bomb targets unexpectedly occupied by friendly forces; or messages taking emergency action to prevent conflict between friendly forces. (3) Warnings of imminent large-scale attacks. (4) Extremely urgent intelligence messages. (5) Messages containing major strategic decisions of great urgency.	FLASH messages are hand-carried, processed, transmitted, and delivered in the order received and ahead of all other messages. Messages of lower precedence will be interrupted on all circuits involved until handling of the FLASH message is completed. Time Standard: As fast as possible with an objective of less than 10 minutes.
O	I M M E D I A T E	IMMEDIATE is the precedence reserved for messages relating to situations that gravely affect the national forces or populace, and require immediate delivery to the addressee(s). Examples: (1) Amplifying reports of initial enemy contact. (2) Reports of unusual major movements of military forces of foreign powers in time of peace or strained relations. (3) Messages that report enemy counterattack or request or cancel additional support. (4) Attack orders to commit a force in reserve without delay. (5) Messages concerning logistical support of special weapons when essential to sustain operations. (6) Reports of widespread civil disturbance. (7) Reports or warnings of grave natural disaster (earthquake, flood, storm, etc.). (8) Requests for or directions concerning distress assistance. (9) Urgent intelligence messages. (10) Requests for news of aircraft in flight, flight plans, or cancellation messages to prevent unnecessary search/rescue action. (11) Messages concerning immediate movement of naval, air, and ground forces.	IMMEDIATE messages are processed, transmitted, and delivered in the order received and ahead of all messages of lower precedence. If possible, messages of lower precedence will be interrupted on all circuits involved until the handling of the IMMEDIATE message is completed. Time Standard: 30 minutes.
P	P R I O R I T Y	PRIORITY is the precedence reserved for messages that furnish essential information for the conduct of operations in progress. This is normally the highest precedence for administrative messages. Examples: (1) Situation reports on position of front where attack is impending or where fire or air support will soon be placed. (2) Orders to aircraft formations or units to coincide with ground or naval operations.	PRIORITY messages are processed, transmitted, and delivered in the order received and ahead of all messages of ROUTINE precedence. ROUTINE messages being transmitted should not be interrupted unless they are extra long and a very substantial portion remains to be transmitted. PRIORITY messages should be delivered immediately upon receipt at the addressee destination. When commercial refile is required, the commercial precedence that most nearly corresponds to PRIORITY is used. Time Standard: 3 hours.
R	R O U T I N E	ROUTINE is the precedence to use for all types of messages that justify transmission by rapid means unless of sufficient urgency to require a higher precedence. Examples: (1) Messages concerning normal peacetime military operations, programs, and projects. (2) Messages concerning stabilized tactical operations. (3) Operational plans concerning projected operations. (4) Periodic or consolidated intelligence reports. (5) Ship movement messages, except when time factors dictate use of a higher precedence. (6) Supply and equipment requisition except when time factors dictate use of a higher precedence. (7) Administrative, logistic, and personnel matters.	ROUTINE messages are processed, transmitted, and delivered in the order received and after all messages of a higher precedence. When commercial refile is required, the lowest commercial precedence is used. ROUTINE messages received during nonduty hours at the addressee destination may be held for morning delivery unless specifically prohibited by the command concerned. Time Standard: 6 hours.

Figure 3-4.—The precedence of a message indicates its relative importance. Note time standards for handling.

of the proximity of ships and signaling stations. If, however, the action addressee of a dual-precedence (for example, P R) message were in company but one or more information addressees were not, relay would be required. In that instance, the message would be sent immediately to the action addressee, but might be transmitted to a different station for relay to the information addressees using Routine precedence. Transmission for relay, of course, would be delayed until all higher precedence traffic were cleared.

The date-time group (DTG) indicates the approximate time a message was readied for transmission. Normally, the DTG is assigned by the communication watch officer or signal officer. The DTG in figure 3-2 indicates the message was ready for transmission at about 1933 Greenwich mean time (Z is the zone suffix) on the 17th day of the month.

Because the date-time group serves as a positive means of identification, no DTG should be assigned by any station to more than one outgoing message. If for some reason you have to assign a date-time group, be sure to inform the communication center of the DTG you used.

Figure 3-2 has no message instruction element. The use of operating signals and the prosign IX are discussed in chapter 4.

Address Component

The address component of figure 3-2 is FM NQHS TO OHWZ INFO XGHL XMT NFZV. This component shows who originated the message, the addressees for action, and the addressees for information. Provision is also made to show which, if any, addressees included in a collective call sign need not receive the message. (A collective call sign represents two or more ships, stations, or commands.)

The address component of the message is determined by the drafter and originator. Communication personnel are authorized to convert the plain language addressees to call signs or address groups when processing messages for transmission.

All four prosigns that can be included in the address component appear in the example message. The originator's sign, FM, means "The originator of this message is indicated by the designation immediately following." The prosign for action addressee, TO, means "Addressees indicated by the designation immediately following are addressed for action." The information addressee sign, INFO, followed by call signs, shows that the message is for information only.

The exempted addressee sign, prosign XMT, means that addressees following XMT are exempted from the collective address. If a collective call is also used, the prosign XMT must also appear in the transmission instructions. It appears as the last element in the address component, following the action and information addressees' designations.

If the call element gives all the addressees, the address component of a message may be omitted. In the example message, if there were no information addressees, the call would serve as the address. The address component could then be omitted.

Prefix

The prefix of a plaindress message contains accounting symbols and the group count.

Accounting symbols are included in Navy messages when a possibility exists that they may be transmitted over commercial facilities. Instructions for the use of accounting symbols are found in JANAP 128.

The group count of a message is the number of groups in the text. In a message, GR followed by numeral(s), means "This message contains the number of groups indicated." In a message containing a text of 26 words, the group count is written GR26. If the message were encrypted, the group count would indicate the number of code groups in the text. Rules to follow when counting groups are—

1. Count groups in the text only.
2. Each sequence of characters uninterrupted by a space is counted as one group.
3. Punctuation is not counted unless abbreviated or spelled out.

4. Count every word and every continuous combination of letters, figures, and/or symbols as one group.

5. Hyphenated words and hyphenated names, when transmitted as one word, count as one group.

A numerical group count always must be used in encrypted messages. Sometimes the group count is omitted in messages having plain language texts, although this omission is more common in teletypewriter procedure than in visual messages.

Messages with accounting symbols **MUST** have a group count. If GRNC is used, the correct group count must be transmitted on line 15 and the receiving operator corrects line 10 to reflect the actual group count.

Long Break

The long break prosign, **BT**, marks the separation between the text and other parts of a message. In most messages, **BT** immediately precedes and follows the text. In some abbreviated service messages, discussed in chapter 4, the long break is omitted altogether.

Text

The textual format of Navy messages is designed to make the messages easily readable, yet keep them concise to conserve time and facilities so that all necessary messages can be sent. The text of the example message in figure 3-2 conforms to the standard format for plain language messages. When processed by the communication center, the text is placed in the form shown in figure 3-5.

Exempt from the standard format are messages with very short texts. Examples are tactical messages and pro forma messages using a firmly established format, such as standard "reporting type" messages that use letters of the alphabet to indicate a prearranged subject matter. If all elements are required, they appear in the following order:

1. Classification or the abbreviation **UNCLAS**. The highest classification authorized for visual means regardless of method, is Confidential.

2. Special category marking (**EXCLUSIVE**, **COSMIC**, and the like).

3. Special handling security markings (**NOFORN**, **RESDAT**, and so on).

4. Exercise identification (**EXERCISE MAIN BRACE**).

5. Code name or nickname of special projects or operations.

6. Flag word (**EXPRESS**, **REDLINE**, etc.)

7. Passing instructions and other indications of message distribution (**FOR _____**).

8. Subject line, concise and untitled.

9. References, identified by letter(s).

10. Text:

a. Paragraphs are numbered.

b. Subparagraphs are indented and lettered or numbered as appropriate.

c. In a one-paragraph message, any subparagraphs are lettered.

d. If a message is classified, proper declassification markings are included.

If unclassified paragraphs or subparagraphs appear within a classified message, each number and/or letter will be followed by the abbreviated classification in parentheses; e.g., A.(C), 1(U).

Following is an example of a message employing most of the elements of the standard text format.

UNCLAS //N01430//

COMTWELVE PASS TO VADM SMITH

REVISED CONFERENCE SCHEDULE

A. MY 091700Z AUG 81

B. COMTHIRTEEN 131530Z AUG 81

JOINT MESSAGEFORM							SECURITY CLASSIFICATION			
PAGE	DTG/RELEASE TIME			PRECEDENCE		CLASS	SPECAT	LMP	CIC	ORIG. MAIL IDENT
	DATE-TIME	MONTH	YR	ACT	INFO					
01 of 01	171800Z	AUG	81	PP	RR	UUU				2290800
BOOK	MESSAGE HANDLING INSTRUCTIONS									
FROM: USS BLUE RIDGE TO: COMPHIBRON THREE INFO PHIBRON THREE XMIT USS OGDEN UNCLAS //NOB415// SUBJ: TROOP MOVEMENT 1. EXPECT DEBARK TROOPS 1 08030H AUG 81 AT IWAKUNI 2. BUS TRANSPORTATION ARRANGED 3. NEW GROUP TO ARRIVE 181300H AUG 81 4. REQUEST COMPOSITION OF NEW GROUP										
DISTR:										
DRAFTER TYPED NAME, TITLE, OFFICE SYMBOL, PHONE						SPECIAL INSTRUCTIONS				
J.K. BROWN RM3 2-1338										
TYPED NAME, TITLE, OFFICE SYMBOL AND PHONE						SECURITY CLASSIFICATION				
S.J. TWISDALE RM2 2-1301										
SIGNATURE						DATE TIME GROUP				
<i>S.J. Twisdale</i>										

DD FORM 1 MAR 79 173/2 (OCR)

PREVIOUS EDITION IS OBSOLETE

GPO: 1979 - 302-176

Figure 3-5.—Plaindress message processed by the communication center.

1. REQUEST DESIGNATED COMMITTEE
ARRIVE COMTWELVE 24 HOURS PRIOR
CNO

2. AGENDA:

A. ADD "LOGISTICS OF PROJECT."

B. DELETE "POSSIBLE LOCATION
FACILITIES."

3. CNO ITINERARY, 19 AUG, TIMES
UNIFORM:

ETA	ETD	LOCATION
ORIG	1300	NAS SEATTLE
1515	1800	NAS ALAMEDA
2300	TERM	CHICAGO-OHARE

If a message does not require all elements, the format is adjusted accordingly by omitting nonessentials. Certain other exceptions are allowed when using the standard format.

The subject line may be omitted if it necessitates that an otherwise unclassified message be classified, noticeably increases the length of what would be a brief message, or increases commercial charges when the message is addressed to activities served by commercial communication facilities.

If a short message consists of only one paragraph, the paragraph is not numbered. When there is only one reference, the reference identification is included in the body of the paragraph. For example:

UNCLAS

YOUR 100915Z AUG 81.BUDGET APPROVED

SUBJECT CNO CONCURRENCE

The first word of all plain language text messages must be either the abbreviation UNCLAS (unclassified), or the security classification of the message. Each message will be authorized by the commanding officer for transmission by directional visual communications. As a Signalman, you must be alert to prevent the transmission of any classified message not authorized for transmission.

Ending Procedure

The procedure component of the ending of a message contains three elements; time group, final instructions, and ending prosign. Normally a time group is not used in plaindress message. The elements of the ending procedure are assigned by communication personnel to complete delivery of the message or signal.

In figure 3-2, the ending is: C WA DEBARK TROOPS K. The first two prosigns and the two words constitute the final instructions of the message. Standing alone, prosign C means "Correct." Because it is followed by other information in our example, it means "This is a correct version of the portion of the message indicated." Another prosign, WA, meaning "word after," follows certain prosigns (including C) to identify a portion of the text of a plain language message. In figure 3-2, the portion of the text identified is the word after DEBARK, which appears in the text as GROUPS. Accordingly, the final instructions of the message mean: "Correct word after DEBARK to TROOPS."

Other prosigns may appear in the final instructions. Prosign C may be followed by AB, AA, or WB, instructing the receiving station to correct portions of the text. Prosign B, used alone in final instructions means "More to follow to all stations called." When B is followed by call signs, it means, "More to follow to stations indicated."

Prosign G, for repeat back, may be used in the final instructions if, during transmission, its use is deemed necessary. Used alone, G directs all stations to repeat back the message. When G is preceded by a call sign (or signs), its meaning is: "Stations whose call sign (or signs) precede G are to repeat back."

Visual transmissions are completed by ending prosigns K or AR. The K means "This is the end of my transmission to you, and a response is necessary."

Ending prosign AR means "This is the end of my transmission to you, and no response is required or expected."

SERVICE MESSAGE

A service message is one between communication personnel pertaining to any phase of traffic handling, communication facilities, or circuit conditions. It is prepared and transmitted in plaindress, abbreviated plaindress, or codress form.

The abbreviation SVC following any security classification or UNCLAS in the beginning of the text, identifies a plain language service message.

An encrypted service message cannot be recognized as such, purposely so for security reasons. It is identified as a service message only within the encrypted text.

Most service messages are concerned with the handling of messages or to obtain corrections and repetitions of messages or parts of messages. They are prepared and transmitted as regular messages and normally are assigned a precedence the same as the message being serviced.

ABBREVIATED SERVICE MESSAGE

The text of an abbreviated service message contains only prosigns, operating signals, address designations, identification of messages, parts of messages, and amplifying data as necessary. It may be originated by operators and may contain any of the components shown in the basic format. The break prosign **BT**, however, is used only if the date-time group/time group is used when it is necessary to indicate the time at which the message was originated or when it is considered that further reference may be made to the message.

ABBREVIATED PLAINDRESS MESSAGES

Operational requirements for speed of handling—contact reports, for example—may dictate the abbreviation of plaindress message headings. At such times, any or all of the following may be omitted from the heading: precedence, date, DTG, and group count. If the date-time group is omitted, a time group must be in the ending procedure components.

When the originator is in direct communication with the addressees, the call will serve as the address only when the call designations of the stations used in calling and answering are the same as those assigned the originator and addressees.

CODRESS MESSAGES

Codress is an encrypted message form in which originator and addressee designations (as well as additional passing instructions, if any) are buried in the encrypted text.

Codress is a valuable security device in that it conceals the identity of units and prevents an enemy from making inferences from originator-addressee patterns. The callup, date-time group, and/or address component are only assigned to deliver the message to addressees for decryption to determine the true date-time group and address component which is concealed in the encrypted text. A codress message must always have an external date-time group and a group count.

STATION AND ADDRESS DESIGNATORS

Station and address designators are formed of combinations of characters or pronounceable words for use in message headings to identify originators and addressees. The kinds of station and address designators are call signs, address groups, and plain language address designators.

CALL SIGNS

Call signs are letters, letter-number combinations, or one or more pronounceable words used chiefly for establishing and maintaining communications that identify some communication activity. They are applicable in both civil and military communications. Call signs are of several categories, with some calls belonging to more than one category.

International Call Signs

International call signs are assigned radio stations of all countries—civil and military,

afloat and ashore—according to international agreement. The first letter or first two letters of a call indicate the nationality of the station. The United States has the first half of the A block (through ALZ) and all of the K, W, and N blocks. The United States reserves A calls for the Army and Air Force. The K and W blocks are assigned to commercial and private stations, merchant ships, and others. The N block is for use by the Navy, Marine Corps, and Coast Guard.

Naval shore communication stations have three-letter N calls. If necessary, these calls may be expanded by adding numerical suffixes. Thus, additional call signs are provided for facilities located remotely from the parent station. Examples are the following:

NAM . . . NAVCOMMSTA, Norfolk

NAM1. . . Headquarters, CINCLANTFLT,
Norfolk

NAM2. . . Naval Shipyard, Norfolk.

International call signs assigned to U.S. naval ships are four-letter N calls, which are used unencrypted only. They have no security value, hence are authorized for use with Allied, civil, and merchant stations.

NJUL. . . USS BAINBRIDGE (CG(N) 25).

International call signs for USN, USMC, and USCG aircraft are composed of the service designator N, NM, or NC, respectively, followed by the last four digits of the serial number of the aircraft.

Military Call Signs

Most ships of Allied nations are assigned military call signs in addition to international call signs. The encrypted call signs for radiotelegraph and radioteletype communications are derived from the military call signs. They are never used in their basic form to address messages. Consequently, military call signs are assigned only to ships capable of encrypting call signs. Call signs are encrypted by appropriately cleared communication personnel.

Both international and military call signs are listed in ACP 113, *Call Sign Book for Ships*.

Indefinite Call Signs

Indefinite call signs represent no specific facility, command, authority, or unit, but may represent any one or any group of these. Examples:

NERK (To) any or all U.S.
Navy ship(s).

NA through NZ . . . (From) any U.S. Navy
ship.

Indefinite call signs are used in codress message headings to conceal the identity of originators and addressees. In such instances, the address component is placed in the encrypted text.

Collective Call Signs

Collective call signs pertain to two or more facilities, commands, or units. Examples:

NATA . . . All U.S. Navy ships copying this
broadcast.

NIMK . . . All U.S. submarines copying this
broadcast.

Net Call Signs

Net call signs represent all stations within a net. (A net is a group of stations in direct communication with each other on a common channel.) Normally, net call signs are not used in visual transmissions. Following is an example of a net call sign.

NQN All U.S. Navy radio stations in
the Pacific guarding the ship-
shore high-frequency calling
series.

Tactical Call Signs

Tactical call signs, with the exception of task organization and aircraft call signs, are limited in application. They normally are used in tactical communications only to identify tactical commands or communication facilities. Tactical

call signs are composed of four-element letter-number combinations. They are listed in ACP 110, *Tactical Call Sign Book* (with supplements), and ACP 112, *Task Organization Call Sign Book*.

Voice Call Signs

Voice call signs are letters, numbers or a combination of letters and numbers that identify commands and units of commands. These include ships, aircraft squadrons and wings, shore establishments, type commanders, and task organization components. The voice call signs change daily using the system that is in effect at the time of this writing. The Navy continues to strive to improve security and at the same time provide a proficient and workable system of call sign identification.

In addition to the daily changing call signs, JANAP 119 contains ship and other joint armed forces voice call signs. Although the publication is always kept up to date, normally it is not used. JANAP 119 provides an adequate backup system, but lacks the security needed today.

Visual Call Signs

Visual call signs are used primarily to provide short calls in conjunction with flaghoist signals. They also may be used in other methods of visual communications. In semaphore and in flashing light communications, visual call signs may take the place of other call signs in the call element and the address component. These call signs are not used in the texts of messages unless the text is composed of signal groups. Visual call signs are as follows:

1. Calls for ships.
2. Shortened visual calls.
3. Unit or command call signs.
4. Numeral pennant call signs.
5. Special task organization call signs.
6. Signal stations.
7. Ships' boats.
8. Convoys.

Visual call signs use signal flags and pennants in their construction. When used with visual methods besides flaghoist, the numbers and letters represented by the flags and pennants are sent as numbers and letters. When visual call signs are written, the pennants are preceded by the small letter p. (Example: Cp2p9 for cruiser 29.) Except for special task organization call signs and the boat numbers in boat calls, all numerals appearing in call signs used visually are numeral pennants; e.g., Jp1CC.

VISUAL CALLS FOR SHIPS.—Visual call signs for ships may be constructed using the appropriate single-letter type indicator plus the hull number of the ship. A list of single-letter type indicators for Allied use is given below.

A	Auxiliary	(Oiler, cargo, tender, floating dry dock, training aircraft carrier, etc.)
B	Battleship	
C	Cruiser	
D	Destroyer/destroyer escort	
F	Frigate	
G	Government station	
H	Visual signal station	(Military)
K	Shore signal station	(Commercial)
L	Assault vessel	(Landing craft, amphibious transport dock, tank landing ship, etc.)
M	Minesweeper	
N	Minelayer	
P	Fast motor craft	(Submarine chaser, patrol escort motor gunboat, motor torpedo boat, etc.)

- Q Boat
- R Aircraft carrier
- S Submarine
- W Coast Guard ship
- X Submersible craft
- Y Yard service craft

For example, the visual call sign of the USS *Fanning* (FF 1076) is Fp1p0p7p6; of the USS *Forrestal* (CV 59), Rp5p9; of the USS *England* (CG 22), Cp2p2.

If it happens that visual calls are the same for two or more ships in company or in the same port, their international call signs are used.

SHORTENED VISUAL CALLS.—Shortened visual calls are constructed by omitting unnecessary numbers. If the *Alamo* (LSD 33) were the only amphibious-type ship in the vicinity, its visual call might use only the final digit of its hull number (Lp3). Similarly, USS *Sellers'* call sign could be either Dp1p1 or Dp1.

UNIT INDICATOR CALL SIGNS.—Collective visual call signs for administrative groups of ships are constructed by using the appropriate unit pennant with a type indicator flag preceding the unit pennant, and numeral pennants following. Unit pennants in the Navy flag bag are flotilla/group, squadron, division, and subdivision. In recording these pennants, and in semaphore and flashing light procedures, abbreviations used are FLOT/GROUP, SQUAD, DIV, and SUBDIV, respectively. Example:

The collective call sign for carrier division 4 is R DIV p4; destroyer squadron 1 is D SQUAD p1.

When calling commands and ships in the same unit, the unit indicator may be used alone. Thus, DIV alone would be the call for This Division.

Type indicators may be omitted from call signs if no confusion could result. If cruiser-destroyer group 1 were in port with no other ship group 1 present, the call for CruDesGru 1 could be FLOT/GROUP p1.

Commanders and all subordinate commanders in a group, as well as all ships, are included in collective calls. To call only the commander of a unit, the type indicator must follow the unit indicators. Thus, SQUAD D is Commander of this Destroyer Squadron; FLOT CDp9 is Commander Cruiser Destroyer Flotilla 9.

Call signs for a group of ships, unorganized as a task unit or element but associated with an individual ship, may be constructed by preceding the visual call sign of the individual ship by the unit indicator. The call sign of the subdivision in which the USS *Kitty Hawk* is included would be SUBDIV Rp6p3.

If the unit indicator follows the call sign of the ship, the resulting call sign is the commander call sign. Thus, Rp5p9 SUBDIV would be the commander of *Forrestal's* subdivision.

NUMERAL PENNANT CALL SIGNS.—Listed in figure 3-6 are numeral pennant call signs for general use in tactical organizations. To form the call sign for the commander of one of these groups or units, precede the listed call with pennant 0. Thus, "Entering or leaving harbor group No. 2" is p5p2. This call includes all units of the group as well as the commander and subordinate commanders. To address only the commander of the group, the call sign is p0p5p2.

To call the commander of the unit indicated, pennant 0 may be used preceding the unit indicator call signs.

Similarly, to address subordinate commanders, p0p0 is used. A message to all squadron commanders under a group commander could use the call sign p0p0 SQUAD.

Other numeral pennant call signs may be used with type indicators to designate the type of ships in a unit. The call sign for all destroyers, for instance, is p2D.

Call Sign	Meaning	Call Sign	Meaning
p#	(Singly) My immediate superior in tactical command	p5p1	Entering/leaving harbor group No. 1
p#	Commander of (type and/or unit)	p5p2	Entering/leaving harbor group No. 2
p#p#	Commanders under my command	p5p3	Entering/leaving harbor group No. 3
p#p1	Officer in tactical command	p5p4	
p1	All ships under my tactical command	p5p5	Escort force (group)
p2	All ships	p5p6	Fire support group (unit)
p3	Main body	p5p7	Flank groups (both flanks)
p4	This line	p5p8	Flank group (left)
p5	Screen	p5p9	Flank group (right)
p6	This task force	p6p#	Fueling units (oilers)
p7	This task group	p6p1	fueling group (ships fueling)
p8	This task unit	p6p2	Hunter/killer group
p9	This task element	p6p3	Logistic support group
plp#	All task force commanders	p6p4	Minelaying group
plp1	All task group commanders	p6p5	Minesweeping group
plp2	All task unit commanders	p6p6	
plp3	All task element commanders	p6p7	
plp4**		p6p8	Patrol group
plp5**		p6p9	Pickets
plp6**		p7p#	Pouncers
plp7**		p7p1	Reconnaissance group (unit)
plp8**		p7p2	Replenishment force (group)
plp9**		p7p3	Rescue destroyer(s)
p2p#	Advance force (group)	p7p4	Reserve force (group)
p2p1*	All units on circle 1	p7p5	Reserve replenishment group (unit)
p2p2*	All units on circle 2	p7p6	Retirement group
p2p3*	All units on circle 3	p7p7	Screening group
p2p4*	All units on circle 4	p7p8	Screening units under my command
p2p5*	All units on circle 5	p7p9	Scouting group
p2p6*	All units on circle 6	p8p#	Search and rescue group
p2p7*	All units on circle 7	p8p1	Service line (first)
p2p8*	All units on circle 8	p8p2	Service line (second)
p2p9*	All units on circle 9	p8p3	Service line (third)
p3p#	All units in This Exercise	p8p4	Senior officer present afloat (SOPA)
p3p1	All units this column (or column indicated by numeral pennant(s) following)	p8p5	Senior officer present afloat (administrative)
p3p2	Amphibious force	p8p6	Striking force (group)
p3p3	ASW carrier group	p8p7	Support force (group)
p3p4	ASW covering group	p8p8	Surface action force (group)
p3p5	Attack force (group)	p8p9	Search attack unit (SAU)
p3p6	Battle line	p9p#	Transport group
p3p7	Carrier group	p9p1	Waiting line (first)
p3p8	Carrier support group	p9p2	Waiting line (second)
p3p9	Carriers and rescue destroyers	p9p3**	Waiting line (third)
p4p#	Center group	p9p4**	
p4p1	Close covering group	p9p5**	
p4p2	Convoy (to indicate or denote)	p9p6**	
p4p3	Demonstration force (group)	p9p7**	
p4p4	Detached wing	p9p8**	
p4p5**		p9p9	
p4p6**			
p4p7**			
p4p8**			
p4p9**			
p5p#**			

* Units on a partial circle may be indicated by a third pennant.

** For local assignment by task force commanders or higher authority.

Figure 3-6.—Numeral pennant call signs for use in tactical organization.

SPECIAL TASK ORGANIZATION CALLS.—Visual call signs employing numeral flags and numeral pennants are used only in flaghoist communications within task organizations. The call sign groups may be combined with type indicators following the call sign to indicate types of ships within units.

Following is the table of special task organization visual call signs listed in ACP 129.

Call sign
(Numeral
flag)

0	Commander Task Force No. _____
1	*Commander Task Group No. _____
2	*Commander Task Unit No. _____
3	*Commander Task Element No. _____
4	Commander _____ Fleet
5	
6	Task Force No. _____
7	*Task Group No. _____
8	*Task Unit No. _____
9	*Task Element No. _____

(*Within own task organization)

Examples:

6p4p5 ... Task Force 45.

8p3 ... Task Unit 3.

9p2D ... Destroyers of Task Element 2.

3p6 ... Commander Task Element 6.

OTHER VISUAL CALL SIGNS.—Other visual call signs are used to address signal stations and ships' boats. Special call signs for convoys are contained in ACP 148.

Signal Stations.—Government signal stations on shore or on lightships use letter G as the visual call sign for "Any, all, or the senior man-of-war."

In compliance with international procedure, the letter K (with complement if desired) is used to call or address shore stations.

Following is a partial list of visual call signs for military signal stations.

<u>Call Sign</u>	<u>Meaning</u>
Hp0	Commander in chief
Hp1	Harbor entrance control post/port war signal station (HECP/PWSS) (main signal station)
Hp2	HECP/PWSS (secondary auxiliary signal station)
Hp3	Port director
Hp4	Senior officer percent afloat (SOPA) (when ashore)
Hp5	SOPA administrative (when ashore)
Hp6	Flag officer, second in command
Hp7	Commander naval district
Hp8	Commander naval base
Hp9	Commander naval operating base
Hp1p0	Commander naval shipyard
Hp1p1	Commander sea frontier
Hp1p2	Commander air station
Hp1p3	Commander amphibious base
Hp1p4	Commander section base
Hp1p5	Commander submarine base
Hp1p6	Degaussing station No. 1
Hp1p7	Degaussing station No. 2
Hp1p8	Degaussing station No. 3
Hp1p9	Degaussing station No. 4
Hp2p0	Deperming station No. 1
Hp2p1	Deperming station No. 2
Hp2p2	
Hp2p3	
Hp2p4	
Hp2p5	
Hp2p6	

<u>Call Sign</u>	<u>Meaning</u>
Hp2p7	
Hp2p8	
Hp2p9	
Hp3p0)	Reserved for local assignment by
)	competent authority to shore
)	signal stations not covered herein.
Hp9p9)	

Ships' Boats.—Following is a list of boat call signs.

Qp0	All boats
Qp1	Admiral's barge
Qp2	Chief of staff barge or gig
Qp3	Staff gigs or motorboats
Qp4	Captain's gig
Qp5	Boats under power
Qp6	Boats under sail
Qp7	Boats under oars
Qp8)	Reserved for local assignment by
to)	commanding officers. Calls are gen-
Qp5p0)	erated according to boat numbers.

Boat calls consist of QUEBEC hoisted above numeral pennant(s). Together, they signify the type of boat(s) called. Numeral flags following the call sign indicate the number of the boat. Thus, Qp54 is the call sign a ship would use for its utility boat number 4. To call another ship's boat, the call of the ship is hoisted below the boat call. For example, Qp4Rp1p4 is the captain's gig of carrier 14.

ADDRESS GROUPS

Address groups are four-letter groups assigned to represent a command, activity, or unit. Although address groups are used mainly in the message address, they can be used in military communications to establish and maintain communications in the same manner as call signs. In general, call signs and address groups are used by the Navy in the same way.

Address groups never start with the letter N, hence they are easily distinguishable from naval radio call signs. Unlike international call signs, address groups follow no distinctive pattern. For

example, you learned the difference in call signs for naval ships and shore stations. In address groups, however, the arrangement of the four letters is not significant.

All commands afloat (except individual ships) are assigned address groups. Address groups are assigned also to shore-based commands, authorities, or activities not served by their own communication facilities. More specifically, these are (1) senior commands and commanders ashore, such as the Secretaries of Defense and of the Navy, bureaus and offices of the Navy Department, and district commanders; (2) fleet, type, or force commanders ashore; (3) elements of operating forces permanently ashore who are in frequent communication with forces afloat; and (4) elements of the shore establishment (such as weather centrals) having a need for direct addressing and receipt of the messages.

Among other uses, address groups aid in the delivery of messages when a communication center serves so many activities that its own call sign is insufficient to identify the addressee.

Address groups, like call signs, are divided into types. They are individual activity, collective, conjunctive, and geographic address groups, and address indicating groups.

Individual Activity Address Groups

Individual activity address groups are representative of a single command or unit, either afloat or ashore. Examples:

DTCI COMPHIBLANT

SSMW CNO

Collective Address Groups

Collective address groups represent two or more commands, authorities, activities, units, or combinations of these. Included in the group are the commander and subordinate commanders. Examples:

DSWN DESRON 16

AMGK SIXTH FLT

Conjunctive Address Groups

You must remember that conjunctive address groups have incomplete meanings. It is always necessary to complete the meaning by the addition of other address groups denoting a specific command or location. For that reason, conjunctive address groups are used only with one or more other address groups. The conjunctive address group XZKW, for example, means "All ships present at _____." This particular group must be followed by a geographic address group to complete the meaning.

Geographic Address Groups

Geographic address groups are the equivalent of geographical locations or areas and are always preceded by conjunctive address groups. Assuming the geographic address group for Newport, R. I., to be DEXL, all ships present at Newport would be addressed XZKW DEXL.

Address Indicating Groups

An address indicating group (AIG) is a form of military address designator representing a predetermined list of specific and frequently recurring combinations of action and/or information addressees. The identity of the originator may also be included if the AIG is used frequently by any one originator. Each AIG is numbered so it will be easy to identify. An address group is assigned to each AIG for use as an address designator. AIG numbers may also be used as plain language address designators when appropriate.

The purpose of AIGs is to increase the speed of traffic handling and to reduce the length of the address component. Address indicating groups can be used whenever suitable, irrespective of whether the message concerned is unclassified or classified, unencrypted or encrypted, or in plaindress or codress form.

PLAIN LANGUAGE ADDRESS DESIGNATORS

Plain language address designators are the official abbreviated, or short titles of commands

or activities. They are used in message headings in place of call signs or address groups. Some abbreviated titles are written as single words, such as NAVSEA. Others have conjunctive titles and geographical locations, such as NAVCOMMSTA PUERTO RICO.

Plain language designators normally are confined to the abbreviated titles of commands and activities listed in the Standard Navy Distribution List. They may be used in communication with the U.S. Army and Air Force and the armed forces of our Allies. They may not be used when addressing a message to a nonmilitary activity, in the heading of a codress message, or in radiotelegraph messages originated by naval forces afloat.

INCOMING MESSAGE PROCEDURE

The manner in which incoming messages are handled and distributed aboard ship is in accordance with stipulated shipboard communication doctrine or as determined otherwise by the OOD. Messages bearing a higher precedence than Routine receive particular attention, whether they are administrative or tactical in nature. There may be special procedures for Flash and Immediate visual traffic.

In general, incoming nontactical messages are recorded on a message blank, shown to and initialed by the OOD, and delivered promptly to the communication center for typing and distribution. In the case of a high-precedence message, however, the OOD usually orders the signal supervisor to have it shown immediately to the captain.

If you are signal supervisor, relay all tactical signals to both the OOD and CIC (the latter by intercom, usually the 21MC circuit). The OOD or JOOD refers to the appropriate signal book to interpret the signal's meaning. In CIC, the signal also is interpreted. The CIC watch officer informs the OOD of its meaning. If both interpretations agree, the OOD will order you to indicate receipt for the message.

There are excellent reasons for requiring two interpretations of each tactical signal. For one thing, the practice keeps CIC informed of the ship's possible movements. For another, there are great many signals, particularly for maneuvering, and there must be no error on the

part of message addressees because of the danger of collision. When OOD and CIC agree to the meaning of a signal, the OOD orders the signal acknowledged. On the rare occasion when there is disagreement, the OOD uses his or her judgment as to the better interpretation.

CHAPTER 4

ALLIED COMMUNICATION PROCEDURES

In addition to operating signaling equipment and constructing messages according to standard naval message format, it is important that you use correct communication procedures, which vary depending on the method of communicating. The procedures themselves serve only one purpose—to provide a concise and definite language whereby communications may be conducted accurately and rapidly. The method of communicating may depend on a number of considerations—desired degree of security, whether signaling in daylight or darkness, required speed of transmission, if any, and so on.

This chapter explains communication procedures used by the Armed Forces of the United States and its Allies.

METHODS OF COMMUNICATING

Although Signalmen normally use only three methods to communicate visually (flashing light, semaphore, and flaghoist), other methods available are wigwag, sound, and pyrotechnics. Wigwag, which requires the use of a handheld flag, is rarely used because of the versatility and greater potential speed of semaphore. Sound is used mainly for fog warning and maneuvering signals, although applications of other sound signals are applicable to convoy and emergency situations. Pyrotechnics are mainly for emergency communications.

FLASHING LIGHT

Directional flashing light can be pointed and trained so it is visible and readable only by one addressee. When signaling with nondirectional

flashing light, the operator forms the dots and dashes with a telegraph key that switches the yardarm blinkers on and off.

In wartime, flashing light communications that must be carried on after dark usually are conducted by using infrared beams, which are invisible unless viewed through a special receiver. Transmissions can be either directional or nondirectional. During darkness, infrared is the most secure means of visual communications.

SEMAPHORE

Semaphore and flashing light can be used interchangeably. Semaphore is much faster and generally more secure than flashing light for short-distance transmissions in clear daylight. Semaphore may be used to send messages to several addressees at once if they are in suitable positions. Because of its speed, semaphore is better adapted for long messages than are other visual methods. See appendix I for semaphore procedure and drills.

FLAGHOIST

Flaghoist signaling provides a rapid and accurate system of handling tactical and informational signals of short length during daylight between ships in proximity. In general, a flaghoist signal ensures a more uniform execution of a maneuver than any other system. Flaghoist procedures are discussed in chapter 5.

PYROTECHNICS AND SOUND

The use of pyrotechnics for communications is limited to certain prescribed signals (laid down

in ACP 168) and emergency signals. Theater, operational, and tactical commanders, however, may authorize alternate or additional meanings provided they cannot be confused by forces not taking part in the operation or exercise.

Sound systems include whistles, sirens, bells, and sonar. The first three are used by ships for transmitting emergency warning signals such as air raid alerts, for navigational signals prescribed by the Rules of the Road, and for communication between ships in convoy.

A sonar-equipped ship with an underwater telephone system can use the system to communicate either by continuous wave (CW), using an operator's handkey, or by voice. The unit usually is located in underwater battery plot, but the system may have an operator's station on the bridge. This sound system has the same range limitation as a visual method and is considered less secure.

GENERAL PROCEDURES

Visual communication procedures may be subdivided into Allied, international, and special procedures.

Allied procedures are those used by the United States with its Allies and between Allied Nations.

International procedures, discussed in chapter 6, are those designed for nonmilitary communications between civil stations, but may be adapted for military use.

Special signal procedures are those not included under Allied or international procedures, such as those described in ACP 148, and—

1. Signals for various foreign ports.
2. U.S. Navy and Allied fleet exercise signals.
3. Shipwreck signals.
4. Ship-shore movement (amphibious) signals.
5. Harbor tug control signals.
6. Visual aircraft control.

The foundation for these signal procedures is contained in ACP 129, *Communication Instruction, Visual Signaling Procedures*; ACP 148,

Allied Guide to Masters; ATP 1(B), volume II, *Allied Maritime Tactical Signal Book*; and *International Code of Signals*, Pub. 102.

OPERATING SIGNALS

Operating signals are designed mainly for use by communication personnel in exchanging information incident to handling messages or establishing communications. Although the signals eliminate the need for plain language transmissions between operators, they have no security and are in fact the equivalent of plain language.

Several hundred three-letter operating signals, divided into Q and Z codes, are listed in *Communication Instructions Operating Signals*, ACP 131. Q signals may be used for both military and nonmilitary international communications. The Z code covers military communication requirements not adequately provided for by the Q code. Both codes may be used in military communication, but the Z code is only for Allied military use. Operating signals may supplement signals from the *Allied Maritime Tactical Signal Book*.

Many signals may be used both as a question or in reply to a question. For communications with a military station, an interrogative signal includes prosign INT before the Z or Q signal. For example, NTGT asks NWBJ, "NWBJ DE NTGT INT QRU K," INT QRU in that case means, "Have you anything for me"? NWBJ replies "NTGT DE NWBJ QRU K," meaning "I have nothing for you."

When you are communicating with a nonmilitary station, prosign IMI after the Q signal, and any data used with it, will be used by Allied military stations to ask questions.

The Q signals are no longer listed in *International Code of Signals*. However, chapter 8 of Pubs. 117A and B (*Radio Navigational Aids*) carry the Q signals. Since Pubs. 117A and B are not required on all merchant ships, establish whether stations hold the publications with the Q signals before you use the signals.

A number of signals contain blank portions in their meanings that may be filled in to convey specific information. ZOA, for instance, means, "Relay this message by visual to _____."

The originating station completes the meaning of the signal by adding the appropriate call sign(s).

OPERATOR'S RESPONSIBILITIES

Reliability, security, and speed depend, to a large extent, upon the operator. It is essential that operators be well trained, maintain signaling discipline, and understand thoroughly their responsibilities.

Always follow the prescribed procedure. Unauthorized departures from or variations in prescribed procedure invariably create confusion, reduce reliability and speed, and tend to nullify security precautions. If an unusual circumstance is not covered by set procedure, initiative and common sense should provide a reasonable procedure. The following practices are specifically forbidden:

1. Violating visual silence, when such condition is imposed.
2. Transmitting the operator's personal sign. (The operator's initials or any other identifying sign constitutes a personal sign.)
3. Unauthorized use of plain language.
4. Profane, indecent, or obscene language.
5. Using other than authorized prosigns.

VISUAL RESPONSIBILITY

Commanders may issue detailed relaying instructions and/or diagrams showing sectors of visual responsibility. In assigning responsibility, consideration is given to relative capabilities of various ships, type of visual equipment installed, personnel limitations, and type of formation.

Any ship through which a message is relayed is a repeating ship. The term "repeating ship" includes a ship—

1. Designated specifically as a repeating ship.
2. That automatically relays.
3. That elects to relay to facilitate signaling.
4. Through which messages are routed.

The function of a ship specifically designated as a repeating ship is to act as a primary relay station to facilitate communications.

Even though some ships may be designated specifically as repeating stations, the general rule for determining visual responsibility for any situation is that each addressee is responsible for the delivery of messages to addressees beyond its own ship in the general direction away from the originator when a collective call sign is employed. The object of relaying is to reduce the time lag between the originator's transmission and its accurate delivery to the last addressee. It is the duty of any ship to expedite the transmission of a message by relay when it is evident that it is in a better position to do so than a ship specifically responsible.

In multiple-line or circular formations, task force or task group commanders are responsible for their subordinate commanders and for other group commanders in the direction beyond and away from the originating ship. Unit commanders, in turn, are responsible for their division or line leaders and for other unit commanders in the direction beyond and away from the group commander. Division or line leaders are responsible for the ships of their divisions or lines, and ships of other divisions or lines in a direction beyond and away from the leader.

When a maneuver alters the positions of units and ships relative to the officer in tactical command (OTC), responsibility for relaying signals or messages does not change until the maneuver is completed by all ships.

AUTHENTICATION PROCEDURES

Authentication is a security measure to protect communication systems against fraudulent messages. Although authentication is intended mainly for radio transmissions, Signalmen should be aware of authentication procedures because the need may arise for authenticating by visual means.

An authenticator is a letter, numeral, or group of letters or numerals, or both, selected in a prearranged manner and usually inserted at a predetermined point within a transmission so an addressee can distinguish between a genuine and fraudulent transmission. Each authentication system, which changes periodically, specifies the letters or numerals to be used and the method of inserting them in a message.

As a general rule, communication center personnel retain the authenticator list, because they have greater need for it. Should the signal force require authentication procedures, the signal supervisor should obtain the current letters and/or numerals and instructions for their use from radio central.

CHALLENGE AND REPLY PROCEDURES

When a station includes authentication in an outgoing message as previously described, it is referred to as transmission authentication; that is, it is included as a part of the transmitted message. Another application of the system involves challenges and replies for identification purposes between operational units. This type of authentication is mandatory when any station is challenged to identify itself. Challenge and reply procedures are used only when other means of identification—visual and electronic—fail.

Like other authenticators, challenges and their replies consist of randomly selected letters that remain in effect for a specified period of time. Because these challenges and replies are highly classified, they are retained by the communication center, but current extracts are supplied to the bridge daily by the communication officer.

Only the commanding officer may originate a challenge, because a ship seldom challenges unless prepared to fight. The reply to a challenge will be authorized by the commanding officer. Render a reply promptly and correctly. If you use an incorrect code, you will send an incorrect reply to a challenge, which is as faulty as not replying at all. General instructions for challenge and reply for sea elements are found in articles 512 through 517 of *Recognition and Identification Instructions, Air, Land, and Sea Forces*, ACP 150.

FLASHING LIGHT PROCEDURE

Now that you know what call signs, operating signals, and prosigns are, your next job is to learn how to use them.

CALLING AND ANSWERING

When calling another station, there are certain details for which you are responsible. In visual communications, the identity of the calling station usually is apparent, and it is necessary only to gain the attention of the station called. Normally, that is done by directing the signal light at the station and making the receiving station's call sign until answered. When necessary or desirable to identify the calling station, the full call (call sign of station called, prosign DE, and call sign of the calling station) is used. As distinguished from the full call, the short call is known as an abbreviated call. Examples of abbreviated and full calls are as follows:

Abbreviated call NCGP (until answered)

Full call NCGP DE NTJZ

The callup, then, is a transmission directed to the station with which you wish to communicate, requesting that station to answer you. It is part of a definite procedure established for the swift and reliable transmission of messages.

It is essential that you understand thoroughly the reasoning behind the callup procedure. Here is how substituting letters (or combinations of letter) for words and phrases saves transmission time, speeds delivery, and increases the security of a message. If there were no uniform transmission procedure, a Signalman aboard the USS *Forrestal*, in calling USS *England* to say there is a message for that ship, might transmit the following:

THIS IS THE USS *Forrestal* CALLING
USS *England*

The operator aboard USS *England* might reply:

USS *England* ANSWERING USS *Forrestal*—GO AHEAD WITH YOUR MESSAGE

This method is lengthy and obviously inefficient. It encourages misinterpretation of calls

and, what is worse, variations might increase with each ship contacted and errors would result. Let's condense the call and answer to their most efficient forms.

Call *England* FROM *Forrestal*

Answer *Forrestal* FROM *England*—GO
AHEAD

ACP 113 indicates that NJVF is the international call sign for the USS *Forrestal* and NLXZ is the call sign of the USS *England*. Substituting call signs for the ships' names, we have—

Call NLXZ FROM NJVF

Answer NJVF FROM NLXZ GO
AHEAD

In ACP 113 you also find that the USS *Forrestal* is CV 59, an aircraft carrier. Referring to the single-letter type indicators contained in ACP 129, you learn that the type indicator for a carrier is the letter R. The visual call sign for the USS *Forrestal* then, is R59. In the same manner, the USS *England* is the CG 22, a cruiser. Applying the single-letter type indicator for a cruiser, C, the call sign of the USS *England* is C22. By substituting these call signs, you have the following visual call:

Call Cp2p2 FROM Rp5p9

Answer Rp5p9 FROM Cp2p2

In visual communication, the small letter "p" indicates that the number following represents a numeral pennant; only numeral pennants (as opposed to number flags) are used in calls. (See chapter 5, "Allied Flaghoist Procedures.") Under flashing light procedure, the letter p in the call is not transmitted, but it is so understood and written by the receiving station recorder.

In the list of authorized prosigns (chapter 3), DE means from, and K means invitation to transmit. By substituting these signs, you form the following brief call:

Call Cp2p2 DE Rp5p9 K

Answer Rp5p9 DE Cp2p2 K

The complete visual call is only required when two units of the same type have the same numerals as the last number of their hull; e.g., Cp2p2, Cp3p2. If no confusion will result, a shortened visual call may be used.

Example: Cp2 DE Rp9

After the initial callup, any further calling and answering incident to the transmission of a message usually is handled by abbreviated calls. If there is any possibility of confusion, of course, a full call should be made. As an example of the difference in callups, note how a Signalman on the USS *Forrestal* questions the accuracy of the group count of a 23-group message from the USS *England*.

Full call Cp2p2 DE Rp5p9 $\overline{\text{INT}}$
GR23 K

Abbreviated call Cp2p2 (until
answered) $\overline{\text{INT}}$
GR23 K

Shortened visual call ... Cp2 DE Rp9 $\overline{\text{INT}}$
GR23 K

DOUBLE-FLASH PROCEDURE

Double-flash procedure can be used when a recorder is unavailable and when you are communicating with an aircraft. A called station desiring to use double-flash transmits the operating signal ZJJ in response to the call. Thereafter, the receiving operator flashes once to indicate receipt of each word (or group), and flashes again to indicate that the word has been recorded and he or she is again ready to receive.

TRANSMIT TO

When a message is required to be transmitted to addressees other than the station(s) called and relay is not automatic, the prosign T is used. When a message is received with prosign T standing alone in the procedure component of the heading, it means "Station called transmit this message to all addressees." Suppose that

C87 transmits a message to R47, with instructions for R47 to relay the message to D76, the addressee in this example:

Rp4p7 DE Cp8p7 T R 231410Z AUG 81
FM Cp8p7 TO Rp4p7 Dp7p6 BT

Prosign T, followed by a call sign in the procedure component, means "Station called transmit this message to station(s) whose call signs follow T." Assume that C87 transmits a message to R47 with instructions for R47 to transmit the message to one of the addressees—in this instance D70:

Rp4p7 DE Cp8p7 T Dp7p0 R 231410Z AUG
81 FM Cp8p7 TO Dp7p0 Dp7p6 GR4 BT
UNCLAS RETURN TO PORT BT K

(Station C87 made other arrangements to get the message to D76, so that station is not included in the relay.)

Prosign T, both preceded and followed by call signs, means, "The station indicated before T is to transmit this message to the station(s) indicated immediately following T." Station C87, transmitting a message to D70 and R47, instructs D70 to relay the message to D76:

Dp7p0 Rp4p7 DE Cp8p7 Dp7p0 T Dp7p6
R 231410Z AUG 81 FM Cp8p7 TO Dp7p0
Dp7p6 Rp4p7 GR4 BT UNCLAS RETURN
TO PORT BT K

When transmission is accomplished, all addressees (D70, D76, R47) will have received the message: station C87 is in direct communication with D70 and R47; D70 is in touch with D76.

When a message is to be relayed to a group of ships operating under a collective call sign, with one or more ships exempted, prosign XMT is used in conjunction with T to exclude exempted ships from the collective call. If we assume that QUOB is COMDESRON 28, ZQFK is the collective call for that squadron, and NTFS is a ship in the squadron, a transmission exempting NTFS from the collective call would be: NUYO DE QUOB—T—ZQFK—XMT—NTFS.

NOTE: Visual call signs will not be used in the transmission instructions or address of messages to be transmitted or relayed by other than visual means.

VERIFICATIONS, REPETITIONS, CORRECTIONS

Occasionally, messages or parts of messages must be verified, corrected, or repeated. To accomplish these procedures, prosigns AA (all after), AB (all before), WA (word after), and WB (word before) are used in service or abbreviated service messages in conjunction with IMI, INT, C, J, and certain operating signals. IMI is used by communication personnel to obtain a repetition, and J is used by an addressee to obtain a verification and repetition of the entire transmission.

Examples:

1. To have the heading of a message repeated, you would send: IMI AB BT K
2. If you wanted the heading of a message verified and repeated, you would send: J—181545Z AUG 81 AB BT
3. If you wanted to correct the heading of a message, you would send: C—181545Z AUG 81 AB BT and then send the correct version.

When a message that has been receipted for must be verified, corrected, or repeated, a new message, either service or abbreviated service, must be originated with sufficient identifying information to identify the original message. Identification usually is made by using the date-time group, but the message may be further identified by adding the call sign of the originating station and the group count. If even more identification is needed, the complete preamble or address, or the complete (or partial) text may be included.

For a plain language message, the reference point is a plain language word. If a word or group used to identify a part of a message appears more than once in that message, it is assumed that the first occurrence of that word or group is implied. If otherwise intended, amplifying data (such as adjacent words or groups) must be included.

When necessary to use a code group of an encrypted message as a reference point, reference is made to it by number; that is, according to the numerical order in which it appears in the text. Use of numbers as references to encrypted groups is illustrated below. The following message is transmitted:

Rp4p7 DE Cp8p7 ZFH2 Dp7p0 P 121015Z
AUG 81 GR5 BT XRDAT MNCRB TYQCO
MNSDA PWSET BT K

Prosign BT is used in the message twice, therefore a request using—

1. AB BT denotes all before the text.
2. AA BT denotes the complete text and message ending.
3. AA LUXO BT denotes the message ending, where LUXO is the last group in the text.

Using prosigns correctly is a determining factor in your proficiency as a Signaller. Make sure you understand the rules and examples that follow. Here is the encrypted message used throughout the examples:

Rp4p7 DE Cp8p7 ZF42 Dp7p0 P 271545Z
AUG 81 GR 11 BT JAPAY BOQBU LAJCY
KUPDY FOQEO MUCRU KAWGC
GUXHO XAVIA RATJU SABKO BT K

Prosign IMI, meaning "Repeat," is used in the following ways (remember, however, that it is NOT used to obtain a repeat on a message for which a receipt has been given):

1. Used alone, IMI means, "Repeat last transmission."
2. Used with other data, IMI indicates, "Repeat portion indicated."

Examples:

1. R47, desiring the entire message repeated, transmits:

Cp8p7 DE Rp4p7 IMI K

Ship C87 replies by sending the entire message as originally transmitted.

2. R47 desires all after the heading repeated:

Cp8p7 DE Rp4p7 IMI AA BT K

Reply from C87:

Rp4p7 DE Cp8p7 AA BT—JAPAY BOQBU
LAJCY KUPDY FOQEO MUCRU
KAWGC GUXHO XAVIA RATJU SABKO
BT K

3. R47 desires all before the text of the message repeated:

Cp8p7 DE Rp4p7 IMI AB BT K

Reply:

Rp4p7 DE Cp8p7 AB BT—Rp4p7 DE
Cp8p7—P—271545Z AUG 81—FM
Cp8p7—TO Rp4p7—INFO Dp7p0 GR11
BT K

4. R47 wishes a repeat of the preamble and procedure components (all before FM):

Cp8p7 DE Rp4p7 IMI AB FM K

Reply:

Rp4p7 DE Cp8p7 AB FM—Rp4p7 DE
Cp8p7—P—271545Z AUG 81 K

5. R47 wishes all after the eighth group repeated:

Cp8p7 DE Rp4p7 IMI AA 8 K

Reply:

Rp4p7 DE Cp8p7 AA 8—XAVIA RATJU
SABKO BT K

6. R47 asks for a repeat of the ninth group:

Cp8p7 DE Rp4p7 IMI 9 K

Reply:

Rp4p7 DE Cp8p7—9—XAVIA K

7. R47 wants a repeat of groups three through eight:

Cp8p7 DE Rp4p7 IMI 3 TO 8 K

Reply:

Rp4p7 DE Cp8p7—3 TO 8—LAJCY
KUPDY FOQEO MUCRU KAWGC
KAWGC GUZHO K

In plain language messages, portions of the text are identified as words rather than by number. The following examples show how an operator checks the reception of certain portions of a message.

Request:

Cp8p7 DE Rp4p7 IMI WA CARRY K

Reply:

Rp4p7 DE Cp8p7 WA CARRY—OUT K

Request:

Cp8p7 DE Rp4p7 IMI CARRY TO SIX-
TEEN K

Reply:

Rp4p7 DE Cp8p7 CARRY TO SIXTEEN—
CARRY OUT PLAN SIXTEEN K

To correct errors, a succession of eight or more Es is transmitted and means, "An error in transmission has just been made." (The phrase "eight or more Es" is intended to facilitate operation and shall not be construed as permitting transmission of an excessive number of Es). In correcting errors in the heading, the error sign will be followed by the last prosign or operating signal correctly sent. Within the text, the error sign will be followed by the last word or group correctly sent. Within the text of signals taken from a naval signal book, the error sign will be followed by BT or the last TACK correctly sent. The operator then continues with the correct version. Example:

Rp4p7 DE Cp8p7—O—241217Z AUG 81
BT RETURNIM EEEEEEEEE BT RETURN-
ING TO BASE BT K

To cancel a transmission during transmission, a succession of eight or more Es followed by the prosign AR means, "This transmission is in error, disregard it." This method of cancelling a transmission cannot be used after the transmission has been completed. Example:

Rp4p7 DE Cp8p7—O—241217Z AUG 81
BT PROCEED IN EEEEEEEE AR

The "verify with originator and repeat" prosign, J, is signaled by an addressee when all or part of a received message appears to be incorrect or is not understood. Prosign J does not signify an exchange of information between operators. The signal J is released only by the commanding officer or a representative and is intended for the originator of the questioned message.

When used with AA, AB, WA, and WB, J means, "Verify with originator and repeat message or portions indicated."

When a J is used, the originator of the message must send a correct verification, beginning with the prosign C. When so used, C means "This is the correct version of the original message." Examples:

1. Ship R47 wants the message verified by the originator and repeated:

Cp8p7 DE Rp4p7 J 271545Z AUG 81 K
(date-time group is used as reference)

Station C87 finds the message, verifies it with the originator, and sends:

Rp4p7 DE Cp8p9 C 271545Z AUG 81—
Rp4p7 DE Cp8p7—P—271545Z AUG 81—
FM Cp8p7—TO Rp4p7—INFO Dp7p0
GR11 BT JAPAY BOQBU (and so on) BT K

2. Ship R47 desires the text of the message verified by the originator and repeated:

Cp8p7 DE Rp4p7 J 271545Z AUG 81 BT TO
BT K

Originator sends:

Rp4p7 DE Cp8p7 C 271545Z AUG 81 BT
TO BT—BT JAPAY BOQBU (and so on)
BT K

3. Ship R47 wants the heading of the message verified by the originator and repeated:

Cp8p7 DE Rp4p7 J 271545Z AUG 81 AB
BT K

Originator verifies heading by sending:

Rp4p7 DE Cp8p7 C 271545Z AUG 81 AB
BT—Rp4p7 DE Cp8p7—P—271545Z AUG
81—FM Cp8p7—TO Rp4p7—INFO Dp7p0
GR11 BT K

You already know that the prosign INT means interrogative. In a plain language message, for instance, R47 believes a word is "Argentina," but is unsure.

Accordingly, R47 sends:

Cp8p7 DE Rp4p7 INT ARGENTINA K

Station C87 sends:

Rp4p7 DE Cp8p7 C K

If the questioned word happens to be "Argentia" instead of "Argentina," C87 will reply:

Rp4p7 DE Cp8p7—C—ARGENTIA K

RECEIPTING

When only two stations are communicating by flashing light, directional receipting procedure is used regardless of whether the light is a directional or nondirectional type. Nondirectional procedure is used when one station transmits a message to a number of other stations simultaneously.

In directional procedure, the transmitting station—after sending a prosign, word, code

group, or operating signal—waits for the receiving station to make a flash for each group before going to the next. If the receiving station does not make a flash, the transmitting station repeats the group.

Nondirectional receipting procedure differs in the following particulars:

1. The call may consist of a collective call sign or a number of call signs, repeated until answered by all receiving stations.

2. Each receiving station answers by transmitting a continuous series of Ks until the calling station, seeing that all receiving stations are answering, stops calling, waits a short time, then starts transmitting the message.

3. During message transmission, all receiving stations keep their lights out. Should a receiving station miss a portion of the message, that station requests a repetition in the normal manner.

4. Receiving stations receipt for the message by making R four times.

5. When prosign F (do not answer) is used in the all-around (nondirectional) procedure, no ship responds to that call or receipts for the message. Ships that miss the transmission or portions thereof may request repetition from adjacent ships by directional flashing light, bearing in mind the danger of disclosing the tactical composition of the formation.

EXECUTIVE METHOD

When an officer in tactical command (OTC) wishes two or more units to execute a signal (usually a maneuver) simultaneously, the executive method of communicating is used. Although the executive method normally is associated with signals from a signal book, it may be used, when appropriate, for plain language messages.

Tactical signals may be sent by flashing light. When the OTC uses that method, however, the

procedure for the executive method is governed by the following rules:

1. Abbreviated plaindress messages are used exclusively.
2. The message carries the prosign $\overline{IX}$ (execute to follow) immediately before the first $\overline{BT}$.
3. The signal of execution is another prosign $\overline{IX}$, followed by a 5-second flash. The moment of execution is termination of the 5-second flash.
4. Executive method messages do not carry a time group.

There are two types of executive method messages; delayed and immediate.

Delayed Executive Method

When the delayed executive method is used, receiving stations receipt for the message, and the signal of execution is made in a later transmission. Example: C45 transmits directly to D35:

<u>C45 makes</u>	<u>D35 makes</u>
D35 (until answered)	K
$\overline{IX}$	Flash
$\overline{BT}$	Flash
TURN	Flash
STBD	Flash
FOUR	Flash
$\overline{BT}$	Flash
K	R
Flash (to execute)	
D35 (until answered)	K
$\overline{IX}$ s	$\overline{IX}$ s
5-second flash	5-second flash
$\overline{AR}$	Flash

Should there be any doubt that an executive method message was received correctly, the request for repetition, correction, or verification is made in the normal manner. An exception is that, for signals taken from a naval signal book, the request must be for the entire signal or for those portions separated by TACK. If there are more than two TACKs in any signal, further amplification by use of the nearest whole signal is required.

The signal of execution does not require a receipt. The receipt is obtained for the original signal, the 5-second flash is not made until all stations repeat the $\overline{IX}$ s, and a flash is given for the final $\overline{AR}$.

Once the executive signal has been given, the message cannot be canceled. An executive method message awaiting execution is cancelled by a separate non-executive message. The message is addressed to all stations originally called and consists of NEGAT used alone or with the portion of the signal to be cancelled. If the originator wishes to cancel all outstanding unexecuted messages, NEGAT preceded by the appropriate call sign(s) is transmitted. For example, PKWN sends:

NFFN NHDY DE PKWN $\overline{IX}$ $\overline{BT}$ FORM
ONE EIGHT ZERO $\overline{BT}$ K

Before executing the signal, PKWN desires to cancel it. PKWN transmits:

NFFN NHDY DE PKWN $\overline{BT}$ NEGAT $\overline{BT}$
1621Z K

In the event of collective calls, normal visual responsibility is followed to receipt for the signal of cancellation.

To cancel a particular signal or one of several outstanding unexecuted signals, NEGAT is transmitted, followed immediately by the signal to be cancelled. Assume Cp7 sent the following messages but executed none:

p1 DE Cp7 $\overline{IX}$ $\overline{BT}$ SIERRA BRAVO TACK
DELTA GOLF $\overline{BT}$ K

p1 DE Cp7 $\overline{IX}$ $\overline{BT}$ TURN STBD SIX $\overline{BT}$ K

p1 DE Cp7 $\overline{IX}$ $\overline{BT}$ SPEED TWO SIX TACK
GOLF KILO $\overline{BT}$ K

Desiring to cancel TURN STBD SIX, Cp7 sends:

p1 DE Cp7 $\overline{\text{BT}}$ NEGAT TURN STBD SIX
 $\overline{\text{BT}}$ 1623Z K

To show how verification of an executive method message is made by using prosign J, assume that Cp4 transmits the following message to D76 and R67, and both receipt for it.

Dp7p6 Rp6p7 DE Cp4 $\overline{\text{IX}}$ $\overline{\text{BT}}$ TURN STBD TWO $\overline{\text{BT}}$ K

DE Dp7p6 R

DE Rp6p7 R

After receipting for the message, however, R67 wants the message verified:

Cp4 DE Rp6p7 J TURN STBD TWO K

The message is correct as originally transmitted, and R67 is so informed:

Rp6p7 DE Cp4 C TURN STBD TWO K

Had the message been incorrect, it would have been necessary to cancel it and transmit a new message. (The new message may be made and executed before the incorrect message is cancelled in those cases when speed is vitally important.)

Immediate Executive Method

In the immediate executive method, the text is sent twice, separated by $\overline{\text{IMI}}$, and the signal of execution is transmitted in the message ending. Receiving stations have no opportunity to receipt or obtain repetitions before execution. For that reason, messages are carefully worded and transmitted to avoid any possibility of misinterpretation. Example: The OTC, R67, transmits the following message by

the immediate executive method, using non-directional procedure.

R67 makes—

222

$\overline{\text{IX}}$

$\overline{\text{BT}}$

TURN STBD NINE
TACK SPEED
ONE SIX

$\overline{\text{IMI}}$

TURN STBD NINE
TACK SPEED
ONE SIX

$\overline{\text{BT}}$

$\overline{\text{IX}}$ $\overline{\text{IX}}$ $\overline{\text{IX}}$

(5-second flash)

K

Answering ships make—

Ks

$\overline{\text{IX}}$ $\overline{\text{IX}}$ $\overline{\text{IX}}$

(5-second flash)

RRRR

Now, let's go over this example in a little more detail. The originator, R67, sends a series of 2s (2 is the call for all ships) until all ships answer by sending a series of Ks.

When all ships answer, R67 stops calling and, after a short pause, sends $\overline{\text{IX}}$ (execute to follow prosign). This prosign is followed by the long break sign $\overline{\text{BT}}$, text of the message, prosign $\overline{\text{IMI}}$, and again the text. To signify end of text, R67 sends $\overline{\text{BT}}$ again. A series of $\overline{\text{IX}}$ s is transmitted to alert receiving ships to stand by, then the 5-second flash is made. The signal is executed at the end of the flash. The prosign K is transmitted following the signal of execution to receive receipts and to accept requests for repetitions, if necessary.

INFRARED COMMUNICATIONS

Infrared flashing light communications between ships generally are directional, although

nondirectional procedure can be used for traffic having a wide distribution.

The OTC may prescribe calling periods during which infrared traffic may be passed without special signal to attract attention. As an example, stations may be required to monitor for infrared signaling for fifteen minutes beginning on the hour and half hour. Such instructions may be found in the operation order, communications plan, or message traffic scheduling calling periods. At the beginning of the calling period, the OTC may transmit the appropriate operating signal and the call sign(s) of the stations for whom it has traffic. Stations not included in the traffic list may secure their equipment unless they have traffic for the OTC or units in company.

To transmit infrared traffic outside calling periods or when calling periods have not been prescribed, the addressee(s) may be alerted by the code word Nancy Hanks on voice radio, the appropriate signal from ATP 1(B), volume II, or the appropriate operating signal.

Ships will turn on their point of train lights (POT) when ready to communicate by infrared. When communicating by infrared, the POT lights will be left on to aid the sender and receiver(s) in training their lights and receiver(s). In the event of nondirectional procedure, the originator's POT lights will become its nancy beacons and the receiving stations will be able to train their receivers on the actual transmissions.

FLASHING TO AIRCRAFT

When signaling is taking place between aircraft in flight and the ground (or surface vessels), the following points must be borne in mind:

1. Visual signaling from aircraft is possible only when the aircraft occupies certain positions relative to the line of sight from the station with which signaling is taking place. Because the aircraft is moving rapidly, the time during which it is in favorable positions for signaling is very short.

2. The signaler in an aircraft may have no one to write down the message. The entire

message must then be read and written down from memory, or each word written down before sending a flash. For long messages it may be advisable, therefore, to use the double-flash procedure (described previously).

3. The aircraft should be maneuvered into a favorable position so that the signaler can have an unobstructed view for as long a period as possible.

Aircraft are called by the procedure signal AA, the unknown station sign.

Because many aircraft cannot signal by flashing light, an answer cannot always be expected. If an answer is not seen, the complete message is sent at least twice. Repetitions are preceded by IMI. The contacted aircraft may indicate receipt by rocking its wings. Don't forget that the light must be trained accurately the whole time.

SIGNAL LIGHT—WAR PROVISION

When signaling at night during wartime, you must take the greatest precautions. Flashing light is used only when absolutely necessary. A minimum of light is shown, except when making recognition signals, but a light of sufficient brilliancy must be used to ensure that it is seen immediately. Destroyers and small ships have difficulty reading dim lights in heavy weather because of movement and sea conditions.

The background must be considered, and care taken to avoid showing light close to or in line with navigation lights.

No upper deck lighting should be visible on or in the vicinity of the signal bridge. Signal lights must be carefully tested for leakage of light.

At Dusk and Early Daylight

The use of signal lights at dusk and dawn must be avoided when possible. Any time it is necessary to use flashing lights at dusk, Signalmen must constantly reduce lamp brilliancy as daylight fades during the transmission of a message.

At All Times

All ships must keep a constant watch on the flagship of the OTC.

Often, after communication is established, you may find that light brilliancy can be reduced still further.

When using any type of directional light, it is essential to keep the light trained accurately on the receiving ship throughout the transmission of the message.

Ships should send prosign D to signaling ships when their lights are observed to be brighter than necessary.

Sighting arrangements of lights must be tested frequently for alignment.

Masthead and yardarm signaling lights and circuits must be maintained in an efficient state of readiness. To prevent them from shorting or being switched on accidentally, switches (on the bridge) for the main electrical supply leads should be kept open until actually needed.

SYNCHRONIZING TIME

The procedures described in this topic are used for requesting and transmitting timing signals by flashing light.

The request for a timing signal is conveyed by a procedure message using the operating signal that means "Request a timing signal now (or at _____)."

The intention to make a timing signal may be conveyed in advance by an abbreviated service message using the operating signal meaning "Stand by," followed by the signal meaning, "Timing signal will be transmitted now (or at _____)."

The timing signal, transmitted as an abbreviated service message, consists of the operating signal meaning, "Timing signal will be transmitted now (or at _____)." The operating signal is followed by the 4-figure group indicating the time and by a 5-second flash. The 5-second flash is to be completed exactly at the time indicated for the check.

Stations concerned, which received the check correctly, give a receipt in the normal manner (if

instructed to do so). Any stations that fail to receive the timing signal correctly must request a further check by operating signal.

In the following example, assume that—

1. ZUJ is the operating signal meaning, "Stand by."

2. ZUA is the operating signal meaning, "Timing signals will be transmitted now (or at _____)."

D546 conveys intention to D806 to make a timing signal:

<u>D546 makes—</u>	<u>D806 makes—</u>
D806 (until answered)	K
ZUJ	Flash
ZUA	Flash
0845	Flash
K	R
<u>D546 makes—</u>	<u>D806 makes—</u>
D806 (until answered)	K
ZUA	Flash
0845	Flash
(5-second flash)	(5-second flash)
<u>AR</u>	Flash

SEMAPHORE PROCEDURE

Semaphore signaling procedures are similar to those used in flashing light. The general rules of visual responsibility apply, call signs are the same, and message parts are unchanged. Because of the different equipment used, some differences in procedure do exist.

Semaphore is more secure than flashing light because of the short range at which it is visible. Semaphore normally can be read only when facing the sender, and in this respect is of limited value in nondirectional signaling. Semaphore can be used at night by attaching wands to flashlights and using them as hand flags.

For greatest range in semaphore signaling, choose a good background. Some ships have semaphore stands making the flags more noticeable. The position of the flags may become confused against a cluttered background; for that reason, a smooth background is best.

Characters are made facing the ships addressed. A distinct pause is made at each character position. When sending prosigns, operating signals, and abbreviations, the pause at each character is of double duration.

Between words and groups, drop your arms to the front position. When sending double letters, drop your arms to the front position between the letters. Numerals are spelled. If a numeral or groups of numerals are to be recorded as digits, precede and follow the numerals with the numeral sign. (The exception to that procedure is in the heading or ending, where numerals are always recorded as digits.)

CALLING

A station may be called by semaphore, light, or flaghoist. To call by semaphore, make the call sign of the station called or use the attention sign. By flashing light, the identity of the calling station is usually apparent, and it is necessary only to gain the attention of the stations being called: That is normally done by making, until answered, the call sign of the station being called.

To call by flaghoist, hoist the call sign of the addressee above JULIETT. If the message is intended for all ships and stations within usual range, hoist only JULIETT. If the message to follow carries a precedence higher than Routine, hoist DESIG below JULIETT to indicate Priority. For a higher precedence, hoist the appropriate precedence prosign (O or Z) flag below DESIG.

When answering a call made by flashing light, the answer is K by flashing light. When the call is by semaphore, the answer may be C by semaphore, or K by flashing light. When the call is by flaghoist, hoist the call sign of the transmitting station over ANSWER pennant at the dip as soon as seen and close up when ready to receive. The ANSWER pennant hoisted alone may be used when no confusion will result.

RECEIPTING

Semaphore messages are receipted for by sending prosign R by semaphore or flashing light or by hauling down ANSWER after the transmitting station hauls down the call.

If the transmitting station has more semaphore messages to send and is using the flaghoist call, it dips the call on completion of each message or part, and makes the "more to follow" prosign B followed by prosign K. The receiving ship dips the ANSWER pennant to receipt for the message sent and, for subsequent messages, closes up the pennant when the transmitting ship closes up its hoists.

REPETITIONS, INTERRUPTIONS, AND RELAY

Receiving stations request repetitions only when the transmitting station completes its messages. Repetitions may be requested by using IMI by light or semaphore. In the flaghoist method of calling, requests for repetitions must be made before hauling down the answering pennant (receipting for the message).

If the transmitting station is required to interrupt a message, it may dip the call sign of the receiving station to indicate that the receiving stations are required to wait. The transmitting station may also use the prosign AS by semaphore. The receiving stations may dip their answering hoists to indicate that they are unable to receive.

Relay procedures are essentially the same as those for flashing light, except that the relay ship need not wait for the end of the message before beginning to relay.

EXECUTIVE METHOD

The use of the executive method by semaphore is not authorized.

SIGNALING BY PYROTECHNICS AND COLORED LIGHTS

Pyrotechnics for signaling are, for the most part, of the "fireworks" variety. As applied here, "pyrotechnic light" includes all pyrotechnics that provide a temporary source of light (as opposed to pyrotechnic smoke).

Common sources of pyrotechnic light are pyrotechnic pistol flares, colored shell bursts (parachute flares), aircraft parachute flares, roman candles, and float-type flares.

The usual types of pyrotechnic smoke also result from pyrotechnic pistol bursts, colored smoke from shell burst, aircraft parachute smoke pots, float-type smoke pots, smoke generators, and smoke puffs from surface ship stacks.

Pyrotechnic signals are contained in ACP 168 and ATP 1(B), volume II, *USN Addendum*. Pyrotechnic light, flares, and rockets for international emergency situations are found in Pub. 102, chapter 4.

The meaning of a pyrotechnic signal depends on the color rather than the type of pyrotechnic used. Limitations of pyrotechnic signals should be fully recognized by Signalmen. Following are some characteristics that can serve as guidelines for devising pyrotechnic signals for special operations.

1. Simplicity, instead of complicated color combinations, is essential. Signals composed of a succession of pyrotechnics or a combination of colors should be avoided, if possible, because there is always danger that an observer may not see the whole signal and, consequently, may misinterpret it.

2. Experiments have proved that the standard red, white (or yellow), and green are the only satisfactory colors under varying conditions of visibility.

3. Under certain atmospheric conditions, white signals may appear yellow. Likewise, a

white pyrotechnic may be mistaken for green under certain humidity conditions. It is easy for tracer to be confused with red pyrotechnics.

4. Pyrotechnic signals are easily copied by the enemy, either for their own purposes or to confuse their opponents. Little reliance can, therefore, be placed on them unless the source or origin can be definitely identified.

5. At a distance, it is difficult to identify the exact location from which a pyrotechnic signal was fired. A single pyrotechnic fired by each of two separate originators may, consequently, appear to an observer as two pyrotechnics fired simultaneously or in succession from one originator.

6. The originator of a pyrotechnic signal has no way of knowing whether the signal was observed by the receiver for whom it was intended. Unless the action taken by the receiver indicates receipt (as ceasing fire, for example), the signal should be confirmed by other means of communication. Once a pyrotechnic signal is fired, there is no method of canceling except by some other method of communication.

7. Range of visibility for a pyrotechnic signal depends largely on weather conditions, hence it is variable and unreliable.

Pyrotechnics are designed for use at night in case of extreme urgency (in the event of an enemy attack), threat of enemy attack (when security of position is not of paramount importance), or when thick weather justifies their use for maneuvering. These signals are contained in ACP 148.

COLORED LIGHTS

In addition to their function as navigation lights, colored lights are used for maneuvering convoys, for recognition and identification purposes, and for flight operations and flight emergencies at sea. Like pyrotechnic displays, colored lights usually are illuminated for only short periods of time.

The meanings of colored light signals usually differ from the meanings of pyrotechnic light signals of the same color.

Many of the pyrotechnic signals shown in ACP 168 are of an executive type, inasmuch as they are commands to carry out an action as soon as the signal is understood. Colored light signals, besides the navigational variety, are given in Allied recognition and identification publications.

Colored lights for convoy maneuvers, contained in ACP 148, are executive signals whose time of execution is when the lights are switched off. These colored lights are in addition to navigational lights, which also may be used in convoy operations.

SOUND SIGNALING

Sound may be used in maneuvering ships either as a supplement to flag signals or as a separate signal. Because of the apparatus required, sound signaling in Morse code is necessarily slow. For that reason, the practice of sound signaling is, in general, held to a minimum. Signals other than single-letter signals should be used only in extreme emergencies and NEVER in frequently navigated waters.

Under U.S. Navy and Allied procedures, no heading or ending is used for sound signaling. The text is sent twice, separated by a pause. If a message is originated by a ship other than the one in which the OTC is embarked, it is followed by the call sign of that ship.

When the OTC signals by sound, one ship usually is directed to repeat back or receipt for the signal. When an individual ship signals, the OTC receipts for the signal by sending that ship's call sign, followed by R. The OTC may direct another ship to receipt by making that ship's call sign, followed by K. The designated ship receipts by making DE, its call sign, and R. Ships do not relay sound signals.

The executive signal consists of a 5-second blast immediately following the repetition of the text. The execute to follow sign (IX) is not sent either in the text or preceding the 5-second blast. The signal is executed on termination of the 5-second blast without waiting for any ship that may be ordered to receipt or repeat back.

Sound signals among units of an Allied convoy follow Pub. 102 procedures (see chapter 1,

section 7) supplemented by ACP 148. General signals are preceded by the general call AA AA, etc. Column leaders repeat all general signals, after which all ships in columns repeat.

Sound signals to individual ships are infrequent; sound-repeating ships may be designated to relay.

The executive signal consists of prosign IX followed by a 5-second blast. The moment of execution occurs at termination of the blast.

RADIOTELEPHONE

Radiotelephone (R/T) is used for voice tactical and administrative communication by ships and aircraft.

There can be certain drawbacks to using radiotelephone. Poor voice communications, whether because of faulty equipment, adverse atmospheric conditions, or inept performance by an operator, can create confusion, reduce reliability and speed, and adversely affect operations. It is essential, therefore, that all users strictly observe established operating procedures.

Basic guidance for voice radio communications is contained in *Communications Instructions Radiotelephone Procedures*, ACP 125. Various naval warfare publications (NWP) and allied tactical publications (ATPs) prescribe procedures for specific environments (AAW, ASW, NGFS, etc.).

SECURITY

In the interest of security, transmissions by radiotelephone should be as short and concise as possible, consistent with clearness. All operators must be cautioned that transmissions by radiotelephone are subject to enemy interception and, therefore, have no security.

The following basic rules are essential to transmission security and are to be strictly enforced on all military radiotelephone circuits.

1. No transmission will be made which has not been authorized by proper authority.

2. The following practices are specifically forbidden:

- a. Violation of radio silence.
- b. Unofficial conversation between operators.
- c. Transmitting on a directed net without permission.
- d. Excessive tuning and testing.
- e. Transmitting the operator's personal sign or name.
- f. Unauthorized use of plain language.
- g. Use of other than authorized prowords.
- h. Unauthorized use of plain language in place of applicable prowords or operating signals.
- i. Linkage or compromise of classified call signs and address groups by plain language disclosures or association with unclassified call signs.
- j. Profane, indecent, or obscene language.

3. The following practices are to be avoided:

- a. Use of excessive transmitting power.
- b. Excessive time consumed in tuning, changing frequency, or adjusting equipment.
- c. Transmitting at speeds beyond the capabilities of receiving operators.

RADIO NETS

A radio net is the organization of two or more stations in direct communication on a common channel. Usually the senior station in the circuit is net control and directs the operation and flow traffic on the net. The type of net and method of operation is determined from consideration of operational factors involved.

In a free net, the net control station (NCS) authorizes stations to transmit traffic to other stations without first obtaining permission from NCS. However, the NCS is not relieved of responsibility for maintaining circuit discipline.

In a directed net, stations must obtain permission from NCS before communicating with other stations. When two or more stations have traffic to send, NCS grants permission in order of message precedence. An exception is that Flash messages may be sent direct.

A net is deemed to be a free net unless otherwise ordered. To change the type of net in effect, the NCS will transmit, "This is a free net," or "This is a directed net," as appropriate.

Free and directed nets are generally associated with, but are not restricted to, administrative circuits in port. They are a means of net operation and should not be confused with specifically named circuits, e.g., Task Group Tactical/Warning Net, Task Group Reporting Net, Naval Gunfire Control Net, etc.

CIRCUIT LOGS

Circuit logs are maintained, when practicable, on all radiotelephone nets or circuits. The log should show a complete record of all transmitted and received traffic and of operating conditions. The log should also include the following:

1. Time of entering and leaving the circuit.
2. Causes of delays on the circuit.
3. Frequency adjustments and changes.
4. Unusual occurrences such as procedure and security violations.

Messages addressed to, or to be relayed by, the receiving station are written in full on a message blank; thus, only sufficient data need be entered in the log to identify the message (e.g., time of receipt, originator, and date-time group). Other messages should be logged with as much detail as possible. A watch-to-watch record of circuit operators is kept, with each operator signing the log on being relieved.

No entries will be erased. Necessary changes are made by drawing a single line through the original entry then entering the change adjacent to the lined-out entry. The operator making the change initials the correction, usually in the margin. All entries must be legible. Abbreviations may be used, but they must be readily

understood. A zero is written 0 to avoid confusion with the letter O; the letter Z is written with a bar across its riser (Z) to avoid confusion with the numeral 2.

In connection with circuit logs, the following terms identify the requirements of different types of radio watches.

GUARD. A continuous receiver watch with a transmitter ready for immediate use. A complete log is kept.

COVER. A continuous receiver watch. A transmitter is tuned and available, but not necessarily immediately. A complete log is required.

COPY. A continuous receiver watch with a complete log.

LISTEN. A continuous receiver watch. A complete log is optional, but all traffic of interest to own ship must be logged.

Although logs may be kept manually, automatic recording devices should be used whenever possible on circuits requiring complete logs.

PHONETIC ALPHABET

Because it is easy to confuse the sounds of certain letters, such as B and D, and C and Z, letters of the alphabet are never spoken as such. Instead, their phonetic equivalents are used. When signals from naval signal books are transmitted by voice radio, the voice equivalents of the flags are used. In the list that follows, the accent is on the capitalized syllable.

Letter	Phonetic Equivalent	Pronounced As
A	ALFA	Al fah
B	BRAVO	BRAH voh
C	CHARLIE	CHAR lee
D	DELTA	DELL tah
E	ECHO	ECK oh
F	FOXTROT	FOKS trot

Letter	Phonetic Equivalent	Pronounced As
G	GOLF	GOLF
H	HOTEL	hoh TELL
I	INDIA	IN dee ah
J	JULIETT	JEW lee ett
K	KILO	KEY loh
L	LIMA	LEE mah
M	MIKE	MIKE
N	NOVEMBER	no VEM ber
O	OSCAR	OSS cah
P	PAPA	pah PAH
Q	QUEBEC	keh BECK
R	ROMEO	ROW me oh
S	SIERRA	see AIR rah
T	TANGO	TANG go
U	UNIFORM	YOU nee form
V	VICTOR	VIK tah
W	WHISKEY	WISS key
X	XRAY	ECKS RAY
Y	YANKEE	YANG key
Z	ZULU	ZOO loo

PROWORDS

Prowords (procedure words) are pronounceable words or phrases which have been assigned meanings to expedite message handling on radiotelephone circuits. Prowords are not to be substituted for textual components.

The prowords contained in table 4-1 are authorized for general use. Certain of these prowords are the approximate equivalent of prosigns used in radiotelegraph. When copying messages, the equivalent prosign may be written rather than the proword. For radiotelephone communication between units of different

Table 4-1.—Prowords

<u>PROWORD</u>	<u>EXPLANATION</u>	<u>EQUIVALENT TO</u>	<u>PROWORD</u>	<u>EXPLANATION</u>	<u>EQUIVALENT TO</u>
ADDRESS GROUP	The group that follows is an address group.			An error has been made in this transmission (or message indicated). The correct version is ____.	C
ALL AFTER	The portion of the message to which I have reference is all that which follows ____.	AA		That which follows is a corrected version in answer to your request for verification.	C
ALL BEFORE	The portion of the message to which I have reference is all that which precedes ____.	AB	DISRE- GARD THIS TRANS- MISSION— OUT	This transmission is in error. Disregard it. This proword shall not be used to cancel any message that has been completely transmitted and for which receipt or acknowledgement has been received.	EEEEEEEEEE $\overline{AR}$
AUTHEN- TICATE	The station called is to reply to the challenge which follows.				
AUTHEN- TICATION IS	The transmission authentication of this message is . . .				
BREAK	I hereby indicate the separation of the text from other portions of the message.	$\overline{BT}$	DO NOT ANSWER	Stations called are not to answer this call, receipt for this message, or otherwise transmit in connection with this transmission. When this proword is employed, the transmission shall be ended with the proword OUT.	E
CALL SIGN	The group that follows is a call sign.				
CORRECT	You are correct, or what you have transmitted is correct.	C			
CORREC- TION	An error has been made in this transmission. Transmission will continue with the last word correctly transmitted.	EEEEEEEE	EXECUTE	Carry out the purport of the message or signal to which this applies. To be used only with the executive method.	$\overline{IX}$ (5-sec dash)

Table 4-1.—Prowords—Continued

<u>PROWORD</u>	<u>EXPLANATION</u>	<u>EQUIVALENT TO</u>	<u>PROWORD</u>	<u>EXPLANATION</u>	<u>EQUIVALENT TO</u>
EXECUTE TO FOLLOW	Action on the message or signal which follows is to be carried out upon receipt of the proword EXECUTE. To be used only with the delayed executive method.	<u>IX</u>	IMMEDI- ATE EXECUTE	Action on the message or signal following is to be carried out on receipt of the word EXECUTE. To be used only with the immediate executive method.	<u>IX</u>
EXEMPT	The addressees immediately following are exempted from the collective call.	XMT	INFO	The addressees immediately following are addressed for information.	INFO
FIGURES	Numerals or numbers follow.		I READ BACK	The following is my response to your instructions to read back.	
FLASH	Precedence Flash.	Z			
FROM	The originator of this message is indicated by the address designator immediately following.	FM	I SAY AGAIN	I am repeating transmission or portion indicated.	<u>IMI</u>
			I SPELL	I shall spell the next word phonetically.	
GROUPS	This message contains the number of groups indicated by the numeral following.	GR	I VERIFY	That which follows has been verified at your request and is repeated. To be used only as a reply to VERIFY.	
GROUP NO COUNT	The groups in this message have not been counted.	GRNC	MESSAGE	A message which requires recording is about to follow. Transmitted immediately after the call. (This proword is not used on nets primarily employed for conveying messages. It is intended for use	
I AUTHEN- TICATE	The group that follows is the reply to your challenge to authenticate.				
IMME- DIATE	Precedence Immediate.	O			

Table 4-1.—Prowords—Continued

<u>PROWORD</u>	<u>EXPLANATION</u>	<u>EQUIVALENT TO</u>	<u>PROWORD</u>	<u>EXPLANATION</u>	<u>EQUIVALENT TO</u>
	when messages are passed on tactical or reporting nets.)		ROGER	I have received your last transmission satisfactorily.	
MORE TO FOLLOW	Transmitting station has additional traffic for the receiving station.	B	ROUTINE	Precedence Routine.	R
NET NOW	All stations are to net their radios on the unmodulated carrier wave which I am about to transmit.		SAY AGAIN	Repeat all of your last transmission. Followed by identification data means "Repeat _____ (portion indicated)."	IMI
NUMBER	Station serial number.	NR	SIGNALS	The groups which follow are taken from a signal book. (This proword is not used on nets primarily employed for conveying signals. It is intended for use when tactical signals are passed on nontactical nets.)	
OUT	This is the end of my transmission to you and no answer is required or expected.	AR			
OVER	This is the end of my transmission to you and a response is necessary. Go ahead; transmit.	K	SILENCE (Repeated three or more times.)	Cease transmissions on this net immediately. Silence will be maintained until lifted. (When an authentication system is in force, the transmission imposing silence is to be authenticated.)	HM HM HM
PRIORITY	Precedence Priority.	P			
READ BACK	Repeat this entire transmission back to me exactly as received.	G	SILENCE LIFTED	Silence is lifted. (When an authentication system is in force, the transmission lifting silence is to be authenticated.)	
RELAY (TO)	Transmit this message to all addressees (or addressees immediately following this proword). The address component is mandatory when this proword is used.	T			

Table 4-1.—Prowords—Continued

<u>PROWORD</u>	<u>EXPLANATION</u>	<u>EQUIVALENT TO</u>	<u>PROWORD</u>	<u>EXPLANATION</u>	<u>EQUIVALENT TO</u>
SPEAK SLOWER	Your transmission is at too fast a speed. Reduce speed of transmission.		WAIT- OUT	I must pause longer than a few seconds.	<u>AS AR</u>
THIS IS	This transmission is from the station whose designator immediately follows.	DE	WILCO	I have received your signal, understand it, and will comply. To be used only by the addressee. Since the meaning of ROGER is included in that of WILCO, the two prowords are never used together.	
TIME	That which immediately follows is the time of date time group of the message.		WORD AFTER	The word of the message to which I have reference is that which follows ____.	WA
TO	The addressees immediately following are addressed for action.	TO	WORD BEFORE	The word of the message to which I have reference is that which precedes ____.	WB
UNKNOWN STATION	The identity of the station with whom I am attempting to establish communication is unknown.	<u>AA</u>	WORDS TWICE	Communication is difficult. Transmit (transmitting) each phrase (or each code group) twice. This proword may be used as an order, request, or as information.	
VERIFY	Verify entire message (or portion indicated) with the originator and send correct version. To be used only at the discretion of or by the addressee to which the questioned message was directed.	J	WRONG	Your last transmission was incorrect. The correct version is ____.	
WAIT	I must pause for a few seconds.	<u>AS</u>			

nationalities, equivalent prosigns may be used instead of prowords. When so used, they are transmitted phonetically.

GENERAL PROCEDURES

The following is a guide for developing good microphone technique. Succeeding topics will address specific situations.

1. Listen before transmitting. Unauthorized break-in causes confusion and often blocks a transmission in progress to the extent that neither transmission gets through.

2. Speak clearly and distinctly. Both slurred syllables and clipped speech are hard to understand. A widespread error among untrained operators is failure to emphasize vowels sufficiently.

3. Speak slowly. Give the recorder a chance to get it all down. That way you save time and avoid repetitions.

4. Avoid extremes of pitch. A high voice cuts through interference best, but is shrill and unpleasant if too high. A lower pitch is easier on the ear, but is difficult to understand through background noises if too low.

5. Be natural. Maintain a normal speaking rhythm. Group words in a natural manner. Send your message phrase by phrase instead of word by word.

6. Use standard pronunciation. Speech with sectional peculiarities is difficult for persons from other parts of the country to understand. Talkers who use as a model the almost standard pronunciation of a broadcast network announcer are easiest to understand.

7. Speak in a moderately strong voice to override unavoidable background noises and prevent dropouts.

8. Keep correct distance between lips and microphones. A distance of about 2 inches is correct for most microphones. If the distance is too great, speech is inaudible and background noises creep in; if too small, blaring and blasting result.

9. Shield your microphone. Keep your head and body between noise-generating sources and the microphone while transmitting.

10. Keep the volume of a handset earphone low.

11. Keep speaker volumes to a moderate level.

12. Give an accurate evaluation in response to a request for a radio check. A transmission with feedback or a high level of background noise is not "loud and clear," even though the message can be understood.

13. Pause momentarily, after each normal phrase, and interrupt your carrier. This method allows any other station with higher precedence traffic to break in.

14. Adhere strictly to prescribed procedures.

15. Transact your business and get off the air. Preliminary calls waste time when communications are good and the message is short. It is not necessary to blow into a microphone to test it nor to repeat portions of messages when no repetition is requested.

Pronouncing Numerals

To distinguish numerals from words similarly pronounced, the proword **FIGURES** may be used before such numbers. Numerals are pronounced as follows:

<u>Numeral</u>	<u>Spoken As</u>
0	ZE RO
1	WUN
2	TOO
3	TREE
4	FOW er
5	FIFE
6	SIX
7	SEV en
8	AIT
9	NIN er

The numeral 0 is always spoken as "zero"—never as "oh." Decimal points are spoken as "day-see-mal."

In general, numbers are transmitted digit by digit, except that exact multiples of thousands are spoken as such. However, there are special cases when the normal pronunciation is prescribed and this rule does not apply.

EXAMPLES:

<u>Number</u>	<u>Pronounced</u>
12	Twelve
44	Fow-er Fow-er
90	Nin-er Ze-ro
136	Wun Tree Six
500	Fife Ze-ro Ze-ro
1,478	Wun Fow-er Sev-en Ait
7,000	Sev-en Tou-zand
16,000	Wun Six Tou-zand
812,681	Ait Wun Too Six Ait Wun

Abbreviations

Dates within the text should be spoken digit by digit and the month spoken in full.

EXAMPLE:

“19 Sep” is spoken as “One niner September.”

Initials used alone or in conjunction with short titles shall be spoken phonetically.

EXAMPLE:

“ACP” shall be spoken phonetically as “Alfa Charlie Papa.”

Personal initials shall be spoken phonetically prefixed by the word “INITIALS.”

EXAMPLE:

“G.M. SMITH” shall be spoken as “INITIALS Golf Mike Smith.”

Abbreviations frequently used in normal speech may be used in the same manner when transmitted by voice.

EXAMPLE:

“USS *Forrestal*” may be spoken as “USS *Forrestal*.”

“NATO” may be spoken as “NATO.”

Punctuation marks are pronounced as they appear in the text, with the following exceptions: Parentheses are indicated by PAREN/UN-PAREN or OPEN BRACKETS/CLOSE BRACKETS; an oblique stroke is called SLANT; quotation marks are spoken QUOTE/UNQUOTE.

Call Signs

Voice call signs are letters, numbers, or a combination of letters and numbers that identify commands and units of commands. These include ships, aircraft squadrons and wings, shore establishments, type commanders, and task organization components. The voice call signs change daily using the system that is in effect at the time of this writing. The Navy continues to strive to improve security and at the same time provide a proficient and workable system of call sign identification. For this reason, the present system may be replaced by a more improved system in the near future.

In addition to the daily changing call signs, JANAP 119 contains ship and other joint armed forces voice call signs. Although the pub is always kept up to date, it is not normally used. JANAP 119 provides an adequate backup system but lacks the security needed today.

Voice calls do not provide any great degree of identification security, so they should not be used over harbor common circuits. In ports not under U.S. control, phoneticized international call signs should be used (e.g., NHDY is spoken “November Hotel Delta Yankee”).

In U.S. ports and U.S.-controlled ports overseas, names of ships and abbreviations of administrative activity titles serve as voice call signs. As a general rule, the USS prefix, hull

designations and numbers, and first names or initials of ships need not be included in the voice call unless they are essential for clarity. Even when essential for clarity, it is unnecessary to use the phonetic equivalents for letters and initials.

Port authorities controlling local harbor voice circuits are identified by the word **CONTROL**. On local harbor circuits established for specific purposes, such as for degaussing, tug, and shipyard services, **CONTROL** is preceded by the appropriate word describing the service.

The following examples illustrate the simplified voice call procedure. (Words in parentheses in the examples should not be used unless essential for clarity. Portions of examples marked with an asterisk (*) are spoken without phonetics.)

(NORFOLK) **CONTROL THIS IS (*USS) Roanoke**

COMDESRON TWELVE THIS IS (NORFOLK) DEGAUSSING CONTROL

(NEWPORT) **CONTROL THIS IS (*TJ) Gary**

(PORTSMOUTH) **SHIPYARD CONTROL THIS IS (*USS) Forrestal**

(Franklin *D) **Roosevelt THIS IS (CHARLESTON) CONTROL**

Establishing Communications

Figure 4-1 illustrates a radiotelephone net and shows both voice and tactical call signs. (These calls have no particular meaning, being merely representative of procedures. The operating forces currently change call signs daily.)

Full call signs are used when opening a net, reopening a net, or reporting into a previously established net. Abbreviated calls may be used thereafter at the discretion of the net control station. (Abbreviated calls are indicated in sample transmissions by enclosing optional words or phrases within parentheses.)

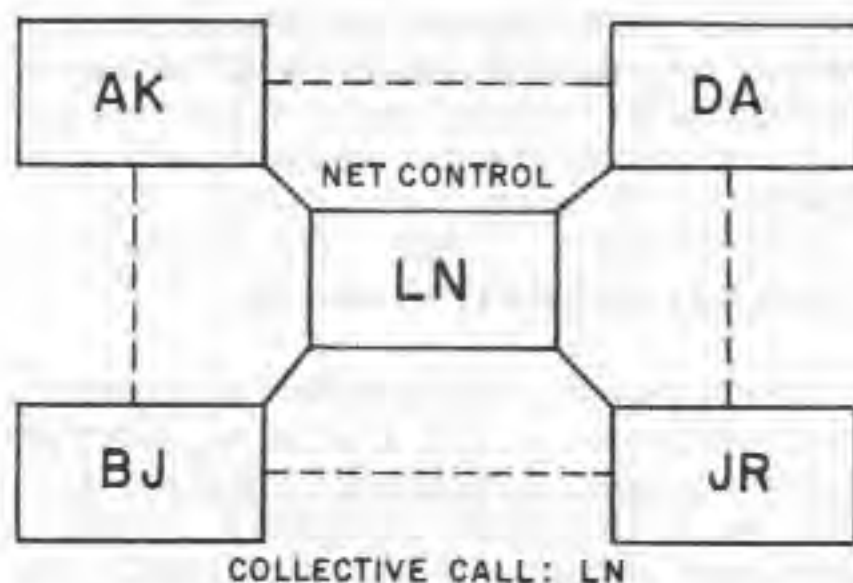


Figure 4-1.—Radiotelephone net.

153.19

When ready to establish a net, the net control station transmits—

ALL UNITS IN LN—THIS IS LN—OVER

All stations answer in alphabetical order.

THIS IS AK—ROGER OVER

THIS IS BJ—ROGER OVER (and so on).

If a station fails to reply within a few seconds, the next station in order, hearing no answer, waits approximately 5 seconds then answers. The delinquent station reports after all other stations have done so.

To establish a directed net, NCS transmits—

ALL UNITS IN LN—THIS IS LN—THIS IS A DIRECTED NET—OF WHAT PRECEDENCE AND FOR WHOM ARE YOUR MESSAGES—OVER

THIS IS AK—NO TRAFFIC—OVER

THIS IS BJ—ONE ROUTINE FOR YOU—OVER

THIS IS DA—NO TRAFFIC—OVER

THIS IS JR—ONE IMMEDIATE FOR DA—OVER

ALL UNITS IN LN—THIS IS LN—ROGER—JR—SEND YOUR IMMEDIATE—OUT

Under good operating conditions, particularly on large nets, the proword **THIS IS** may be omitted by the receiving station. When there are only two stations on a net, the entire call may be omitted.

GENERAL OPERATING RULES

Radiotelephone uses a 16-line message format comparable to that used in radioteletype communications. Although R/T uses the three message forms—plaindress, abbreviated plaindress, and codress—the form most used is the abbreviated plaindress. However, the three major message parts are still used: heading, text, and ending.

Plaindress

In a plaindress message, the originator and addressee are indicated externally of the text. The plaindress message contains all the components of the message format, and must always include precedence and date-time group. The proword **MESSAGE** normally is used only on nonadministrative (i.e., tactical and warning) nets as a warning that a message requiring recording is about to follow.

ALL UNITS IN LN—THIS IS LN—
MESSAGE—PRIORITY—TIME 121545Z
FEB 81—FROM LN—TO—ALL UNITS
LN—GROUPS 8—BREAK—UNCLAS
MAKE PREPARATIONS TO GET
UNDERWAY AT 121830R—BREAK—
OVER

Abbreviated Plaindress

The heading of an abbreviated plaindress message is much shorter than that of a plaindress message, one reason being that the precedence, date-time group, and group count may be omitted. The call may also serve as the address, and abbreviated calls may be used.

ALL UNITS IN LN—THIS IS LN—
BREAK—UNCLAS MAKE PREPARA-
TIONS TO GET UNDERWAY AT
121830R—BREAK—TIME 1545Z—OVER

The time given in the ending is the time of origin and replaces the date-time group in the heading.

Codress

In a codress message, the entire address is encrypted within the text. The heading contains only enough information to enable communication personnel to identify and handle the message properly.

The text, following the encrypted heading, consists of 5-character groups, 10 groups to the line. Each group is spelled phonetically even though an occasional group might be pronounceable.

Radio Checks

The words **RADIO CHECK** comprise a query by a sending station regarding its signal strength and readability. If the sender is being received loud and clear, the receiver simply transmits the proword **ROGER**. If reception is other than loud and clear, the sender's signal strength and readability (in that order) must be reported.

3C—THIS IS 4D—RADIO CHECK—
OVER

THIS IS 9Z—ROGER—OVER

THIS IS 4B—WEAK BUT READABLE—
OVER

THIS IS 6C—ROGER—OVER

THIS IS 9D—ROGER—OVER

Heading all stations loud and clear, NCS
transmits—

THIS IS 4D—ROGER—OUT

(NOTE: It should be understood that where single letters appear in transmission examples, they are pronounced phonetically; e.g., "4D" is pronounced "Four Delta"; time zone designator "R" is pronounced "Romeo.")

Repetitions

When part of a message is missed or is doubtful, a repetition is requested by the receiving station before receipting for the message. The proword SAY AGAIN, used alone or in conjunction with "ALL BEFORE _____," "ALL AFTER _____," "_____ TO _____," "WORD BEFORE _____," or "WORD AFTER _____" is used for that purpose.

DA—THIS IS LN—SEND MESSENGER
FOR GUARD MAIL—OVER

DA, being doubtful of the word "Guard,"
transmits—

THIS IS DA—SAY AGAIN WORD
AFTER FOR—OVER

THIS IS LN—I SAY AGAIN WORD
AFTER FOR—GUARD—OVER

DA—ROGER—OUT

Correction During Transmission

When an error is made by a transmitting operator, the proword CORRECTION is transmitted followed by the last word, group, or phrase correctly transmitted. The message is then completed. Corrections must be made before the ending proword is transmitted; otherwise a separate message must be sent, correcting the first message.

AK—THIS IS LN—PRIORITY—ZULU
BRAVO ALFA XRAY XRAY—XRAY
OSCAR OSCAR—CORRECTION—ZULU
BRAVO ALFA XRAY XRAY—BRAVO
OSCAR OSCAR KILO SIERRA—etc.

Cancellations

A message may be cancelled at any time before the ending proword is transmitted. The cancelling proword is DISREGARD THIS TRANSMISSION—OUT.

ALL UNITS IN LN—THIS IS LN—
ROUTINE—TIME 281345Z—CON-
DUCT RADIO CHECKS COMMENCING
010330Z IN ORDER CHANNELS
EIGHT—DISREGARD THIS TRANSMIS-
SION—OUT

A message that has been sent and receipted for can be cancelled only by another message.

ALL UNITS IN LN—THIS IS LN—
CANCEL MY 281345Z—TIME 281730Z—
OVER

Acknowledgments

An originator who desires confirmation that his or her message can (or will) be acted upon may request an acknowledgment from the addressee. The request is included in the text. The message is receipted for in the usual manner, but only the commanding officer or a duly authorized representative (e.g., OOD) can acknowledge a message or tactical signal. Although tactical radio circuits are guarded both on the bridge and in CIC, the latter cannot acknowledge unless told to do so by competent authority.

9Z—THIS IS 4D—SEARCH AREA
BRAVO FOR POSSIBLE PLANE
WRECKAGE—ACKNOWLEDGE—TIME
1445Z—OVER

THIS IS 9Z—ROGER—OUT

The commanding officer, after reading the message, orders the operator to acknowledge.

4D—THIS IS—9Z—YOUR 1445Z AC-
KNOWLEDGED—TIME 1450Z—OVER

If the commanding officer had heard and understood the message and directed acknowledgment, the operator would have replied—

THIS IS 9Z—WILCO—OUT

(NOTE: ROGER and WILCO are never to be used together.)

Verification

When a receiving station requests verification of a message or portion thereof, the sending

station will check with the originator and send the correct version even though the original transmission was correct.

4D—THIS IS 4B—VERIFY YOUR
271120Z—ALL BEFORE BREAK—OVER

The operator checks with the originator, establishes that the heading is correct, and transmits—

4B—THIS IS 4D—I VERIFY MY
271120Z—ALL BEFORE BREAK—3C—
THIS IS 4D—PRIORITY—TIME
271120Z—FROM 4D—TO—3C—EXEMPT
4B—GROUPS 26—BREAK—OVER

THIS IS 4B—ROGER—OUT

Emergency Silence

Emergency silence may be imposed or lifted only by competent authority. When an authentication system is in effect, the originating station must authenticate any transmission that imposes or lifts silence or is made during a condition of silence. Silence is imposed by transmitting the proword SILENCE three times, then repeating the message. Stations do not receipt for the transmission.

ALL UNITS IN LN—THIS IS LN—
SILENCE SILENCE SILENCE—TIME
2135Z—AUTHENTICATION IS. . .—I
SAY AGAIN—SILENCE SILENCE
SILENCE—TIME 2135Z—AUTHENTI-
CATION IS. . .—OUT

To lift a silence condition, the NCS transmits—

ALL UNITS IN LN—THIS IS LN—
SILENCE LIFTED—TIME 2347Z—
AUTHENTICATION IS. . .—OUT

TACTICAL SIGNALS

The executive method of transmitting tactical signals is used when the OTC desires that all units take action at the same moment. An abbreviated plaindress format normally is used, but a

time group is not included in the message ending. There are two executive methods: delayed and immediate.

Delayed Executive Method

In the delayed executive method the proword EXECUTE TO FOLLOW immediately precedes the text. The signal of execution is sent later in the form of "Stand by—EXECUTE." At the time of execution the signal is repeated if it is part of or one of several outstanding signals, or if a considerable time has elapsed since transmission of the EXECUTE TO FOLLOW signal. Usually only one, or just a few, stations are required to receipt for the signal of execution.

Example 1: The signal is to be executed within a short time after sending the signal.

ALL UNITS IN LN—THIS IS LN—
EXECUTE TO FOLLOW—CORPEN
PORT 185—OVER

All stations receipt in order with
ROGER—OUT

ALL UNITS IN LN—THIS IS LN—
STANDBY—EXECUTE BREAK JR—
OVER

THIS IS JR—ROGER—OUT

Example 2: Only part of an outstanding signal is to be executed.

ALL UNITS IN LN—THIS IS LN—
EXECUTE TO FOLLOW—TURN STAR-
BOARD 080—TACK—SPEED 25—
BREAK BJ—OVER

THIS IS BJ—ROGER—OUT

ALL UNITS IN LN—THIS IS LN—TURN
STARBOARD 080—STANDBY—EXE-
CUTE—DA—OVER

THIS IS DA—ROGER—OUT

When ready to execute the speed signals, the OTC transmits—

ALL UNITS IN LN—THIS IS LN—
SPEED 25—STAND BY—EXECUTE—
BREAK—JR—OVER

THIS IS JR—ROGER—OUT

Immediate Executive Method

In cases of urgency the signal of execution may be transmitted as the final instructions element of the message. The warning proword is IMMEDIATE EXECUTE. This type of message does not allow stations to obtain verifications or repetitions, and usually is limited to basic course and speed signals. The text is transmitted twice.

ALL UNITS IN LN—THIS IS LN—
IMMEDIATE EXECUTE BREAK—TURN
STARBOARD 4—TACK—SPEED 30—I
SAY AGAIN—TURN STARBOARD 4—
TACK—SPEED 30—STAND BY—EXE-
CUTE BREAK—AK—JR—OVER

Authentication

A radiotelephone message must be authenticated if there is any chance it might be of enemy origin. Be alert and quick to be suspicious. Sometimes you can spot an enemy deceptive message by the operator's mistakes in procedure or in English grammar or pronunciation. One of the best informal (but not foolproof) authenticators is to be able to recognize the other operator's voice.

Authentication is mandatory when—

1. Any station suspects imitative deception on a circuit.

2. Any station is challenged or requested to authenticate.

3. Directing radio silence or requiring a station to break an imposed radio silence.

4. Making contact and amplifying reports in plain language or brevity code.

5. Transmitting a plain language cancellation by radio, nonapproved wireline circuits, or visual means (when the sending station cannot be recognized).

6. Making initial radio contact or resuming contact after prolonged interruption. Authentication should be exchanged to prevent an unauthorized station from opening a circuit by asking a legitimate station to authenticate.

7. Transmitting to a station which is under radio silence.

8. Authorized to transmit a classified message in the clear over a nonapproved circuit.

9. A station, having for any reason failed to obtain an answer to its calls, is forced to transmit its messages blind, i.e., without getting a receipt from the intended receiving station.

Good judgment sometimes dictates that an operator accept a message rather than argue over authentication, even though doubt of its genuineness exists. Such a message should be delivered promptly to the addressee with the operator's notation that it was authenticated improperly. The decision governing its authenticity is made by the addressee.

CHAPTER 5

ALLIED FLAGHOIST PROCEDURES

A large percentage of all tactical messages received by a ship are signaled by flaghoist. The requirement for a broad knowledge of flaghoist communication procedures on the part of every Signaller is, therefore, fairly obvious. That is not to say you need concern yourself only with maneuvering signals. As you will learn in chapter 6, flaghoist also is used for international signaling. It comes into play, for example, if your ship exchanges messages with a merchant ship, under United States flag or otherwise, when somewhat different procedures apply than those governing exchanges of messages between Allied naval units.

Flaghoist signaling provides a rapid and accurate system of passing tactical and administrative information during daylight. Flaghoist is rapid because, by hoisting one or more flags that have a predetermined meaning, you can communicate simultaneously with all ships in company. It is accurate because addressees are required to repeat the signal, flag for flag, allowing the originator to see if addressees have read the hoist correctly. Flaghoist signaling aptly meets the provisions of security, another prime requisite of naval communications. Not only is the range limited, but the meanings of many signals are contained in a classified signal publication.

Flaghoist signaling is especially well suited to tactical signals. All vessels can read the signal at the same time, and all can take action in unison with a minimum chance of error.

To perform effectively as a Signaller, for both military and international situations, you must acquire a solid background in procedures, methods, and rules pertaining to flaghoist communications. The main purposes of this chapter are to illustrate the flags and pennants

used; explain how to construct, read, raise, and lower hoists; and discuss partial contents of the *Allied Maritime Tactical Signal Book*, ATP 1(B), volume II, from which most tactical signals are derived.

SIGNAL FLAGS AND PENNANTS

The Navy uses the international alphabet flags, numeral pennants, and a Code/Answer pennant; a set of numeral flags; special flags and pennants; and four substitutes, or repeaters.

Each alphabet flag has the phonetic name of the letter it represents. A numeral flag takes the name of the numeral it represents; numeral pennants are used only in calls. Special flags and pennants are used in tactical maneuvers to direct changes in speed, position, formation, and course, to indicate and identify units, and for specialized purposes. Flags and pennants are spoken and written as shown in figures 5-1 and 5-2.

One good way to learn flags and pennants is to practice sketching each of them, labeling each according to its proper color or colors. Your flag bag contains 68 different flags and pennants. When you feel you know every flag and pennant, ask someone to test you. Ask the person testing you to call at random various letters of the alphabet, and you name and describe corresponding flags. When you are topside, pay particular attention to flaghoists flying from other ships. Test your ability to recognize and name those flaghoists. Many flags and pennants may be learned as opposites. Number flags can be learned by color and design sequence.

In addition to the 68 flags in the bag, you have a tackline, which is a 6-foot length of

FLAG and NAME	Spoken	Written	FLAG and NAME	Spoken	Written	FLAG and NAME	Spoken	Written
 A	ALFA	A	 M	MIKE	M	 Y	YANKEE	Y
 B	BRAVO	B	 N	NOVEMBER	N	 Z	ZULU	Z
 C	CHARLIE	C	 O	OSCAR	O	 1	ONE	1
 D	DELTA	D	 P	PAPA	P	 2	TWO	2
 E	ECHO	E	 Q	QUEBEC	Q	 3	THREE	3
 F	FOXTROT	F	 R	ROMEO	R	 4	FOUR	4
 G	GOLF	G	 S	SIERRA	S	 5	FIVE	5
 H	HOTEL	H	 T	TANGO	T	 6	SIX	6
 I	INDIA	I	 U	UNIFORM	U	 7	SEVEN	7
 J	JULIETT	J	 V	VICTOR	V	 8	EIGHT	8
 K	KILO	K	 W	WHISKEY	W	 9	NINE	9
 L	LIMA	L	 X	XRAY	X	 0	ZERO	0

Figure 5-1.—Alphabet and numeral flags.

PENNANT and NAME	Spoken	Written	PENNANT or FLAG	Spoken	Written	PENNANT or FLAG	Spoken	Written
 1	PENNANT ONE	p1	 CODE or ANSWER	CODE or ANSWER	CODE or ANS	 NEGATIVE	NEGAT	NEGAT
 2	PENNANT TWO	p2	 SCREEN	SCREEN	SCREEN	 PREPARATIVE	PREP	PREP
 3	PENNANT THREE	p3	 CORPEN	CORPEN	CORPEN	 PORT	PORT	PORT
 4	PENNANT FOUR	p4	 DESIG- NATION	DESIG	DESIG	 SPEED	SPEED	SPEED
 5	PENNANT FIVE	p5	 DIVISION	DIV	DIV	 SQUADRON	SQUAD	SQUAD
 6	PENNANT SIX	p6	 EMERGENCY	EMERGENCY	EMERG	 STARBOARD	STARBOARD	STBD
 7	PENNANT SEVEN	p7	 FLOTILLA/ GROUP	FLOT/GRU	FLOT/ GRU	 STATION	STATION	STATION
 8	PENNANT EIGHT	p8	 FORMATION	FORMATION	FORM	 SUBDIVISION	SUBDIV	SUBDIV
 9	PENNANT NINE	p9	 INTER- ROGATIVE	INTER- ROGATIVE	INT	 TURN	TURN	TURN
 0	PENNANT ZERO	p0	SUBSTITUTES					
TACK LINE	TACK	—						
			 1st. SUBSTITUTE	FIRST SUB	1st.	 3rd. SUBSTITUTE	THIRD SUB	3rd.
			 2nd. SUBSTITUTE	SECOND SUB	2nd.	 4th. SUBSTITUTE	FOURTH SUB	4th.

Figure 5-2.—Numeral pennants; special flags and pennants.

C17.68

halyard (illustrated in chapter 2) having a ring at one end and a snap at the other. Spoken TACK and written as a dash (hyphen) "-", it is used to separate flags or groups of flags which, if not separated, could convey a different meaning from that intended. In most cases, TACK is included with a signal to avoid confusion. If the signal SL2, for example, means, "Prepare to receive personnel casualties," TACK would be inserted between the digit "2" and the given number of casualties, as SL2 TACK 27. TACK also is used to separate range and bearing figures. If C3 means, "Investigate possible sighting," the signal might be C3 TACK 345 TACK 20, indicating the sighting at a bearing of 345° and a distance of 20 miles.

FLAGHOIST TERMINOLOGY

Every rating has its own vocabulary; the Signalman rating is no exception. You may already be familiar with some of the terms discussed in this section.

Signal flags are stowed in the flag bag. It is not actually a bag, but derives its name from the metal frame, covered with canvas, in which flags formerly were stowed. Most ships today are equipped with all-metal bags which are fireproof and afford more protection for the flags.

Halyards are numbered from outboard to inboard (one, two, and so on). Hence, number one starboard would be the outboard halyard on the starboard yardarm.

When the end of a hoist gets away from you and flies out of your reach, it is recovered by using a retriever. A retriever is a separate line attached by a metal ring to each halyard. The retriever may be moved up and down by separate lines attached as part of such rigging.

The Signalman who keeps a lookout for signals and calls them out to personnel handling the flags at the flag bag is called the spotter. The spotter will call out, "Stand by your bags" when a signal is being made on another ship. That warning tells those personnel on the bags that a signal is being made and they should be ready to repeat it. The spotter calls out the complete hoist, then calls out, "Going up."

An example of an incoming signal is as follows: The spotter calls out "Stand by your port/starboard bag. Signal in the air from the OTC. First hoist, BT—FORM 3, going up to the

dip; second hoist, CORPEN STBD 275, going up to the dip; third hoist, SPEED 15-T13, going up to the dip. End of signal."

Signal flags are bent onto the uphaul part of the halyard. The piece of halyard that is made fast to the last flag in a hoist (so the flags can be hauled down) is called the downhaul. When personnel on the bags have the downhaul secured to the last flag and are ready for the signal to be hoisted, they tell the person on the uphaul to, "Take it up."

The point of hoist is the block attached to the yardarm through which the halyard carrying the hoist is rove. It is the highest point to which the signal can be raised. When the top flag is touching the point of hoist, it is closed up. When the hoist is three-fourths of the way up toward the point of hoist, it is at the dip (figure 5-3). Once a signal is closed up and is lowered a fourth of the way down from the point of hoist, it has been dipped. Most signals, once closed up, are not dipped, but many single-letter signals may be made to indicate a modification or change in conditions signaled.

A hoist is a signal consisting of one or more flags on a single halyard. A display is a complete signal, whether on one hoist or on two or more adjacent hoists.

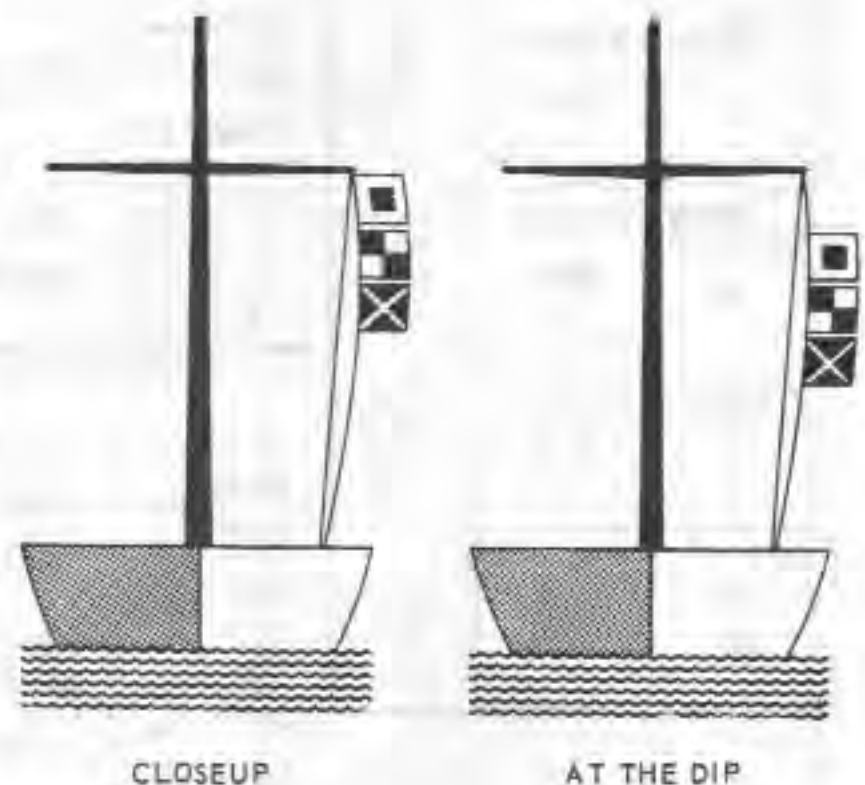


Figure 5-3.—Flaghoist close up at the dip.

69.123.1

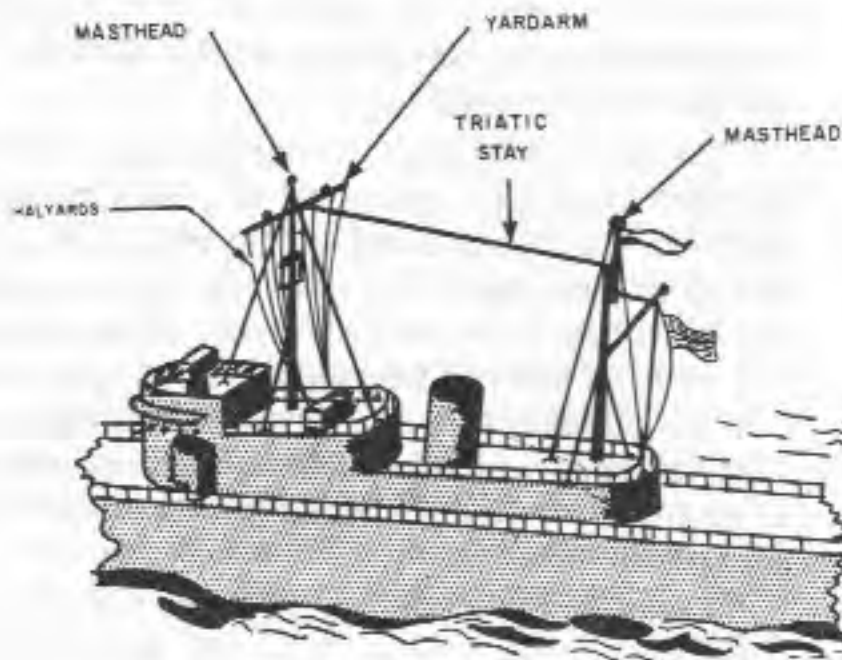


Figure 5-4.—Flaghoist locations.

3.97

A flaghoist is said to be hauled down when it is returned to the deck. The moment of hauling down is the moment of execution, unless time of execution is otherwise indicated or an emergency pennant is used, or the signal requires no immediate action.

READING FLAGHOISTS

It is not enough to know every flag and pennant by sight; you have to read flags in their proper sequence to interpret their meaning correctly.

When several flaghoists are displayed simultaneously, they are read in the following order: masthead, triatic stay, starboard yardarm, and port yardarm. Locations of halyards vary on ships because superstructure characteristics differ. Figure 5-4 shows the locations.

Read the flags of a hoist from the top down. If a signal flown on a yardarm is divided into more than one hoist, read from the top down and from outboard in, as in figure 5-5. It does

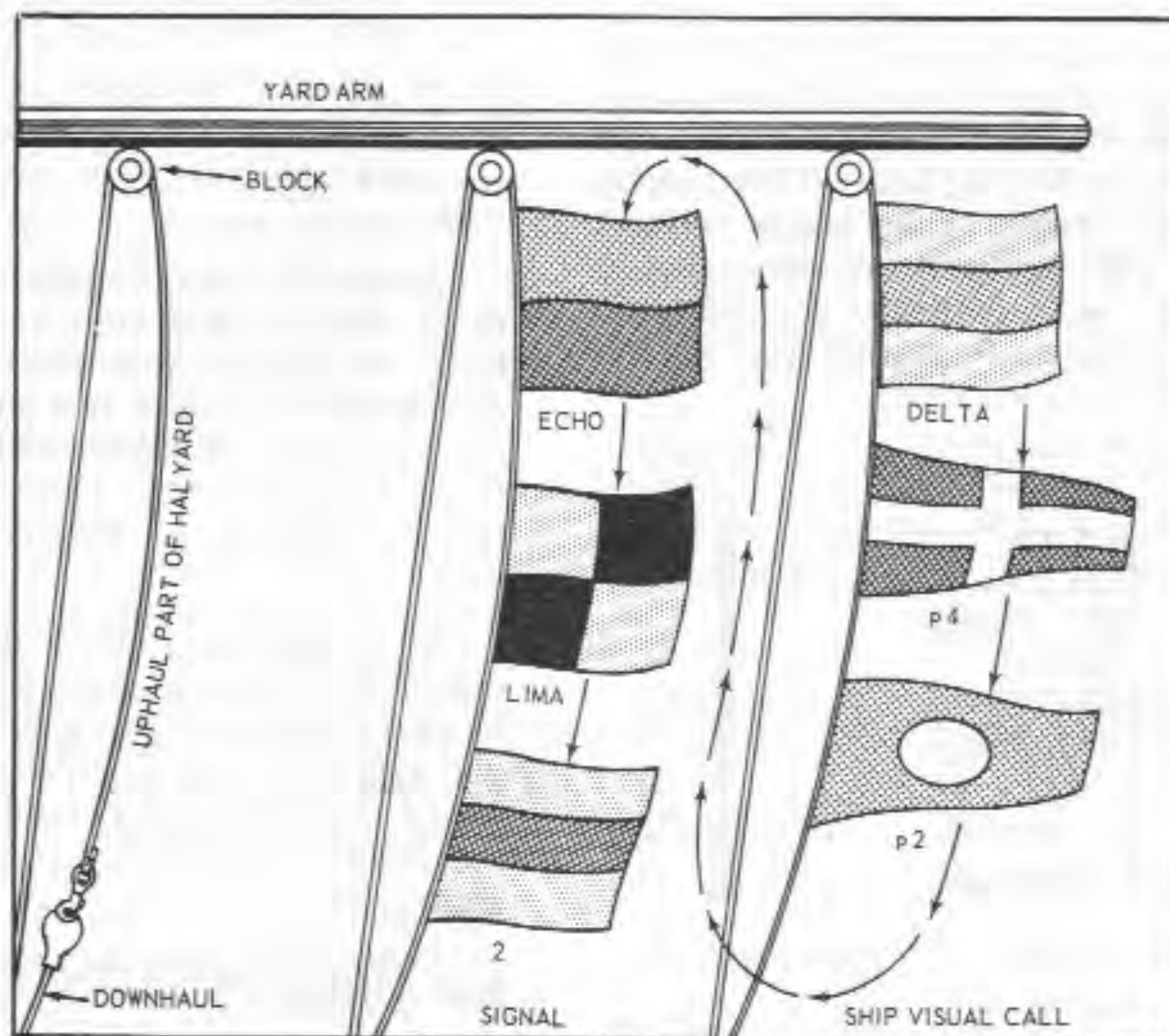


Figure 5-5.—When displayed from yardarms, hoists are read from the top down, starting with the outboard halyard.

69.122

not matter whether the hoist is raised to port or starboard; it may be raised on both sides.

Read flags hoisted at the triatic stay from forward to aft. (See figure 5-6.)

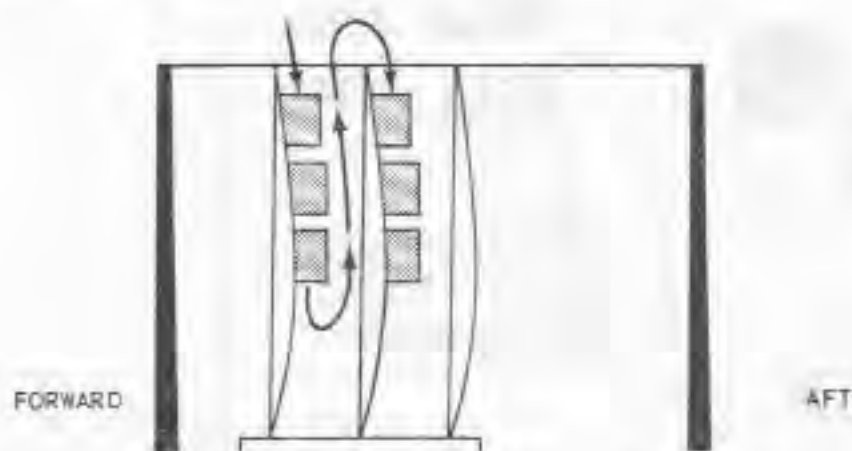
FLAGHOIST ESSENTIALS

Strive for the following essentials in flaghoist signaling:

1. Always bend on the correct flag.
2. Hoist rapidly and smoothly.
3. Send all flags up clear, unfouled by rigging or by themselves.
4. Haul down signals sharply and smoothly, without allowing them to stream to leeward or over the side.
5. Restow flags rapidly and accurately so you are ready for the next signal to be made.

HOISTING

The day will soon come when it is your turn to stand in front of the flag bag and bend on the flags. You should know the flag bag so well that you can close your eyes and still come close to hitting the slot where a particular flag is stowed. The ability to bend on flags with accuracy and speed comes only with practice.



69.123.2

Figure 5-6.—Flags hoisted at the triatic stay are read from forward to aft.

There are many correct ways to bend on the flags. The best way for you is the method that enables YOU to do the fastest and most accurate job possible. A description of one method of doing the job follows.

To bend on, lead the uphaul part of the halyard under the upper part of your right arm, with the snap on the end of the uphaul grasped firmly in your right hand. The ring on the end of the downhaul is in your left hand. (When standing by for a hoist to be called out by the spotter, you can hook the snap on the uphaul into the ring on the downhaul. This method prevents the snap from accidentally being pulled out of your hand and swinging out of reach.)

As the first flag is called out by the spotter, hook the halyard snap into the ring on the correct flag. Pull the ring out of its slot with the snap and let go. Then grasp the snap of the flag and pull it out. You are now ready to hook into the ring of the next flag. Continue this process until the spotter calls out, "Going up." Then hook the snap, which you are holding in your right hand, into the ring on the downhaul, which you have in your left hand. You are now ready to tell the person on the uphaul to, "Take it up."

The actual hoisting of a signal is generally a "two-man" job.

Be sure there is sufficient slack in the halyard to prevent the snap from pulling out of your hand. In a strong wind, put the downhaul ring over a belaying pin to free your left hand, and use both hands to handle the flags. Never make fast a halyard in use. These halyards must be free for hoisting or lowering at an instant's notice.

When you call out to the person on the uphaul, "Take it up," keep a slight strain on the halyard so the hoist goes almost straight up, not out with the wind. The person on the uphaul should haul away quickly and speedily, hoisting the signal to the dip or close-up position, as appropriate.

HAULING DOWN SIGNALS

When a signal is hauled down, the person on the uphaul should keep a slight strain on the

halyard as you lower the hoist; otherwise, the hoist might fly out with the wind and become fouled.

Haul in quickly and evenly on the downhaul. As the ring on the downhaul comes to your hand, grasp it. Then grasp the snap on the bottom flag, and unhook it from the halyard ring. Place the downhaul ring on the belaying pin located in the life rail on the flag bag front. Keep hauling the rest of the hoist down to the deck. As the topmost flag passes, unhook the snap end on the halyard, and hook it on the ring located on or near the flag bag. Take a turn on the belaying pin to hold the halyard.

As soon as the flags are on deck, the person on the uphaul should unsnap them one from another and hand them to you for restowing in the bag. As the flags are handed to you, the name of each flag is called out to assist you in getting them stowed. When all flags are stowed and your halyards are made ready for the next hoist, call out to the spotter, "Ready on the bag."

PARTS OF A FLAGHOIST MESSAGE

A flaghoist message (signal) consists of two parts—heading and text. The heading may be specified by hoisting a visual call sign. More frequently, the heading is implied. Normally, a flaghoist signal or message hoisted without call signs is addressed to all units within visual contact or to the commander of the unit. It may be said that the ending also is implied by means of the end of the display or hoist.

Heading

The heading of a flaghoist message is hoisted superior to the text. That is, it is displayed in a position that is read before the text of a message. So long as the heading appears before the text, it may be flown from the yardarm on outboard hoists (as in figure 5-5) or at the triatic stay or masthead.

The heading consists of the address. Ordinarily, only action addressees are indicated, but information and exempted addressees may be included. Headings (or addresses) normally are omitted in signals to all ships from the officer in tactical command or senior officer

present afloat. The heading is omitted also by ships addressing the officer in tactical command when no relay is required and no confusion would result. Ships or commands addressing emergency signals to the OTC may also omit the heading.

Address designations used in flaghoist messages are call signs, address groups, and visual call signs.

Text

The text of flaghoist messages usually is made up of signals from the *Allied Maritime Tactical Signal Book*, ATP 1(B), volume II, or the *International Code of Signals*, Pub. 102. International signaling is discussed in a separate chapter.

ALLIED MARITIME TACTICAL SIGNAL BOOK

ATP 1(B), volume II, is the origin of most tactical communications between Allied naval units. The U.S. Navy addendum to that publication is for U.S. intraservice use only; it may not be used for signals between units of Allied navies, and Coast Guard (except in wartime).

The signal book consists of instructions, tabulated sections of code, and special tables. The 33 chapters of the signal book are constituted as follows:

Chapter 1	General instructions for use of the book.
Chapter 2	Single flags and special pennants.
Chapter 3	Emergency alarm and action signals.
Chapters 4-9	Maneuvering signals using pennants.
Chapters 10-33	Two-letter and number-letter signals, special tables (operational and administrative), and main signal vocabulary.

Overall security classification of the signal book is Confidential, but groups contained therein are a simple unchanging code and have no security. If the system of signaling is subject to interception, only unclassified information should be sent in the code. Unless specified otherwise, signals from the signal book may be used with any communication media, including flashing light, voice radio, and flaghoist.

Signals relating to certain important types of actions are grouped in special tables. For instance, signals relating to antisubmarine tactics are in one table, those concerning torpedo action in another. Each special table has a signal flag indicator assigned to it. This flag may be kept flying constantly while signals pertaining to its particular form of maneuvering are being sent. Participants then may keep their books open to one table instead of searching through the book each time a signal is hoisted. This practice permits greater speed in signaling.

Supplementary tables are used primarily to expand the meaning of certain basic groups; they may be used with any governing or basic group as appropriate. When an item from the supplementary table is used by itself, it must be preceded by the basic group BV.

CONSTRUCTING FLAGHOIST SIGNALS

Words are seldom spelled out in Navy flaghoist signaling because of the length and number of hoists required and the time required to handle the hoists. The signal book provides groups, usually consisting of two letters, for use in place of several words. These groups are signals.

Some basic groups require additional information to complete the signal. Others may be supplemented or modified by—

1. Governing pennants.
2. Governing groups.
3. Call signs and unit indicators.
4. Description signals.

5. Plain text.
6. Operating signals.
7. *International Code of Signals*.
8. Tables.

Substitutes

Whenever possible, substitutes are used to prevent alphabet flags, numeral flags, or numeral pennants from appearing more than once in the same hoist. As their names imply, they are substitutes for other flags or pennants used in the hoist.

FIRST SUB repeats the first flag or pennant in the hoist.

SECOND SUB repeats the second flag or pennant in the hoist.

THIRD SUB repeats the third flag or pennant in the hoist.

FOURTH SUB repeats the fourth flag or pennant to the hoist.

To illustrate, the signal CORPEN PORT ZERO ZERO ZERO would read

CORPEN
PORT
ZERO
3rd
4th

THIRD SUB repeats the third flag, and FOURTH SUB repeats the fourth flag, which already repeats ZERO.

When more than one halyard is used to hoist a signal, each hoist is considered separately as regards substitutes. When a tackline separates hoist components, it is disregarded in the substitute count. Once a substitute is used, it should be considered as the flag or pennant for which it has been substituted.

Substitutes also are used as "absence indicators" when a ship is not underway. They are flown from sunrise to sunset and indicate the absence (for less than 72 hours) of officers and officials shown in the following list.

<u>Signal</u>	<u>Meaning</u>
FIRST SUB at starboard main yardarm outboard.	Absence of flag officers or unit commander whose personal flag or command pennant is flying on the ship.
SECOND SUB at port main yardarm inboard.	Absence of chief of staff.
THIRD SUB at port main yardarm outboard.	Absence of commanding officer (executive officer if CO is absent for a period exceeding 72 hours). NOTE: In the absence of a commanding officer who is acting as a temporary unit commander, both the FIRST and THIRD SUB absentee pennants should be displayed.
FOURTH SUB at starboard main yardarm inboard.	Absence of civil or military official whose flag is flying on the ship.

When flown from a ship underway, each substitute has another meaning pertaining to flaghoist procedure. These meanings are discussed in the *Allied Maritime Tactical Signal Book*.

Signaling Time

When the originator desires to have a signal executed at a specific time instead of when the signal is hauled down, the time indicator, TANGO flag, is used.

An exact hour, transmitted in conjunction with the time indicator, may be expressed in two digits (for example, 19 for 1900), and ANS may be used instead of the last two figures of a time signal to express 30 minutes. (ANS pennant indicates half units and decimals.) Thus, 1630 is sent as 16 ANS.

When time is sent together with a signal group, TANGO has the following meanings:

<u>Signal</u>	<u>Meaning</u>
T preceding numerals	Action will commence at that time.
T following numerals	Action will be completed by that time.
T between numeral groups	Time by which action is to be completed and time at which action is to commence, respectively.

Assuming that AV means, "Launch aircraft," examples of the foregoing are:

AV1 TACK T1845	Commence launching aircraft at 1845.
AV1 TACK 1845T	Complete launching aircraft by 1845.
AV1 TACK 19T1845	Commence launching aircraft at 1845; complete launching by 1900.

When a signal group provides for insertion of time, TANGO may be omitted provided no confusion results.

A time signal applies only to the group immediately preceding it. If signaled time applies to more than one group, flags BRAVO TANGO (BT) are inserted before the first of the groups to which the time signal applies.

BRAVO TANGO, separated from the remainder of the hoist or display, indicates that all signals between BT and the time group are governed by the time group. Thus, in the display—

FORM	CORPEN	SPEED	T
3	STBD	1	1
	2	5	3
	7		
	5		

FORM 3 and CORPEN STDB 275 are to be executed when hauled down, but speed 15 will be carried out at 1300. To make the signaled time apply to the entire display, the latter would read as follows:

B	CORPEN	SPEED	T
T	STBD	1	1
TACK	2	5	3
FORM	7		
3	5		

When BT is flown separately as the first hoist and left flying during several succeeding displays, all signals made during that period will be executed when BT is hauled down. No time signal is needed with that method of execution.

Governing Pennants

Three governing pennants—PREPARATIVE, INTERROGATIVE, and NEGATIVE—are available to impart a different

sense to a signal. When hoisted with signals, their meanings are as follows:

Pennant	Preceding the Signal
PREP	Prepare to_____.
INT	Questions or inquiries.
NEGAT	Cease, do not_____ or give a negative sense to an otherwise affirmative (informatory) statement.

In the following examples, again assume that AV means, "Launch Aircraft."

Signal	Meaning
PREP AVI	Prepare to launch aircraft.
INT AVI	Are you launching aircraft?
NEGAT AVI	Do not launch aircraft; or, cease launching aircraft.

A governing pennant governs all signal groups when separated from those groups by TACK, or when hoisted alone on an adjacent halyard. If the pennant is to govern only one of several signal groups, it must precede the group governed. The other groups must be separated from the governed group by TACK.

Governing Groups

Governing groups are two-letter signals used in much the same fashion as governing pennants. They are hoisted above the basic signal group, separated from that group by TACK. There are sixteen governing groups:

	Meaning
BA	Action is being carried out (or I am)
BB	Action completed (or I have)
BC	I recommend
BD	Report time you will be ready (to_____)

Meaning

BE	Report when ready (to____)
BF	Am ready (to____)
BG	My present intention is to
BH	Request permission to
BI	Action is not being carried out (or I am not)
BJ	If you desire
BK	When you desire
BT	All signals between this indicator and the next following time signal are governed by that time signal.
BU	Am unable to
BV	Take action or information as indicated from appropriate Supplementary Table
BX	Indicates end of series of groups governed by governing group
BZ	Well done

Example: If a junior requests permission to use cruising turbines by signaling BH TACK UG, the superior would reply C TACK UG signifying "Permission granted to use cruising turbines."

CALL SIGNS AND UNIT INDICATORS

When call signs or unit indicators are used to address ships, units, or commands, the call sign or indicator precedes the signal. When used to indicate ships, units, or commands referred to in the meaning of the signal, call signs or unit indicators follow the signal.

DESCRIPTION SIGNALS (DESIG)

A description signal, used to supplement a signal group, normally describes own or enemy forces or conveys other information. A description signal consists of DESIG, followed by numerals, letters, or groups necessary to amplify the meaning of the signal. For example, a flaghoist reporting the sighting of enemy forces might be supplemented by DESIG 2CL, which would indicate the forces were composed of two light cruisers.

When appropriate, DESIG followed by letters and/or numerals indicates that such a group is to be interpreted literally. In that way, words may be spelled out within the text of a signal to complete or modify the meaning. For example, to spell out the word "yes," the hoist would be—

DESIG pennant

YANKEE flag

ECHO flag

SIERRA flag

Because spelling out words requires a number of flags, plain text is never used in flaghoist signals when the same information can be conveyed by code.

INTERNATIONAL CODE OF SIGNALS

Signals contained in *International Code of Signals* (Pub. 102) may be used alone or in conjunction with signal groups from ATP 1(B), volume II. Whenever international groups are used alone in flaghoist, international procedure is to be used in answering.

BASIC MANEUVERING FLAGS

Navy signal flags and pennants include six that pertain directly to maneuvering: CORPEN, FORMATION, SPEED, STATION, SCREEN and TURN. Signals using these basic maneuvering flags are called maneuvering signals.

A complete maneuvering signal contains one or more maneuvering flags and pennants, followed or preceded by numeral flags. Three numeral flags indicate a true course or a true bearing, depending upon the maneuvering flag or pennant with which they are displayed. When fewer than three flags are hoisted, they indicate a relative change of course or bearing in 10 units. The ANSWER pennant indicates half units, 5° increments, a fraction (1/2), or a decimal point. If the OTC desires to send a signal for a change of speed to 16.5 knots, for example, the Signalmen would hoist SPEED ONE SIX ANS. For a speed of 12.7 knots, however, they would hoist SPEED ONE TWO ANS SEVEN.

The CORPEN pennant is spoken, written, and transmitted CORPEN. It is used to change course of ships in succession (known as column movement or wheeling) or, with a modifier, to indicate a course of a ship formation. When CORPEN is used to alter course by wheeling in a relative direction from dead ahead, it precedes the PORT flag or STARBOARD pennant and one or two numeral flags which indicate the number of tens of degrees; three numeral flags would indicate the course on which to steady. Examples:

<u>Signal</u>	<u>Meaning</u>
CORPEN STBD 9	Alter course by wheeling to starboard 90°.
CORPEN PORT 090	Alter course by wheeling to port to course 090.
CORPEN PORT 4 ANS	Alter course by wheeling to port 45°.

The TURN pennant, spoken, written, and transmitted TURN, may be used in any formation. It requires that all addressees put over their rudders simultaneously when the execute signal is given. Interpretation of these signals is always a turn together to starboard or to port.

The direction and specified amount of the turn must be indicated. TURN precedes the PORT flag or STARBOARD pennant and one or two numeral flags that indicate the amount of degrees of the turn in tens of degrees relative to the present course; three numeral flags indicate the course on which to steady. Examples:

<u>Signal</u>	<u>Meaning</u>
TURN STBD 9	Ships turn together to starboard 90°.
TURN PORT 270	Ships turn together to port to course 270.
TURN STBD 1 ANS	Ships turn together to starboard 15°.

The FORMATION pennant, spoken FORMATION but written and transmitted FORM, is used to assemble ships in a formation or to change a formation. The most common use of a FORM signal is to order a group of ships to arrange or rearrange themselves on an indicated

line of bearing from the guide. When the desired direction is true, the usual three numeral flags are hoisted. When indicated bearing is relative, inclusion of PORT flag or STARBOARD pennant determines whether the line of bearing is to the right or left of the guide.

<u>Signal</u>	<u>Meaning</u>
FORM 225	Ships are to form on true bearing of 225° from guide.
FORM PORT 9	Ships are to form on relative bearing indicated in tens of degrees from guide (in this instance, 090° relative to port side of the guide).

Relative bearings are always 000° to 359° clockwise around the ship. For purposes of forming up, however, these bearings run only to 180°—bow to stern—and may be on either side of the ship. A good reason for that is there are a number of standard form signals consisting simply of FORM and a number. For instance, FORM 9, without a direction pennant, means, "Form divisions in line abreast to starboard, division guides bearing astern," a signal entirely different from FORM PORT 9.

Although execution of a FORM signal may require a change of course to carry out the maneuver, the final course always is the same as the original course. The only element that changes is the maneuvering ship's position relative to the guide.

The STATION pennant—spoken, written, and transmitted STATION—is used mainly to assign position or station to a ship or unit that is joining another ship or unit, or to move a ship or unit from one station to another. When accompanied by a distance or interval signal, the pennant indicates the distance a ship or unit is to be stationed from the guide or from the ship indicated in the signal.

When accompanying a ship's call sign, STATION alone directs that ship to take its proper and assigned station.

The SCREEN pennant is spoken, written, and transmitted SCREEN. It is used in signaling various screening situations.

SINGLE FLAGS AND PENNANTS

Some single (including basic maneuvering) flags and pennants are in almost constant use by ships in port as well as underway. Many are used so commonly that all hands aboard ship soon know them. Whenever BRAVO is seen flying, for instance, all hands should know that flammable or explosive material is being handled and that the smoking lamp is out.

When two or more single flags or pennants are shown in the same hoist, they must be separated by TACK. Single flags or pennants may be hoisted also with groups from the signal book if separated from the group and themselves by TACK. Signals from the single flag and pennant tables are not to be preceded by EMERGENCY. Individual flags following EMERGENCY have different meanings. Example: OSCAR, when hoisted alone, means man overboard, which is certainly an emergency situation. However, EMERG O has an entirely different meaning. Its meaning may be found in chapter 3 of the signal book.

Single flags also are used in international signaling; do not confuse the meanings of signals under the two procedures.

EMERGENCY SIGNALS

When an emergency exists, or when the tactical situation is such that speed is the main consideration in executing a maneuver, the originator hoists the EMERGENCY pennant as the first flag on the hoist.

Any received signal preceded by EMERG is acted upon as soon as understood. The originator sounds six short blasts on the ship's whistle to call attention to the hoist and, if other than the OTC, passes the signal to the OTC by the most expeditious means authorized.

Emergency signals made by flaghoist are repeated by all ships. FIRST SUB and the originator's call sign are only used with emergency alarm signals. Emergency action signals are repeated flag for flag.

When EMERG is shown with several signal groups, it governs all groups when either separated from them by TACK or hoisted in a superior position on an adjacent halyard. If EMERG is required to govern only one of

several groups, it immediately precedes the group to be governed.

EMERG preceding a call executes all signals flying under a similar call sign as soon as understood. Used without a call, EMERG executes all signals flying without a call.

ANSWERING AND ACKNOWLEDGING

In transmitting a flaghoist signal, the originator hoists the flags close up with the upper (first) flag against the block. Addressees answer the signal by repeating the hoist, flag for flag, at the dip. This action tells the originator that an addressee has read the signal correctly. It does not, however, mean that the addressee knows what the message says. Signal watch supervisor should assist in verifying the accuracy of incoming and outgoing signals.

An addressee keeps the hoist at the dip while the OOD and CIC compare interpretations of the signal. When the OOD, by using the term "Understood," "Signal understood," or a similar phrase, orders you to acknowledge the signal, do so by hoisting the signal close up, bearing in mind the ship's visual responsibility (discussed in chapter 4 and very briefly in the next section of the chapter). This notifies the originator that your ship understands the signal and is ready to carry out any required action. When the originator lowers the hoist, haul down your hoist smartly and inform the OOD that the signal has been hauled down.

Under certain circumstances, as when needed flags are in use, you may answer a signal by hoisting only the ANSWER pennant. If several ships have signals in the air, hoist ANS to the dip under the call sign of the originator of the signal you are answering.

INTERROGATIVE PENNANT

When an addressee desires to question a signal, the signal shall be hoisted at the dip, and the Interrogative pennant hoisted on an adjacent halyard. Normally, an address over INT will not be required when communication is only between the originator and the addressee questioning the signal. When necessary to refer to the signal of a specific originator, a call may precede INT.

NOTE: INT signals need not be acknowledged if the signal in question can be clarified, hoisted, or canceled immediately. However, when answered and brought close up both ships, INT signals should be hauled down to free the halyards for additional signals.

In addition to the provisions for the use of the Interrogative pennant used alone, it may be amplified and used as follows:

<u>Signal</u>	<u>Meaning</u>
INT 1	Signal now flying not distinguishable.
INT 2	You are repeating signal incorrectly.
INT 3	I am repeating signal incorrectly.

These signals are most effective in expediting flaghoist signaling when passed by flashing light. Once a problem has been identified, regardless of ship (be it the originator, repeating ship or last ship in visual chain of responsibility), adherence to the procedures for canceling or correcting a hoist are of paramount importance to avoid possible early execution or possible delay and/or confusion in the receipt of the intended signal by all addressees.

CANCELING A HOIST

When "all ships" signals and specifically addressed signals are flying at the same time, NEGAT without a call preceding it cancels all signals without a call, and NEGAT with a call preceding it cancels all signals under a similar call. If only one signal of several under the same call is to be canceled, it must be repeated, preceded by NEGAT under the same call.

VISUAL RESPONSIBILITY

General rules of visual responsibility are discussed in chapter 4.

During maneuvers that alter the formation, visual responsibility for relay does not change until completion of the maneuver by all ships. A situation in which units rapidly change positions relative to the OTC demands particular initiative and alertness by every

ship if collective address messages are to be delivered promptly.

FIRST SUB, as the first element of a flaghoist, means that intervening ships are to relay the message to the addressee. A single call sign following the FIRST SUBSTITUTE indicates the originator of the message. It also signifies that the message is to be relayed to the OTC. When more than one call sign follows the FIRST SUBSTITUTE, the first call sign is that of the originator, and the remaining call signs are those of addressees to whom the message is to be relayed.

Hoists that do not have an addressee indicated are for the OTC; hoists that do not have an originator indicated are from the OTC. Any ship that is in an intervening position, or better able to relay such a signal, must hoist the FIRST SUBSTITUTE close up over the originator's call (if identity of the originator is evident to all ships, this hoist may be omitted) and hoist at the dip the call of addressee(s) and the signal.

Addressees acknowledge by hoisting the signal close up. When addressees acknowledge, the closeup position indicates to the originator that the signal has been relayed and acknowledged. The relay ship hauls down after the originator hauls down.

SECOND SUB, as the first element of a flaghoist, indicates that the originator has hoisted the signal for general information to all ships. No action is ordered, there is no specific address, and the signal is not to be answered. For example, when hoisted by the OTC, the signal

2nd
ECHO
XRAY
TWO
TACK
4th
ONE
3rd

indicates to all ships in company that the OTC is exercising at general quarters. SECOND SUB obviously is needed to complete the signal, and it notifies receiving ship personnel that an immediate decode is unnecessary.

TACTICAL SIGNALS

A tactical flaghoist signal ordinarily is executed when it is hauled down by the originator. When execution is to be otherwise, time of execution is indicated by—

1. A time designated in the signal.
2. A position indicated in the signal.
3. Signals preceded by Emergency as prescribed in the *Allied Maritime Tactical Signal Book*, requiring execution as soon as understood.
4. Signals executed by dipping.
5. Successive signals being made while the call or BT is left flying in a superior position.
6. Certain signals governed by a governing group or governing pennant.

Standard operational signals and administrative signals that do not require a simultaneous action are acted upon as soon as understood. Information signals and signals governed by a governing group or governing pennant also fall into this category.

When signal is received by more than one method, the signal is executed on the first signal of execution received. In other words, for a flaghoist signal that is paralleled by voice radio and executed by radio first, your ship would react when the signal first was executed.

Should the OTC haul down a signal before all ships acknowledge, ships that answered the signal should hoist it close up, then haul down immediately. Relaying ships should then pass it on by light to ships for whom they are responsible and who may not have received it.

MAKING UP A FLAG FOR BREAKING

The practice of "breaking" pre-positioned flags and pennants has been followed for many years and is a sign of a smart ship. Flags and pennants should be made up and ready for breaking in the following situations:

1. Man overboard.

2. Breakdown of the ship.
3. Assuming the guide.
4. Displaying absence indicators.
5. Displaying personal flags and pennants.
6. ROMEO, BRAVO, and PREP may also be broken during replenishment operations.

The first two occasions, in particular, signal emergencies requiring fast action.

To make up a flag for breaking, follow the steps illustrated in figure 5-7. The numbered steps correspond to the numbers under each part of the illustration.

1. Usually two people hold the flag while folding it into proper form. If no one is available

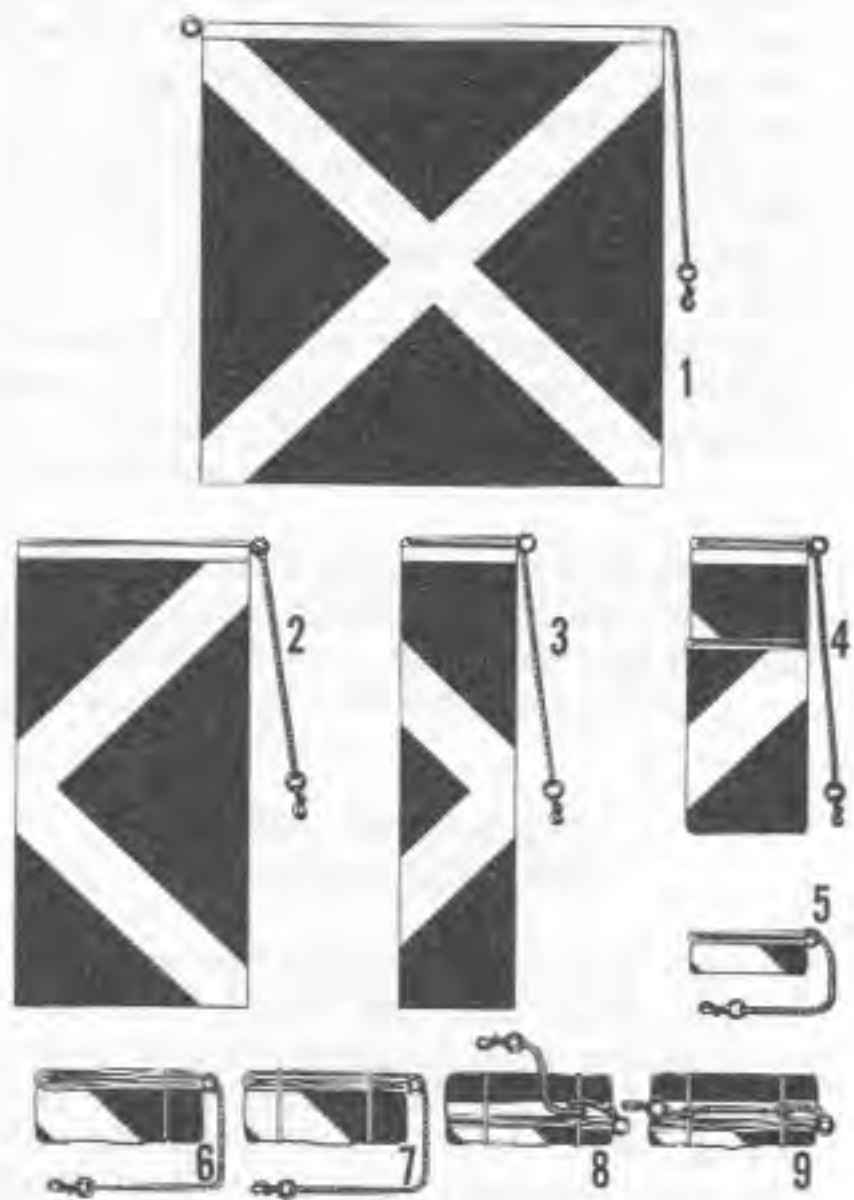


Figure 5-7.—Making up a flag for breaking.

to assist you, lay the flag on deck, hoist end away, with the ring to your left and snap to your right.

2. Fold the flag to your right so that the left half just covers the right half.

3. Repeat step 2.

4. Fold up the fly end to a position about three-quarters of the way toward the hoist,

5. Roll the flag tightly from the fold toward the hoist.



6 and 7. About 2 inches from each end of the resulting roll, wrap two turns of white twine around the roll. Tie securely.

8 and 9. With the tail line, take a full turn around the twine near the ring, repeating the operation for the twine at the other end of the roll.

The flag is now ready for breaking. Clear the halyard, bend on the flag, and run it up smartly. A sharp downward pull on the halyard will snap the twine and break the flag.

CHAPTER 6

INTERNATIONAL SIGNALING

In wartime and peacetime, communications are necessary between U.S. Navy ships and merchantmen sailing throughout the world. Vessels of many nations come in constant contact with one another, exchanging messages of varying degrees of importance.

This chapter discusses some of the facets of international signaling, such as the manner of calling and answering, message construction, and use of procedure signals and signs (as compared to standard U.S. Navy prosign procedures). International signaling procedures are in many respects similar to those used by Allied naval units. Every Signalsman must be aware, however, that there are significant differences.

Signal codes for the use of mariners have been published in many countries since the beginning of the 19th century. Not until 1855, however, was the first international code of signals drafted by a committee set up by the British Board of Trade. The first code consisted of 70,000 signals and 18 signal flags, which represented the consonants of the alphabet less X and Z.

A new edition of the *International Code of Signals* was published in 1897. A CODE (or answering) pennant, was added, and the flags were increased to 26, one for each letter of the alphabet. The new edition worked satisfactorily for routine communications, but during World War I attempts to send messages by various forms of visual signaling failed more often than they succeeded.

The Code was revised in 1931, at which time 10 numeral pennants and 3 substitutes were added. The present Code, Pub. 102, superseded the two-volume 1931 edition (Pubs. 103 and

104), and became effective on 1 April 1969. The present revision is prepared in nine languages. Code signals are suitable for transmission by all means of communication.

Many of the terms, procedures, and procedure signs used in international signaling are the same as those practiced in the U.S. Navy. You are already familiar with them. Others, however, are completely different. When communicating with a merchantman, you must remember to use international procedure. Merchantmen do not have access to all our publications, nor do they have to know Navy procedure. Another important point to keep in mind is that speed requirements for Navy Signalsmen are higher than those for merchant sailors. By international agreement, the standard rate of signaling by flashing light and semaphore is eight words per minute.

The material in this chapter will be presented in a style which closely follows the format of Pub. 102. Chapters, sections, and page numbers listed are identical with those in the Code.

EXPLANATION AND GENERAL REMARKS

The purpose of the *International Code of Signals* is to provide ways and means of communication in situations related essentially to safety of navigation and persons, especially when language difficulties arise. In the preparation of the Code, account was taken of the fact that wide application of radiotelephony and radiotelegraphy can provide simple and effective means of communication in plain language

whenever language difficulties do not exist. The Code consists of:

1. Single-letter signals, chapter 1. Allocated to significations which are very urgent, important, or of very common use.

2. Two-letter signals for General Signal Code, chapter 2. Subjects covered under the General Signal Code are:

Section 1.—DISTRESS—EMERGENCY

Section 2.—CASUALTIES—DAMAGES

Section 3.—AIDS TO NAVIGATION—NAVIGATION—HYDROGRAPHY

Section 4.—MANEUVERS

Section 5.—MISCELLANEOUS

Section 6.—METEOROLOGY—WEATHER

Section 7.—COMMUNICATIONS

Section 8.—INTERNATIONAL SANITARY REGULATIONS

Section 9.—TABLE OF COMPLEMENTS

3. Three-letter signals beginning with "M" for the Medical Signal Code, chapter 3.

The Code follows the basic principle that each signal should have a complete meaning. This principle is followed throughout the Code; in certain cases, complements are used when necessary to supplement the available group.

Complements express:	Examples:
1. Variations in the meaning of the basic signal.	CP. I am (or vessel indicated is) proceeding to your assistance. CP 1. SAR aircraft is coming to your assistance.
2. Questions concerning the same basic subject or basic signal.	DY. Vessel (name or identity signal) has sunk in lat . . . long. . . DY 4. What is the depth of water where vessel sank?
3. Answers to a question or request made by the basic signal.	HX. Have you received any damage in collision? HX 1. I have received serious damage above the waterline.

4. Supplementary, specific, or detailed information.	IN. I require a diver. IN 1. I require a diver to clear propeller.
--	---

Complements appearing in the text more than once are grouped in three tables. These should be used only as and when specified in the text of the signals. The tables of complements which follow were taken from chapter 2, section 9 of the Code.

Table 1

1. Semaphore
2. Morse signaling by hand flags or arms
3. Loud hailer (megaphone)
4. Morse signaling lamp
5. Sound signals
6. International Code flags
7. Radiotelegraphy 500 kHz
8. Radiotelephony 2182 kHz
9. VHF Radiotelephony—Channel 16

Table 2

0. Water
1. Provisions
2. Fuel
3. Pumping equipment
4. Firefighting appliances
5. Medical assistance
6. Towing
7. Survival craft
8. Vessel to stand by
9. Icebreaker

Table 3

0. Direction unknown (or calm)
1. Northeast
2. East
3. Southeast
4. South
5. Southwest
6. West
7. Northwest
8. North
9. All directions (or confused or variable)

Text in brackets indicates:

1. An alternative; e.g., “. . . (position to be indicated if necessary).”
2. An explanation of the text.

The material is classified according to subject and meaning. Extensive cross-referencing of the signals is used to facilitate coding.

DEFINITIONS

When a man-of-war and merchant ship desire to communicate, it is extremely important for those involved in the use of the Code to follow the prescribed terminology.

For the purpose of the Code, the following terms have the meanings indicated:

Sound Signaling. Any method passing Morse signals by means of siren, whistle, foghorn, bell, or other sound apparatus.

Identity Signal (or call sign). The group of letters and figures assigned to each station by its administration.

Station. A ship, aircraft, survival craft, or any place at which communications can be effected by any means.

Station of Origin. Station where the originator submits a signal for transmission, irrespective of the method of communication used.

Station of Destination. Station in which the signal is finally received by the addressee.

Receiving Station. The station by which a signal is actually being read.

At the Dip. The position of a hoist or signal when it is about half of the full extent of the halyards. (Navy meaning is three-fourths of the full extent.)

Group. Denotes more than one continuous letter and/or numeral which together compose a signal.

Numeral Group. One or more numerals.

Definitions of the following terms agree in meaning with Allied signaling instructions:

Visual signaling

Originator

Transmitting station

Addressee

Procedure

Procedure signal

Hoist

Tackline

METHODS OF SIGNALING

The methods of signaling that may be used are:

1. Flag signaling.
2. Flashing light signaling using Morse code.

3. Sound signaling using Morse code.
4. Voice over a loud hailer.
5. Radiotelephony.
6. Signaling by hand flags or arms, using semaphore Morse code.

FLAG SIGNALING

A set of signal flags consists of 26 alphabetical flags, 10 numeral pennants, 3 substitutes, and the ANSWER pennant.

FLASHING LIGHT AND SOUND SIGNALING

The Morse symbols representing letters and numerals are signaled as in any other form of Navy communications.

In flashing light and sound signaling, it is best to err on the side of making the dots shorter in their proportion to the dashes. The distinction between the elements is then clearer. The standard rate of signaling by flashing light is regarded as 40 letters per minute.

VOICE OVER A LOUD HAILER

Whenever possible, plain language should be used. Where a language difficulty exists, however, groups from the *International Code of Signals* could be transmitted using the phonetic spelling tables shown in Pub. 102.

GENERAL INSTRUCTIONS

Unless otherwise indicated, all signals between vessels are made from the master (or commanding officer) of the vessel of origin to the captain of the vessel of destination.

Identification of Ships and Aircraft

Identity signals for ships and aircraft are allocated on an international basis. The signals for ships are the same as their radio call signs and consist of four characters, the first one or two of which indicate the nationality of the ship. In accordance with NTP 4, there is no objection to transmitting international call signs (identity

signals) to merchantmen in flashing light procedure.

Identity signals for aircraft also are the same as their radio call signs, but consist of five characters. Here, too, the nationality of the aircraft is indicated by the first character or two. These "nationality marks" are made up into registration marks by adding three or four characters, increasing the group to five. A table showing the allocation of these identity signals is contained in appendix 1 of the Code. Following are some examples:

<u>Call sign series</u>	<u>Allocated to</u>
AAA-ALZ	UNITED STATES OF AMERICA
AMA-AOZ	SPAIN
CFA-CKZ	CANADA
LAA-LNZ	NORWAY
7JA-7NZ	JAPAN

Use of Identity Signals

Identity signals may be used for two purposes:

1. To speak to, or call, a station.
2. To speak of, or indicate, a station.

Examples:

YP4 LABC	I wish to communicate with vessel LABC by Morse signaling lamp. (Complements Table 1 is used to indicate (by numeral) the method of communication desired.)
HY1 LABC	The vessel LABC with which I have been in collision has resumed her voyage.

Names of Vessels and/or Places

Names of vessels and/or places are spelled out.

RV GIBRALTAR	You should proceed to Gibraltar.
LN CAPE HENRY	Light on Cape Henry has been extinguished.
IT2 SS <i>Michigan</i>	SS <i>Michigan</i> is on fire.

How to Signal Numbers

Use the following as a guide when you are signaling numbers.

1. Numbers are signaled as follows:

- a. Semaphore: spelled out.
- b. Flag signaling: by the numerical pennants of the Code.
- c. Flashing light or sound signaling: usually by the numerals in the Morse code; they may also be spelled out.
- d. Radiotelephony or loud hailer: by the code words of the Figure Spelling Table in chapter 1, section 10 of the Code.

2. Figures which form part of the basic signification of a signal are to be sent together with the basic group. Examples:

DI 20 I require boats for 20 persons.

FJ 2 Position of accident (or survival craft) is marked by sea marker.

3. A decimal point between numerals is to be signaled as follows:

- a. Semaphore: spelled out.
- b. Flag signaling: by inserting the ANSWER pennant where it is desired to express the decimal point.
- c. Flashing light and sound signaling: by "decimal point" signal "AAA."
- d. Voice: by use of the word "decimal" (pronounced DAY-SEE-MAL).

4. Wherever the text allows depths, etc., to be signaled in feet or in meters, the figures should be followed by "F" to indicate feet or by "M" to indicate meters.

Azimuth or Bearing

These are expressed in three figures denoting degrees from 000 to 359, measured clockwise. If

there is any possibility of confusion, the figures should be preceded by the letter "A." They are always true unless expressly stated to be otherwise. Examples:

LW 005 I receive your transmission on bearing 005.

LT A120 T1540 Your bearing from me is 120° at (local time) 1540.

Course

Courses are expressed in three numerals denoting degrees from 000 to 359, measuring clockwise. If there is any possibility of confusion, the numerals should be preceded by the letter "C." They are always true unless expressly stated to be otherwise. Examples:

MD 025 My course is 025.

GR C240 S18 Vessel coming to your rescue is steering course 240°, speed 18 knots.

Date

Dates are signaled by two, four, or six numerals preceded by the letter "D." The first two numerals indicate the day of the month. When they are used alone, they refer to the current month. Example:

D15 Transmitted on the 15th or any date in April means 15 April.

The two numerals which follow indicate the month of the year. Example:

D1504 means 15 April.

Where necessary, the year may be indicated by two further numerals. Example:

D181081 means 18 October 1981.

Latitude

Latitude is expressed by four figures preceded by the letter "L." The first two figures denote the degrees and the last two the minutes.

The letters "N" (north) or "S" (south) follow if they are needed; however, to keep things simple, they may be omitted if there is no risk of confusion. Example:

L3740S Indicates latitude 37°40'S.

Longitude

Longitude is expressed by four or, if necessary, five figures preceded by the letter "G." The first two (or three) figures denote the degrees and the last two the minutes. When the longitude is more than 99°, no confusion will normally arise if the figure indicating hundreds of degrees is omitted. However, where it is necessary to avoid confusion the five figures should be used. The letter "E" (east) or "W" (west) follow if they are needed; otherwise they may be omitted, as in the case of latitude. Example:

G13925E Indicates longitude 139°25'E.

A signal requiring the indication of position to complete its signification should be signaled as follows:

CH L2537N G4015W Vessel indicated is reported as requiring assistance in lat. 25°37'N long. 40°15'W.

Distance

Figures preceded by the letter "R" indicate distance in nautical miles. Example:

OM A080 R10 Bearing and distance by radar of vessel indicated, is bearing 080°, distance 10 miles.

The letter "R" may be omitted if there is no possibility of confusion.

Speed

Speed is indicated by figures preceded by:

1. The letter "S" to denote speed in knots, or

2. The letter "V" to denote speed in kilometers per hour.

Examples:

BQ S300 The speed of my aircraft in relation to the surface of the earth is 300 knots.

BQ V300 The speed of my aircraft in relation to the surface of the earth is 300 kilometers per hour.

Time

Times are to be expressed in four figures, of which the first two denote the hour (from 00—midnight up to 23—11 p.m.), and the last two denote the minutes (from 00-59). The figures are preceded by:

1. The letter "T" indicating local time, or
2. The letter "Z" indicating Greenwich mean time.

Examples:

BH T1045 L2015N G3840W C125 I sighted an aircraft at local time 1045 in lat. 20°15'N long. 38°40'W flying on course 125°.

RX Z0830 You should proceed at GMT 0830.

Time of Origin

The time of origin may be added at the end of the text. It should be given to the nearest minute and expressed by four figures. Apart from indicating at what time a signal originated, it also serves as a convenient reference number.

Communication by Local Signal Codes

If a vessel or a coast station wishes to make a signal in a local code, the signal YV1—"The groups which follow are from the local code," should precede the local signal, if it is necessary, in order to avoid misunderstanding. CODE YVp1, is also used by U.S. Navy warships to

indicate signals taken from the Incidents at Sea (INCSEA) Agreement. Particulars concerning these local signals should be looked up in *Sailing Directions*.

FLAG SIGNALING

A man-of-war desiring to communicate with a merchant vessel will hoist the CODE pennant in a conspicuous position and keep it flying during the entire time that signals are being made. This indicates that the signal groups are from the *International Code of Signals*.

Groups from the *International Code of Signals* may also be used between Allied naval ships. They may be used alone or to supplement basic signals from the *Allied Maritime Tactical Signal Book*, ATP 1(B), volume II. Whenever military use is made of the Code, groups will be preceded by CODE when transmitted by flag-hoist, or INTERCO when transmitted by Morse, voice, or semaphore. When only international signals are used, CODE/INTERCO followed by TACK shall be used as the first group to indicate that all of the following groups are taken from the CODE. When used to supplement other signals, CODE/INTERCO immediately precedes the signal group to indicate that only the one group is taken from the CODE. When using international signals to supplement signals from ATP 1(B), volume II, or when international signals are preceded by a naval call sign, naval procedure is used. Under all other circumstances, international procedure is to be used.

As a general rule, only one hoist should be displayed at a time. Each hoist or group of hoists should be kept flying until it has been answered by the receiving station. When more groups than one are shown on the same halyard, they must be separated by a tackline. The transmitting station should always hoist the signal where it can be most easily seen by the receiving station, that is, in such a position that the flags will blow out clear and free from smoke.

CALLING

The identity signal of the station(s) addressed is hoisted with the signal. If no identity signal is

hoisted, it will be understood that the signal is addressed to all stations within visual signaling distance. If it is not possible to determine the identity signal of the station which it is desired to call, the transmitting station should hoist the group:

VF — “You should hoist your identity signal”
or

CS — “What is the name or identity signal of your vessel (or station)?”

At the same time, the transmitting station will hoist its own identity signal. The group YQ—“I wish to communicate by, . . . (Complements Table 1) with vessel bearing, . . . from me” can also be used.

ANSWERING

All stations to which signals are addressed or which are indicated in signals hoist the ANSWER pennant at the dip as soon as they see each hoist and close up immediately when they understand it. It is lowered to the dip as soon as the hoist is hauled down at the transmitting station, and is hoisted close up again as soon as the next hoist is understood.

HOW TO COMPLETE A SIGNAL

The transmitting station hoists ANS singly after the last hoist of the signal to indicate that the signal is completed. The receiving station answers this in a manner similar to other hoists. Call for unknown station(s) or general call to stations is CQ.

HOW TO ACT WHEN SIGNALS ARE NOT UNDERSTOOD

You cannot question the meaning of a hoist by displaying the INTERROGATIVE pennant used in naval procedure. If the receiving station cannot clearly distinguish the signal made to it, it keeps the ANSWER pennant at the dip. If it can distinguish the signal but cannot understand the meaning of it, it can hoist the following signals:

ZK — “I cannot distinguish your signal.”

ZQ — “Your signal appears incorrectly coded. You should check and repeat the whole”; or

ZL — “Your signal has been received but not understood.”

If the originating ship hoists a wrong signal group, it cannot cancel it with the NEGAT pennant. Although international procedure does not provide for special pennants, it does have signal groups that fulfill the same purpose. In this case, for example, the originating ship would hoist the signal group:

YN — “Cancel my last signal/message”; or

ZP — “My last signal was incorrect. I will repeat it correctly.”

SUBSTITUTES

The basic reason for using substitutes in international signaling is the same as in naval procedure: a signal flag can be repeated one or more times in the same group, although the ship may carry only one or two sets of flags. Without substitutes, for instance, it is obvious that such a group as AAA or 1000 can be made only if three sets of signal flags are available. By using three substitutes, any two-, three-, or four-letter group can be hoisted with only one set of flags.

The FIRST SUBSTITUTE always repeats the uppermost signal flag of that class of flags which immediately precedes the substitute. The SECOND SUBSTITUTE always repeats the second and the THIRD SUBSTITUTE repeats the third signal flag, counting from the top of that class of flags which immediately precedes them. No substitute can ever be used more than once in the same group.

There is an important difference between the use of substitutes in naval and international procedures. As you learned in chapter 5, in naval procedure a substitute repeats ANY flag or pennant that precedes it on the base hoist. In international signaling, a substitute repeats only a flag or pennant of the same class (that is, alphabet or numeral) immediately preceding it.

The signal VV, for example, would be made as:

V

FIRST SUBSTITUTE

The number “1100” would be made by numeral pennants as follows:

1

FIRST SUBSTITUTE

0

THIRD SUBSTITUTE

The signal “L 2330” would be hoisted as:

L

2

3

SECOND SUBSTITUTE

0

In this case, the SECOND SUBSTITUTE follows a numeral pennant and, therefore, it can only repeat the second numeral in the group.

No substitute may be used more than once in the same group. For example, the signal AABA would be:

A

FIRST SUBSTITUTE

B

SECOND SUBSTITUTE

The FIRST SUBSTITUTE, used to repeat the first A, cannot be used again. But, having been used, it is equivalent to having hoisted A as the second flag. Consequently, it is the second flag that is required to be repeated as the last flag of the group. Hence, the SECOND SUBSTITUTE is used.

When the ANSWER pennant is used as a decimal point, it is disregarded in determining the substitute to use.

HOW TO SPELL

Names in the text of a signal are spelled out by means of alphabet flags. The signal YZ—"The words which follow are in plain language"—can be used, if necessary.

FLASHING LIGHT SIGNALING

A signal made by a flashing light is divided into the following parts:

1. Call—Consists of the general call or identity signal of station to be called. It is answered by the answering signal.

2. Identity—Transmitting station makes "DE" followed by its identity signal or name. This is repeated back by receiving station which then signals its own identity signal or name. This also is repeated back by transmitting station.

3. Text—Consists of plain language or Code groups. When Code groups are to be used they should be preceded by the signal "YU." Words of plain language may also be in the text when the signal includes names, places, etc. Receipt of each word or group is acknowledged by "T."

4. Ending—Consists of ending signal " $\overline{AR}$ " which is answered by "R."

If the entire text is in plain language, the same procedure is followed. Call and identity may be omitted when two stations have established communications and have already exchanged signals.

The list of procedure signals for flashing light transmissions appears in chapter 1, section 10, of Pub. 102.

$\overline{AA} \overline{AA} \overline{AA}$, etc.	Call for unknown station or general call.
$\overline{EEEEEE}$, etc.	Erase signal.
$\overline{AAA}$	Full stop or decimal point.
$\overline{TTTT}$, etc.	Answering signal.
T	Word or group received.

USE OF PROCEDURE SIGNALS AND SIGNS

The following procedure signals are appropriate for all forms of transmission:

AA	"All after. . ." (when used after the "Repeat signal" (RPT)), means "Repeat all after. . ."
AB	"All before. . ." (when used after the "Repeat signal" (RPT)), means "Repeat all before. . ."
$\overline{AR}$	Ending signal or end of transmission or signal.
$\overline{AS}$	Waiting signal or period.
BN	"All between. . . and. . ." (used after the "Repeat signal" (RPT)), means "Repeat all between. . .and. . ."
C	Affirmative—YES or "The significance of the previous group should be read in the affirmative."
CS	"What is the name or identity signal of your vessel (or station)?"
DE	"From. . ." (used to precede the name or identity signal of the calling station).
K	"I wish to communicate with you" or "Invitation to transmit."
NO	Negative—NO or "The significance of the previous group should be read in the negative." When used in voice transmission the pronunciation should be "NO."
OK	Acknowledging a correct repetition or "It is correct."
RQ	Interrogative, or, "The significance of the previous group should be read as a question."
R	"Received" or "I have received your last signal."
RPT	Repeat signal "I repeat" or, "Repeat what you have sent" or "Repeat what you have received."

WA "Word or group after. . ." (used after the "Repeat signal" (RPT)), means "Repeat word or group after. . ."

WB "Word or group before. . ." (used after the "Repeat signal" (RPT)), means "Repeat word or group before. . ."

Examples that follow illustrate the convenience of international procedure signals and signs.

1. The general call signal (or call for unknown station) "AA AA AA" is made to attract attention when wishing to signal to all stations within visual signaling distance or to a station whose name or identity signal is not known. The call is continued until the station addressed answers.

2. The answering signal "TTTT" is made to answer the call and it is continued until the transmitting station ceases to make the call. The transmission starts with the signal "DE" followed by the name or identity signal of the transmitting station. Example: When one of the stations is other than an Allied naval ship:

STATION "A" TRANSMITS	STATION "B" TRANSMITS
(1) AA AA (until answered)	(2) TTTT (until call ceases)
(3) DE NABC	(4) DE NABC KFLN
(5) KFLN AR	(6) R

3. The letter "T" is used to indicate the receipt of each word or group.

4. The erase signal "EEEEEE" indicates that the last group or word was signaled incorrectly. It is answered with the erase signal. When answered, the transmitting station will repeat the last word or group which was correctly signaled and then proceed with remainder of the transmission.

5. The repeat signal "RPT" is used as follows:

a. By the transmitting station to indicate that it is going to repeat ("I repeat"). If such a repetition does not follow immediately after "RPT," the signal should be interpreted as a request to the receiving station to repeat the signal received ("Repeat what you have received").

b. By the receiving station to request a repetition of the signal transmitted ("Repeat what you have sent").

c. The special repetition signals "AA," "AB," "WA," "WB," and "BN" are made by the receiving station as appropriate. In each case, they are made immediately after the repeat signal "RPT." Examples:

RPT AB KL—Repeat all before group KL.

RPT BN BOATS SURVIVORS—"Repeat all between words 'boats' and 'survivors'."

If a signal is not understood or, when decoded, is not intelligible, the repeat signal is not used. The receiving station must then make the appropriate signal from the Code; e.g., "Your signal has been received but not understood."

6. A correctly received repetition is acknowledged by the signal "OK." The same signal may be used as an affirmative answer to a question ("It is correct").

7. The ending signal "AR" is used in all cases to indicate the end of a signal or the end of transmission. The receiving station answers the signal "R"—"Received" or "I have received your last signal."

8. The transmitting station makes the signal "CS" when requesting the name or identity signal of the receiving station.

9. The waiting signal or period signal "AS" is used as follows:

a. When made independently or after the end of a signal, it indicates that the other station must wait for further communications (waiting signal);

b. When it is inserted between groups, it serves to separate them (period signal) to avoid confusion.

10. The signal "C" should be used to indicate an affirmative statement or an affirmative reply to an interrogative signal; the signal

"RQ" should be used to indicate a question. For a negative reply to an interrogative signal or for a negative statement, the signal "N" should be used in visual or sound signaling and the signal "NO" should be used for voice or radio transmission.

When the signals "N" or "NO" and "RQ" are used to change an affirmative signal into a negative statement or into a question, respectively, they should be transmitted after the main signal. Examples:

CY N (or NO, as appropriate)—"Boat(s) is (are) coming to you."

CW RQ—"Is boat/raft on board?"

The signals "C," "N," or "NO," and "RQ" cannot be used in conjunction with single-letter signals.

SOUND SIGNALING

Because of the apparatus used (whistle, siren, foghorn, etc.), sound signaling is necessarily slow. Moreover, the misuse of sound signaling could create serious confusion at sea. Sound signaling in fog should, therefore, be reduced to a minimum. Signals other than the single-letter signals should be used only in extreme emergency and never in frequented navigational waters.

The signals should be made slowly and clearly. They may be repeated, if necessary, but at sufficiently long intervals to ensure that no confusion can arise and that one-letter signals cannot be mistaken as two-letter groups.

Under international procedures, a transmitting ship calls in the same manner as by flashing light; the receiving ship replies with the answering sign. (No call or answer is sent, however, when transmitting single-letter signals.) The transmitting ship then sends the entire message. Unless the receiving ship misses a word or group, it does not answer until the ending $\overline{AR}$ is made; it then indicates receipt by sending R.

If the receiving ship misses a word or group during the transmission, it immediately signals RPT to indicate the omission; the transmitting ship goes back a few words or groups, then continues the message. Ships do not exchange identities in this form of communicating despite use of the general call $\overline{AA}$. Example:

Component	<i>Beachwood</i> makes—	<i>Sirius</i> makes—
Call	$\overline{AA} \overline{AA} \overline{AA}$	$\overline{TTTTTT}$
Text	HAVE JUST PASSED FLOATING MINES	
Ending	$\overline{AR}$	R

SIGNALING BY SEMAPHORE

A station which desires to communicate with another station by semaphore may so indicate by transmitting to that station the signal "K1" (KILO UNAONE) by any method. If the stations are close to one another, the attention sign may be made instead.

On receipt of the call, the station addressed should hoist the ANSWER pennant at the dip, or make the answering sign, or, if unable to communicate by semaphore, should reply with the signal "YS 1."

The sender will make the attention sign and wait until the ANSWER pennant is hoisted close up, or the answering sign is made by the station addressed, commencing transmission after a reasonable pause.

The signal should always be made in plain language; numbers occurring in a semaphore signal are spelled out in words.

At the end of each word the arms are dropped to the break position. When double letters occur, the arms are dropped to the break position after the first letter is made and then moved out to the second letter without pausing. The erase signal is a succession of Es.

The reception of each word is indicated by the receiving station making the letter "C." If this letter is not made, the word is to be repeated.

All signals will end with the ending signal "AR."

Assume that the master of SS *Lurline* (signal letters KIEK) wishes to transmit to the master of the SS *Stora* (GDVR), by semaphore, the message: "Can you loan me a kedge anchor?"

Component	<i>Lurline</i> makes—	<i>Stora</i> makes—
Call	GDVR TACK "K1" or attention sign	ANS dipped (closes up when ready to receive) or answering sign C
Identity	DE <i>Lurline</i>	C
Text	CAN	C
	YOU	C
	LOAN	C
	ME	C
	A	C
	KEDGE	C
Ending	ANCHOR	C
	AR	

MORSE SIGNALING BY HAND FLAGS OR ARMS

A station which desires to communicate with another station by Morse signaling using hand flags or arms may indicate the requirement by transmitting to that station the signal "K2" by any method. The call signal "AA AA AA" may be made instead.

On receipt of the call, the station addressed should make the answering signal, or, if unable to communicate by this means, should reply with the signal "YS2" by any available method.

The call signal "AA AA AA" and the signal "T" should be used, respectively, by the transmitting station and the addressed station.

Normally both arms should be used for this method of transmission, but in cases where this is difficult or impossible, one arm can be used.

All signals will end with the ending signal "AR."

In Morse signaling by hand flags or arms, the following system is prescribed:

1. A dot is indicated by raising both arms vertically overhead.

2. A dash is indicated by spreading both arms horizontally at the sides.

3. Both arms are brought before the chest for separation of "dots" and/or "dashes."

4. Both arms are lowered to a 45° angle from the ground to indicate separation of letters.

5. Circular motions of arms and hands overhead indicate a request for repetition by the receiver; or a mistake in the transmission or "erase" when made by the sender.

6. The end of transmission is indicated by quick vertical movements of the arms in front of the body.

SINGLE-LETTER SIGNALS

International single-letter signals, which may be made by any method of signaling, have specific meanings that in most cases do not parallel the same single-letter signals from ATP 1(B), volume II. These important and commonly used signals are as follows:

A — I have a diver down; keep well clear at slow speed.

*B — I am taking in, or discharging, or carrying dangerous goods.

C — Yes (Affirmative or "The significance of the previous group should be read in the affirmative.")

*D — Keep clear of me; I am maneuvering with difficulty.

*E — I am altering my course to starboard.

F — I am disabled; communicate with me.

G — I require a pilot. When made by fishing vessels operating in close proximity on the fishing grounds, it means: "I am hauling nets."

*H — I have a pilot on board.

*I — I am altering my course to port.

J — I am on fire and have dangerous cargo on board; keep well clear of me.

- K — I wish to communicate with you.
 L — You should stop your vessel instantly.
 M — My vessel is stopped and making no way through the water.
 N — No (Negative or "The significance of the previous group should be read in the negative.") This signal may be given only visually or by sound. For voice or radio transmission the signal should be "NO."
 O — Man overboard.
 P — In harbor.—All persons should report on board as the vessel is about to proceed to sea.
 At sea.—It may be used by fishing vessels to mean: "My nets have come fast upon an obstruction."
 Q — My vessel is "healthy" and I request free pratique.
 *S — My engines are going astern.

- T — Keep clear of me; I am engaged in pair trawling.
 U — You are running into danger.
 V — I require assistance.
 W — I require medical assistance.
 X — Stop carrying out your intentions and watch for my signals.
 Y — I am dragging my anchor.
 Z — I require a tug. When made by fishing vessels operating in close proximity on the fishing grounds, it means: "I am shooting nets."

Signals of letters marked by an asterisk (*), when made by sound, may only be made in compliance with the requirements of the *International Regulations for Preventing Collisions at Sea*.

Signals "K" and "S" have special meanings as landing signals for small boats with crews or persons in distress.

SINGLE-LETTER SIGNALS WITH COMPLEMENTS

AZIMUTH or BEARING	A with three numerals.
COMMUNICATE, I wish to communicate with you by ... (Complements Table 1)	K with one numeral.
COURSE	C with three numerals.
DATE	D with two, four, or six numerals.
DISTANCE in nautical miles	R with one or more numerals.
GMT (the first two denote hours and the rest minutes)	Z with four numerals.
LATITUDE (the first two denote degrees and the rest minutes)	L with four numerals.
LONGITUDE (the last two numerals denote minutes and the rest degrees)	G with four or five numerals.
LOCAL TIME (the first two denote hours and the rest minutes)	T with four numerals.
SPEED in kilometers per hour	V with one or more numerals.
SPEED in knots	S with one or more numerals.

MEDICAL SIGNAL CODE

Medical advice should be sought and given in plain language whenever possible but, if language difficulties arise, the Code should be used.

Even when plain language is used, the text of the Code and the instructions should be followed as far as possible.

Reference is made to the procedure signals "C," "N," or "NO," and "RQ" which, when used after the main signal, change its meaning into affirmative, negative, and interrogative respectively.

Example:

MFE RQ	Is bleeding severe?
MFE N	Bleeding is not severe.

INSTRUCTIONS TO MASTERS

The master should make a careful examination of the patient and should try to collect, as far as possible, information covering the following subjects (under chapter 3 of the Code):

1. Description of the patient.
2. Previous health.
3. Localization of symptoms, diseases, or injuries.
4. General symptoms.
5. Particular symptoms.
6. Diagnosis.

Such information should be coded by choosing the appropriate groups from the corresponding sections of the Code. It would help the recipients of the signal if the information were transmitted in the order shown above.

Chapter 3, section 2A, contains signals which can be used independently; i.e., with or without the description of the case.

After a reply from the doctor has been received and the instructions therein followed, the master can give a progress report by using signals from chapter 3, section 2G.

INSTRUCTIONS TO DOCTORS

Additional information can be requested by using chapter 3, section 3A. Example:

MQB—I cannot understand your signal.
Please use standard method of case description.

For diagnosis, chapter 3, section 3B should be used. Example:

MQE 26—My probable diagnosis is cystitis.

Prescribing should be limited to the "List of Medicaments" which comprises table M-3 in chapter 3, section 4.

For special treatment, signals from chapter 3, section 3C should be used. Example:

MRP 4—Apply ice-cold compress and renew every 4 hours.

When prescribing medication, three signals found in chapter 3, section D, should be used as follows:

1. The first (chapter 3, section 3D-1 and table M-3 in chapter 3, section 4) to signify the medication itself. Example:

MTD 32—You should give aspirin tablets.

2. The second (chapter 3, section 3D-2) to signify the method of administration and dose. Example:

MTI 2—You should give by mouth two tablets/capsules.

3. The third (chapter 3, section 3D-3) to signify the frequency of the dose. Example:

MTQ 8—You should repeat every 8 hours.

The frequency of external applications is coded in chapter 3, section 3D-4. Example:

MTU 4—You should apply every 4 hours.

Advice concerning diet can be given by using signals from chapter 3, section 3E. Example:

MUC—Give water only in small quantities.

As an example, two cases of request for assistance and the corresponding replies follow:

CASE ONE

REQUEST FOR MEDICAL ASSISTANCE. "I have a male age 44 years. Patient has been ill for 2 days. Patient has suffered from bronchitis acute. Onset was sudden. Patient is delirious. Patient has fits of shivering. Temperature taken in mouth is 40° Celsius. Pulse rate per minute is 110. The rate of breathing per minute is 30. Patient is in pain (chest). Part of the body affected is right (chest). Pain is increased on breathing. Patient has severe cough. Patient has bloodstained sputum. Patient has been given penicillin injection without effect. Patient has received medication in last 18 hours. My probable diagnosis is pneumonia."

MEDICAL ADVICE. "Your diagnosis is probably right. You should continue giving penicillin injection. You should repeat every 12 hours. Put patient to bed lying down at absolute rest. Keep patient warm. Give fluid diet, milk, fruit juice, tea, mineral water. Give water very freely. Refer back to me in 24 hours or before if patient worsens."

CASE TWO

REQUEST FOR MEDICAL ASSISTANCE. "I have a male aged 31 years. Patient has been ill for 3 hours. Patient has had no serious previous illness. Pulse rate per minute is 95. Pulse is weak. Patient is sweating. Patient is in pain in lumbar (kidney) region. The part affected is left lumbar (kidney) region. Pain is severe. Pain is increased by hand pressure. Bowels are regular."

REQUEST FOR ADDITIONAL INFORMATION. "I cannot make a diagnosis. Please answer the following questions. Temperature taken in the mouth is (number). Pain radiates to groin and testicle. Patient has pain on passing water. Urinary functions normal. Vomiting is present."

ADDITIONAL INFORMATION. "Temperature taken in mouth is 37° Celsius. Pain radiates to groin and testicle. Patient has pain on passing water. Patient is passing small quantities of urine frequently. Vomiting is absent. Patient has nausea."

MEDICAL ADVICE. "My probable diagnosis is kidney stone (renal colic). You should give morphine injection. You should give by subcutaneous injection 15 milligrams. Give water freely. Apply hot water bottle to lumbar (kidney) region. Patient should be seen by doctor when next in port."

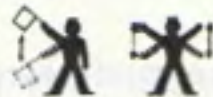
DISTRESS SIGNALS

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 radiotelegraphy or by any other signaling method consisting of the group . . . --- . . . (SOS) in the Morse code.
5. A signal sent by radiotelephony consisting of the spoken word "Mayday."
6. The international code signal of distress indicated by NC.
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.

Table 6-1.—Lifesaving Signals

LANDING SIGNALS FOR THE GUIDANCE OF SMALL BOATS WITH CREWS OR PERSONS IN DISTRESS

	MANUAL SIGNALS	LIGHT SIGNALS	OTHER SIGNALS	SIGNIFICATION
DAY SIGNALS	 VERTICAL MOTION OF A WHITE FLAG OR OF THE ARMS	 OR FIRING OF A GREEN STAR SIGNAL	 OR CODE LETTER K GIVEN BY LIGHT OR SOUND-SIGNAL APPARATUS	THIS IS THE BEST PLACE TO LAND
NIGHT SIGNALS	 VERTICAL MOTION OF A WHITE LIGHT OR FLARE	 OR FIRING OF A GREEN STAR SIGNAL	 OR CODE LETTER K GIVEN BY LIGHT OR SOUND-SIGNAL APPARATUS	

A RANGE (INDICATION OF DIRECTION) MAY BE GIVEN BY PLACING A STEADY WHITE LIGHT OR FLARE AT A LOWER LEVEL AND IN LINE WITH THE OBSERVER

DAY SIGNALS	 HORIZONTAL MOTION OF A WHITE FLAG OR OF THE ARMS EXTENDED HORIZONTALLY	 OR FIRING OF A RED STAR SIGNAL	 OR CODE LETTER S GIVEN BY LIGHT OR SOUND-SIGNAL APPARATUS	LANDING HERE HIGHLY DANGEROUS
NIGHT SIGNALS	 HORIZONTAL MOTION OF A LIGHT OR FLARE	 OR FIRING OF A RED STAR SIGNAL	 OR CODE LETTER S GIVEN BY LIGHT OR SOUND-SIGNAL APPARATUS	
DAY SIGNALS	 1 HORIZONTAL MOTION OF A WHITE FLAG, FOLLOWED BY 2 THE PLACING OF THE WHITE FLAG IN THE GROUND AND 3 BY THE CARRYING OF ANOTHER WHITE FLAG IN THE DIRECTION TO BE INDICATED	 1 OR FIRING OF A RED STAR SIGNAL VERTICALLY AND A 2 WHITE STAR SIGNAL IN THE DIRECTION TOWARDS THE BETTER LANDING PLACE	1 OR SIGNALLING THE CODE LETTER S (...) FOLLOWED BY THE CODE LETTER R (...) IF A BETTER LANDING PLACE FOR THE CRAFT IN DISTRESS IS LOCATED MORE TO THE RIGHT IN THE DIRECTION OF APPROACH 2 OR SIGNALLING THE CODE LETTER S (...) FOLLOWED BY THE CODE LETTER L (...) IF A BETTER LANDING PLACE FOR THE CRAFT IN DISTRESS IS LOCATED MORE TO THE LEFT IN THE DIRECTION OF APPROACH	LANDING HERE HIGHLY DANGEROUS, A MORE FAVOURABLE LOCATION FOR LANDING IS IN THE DIRECTION INDICATED
NIGHT SIGNALS	 1 HORIZONTAL MOTION OF A WHITE LIGHT OR FLARE 2 FOLLOWED BY THE PLACING OF THE WHITE LIGHT OR FLARE ON THE GROUND AND 3 THE CARRYING OF ANOTHER WHITE LIGHT OR FLARE IN THE DIRECTION TO BE INDICATED	 1 OR FIRING OF A RED STAR SIGNAL VERTICALLY AND A 2 WHITE STAR SIGNAL IN THE DIRECTION TOWARDS THE BETTER LANDING PLACE	1 OR SIGNALLING THE CODE LETTER S (...) FOLLOWED BY THE CODE LETTER R (...) IF A BETTER LANDING PLACE FOR THE CRAFT IN DISTRESS IS LOCATED MORE TO THE RIGHT IN THE DIRECTION OF APPROACH 2 OR SIGNALLING THE CODE LETTER S (...) FOLLOWED BY THE CODE LETTER L (...) IF A BETTER LANDING PLACE FOR THE CRAFT IN DISTRESS IS LOCATED MORE TO THE LEFT IN THE DIRECTION OF APPROACH	

Table 6-1.—Lifesaving Signals—Continued

SIGNALS TO BE EMPLOYED IN CONNECTION WITH THE USE OF SHORE LIFESAVING APPARATUS

	MANUAL SIGNALS	LIGHT SIGNALS	OTHER SIGNALS	SIGNIFICATION
DAY SIGNALS	 VERTICAL MOTION OF A WHITE FLAG OR OF THE ARMS	 OR FIRING OF A GREEN STAR SIGNAL		IN GENERAL: AFFIRMATIVE SPECIFICALLY: ROCKET LINE IS HELD— TAIL BLOCK IS MADE FAST— HAWSER IS MADE FAST— MAN IS IN THE BREECHES BUOY— HAUL AWAY
NIGHT SIGNALS	 VERTICAL MOTION OF A WHITE LIGHT OR FLARE	 OR FIRING OF A GREEN STAR SIGNAL		
DAY SIGNALS	 HORIZONTAL MOTION OF A WHITE FLAG OR OF THE ARMS EXTENDED HORIZONTALLY	 OR FIRING OF A RED STAR SIGNAL		IN GENERAL: NEGATIVE SPECIFICALLY: SLACK AWAY— AVAST HAULING
NIGHT SIGNALS	 HORIZONTAL MOTION OF A LIGHT OR FLARE	 OR FIRING OF A RED STAR SIGNAL		

REPLIES FROM LIFESAVING STATIONS OR MARITIME RESCUE UNITS TO DISTRESS SIGNALS MADE BY A SHIP OR PERSON

DAY SIGNALS	 ORANGE SMOKE SIGNAL	 OR COMBINED LIGHT AND SOUND SIGNAL (THUNDER-LIGHT) CONSISTING OF 3 SINGLE SIGNALS WHICH ARE FIRED AT INTERVALS OF APPROXIMATELY ONE MINUTE	YOU ARE SEEN— ASSISTANCE WILL BE GIVEN AS SOON AS POSSIBLE (REPETITION OF SUCH SIGNAL SHALL HAVE THE SAME MEANING)
NIGHT SIGNALS	 WHITE STAR ROCKET CONSISTING OF 3 SINGLE SIGNALS WHICH ARE FIRED AT INTERVALS OF APPROXIMATELY ONE MINUTE		

IF NECESSARY, THE DAY SIGNALS MAY BE GIVEN AT NIGHT OR THE NIGHT SIGNALS BY DAY

SIGNALS USED BY AIRCRAFT ENGAGED ON SEARCH AND RESCUE OPERATIONS TO DIRECT SHIPS TOWARDS AN AIRCRAFT, SHIP OR PERSON IN DISTRESS

PROCEDURES PERFORMED IN SEQUENCE BY AN AIRCRAFT

 1 AIRCRAFT CIRCLES THE SURFACE CRAFT AT LEAST ONCE	 2 AIRCRAFT CROSSES THE SURFACE CRAFT COURSE CLOSE AHEAD AT LOW ALTITUDE OPENING AND CLOSING THE THROTTLE OR CHANGING THE PROPELLER PITCH	 3 AIRCRAFT HEADS IN THE DIRECTION IN WHICH THE SURFACE CRAFT IS TO BE DIRECTED	THE AIRCRAFT IS DIRECTING A SURFACE CRAFT TOWARDS AN AIRCRAFT OR SURFACE CRAFT IN DISTRESS (REPETITION OF SUCH SIGNALS SHALL HAVE THE SAME MEANING)
 CROSSING THE SURFACE CRAFT'S WAKE CLOSE ASTERN AT LOW ALTITUDE OPENING AND CLOSING THE THROTTLE OR CHANGING THE PROPELLER PITCH			THE ASSISTANCE OF THE SURFACE CRAFT IS NO LONGER REQUIRED (REPETITION OF SUCH SIGNALS SHALL HAVE THE SAME MEANING)

THE ASSISTANCE OF THE SURFACE CRAFT IS NO LONGER REQUIRED

(REPETITION OF SUCH SIGNALS SHALL HAVE THE SAME MEANING)

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.

Vessels in distress may use the radiotelegraph alarm signal or the radiotelephone alarm signal to secure attention to distress calls and messages. The radiotelegraph alarm signal, which is designed to actuate the radiotelegraph auto alarms of vessels so fitted, consists of a series of 12 dashes sent in 1 minute. The duration of each dash is 4 seconds, and the duration of the interval between 2 consecutive dashes is 1 second. The radiotelephone alarm signal consists of 2 tones transmitted alternately over periods of from 30 seconds to 1 minute.

The use or exhibition of any of the foregoing signals except for the purpose of indicating distress and need of assistance and the use of other signals which may be confused with any of the above signals is prohibited.

Any of the following words concerns SAFETY:

MAYDAY (Distress)	Indicates that a ship, aircraft, or other vehicle is threatened by grave and imminent danger and requests immediate assistance.
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PAN
(Urgency)

Indicates that the calling station has a very urgent message to transmit concerning the safety of a ship, aircraft, or other vehicle, or the safety of a person.

SECURITE
(Safety)

Indicates that the station is about to transmit a message concerning the safety of navigation or giving important meteorological warnings.

If you hear these words, pay particular attention to the message and call the master or the officer on watch.

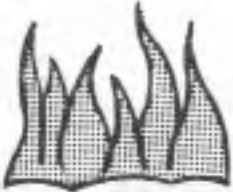
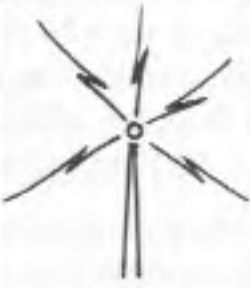
Attention is drawn to the relevant sections of the *International Code of Signals*, the *Merchant Ship Search and Rescue Manual*, and the following signals:

1. A piece of orange-colored canvas with either a black square and circle or other appropriate symbol (for identification from the air).

2. A dye marker.

Signals used in situations of distress and search and rescue are illustrated in table 6-1 (Lifesaving Signals) and table 6-2 (Distress Signals).

Table 6-2.—Distress Signals

			
RED STAR SHELLS	FOG HORN CONTINUOUS SOUNDING	FLAMES ON A VESSEL	GUN FIRED AT INTERVALS OF 1 MIN.
	SOS  SOS		
ORANGE BACKGROUND BLACK BALL & SQUARE	"MAYDAY" BY RADIO	PARACHUTE RED FLARE	
			
DYE MARKER (ANY COLOR)	CODE FLAGS NOVEMBER CHARLIE	SQUARE FLAG AND BALL	WAVE ARMS
			
RADIO-TELEGRAPH ALARM	RADIO-TELEPHONE ALARM	POSITION INDICATING RADIO BEACON	SMOKE

CHAPTER 7

WATCHSTANDING DUTIES

Visual communications at sea usually involve messages that require specific and often immediate compliance. Through tactical communications, ships are joined in formation and maneuvered together as a unit, combat information is passed rapidly between ships, and weapons, including aircraft, are coordinated for attack or mutual defense of the group.

Because of their importance, tactical communications are handled by specially trained responsible personnel. Usually the staff communication officer or staff watch officer on a flagship disseminates signals for the officer in tactical command (OTC) by voice radio located in flag plot, or through the flagship signal bridge. On other ships of the force, tactical communications are handled by key personnel who assist the CO in receiving and interpreting communications. These personnel include the OOD, JOOD, CIC personnel, and the signal watch.

The signal officer, if one is assigned, takes direct charge of the signal bridge during maneuvers, tactical drills, general quarters, and when leaving or entering port.

Basic communication doctrine stipulates that visual signaling, in preference to radio, be used for communicating whenever practicable. Visual communications, therefore, constitutes an integral part of the overall communication effort of the ship. The signal bridge plays an important role in the effectiveness of communications as a function of command.

The point of this introduction is to emphasize the importance of your job as a watchstander on the signal bridge. During periods of independent steaming and when the

task force is not maneuvering, the watch is necessarily slow. When maneuvers begin, the pace is rapid and requires "instant response." When the OTC puts a signal in the air, the sign of a smart ship is to answer, acknowledge, and execute with minimum loss of time. A signal watch aboard a ship with a fast maneuvering task force can be a major challenge.

This chapter enumerates major responsibilities of the signal force, including a short discussion of forms and publications you will use, and discusses signals with which a boatcrew Signalman must be familiar.

DUTIES OF THE WATCH

Frequently, the duties of signalmen, spotters, and recorders may be rotated to better qualify strikers. When the pace is quick, however, the supervisor ensures that the best qualified personnel are in the more important spots.

SIGNAL SUPERVISOR

A Signalman 3 or 2 frequently is signal supervisor. During the watch, the supervisor is in complete control of signal personnel on watch and of signal material in use, and ensures that a proper lookout is kept at all times. When the ship is underway, the signal supervisor is subject to the leading Signalman (usually a Signalman First Class or above) and the signal officer. The supervisor stations the watch so as best to carry on the signal activities and to attain watch discipline. The supervisor's primary concerns are with traffic handling and watch discipline,

and only secondarily (as necessary) with actual operation. It is the supervisor's responsibility to ensure that instructions are complied with for internal routing and filing of messages applicable to the signal section.

Any person assigned as a watch supervisor must be thoroughly familiar with *Communication Instructions*, *Visual Signaling Procedures*, ACP 129; the *Allied Maritime Tactical Signal Book*, ATP 1(B), volume II; *Call Sign Book For Ships*, ACP 113; *International Code of Signals*, Pub. 102, and all applicable instructions and other publications pertaining to visual communications. The supervisor should be proficient in all forms of visual communications and be able to draft a message for transmission in any visual system. The supervisor must know the watchstanders' duties in various emergency bills, with emphasis on man overboard.

During the watch, the supervisor is required to—

1. Ensure that an alert watch is maintained at all times.
2. Coordinate and supervise operations and activities of the watch in such a way as to maintain efficiency in handling visual message traffic with minimum noise and confusion.
3. Know recognition signals in effect.
4. Keep the watch informed of the disposition, organization, formation, and location of all units in visual company.
5. Know the visual responsibility of own ship for relaying and repeating signals and messages.
6. Safeguard communication publications on the signal bridge; ensure that a watch-to-watch inventory is maintained.
7. Conduct training and instruction for personnel on watch, as practicable, under existing operating conditions.
8. Assume responsibility for cleanliness and orderliness of the signal bridge and personnel on watch.

9. Acquaint the watch with the location and use of emergency signal equipment.

10. Ascertain visual challenge and reply procedures.

11. Make all required reports to the bridge or quarterdeck. These reports include ships or objects sighted, status of signals on own ship and ships in the vicinity, execution of signals, and casualties to signal bridge equipment.

12. Ensure that receipts are obtained for messages accepted by the watch for delivery or relay.

13. Maintain the visual station file and visual log.

SIGNALMEN

Signalmen should be proficient in all means of visual communications. They must know how to use the *Allied Maritime Tactical Signal Book* and have knowledge of—

1. Correct visual procedures, including the uses of procedure signals, procedure signs, and call signs.
2. Recognition procedures and recognition signals in effect.
3. The organization, disposition, formation, and location of all units in company.
4. Log and file maintenance.
5. Special meanings of all flags and pennants.
6. The location and method of operation of all emergency signaling gear.

Signalmen should be able to compose and break down any visual or radio message heading in naval form. They also must know how to communicate by visual means with a merchant ship at sea and should have a basic knowledge of visual communication with aircraft.

Signalmen should pay particular attention to the following conditions:

1. Keep halyards taut in fair weather. In fog or inclement weather, and when it is too dark for flaghoist, slack the halyards off to prevent unnecessary strain from shrinkage.

2. Do not leave Irish pennants, loose equipment, or personal gear about the signal bridge.

3. Report lost, damaged, or inoperable equipment at once, and take steps to repair or replace it.

4. Keep bunting dry and covered in bad weather, and air it as often as necessary to prevent mildew. Before airing bunting, obtain permission from the senior officer present afloat (SOPA).

Signalmen must always be mindful that an alert signal force is the mark of a smart ship. The following items make for smartness in flaghoist signaling:

1. Accuracy in bending on the correct flag the first time.

2. Smoothness in hoisting and making a quick turn with the uphaul.

3. Speed in hauling up the hoist.

4. Assurance that all flags are sent up clear.

5. Certainty that the signal is kept visible while the hoist is flying. Keep the downhaul fairly taut.

6. Haul down signals sharply, smoothly, and in such manner that they are not allowed to stream to leeward or over the side.

Signalmen must be alert to respond to a flashing light or semaphore call without delay.

At night, Signalmen must use extreme care to avoid illuminating the ship's bridges and aircraft. Such illumination reduces the night visual acuity of pilots and conning officers. Whenever

practicable during carrier night flight operations, infrared systems should be used instead of visible flashing light.

Before you can send a visual message to another ship, you first must know where that ship is located. A Signalman with a message in hand, not knowing the location of the addressee, would be in the same plight as a postman trying to deliver a letter that has no address.

When operating with only one other ship, there is no great difficulty. Operating with a large force, however, does present a problem, and the problem becomes even more complex at night. Infrared communications during darken ship operations would be impossible without some method of keeping track of ships in the formation or locating them.

Signalmen on the signal bridge maintain an up-to-date plot of all ships in company. One of the best systems for plotting ships is a formation plot drawn on a maneuvering board. The maneuvering board itself is a compass rose with range circles, containing speed, distance, and time scales. Our only interest in the board at this time is how to use it to assist you in plotting and locating other ships in formation. You will learn more about how to solve maneuvering board problems in *Signalman 1 & C*, NAVEDTRA 10136.

The different formations and their component stations are contained in *Allied Maritime Tactical Instructions and Procedures*, ATP 1(B), volume I. Using the formation in figure 7-1, imagine yourself as the Signalman on USS *Farragut* (DDG-37) with a message for USS *Dewey* (DDG-45).

By checking the formation plot, you find that *Dewey* is in station No. 4 and that your own station is No. 8. Place a set of parallel rulers so they intersect your station and that of *Dewey* (single dashed line in figure 7-1). Move the parallel rulers to the center of the plot (along the paths of the double lines). Where the parallel rulers cross the outside ring of the maneuvering board is the true bearing (330°T) of *Dewey* from your ship. The formation course is 050°T, so the relative bearing of *Dewey* is 280° (true bearing less course, or just forward of your port beam.

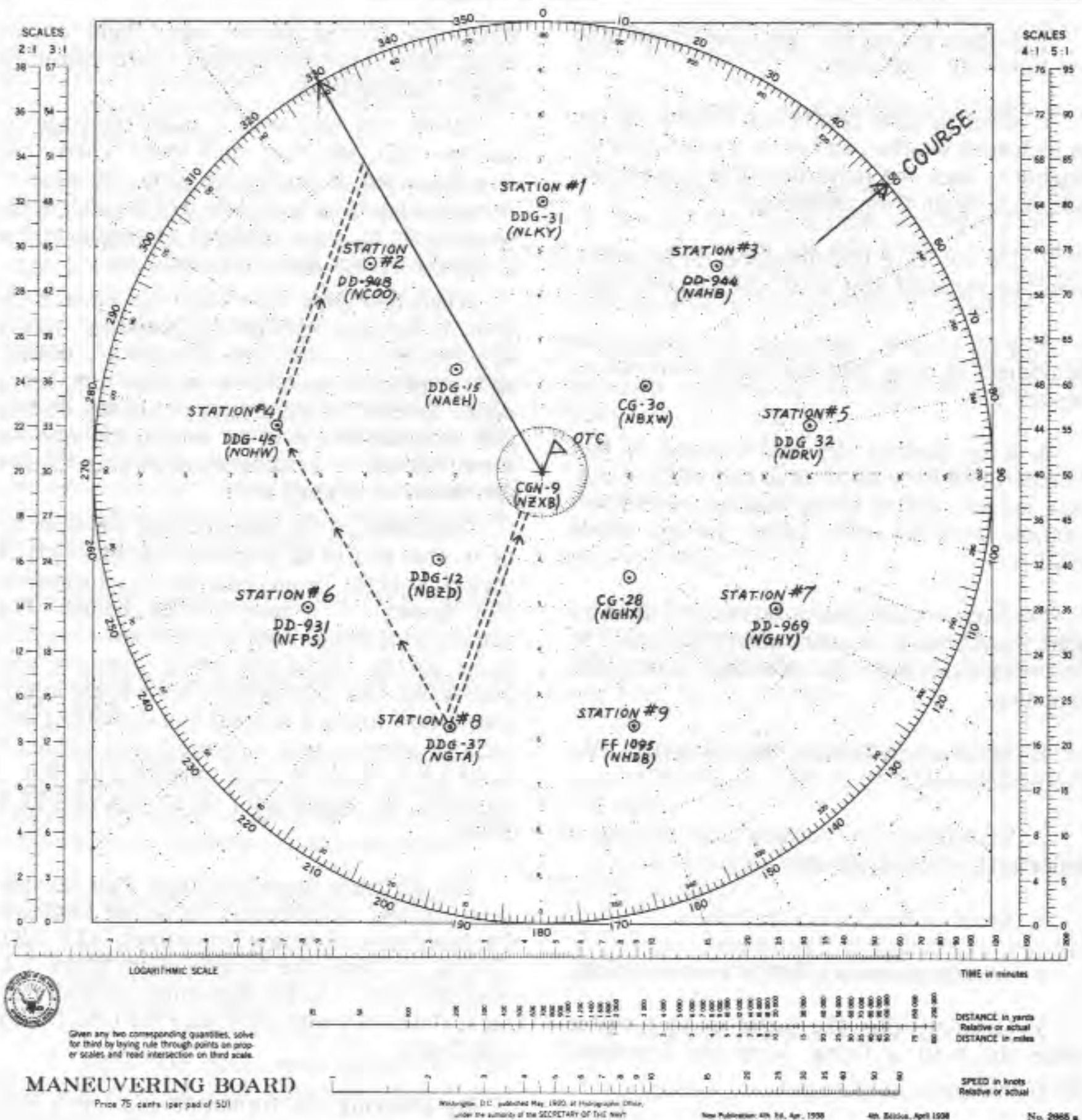


Figure 7-1.—Locating a ship by use of the formation plot.

SPOTTERS

When operating in company, spotters are stationed on the signal bridge from dawn to dark to watch for signals from the OTC and other ships in company. They must be alert at all times.

Spotters must be able to read flaghoist accurately. They call out each flag in the signal in a loud, distinct voice so that personnel on the flag bags and personnel relaying the signal to those responsible for determining the meaning of the signal can hear the signal clearly.

If the originating ship maneuvers in such a manner that its signals cannot be distinguished, the spotter should immediately inform another member of the signal force to spot the ship from another position on the signal bridge. Where there are obstructions such as smoke, haze, fouled flags, or sun glare, the spotter should be given assistance. Regardless of the effort involved or the means necessary, the signal must be obtained with minimum delay.

RECORDERS

An important duty of Signalmen and strikers is to record signals and messages being read by another Signalman. The date, time of transmission or receipt, reference numbers, date-time group, means of transmission, transmitting and receiving ships, and relaying ships or stations all must be carefully recorded.

Messages are initialed by the operator and supervisor at the time of receipt or transmission. Normally, originals of nontactical messages, after being initialed, are shown to the OOD or captain, after which a copy is sent to the communication center for writeup and internal distribution. The method for handling tactical signals was discussed in chapter 5.

LOGS AND FILES

Naval Telecommunication Procedures Fleet Communication, NTP 4, requires that an accurate and complete record be maintained of all events that occur during each watch. Comprising these records are visual logs, visual station files, and publications custody logs for the purpose of maintaining accurate watch-to-watch publication inventories.

Visual Communications Log

The visual communications log is maintained in a ledger-type record book or other bound book especially printed for that purpose. The log is maintained by the watch section supervisor and is started at the beginning of each new day, 0000 (GMT), and ends at 2359 (GMT). The first entry will be "assumed the watch" and on the next line the supervisor signs in. At 2359Z, the

day's log is to be closed out and the watch entries continued on the next page. All entries, excluding the watch identification, i.e., 00-04, 04-07, shall be made in Greenwich mean time (GMT).

The visual log will contain a record of all visual traffic sent and received. This record will include the time of receipt/delivery, and as applicable in the case of signals, the time the signal is executed/hailed down. It will also show the method used, from whom the traffic was received, to whom the traffic was transmitted, the originator, the action addressee(s), the information addressee(s), and the exempted addressee(s). Even though traffic is not transmitted to an exempted addressee, exempted addressee(s) must be recorded in the log.

The last column in the visual log is used to record visual numbers. This is a convenient method of accountability. As each message is logged, it is assigned a visual number. After a message has been internally routed and, if required, relayed, it is finally placed in the visual station file and the number circled in the visual log.

No blank lines are to be left between entries in the visual log. The log is to be kept in black or blue ink. Correct errors by drawing a single line through the error and relogging the correct entry. The person making the correction must initial it adjacent to the correction. If the visual log is to perform its function as a record, it must be legible.

All narrative entries must be logged under the Text/Remarks column. Shipboard events and evolutions recorded in other official records, e.g., ship's deck log, need not be logged. Corresponding signals paralleling shipboard evolutions must be entered.

Figure 7-2 shows an example of a page from a visual log. This example is not intended to cover every situation that could arise. If there is any doubt as to whether something should or should not be logged, log it. Supervisors must continually monitor the visual log to ensure that it meets one simple test: "Is there any doubt as to who said what to whom?"

DATE: 9 SEP 78											ZONE: +5	
TOR A/D	TOD C/U	TOX H/D	M H	RCVD FM	TRANS TO	ORIG	ACT	INFO	XMT	TEXT/REMARKS	VIS NR	
1230	1250		FL	NDFQ	NTYP	Jp9XH	Kp0AD	NNCD	NWDL	091145Z SEP 78	(12)	
	1305		FL		NJFK	NABC	Jp9XH	NJFK		091240Z SEP 78	(13)	
1340			SEM	NTYP		Ap7WF	Mp5BS			1248Z	(14)	
	1415	1420	FH		p2	DpLp2				M		
1430		1433	FH	Rp6p7		Lp3	p7			SPEED 20		
1503		1507	FH	CpLp6		p0p5	p5	3 rd		SCREEN Z		
	1520	1525	FH		p2	DpLp2				M SPEED 20		
1545										FWD STBD 12" LIGHT INOP		
1556		1603	FL	CpLp6		p0p5	DpLp2			STATION BL-Rp6p7		
1604		1610	FH		p2	DpLp2				25		
	1645	1649	FH		CpLp6	DpLp2	2p2			BH-AD26-2		
1653		1659	FH	Rp6p7		p0p1				4 TH XAF		
1725										RELIEVED BY SM3 JONES		
										SM2 J Waver		
										12-16		
1725										ASSUMED THE WATCH		
										SM3 J Jones		
1735	1740	1800	FH		p2	DpLp2				HL		
1810	1820		FL	NJFK	NNCD	NJFK	NNCD	NLXZ		091755Z SEP 78	(15)	
1825			FL	Ap6		Ap6	DpLp2			X TURN STBD		

101.53

Figure 7-2.—Visual log entries. The log is maintained according to Greenwich mean time.

Unnecessary and higher than necessary classification of the visual log must be avoided. In all cases, the current OPNAVINST 5510.1 must be consulted before any security classification is assigned to the visual log. The fact that a visual log may not have been classified does not give license to careless handling and accountability of the log. Because of the reasons stated above, the decoded versions of signals are NOT included in the visual log.

The visual log is retained and disposed of in accordance with the current SECNAVINST 5212.5, Disposal of Navy and Marine Corps Records. As a minimum, the visual log must be

retained for 6 months. However, the visual log may be disposed of when the ship is decommissioned provided the log does not meet any of the special criteria specified in SECNAVINST 5212.5.

A separate log is maintained for recording visual communications drills and exercises. The format for this log is basically the same as the official log but must be clearly labeled "Visual Communications Drill Log." There are no destruction requirements for the drill log. Note that signals and messages used to begin or end drills are logged in the official log.

Visual Station File

The visual station file contains a copy of all messages (except signals from an authorized signal book) handled visually. These messages are filed chronologically in date-time group order.

On a flagship, if the embarked flag so desires, a separate visual station file will be maintained for flag traffic. If separate ship and flag files are maintained, many messages originated by and filed in the embarked flag's file must, if the address so indicates, also be filed in the ship's file. Duplicate filing is also required when incoming messages are addressed to both the embarked flag and the ship.

The visual station file must be classified, safeguarded, and stored according to the highest classification of its contents. The visual station file is retained and disposed of in accordance with the current SECNAVINST 5212.5. To maintain continuity with destruction of the visual log, visual station files must be retained for a minimum of 6 months.

Publication Custody Log

The signal supervisor is responsible for all publications issued to the signal bridge. Because many of the publications are classified, they must be safeguarded. Others may be in limited supply. All are essential for efficient operation of the signal bridge. To provide positive control of communication publications, a watch-to-watch inventory similar to the one shown in figure 7-3 should be used. At the change of each watch, the watches will jointly conduct a sight inventory of every publication. Some loose-leaf distributed publications require a page check at the change of the watch in addition to the sight inventory. These loose-leaf publications will be specifically indicated on the watch-to-watch inventory. The signing of the watch-to-watch inventory by the relieving watch certifies that the publications were sighted, the required page checks were conducted, and that the relieving watchstander is responsible for them. Any discrepancies noted must be resolved before the

watch is relieved. All signatures must be in ink. Watch-to-watch inventories of communication publications may be destroyed after 30 days, provided they are no longer required for local reference. On board ships, if an inventory is not conducted on a watch-to-watch basis, a daily inventory is required.

HANDLING CLASSIFIED MATERIAL

Classified material available on the signal bridge while underway involves not only signal publications as such, but may include such documents as encrypted call signs, task force call signs, and daily abstracts of challenge and reply codes.

Classified material is made available to personnel only on a "need-to-know" basis. In other words, the material is on the signal bridge only because Signalmen need it to perform their duties. As a signal supervisor, you are directly responsible for the classified matter on the signal bridge during your watch. If possible, keep the material out of sight until needed. Do not allow lookouts, telephone talkers, or other watchstanders to have access to it. In the first place, they have no need for the information. Secondly, you have no way of knowing whether they have been granted an appropriate security clearance.

When the ship is not underway, classified matter required for use by the signal bridge generally is retained in the communication spaces where facilities are available to provide adequate security. Needed material is delivered to the signal bridge by the communication officer when the ship gets underway and is removed by the communication officer when the ship enters port. In ships having proper stowage facilities on the bridge, the signal officer is responsible for delivering, collecting, and securing the classified material.

EMERGENCY SIGNALS

While on the bridge, be particularly alert for emergency signals in your area.

WATCH - TO - WATCH INVENTORY

[illegible]

I certify that I have personally sighted and inventoried each of the above-listed publications and/or materials. By my signature above I acknowledge responsibility for maintaining security precautions and assume custody for all above-listed publications and/or material during my watch or until properly relieved of their custody. I will report immediately to the custodian or other competent authority any discrepancy in the inventory.

* Requires a watch to watch page check.

Figure 7-3.—Publication custody log. Each signal supervisor is personally responsible for classified material on the signal bridge during the period of his or her watch.

AIRCRAFT EMERGENCIES

The following pyrotechnic light signals may be given by pilots in emergency situation over the seas.

<u>Signal</u>	<u>Meaning</u>
One red light or a succession of red lights	Aircraft in distress; or, if in the vicinity of the carrier, immediate landing is required; no radio is available.
One green light	Pilot wishes to land but has no immediate need; used only when in the vicinity of a carrier.
Succession of green lights	Aircraft has an urgent message to transmit concerning its own safety or that of another aircraft, ship, or vehicle, or the safety of any person on board or within sight.
One white light	Man overboard.
Succession of white lights	Pilot in difficulties that compel him to land; immediate assistance not required.

SUBMARINE EMERGENCIES

The following signals are prescribed for submerged submarines in emergency situations wherein the boat must come to periscope depth or surface.

A yellow or white smoke bomb fired into the air, followed by a second yellow or white smoke bomb 3 minutes later, indicates the submarine is coming to the surface. Ship clear the immediate area, but should not stop propellers. (White and yellow are synonymous because, under certain atmospheric conditions, white signals may appear as yellow.)

A red smoke bomb fired into the air indicates the submarine is in serious trouble and will surface immediately, if possible.

SURFACE SHIP EMERGENCIES

International emergency signals for surface ships are discussed in chapter 6.

For a man-overboard situation, the daytime display is the OSCAR flag, flown at the foretruck or where it can be seen best. When a person is lost over the side at night, the peacetime procedure is to display two flashing red lights arranged vertically. These two red lights, visible 2 miles all around the horizon, are the not under command lights. They are pulsed 50 to 60 times a minute by means of a crank on the light panel in the pilothouse.

In addition to the two red lights, the ship losing the person sounds, either by day or night, at least six short blasts on the ship's whistle and/or fires one white star.

SIGNALMAN AS MEMBER OF BOATCREW

One of the most important single billets you can fill in your naval career is that of boat Signalman. You will be on your own; you won't have any other Signalmen on whom to rely. The success of a particular mission depends on your ability to send and receive communications, both by visual means and by voice radio. Your ability to recognize and interpret signals will have a direct bearing on the success of that mission.

The normal boatcrew allowance does not include a Signalman; however, there will be one assigned whenever the boat is used for distress or emergency purposes.

In the event of a man overboard, downed aircraft, or other cases where personnel are to be rescued, a Signalman is assigned to the boat. In a small boat, the range of visibility is very limited because of the low height of eye. For this reason, other personnel are assigned to stations high in the ship to keep the person in sight. The ship can then direct the lifeboat to the vicinity of the person in the water by means of flaghoist, semaphore, flashing light, pyrotechnics, or voice radio. It is your job to receive these directions and pass them on to the boat officer and coxswain.

The emergencies that arise at sea which require a boat Signalman are many. So you will

not be found wanting in one of these emergencies, you must be familiar with all phases of visual communications and proper voice radio procedures.

The flaghoist direction signals and pyrotechnic signals, along with their meanings, will be covered later in this chapter.

No other phase of naval warfare depends as much on communication as does a joint amphibious assault. Although, as a Signalman you are not primarily concerned with the overall communication problem, your job as a Signalman in an assault boat is no less important than any other.

Landing craft churning toward the beach have to be in constant communication with their wave commanders. They use their voice radio and visual communications to request quick assistance—anything from air support to first aid; to supervise the returning of the wounded

to the hospital ships; and to call salvage units to clear the beach. Communications, your specialty, is the heartbeat of the amphibious operation.

DIRECTING THE BOAT BY VISUAL SIGNALS

Most boat signals are made by pyrotechnics (signal flares fired by the Mark V pyrotechnic pistol), multipurpose lights, semaphore, and flaghoist.

Pyrotechnic Pistol

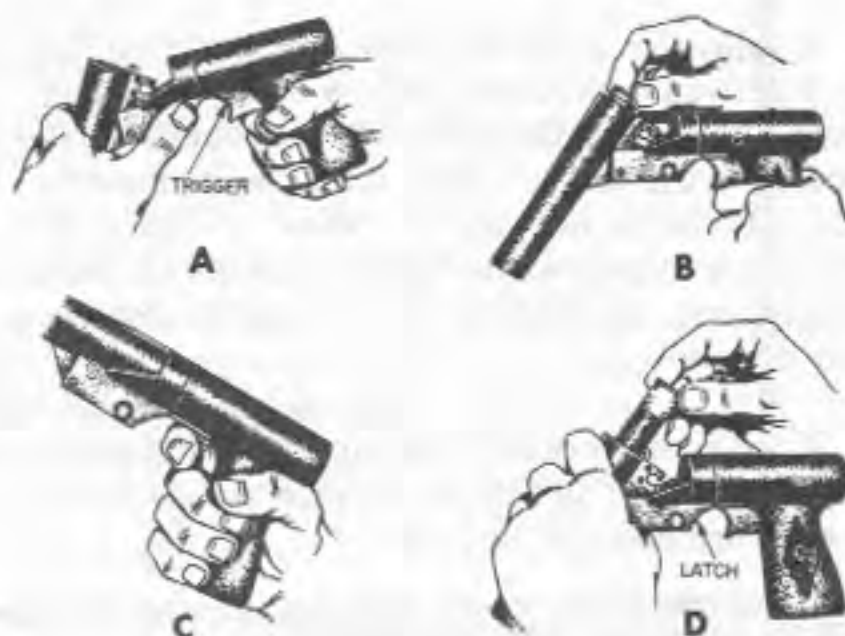
Signal flares are similar to standard shotgun cartridges in appearance. When fired from the projector or pistol into the air, the flare burns for 6 seconds at a minimum altitude of 200 feet (figure 7-4).

The pyrotechnic pistol (figure 7-5) is a single-barrel, breech-loading projector about 11 inches long. Metal parts are mounted on a plastic frame. A cartridge belt and holster are issued for use with the pistol.

To load the pistol, press in on the latch button below the barrel and depress the muzzle end of the barrel as in figure 7-5,A. Insert the cartridge (figure 7-5,B) and return the barrel to its



83.109
Figure 7-4.—Firing the pyrotechnic pistol. The star rises to a height of about 200 feet.



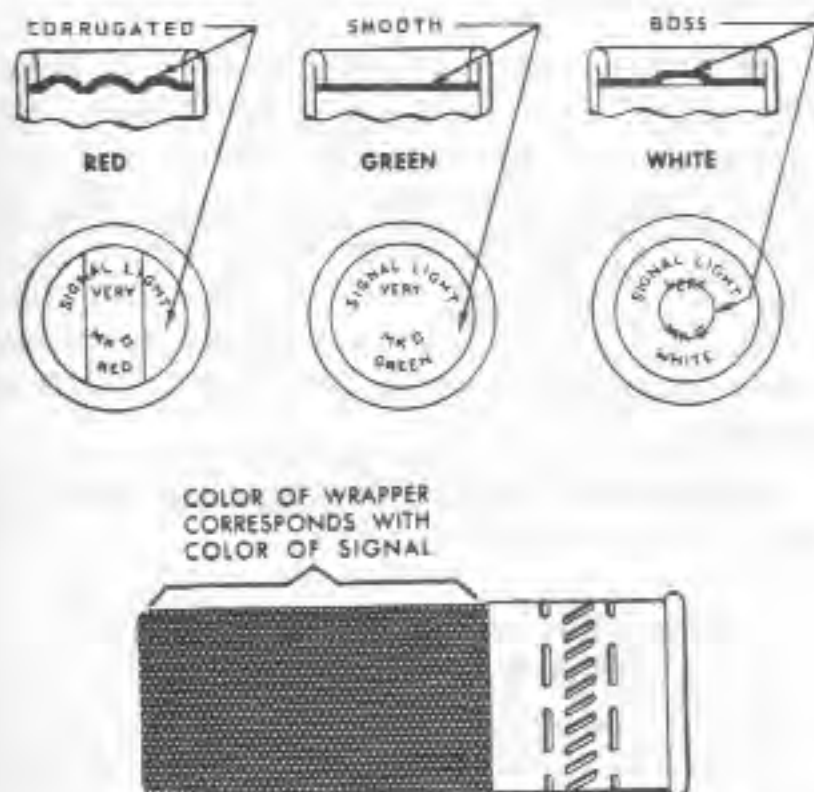
83.111
Figure 7-5.—Operation of the pyrotechnic pistol.

original position. Be sure the barrel is locked before firing.

To fire the pistol, point it upward at arm's length and at an angle of about 45° , as in figure 7-5,C, aiming it clear of other boats, ships, and personnel. Keep your elbow slightly bent to absorb the shock of recoil and avoid having the pistol knock itself out of your hand.

To extract the expended shell, break the pistol open again, and pull the shell out of the chamber (figure 7-5,D).

Cartridges come in three colors: red, green, and white. Each color has a different meaning and each is identified by the corresponding color of the paper on the cartridge (figure 7-6). For nighttime identification, the red cartridge has a corrugated closing wad, the green a smooth closing wad, and the white shell has a small conical tip, or boss, on its closing wad. It is also beneficial to load the cartridge belt with red grouped to port, green to starboard and white astern. This provides a general area from which to remove a cartridge of the desired color. This does not preclude checking the closing wad but does reduce the margin for error.



83.110

Figure 7-6.—Pyrotechnic pistol cartridges have both day and night identification characteristics.

The following pistol signals (for intra-U.S. Navy use) are used by the boat Signaller during man-overboard recovery operations.

Signal	Meaning
One white star	Have recovered man
One red star	Need assistance
One green star	Cannot find man

The following signals are given at night to direct a lifeboat engaged in picking up a man overboard.

One white star	Steer straight away from the ship
One red star	Steer left (or to port)
One green star	Steer right (or to starboard)
Two green stars	Steer straight toward the ship
Two red stars	Return to ship
Two white stars	Steady on present course

The pyrotechnic pistol must be kept in a serviceable condition at all times. Clean it thoroughly after each use, wiping all parts with a cloth dampened with light machine oil.

The pistol and cartridges are kept in a specially designed stowage box that is retained on the bridge while at sea. All signal personnel must know the exact location of the stowage box and must know how to load and fire the pistol properly.

Pyrotechnic ammunition is a fire hazard. It forms a hot fire that is difficult to extinguish. Most types furnish their own oxygen upon combustion. Pyrotechnic ammunition must be protected against the direct rays of the sun, high temperatures, absorption of moisture, corrosion, and rough handling.

Pyrotechnic ammunition which has deteriorated or is damp or damaged should be reported at once to the signal officer who will make the necessary report to the weapons officer.

CAUTION: Never fire a pyrotechnic cartridge in a shotgun, nor a shotgun cartridge in a pyrotechnic pistol!

When a cartridge-type pyrotechnic misfires, make at least two more attempts to fire it. If the pistol or projector still fails to fire, wait a MINIMUM of 30 seconds before you unload it. Because of the possibility of a hangfire, ALWAYS observe that rule.

Multipurpose Lamp

When using the portable multipurpose light (discussed in chapter 2) in a small boat, bear in mind that (1) it requires extra effort to keep the light accurately trained because of the boat's possible extreme pitch and roll, and consequently (2) your rate of sending must be slower than normal.

Semaphore

When signaling by semaphore, use normal procedure but, again, transmit at a reduced rate of speed. Since you may have a poor background for sending, Signalmen on the ship may have difficulty reading your message.

Flaghoist

Five signals with predetermined meanings, called direction signals, are used to direct a lifeboat by flaghoist.

<u>Hoist</u>	<u>Meaning</u>
THREE	Steer straight away from the ship
THREE PORT	Steer left; when hauled down, cease turn and steady on present course
THREE STBD	Steer right; when hauled down, cease turn and steady on present course
EIGHT	Steer straight toward ship
QUEBEC	Return to ship

SIGNAL BRIDGE IN PORT

Signal watches in port are as important as those at sea. Because fewer personnel are available for each watch, a signal watch in port can be more difficult than at sea.

Occasionally, a destroyer or smaller ship may get a tender to take its visual guard. Another possibility is that the squadron flagship may assign a rotating guard among ships in a nest. More frequently—especially aboard larger ships—each ship maintains its own visual watch in port. Signal watches in port are normally stood between the hours of sunrise and sunset unless SOPA requires that a 24-hour visual watch be maintained.

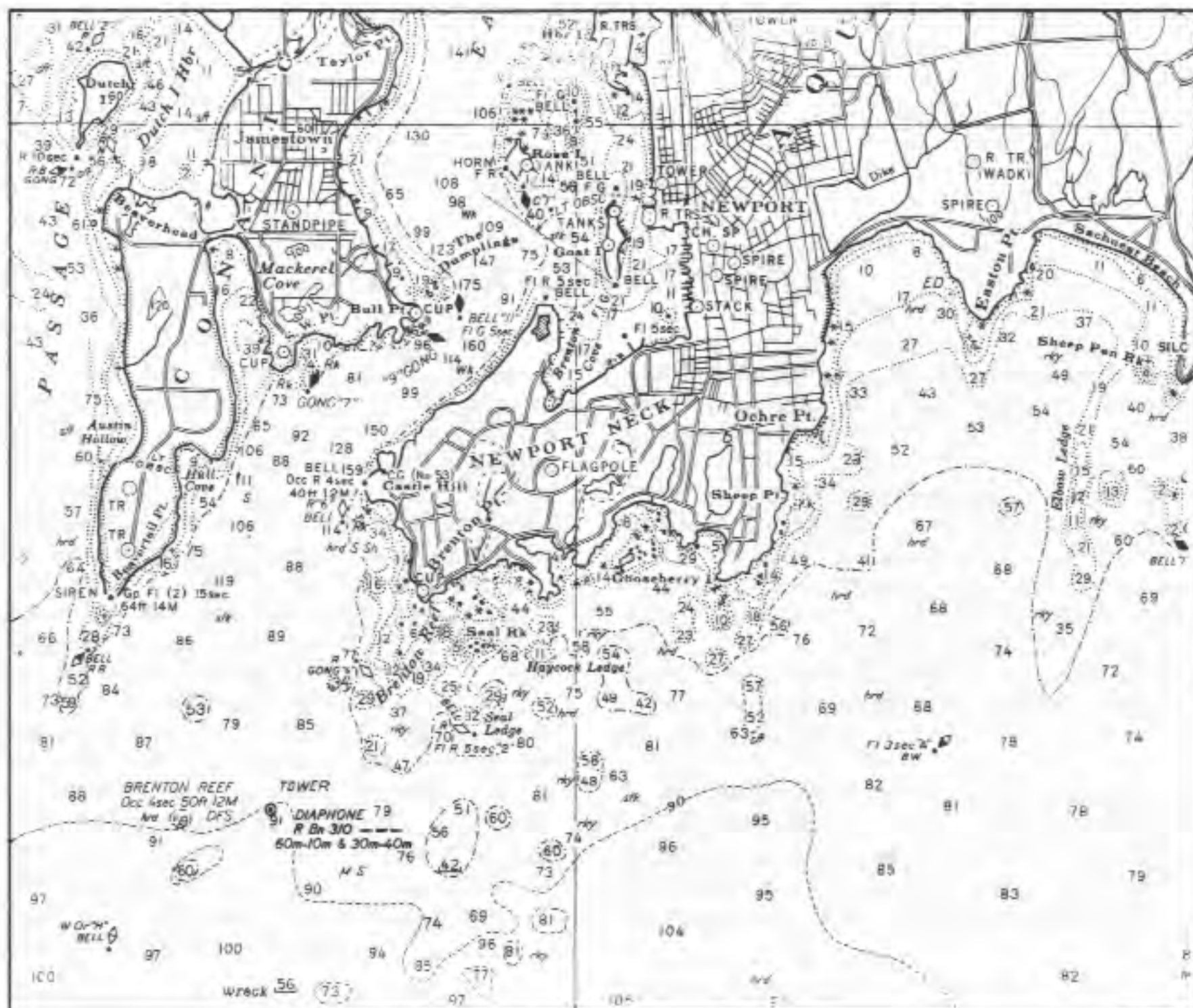
In port, Signalmen on watch are required to report to the OOD all ships departing and arriving in port, the movement of own ship's small boats in the harbor, and the approach of other ships' boats. Signalmen provide the OOD with advance warning of possible honors required and furnish the OOD data needed to keep the commanding officer informed of ships' movements. It is important to refer to the appropriate fleet commander's quarterly promulgated administrative organization manual for that purpose.

Although seldom required to hoist or lower the ensign and union jack at colors, the Signalman on watch hoists PREP and frequently signals morning and evening colors by whistle. The Signalman on watch also assures that the appropriate absentee indicator flies when the senior officers are ashore and hauls down the pennants when the officers return to the ship.

Semaphore and flashing light are used in port for administrative traffic.

STORM WARNING SIGNALS

The combinations of storm warning flags and pennants in figure 7-7 are hoisted at weather bureau facilities and other shore stations in the United States and possessions. The ability of a Signalman on watch to recognize and know the meanings of these storm warning signals will



C69.117

Figure 7-7.—Small craft, gale, storm, and hurricane warnings.

prove invaluable to bridge personnel both in leaving and in entering port.

NOTE: Figure 7-7 indicates wind speed associated with STORM warnings is 48-UP, meaning that winds 48 knots and above, no

matter how high the speed, are forecast for the area. If the winds are associated with a tropical cyclone, the STORM warning displayed indicates that winds within the range 48-63 knots are forecast. When the winds of a tropical cyclone reach 64 knots, the storm is designated a hurricane.

CHAPTER 8

NAVIGATIONAL DUTIES

Navigation is the art or science of determining the position of a ship or aircraft and directing that ship or aircraft from one position to another. It can be regarded as an art because its application involves the exercise of special skills and fine techniques which can be perfected only by experience and careful practice. On the other hand, navigation can be regarded as a science inasmuch as it is knowledge dealing with a body of facts and truths systematically arranged and showing the operation of general laws. Navigation has been practiced for thousands of years; however, modern methods date from the 18th century invention of the chronometer, a precision timepiece. As a Signalman, you may be required to assist the navigator by taking bearings, using the bearing circle or alidade. You may assist the officer of the deck by sounding whistle signals and by being alert to aids to navigation.

To better prepare you for your navigational duties, this chapter contains information on navigational equipment, aids to navigation, and Rules of the Road.

NAVIGATIONAL EQUIPMENT

The equipments described in this section are those most likely to be used by you in performing navigational duties.

COMPASSES

There are two types of compasses in general shipboard use: The magnetic compass, which depends on the Earth's magnetic field for its

directive force; and the gyrocompass, which operates on the gyroscopic principle of the spinning wheel.

When you studied *Seaman*, you learned that the magnetic compass points to the magnetic rather than the true North Pole, and that the magnetic pole is located some distance away from the true pole. You also discovered how the Navy standard compass is made, and how its needle is deflected by magnetic materials either in a ship itself or by magnetic materials brought near the compass.

The gyrocompass, on the other hand, points to true north by operation of the gyroscopic principle. It may, however, have a slight mechanical error of a degree or two, which is known and for which due allowance is made.

Magnetic Compass

The ship's magnetic compasses are named or classed according to their use.

The standard compass is the magnetic compass used by the navigator as a standard for checking other compasses on the ship. It is so located that it is least affected by internal magnetism of the ship. Courses or bearings given from it are designated per standard compass (psc).

The steering compass is located near the helmsman. Along with the gyro repeater, it is the compass by which the ship is steered. Courses or bearings given from it are designated per steering compass (pstgc).

Gyrocompass

The gyrocompass is not affected by variation and deviation. Headings or bearings from it are designated per gyrocompass (pgc).

When in proper running order, the gyrocompass points constantly to true instead of magnetic north. It may have a slight mechanical error, called gyro error, which is computed easily and remains constant for any headings.

Despite the excellence of the gyro mechanism, it is the magnetic compass—not the gyro—that is standard aboard ship. The reason is the magnetic compass operates through the attraction exerted by the Earth. Consequently, the magnetic compass will never go out of commission because of any power failure.

The gyrocompass, on the other hand, is powered by electricity. If the supply is cut off, the gyro is useless. Being an extremely complicated and delicate instrument, it is also subject to mechanical failure. Some gyros, for instance, become erratic after the ship makes a series of sharp turns at high speeds. The possibility of a gyro malfunction does not mean, however, that great confidence cannot be placed in the gyro. When running properly, it can be depended upon to point faithfully and steadily to true north. But the magnetic compass, being more reliable, is used constantly to check the gyro's performance.

Typical shipboard installations of gyrocompasses consist of one or more master gyros whose indications are transmitted electrically to repeaters located in conning stations, on bridge wings, and at other necessary points.

BEARING AND AZIMUTH CIRCLES

Strictly speaking, azimuth and bearing are the same in meaning—the horizontal angle which a line drawn from your position to the object sighted makes with a line drawn from your position to true north. The word "azimuth," however, applies only to bearings of heavenly bodies. For example, it is not the bearing, but the azimuth of the Sun; not the

azimuth, but the bearing of Brenton Reef Tower.

A bearing circle is a nonmagnetic metal ring, equipped with sighting devices, which is fitted over a gyro repeater or magnetic compass. The bearing circle is used to take bearings of objects on the Earth's surface.

The azimuth circle (figure 8-1) is a bearing circle equipped with additional attachments for measuring azimuths of celestial bodies. Either bearings or azimuths may be taken with the azimuth circle.

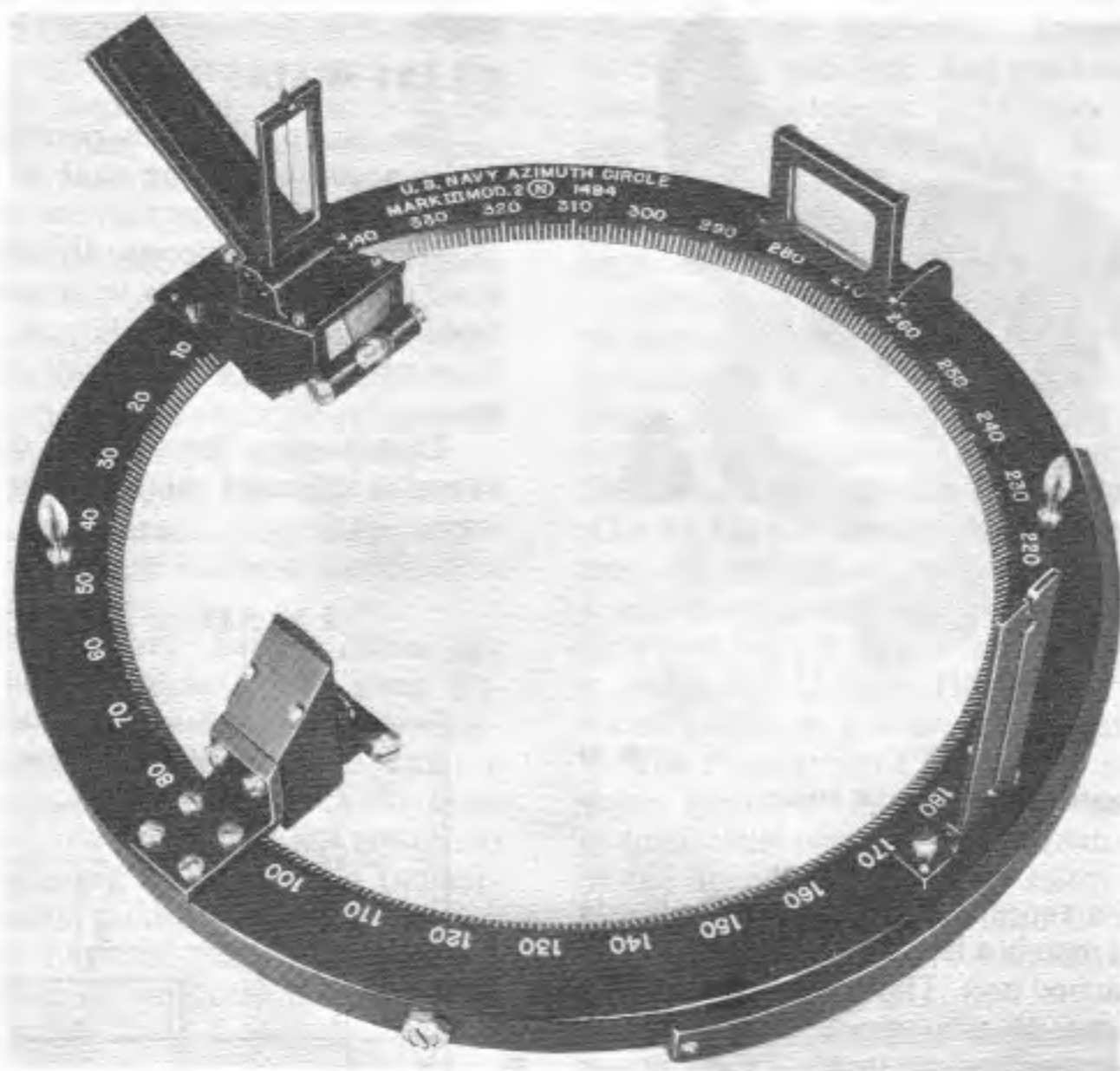
Taking a Bearing

Assume that you are getting a bearing on a lighthouse. Install either a bearing or azimuth circle on the gyro repeater, and make sure that the circle rotates freely. Train the vanes on the lighthouse so that the lighthouse appears behind the vertical wire in the far vane. Drop your gaze to the prism at the base of the far vane, then read the bearing indicated by a hairline in the prism.

Taking an Azimuth

The azimuth circle may be used in two ways to measure azimuth of a celestial body. The first method is used with a brilliant body such as the Sun. At the upper center in figure 8-2 you see a concave mirror; at the lower center a prism attachment. Sight with the mirror nearest you, with the prism toward the observed body. Light from that body is reflected from the concave mirror into the prism. The prism, in turn, throws a thin beam on the compass card. This beam strikes the graduation that indicates the azimuth.

The second method is used for azimuths of bodies whose brightness is insufficient to throw such a distinct beam. Behind the far vane on the azimuth circle is a dark glass that may be pivoted so as to pick up celestial bodies at various altitudes. When a body is sighted, its reflection appears behind the vertical wire in the far vane, and its azimuth may be read under the hairline in the prism.



65.122

Figure 8-1.—The azimuth circle is a bearing circle equipped with attachments for measuring azimuths of celestial bodies.



101.20

Figure 8-2.—Taking an azimuth.

The inner lip of the azimuth circle in figure 8-2 is graduated counterclockwise in degrees. It is possible, then, to obtain relative bearings of objects by merely training the vanes on an object, then reading the graduation on the inner circle alongside the lubber's line on the pelorus or repeater.

Each of the far vanes contains a spirit level to indicate when the circle is level. Bearings taken when the azimuth or bearing circle is not on an even keel are inaccurate.

TELESCOPIC ALIDADES

Another means of taking bearings is by using an alidade which, like the bearing circle, is



Figure 8-3.—Telescopic alidade.

mounted on a repeater. The telescopic alidade (figure 8-3) is merely a bearing circle with a small telescope attached to it. The image is magnified, making distant objects appear larger to the observer. A series of prisms inside the low-power telescope enables the bearing taker to read the bearing directly from the compass card without removing the eye from the eyepiece.

Bearings and azimuths may be true, per gyrocompass (pgc), magnetic, or per steering compass (pstgc). When you are helping the navigator in piloting, you probably will report bearings directly from the gyro repeater and the navigator will correct them to true.

CHARTS AND PUBLICATIONS

A map represents pictorially all or part of the Earth's surface. When specially designed for navigators, maps are called charts. Navigational charts invariably portray a body of water together with the topography of adjacent land.

Because the Earth's surface is curved, its image is projected onto the flat surface of the chart by one of several methods. The Mercator projection is the one most used for navigational charts because meridians and parallels

appear as straight lines and intersect at right angles.

CHART SCALES

The size of the area portrayed by a chart varies according to the scale of the chart. The larger the scale, the smaller the area represented. (See figure 8-4.) It necessarily follows that large-scale charts show areas in greater detail. Many features that appear on a large-scale chart do not show up at all on a small-scale chart of the same area.

Customarily, the scale to which a chart is drawn is indicated below its title in one of three ways:

$$1 \text{ to } 5000 \text{ or } 1:5000 \text{ or } \frac{1}{5000}$$

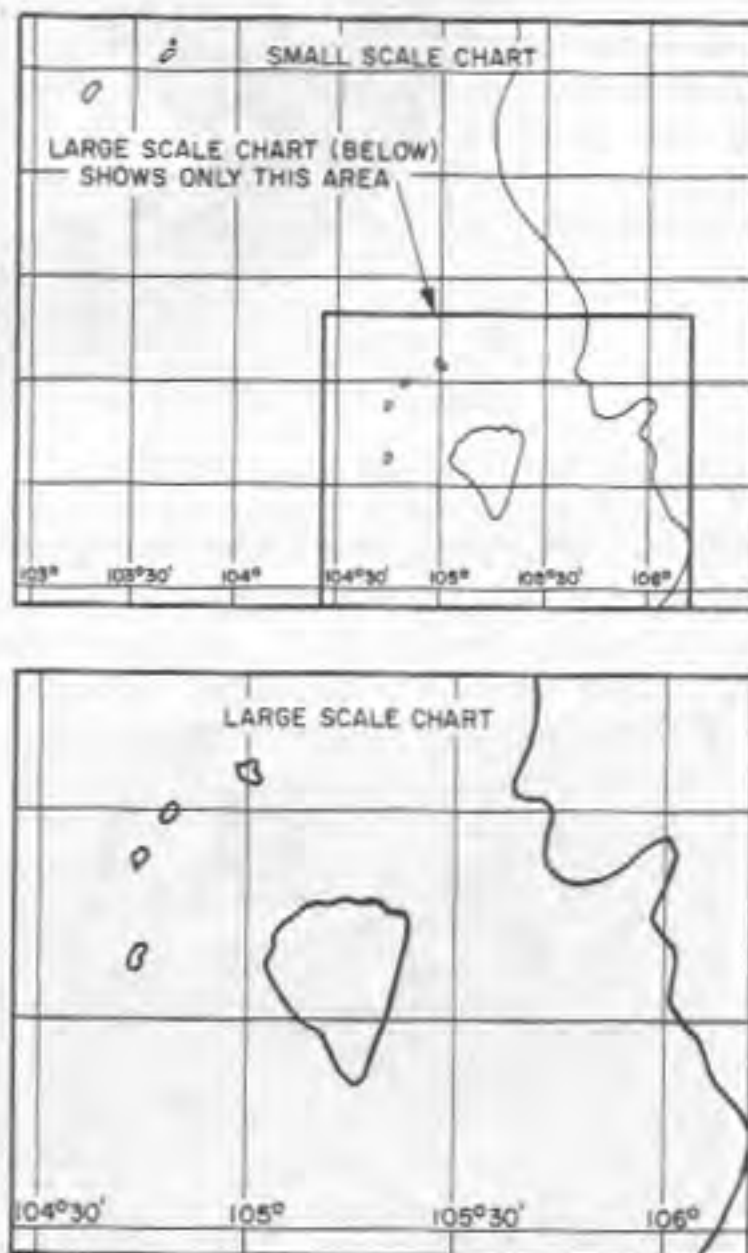


Figure 8-4.—Comparison of small- and large-scale charts.

These figures mean that an actual feature is 5000 times larger than represented on the chart. In other words, an inch, foot, or yard on the chart means 5000 inches, feet, or yards on the Earth's surface. Thus, the larger the figure indicating the proportion of the scale, the smaller the scale of the chart. For instance, a chart on a scale of 1:5000 is, on scale, 10 times larger than one whose scale is 1:50,000.

Be careful when working with small-scale charts. A small error, which may be only a matter of yards on a large-scale chart, could amount to miles on a chart showing a larger area.

When approaching land, use only charts of the largest scale. In general, it is a good policy to use the largest scale chart available for the area in which you are sailing.

Types of charts vary. Sailing charts are small-scale (1 inch equaling a very great distance), showing the approaches to a coast. General charts of a coast are larger in scale, and are used in coastwise navigation. Coast charts, even larger in scale, are used when navigating close to shore or in the channels leading to bays and harbors. Harbor charts, on the largest scale, are for navigating inside harbors. All charts contain a wealth of information, which the navigator uses to determine position.

CHART SOUNDING MARKS

Scattered over the water area of each navigational chart are many tiny figures, as in figure 8-5. Each figure represents the depth of water in that locality. Depths on charts are shown in feet, fathoms, or meters. A notation under the title of the chart provides the key to its depth; for example, "Soundings in feet at mean low water," or "Soundings in fathoms at . . ." Most charts also contain broken lines called fathom curves, marking the limits of areas of certain depths. A 10-fathom (60 feet) curve and a 15-fathom (90 feet) curve can be seen in figure 8-5.

AIDS TO NAVIGATION

In piloting, a ship's position is determined by bearings or ranges of objects whose exact location is shown on the area chart. Such objects are aids to navigation, and may be natural or artificial. Examples of natural objects are

prominent hills, rocks, and mountains. Artificial objects include lighthouses, lightships, buoys, daybeacons, buildings, and smokestacks. Technically, marks placed on hidden dangers and obstructions are also aids to navigation, although they seldom are used to fix position. Every country that has a coastline and waterways maintains a system of aids to navigation.

Aids to navigation are indicated on a chart by appropriate symbols. In figure 8-5, note the light on Castle Hill on the west point of Newport Neck. Printed near the light symbol is the following information: Occ R 4 sec 40 ft 12 M. This means the light is a red occulting light (Occ R), the periods of light being always greater than the periods of darkness, the light taking 4 seconds to go through its complete cycle. The light is 40 feet (40 ft) above mean high water and is visible for 12 miles (12 M). By "visible" is meant visible on a clear, dark night.

The chart symbol for a buoy is a diamond shape. Notice in the illustration that a small dot or small circle marking the approximate position of the anchor is near every buoy symbol. Because the diamond shape itself is not drawn to scale, it may be shown considerably off the buoy's actual position.

As much information as possible is printed in standard abbreviations near the symbols. The standard abbreviations and symbols used on nautical charts are contained in Chart No. 1.

LIGHTS

A ship cannot suspend piloting operations when darkness falls and daytime navigational aids no longer can be seen. For this reason, aids to navigation are lighted whenever necessary and practicable. For purposes of identification, lights have individual characteristics of color, brilliancy, and system of operation. Some of a light's characteristics may be printed near its symbol on the chart. Detailed information is shown in light lists. The height of the light, its brilliancy, and the height of the observer determine the light's range. Symbols used to describe lights in light lists are uniform throughout the world.

The Defense Mapping Agency Hydrographic Center (DMAHC) publishes seven volumes of a *List of Lights*, which describe every light in the

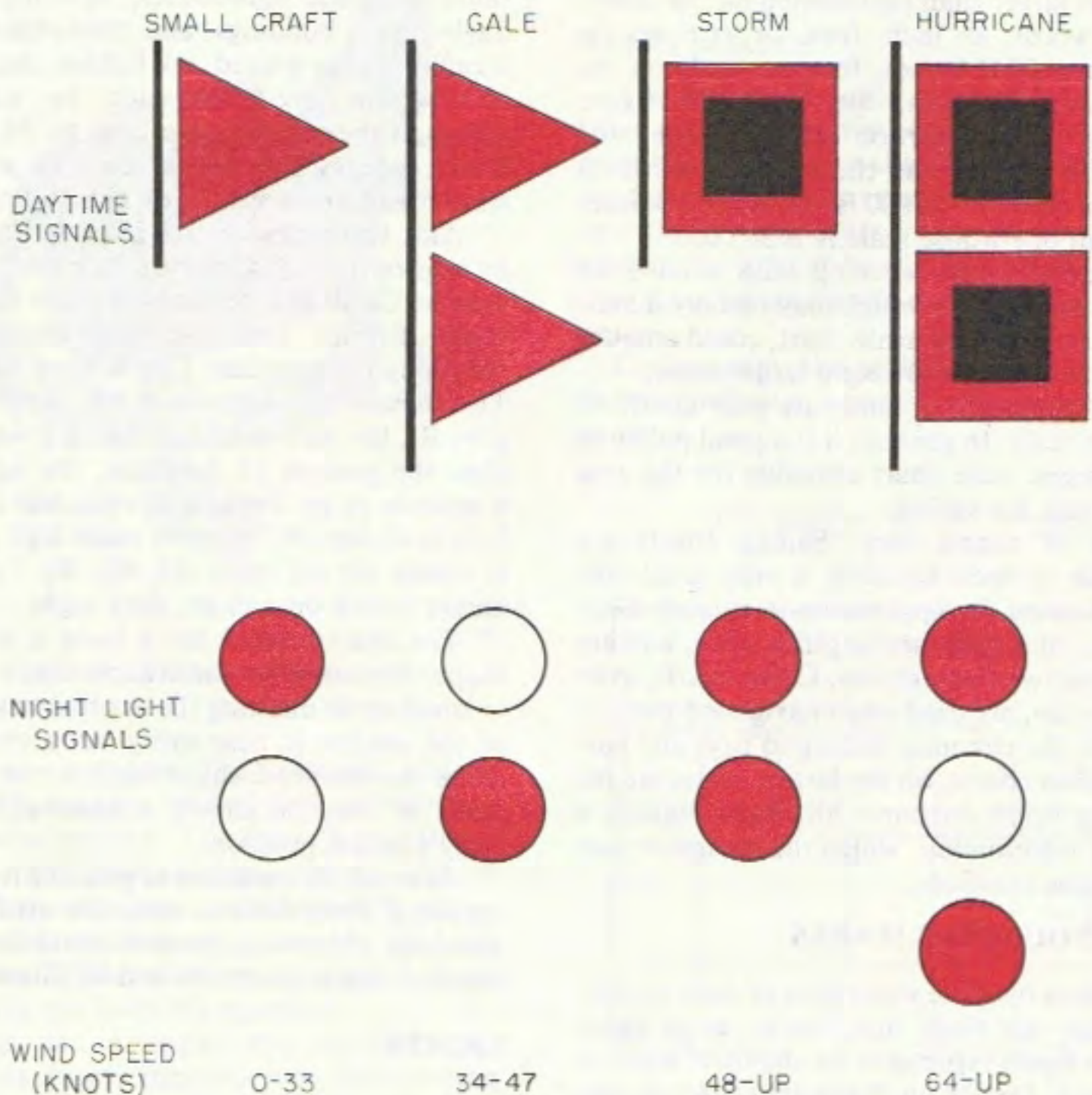


Figure 8-5.—Part of a navigational chart showing individual depths and fathom curves.

world not located in the United States or its possessions. Each volume contains a definite geographical division. Descriptive symbols in these lists are the same as those used on all charts published by the DMAHC.

Lights located in the United States and its possessions are described in light lists published by the U.S. Coast Guard.

Light Colors

White, red, and green are the three standard colors for lights on aids to navigation. The

significance of the different colors is important chiefly with regard to channel buoys, discussed later.

Light Characteristics

Some navigational lights are fixed, meaning they burn steadily. Important lights, however, go through repeated periods of systematic changes of light and darkness. Those characteristics of a navigational light are the most valuable for identification purposes. Figure 8-6 describes light characteristics.

Illustrations	Symbols and meaning		Phase description
	Lights which do not change color	Lights which show color variations	
	F. —Fixed-----	Alt. —Alternating.	A continuous steady light.
	F.Fl. —Fixed and flashing.	Alt.F.Fl. —Alternating fixed and flashing.	A fixed light varied at regular intervals by a single flash of greater brilliance.
	F.Gp.Fl. —Fixed and group flashing.	Alt.F.Gp.Fl. —Alternating fixed and group flashing.	A fixed light varied at regular intervals by groups of 2 or more flashes of greater brilliance. The group may, or may not, be preceded and followed by an eclipse.
	Fl. —Flashing----	Alt.Fl. —Alternating flashing.	Showing a single flash at regular intervals, the duration of light always being less than the duration of darkness.
	Gp.Fl. —Group flashing.	Alt.Gp.Fl. —Alternating group flashing.	Showing at regular intervals groups of 2 or more flashes.
	Gp.Fl.(3+2) —Composite group flashing.	-----	Group flashing in which the flashes are combined in alternate groups of different numbers.
	Mo. (K) —Morse Code.	-----	Light in which flashes of different durations are grouped to produce a Morse character or characters.
	Qk.Fl. —Quick flashing.	-----	Shows not less than 60 flashes per minute.
	Int.(I.)Qk.Fl. —Interrupted quick flashing.	-----	Shows quick flashes for about 4 seconds, followed by a dark period of about 4 seconds.
	Iso.(E.Int.) —Isophase.	-----	Duration of light equal to that of darkness.
	Occ. —Occulting.	Alt.Occ. —Alternating occulting.	A light totally eclipsed at regular intervals, the duration of light always greater than the duration of darkness.
	Gp.Occ. —Group occulting.	Alt.Gp.Occ. —Alternating group occulting.	A light with a group of 2 or more eclipses at regular intervals.
	Gp.Occ.(3+4) —Composite group occulting.	-----	Group occulting in which the occultations are combined in alternate groups of different numbers.

LIGHT COLORS USED AND ABBREVIATIONS: W=WHITE, R=RED, G=GREEN.

Figure 8-6.—Typical light characteristics.

LIGHTHOUSES AND LIGHT STRUCTURES

Lighthouses are numerous on all the coasts of the United States, on the Great Lakes, and along many interior waterways. They are placed wherever a powerful light may be of assistance to navigators, or wherever a danger requires a warning beacon of long-range visibility. Visibility increases with height; thus, the principal purpose of a light structure is to increase the height of a light above sea level.

A lighthouse may also contain fog signaling and radiobeacon equipment. In lights still staffed by keepers, the lighthouse may also contain their quarters, or the operating personnel may be housed in separate buildings grouped around the tower. Such a group of buildings is called a light station. Many lights formerly operated by keepers are now automatic.

You probably have noticed that usually you can see the "loom" of a powerful navigational light for some time before the light itself is actually visible. That is because most lights of that kind are so powerful that their luminous range, which increases their brilliance, is greater than their geographic range, which depends on their height. Only the curve of the Earth prevents such a light from being visible at considerably more than its geographic range.

Secondary, minor, and automatic lights are located in structures of varying types. Those structures range from towers that resemble those of important seacoast lighthouses to such objects as a small cluster of piles supporting a battery box and lens.

Solid colors, bands, stripes, and the like are applied to lighthouses and light structures in various patterns to make them easier to identify. Minor structures sometimes are painted red or black, like channel buoys, to indicate the side of the channel on which they are located—red structures to the right, black to the left, coming from seaward.

Danger Sectors

Sectors of red glass are placed in the lanterns of certain lighthouses to indicate danger bearings within which a ship will be in danger of running on rocks, shoals, or some other hazard.

The arcs over which the red light shows are the danger sectors whose bearings appear on the chart. Although the light is red within the danger bearings, its other characteristics remain the same.

Sectors may be only a few degrees wide, marking an isolated obstruction, or they may be so wide as to extend from the direction of deep water to the beach. A narrow green sector may indicate a turning point or the best water across a shoal. The exact significance of each sector must be obtained from the chart.

BUOYS

Navigational buoys are moored floating markers, so placed as to guide ships in and out of channels, warn them away from hidden dangers, and lead them to anchorage areas. Buoys are of various types, but their distinctive coloring is the chief indication of their purpose.

Types of Buoys

Although a buoy's type alone has no special navigational significance, it may help toward its identification from the description given on the chart. A description of the principal types of buoys follows. Figure 8-7 illustrates the buoys.

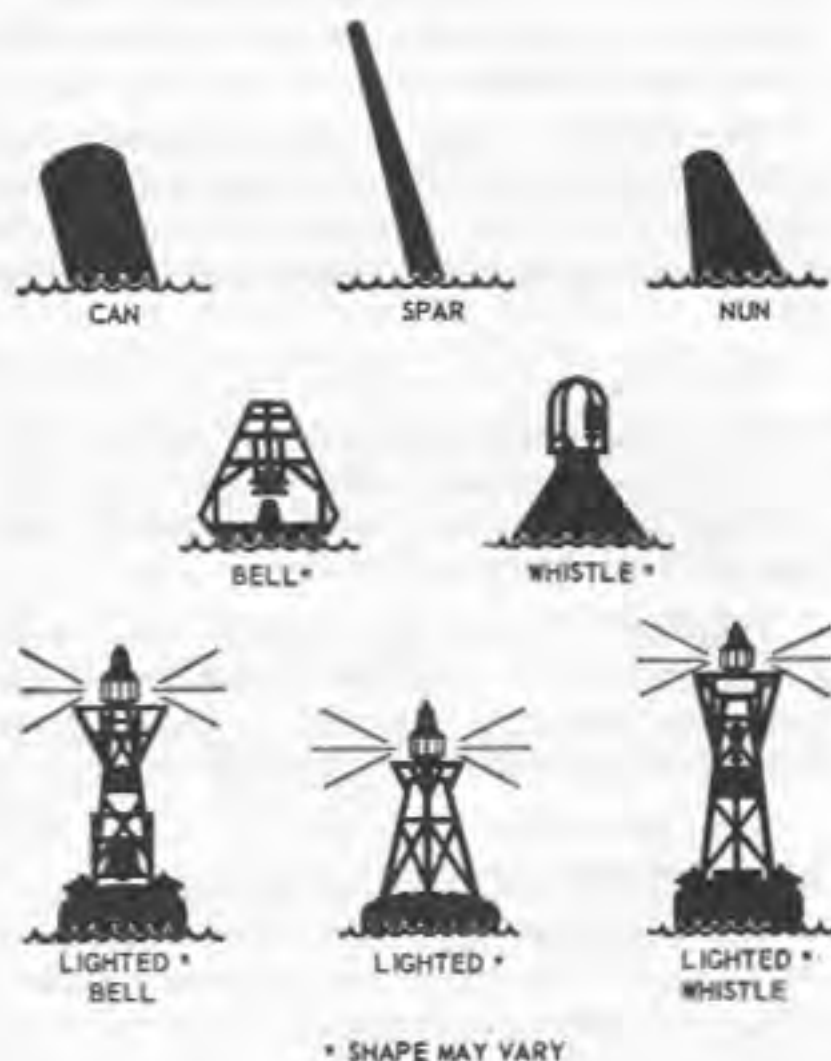
1. Spar: Large logs trimmed, shaped, and appropriately painted. They may also be of metal, constructed in the familiar spar shape.

2. Can and nun: Cylindrical and conical, respectively.

3. Bell: Steel float topped by a short skeleton tower in which the bell is placed. Most bell buoys are sounded by the motion of the sea, but a few are operated automatically by gas or electricity.

4. Whistle: Ordinarily cone-shaped, the whistle usually is sounded by the motion of the sea, although some are equipped with a horn sounded at regular intervals by mechanical means.

5. Gong: Similar to a bell buoy, except that it carries four gongs, each sounding a different note.



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Figure 8-7.—Types of buoys used in the U.S. buoyage system.

6. **Lighted:** Steel float topped by a skeleton tower with the lantern at the top. It carries batteries or gas tanks in the body of the buoy below water level.

7. **Combination:** A buoy in which a light and sound signal are combined, such as a lighted bell or lighted gong.

Buoy Coloring

Red buoys mark the right-hand side, and black buoys the left-hand side of a channel, coming from seaward. The expression "red-right-returning" is a memory aid in remembering red and black channel buoy orientation.

Black and red horizontally banded buoys are used to mark obstructions and channel junctions. They may be passed on either side, but sometimes the channel on one side is preferable.

If the top band on the buoy is red, the preferred channel is to the left of the buoy, coming from seaward. If the top band is black, the preferred channel is to the right.

Black and white vertically striped buoys mark the middle of a channel or fairway.

Yellow buoys mark quarantine anchorages.

The foregoing are practically all the colors on buoys that have a direct connection with navigation. Buoys painted all white have no special significance. Their purpose is not connected with navigation, such as to mark ordinary anchorage areas. Buoys with black and white horizontal bands are used around Norfolk, Virginia, to mark fish-trap areas. A white buoy with a green top usually means a dredging area.

Buoy Numbering

Red buoys marking the right side of a channel bear even numbers, starting with the first buoy from seaward. Ordinarily, this is the only maritime situation where anything to starboard has an even number. Black channel buoys marking the left of the channel, coming from seaward, bear odd numbers.

Buoy Lights

Red lights are used only on red buoys or on red and black horizontally banded buoys with the topmost band red. Green lights are only for black buoys or black and red horizontally banded buoys with the topmost band black. White lights are permissible on any color of buoy, because no special significance is attached to the white light. The color or number of the buoy or its light characteristic signifies its purpose. For example, lights on black and white vertically striped buoys that mark the middle of a channel or fairway always show a white short-long flash. That combination recurs at the rate of about eight times a minute.

Fallibility of Buoys

Buoys frequently drag their moorings in heavy weather, or they may be set adrift when run down by passing vessels. Lighted buoys may

have their lights go out. Whistles, bells, and gongs—many of which are sounded by the motion of the sea—may fail to function in smooth water. Consequently, although buoys are valuable aids to navigation, they cannot be depended upon exclusively. They are never to be used for taking a fix.

DAYBEACONS

Unlighted aids to navigation (except unlighted buoys) are called daybeacons. A daybeacon may consist of a single pile with a daymark on top of it, a spar supporting a cask, a slate or masonry tower, or any other of a variety of structures.

Like lighthouses and light structures, daybeacons usually are colored so as to distinguish them from their surroundings and make them easy to identify. Those marking channels are colored and numbered in the same manner as channel buoys. Many are fitted with reflectors that show the same colors a lighted buoy would show at night in the same location.

RANGES

Two daybeacons, located some distance apart on a specific true bearing, constitute a daybeacon range. Two lights similarly located comprise a lighted range. When a ship reaches a position where the two lights or beacons are seen exactly in line, it is on the range. Ranges are especially valuable for guiding ships along the approaches to or through narrow channels.

Lights on ranges may show any of the three standard colors, and they may be fixed, flashing, or occulting. Frequently, the nearer light is fixed; the more distant one is flashing or occulting. Range lights appear to lose brilliance rapidly as a ship veers from the range line of bearing.

FOG SIGNALS

Most lighthouses, light towers, and large navigational buoys are equipped with fog signaling apparatus, generally sounded automatically by mechanical means. For purposes of identification, each station has its own assigned number of blasts, recurring at specified intervals. A

definite time is required for each station to sound its entire series of blasts, providing additional identification.

The different types of apparatus used produce corresponding variances of pitch and tone, thus giving your ear a chance to compare the sound of a station with its description in the light list.

Diaphones create sound by means of slotted reciprocating pistons actuated by compressed air. The resulting sound consists of two tones of different pitch, the first part of the blast being high-pitched, the remainder low.

Diaphragm horns are sounded by a disk diaphragm which is vibrated by compressed air, steam, or electricity. Duplex or triplex horn units of differing pitch give a chime signal.

Reed horns emit sound through a steel reed that is vibrated by compressed air.

Sirens produce sound by either a disk or a cup-shaped rotor. They are actuated by compressed air, steam, or electricity.

Whistles make sound by compressed air or steam, admitted through a slot into a cylindrical chamber.

Bells are sounded by gas or electricity, or possibly by a hand-hammer.

AIDS IN INTRACOASTAL WATERWAY

The Intracoastal Waterway, called the inland waterway, is a channel in which a light-draft vessel can navigate coastwise from the Chesapeake Bay almost to the Mexican border, remaining inside natural or artificial breakwaters for almost the entire length of the trip. Following paragraphs describe special markings for the Intracoastal Waterway proper and for those portions of connecting or intersecting waterways that must be crossed or followed in navigating it.

Every buoy, daybeacon, or light structure along the Intracoastal Waterway has part of its surface painted yellow, the distinctive coloring adopted for this waterway. Lighted buoys have a band or border of yellow somewhere.

Red buoys and daybeacons are to the right, black to the left, as you proceed from the Chesapeake Bay toward Mexico. As in other channels, red buoys have even numbers; black buoys, odd numbers. Because the numbers would increase excessively in such a long line of buoys, they are numbered in groups that usually contain no more than 200 buoys. At certain natural dividing points, numbering begins again at 1.

Lights on buoys in the Intracoastal Waterway follow the standard system of red or white lights on red buoys, and green or white lights on black buoys. Lights on lighted aids besides buoys also agree with the standard rules for lights on aids to navigation.

LATERAL AND CARDINAL BUOYAGE SYSTEMS

Most maritime countries use either the lateral or the cardinal system of buoyage; some regions use both. In the lateral system (figure 8-8), used on all navigable waters of the United States, the coloring, shape, and lighting of buoys indicate the direction to a danger relative to the course that should be followed. In the cardinal buoyage system (figure 8-9), the coloring, shape, and lighting of buoys show the cardinal direction to a danger relative to the buoy itself. The color, shape, lights, and number of buoys in the lateral system, as used by the United States, are determined relative to a direction from seaward. Some countries using the lateral system color their buoys and lights the direct opposite of the United States color scheme. Before going into foreign waters, consult *Sailing Directions* for an exact description of the aids to navigation in the particular locality.

In offshore channels the lateral buoyage system prescribes the following markings and colorings for United States waters: Proceeding in a southerly direction along the Atlantic coast, in a northerly and westerly direction along the Gulf coast, and in a northerly direction along the Pacific coast is considered to be proceeding from seaward. Accordingly, coastal buoys on the right, when proceeding in those directions, are red buoys with even numbers. On the Great Lakes, offshore buoys are colored and numbered from the outlet of each lake toward its

upper end. The Intracoastal Waterway is marked from the North Atlantic States to the lower coast of Texas, regardless of the compass bearings of individual sections.

RULES OF THE ROAD

You are acquainted with basic Rules of the Road from studying the *Seaman* text. That text contains just enough information to enable a small boat coxswain to navigate a craft safely. But a Signalman needs a somewhat broader knowledge of the rules.

International Rules of the Road, first adopted by all maritime nations in 1889, govern all ships navigating the high seas. The original rules have been periodically modified or added to as a result of an international convention that was developed under the auspices of the United Nations' Inter-Governmental Maritime Consultative Organization (IMCO) in 1972.

The Inland Navigational Rules Act of 1980 was signed into law on 24 December 1980. This new law superseded the old Inland Rules, the Western Rivers Rules, the Great Lakes Rules, their respective pilot rules, and parts of the Motorboat Act of 1940. The new rules went into effect on all United States inland waters except the Great Lakes on 24 December 1981. The effective date for the Great Lakes will be set in coordination with the Canadian Coast Guard.

Some foreign governments have local rules that may be found in *Sailing Directions*. Generally, however, local rules for foreign waters must be obtained from local authorities. In foreign jurisdictions that have no local rules, International Rules ordinarily are observed.

RULES FOR LIGHTS

Rules for lights must be complied with in all weather, from sunset to sunrise, as specified by both International and Inland Rules of the Road.

Navigational lights of another vessel convey information such as a clue to the type and size of vessel, its heading in relation to your vessel, type of operation in which it may be engaged, and other data which is helpful in determining right of way and preventing a collision.

AIDS TO NAVIGATION ON THE INTRACOASTAL WATERWAY

AS SEEN ENTERING FROM NORTH AND EAST—PROCEEDING TO SOUTH AND WEST

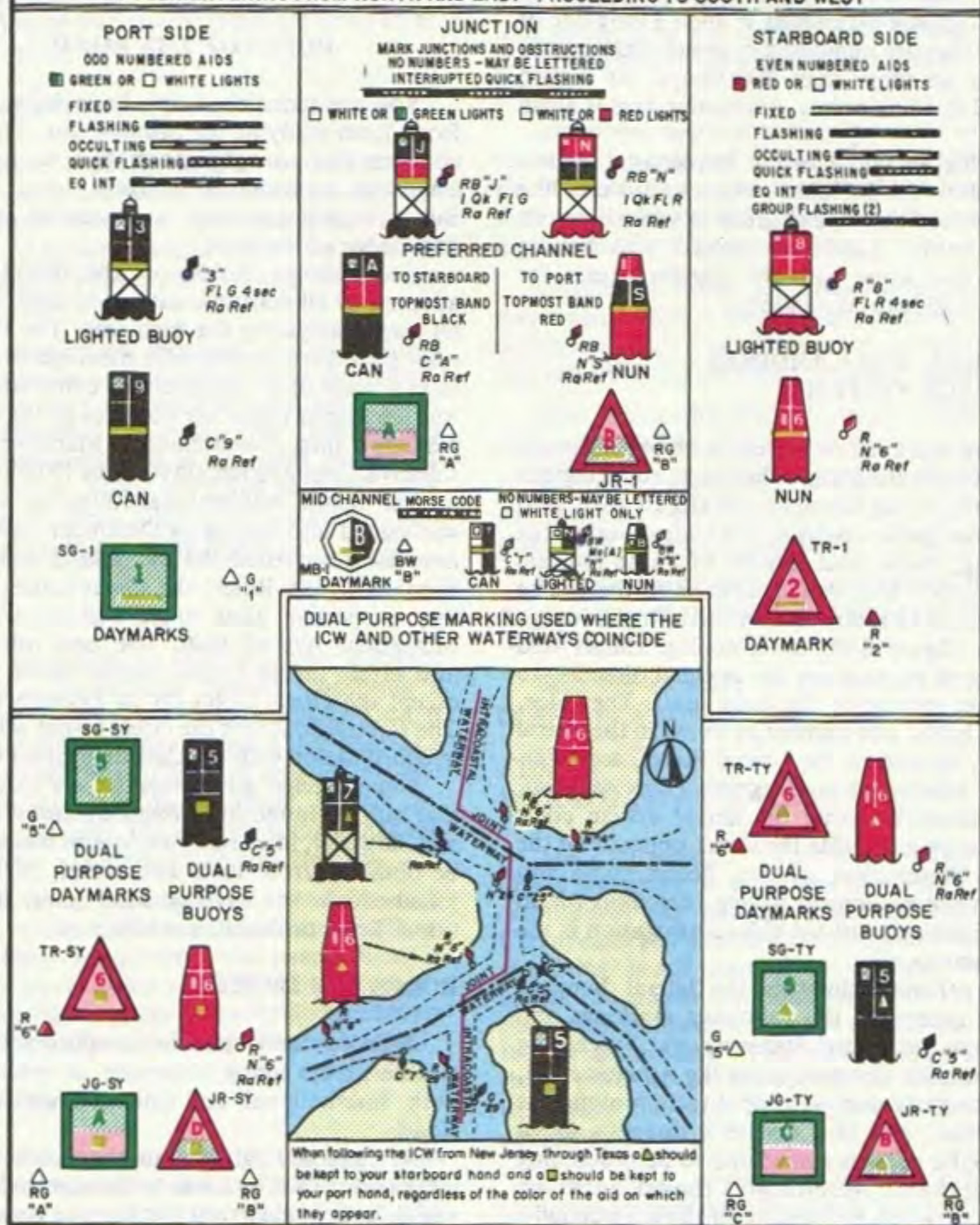


Figure 8-8.—Aids to navigation.

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AIDS TO NAVIGATION ON NAVIGABLE WATERWAYS except Western Rivers and Intracoastal Waterway

LATERAL SYSTEM AS SEEN ENTERING FROM SEAWARD

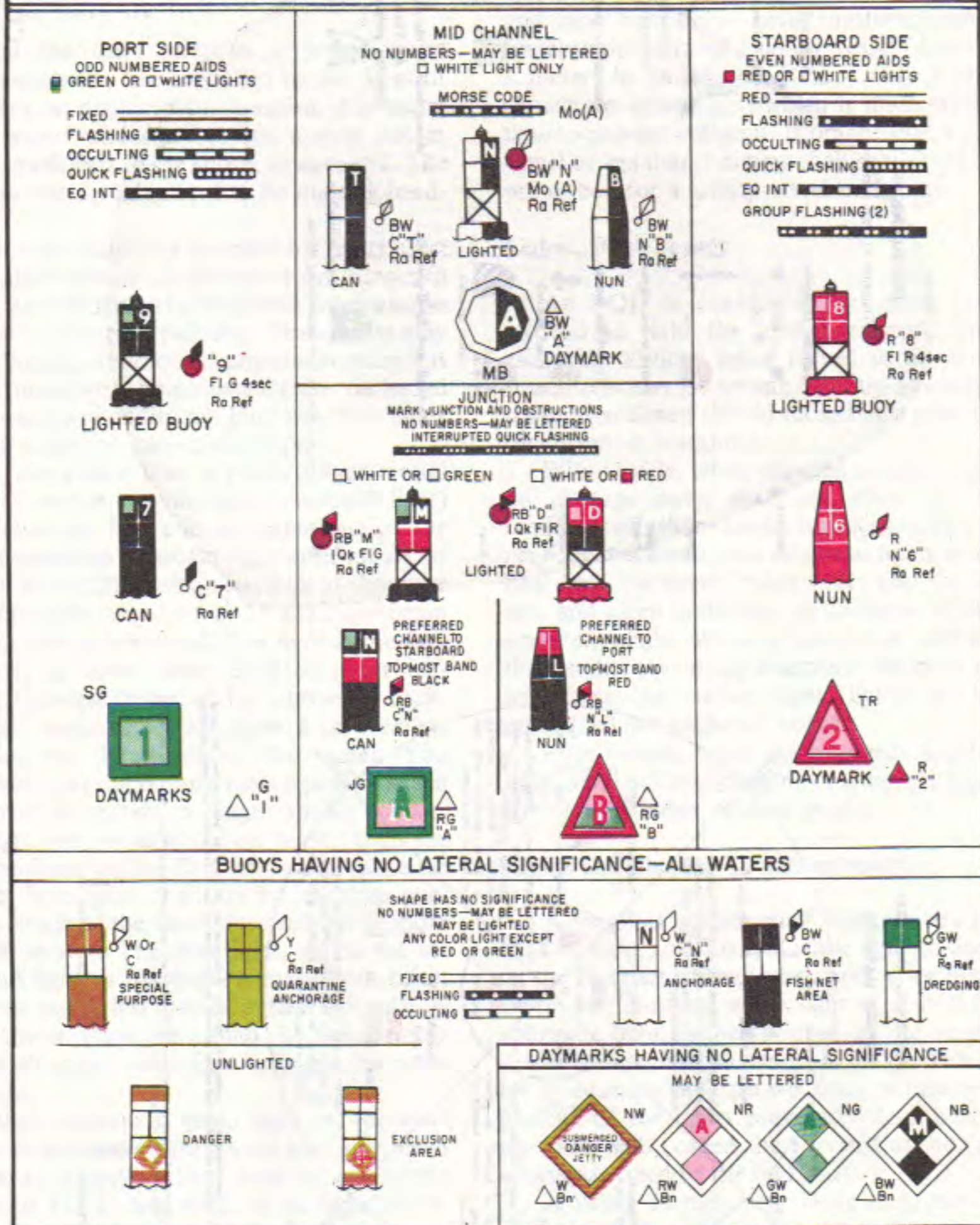
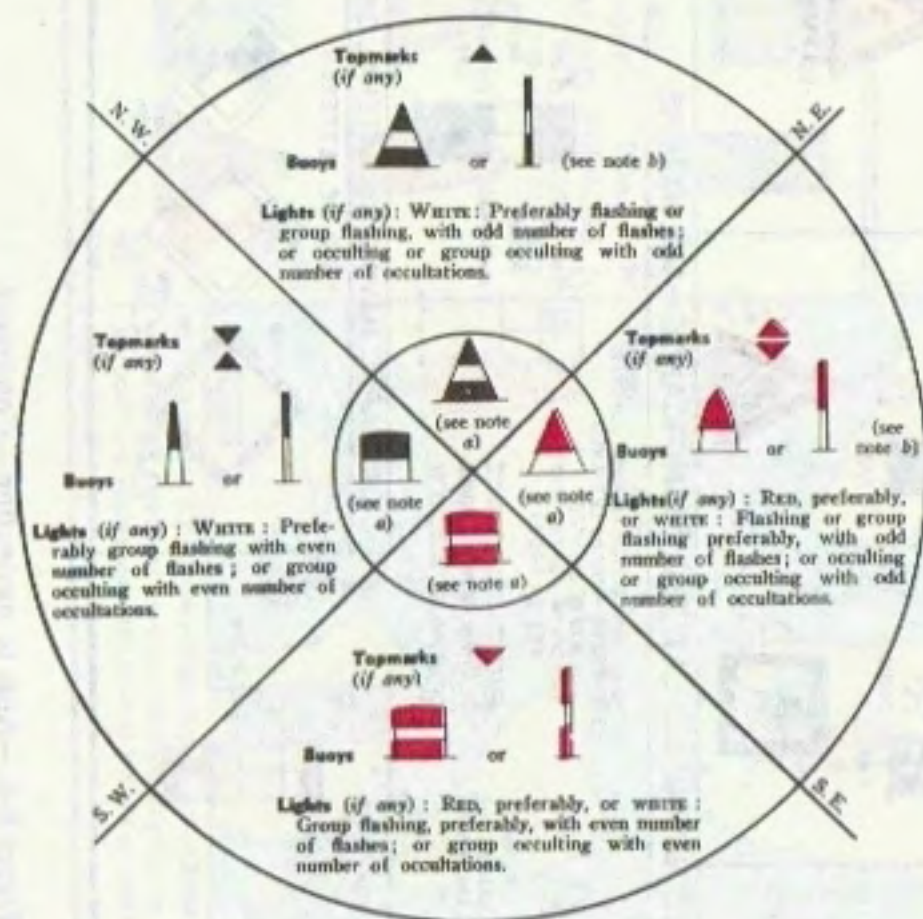


Figure 8-8.—Aids to navigation—Continued.

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CARDINAL SYSTEM

DANGER MARKING



MISCELLANEOUS

(Common to both systems)

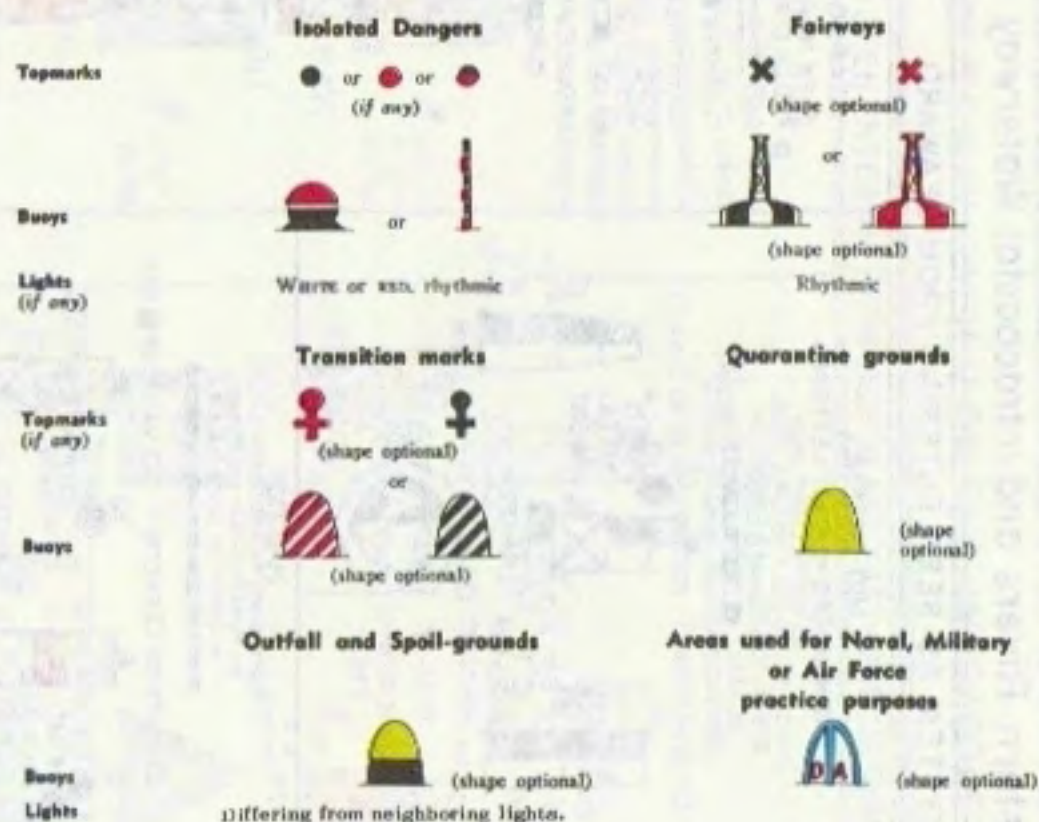


Figure 8-9.—Cardinal buoyage system used by many foreign countries.

Various navigational light displays prescribed by the rules are discussed in the following topics.

Running Lights

When the rules refer to a power-driven vessel, they mean one propelled by any kind of machinery, as distinct from a sailing ship under sail. A vessel underway means a ship not at anchor, made fast to the shore, or aground. The ship does not actually have to be making headway.

Both rules state that the rules for lights must be complied with in all weather from sunset to sunrise, and shall also be exhibited from sunrise to sunset in restricted visibility. These lights may be exhibited in all other circumstances when it is deemed necessary. Ships usually are darkened during wartime conditions, but even then lights are kept ready for immediate display.

You are aware that a power-driven vessel underway carries a white light (masthead light) placed over the fore and aft centerline of the vessel showing an unbroken light over an arc of the horizon of 225° and so fixed as to show the light from right ahead to 22.5° abaft the beam on either side of the vessel. The light at the foremasthead, or some other elevated point forward, is between 20 and 40 feet above the deck. This light must be visible from 2 to 6 miles, depending on the length of the vessel. You know, too, that under both rules a power-driven vessel over 50 meters in length shows another white light aft, at least 15 feet higher than the foremasthead light. The horizontal distance between these lights shall not be less than one-half the length of the vessel but need not be more than 100 meters. The after light, called the aft masthead light, is mandatory under both rules, except for vessels less than 50 meters in length. A power-driven vessel less than 12 meters may show an all-round white light in lieu of the masthead light.

Sidelights means a green light on the starboard side and a red light on the port side, each showing an unbroken light over an arc of the horizon of 112.5° and so fixed as to show the light from right ahead to 22.5° abaft the beam on its respective side. In a vessel of less than 20 meters, the sidelights may be combined in one

lantern carried on the fore and aft centerline of the vessel.

Side lights must be visible from 1 to 3 miles, depending on the size of the vessel. A sailing vessel or a ship being towed displays side lights and stern light only—never masthead lights. A vessel under oars or a sailing vessel of less than 7 meters in length, need carry only a lantern showing a white light, which it must exhibit in time to prevent collision. If practicable, a sailing vessel of less than 7 meters shall exhibit the lights prescribed for a sailing vessel underway.

Lights, Pilot Vessels

An OOD or conning officer often is most anxious to sight the pilot boat and signal it alongside without being forced to lie to when conditions may be setting the ship toward a lee shore. Signalmen should recognize a pilot vessel the instant it is sighted.

Pilot vessels, when engaged on their stations on pilotage duty, shall not show the lights required for other vessels, but shall exhibit at or near the masthead, two all-round lights in a vertical line, the upper being white and the lower red, and when underway, in addition, sidelights and a sternlight. When at anchor, in addition to those lights previously described, the pilot vessel will show the anchor light, lights, or shape prescribed for anchored vessels.

Pilot vessels, when not engaged on pilotage duty, shall exhibit the lights or shapes prescribed for similar vessels of their length.

Lights and Shapes, Vessels at Anchor

A vessel at anchor shall show, where it can best be seen, an all-round white light or one ball in the forepart of the vessel, and, at or near the stern, an all-round white light at a level lower than the light in the forepart of the vessel. A vessel of less than 50 meters in length may show an all-round white light where it can best be seen instead of the lights previously described. The forward light, called the forward anchor light, usually is fixed to the jackstaff.

A vessel 50 meters or more long carries its forward anchor light not less than 20 feet above the hull, and a similar light aft, not less than 15 feet lower than the forward light. The after

light on a man-of-war is usually fixed to the flagstaff. Also, when the anchor lights come on, all running lights go out.

Lights, Towing Vessels

In international and inland waters, a power-driven vessel with a tow displays two masthead lights in a vertical line. If length of tow exceeds 200 meters, it carries three such lights in a vertical line.

In inland waters, a power-driven vessel, when pushing another vessel or vessels ahead or towing alongside, shall also carry at or near the stern two bright yellow lights in a vertical line, one over the other, not less than 3 feet apart. Each of these lights shall be so constructed as to show an unbroken light over an arc of the horizon of 135° , so fixed as to show the light 67.5° from right aft on each side of the vessel, and of such a character as to be visible at a distance as prescribed by the length of the vessel.

Not Under Command Lights

Both rules specify that a ship not under command at night must show two all-round red lights in a vertical line where they can best be seen. On power-driven ships, not-under-command lights, when shown, replace masthead lights. If the ship is making no headway, only the red lights are shown; if making headway, its side lights also must appear. The reason for that is obvious. If a ship is not under command, it is essential for nearby ships to know whether it is making headway and, if it is, the direction in which it is headed.

During daylight, a ship not under command hoists two balls or similar shapes in a vertical line where they can best be seen.

SOUND SIGNALS FOR FOG

A power-driven vessel sounds its fog signals on the whistle. A prolonged blast is one of from 4 to 6 seconds' duration; a short blast is of about

1 second duration. As can be seen in figure 8-10, most fog signals are sounded at 2-minute intervals.

A power-driven vessel making way through the water in a fog (or thick weather of any kind) is required by the International and Inland Rules to sound a prolonged blast at intervals of not more than 2 minutes. Under both sets of rules, a power-driven vessel underway, but stopped and having no way on, sounds two prolonged blasts, with about 2 seconds between them, at intervals of not more than 2 minutes.

A power-driven vessel towing another vessel sounds one prolonged blast, followed by two short blasts at 1-minute intervals. This same signal is sounded in international and inland waters by a vessel not under command in a fog.

Risk of Collision

The rules generally discuss a case in which two ships are approaching each other so as to involve risk of collision. Naturally, no maneuvering is required by ships that will pass well clear by merely maintaining their present courses and speeds. Even under these circumstances, however, there is a situation in which Inland Rules require whistle signals.

The rules say that risk of collision can be ascertained by carefully watching the compass bearing of an approaching vessel. If the bearing does not appreciably change, such risk should be deemed to exist.

When the bearing of a vessel whose course is converging with yours remains constant, it is on a collision course. In this situation, one (the give-way) vessel is charged by the rules with the duty of keeping clear by the best means available. The other ship must maintain course and speed until risk of collision no longer exists. It is said to have the right-of-way, or it may be called the stand-on vessel. This term must be applied in a strictly limited sense, however, for even the so-called stand-on vessel is charged with definite duties from which it may depart only in situations covered by the Responsibility Rule.

SOUND SIGNALS IN RESTRICTED VISIBILITY

INTERNATIONAL	INLAND
— MAKING WAY	— MAKING WAY
— — UNDERWAY BUT STOPPED AND MAKING NO WAY	— — UNDERWAY BUT STOPPED AND MAKING NO WAY
— . . VESSEL NOT UNDER COMMAND, VESSEL RESTRICTED IN HER ABILITY TO MANEUVER, VESSEL CONSTRAINED BY DRAFT, SAILING VESSEL, VESSEL ENGAGED IN FISHING, VESSEL ENGAGED IN TOWING OR PUSHING	— . . VESSEL NOT UNDER COMMAND, VESSEL RESTRICTED IN HER ABILITY TO MANEUVER UNDERWAY OR AT ANCHOR, SAILING VESSEL, VESSEL ENGAGED IN FISHING UNDERWAY OR AT ANCHOR, VESSEL ENGAGED IN TOWING OR PUSHING ANOTHER VESSEL
— . . . VESSEL BEING TOWED OR LAST VESSEL OF TOW	— . . . VESSEL BEING TOWED OR LAST VESSEL OF TOW
RAPID RINGING OF BELL FOR 5 SEC. EV. MIN. ANCHORED . — .	RAPID RINGING OF BELL FOR 5 SEC. EV. MIN. ANCHORED . — .
RAPID RINGING OF BELL FOR 5 SEC. FOLLOWED BY RAPID RINGING OF GONG EVERY MINUTE ANCHORED OVER 100 METERS	RAPID RINGING OF BELL FOR 5 SEC. FOLLOWED BY RAPID RINGING OF GONG EVERY MINUTE ANCHORED OVER 100 METERS
THREE STROKES OF BELL AFTER BELL OR GONG SIGNAL EVERY MINUTE AGROUND	THREE STROKES OF BELL AFTER BELL OR GONG SIGNAL EVERY MINUTE AGROUND
. . . . PILOT VESSEL ENGAGED ON PILOTAGE DUTY	 PILOT VESSEL ENGAGED ON PILOTAGE DUTY

NOTE: SIGNAL INTERVALS ARE 2 MINUTES UNLESS OTHERWISE NOTED.

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Figure 8-10.—Summary of sound signals.

Responsibility Rule

The Responsibility Rule makes it impossible for a stand-on vessel to escape responsibility, after standing into a recognized danger, simply because its captain was determined not to haul off when he had the right-of-way.

Obviously, a vessel may depart from the requirements of the Rules of the Road, under the Responsibility Rule, only when an immediate danger exists that requires such a departure. Although we have mentioned the failure of a stand-on vessel to heed the Responsibility Rule, there are conceivable situations where a

give-way vessel could be at fault in the same manner.

This Rule says—

“Nothing in these Rules shall exonerate any vessel, or the owner, master or crew thereof, from the consequences of any neglect to comply with these Rules or of the neglect of any precaution which may be required by the ordinary practice of seamen, or by the special circumstances of the case.

In construing and complying with these Rules due regard shall be had to all dangers of navigation and collision and to any special circumstances, including the limitations of the vessels involved, which may make a departure from these Rules necessary to avoid immediate danger.”

Head-On

When two power-driven ships meet on reciprocal or nearly reciprocal courses so as to involve risk of collision, each alters course to starboard to pass on the port side of the other.

Most of the steering and sailing rules point out that one ship or the other must keep clear; the rule for meeting head-on requires both ships to keep clear. The rule applies only when ships are so nearly stem-to-stem that each sees the masts of the other in line by day or both side lights at night. If they are far enough off each other to pass clear without changing course, each maintains course and speed.

Both International and Inland Rules stipulate that before making any whistle signals discussed in the remainder of this chapter, ships must be in sight of each other. In fog or heavy weather, for example, fog signals are made until the ships are near enough to each other to be seen.

Inland and International Rules make a distinction in the whistle signals for a head-on

situation. First of all, note this general difference between the two:

International whistle signals are signals of execution.

Inland whistle signals are signals of intention.

International waters are not generally as crowded as inland waters; consequently, it is not necessary to make international whistle signals as informative as inland signals. International signals and their meanings follow:

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.

These signals of execution are not sounded unless and until the ship is executing the maneuver.

Because of close quarters and heavy traffic in inland waters, inland whistle signals must provide a better means of communication than international signals. In inland waters, the ship sounding a signal does not put its intention into execution until it gets an okay from the other vessel, which returns the same signal. If the other vessel does not understand the signal, or considers the proposed maneuver of the first vessel dangerous, it replies with the in-doubt signal—not less than five short, rapid blasts.

Any vessel may supplement the whistle signals for maneuvering by light signals. Under international rules, these lights shall have the following significance:

One flash to mean: I am altering my course to starboard.

Two flashes to mean: I am altering my course to port.

Three flashes to mean: I am operating astern propulsion.

Under inland rules, these signals shall have the following significance:

One flash to mean: I intend to leave you on my port side.

Two flashes to mean: I intend to leave you on my starboard side.

Three flashes to mean: I am operating astern propulsion.

The light used for this signal in international waters shall be an all-round white light, visible at a minimum range of 5 miles; in inland waters one all-round white or yellow light, visible at a minimum range of 2 miles, synchronized with the whistle.

Now let's return to that head-on situation. To repeat: Two ships so meeting must pass port-to-port, altering course to starboard only if necessary for safe passing. In inland waters, each sounds one short blast to indicate its intention to pass port-to-port; in international waters, each gives one short blast only if it changes course to starboard.

As mentioned earlier, if the vessels are already far enough to port or starboard of each other to pass well clear on their present courses, they stay on their courses. But there is an important distinction between International and Inland Rules: If no course change is ordered, no signal is made in international waters. Inland Rules require that if the ships are to pass port-to-port, regardless of a course change, either ship must sound one short blast to signify its intention to pass port-to-port, and the other must answer with one short blast to show it is okay. If the ships are going to pass starboard-to-starboard, well clear of each other, either ship must sound two short blasts, and the other with two short blasts.

When two ships approach each other obliquely, even if the angle is very slight, it is not a head-on situation but a crossing situation, and is covered by a different rule. However, when a vessel is in doubt as to whether the head-on situation exists, it assumes it does and acts accordingly.

Crossing Situations

Because a ship under sail is necessarily restricted in maneuverability, the general rule is that when a sailing ship and a power-driven ship are proceeding in such directions as to involve a risk of collision, the latter must keep out of the way. There are two exceptions to the general rule. First, regardless of type, a ship overtaking another always keeps out of the way of the overtaken ship. Second, the general rule does not give a sailing vessel the right to hamper, in a narrow channel, the safe passage of a steam ship that cannot navigate outside that channel.

The remainder of this section covers only power-driven ships.

Rule 15 of both rules states: "When two power-driven vessels are crossing so as to involve risk of collision, the vessel which has the other on its own starboard side shall keep out of the way and shall, if the circumstances of the case admit, avoid crossing ahead of the other vessel."

In other words, the ship that has the other to starboard is the give-way vessel; the one that has the other to port is the stand-on vessel. A give-way vessel must keep out of the way by the best means possible—by stopping, changing course, or backing. The stand-on vessel must maintain its course and speed until the danger is past or when, if it becomes apparent that the give-way vessel is not taking appropriate action to comply with the rules, it finds itself so close that collision cannot be avoided by action of the give-way vessel alone, it shall take such action as will best aid to avoid collision.

In a crossing situation in international waters, a whistle signal is made by either vessel only if and when it changes course or backs its engines. Inland Rules for whistle signals in a crossing situation are the same as for the head-on situation; one short blast means, "I intend to leave you on my port side"; two short blasts mean, "I intend to leave you on my starboard side", and three short blasts mean, "I am operating astern propulsion."

Overtaking

Any vessel overtaking another must keep clear of the vessel being overtaken.

An overtaking vessel is one that is coming up with another vessel from any direction more than 22.5° abaft its beam. When in doubt whether you are forward or abaft this bearing, you must assume you are overtaking and keep clear.

In overtaking, as in other instances, there are significant differences between the Inland and International Rules for whistle signals. In international waters, a vessel that can pass another without a change of course sounds no signal. If it must change course, it sounds the appropriate signal. In a narrow channel or fairway where overtaking, the vessel intending to overtake shall indicate its intention by sounding two prolonged and one short blast(s) to overtake to starboard and two prolonged and two short blasts to overtake to port. The overtaken vessel, if in agreement, shall sound one prolonged, one short, one prolonged, one short blast, in that order.

In inland waters, however, an overtaking vessel cannot pass another until it signals to indicate on which side it intends to pass, giving one short blast if passing to starboard, two if passing to port. It sounds a signal whether it must change course or not, and it may not pass until it gets an okay, by a repeat of the same signal, from the vessel being overtaken.

If the ship being overtaken considers the proposed maneuver risky, it sounds the doubt signal, followed by the signal for what it considers the safer procedure. For example: The overtaking vessel sounds one short blast, signifying an intention to pass to starboard. The ship being overtaken vetoes it by sounding the doubt signal. The ship then sounds two blasts, meaning: "You had better pass me to port instead." The overtaking vessel replies with two short blasts, then may pass the other to port.

Channels; Bends; Leaving a Berth

Both rules say that in a narrow channel every steam vessel must, when it is safe and practicable, keep to the side of the fairway or midchannel that lies to its own starboard.

A vessel nearing a bend or an area of a channel or fairway where other vessels may be obscured by an intervening obstruction shall sound one prolonged blast. Such signal shall be answered with a prolonged blast by any approaching vessel that may be within hearing around the bend or behind the intervening obstruction.

In inland waters only, a vessel leaving a dock or berth sounds one prolonged blast. That is considered a prudent and precautionary action that announces the maneuver to other vessels in the area.

CHAPTER 9

HONORS AND CEREMONIES

From the days when the United States first came into being as an independent nation, tradition has played an important role in the ceremonial functions of our Navy. At first most of the honors and ceremonies rendered by our Navy were carried over from the British Navy. Before many years, however, the United States Navy began changing them to conform to its own concepts. The United States Navy now has a very rigid set of rules which covers all phases of ceremonial functions.

Of all ratings aboard ship, the Signalman is most directly concerned with rules for rendering honors and ceremonies. When the occasions for rendering them arise, there often is insufficient time to search through the regulations for needed information. That is why the Signalman must know, in advance, what, when, how, where, and by whom honors are rendered. This chapter attempts to answer some of those requirements. Additional information is contained in *Flags, Pennants and Customs*, NTP 13, and chapter 10, *U.S. Navy Regulations*.

FLAG DISPLAYS

A national flag is the flag flown to represent a national government. The ensign is a flag designated by a country to be flown by its men-of-war. In the United States, the designs of the two are identical. As used in this section, "national flag" and "ensign" are synonymous. Aboard ship, however, the national flag always is referred to as the ensign.

NATIONAL ENSIGN

When not underway, commissioned ships display the ensign from the flagstaff at the stern

and the union jack from the jackstaff at the bow from 0800 to sunset. When flown underway, the ensign normally is displayed from a gaff. In ships having more than one mast, the gaff usually is positioned on the after mast. In ships equipped with two macks (combination masts and stacks), location of the flag depends on which mack is configured to accept halyards or gaff.

After entering a foreign port during darkness, a Navy ship briefly displays the ensign from the gaff at first light to establish nationality. Other ships of war present customarily display their ensigns in return.

Colors

The ceremonial hoisting and lowering of the national flag at 0800 and sunset at commands ashore and aboard ships of the Navy not underway is known as morning and evening colors. The guard of the day and the band, if available, are in the vicinity of the point of hoist.

Aboard Navy ships or naval shore activities on all occasions of hoisting and lowering or half-masting the national ensign, the motions of the senior officer present shall be followed. Five minutes before morning and evening colors, the PREPARATIVE pennant is hoisted. Ceremonies for colors begin when the pennant is hauled to the dip.

If a band is available for color ceremonies, "Attention" is sounded, followed by the band playing the national anthem. In the morning, the ensign is started up at the beginning of the music and hoisted smartly to the peak or truck. At evening colors, the ensign is started down at the beginning of the music; lowering is so regulated as to be completed at the last note of the music.

The national flag always is hoisted smartly and lowered ceremoniously. "Carry on" is sounded at the completion of the music.

If no band is aboard, "To the Colors" is played on the bugle at morning colors, and "Retreat" at evening colors. For ships having neither a band nor a bugler, "Attention" and

"Carry on" are signals for rendering and terminating the hand salute.

When the music from another ship can be heard during colors, and there is no band or bugler aboard your ship, the command to "Carry on" should not be given until the music being overheard is completed.

Official	National flag half-masted	
	By—	Period
President, former President, or a President-elect.	All ships and stations of the Naval Establishment.	When displayed: For 30 days from the day of death.
Vice President, Chief Justice or retired Chief Justice of the United States, or the Speaker of the House of Representatives.	do.....	When displayed: For 10 days from the day of death.
An Associate Justice of the Supreme Court, a member of the Cabinet, a former Vice President, the Secretary of the Army, the Secretary of the Navy, or the Secretary of the Air Force.	do.....	From the day of death until interment.
Governor of a state, territory, or possession.	All ships and stations in such state, territory, or possession.	Do.
United States Senator, Representative, Territorial Delegate, or the Resident Commissioner from the Commonwealth of Puerto Rico.	All ships and stations in the metropolitan area of the District of Columbia, and All ships and stations in the applicable state, congressional district, territory or commonwealth.	On the day of death and the following day. From the day of death until interment.
Civil official not listed above, but entitled to gun salute on official visit.	Ships and stations in the vicinity when directed by senior officer present or other competent authority to join in funeral honors.	When displayed: From 0800 till sunset on day of funeral.

Figure 9-1.—Civil officials for whom flag is half-masted as a symbol of mourning.

After morning colors, if foreign warships are present, the national anthem of each so represented shall be played in the order in which a gun salute would be fired to, or exchanged with, the senior official or officer present of each nation; provided that, when in a foreign port, the national anthem of the port shall be played immediately after morning colors, followed by the national anthems of other foreign nations represented. A schedule of the English alphabetical order of the members of the United Nations is listed in Annex B of NTP 13.

Half-masting the Ensign

National flags flown at half-mast, or half-staff ashore, are an internationally recognized symbol of mourning. The United States honors its war dead on Memorial Day by half-masting the flag from 0800 until the last gun of a 21-minute gun salute that begins at noon (until

1220 if no gun salute is rendered). Figures 9-1 and 9-2 show the occasions when the flag is half-masted as a symbol of mourning for civil officials and military personnel. Personal flags are also half-masted as a symbol of mourning.

Normally, the flag is half-masted on receiving information of the death of one of the officials or officers listed in *U.S. Navy Regulations*. Notification may be in news media reports or by an official message.

In half-masting an ensign already flying at the peak or at the truck, lower it ceremoniously to half-mast. If the ensign is not flying, hoist it smartly to the peak or truck before lowering it to half-mast.

In lowering a half-masted ensign, raise it first to the peak or truck, then lower it ceremoniously.

When the national anthem, "To the Colors," or "Retreat" is played at morning or evening colors, all hands hold the salute during

Deceased	National flag half-masted		Personal flag or command pennant of deceased, commission pennant of ship command.
	By—	Period	
Chairman or former Chairman of the Joint Chiefs of Staff, United States military officer of 5-star rank, Chief or former Chief of Naval Operations, Commandant or former Commandant of the Marine Corps.	All ships and stations of the Department of the Navy.	From the time of death until sunset of the day of funeral.	Half-masted from time of death until sunset of day of funeral, or removal of the body, and then hauled down.
Flag or general officer (Marine) in command.	All ships present, not under way, and by naval stations in vicinity.	When displayed: From time of death until sunset of day of funeral; or removal of the body.	Do.
Flag or general officer (Marine) not in command.	 do	From the beginning of the funeral until sunset of that day.	Do.
Unit commander not a flag officer; commanding officer.	 do	.. do	Half-masted from time of death until sunset of day of funeral, or removal of the body, and then hauled down; except commission pennant rounded up.
All other persons in the naval service.	 do	During funeral and for 1 hour thereafter.	

Figure 9-2.—Half-masting as a symbol of mourning for deaths of military personnel.

the raising or lowering of the flag. Thus, "Carry on" after morning colors would not be sounded until the flag was lowered to half-mast. At evening colors, "Attention" is sounded and the salute rendered before raising the flag to the peak from its half-mast position.

If the ensign is flown from the flagstaff and is half-masted, the jack also is half-masted. Distinctive marks, such as commission or command pennants, are not half-masted except when the ship's commanding officer or the unit commander dies.

In a foreign port or when in company with foreign warships, when a national anniversary or solemnity is being observed by foreign port authorities or foreign warships, a ship of the Navy shall, upon official invitation, follow the example of the foreign authority or warships in full-dressing or dressing ship, firing salutes, and half-masting ensigns. Salutes shall not exceed 21 guns unless the senior officer present deems it proper to fire a larger number in order to participate properly in the ceremony or to avoid giving offense.

A special ceremony calling for half-masting the ensign is required of ships passing Washington's tomb between sunrise and sunset. A full guard and band are paraded (if aboard), the ship's bell is tolled, and the ensign is half-masted as the ship comes in sight of Mount Vernon, Virginia. When the ship is opposite the tomb, the guard and all persons on deck face the tomb and salute. Upon sounding taps, the ensign is raised to the peak; tolling of the bell ceases on the last note of taps. The band then plays the national anthem, which is followed by, "Carry on."

The national flag is half-masted by all ships and stations on occasions stipulated by *U.S. Navy Regulations*. These include Memorial Day and the deaths of certain high-ranking civil officials and military personnel as shown in figures 9-1 and 9-2. As can be seen in the illustrations, there are occasions when ships underway do not half-mast the ensign, although those not underway do so.

Answering a Dip

U.S. Navy Regulations stipulates that when any ship under United States registry or the

registry of a nation formally recognized by the United States salutes a U.S. Navy ship by dipping its flag, the courtesy is to be returned dip for dip. A U.S. Navy ship never dips to a foreign ship/flag first. U.S. Naval Ships (USNS) of the Military Sealift Command do not dip the national ensign to Navy ships since they are public ships of the United States.

Formal recognition does not necessarily mean that diplomatic relations must exist. Moreover, the fact that diplomatic relations have been severed does not mean that the United States no longer recognizes the existence of the state or the government concerned.

As of December 1980 the following countries were not formally recognized by the United States and, therefore, are not entitled to a salute.

Albania
Andorra
Angola
Bhutan
Cambodia
Cuba
Iran
Iraq
North Korea
Liechtenstein
Mongolia
Monaco
Vietnam
San Marino
South Yemen
Vatican City
Taiwan

Figure 9-3 shows the flags of nations not formally recognized by the United States.

If a salute is rendered to a naval vessel when the ensign is not already displayed, such as before 0800 or after sunset (in port), the saluted ship hoists its ensign for the purpose of answering the dip, returns the salute and, after a short interval, hauls down its ensign. When the ensign is at half-mast, it is hoisted to the peak or truck before the dip is answered.

Dips by yachts displaying a yacht ensign also are returned. The yacht ensign is similar in design to the U.S. ensign except that the blue field contains a white fouled anchor surrounded by 13 white stars.



Figure 9-3.—Flags of nations not formally recognized by the United States.

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UNION JACK

The union is the rectangular blue part of the United States flag containing the stars. The union jack, when displayed from the jackstaff, is the same size as the union of the ensign displayed from the flagstaff.

When a naval ship is not underway, the union jack is flown from the jackstaff from 0800 to sunset. It is also hoisted at the yardarm to indicate that a general court-martial or a court of inquiry is in session. It is hoisted when the court meets and is hauled down when the court adjourns.

When displayed from the jackstaff, the union jack is half-masted when the ensign is half-masted. It is not dipped, however, when the ensign is dipped in return for such honor being rendered it.

The union jack is flown in boats as follows:

1. When a diplomatic representative of the United States of or above the rank of charge d'affaires is embarked in a boat of the U.S. Navy and is within the waters of the country to which he or she is accredited.

2. When a governor general or governor commissioned as such by the President is embarked in a boat in an official capacity and is within the area of jurisdiction (for example, the Governor of the Virgin Islands).

U.S. NAVY FLAG

On 24 April 1959 the President, on the recommendation of the Secretary of the Navy, established an official flag (figure 9-4) for the United States Navy. That was done to fulfill a need for an official flag to represent the Navy on a variety of ceremonial, parade, and display occasions.

The U.S. Navy flag represents the Navy as follows:

1. At official ceremonies.



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Figure 9-4.—United States Navy flag.

2. In parades.
3. During official Navy display occasions.
4. At public gatherings when the Navy is an official participant.
5. On other occasions as may be authorized by the Secretary of the Navy.

When used for the purposes listed above, the Navy flag accompanies and takes the place of honor after the national flag. However, when other branches of the Armed Forces are participating, the flags take precedence in order of seniority of the services represented.

PERSONAL FLAGS AND COMMAND PENNANTS

Figure 9-5 shows personal flags, personal command pennants, and several miscellaneous flags and pennants.

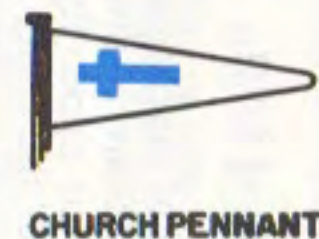
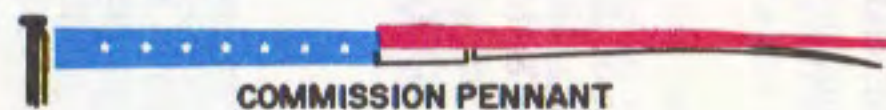
With the exceptions of hospital ships (which display the Red Cross flag) and ships not engaged in the service of the United States, the distinctive mark of each ship in commission is



CHIEF OF NAVAL OPERATIONS



VICE CHIEF OF NAVAL OPERATIONS



C101.39

Figure 9-5.—Personal flags and command pennants of officers eligible for command at sea.

either a commission pennant (figure 9-6) or the personal flag or command pennant of an officer of the Navy eligible for command at sea. Only one distinctive mark is displayed. If a personal flag (including that of a civil official) or command pennant goes up, the commission pennant comes down.

Personal Flag of CNO

The field of the personal flag of the Chief of Naval Operations is divided diagonally from lower hoist to upper fly. The emblem is an adaptation of the center of the official seal of CNO—an eagle clutching an anchor, encircled by 50 links of gold chain.

Personal Flags and Pennants of Other Officers

Each flag officer in the Navy is entitled to display a personal flag, the number of stars thereon denoting the officer's grade. Flags of line officers have a blue field with white stars, as



101.40

Figure 9-6.—Signalmen standing by to hoist the commission pennant, which will remain in the air as long as the ship is in commission unless replaced by a personal flag or command pennant.

in figure 9-5. A line officer who has command at sea flies a flag from a ship of his or her command.

Personal command pennants, flown by officers below flag rank, are of two types: broad and burgee. A broad command pennant indicates command of—

1. A force, flotilla/group (e.g., PHIBGRU, SERVGRU), or squadron of ships of any type.
2. An aircraft wing.

The burgee command pennant indicates command of a division of ships other than aircraft carriers or cruisers; or a major subdivision of an aircraft wing.

When an officer assumes command of a fleet or unit of a fleet, the personal flag or command pennant is hoisted at the after masthead on the flagship and kept flying continuously until the command is turned over to a successor. If the officer is to be absent from command for a period exceeding 72 hours, however, the personal flag is hauled down until the officer returns. The flag is never displayed from more than one ship at the same time.

During periods of dress or full-dress ship, no personal flag or pennant is displayed at the same masthead with the ensign; when the ensign must be flown at the main truck, the personal flag or pennant is displayed at the foretruck. During gun salutes in which the ensign is hoisted at the main truck, however, the personal flag or pennant is simply lowered clear of the ensign. When a single-masted flagship is dressed or full-dressed, the personal flag or pennant is shifted to the starboard yardarm.

When riding in an automobile on an official occasion, an officer entitled to a personal flag or command pennant may display the flag or pennant on the forward part of the vehicle. (Rules for displaying flags in boats are discussed in a later section.)

Personal Flags of U.S. Civil Officials

There are any number of civil officials entitled to show personal flags that go with their offices. The only such flags of interest to a

Signalman, however, are those belonging to civil officials whose personal flags are authorized for display during official visits. (Visits are discussed later in this chapter.) Personal flags of principal civil officials are shown in figure 9-7.

Personal flags of the following civil officials are displayed at the main truck during official visits and during the time they are officially embarked for passage in a Navy ship.

1. President.
2. Vice President.
3. Secretary of State when acting as a special foreign representative of the President.

4. Secretary, Deputy Secretary, and Assistant Secretaries of Defense.
5. Secretary, Under Secretary, and Assistant Secretaries of the Navy.

When more than one civil official is aboard, only the flag of the senior is displayed.

While the personal flag of a civil official is hoisted, the personal flag or command pennant of an officer of the Navy is displayed, if required, as follows:

1. Aboard a single-masted ship—at the starboard yardarm.



The President



Secretary of Defense



Vice President



Secretary of the Navy



Secretary of State

Figure 9-7.—Personal flags for high-ranking civil officials of the United States.

C101.41

2. Aboard a two-masted ship—at the foretruck.
3. Aboard a ship with more than two masts—at the after truck.

COMMISSION PENNANT

With exceptions already noted, the commission pennant is the distinctive mark of a Navy ship in commission that has no flag officer or other unit commander embarked. The pennant is flown at the after truck or, on a mastless ship, at the highest and most conspicuous point of hoist.

Although the commission pennant is not a personal pennant, it is sometimes regarded as the personal symbol of the commanding officer. Along with the ensign and union jack, it is half-masted upon the death of the commanding officer. It remains at half-mast until sunset of the day of the funeral or until the body is removed from the ship.

HOMEWARD-BOUND PENNANT

The homeward-bound pennant is flown by ships returning from extended overseas tours. The pennant is authorized for display by a ship that has been on duty outside the limits of the United States continuously for at least 9 months. It is hoisted on getting underway for the United States and may be flown until sunset on the day of arrival in a port of destination. The pennant is similar to the commission pennant, but instead of the usual seven stars there is one star for the first 9 months of overseas duty and one star for each additional 6 months. Total length of the pennant customarily is 1 foot for each officer and enlisted crewmember who served overseas for a period in excess of 9 months. When the number of personnel produces an unwieldy pennant, the length of the pennant is restricted to the length of the ship.

RED CROSS FLAG

The Red Cross (Geneva Convention) flag is the distinctive mark flown from the after truck of a hospital ship of the Navy in commission.

In general, the Red Cross flag is regarded as an international guarantee of amnesty from attack. It is displayed ashore at the sanitary branch (such as dispensary or infirmary) of an activity of the Navy, in company with the national flag, to indicate that the area immediately surrounding it is entitled to protection under the rules of the Geneva Convention. None of the military services, however, flies it on the same halyard as the national flag. Boats engaged in sanitary service and landing party hospital boats display the Red Cross flag in the bow.

Some nations in the Middle East regard the cross as a symbol contrary to their religious beliefs. Instead of a red cross on the flag, they use designs such as a red crescent on a white field or a red lion and sun on a white field as an indication of a mission of mercy or amnesty from attack.

CHURCH PENNANT

With the sole exception of flag displays at United Nations headquarters, where special rules apply, no flag or pennant may be flown above or, if on the same level, to the right of our national flag. The exception is during church services conducted by Navy chaplains or visiting church dignitaries aboard ship. Then the church pennant is flown above the ensign.

Many ships are fitted with two halyards to the same point of hoist at both the staff and gaff to permit display of the church pennant and ensign simultaneously.

In displaying the church pennant, it is hoisted to the peak or truck, the ensign then being dipped just clear of it. If services are being conducted at the time of morning colors, the ensign is hoisted to the truck at the prescribed time. The church pennant is then hoisted and the ensign dipped just clear of the pennant. If the ensign is displayed at half-mast, the church pennant is hoisted just above the ensign. In lowering the church pennant, the ensign is closed up before the pennant is lowered.

Although the church pennant may not be flown above the national flag ashore, it may be displayed separately.

The Jewish worship pennant is displayed during Jewish religious services afloat and ashore. The same rules governing the display of the church pennant apply to the display of the Jewish worship pennant.

FLAG DISPLAYS IN BOATS

The ensign is displayed at the stern of waterborne boats of the naval service—

1. When underway during daylight in a foreign port.
2. When ships are required to be dressed or full-dressed.
3. When going alongside a foreign vessel.
4. When an officer or official is embarked on an official occasion.
5. When a flag or general officer, a unit commander, a commanding officer, or a chief of staff, in uniform, is embarked in a boat of the command or in one assigned for personal use.
6. At other times when prescribed by the senior officer present.

When an officer in command (or chief of staff) entitled to a personal flag or pennant is embarked in a boat on an official occasion, the appropriate flag or pennant is flown at its bow. (If not entitled to a personal flag or pennant, a commission pennant is displayed.) On other than official occasions, a miniature personal flag or pennant is displayed near the coxswain's station.

Boats also carry bow markings indicating to whom the boat is assigned. A boat having an arrow at the bow is assigned for use by a commanding officer or a chief of staff who is not a flag officer. A miniature of the command pennant is on the bow of a boat assigned to a unit commander. A boat assigned for the personal use of a flag or general officer has on each bow the number of stars corresponding to the officer's rank.

The flags of a civil official entitled to display a personal flag during official visits is flown from the boat in which the official is embarked when on official business.

A consular representative is entitled to fly the consular flag from the bow of a Navy boat. In the waters of the nations to which he or she is accredited, a diplomatic representative of or above the rank of charge d'affaires is entitled to fly the union jack. A governor or governor general commissioned by the President may also display the union jack within his or her area of jurisdiction.

DRESSING AND FULL-DRESSING SHIP

When dressing or full-dressing ship, the largest national ensign with which the ship is furnished shall be displayed from the flagstaff and, except as prescribed for a ship displaying a personal flag or command pennant, a national ensign is displayed from each masthead. The national ensigns displayed at the mastheads should be of uniform size, but smaller than the one at the flagstaff. If there is substantial difference in heights of mastheads, however, a difference in the size of the national ensigns is appropriate.

When the ship is full-dressed, mastheads are dressed as described in the preceding paragraph. In addition, a rainbow of signal flags is displayed, reaching from the foot of the jackstaff to the mastheads, then to the foot of the flagstaff. Peculiarly masted or mastless ships make a display as little modified from the rainbow effect as possible. The rainbow is displayed in the order prescribed in NTP 13.

Ships not underway are dressed or full-dressed from 0800 until sunset. Ships underway are not dressed or full-dressed.

U.S. Navy Regulations requires that ships be full-dressed on Washington's Birthday and on Independence Day. When these days fall on Sunday, ceremonies are postponed until the following day. On official invitations, U.S. Navy ships are dressed or full-dressed in honor of foreign holidays. Other occasions for these ceremonial displays may be designated by the senior officer present.

When dressing or full-dressing ship in honor of a foreign nation, the national ensign of that nation replaces the United States national ensign at the main, or the masthead in a single-masted ship.

Should the occasion arise whereby the ensign is to be half-masted or dipped during dress or full-dress ship, only the national ensign at the flagstaff is half-masted or dipped.

When full-dressing is prescribed, the senior officer present may direct that dressing be substituted if the state of the weather makes such action advisable. The senior officer present may also, under such circumstances, direct that the ensigns be hauled down from the mastheads after being hoisted.

Only clean flags should be used in full-dressing ship. On large ships, more than one set of flags may be needed to fill all the dressing lines. Flags should be stopped to the dressing lines the day before the ship is to be full-dressed, otherwise something unforeseen might develop and the dressing lines would not be ready for hoisting at 0800.

The ensigns, jack, and rainbow of flags should be hoisted smartly at 0800. At evening colors, all ensigns and the jack should be lowered ceremoniously. The rainbow of flags should be lowered quickly.

FLAG DISPLAY DURING GUN SALUTES

Besides displaying a foreign ensign when dressing ship in honor of a foreign nation, the foreign ensign is displayed when a ship fires a salute to that nation or to an official of that nation. If the salute is of 21 guns, the ensign is flown from the mainmast; if fewer than 21 guns, from the foremast.

FLAGS OF PRINCIPAL MARITIME NATIONS

Figure 9-8 shows flags and ensigns of some principal maritime nations. Unlike practice in the United States, a number of countries have ensigns differing from their national flags, although color patterns generally remain constant.

A special chart issued by the Defense Mapping Agency Hydrographic Center (DMAHC) office illustrates in color the national flags and ensigns of some 130 countries.

UNITED NATIONS FLAG

The flag of the United Nations consists of the official emblem of the United Nations in white centered on a "United Nations blue" field (figure 9-9).

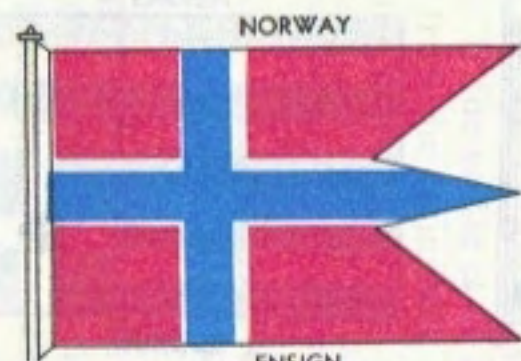
The flag is flown from all buildings, offices, and other property occupied by the United Nations. The manner and circumstances of display conform, as far as appropriate, to the laws and customs applicable to the display of the national flag of the country in which the display is made. Several regulations relating to display of the U.N. flag follow.

1. It may be displayed alone or with other national flags of the United Nations.
2. When it is displayed with one or more other flags, all flags displayed are flown on the same level and should be of approximately equal size.
3. It may be displayed on either side of any other flag without being in a subordinate position to such flag.
4. The flag ordinarily is displayed from sunrise to sunset, but may also be displayed at night upon special occasions.
5. It should not be displayed on days when the weather is inclement.
6. It should never be carried flat or horizontally but always aloft and free.
7. The United Nations flag should never be used as a drapery of any sort, nor festooned, drawn back or up or in folds, but always allowed to fall free.

In a closed circle, a cluster, or a linear or semicircular grouping of flags of the United Nations, flags other than the United Nations flag are displayed in the English alphabetical

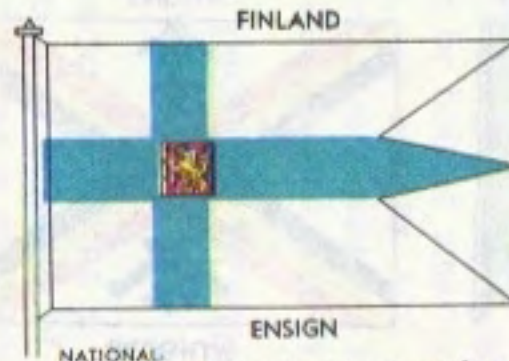


Figure 9-8.—Flags of some leading maritime nations.



NORWAY

ENSIGN
NATIONAL—MERCHANT—rectangular, without swallow-tail



FINLAND

ENSIGN
NATIONAL—MERCHANT—without swallow-tail and coat-of-arms



SWEDEN

ENSIGN
NATIONAL—MERCHANT—rectangular, without swallow-tail



FRANCE

ENSIGN—NATIONAL—MERCHANT



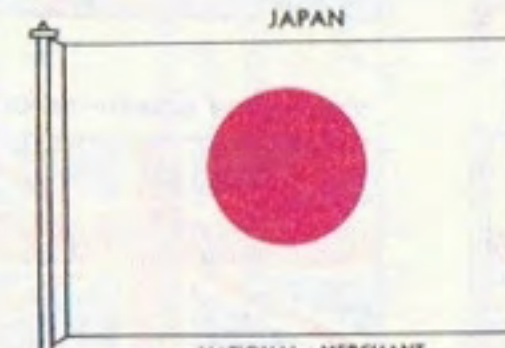
GERMANY

NATIONAL—MERCHANT



AUSTRALIA

NATIONAL—JACK
MERCHANT—Same design on red field



JAPAN

NATIONAL—MERCHANT



LIBERIA

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Figure 9-8.—Flags of some leading maritime nations—Continued.



C101.43

Figure 9-9.—United Nations flag.

order of the countries represented, starting from the left and reading clockwise. The United Nations flag may be displayed on a flagpole in the center of a circle of flags or in the center of a line cluster or semicircular display.

The United Nations flag is displayed at installations of the Armed Forces of the United States only upon occasions of visits of high dignitaries of the United Nations, or on other special occasions in honor of the United Nations. When so displayed, it is flown with the United States flag. Both flags should be of the same approximate size and on the same level with the flag of the United States in the position of honor on the right (observer's left).

On occasions when U.N. dignitaries are to be honored, Navy vessels display the U.N. flag from the main truck in the same manner as they present a foreign ensign during visits of a foreign president or sovereign.

Except as indicated above, display of the U.N. flag by the U.S. Armed Forces is prohibited unless so authorized by the President of the United States.

PASSING HONORS

In some cases, the distinctive mark flown from a ship indicates the grade of the senior line officer on board and, thus, is a means of determining who should initiate passing honors. The commanders in chief of the Atlantic and Pacific

Fleets periodically promulgate a list of ships and subdivisions of the fleet with the name and lineal number of each commanding officer and commander. The list helps determine who should initiate honors, but because unit commanders occasionally ride other ships, Signalmen must be alert to distinctive marks being flown.

Passing honors, initiated by the junior, are honors (other than gun salutes) between Navy and/or Coast Guard ships and to officers and civil officials embarked in boats when passing close aboard. Close aboard is defined as 600 yards for ships and 400 yards for boats, but both frequently are extended to ensure that appropriate honors are rendered.

Most frequently, passing honors consist of saluting the ship or official passing. When the bow of a ship passes the bow or stern of another commissioned ship or boat, attention to the appropriate side is called by sounding one or two whistles over the 1MC. All hands in view on that side and not in ranks face outboard. "Hand salute" is sounded. When the other ship or the official returns the salute, "Two" and then "Carry on" are sounded. Whistle (and bugle) signals used for passing honors are as follows:

One blast	Attention to starboard
Two blasts	Attention to port
One blast	Render salute
Two blasts	Terminate salute, remain at attention
Three blasts	Carry on

In addition, the honors prescribed in figure 9-10 are rendered by a ship of the Navy passing close aboard a ship or naval station displaying the flag of the official indicated and by a naval station, when practicable, when a ship displaying such a flag passes close aboard. These honors, and all honors between ships, are acknowledged by rendering the same honors in return.

The honors prescribed in figure 9-11 are rendered by a ship of the Navy passing or being passed close aboard by a boat displaying the flag of a civil official indicated. Honors to Armed Forces officers displaying a personal flag or

Official	Uniform	Ruffles and flourishes	Music	Guard	Remarks
President	As prescribed by senior officer present.	4	National anthem.	Full	Man rail, unless otherwise directed by senior officer present.
Secretary of State when special foreign representative of the President.	 do	4	. . . do . . .	. . do . .	Crew at quarters.
Vice President	Of the day		Hail Columbia	. . do . .	Do.
Secretary of Defense, Deputy Secretary of Defense, or Secretary of the Navy.	 do		. . . do . . .	. . do . .	Do.
Assistant Secretary of Defense, Under Secretary or an Assistant Secretary of the Navy	 do		. . . do . . .	. . do . .	Do.

Figure 9-10.—Passing honors for ships.

Official	Ruffles and flourishes	Music	Guard	Remarks
President	4	National anthem	Full	"Attention!" sounded, and salute by all persons in view of deck. If directed by the senior officer present, man rail.
Secretary of State when special foreign representative of President.	4	. . . do . . .	. do .	"Attention!" sounded, and salute by all persons in view on deck.
Vice President	4	Hail Columbia	. do .	Do.
Secretary of Defense, Deputy Secretary of Defense, Secretary of the Navy, Assistant Secretary of Defense, Under Secretary or an Assistant of the Navy.	4	Admiral's march	. do .	Do.
Other civil official entitled to honors on official visit.			. do .	
Officer of an armed service.			. do .	

Figure 9-11.—Passing honors for boats.

command pennant from the bow of a boat are the same as those for passing Navy ships. (Flags of some civil officials are shown in figure 9-7.)

When a ship of the Navy is passing the USS *Arizona* Memorial, Pearl Harbor, Hawaii, between sunrise and sunset, passing honors consisting of sounding "Attention" and rendering the hand salute by all persons in view on deck and not in ranks shall be executed by that ship.

Honors to officers or officials embarked in boats are acknowledged by the officer or official through a hand salute or other mark of respect.

When a boat bearing a senior passes, passing honors are rendered. If a junior but a commanding officer, unit commander, or flag officer on an official occasion, personnel on the quarterdeck only will salute. This is a mark of respect to the person who holds command at sea.

Passing honors are not rendered after sunset or before 0800 except when international courtesy requires. They are not exchanged between ships of the Navy engaged in tactical evolutions outside port.

The senior officer present may direct that passing honors be omitted in whole or in part.

PASSING HONORS TO FOREIGN DIGNITARIES AND WARSHIPS

Honors prescribed for the President of the United States are rendered by a ship of the Navy being passed close aboard by a ship or boat displaying the flag or standard of a foreign president, sovereign, or member of a reigning family. The foreign national anthem is played instead of the national anthem of the United States.

SIDE HONORS

Side honors, rendered to officers and officials boarding and departing the ship, are a part of the honors stipulated on the occasion of an official visit. The honors consist of parading the proper number of side boys and piping the

side. Officers appropriate to the occasion also attend the side. Side honors are usually not rendered between sunset and 0800, during meal hours, or on Sunday. Side boys shall not be paraded on Sunday, or on other days between sunset and 0800, or during meal hours of the crew, general drills and evolutions, and periods of regular overhaul, except in honor of civil officials or foreign officers, when they may be paraded at anytime during daylight. Side boys shall be paraded only for scheduled visits.

Side honors also may be rendered as a part of naval courtesy to officers and officials on occasions other than an official visit. Once the honors are rendered, it becomes an official visit modified by the senior officer present.

HONORS FOR OFFICIAL VISITS

Articles in *U.S. Navy Regulations* detail honors for official visits by military officers and civil officials. Figure 9-12 illustrates the proper flag to be displayed for a civil official, where it is to be displayed, and the period of display.

Honors prescribed for an official visit are rendered on arrival as follows:

1. When the rail is manned, personnel are uniformly spaced at the rail on each weather deck, facing outboard.
2. "Attention" is sounded as the visitor's boat or vehicle approaches the ship.
3. If an arrival gun salute is prescribed, it is fired as the visitor approaches and still is clear of the side. The proper flag or pennant is broken on the first gun and hauled down on the last gun except when it is to be flown for the duration of the visit. If the ship visited is moored in such a position that it is not practicable to render the gun salute before the visitor arrives on board, the salute is rendered (provided local regulations do not forbid gun salutes) after the official and party have arrived on board and are in a position well clear of the saluting battery.
4. The boat or vehicle is piped as it comes alongside.

Official	Flag			Official	Flag		
	What	Where	During		What	Where	During
President	President's	Main truck.	Visit.	Under Secretary of the Air Force.	National	Fore truck.	Salute.
Ex-President or president elect.	National	do do do	Salute.	Assistant Secretaries of the Army.	do do do	do do do	Do.
Secretary of State when acting as special foreign representative of the President.	Secretary's	do do do	Visit.	Assistant Secretaries of the Navy.	Assistant Secretary's	Main truck.	Visit.
Vice President	Vice President's	do do do	Do.	Assistant Secretaries of the Air Force.	National	Fore truck.	Salute.
Speaker of the House of Representatives.	National	Fore truck.	Salute.	Governor General or Governor of a Commonwealth or possession of the United States, or area under United States administration.	National	Fore truck.	Salute.
Governor of a State of the United States.	do do do	do do do	Do.	Other Under Secretaries of Cabinet, the Solicitor General, the Deputy Attorney General, and the Deputy Postmaster General.	do do do	do do do	Do.
Chief Justice of the United States.	do do do	do do do	Do.	Members of Congress.	do do do	do do do	Do.
Ambassador, High Commissioner, or special diplomatic representative whose credentials give him authority equal to or greater than that of an Ambassador.	do do do	do do do	Do.	Envoy Extraordinary and Minister Plenipotentiary.	do do do	do do do	Do.
Associate Justices of Supreme Court.	do do do	do do do	Do.	Minister Resident.	do do do	do do do	Do.
U. S. representatives to the U. N.	do do do	do do do	Do.	Charge d'Affaires.	do do do	do do do	Do.
Secretary of Defense.	Secretary's	Main truck.	Visit.	Career Minister, or Counselor of Embassy or Legation.	do do do	do do do	Do.
Deputy Secretary of Defense.	Deputy Secretary's	do do do	Do.	Consul General, or Consul or Vice Consul when in charge of a Consulate General.	National	Fore truck.	Do.
Cabinet officer (other than Secretary of Defense).	National	Fore truck.	Salute.	First Secretary of Embassy or Legation.	do do do	do do do	Do.
Secretary of the Army.	do do do	do do do	Do.	Consul or Vice Consul when in charge of a Consulate.	National	Fore truck.	Salute.
Secretary of the Navy.	Secretary's	Main truck.	Visit.	Mayor of an incorporated city.	do do do	do do do	Do.
Secretary of the Air Force.	National	Fore truck.	Salute.	Second or Third Secretary of Embassy or Legation.	do do do	do do do	Do.
Director of Defense Research and Engineering.	Director's	do do do	Visit.	Vice Consul when only representative of United States, and not in charge of a Consulate General or Consulate.	National	Fore truck.	Salute.
President pro tempore of the Senate.	National	do do do	Salute.	Consular Agent when only representative of the United States.	do do do	do do do	Do.
Assistant Secretaries of Defense.	Assistant Secretary's	Main truck.	Visit.				
General Counsel of the DOD.	National	Fore truck.	Salute.				
Under Secretary of the Army.	do do do	do do do	Do.				
Under Secretary of the Navy.	Under Secretary's	Main truck.	Visit.				

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Figure 9-12.—Flag displays during official visits.

5. The visitor is piped over the side; all persons on the quarterdeck salute and the guard presents arms until termination of the call, ruffles and flourishes, music, or gun salute, depending on which is the last rendered.

6. If a gun salute is not prescribed on arrival, but a flag or pennant is to be displayed during

the visit, it is broken at the start of the call.

7. Piping of the side, ruffles and flourishes, and music are rendered in that order. In the absence of a band, "To the Colors" is sounded on the bugle in lieu of the national anthem, when required.

Departure honors for an official visit are as follows:

1. The rail is manned, if required.
2. "Attention" is sounded as the visitor arrives on the quarterdeck.
3. When the visitor is ready to leave the ship, the guard presents arms, all persons on the quarterdeck salute, and ruffles and flourishes, followed by music, are rendered. The visitor is then piped over the side. The salute and present arms terminate with the last note of the call. If no salute is to be fired, a flag or pennant displayed in honor of the visitor is hauled down.
4. The boat or vehicle is piped away from the side.
5. If a gun salute is prescribed on departure, it is fired when the visitor is clear of the side. If a flag or pennant is displayed in honor of the visitor, it is hauled down with the last gun of the salute.

The Signaller's responsibilities for honors during official visits are the proper display of flags or pennants. That entails some advance planning and coordination to ensure a snappy evolution.

A basic rule for the display is that only one distinctive mark may fly from a ship. Thus, if the person visiting is an officer eligible for command at sea who rates a personal flag or command pennant, the personal flag flies in lieu of the commission pennant. If the ship visited is a flagship and the officer visiting is senior to the commander of the unit and rates a personal flag or command pennant, the personal flag or command pennant of the officer visiting flies in lieu of the unit commander's personal flag or pennant. The flag or pennant of an officer not eligible for command at sea is not displayed from a ship of the Navy.

The Red Cross flag is never replaced. The flying of the personal flag of an officer eligible for command of a warship at sea violates the neutrality of the provisions of the Geneva Convention.

In addition to the rule that only one distinctive mark may be displayed at one time, the commission pennant and personal flag of a civil official may not be displayed simultaneously. When a civil official, in whose honor the display of a personal flag is prescribed (see figure 9-12), pays an official visit or embarks for passage, the personal flag is displayed at the after masthead or most conspicuous hoist, replacing the distinctive mark. If the mark is a commission pennant, it is immediately lowered; if it is an officer's personal flag or command pennant, it is shifted, as explained earlier in this chapter.

Visits during dress ship also provide variations in displaying personal flags and command pennants. Check *U.S. Navy Regulations* and NTP 13 for details.

HONORS ON RELIEF OF COMMAND

When a flag officer or a unit commander relieves a command or departs after being relieved, the same honors are rendered as for an official visit, subject to regulations pertaining to gun salutes.

When assuming a command, an officer reads his or her orders to the assembled officers and crew. Immediately after reading the orders, the officer's personal flag or command pennant is broken, and a gun salute, if required, is fired.

If the flag officer or unit commander is relieving another officer in command, the officer being relieved reads his or her orders to the assembled officers and crew. On completion thereof, or after the gun salute, if fired, the commission pennant is hoisted and the personal flag or pennant immediately lowered. The officer succeeding to command then reads his or her orders, and on completion thereof, the flag or command pennant is broken and the ship's commission pennant is hauled down.

An important point of the relieving ceremony as it pertains to a Signaller is that the ship's distinctive mark always be in the air. There are occasions, for example, when commanding officers (below flag rank) being

relieved are presented with the ship's commission pennant. When such a presentation is to be made, a new commission pennant must be closed up before the one to be presented is hauled down.

HONORS AT OFFICIAL INSPECTIONS

When a flag officer or unit commander boards a ship of the Navy to make an official inspection, honors are rendered as for an official visit. The flag or pennant is broken upon arrival and is hauled down on departure. When the flag of a flag officer or unit commander is flying on board the vessel being inspected, his or her personal flag is hauled down on board the flagship unless the latter is the vessel being inspected.

The same provisions apply, insofar as practical and appropriate, when a flag officer in command ashore makes an official inspection of a unit of his or her command.

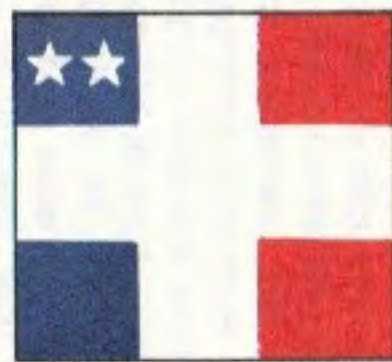
HONORS FOR FOREIGN MILITARY OFFICERS AND CIVIL OFFICIALS

Honors rendered to foreign military officers and civil officials are essentially the same as those for United States officers and civil officials of the same rank. A foreign naval officer's flag is, however, not displayed from a U.S. Navy ship. Flags pictured in figure 9-13 are shown for the purpose of recognition and as an aid in determining relative seniority for rendering passing honors and the like.

The national ensign of the foreign country is flown from a U.S. Navy ship when visited by a foreign officer or civil officer. If the official is entitled to a 21-gun salute, the foreign ensign is flown from the main masthead. If entitled to fewer than 21 guns, it is flown from the foremast. The personal flag or command pennant normally displayed at the main would be moved to another location, as mentioned earlier for U.S. civil officials.



VICE ADMIRAL



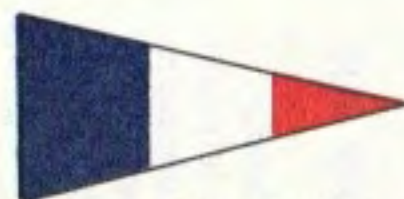
REAR ADMIRAL



CAPTAIN COMMANDING
A DIVISION



CAPTAIN COMMANDING A
GROUP OF SHIPS OR A
NAVAL STATION



COMMANDER COMMANDING A GROUP
OF SHIPS OR A NAVAL STATION

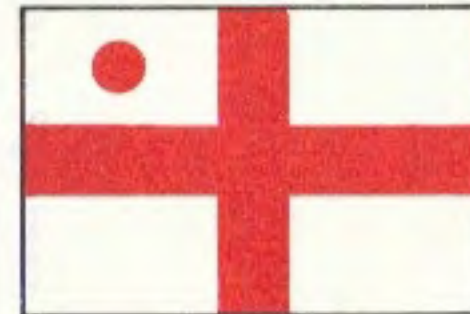


SOPA

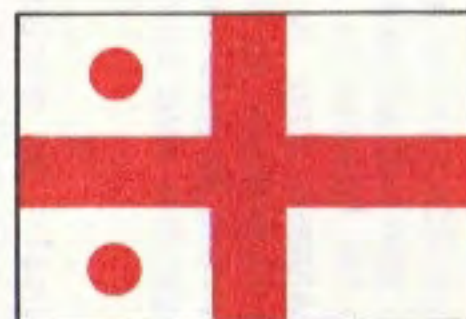
FRANCE



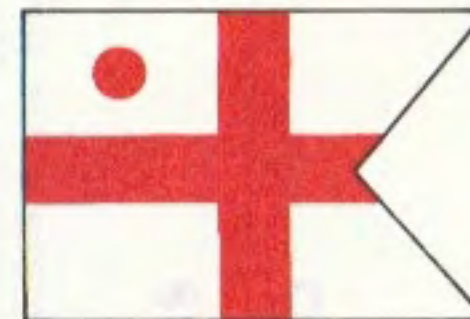
ADMIRAL



VICE ADMIRAL



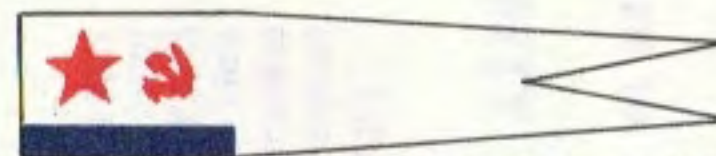
REAR ADMIRAL



COMMODORE

GREAT BRITAIN

USSR



SENIOR OFFICER AFLOAT



COMMANDER OF FLOTILLA



OFFICER COMMANDING
NAVAL FORCES



SENIOR
FLAG OFFICER



JUNIOR
FLAG OFFICER



COMMODORE

C101.47

Figure 9-13.—Personal flags of major naval powers.

CHAPTER 10

SECURITY

As a Signalman, you will hear a great deal about the security of classified material. You will have access to and use classified information every day. For that reason, all activities brief newly arrived Signalmen in security and require them to sign a statement attesting that they have received the briefing and understand the contents. Further, as part of each command's security program, you will be required to read and indicate your understanding of several of the most important national laws and regulations related to security.

Maintaining the security of classified material however, requires more than a briefing, a regulation, or a law. Security will only be as effective as you make it. There is no one to whom you can transfer your responsibility for protecting this information. Security is a basic part of your assignment just as is operating signaling equipment. You must be security conscious to the point that you automatically exercise proper discretion in the discharge of your duties and do not think of security of information as something separate and apart from other matters. In this way, security of classified information becomes a natural element of every task and not an additionally imposed burden.

PURPOSE OF SECURITY PROGRAM

The security program deals basically with the safeguarding of information that should not be allowed to fall into the hands of foreign governments, foreign nationals, or other unauthorized persons because of the danger that such information might be used to the detriment of the United States.

Information may be compromised through careless talk, improper handling of classified material, and in various other ways. Some of the ways in which military personnel may accidentally give away vital information are discussed in *Basic Military Requirements*, NAVEDTRA 10054.

SECURITY PRINCIPLES

The Department of Defense security formula is based on the premise of circulation control; i.e., the control of dissemination of classified information. According to this policy, knowledge or possession of classified defense information is permitted only to persons whose official duties require access to the information ("Need to Know").

CLASSIFICATION CATEGORIES

Official information that requires protection in the interests of national security is placed into one of three categories: Top Secret, Secret, or Confidential. Following are examples and definitions of each category.

TOP SECRET

Classified Top Secret is information or material which requires the highest degree of protection. It is of such a nature that its unauthorized disclosure could reasonably be expected to cause exceptionally grave damage to the national security.

Examples of "exceptionally grave damage" are an armed attack against the United States or

its Allies, and the compromise of military or defense plans, intelligence operations, or scientific or technological developments vital to the national defense.

SECRET

Secret is the classification of information or material the unauthorized disclosure of which could reasonably be expected to cause serious damage to the national security, such as:

1. Jeopardizing the international relations of the United States.
2. Endangering the effectiveness of a program or policy of vital importance to the national defense.
3. Compromising important military or defense plans, or scientific or technological developments important to national security.
4. Revealing important intelligence operations.

CONFIDENTIAL

The use of the Confidential classification is limited to information or material the unauthorized disclosure of which could reasonably be expected to cause identifiable damage to the national security, such as:

1. Operational and battle reports that contain information of value to the enemy.
2. Intelligence reports.
3. Military radio frequency and call sign allocations that are especially important, or are changed frequently for security reasons.
4. Devices and material relating to communication security.
5. Information that reveals strength of our land, air, or naval forces in the United States and overseas areas.
6. Documents and manuals containing technical information used for training,

maintenance, and inspection of classified munitions of war.

7. Operational and tactical doctrine.

8. Research, development, production, and procurement of munitions of war.

SPECIAL MARKINGS

In addition to the security labels mentioned already, other markings also appear on classified material. Among these markings are such designations as "Restricted Data" or "Formerly Restricted Data."

All data concerned with (1) design, manufacture, or utilization of atomic weapons; (2) production of special nuclear material; or (3) use of special nuclear material in production of energy bear conspicuous "Restricted Data" markings. Restricted data, when declassified under the Atomic Energy Act of 1954, must be marked "Formerly Restricted Data, Handle as Restricted Data in foreign dissemination, section 144.b, Atomic Energy Act, 1954."

For Official Use Only

The term "For Official Use Only" (FOUO) is assigned to official information which requires protection in accordance with statutory requirements or in the public interest but which is not within the purview of the rules for safeguarding information in the interests of national defense. An example of FOUO information is an unclassified advancement examination.

COMPROMISES

The compromise of classified material presents a threat to the national security.

When classified material has been compromised or subjected to compromise, the seriousness of the threat must be determined and action taken to reduce the effects of compromise. At the same time, action must be taken to investigate the circumstances and determine the causes to prevent recurrence.

Compromise of classified material results when a security violation has resulted in confirmed or suspected exposure of classified information or material to an unauthorized person. Compromise is considered "confirmed" when conclusive evidence exists that classified material was compromised and is considered "suspected" when some evidence exists that classified material has been subjected to compromise.

Any individual in the Department of the Navy who is aware of the compromise or possible compromise of classified material must report the facts immediately to the most readily available command.

Individuals who are aware of possible acts of sabotage, espionage, deliberate compromise, or other subversive activities shall report immediately all available information to the most readily all available command which, in turn, shall notify the appropriate Naval Investigative Service office.

SECURITY CLEARANCES

A personnel security clearance is an administrative determination that an individual is eligible for access to classified information of the same or lower category as the clearance being granted.

You may not handle classified material without proper security clearance. If your duties require you to use classified publications and documents (and they are virtually sure to), the commanding officer is authorized to grant you clearance up to an interim Confidential clearance on the basis of a review of the personnel, medical, or other records immediately available to the command, if the records do not contain any derogatory information which would indicate the person was not trustworthy and the national agency check or national agency check and entrance have been requested.

To determine whether an individual meets the criteria for access to Secret or Top Secret material, personnel security investigations are used.

TYPES OF INVESTIGATIONS

There are several types of personnel security investigations, each having the goal of determining the loyalty, reliability, and trustworthiness of an individual. Of the several types, only two are discussed here: the national agency check (NAC) and the background investigation (BI). The others are for special purposes or apply to civilians.

National Agency Check

A national agency check consists of a check of the files of a number of Government agencies for pertinent facts bearing on the loyalty and trustworthiness of the individual. Examples of agencies checked are the FBI and the Naval Military Personnel Command.

Background Investigation

The background investigation is much more extensive than a national agency check. It is designed to develop information as to whether the access to classified information by the person being investigated is clearly consistent with the interests of national security. It includes an NAC and probes deeply into the loyalty, integrity, and reputation of the individual.

INTERIM AND FINAL CLEARANCES

Of the two types of clearances (interim and final), an interim clearance is granted as the result of a lesser investigative requirement and is a determination of temporary eligibility for access to classified information.

Because an investigation may take some time, commanding officers may grant an interim clearance, pending receipt of the investigation report. An interim clearance may be issued only when it is clearly established that the delay while waiting for the completion of the investigation required for a final clearance would be harmful to the national interest.

A final clearance is granted upon completion of all investigative requirements as set forth in chapter 16 of the *Department of the Navy Information Security Program Regulation*, OP-NAVINST 5510.1 series.

ACCESS AND CLEARANCE ELIGIBILITY

No person shall be entitled to knowledge of, possession of, or access to classified defense information solely by virtue of office, position, or security clearance.

Classified information is made available to appropriately cleared persons only when it is necessary in the interests of national defense and the individual requires the information to carry out assigned duties. Personnel authorized access to classified information must be trustworthy, loyal, and of good character.

The following is a list of personal acts of varying degrees of seriousness which, if committed, past or present, could cause the denial or revocation of a personal security clearance.

1. Commission of any act of sabotage, espionage, treason, or sedition, conspiring with or aiding or abetting another to commit or attempt to commit any act of sabotage, espionage, treason, or sedition.

2. Establishing or continuing a sympathetic association with a saboteur, spy, traitor, seditionist, anarchist, or revolutionist, or with an espionage or other secret agent or representative of a foreign nation, or any representative of a foreign nation whose interests are contrary to the interests of the United States.

3. Advocacy of use of force or violence to overthrow the Government of the United States, or the alteration of the form of Government of the United States by unconstitutional means.

4. Membership in, or affiliation or sympathetic association with, any foreign or domestic organization, association, movement, group, or combination of persons which is totalitarian, Fascist, Communist, or subversive, or which has adopted a policy of advocating or approving the commission of acts of force or violence to deny other persons their rights under the Constitution of the United States.

5. Acting so as to serve the interests of another government in preference to the interests of the United States.

6. Close or continuing association with persons or organizations whose activities are of the type described in 1 through 5.

7. Excessive indebtedness.

8. Criminal or dishonest conduct.

9. Deliberate false statement, deception, or fraud in applying for enlistment or appointment or in providing information in connection with a security clearance or assignment to a sensitive position.

10. Habitual or episodic use of intoxicating beverages to excess.

11. Abuse of, or addiction to, narcotics, drugs, or other controlled substances.

12. Any facts, circumstances, or conduct that furnishes reason to believe that the person concerned may be subject to coercion, influence, or pressure that could cause the individual to act contrary to the national security. Such facts or circumstances may include the pressure of an immediate family member, friend, or associate residing in a nation whose interests may be contrary to the interests of the United States or in satellites or occupied areas of such a nation. Immediate family includes parents, brothers, sisters, children, and spouse.

13. Any facts, circumstances, or conduct that indicates poor judgment, unreliability, or untrustworthiness, thereby suggesting that the person concerned might fail to safeguard classified information, deliberately or inadvertently, or may not be suitable for assignment to sensitive duties.

14. Any illness, including any mental condition, of a nature which in the opinion of competent medical authority may cause significant defect in the judgment or reliability of the person concerned, with due regard to the transient or continuing effect of the illness and medical findings in such case.

15. Wanton or reckless disregard of public law, statutes, Executive orders, or willful disregard of security regulations.

16. Refusal or intentional failure to provide material facts in a personal history statement or security form or otherwise intentionally failing or refusing in the course of an investigation, interrogation, or hearing to answer, or to authorize others to answer, any material questions.

CUSTODY

Commanding officers are responsible for safeguarding all classified information within their commands and for ensuring that classified material not in actual use by appropriately cleared personnel or under their direct personal observation is properly stored.

STORAGE

A system of numerical evaluation has been developed to provide a uniform guide for establishing security protection for classified material in storage, equal to the security interest in such material. It not only provides a means of determining the relationship between the security interest and the level of protection required, but also sets forth values for various elements of a security program which may be combined to produce an acceptable level of protection. The system of numerical evaluation does not guarantee protection, nor does it attempt to meet every conceivable situation. The law of diminishing returns limits the measures that can be employed profitably. However, with a commonsense implementation of the system of numerical evaluation, it is possible to obtain a satisfactory degree of security with a minimum sacrifice in operating efficiency.

The elements of the numerical evaluation system are as follows:

A table of numerical equivalents (see figure 10-1) which assigns numerical values for various types of storage areas, containers, guarding, and alarm systems which individually or collectively may be incorporated in the physical security program for the protection of classified material.

An evaluation graph (see figure 10-2) which establishes in the form of numerical values, minimum levels of relative security required for the protection of classified material based on classification, quantity, and scope of the documents or equipment concerned.

The application of the numerical evaluation system to a command's physical security program for the protection of classified material is as follows:

From figure 10-1, select the appropriate numerical equivalents for each applicable element in the security program and total them. In arriving at the total, only one value may be assigned for the appropriate element under each of the lettered subsections. For example, under 1.c. Building or Ship, value may be assigned for (1) or (a), (b) or (c), but not for (1) AND (a), (b), or (c). It is permissible to interpolate the values indicated as necessary to reflect the existing situation.

From figure 10-2, select a subcategory which most accurately describes the material in storage. Where the material in storage is of mixed security interest because of classification, scope, or both, the subcategory describing the highest interest shall be used. From the subcategory selected, proceed horizontally to the point of intersection with the diagonal lines on the graph. The relative security required, expressed as a numerical value, will be found on the scale at the bottom of the graph. Again, it is proper to interpolate. That will reflect the relationship of the security program to the standard.

Compare the value obtained in figure 10-2 to the total values developed in figure 10-1. If the security program is below the required standard, the program shall be adjusted to the required level.

Storage of valuables such as money, jewels, precious metals and narcotics, etc., is prohibited in containers used for storage of classified material.

New Storage Equipment

Whenever new storage equipment is procured, it must be of the type designated as

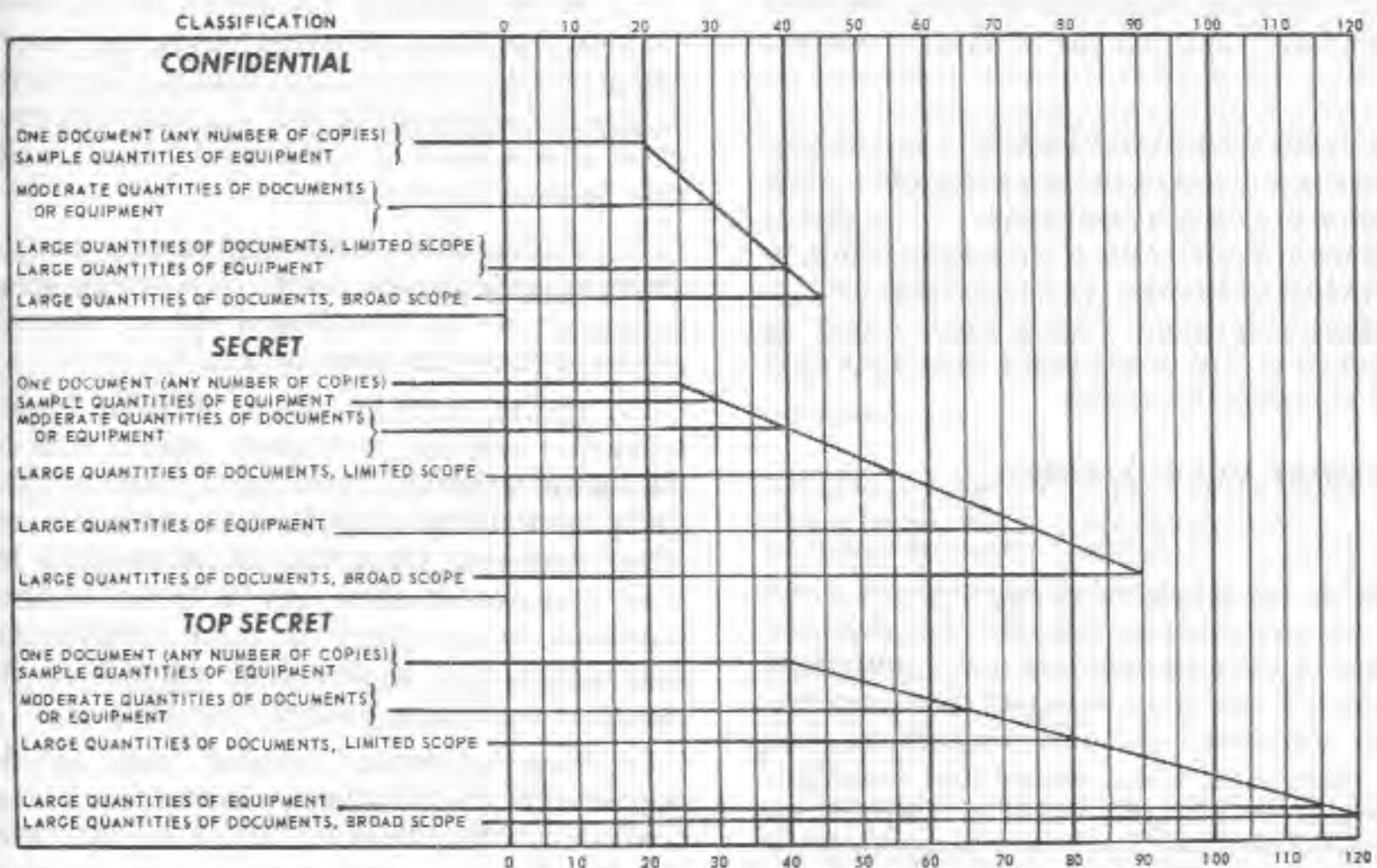
Element of Security	Value	Element of Security	Value
1. Storage Areas:		2. Storage Containers—Continued	
a. Security Fences:		r. Class 6 map and plan, approved GSA security container.....	55
(1) Classified area surrounded by a security fence with all gates secured or controlled.....	5	3. Guarding:	
b. Protective Lighting:		a. Supporting Guard Force:	
(1) Security areas lighted by protective lighting.....	5	(1) Civilian Supporting Guard Force.....	10
c. Building or Ship:**		(2) Military Supporting Guard Force.....	15
(1) Conventional frame or good quality temporary structure.....	5	b. Guards:	
(a) Controlled areas within.....	15	(1) Civilian Guards:	
(b) Limited areas within.....	25	(a) Civilian guard in general area.....	10
(c) Exclusion areas within.....	35	(b) Civilian guard check of container each hour.....	15
(2) Masonry or steel structure with substantial partitions, floors and ceilings (including magazines).....	10	(c) Civilian guard check of container each ½ hour.....	20
(a) Controlled areas within.....	20	(d) Civilian guard in attendance at container.....	30
(b) Limited areas within.....	30	(2) Military Guards:	
(c) Exclusion areas within.....	40	(a) Military guard in general area.....	15
(3) Aboard a Commissioned Ship.....	25	(b) Military guard check of container each hour.....	20
(a) Controlled area.....	35	(c) Military guard check of container each ½ hour.....	25
(b) Limited area.....	40	(d) Military guard in attendance at container.....	60
(c) Exclusion area.....	50	c. Sentry dog accompanying military or civilian guard.....	10
(4) "In Service" or MSC chartered vessel.....	10	4. Protective Alarm Systems:	
(a) Controlled areas within.....	20	a. Area Alarm System:	
(b) Limited areas within.....	30	(1) Make or break (electro-mechanical) alarm to detect entry into immediate area.....	5
(c) Exclusion areas within.....	40	(2) Other alarm system to detect entry into immediate area.....	10
2. Storage Containers:**		(3) Alarm system to detect entry or attempted entry into immediate area.....	15
a. Metal, keylock (built-in).....	0	(4) Alarm system to detect entry or attempted entry and approach to immediate area.....	25
b. Metal, key padlock (attached).....	0	b. Container Alarm Systems:	
c. Metal, high security key padlock (attached).....	5	(1) Make or break (electro-mechanical) alarm to detect opening of container.....	10
d. Metal, combination padlock (attached).....	5	(2) Other alarm system to detect opening of container.....	15
e. Metal, high security combination padlock (attached).....	10	(3) Alarm system to detect opening or tampering with container.....	20
f. Metal, combination lock (built-in).....	15	(4) Alarm system to detect opening or tampering with and approach to container.....	25
g. Strongroom or weapons magazine.....	15		
h. Class C Vault.....	50		
i. Class B Vault.....	60		
j. Class A Vault.....	70		
k. Class 1, approved GSA security container.....	70		
l. Class 2, approved GSA security container.....	60		
m. Class 3, approved GSA security container.....	50		
n. Class 4, approved GSA security container.....	60		
o. Class 5, approved GSA security container.....	70		
p. Class 6, approved GSA security container.....	55		
q. Class 5 map and plan, approved GSA security container.....	70		

*Buildings must be under U.S. Government control or if not under U.S. Government control the space occupied within the building must be at least a controlled area.

**Evaluate as indicated provided other elements in the security program are available to minimize the possibility of unauthorized access to the container.

Figure 10-1.—Table of numerical equivalents.

SECURITY OF MATERIAL IN STORAGE



101.48

Figure 10-2.—Security of material in storage, evaluation graph.

security filing cabinets by the General Services Administration.

If damage to a GSA-approved security file cabinet is repaired with welds, rivets, or bolts which cannot be removed and replaced without leaving evidence of entry, the cabinet is limited thereafter to the storage of Secret and Confidential material.

If the damage is repaired using methods other than those permitted above, use of the cabinet will be limited to unclassified material and a notice to that effect will be permanently marked on the front of the cabinet.

Keys and Combinations

Keys for padlocks, combinations of padlocks, and built-in locks of containers used

for protection of classified information are given the same protection required for the classified material being protected.

Only those persons whose official duties require access to a container are to know its combination or have access to its key. The combination or key to a security container is changed at the time received, at the time any person having knowledge of it leaves the organization, at any time there is reason to believe it has been compromised, or as a minimum every 12 months. Also, combination locks left unlocked and not under continuous surveillance must be changed before they are used again.

Records of combinations shall be sealed in an envelope and kept on file by the security manager, duty officer, communications officer, or other person designated by the commanding officer. In selecting combination numbers,

multiples of 5, simple ascending or descending arithmetical series, and personal data (such as birthdates and service numbers) should be avoided. The same combination will not be used for more than one container in any one component.

Rotate the dials of combination locks at least four complete turns in the same direction when securing containers so equipped. If the dial is given only a quick twist, it may be possible to open the lock merely by turning the dial back in the opposite direction. Check each drawer to make sure it is held firmly in the locked position when a container is secured.

CUSTODIAL PRECAUTIONS

Custodians of classified material shall be responsible for safeguarding the material at all times and particularly for locking classified material in appropriate security equipment whenever it is not in use or under direct supervision of authorized persons. Custodians shall follow procedures which ensure that unauthorized persons do not gain access to classified information or material by sight or sound or other means. Classified information shall not be discussed with or in the presence of unauthorized persons.

Classified information or material shall not be removed from officially designated office or working areas for the purpose of working on such material during off-duty hours or for other purposes involving personal convenience unless specifically approved by the commanding officer or authorized designee. Prior to approval being granted, it must be determined that:

1. A compelling necessity exists.
2. The required physical security can be provided.
3. A complete list of the removed material will be left with the command.

Care During Working Hours

During working hours, precautions shall be taken to prevent access to classified information

by unauthorized personnel. Among the necessary precautions to be followed are:

1. When classified documents are removed from storage for working purposes, they are to be kept under constant surveillance, face down or covered when not in use. Classified material cover sheets, such as OPNAV Form 5216/96, may be used for this purpose.

2. Visitors not authorized access to the classified information within a working space are received or interviewed in a specially arranged reception room or area.

3. Drafts, carbon sheets, carbon paper, typewriter ribbons (one time), plates, stencils, stenographic notes, worksheets, and similar items containing classified information are either destroyed by the person responsible for their preparation after they have served their purposes, or are given the same classification and safeguarded in the same manner as the classified material produced from them.

4. New typewriter ribbons used in the preparation of classified material are either typed on until illegible, or given the same classification and safeguarded in the same manner as classified material prepared from them.

5. Classified material, upon receipt, is opened by the addressee or by persons specifically authorized in writing to open material of the grade involved.

If for any reason a room must be vacated during working hours, any classified material therein must be stowed in accordance with stowage instructions for the classification involved.

Care After Working Hours

Commanding officers shall require a security check at the end of each working day to ensure that all classified material is properly secured. The security check shall determine that:

1. All classified material is stored in the manner prescribed.

2. Burn bags are properly stored or destroyed.

3. The contents of wastebaskets which contain classified material have been properly stored or destroyed.

4. Classified shorthand notes, carbon paper, carbon and plastic typewriter ribbons, rough drafts, and similar papers have been properly stored or destroyed.

5. Security containers have been locked by the responsible custodians. The dial of combination locks shall be rotated at least four complete times in the same direction when securing safes, files, or cabinets.

The security check shall be made a matter of record, with the record retained at least until the next security check is conducted. Optional Form 62 may be used for this purpose.

Identification of the individual responsible for the contents of each container of classified material must be readily available. The individual so identified is contacted in the event a container of classified material is found open.

Care of Working Spaces

At a shore establishment, the precautions taken to protect classified information include trimming shrubbery outside ground floor offices that would afford cover for possible prowlers. Install heavy-duty grilles, screens, or bars on ground floor windows and other accessible openings if the building is in an exclusion or limited security area. The protective grilles and screen have the additional value of preventing missiles such as hand grenades and incendiaries from being hurled through the windows from outside the perimeter.

Classified information should not be disclosed through conversations. Inspections of spaces should be made for unauthorized wiring and possible concealment of listening devices in such places as behind pictures, radiators, under desks, etc. Repairs, routine maintenance, and cleaning in sensitive areas should be performed by reliable personnel under supervision.

Care During Emergencies

Emergency plans for the protection of classified material shall be prepared by each command that has such material under its control to provide adequate safeguards in the event of any emergency situation resulting from the effects of severe natural phenomena, fire, explosion, structural failure, loss of essential services, sabotage, riot, or similar causes. Your command's emergency plan for the protection of classified material should cover the measures to take and education and training of personnel regarding their expected conduct during an emergency.

CONTROLLING AND ACCOUNTING FOR CLASSIFIED INFORMATION

The accounting system for an activity should provide readily available information on what classified material it has received, what classified material it has produced, and who has custody of the material.

The control of classified material is necessary for several purposes. It must be controlled (1) to limit dissemination and to prevent excessive production or reproduction; (2) so that, when regraded or declassified, the holder or recipients can be ascertained and notified; and (3) so that the office or person normally responsible for its security can be ascertained.

Top Secret Material

Except for publications containing a distribution list by copy number, all copies of each Top Secret document and each item of Top Secret equipment shall be serially numbered at the time of origination; e.g., Copy No__ of__ copies.

Top Secret documents shall contain a list of effective pages in which shall be included a record of page checks. When that is impracticable, as in correspondence or messages, the pages shall be numbered "Page __ of __ pages."

When Top Secret documents are reproduced with permission of the issuing office or higher authority, all reproduced copies are serially numbered and recorded with the Top Secret

control officer in order to maintain complete accountability. An acceptable method of identifying the new copies is to label them "Copy number 12/1 of ___ copies," "Copy 12/2 of ___ copies," et cetera. The first number (12) is the copy number of the original series from which reproduction is being made.

A list of names of all persons having knowledge of an item of Top Secret information must be maintained for 2 years after the information has been downgraded, the document has been destroyed, or custody has been transferred.

The control of Top Secret information is maintained by the Top Secret control officer if one is designated, or the classified material control officer. You may be required to assist either of them.

Secret Material

As a minimum requirement, commands must establish administrative procedures for recording all Secret material originated, received, and distributed or routed to components of, or activities within the command, or disposed of by the command by transfer of custody or destruction.

Confidential Material

Accountability for all Confidential information originated or received by a command is maintained by administrative procedures established locally.

DISPOSITION OF CLASSIFIED MATERIAL

When military or civilian personnel are separated from the Department of the Navy, all classified material held by them is turned in to the source from which received, to their commanding officer, or to the nearest naval command, as appropriate, prior to delivery of final orders or separation papers.

Persons being relieved deliver to their successors all classified material of the command within their custody. Receipts are completed, covering, as a minimum, all Top Secret material.

CONTROL OF DISSEMINATION

Commanding officers shall be responsible for controlling the dissemination of classified information coming from or distributed within their commands. They shall also be responsible for the promulgation of additional directives that may be required to prevent unauthorized distribution of information under their control.

The distribution of classified material shall be limited to those persons whose official duties require them to have knowledge or possession of such material. Responsibility for determining whether a person's duties require access to classified information and that the person is authorized to receive it rests upon each individual who has possession, knowledge, or control of the information involved.

The existence, nature content, or whereabouts of classified information shall not be divulged needlessly.

Classified material may be distributed to all agencies of the executive branch of the Government. On requests from Department of Defense agencies, the "Need-to-Know" may be judged on the face of the request. When the "Need-to-Know" is not discernible from the scope of the requester's activities, the need must be determined. Classified material sent to other activities of the executive branch of the Government shall be sent via the departmental headquarters of the requesting activity for a determination of the "Need-to-Know" and capability to handle classified material.

No person in the Department of the Navy shall convey orally, visually, or by written communication any classified information outside the executive branch of the Government of the United States unless such disclosure has been specifically authorized by the Chief of Naval Operations.

Classified information must not be discussed over telephones because of insecurity due to executive cut-in, phantom voice interceptions, and wiretapping. Telephones located in sensitive areas must be provided with a means of complete disconnection such as a plug or jack

arrangement if they are to be considered safe. Intercom systems located in sensitive areas must be confined to the sensitive area.

DESTRUCTION OF CLASSIFIED MATERIAL

Top Secret, Secret, and Confidential material may be destroyed by burning, pulping, pulverizing, or shredding, provided destruction is complete and reconstruction is impossible. The destruction of classified material must be witnessed by personnel having a security clearance at least as high as the category of material being destroyed, and be thoroughly familiar with regulations and procedures for safeguarding classified information. Two witnesses are required for the destruction of Top Secret material; one witness is required for Secret and Confidential material.

Witnessing officials must observe the complete destruction of classified documents or burn bags containing classified material. Burn bags containing classified material must be safeguarded according to the classification of the material therein. Residue shall be checked to determine whether destruction is complete and reconstruction impossible. Portions of burning material must be prevented from being carried away by wind or draft.

EMERGENCY DESTRUCTION

When determined to be required, commands located outside the 50 United States, all deployable commands, and all commands holding COMSEC material shall include in their emergency plan planning for the destruction of classified material in an emergency involving the danger of its capture. This determination shall be based on an overall commonsense evaluation of the following factors:

1. Level and sensitivity of classified material held by the activity.

2. Proximity of land-based commands to hostile or potentially hostile forces or to Communist-controlled countries.

3. Flight schedules or ship deployments in the proximity of hostile or potentially hostile forces or near Communist-controlled countries.

4. Size and armament of land-based commands and ships.

5. Sensitivity of operational assignment. (Contingency planning should also be considered.)

6. Potential for aggressive action of hostile forces.

In emergency destruction planning, the following measures shall be taken:

1. Reduction of the amount of classified material held by a command as the initial step toward planning for emergency destruction.

2. Storage of less frequently used classified material at more secure commands in the same geographical area (if available).

3. Transfer of as much retained classified material as possible to microforms, thereby reducing the bulk that needs to be evacuated or destroyed.

4. Emphasis on the priorities for destruction, designation of personnel responsible for destruction, and the designation of places and methods of destruction. Additionally, if any destruction site or any particular piece of destruction equipment is to be used by more than one activity or entity, the order or priority for use of the site or equipment must be clearly delineated.

5. Authorization for the senior individual present in an assigned space containing classified material to deviate from established plans when circumstances warrant.

6. Emphasis on the importance of beginning destruction sufficiently early to preclude loss of material. The effect of premature destruction is considered inconsequential when measured against the possibility of compromise.

Drills should be conducted periodically to ensure that those responsible are familiar with

the emergency plan. The drills should be used to evaluate the anticipated effectiveness of the plan and prescribed equipment and should be the basis for improvements in planning and equipment use.

METHODS OF EMERGENCY DESTRUCTION

Classified material may be jettisoned at sea at depths of 1,000 fathoms or more. If such water depth is not available and if time does not permit other means of emergency destruction, the material should, nonetheless, be jettisoned to prevent its easy capture. When shipboard emergency destruction plans include jettisoning, document sinking bags shall be available. If a vessel is to be sunk through intentional scuttling or is sinking due to hostile action, classified material should be locked in security filing cabinets or vaults and allowed to sink with the vessel rather than attempting jettisoning.

Other means of emergency destruction include dismantling or smashing metallic items beyond reconstruction by available means such as sledge hammers, cutting tools, torches, etc.; and supplementing emergency destruction devices with routine destruction equipment when time and circumstances permit. As a last

resort and where none of the methods previously mentioned can be employed, use other means, such as dousing the classified material with a flammable liquid and igniting it.

REPORTING EMERGENCY DESTRUCTION

Accurate information concerning the extent of emergency destruction of classified material is second in importance only to the destruction of the material itself. Accordingly, the facts surrounding the destruction shall be reported to the Chief of Naval Operations and other interested commands by the most expeditious means available. Reports shall contain the following information:

1. Identification of the items of classified material that may not have been destroyed.
2. Information concerning classified material which may be presumed to have been captured.
3. Identification of all classified material destroyed and the methods of destruction.

The requirement for reporting of emergency destruction of classified material shall be included as a part of the command's emergency plan.

APPENDIX I

FLASHING LIGHT AND SEMAPHORE DRILLS

FLASHING LIGHT

International Morse code, a series of dots and dashes representing letters and numerals, is the standard for all flashing light and radio CW communications. The original code system was worked out in 1832 by Samuel F. B. Morse.

You must know international Morse code before you can use flashing light equipment effectively. Figure I-1 shows the alphabet, numbers, and punctuation with the code equivalent. Basically, the code consists of 44 sight patterns: 26 letters, 10 numerals, and 8 punctuation marks. Each sight pattern (mental picture), except punctuation, contains from one to five dots or dashes (dits or dahs), or a combination of both, representing a letter or numeral. Punctuation sight patterns (except for the left parenthesis and slant/oblique stroke) consist of dots and dashes in groups of six.

Experience has proven that the best way for most communication personnel to learn code is by "wholes." For example, the Radioman is taught to relate whole tonal sounds to characters. Similarly, the Signaller should learn by whole sight patterns. Don't break each character into dits and dahs that you have to count. Try, instead, to learn each character as a complete mental picture. When you see 1 dit and 1 dah, say and think the letter A. Don't count them 1 dit, 1 dah, and then conclude that it is the letter A.

The best tip you will ever get on how to be a good Signaller is this: PRACTICE—don't neglect it! Practice is the steppingstone to success. When you see a good Signaller sending

and receiving a message on the light, you can rest assured that he or she was the striker who did plenty of practicing and is now the rated person who still is keeping in practice.

Once you memorize the code, ask one of the more experienced Signallers to send to you, using a blinker card, a multipurpose light, or even one of the searchlights. For the first few times, have the sender to tell you in advance what character he or she is going to send so you can get used to how that particular sight pattern looks. When you are reasonably sure you have the sight patterns memorized, ask the sender to send a character without telling you what it is, and you call out the character. If you miss, ask the sender to tell you at once what character it was and ask him or her to repeat it. After you gain considerable practice on individual patterns, have some code groups consisting of random characters sent to you. If you notice that you confuse a few characters with others, or that you seem to miss them more often than the rest, devote more time to those characters than to the others.

Practice these code groups as starters:

AFARF	EBBEU	NPSNP	LMZLM
ARFQZ	FEKUG	RBAPU	GVMCD
UQIWT	EHQXA	YSFTI	KNPUR
UFMGS	IAPZN	CRBDZ	ULXWK

You can make up all sorts of combinations yourself. Just be sure they are code groups and not ordinary words. At this stage of the game, there is a definite reason why you should not attempt plain language drills. You are liable to fall into the habit of anticipating the rest of the word or even the next logical word in the text.

LETTER	NUMBER
A - - - - -	1 - - - - -
B - - - - -	2 - - - - -
C - - - - -	3 - - - - -
D - - - - -	4 - - - - -
E - - - - -	5 - - - - -
F - - - - -	6 - - - - -
G - - - - -	7 - - - - -
H - - - - -	8 - - - - -
I - - - - -	9 - - - - -
J - - - - -	0 - - - - -
K - - - - -	
L - - - - -	PUNCTUATION (MORSE)
M - - - - -	COLON - - - - -
N - - - - -	COMMA - - - - -
O - - - - -	HYPHEN OR DASH - - - - -
P - - - - -	PARENTHESIS/LEFT HAND BRACKET - - - - -
Q - - - - -	PARENTHESIS/RIGHT HAND BRACKET - - - - -
R - - - - -	PERIOD OR DECIMAL POINT - - - - -
S - - - - -	QUESTION MARK - - - - -
T - - - - -	SLANT/OBLIQUE STROKE - - - - -
U - - - - -	
V - - - - -	PUNCTUATION (SEMAPHORE)
W - - - - -	COLON - - - - -
X - - - - -	COMMA - - - - -
Y - - - - -	HYPHEN OR DASH - - - - -
Z - - - - -	PARENTHESIS/LEFT HAND BRACKET - - - - -
	PARENTHESIS/RIGHT HAND BRACKET - - - - -
	PERIOD OR DECIMAL POINT - - - - -
	QUESTION MARK - - - - -
	SLANT/OBLIQUE STROKE - - - - -

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Figure I-1.—Formation of characters in Morse code and semaphore.

When you become really proficient in receiving code groups, only then should you progress to plain language. Even in these drills, try not to anticipate the next letter or word. You will be wrong more often than right, and you will find that when you guess wrong you may become confused and miss the entire word. Anticipating is a bad habit.

TIPS ON SENDING FLASHING LIGHT

After you become fairly adept at receiving, try sending code. You will find this phase a bit

easier. Keep in mind, however, that there is a definite physical limitation to the speed with which flashing light can be sent and still be readable. Depending upon the skill of the operator, the 12-inch Navy signal searchlight can be used to send up to 15 words a minute.

NEVER SEND FASTER THAN YOU CAN RECEIVE. If you transmit a message at 10 words a minute, an experienced SM probably will reply at the same rate; but you will be out of luck if you can read only 6 or 7 words a minute. Speed, incidentally, does not imply noise. The

shutters can be moved quickly without banging them up and down.

When you are first learning to send code by light, it is wise to increase the interval between characters and groups. The extra time enables the beginner to see each character in the proper time ratio. Moreover, the greater period between the characters and groups allows the mind to verify or realize what the eyes have seen. Practice reduces this reception time and the periods can be decreased.

The period the shutter remains open for a dit or dah and closed between characters and groups, when sending by flashing light, is given in the following list. Note that the interval between the dits and dahs is the same.

1. A dit equals 1 unit of duration.
2. A dah equals 3 units.
3. The period between dits or dahs in the same character equals 1 unit.
4. The period between two characters equals 3 units.
5. The period between groups equals 7 units.

FLASHING LIGHT QUALIFICATIONS

Certain flashing light standards are required of the Signaller for advancement to third and second class levels. You must demonstrate your ability to meet these standards before you are recommended for advancement. They are required as part of your performance tests, which must be taken for advancement in rating.

For advancement to Signaller 3, you must be able to transmit and receive code groups at 6 groups a minute and plain language messages at an approximate speed of 8 words a minute. (Five characters equals 1 group.)

For advancement to Signaller 2, you must be able to transmit and receive code groups at an approximate speed of 8 groups a minute and plain language at an approximate speed of 10 words a minute.

Following is a series of Morse code drills. Practice each drill until you can send and receive

it at the rate of 25 characters a minute before going on to the next exercise. To estimate the time required to attain that speed, divide the number of characters in each drill by 25. Drill 1, for example, contains 150 characters. Before going on to drill 2, practice drill 1 until you can send and receive it in 6 minutes.

Drill 1

JGM7O	HJMOH	1GOMG	7MOJG
7HOMJ	GO7JM	GH4OJ	M7GHO
JMJ7G	MOH1J	GOMJ4	HOG1J
HMO1G	JHOM4	GJHJO	OGM1H
JH1GO	MJH7G	7HO7G	MJ4HJ
GOMG1	JH4MO	GJGHM	7GOJM
HGGJ4	OM1JG	H4GMO	GJOGH
4OMGJ	1OGM7		

Drill 2

8OGJK	SK7MY	HMJOD	GSHKD
7M28J	YOSKH	SKDOH	M2GJK
87MOY	MGJOH	G7S2K	DY7GO
J7MHD	YSKG2	8MJ7K	OG8SM
DJH72	KYDS8	KGOMJ	SHD28
K7GO2	YDKSJ	28OHY	7GKSD
HJDYM	HSK07	82GJH	DSK82
HOYMG	7D8KS		

Drill 3

EJ2PH	YBMKW	7GO85	SD3YB
KH5E5	PWJY7	JBK3H	YW7SD
EOGP5	W3BWP	ES5K2	YMOG7
HJKYO	BP827	MGSDW	KHOP3
KSJME	W7G5B	B28YD	2POHB
5SKJM	OMOG2	KYJH7	8SDW3
YBEP5	7HJGO	MYK2D	PS85P
EB3WJ	PKWGY	MJW28	HOGKS

Drill 4

6B82H	00QP3	FLEWY	WEMJO
GSK3P	0HYDL	JFB6Q	FNL08
KDJ07	KMGOP	3W5BE	0KYDS
LFNGJ	YS5WN	JKOBF	P0LQN
5PEDS	87HJ2	GKY3W	BQ6FO

Drill 5

UJKLV	AHYQP	96WX4	JO9UC
A4XQO	6LS2G	WOHPW	6F7YM
W9NSD	NGMJB	CUPEX	QKOH6
YOXC3	POH7G	5BA94	HUWEM
J28N6	QOSKY	EDLF8	X4ACU
FQ7LN	C0536	PBW5G	7HJOM
8DSKY	2DNQL	6JP9C	AW6YF
AN8PV	PWO96		

H	P	9	3	G	X	9	A	5
B	7	G	2	8	N	6	V	R
T	1	Q	0	S	K	Y	D	L
Z	F	1	Q	P	J	1	A	B
9	X	4	1	Z	V	T	C	U
0	8	B	3	W	L	Q	N	5

Drill 6

This exercise contains all letters of the alphabet and the 10 numerals. On completing this drill, you should be proficient in receiving all 36 characters when transmitted at the rate of 25 characters a minute.

JH7K2	YDLR1	ITF9X	40WEM
JUG8S	D0QZT	VACU3	P0H5N
OL6B3	GO2KH	7JDS8	GYMLO
B5VEF	Q6N3W	IZPCA	UIPR9
X4JH7	2KTM0	G6SDE	P5NPL
W3B80	UCTVZ	14X9B	AIJPQ
IFZLD	YKS0Q	ITRV6	N82G7
B5A9X	G39PH	QJMBW	U4YJ0
ZXGPK	RVZQO	J2ENU	VHKPO
CZ7Y5	LAIM8	W65RI	G8KE4

P	E	D	S	6	G	O	M	T
K	2	7	H	J	4	X	9	R
P	I	U	A	C	P	Z	1	W
3	N	6	Q	F	E	V	5	B
X	J	7	F	9	K	T	2	Y
1	1	D	R	L	H	T	4	Z
O	Q	U	E	0	M	D	J	S
W	U	8	3	V	B	A	6	C
L	U	0	3	N	P	5	O	H
0	G	L	O	M	K	Y	2	G
7	H	8	S	J	D	A	B	C
5	P	V	Z	E	1	J	W	Q

A single word is considered as 5 characters. You should now be able to send and receive at the rate of 5 words per minute. Let's go on to drill 7 and find out whether you can.

Drill 7

Practice drill 7 until you can send and receive it in 15 minutes. By then you will have attained a solid speed of 25 characters a minute.

I	R	4	6	W	8	M	1	A
L	5	Y	7	Z	C	0	P	K
H	V	U	N	E	2	J	0	Q
Z	V	R	K	P	G	X	Z	O
J	Y	4	U	W	B	M	J	Q

3	N	6	0	U	M	I	T	P
K	R	2	H	7	X	4	J	9
0	G	8	B	6	S	3	D	W
L	E	Q	P	5	N	Q	U	C
T	P	V	I	Z	A	1	B	4
J	X	9	6	1	V	F	R	Z
T	L	1	D	Q	Y	0	K	S
0	L	M	Y	G	8	S	D	J

Appendix I—FLASHING LIGHT AND SEMAPHORE DRILLS

7 H 2 O K G 3 B 6
 L O N 5 H 0 P 3 U
 C A V T Z Q 0 D S
 8 G U J M E W O 4
 X 9 F T I 1 R L D
 Y 2 K 7 H J H 8 P
 2 G 9 C 3 X 7 B 5
 A 9 N K Q P J G M
 X B Z W O U J 4 Y
 0 R P V K Z H Q 0
 V J U 2 N E I C R
 7 Z 4 Y 6 W 5 L 8
 M 1 A

With 5 words a minute accomplished, we will now try to boost your speed.

Drill 8

Practice drill 8 until you can send and receive it at the rate of 30 characters (6 words) per minute.

B1EF6	EQ3MY	J7AKQ	C31PX
ZAVDT	S61ZN	A5NT0	NJ8SW
5BGWH	G9ZM2	C9LUF	D9PW1
Y8LD4	HDK70	03UY4	K7WJV
XIZG4	R2XA0	HS5Q0	6RCMT
VJW7K	01RUP	0LF8V	2MZ9G
F8LY1	IX5NO	PT3UH	CS6B4
Q1RDZ	E7QVG	FUL9C	4GZIX
0Q5SH	M6ET8	DIRY2	3NPJW
B2V9Y	4RIN9	5WFK0	MEJ70
XS8L0	Z5XPU	TM6CR	0N5XI
4T3Q1	02K7H	PA8O0	D6BVF
KA1LU	TD3HB	A2GWE	CU3SQ
4Z6B7	DH8AK		

Drill 9

Practice this exercise until you can send and receive 35 characters (7 words) a minute.

B2V9Y	HXLB1	1HBXL	0E7YA
LIXHB	4RIN9	I6NDU	U1D6N
DPB1T	NU6ID	5WFKO	75ZGF
F7G5Z	CR2JM	ZF57G	MEJ70
08THE	EOH8T	04VSW	TE8OH
XS8LO	G3UCA	AGC3U	Q3YKA
UA3GC	Z5XPU	A0YE7	7AEQY
ORVG6	PWY7T	2H9NK	TD1BP
PTBD1	94NSK	1U8XZ	31FQM
MCJR2	2MRCJ	2HDJL	0NQRV
GSJ6V	WOS4V	VW40S	BAC3I
SXTG5	YA3QK	5QEMF	AQK3Y
O2YIF	8RCWT	VY2B9	UZP5X
P1A6Z	6APZ1	PXZU5	I9R4N
K2NH9	H8L3U	3LHU8	N92KH
F0EM7	VG6SJ	KCM49	4MK9C
QF3MI	J0EM7	M3QIF	07EBW
BE0W7	6JGVS	8QSXL	T8WRC
OJ4LD	L40DJ	WC8TR	D6ZIP
IZDP6	ZP6D1	PDL6S	6IPZD
W7TYP	UXZ81	21FYU	NRVQO
XG5TS	GVO6R	SN9K4	ME5FQ
JDLAH	3CBIA	YTWP7	8ZU1S
YF201	QVN0R	T5XSG	V0RNQ
TP7WY	5SGXT	Z1XU8	FO12Y
SVOW4	7BWEQ	8HETO	QM7EJ
E70JM			

Drill 10

Practice drill 10 until you can send and receive it in 13 minutes if studying for advancement to E-4, and in 10 minutes for E-5. These rates are about 8 and 10 words per minute, respectively. Drill 10 is a quotation. Remember that when you receive you should not anticipate. The intent of the drill is to build up your solid speed.

“All persons who in time of war or of rebellion against the supreme authority of the United States come or are found in the capacity of spies or who bring or deliver any seducing letter or message from any enemy or rebel or endeavor to corrupt any person in the Navy to betray his trust shall suffer death or such other

punishment as a court-martial may adjudge. If any person belonging to any public vessel of the United States commits the crime of murder without the territorial jurisdiction thereof he may be tried by court-martial and punished with death. All persons in the naval service shall be zealous in. . ."

SEMAPHORE QUALIFICATIONS

For advancement to Signalman 3, you must be able to transmit and receive plain language semaphore messages at an approximate speed of 10 words per minute; and, for advancement to Signalman 2, to transmit and receive plain

language at an approximate speed of 15 words per minute.

TIPS ON LEARNING SEMAPHORE

The "semaphore expert" achieved his or her reputation as a result of PRACTICE. The only pointer we can give you in this course is the code itself and a few helpful hints gathered from the experts to assist you in meeting and surpassing the qualifications of your rate. The semaphore alphabet isn't at all difficult to learn. The speed with which you learn it depends on how consistently you work at it.

First of all, take a look at figure 1-2. It shows how the semaphore alphabet and certain special

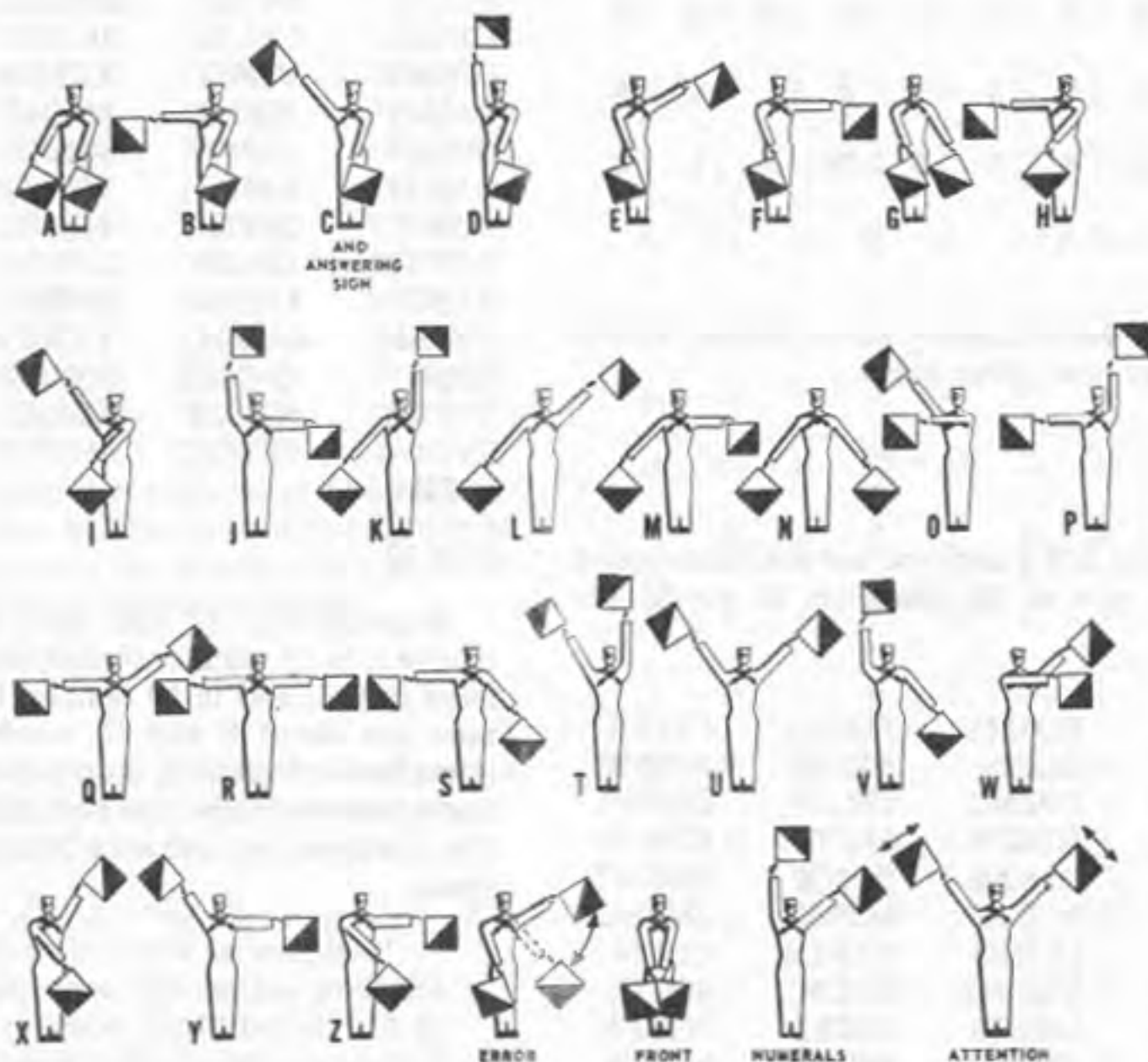


Figure 1-2.—Semaphore alphabet and special signals.

signals used with it are formed by using two flags. As you memorize the positions for the various letters and signals, practice moving your arms quickly and surely to each of the various positions. The man in figure 1-2 is the sender, and you are looking at the illustration as though you are the receiver.

In figure 1-3, you see a man swinging through a position drill. He moves his flags smartly to their positions, using his arms from the shoulders. The flags form an extension of the plane of his shoulders. Notice that there is no mistaking his B for A or C, for example. Don't try for speed at first; that will come after you master the alphabet thoroughly. A sloppy sender not only spends time repeating messages because nobody can read them, but also may cause the receiver to make a mistake on a word or a code group, resulting in the message having an entirely different meaning.

A single semaphore flag may be held in eight correct positions. You can picture these

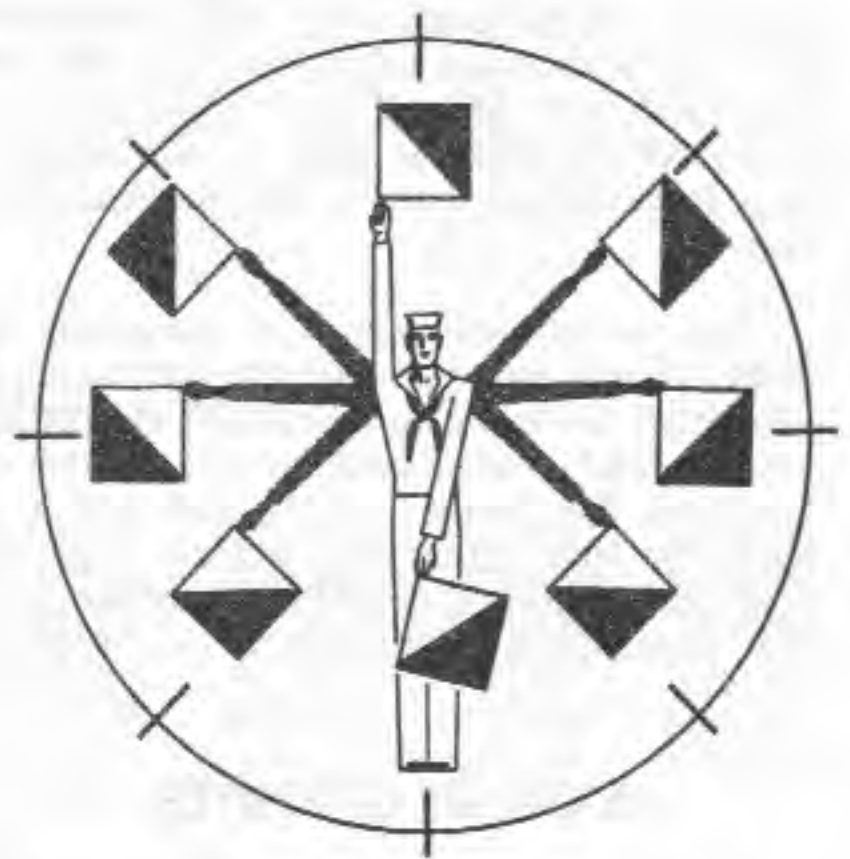


Figure 1-4.—Sempahore position circle.

positions easily if you imagine yourself standing inside a circle like the man in figure I-4. Notice that the circle is divided into eight parts by equally spaced marks. These marks represent the correct flag positions. Anything between them is indefinite and will lead to confusion. Although one flag has only eight positions, innumerable combinations are possible when you use two flags as in semaphore. Of these possible combinations, 28 are used in semaphore communication. The semaphore alphabet is composed of 26 letters plus signs meaning NUMERALS and FRONT.

The **FRONT** sign is used after finishing a word. It is like the space left between words in ordinary writing. Also, it is used before and after each call sign, code group, operating signal, or prosign, and between all letters and numerals of a call sign. The **NUMERAL** sign is given just before you transmit a group of numbers or a group of mixed letters and numerals to be recorded in the text and counted as a single group. The sign is repeated when the group is completed.

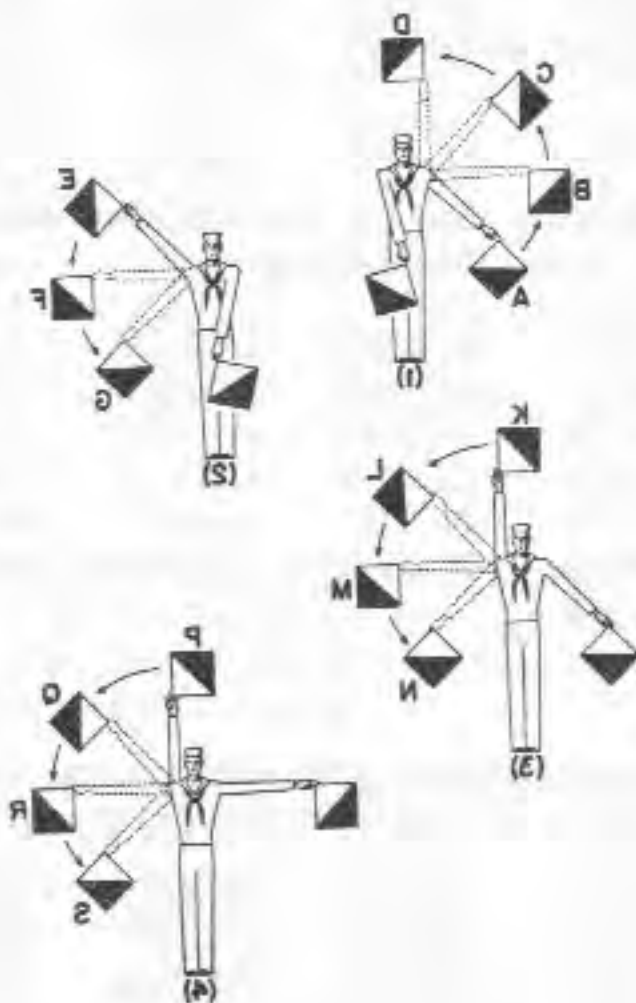


Figure I-3.—Position drill.

Examining figure I-2, notice that C and E also are used as special signs. The ANSWERING sign is the same as letter C. The ERROR sign consists of letter E made eight or more times. ATTENTION is made by waving both flags from the horizontal to the overhead position.

The various instructors of semaphore in Navy schools teach several different methods which they feel make learning easier. One of the most popular of these methods is the system of opposites. (See figure I-5.) The idea here is to learn one letter, then learn a letter made by holding the hands in exactly the opposite position. Going down the list, you see that letters of

the alphabet (except L, D, and R) have opposites that form other letters.

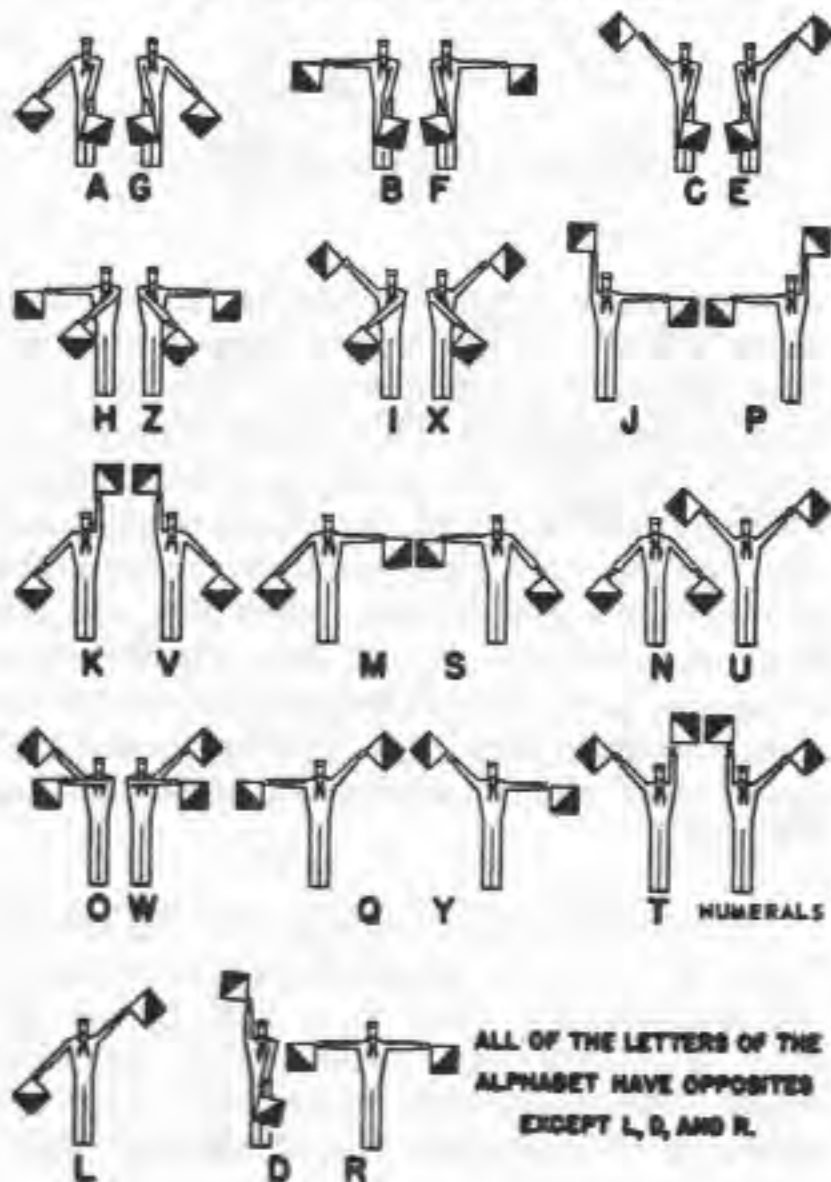
As you practice, move your arms from one position to another by the shortest route possible. Notice the movement of the man's arm(s) in figure I-6 as he sends the word "ships." Cutting out unnecessary movement of the arms makes your sending more uniform and increases your speed. As soon as possible, start sending and receiving with another striker. Always remember: Practice makes perfect.

The remainder of this appendix is devoted to semaphore drills for you to practice.

Drill 1

When you are able to send each letter of the alphabet easily and without hesitation, you are ready to start sending groups. Start with this exercise. Do not try for speed; that will come later.

LEARN BY OPPOSITES



EGMGH	RILCO	MUCVX	LXDIR
ZKOBW	MGQEH	WFKZO	SMGDH
QFWRK	LUIVN	CIJQV	HJEGO
APSJY	BTSPZ	PAYTD	SCIYN
MGQEH	LSMYZ	FXNUV	BTSPA

Drill 2

Practice sending and receiving semaphore drill 2 using the front sign.

AGZMZ	KGUGI	LORPZ	RAZLG
ISMFI	KOHZV	CKEXQ	BXQFY
FOTUB	WBPYQ	AYNDS	NAVTR
KWUGS	ZECOK	CHVTE	LMPIB
CTEVH	NCJIE	VORSZ	HWDNV
XQTCY	RAHED	GLKUM	JORAX
SJXQM			

Drill 3

Practice this exercise until you can send and receive at the rate of 10 groups a minute.

BQIZF	ZGUZT	BHMGV	NBQIZ
HTEPD	NKOYJ	FAGLT	RSKTB
MYKUC	CEUDV	ZQUHP	MOWQE
GOJSX	QTYOA	SCIQR	IPCGW
VAWLR	IKEJW	XOJBV	NRXPM
DAFJN	JPUSL	RWAVL	XOGJS
LYHSV	FSCXR	TEHDP	JUMYC

Figure I-5.—The system of opposites.



Figure I-6.—Eliminate unnecessary movement.

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Drill 4

Practice drill 4 until you can send and receive it without error in 5 minutes. This is a rate of 12 words per minute.

TQYJR	MGLFU	MFIZE	DLFMS
VDKPD	BIZOE	AHSDK	TPCNV
WSAXH	HNXAW	JCTGL	AOGBU
ECOZB	BSPKV	BUONX	HKOWX
UIFLM	RCJYT	PWVRY	EZJRY
LCPND	MKSGU	NEDRX	RJBPC
QEISV	TLFVR	WMAOC	QKSDA
MAWHR	EXHDN	FQLPK	ULMZI
FZTUO	IWOCY	SYBVJ	ETNWF
XVGKY	QPBZJ	TIGZU	VOGXH
ETKDU	LFISG	RWCHJ	VMQNX
LAQVG	MBRWH	NCXSI	ODTYJ
PIGWU	HZJOQ	VBNRC	AXKSD
WBRMH	XCSNI	YTDOQ	ZEUPK
NCXWD	OEYVF	PGZUG	QIBTJ

Drill 5

Practice sending and receiving drill 5 until you can do so without error in 4 minutes. When you can accomplish this, you will have attained a rate of 15 words a minute.

SCSNI	YDTOJ	ZEUPK	AFVQL
OEYVF	PGZUH	QIBTJ	RKASL
ODWHY	PGQUJ	QIATL	RKSBM
LORNP	MKOXC	INELG	DJPAW
QTFSH	OKUBV	HYRZS	UGSJD
KGMBU	FTVAQ	XLEMP	BQLRO
IJDBE	IYKZH	TSCBV	DUWJR
QWXLH	ANPOH	MSOWQ	RBJLT
MNVKG	XGDUI	KVEZF	HGOCA

UOBIP	BQTRV	PQFUK	GIYIW
YWCXA	IXAYF	ZQHOM	LEPGN
YEFQA	QFJZX	DPUGW	XFISK
FSDJR	EJLSI	REHJZ	MGFKA
SQMOE	EAMBN	HMNBG	QSCOI
KLBPC	NHAKP	DFEJL	CGRPT
RNITH	FYTQV		

Drill 6

Practice drill 6 until you can send and receive it at the rate of 20 words a minute.

IFWTL	PMBEV	FWTLI	VPMBE
DZLFG	JFCWR	HJQUA	ANWBK
TLIFW	EVPMB	YEOTV	PKHSV
YUDIQ	VYEOT	HLGYQ	KHSVP
STCGE	PKOZN	ISTCG	XNHRZ
NWXAG	ISUAH	RSNGP	LFDJA
YWUDK	CGIST	SYPKH	MEQBY
DIQYU	EOTVY	WTLIF	BEVPM
KOPNG	WRJFC	UAHJQ	MISFO
IQYUD	OPNGK	OTVYE	LGYQH
DJPTE	SFOMI	CLZIE	SUAHI
SQZTQ	GPRSN	EQNJX	AGNWX
UDKYW	PRSNG	PHLVX	XRUC
TQXWZ	RVUCX	WZTQS	RUOAZ
RZXNH	XVRTC	FBMKZ	ECLZI
AHJQU	KAZWB	FOMIS	IMISF
RJFCW	HLVXP	QSWZT	BDKMO
BYCGM	OLJFD	FDJAL	NJXEQ
NGPRS	WUDKY	XAGNW	KYWUD
DKYWU	JALFD	HRZXN	BYMEQ
PTEDJ	TEDJP	ZFBMK	RTCXV
CXVRT	QUAHJ	FCWRJ	BKANW
JQUAH	LIFWT	QNJXE	SNGPR
ISFOM	BMKZF	WXAGM	VPKHS
GISTC	GYSTC	TVYEO	QYUDI

VRTCX	CSXRV	DKMOB	EQBYM
LVXPH	FDOLJ	TGGIS	JFDOL
MBYCG	GMBYC	PNGKO	WBKAN
GKOPN	CWRJF	NWBKA	MKZFB
ZXHNR	JPTED	LZIEC	UOAZR
IECLZ	KZFBM	OAZRU	EDJPT
ZIECL	MOBDK	JXEQN	YQH LG
ALFDJ	MBEVZ	VUCXR	GNWXA
UDI QY	AHISU	DJALF	OBDKM
HISUA	YMEQB	TCXVR	ZRUOA
CGMBY	XEQNJ	QHLGY	NGKOP
VHRZX			

Drill 7

Practice sending and receiving plain-language semaphore exercise 7 until you can do it in 5 minutes or at the rate of 20 words a

minute. For this seventh drill, work on the following quotation.

"Success of communication depends primarily upon knowledge of how, when, and where to send timely and intelligible messages and can be gained only through a common understanding on the part of those directly concerned in the vital business at hand. Communication personnel have an important place in the ship's organization. Only authorized frequencies should be used by the radio organization. Care must be exercised in the choice of a code or cipher for each message. The necessity for safeguarding visual traffic must not be overlooked. The use of standard phraseology or any external indications of. . ."

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