
Spectrum Management

Radiocommunication Information Circular

Study Guide for the Restricted Operator's Certificate

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Comments and suggestions may be directed to the following address:

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Introduction

The material presented in this publication covers the scope of the Restricted Operator's Certificate examination. This publication will also be required by candidates wishing to obtain the General Operator's Certificate.

Canada is a member of the International Telecommunication Union (ITU), an organization established to regulate the spectrum, providing basic standards for communication procedures and practices, frequency allocation and radio regulations on a worldwide basis. The ITU sets the minimum standards that candidates should meet for obtaining the various classes of radio operator's certificates.

Canada is also a member of the International Maritime Organization (IMO), which is responsible for marine equipment and operations, especially concerning safety at sea.

Industry Canada administers telecommunications in Canada, based on both national and international acts, regulations and conventions. Marine operations in Canada are generally regulated by the Canadian Coast Guard of the Department of Transport.

To bring the Canadian certificate in line with changes in the international requirements, Industry Canada, in collaboration with the Coast Guard, has established five (5) marine certificates. Two certificates are reserved for Coast Guard radio operators. The remaining three radio operator's certificates are listed below:

1. Restricted Operator's Certificate,
2. General Operator's Certificate, and
3. Radiocommunications General Maritime Certificate.

The Coast Guard (*Ship Manning Regulations*) requires ships that are compulsorily fitted with radio equipment to carry persons who hold the appropriate certificate for the type of voyage and the equipment fitted.

Generally speaking, ships fitted with VHF radiotelephones must carry persons who hold a Restricted Operator's Certificate, and ships that are fitted with MF or MF/HF radiotelephones, or ship earth stations, must carry persons who hold either a General Operator's Certificate or a Radiocommunications General Maritime Certificate. There are two exceptions to these requirements.

The first exception is for the radio operators on "small fishing vessels". (A small fishing vessel is described as a vessel that is used in commercial fishing, and that does not exceed 24 meters in length and does not exceed 150 tons, gross tonnage.) This exception permits such vessels fitted with MF or HF transmitting equipment, or both, to carry radio operators holding only a Restricted Operator's Certificate.

The second exception is for radio operators on vessels using the Athabasca-Mackenzie inland waterways. Even though HF radios may be carried by vessels on this waterway, the HF frequency used is outside of the marine bands. The only marine frequencies used in certain areas of this waterway are in the VHF band. Consequently, operators on these vessels are only required to hold a Restricted Operator's Certificate.

Other publications that will be of assistance to candidates taking the government examinations are the *Radio Aids to Marine Navigation* (RAMN) and, to a lesser extent, the *Ship Station Radio Regulations* (SSR) and the *Ship Station Technical Regulations* (SST). These last two documents have been established in accordance with the *Canada Shipping Act* (CSA).

The Global Maritime Distress and Safety System (GMDSS) is being implemented over a seven-year period, commencing February 1, 1992 and finishing on February 1, 1999. This worldwide system will enhance the assistance that can be given to ships in distress and urgency situations. Certificate requirements and background on the area concept of the GMDSS can be found in Radiocommunication Information Circular 16 (RIC-16), *Professional Radio Operator's Certificate*. For additional information on this system, also refer to the present publication under the headings "Distress Communications", "Urgency Communications" and "Safety Communications". Current information on the progress and availability of this system will be available in the latest editions of the *Radio Aids to Marine Navigation* and the annual edition of *Notices to Mariners*.

Radiocommunication Information Circulars are available at your local district office of Industry Canada. Other publications, such as the *Radio Aids to Marine Navigation* and the annual edition of *Notices to Mariners* are available from booksellers offering government documents and publications, or by mail from:

Communications Group - Publishing
Ottawa, Ontario
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Restricted Operator's Certificate

General

A Restricted Operator's Certificate (ROC) or higher grade certificate is required by the operator of a VHF radiotelephone equipped vessel. The radiotelephone equipment at such stations shall be of a type that requires only simple external switching, and all frequency-determining elements must be preset within the transceiver.

Candidates for the ROC examination do not have to be Canadian citizens or landed immigrants. The candidates must, however, be able to identify themselves. A birth certificate, a baptismal certificate, a citizenship certificate, a passport or a driver's licence may be used to do so.

There is no age limit for a person writing the certificate examination. Restricted Operator's Certificates are issued for life. No further validation is required. If a certificate is lost or requires replacement, the nearest district office of Industry Canada should be contacted.

Applying to Industry Canada for a Certificate Examination

Application to be examined for the Restricted Operator's Certificate (ROC) should be made to the nearest district office of Industry Canada.

When completing an application for a Restricted Operator's Certificate, candidates may be requested to certify that they have no physical disabilities that would impair their ability to safely operate a radio station.

Examinations may be held at departmental district offices or at locations suitable for examination purposes. The telephone number for the district office in your area is listed in the local telephone directory. (The names of the district offices are listed in the Appendix of this document.)

Knowledge Required for the Examination

The candidates will be required to satisfy an examiner that they:

1. are capable of operating modern VHF radiotelephone equipment,
2. possess a general knowledge of radiotelephone operating procedures, international regulations applicable to radiotelephone communications between stations, as well as those specific regulations relating to safety of life, and
3. possess practical knowledge of the operation of Global Maritime Distress and Safety System equipment for vessels engaged on voyages within the range of VHF coast stations.

Radio Station Licences

Unless exempted all radio stations in Canada must be licensed by the Minister. The licence (or copy thereof) must be posted in a conspicuous place near the radio equipment.

The radio station licence generally specifies the call sign assigned to the station, the frequencies to be used for transmitting, the type of radio equipment authorized, and any special conditions under which the station should be operated.

To obtain a radio station licence, a completed licence application form with the prescribed fee should be submitted to Industry Canada. The application is then processed, and a licence is forwarded to the licensee. (Station licence application forms are available from any Industry Canada district office.)

To be eligible for licensing in Canada, radiotelephone equipment must be type approved or technically acceptable for licensing by the Department. Industry Canada type approval number is a nine-digit number appearing on a label affixed to the radio (usually at the back of the set) and assures the purchaser or owner of the radio equipment that it meets Canadian technical standards. Therefore, before purchasing a radiotelephone, one must ensure that it is labelled with the Industry Canada type approval number or that it has been granted technical acceptability by Industry Canada.

Station licence fees are due on April 1 of each year. Billing notices are mailed to licensees directly from departmental headquarters in Ottawa.

Note: Any person who establishes a radio station without the benefit of a radio licence is liable, on summary conviction, to a penalty of up to five thousand dollars (\$5,000), or to imprisonment for a term not exceeding one year, or both or, in the case of a corporation, to a fine not exceeding twenty-five thousand dollars (\$25,000).

Inquiries concerning radio licensing may be directed to any of the district offices of Industry Canada.

Communications - General

Superfluous Communications and Interference

Unnecessary Transmissions

Communications should be restricted to those necessary for the safe and expeditious movement of vessels. Unnecessary transmissions are not permitted.

Profane and Obscene Transmissions

Profane and obscene language is strictly prohibited.

Penalty - Any person who violates the regulations relative to unauthorized communications or profane language is liable, on summary conviction to a penalty not exceeding five thousand dollars (\$5,000) and costs, or to imprisonment for a term not exceeding one year, or to both.

False Distress Transmissions

False distress signals are strictly prohibited.

Penalty - Any person who knowingly transmits or causes to be transmitted any false or fraudulent distress signal, call or message is guilty of an offence and is liable, on summary conviction, to a penalty not exceeding five thousand dollars (\$5,000) and costs, or to imprisonment for a term not exceeding one year, or to both.

Interference

All radio stations shall be installed and operated so as not to interfere with or interrupt the working of another radio station.

The only situation under which you may interrupt or interfere with the normal working of another station is when you are required to transmit a higher priority call or message (for example, distress, urgency or safety calls or messages).

Penalty - Any person who, without lawful excuse, interferes with or obstructs any radiocommunication is guilty of an offence. That person is liable, on summary conviction, to a fine not exceeding five thousand dollars (\$5,000) and costs, or to imprisonment for a term not exceeding one year, or to both.

Secrecy of Communications

Radio operators and all persons who become acquainted with radiocommunications are bound to preserve the secrecy of correspondence. The contents or even the existence of correspondence transmitted, received or intercepted by a radio station should not be divulged, except to the addressee of the message or his accredited agent, or the properly authorized officials of the Government of Canada or a competent legal tribunal, or an operator of a telecommunications system as is necessary for the furtherance of delivery of the communications. The foregoing restrictions do not apply to a message of distress, urgency, safety or to messages addressed to ALL STATIONS, that is weather reports, storm warnings, etc.

Penalty - Any person who violates the secrecy of correspondence is liable, on summary conviction, to a penalty not exceeding five thousand dollars (\$5,000), or to imprisonment for a term not exceeding one year, or to both.

Communications Priorities

The order of priority for radiocommunications:

1. distress communications,
2. urgency communications,
3. safety communications,
4. communications relative to direction-finding bearings,
5. communications relative to the navigation, movement and needs of aircraft engaged in search and rescue operations,
6. messages containing exclusively meteorological (weather) observations destined to an official meteorological office,
7. communications related to the application of the United Nations Charter,
8. service messages relative to the working of the radiocommunications service or to messages that have been previously transmitted,
9. all other communications.

Channel/Frequency Assignments

The frequencies used in marine radiotelephone communication are established for use by specific services in specific locations. These frequencies should only be used for the type of communication for which they were intended. Some of the established communication services and frequencies are explained in this section.

Emissions

In VHF transmissions, the type of emission used is frequency modulation (FM).

International Distress, Calling and Answering Frequencies

These frequencies are set aside for the primary use of distress, urgency and safety communications. They may also be used to initiate a call to other stations or to receive their replies, in which case a mutually satisfactory working channel can be determined. Channel 16 (156.800 MHz) on VHF has been designated for this purpose.

Note: A working channel is a channel other than a pre-designated channel that is used for the passage of information or messages from one station to another. You should never send messages or information on the calling channel. This channel is used for contact only. When it is known that a station you want to communicate with is operating on a working frequency, it is not necessary to employ the calling frequency. It is permissible to wait until the communication terminates and then call the station with which you wish to communicate on the working frequency.

Watchkeeping

When at sea, ships voluntarily fitted with radiotelephone equipment should endeavour to keep watch on the frequency 156.800 MHz (Channel 16 VHF) to the greatest practicable extent.

When at sea, ships required by law to be fitted with VHF radiotelephone equipment (compulsorily fitted) must keep a continuous watch on the frequency 156.800 MHz (Channel 16 VHF) or other frequencies specifically designated on their licences, except when actually engaged in conducting communications on their working frequencies.

For compulsorily fitted vessels, the very high frequency (VHF) regulations state that watchkeeping on the VHF band must begin at least 15 minutes before the vessel leaves its dock or place of mooring. The regulations also state that this watch on Channel 16 (156.800 MHz) shall not be terminated until the vessel is securely anchored or moored. There are precautions that must be observed when using radiotelephone equipment while a vessel is in port or navigating near coast stations. The regulations governing the use of the transceivers in and around ports and coast stations state that the VHF transceiver will be used in the 1-watt position.

Radio Logs

General

All compulsorily fitted radio stations using maritime mobile frequencies are required to keep a radio log. The activities of the station, as well as the nature of messages and signals transmitted, received or intercepted by the station, are to be recorded in chronological order. The log must be located at the main operating position of the station during the time the ship is on a voyage. The log is to be kept by the operator maintaining the listening watch, in accordance with the *Ship Station Technical Regulations*. Foreign-going or home-trade vessels of 50 tons, or over-registered tonnage, are also required to keep an official ship log, which contains some

information on the radio installation and battery maintenance. [*Canada Shipping Act*, Chapter S9, Sections 261(1) and 263(e)]

A radio log must contain entries recording the following particulars:

- the name, port of registration and official registration or licence number of the vessel,
- the gross tonnage of the vessel,
- the frequency or frequencies guarded,
- the time, whether:
 - (a) the local time of the area in which the vessel is operating, or
 - (b) the Co-ordinated Universal Time (UTC) when the vessel is engaged in an international voyage, and
- the time and reasons for any radio communication interruption.

VHF Radiotelephone Installations

In conjunction with the general information outlined above, ship stations using equipment operating in the maritime mobile VHF band (156.0 MHz - 162.5 MHz) must record the following:

- the name(s) of the radio operator(s) on watch, as well as the times of going on and off watch,
- a detailed summary of all communications transmitted, received or intercepted relating to distress, urgency or safety traffic, recorded in chronological order,
- brief summaries of communications exchanged with other stations with frequency(ies) used for reception and transmission,
- the time of, and reason for, any discontinuance of the listening watch on frequency 156.800 MHz - Channel 16, and
- the times of departure from and arrival at port.

Note: The *VHF Radiotelephone Practices and Procedures Regulations* (VRP) state that watch on Channel 16 (156.8 MHz) can be interrupted by ships in a Vessel Traffic Service (VTS) Zone when they are required to use a channel other than 16 for vessel traffic management purposes. This is because a continuous watch on Channel 16 is maintained for ships by the traffic centre, or by a coast station that is able to establish contact with

the traffic centre without delay (see the section entitled "Vessel Traffic Services Frequencies").

Frequencies

Intership Frequencies

A number of frequencies have been set aside specifically for communications between ships. Some of these intership frequencies have been designated as safety frequencies to be used when important messages are to be passed between ships (for example, safety messages). For further information on these frequencies, refer to the latest edition of the Radiocommunication Information Circular 13 (RIC-13), *Table of Transmitting Frequencies for the Band 156-174 MHz for Radiotelephony in the Maritime Mobile Service* or the *Radio Aids to Marine Navigation*.

Public Correspondence Frequencies

Coast Guard radio stations are located at various points along the coasts and the Great Lakes. They provide a safety service, including broadcasts of meteorological forecasts and aids to navigation information, as well as facilities for handling messages or telephone conversations between ships and shore. The ship-to-shore frequencies that have been set aside for communicating with coast stations are called public correspondence frequencies. For last minute information pertaining to these frequencies please consult RIC-13 or the *Radio Aids to Marine Navigation*.

Vessel Traffic Services Frequencies

In order to promote navigational safety, the protection of the environment and the safe movement of marine traffic, vessel traffic services (VTS) zones have been established throughout Canadian waters. Communications within these zones are conducted on dedicated frequencies. For a list of these frequencies refer to RIC-13 or the *Radio Aids to Marine Navigation*.

Broadcast Frequencies

One of the many tasks of the Canadian Coast Guard is to pass information to vessels in the form of notices of danger to navigation or the marine weather forecast. These broadcasts are usually transmitted on Channel 21B (161.650 MHz) or on Channel 83B (161.775 MHz). For the current list of frequencies in use refer to RIC-13 or the *Radio Aids to Marine Navigation*.

Emergency Frequencies

Distress:

156.800 MHz (Channel 16) Voice

156.525 MHz (Channel 70) Digital Selective Calling (DSB)

Emergency Position Indicating Radio Beacons (EPIRBs):

156.800 MHz (Marine)

121.500 MHz (Aeronautical)

243.000 MHz (Aeronautical)

406.025 MHz (Marine and Aeronautical)

Operating Procedures - General

Microphone Techniques

The efficient use of radiotelephony depends to a large extent on the operator's method of speaking. As the distinctive sounds of consonants are apt to become blurred in the transmission of speech, words of similar length containing the same vowel sounds may sound alike. Special care is necessary in their pronunciation. Special care is also required in handling the microphone. Do not hold the microphone too close to your mouth because it may cause distortion or slurring of words and you may have to repeat your message to be understood. Speak all words plainly and end each word clearly in order to prevent the running together of consecutive words. Avoid any tendency to shout, to accent syllables artificially or to speak too rapidly. The following points should be kept in mind when using a radiotelephone.

Speed

Keep the rate of speech constant, neither too fast nor too slow. Remember that the operator receiving your message may have to write it down.

Rhythm

Preserve the rhythm of ordinary conversation. Avoid the introduction of unnecessary sounds such as “er” and “um” between words.

If the communication link is unreliable, or the wording of the text complex or confusing, use the command **WORDS TWICE** or, upon request, repeat the message using the phonetic alphabet. This should ensure that the information within the text of the message is received correctly.

Procedural Words and Phrases

While it is impractical to set down precise phraseology for all radiotelephone procedures, the following words and phrases should be used where applicable. Words and phrases such as **OK**, **REPEAT**, **TEN-FOUR**, **OVER AND OUT**, **BREAKER BREAKER**, **COME IN PLEASE**, or slang expressions should not be used.

Table 1

Word or Phrase	Meaning
ACKNOWLEDGE	Let me know that you have received and understood this message.
AFFIRMATIVE	Yes, or permission granted.
BREAK	To indicate the separation between portions of the message. (To be used where there is no clear distinction between the text and other portions of the message.)
CHANNEL	Change to channel before proceeding.
CONFIRM	My version is _____. Is that correct?
CORRECTION	An error has been made in this transmission (message indicated). The correct version is _____.
GO AHEAD	Proceed with your message.
HOW DO YOU READ?	How well do you receive me?
I SAY AGAIN	Self-explanatory (use instead of "I repeat").
MAYDAY	The spoken word for the distress signal.
MAYDAY RELAY	Is the spoken word for the distress relay signal.
NEGATIVE	No, or that is not correct, or I do not agree.
OVER	My transmission is ended and I expect a response from you.
OUT	Conversation is ended and no response is expected.
PAN PAN	The spoken word for the urgency signal.
PRUDONCE	During long distress situations, communications can resume on a restricted basis. Communication is to be restricted to ship's business or messages of a higher priority.
READBACK	Repeat all of this message back to me exactly as received after I have given OVER. (Do not use the word "repeat".)
ROGER	I have received all of your last transmission.
ROGER NUMBER	I have received your message number ...
STANDBY	I must pause for a few seconds or minutes, please wait.
SAY AGAIN	Self-explanatory. (Do not use the word "repeat".)
SÉCURITÉ	Is the spoken word for the safety signal.

Word or Phrase	Meaning
SEELONCE	Indicates that silence has been imposed on the frequency due to a distress situation.
SEELONCE DISTRESS	Is the international expression to advise that a distress situation is in progress. This command comes from a vessel or coast station other than the station in distress.
SEELONCE FEENEE	Is the international expression for a distress cancellation.
SEELONCE MAYDAY	Is the international expression to advise that a distress situation is in progress. The command comes from the ship in distress.
THAT IS CORRECT	Self-explanatory.
VERIFY	Check coding, check text with originator and send correct version.
WORDS TWICE	(a) As a request: Communication is difficult, please send each word twice. (b) As information: Since communication is difficult, I will send each word twice.

Phonetic Alphabet

The words of the International Telecommunication Union (ITU) phonetic alphabet should be learned thoroughly. Whenever isolated letters or groups of letters are pronounced separately, or when communication is difficult, the alphabet can be easily used. The phonetic alphabet should always be used when transmitting call signs.

When it is necessary to spell out call signs or words, the following table should be used. The syllables to be emphasized are shown in bold type.

Table 2

Letter	Word	Pronounced as
A	Alfa	AL FAH
B	Bravo	BRAH VOH
C	Charlie	CHAR LEE or SHAR LEE
D	Delta	DELL TAH
E	Echo	ECK OH
F	Foxtrot	FOKS TROT
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 or OO NEE FORM
V	Victor	VIK TAH
W	Whiskey	WISS KEY
X	X-ray	ECKS RAY
Y	Yankee	YANG KEY
Z	Zulu	ZOO LOO

Example: If the vessel Seawolf VY1234 were asked to spell its name and call sign phonetically it would do so as follows: SIERRA, ECHO, ALPHA, WHISKEY, OSCAR, LIMA, FOXTROT; VICTOR, YANKEE, one, two, three, four.

Numbers

Table 3

Numbers Expressed in Words

0 - ZERO	6	- SIX
1 - ONE	7	- SEVEN
2 - TWO	8	- EIGHT
3 - THREE	9	- NINE
4 - FOUR	.	- DECIMAL
5 - FIVE	?,000	- THOUSAND

All numbers except whole thousands should be transmitted by pronouncing each digit separately. Whole thousands should be transmitted by pronouncing each digit in the number of thousands followed by the word THOUSAND.

10 becomes	ONE ZERO
75 becomes	SEVEN FIVE
100 becomes	ONE ZERO ZERO
5,800 becomes	FIVE EIGHT ZERO ZERO
11,000 becomes	ONE ONE THOUSAND
68,009 becomes	SIX EIGHT ZERO ZERO NINE

Numbers containing a decimal point should be transmitted as above, with the decimal point indicated by the word DECIMAL.

156.8 becomes	ONE FIVE SIX DECIMAL EIGHT
---------------	----------------------------

Monetary denominations, when transmitted with groups of digits, should be sent in the sequence in which they are written.

\$17.25 becomes	DOLLARS ONE SEVEN DECIMAL TWO FIVE
75¢ becomes	SEVEN FIVE CENTS

Time

The twenty-four hour clock system should be used in expressing time in the Maritime Mobile Service. It should be expressed and transmitted by means of four figures, the first two denoting the hour past midnight and the last two the minutes past the hour.

Some examples of time using the twenty-four hour clock system are shown in Table 4.

Table 4

Some Times as Expressed by Radiotelephone

Time	Express as	
12:45 a.m.	0045	ZERO ZERO FOUR FIVE
12:00 noon	1200	ONE TWO ZERO ZERO
12:45 p.m.	1245	ONE TWO FOUR FIVE
12:00 midnight	0000	ZERO ZERO ZERO ZERO
1:30 a.m.	0130	ZERO ONE THREE ZERO
1:45 p.m.	1345	ONE THREE FOUR FIVE
8:30 p.m.	2030	TWO ZERO THREE ZERO

Co-ordinated Universal Time (UTC) (previously known as Greenwich Mean Time - GMT) is normally used in radiocommunications, and the letter Z is an accepted abbreviation for UTC, for example, 0520Z, 2140Z.

However, where operations are conducted entirely within one time zone, standard time may be used. Care should be taken to clearly indicate the time zone involved, for example, 1335E (for Eastern Standard Time), 2214M (for Mountain Standard Time).

Table 5

Time Zone Comparison

Abbreviation	Meaning
NST	Newfoundland Standard Time
AST	Atlantic Standard Time
EST	Eastern Standard Time
CST	Central Standard Time

MST	Mountain Standard Time
PST	Pacific Standard Time

Conversion from Co-ordinated Universal Time (UTC)

To convert from Co-ordinated Universal Time to local standard time, look opposite UTC under the appropriate column in Table 6. For corresponding Daylight Saving Time, add one hour.

Table 6

North American Time Zones versus Co-ordinated Universal Time

UTC	NST	AST	EST	CST	MST	PST
0100	2130	2100	2000	1900	1800	1700
0200	2230	2200	2100	2000	1900	1800
0300	2330	2300	2200	2100	2000	1900
0400	0030	0000	2300	2200	2100	2000
0500	0130	0100	0000	2300	2200	2100
0600	0230	0200	0100	0000	2300	2200
0700	0330	0300	0200	0100	0000	2300
0800	0430	0400	0300	0200	0100	0000
0900	0530	0500	0400	0300	0200	0100
1000	0630	0600	0500	0400	0300	0200
1100	0730	0700	0600	0500	0400	0300
1200	0830	0800	0700	0600	0500	0400
1300	0930	0900	0800	0700	0600	0500
1400	1030	1000	0900	0800	0700	0600
1500	1130	1100	1000	0900	0800	0700
1600	1230	1200	1100	1000	0900	0800
1700	1330	1300	1200	1100	1000	0900
1800	1430	1400	1300	1200	1100	1000
1900	1530	1500	1400	1300	1200	1100
2000	1630	1600	1500	1400	1300	1200
2100	1730	1700	1600	1500	1400	1300
2200	1830	1800	1700	1600	1500	1400
2300	1930	1900	1800	1700	1600	1500
0000	2030	2000	1900	1800	1700	1600

Date

Where the date, as well as the time of day, are required to be shown (as in the radio log or a message preamble), a six (6) figure group should be used. The first two figures indicate the day of the month, the following four figures indicate the time.

Example

Information	Expressed as
Noon on the 16th day of the month (EST)	161200E
2:29 p.m. AST (expressed in UTC), on the 2nd day of the month	021829Z
2:45 a.m. (Atlantic Standard Time), on the 24th day of the month	240245A

Calling

Before transmitting, listen for a period long enough to ensure that harmful interference to transmissions already in progress is not likely to occur. If such interference seems likely, wait until the transmissions in progress are completed before making your call.

A station having a distress, urgency or safety message to transmit is entitled to interrupt a transmission of lower priority.

Single Station Call

When establishing communications with a specific station, transmit the call sign of the station being called, followed by the call sign of the station making the call, as shown in the following example.

Example

VANCOUVER COAST GUARD RADIO (said once or if communication conditions are difficult not more than 3 times)

THIS IS

SEA FOX VC1234

ON CHANNEL 26

OVER

Reverse Calling

Avoid REVERSE calling. Transmitting your own station identifier followed by TO or CALLING and then the identifier of the station you wish to call is not proper radio procedure. Remember that the identifier of the station being called is always spoken first, followed by THIS IS and your own station's identifier.

General Call

When an operator wishes to establish communication with any station within range or in a certain area, the call should be made to ALL STATIONS, using the same procedure as a single station call.

Example

ALL STATIONS, ALL STATIONS, ALL STATIONS
THIS IS
HALIFAX COAST GUARD RADIO (repeated up to 3 times)

Multiple Station Call

If a multiple station call is made, the calling station will call the vessels by call sign, in alphabetical order. If the call sign of the station(s) is unknown, the name(s) of the vessel(s), in alphabetical order, will follow the group for which call signs are available.

Example

SEA FOX VC1234; BLACK PRINCE VY4321; TAG-A-LONG VY4412;
ANDROMEDA; RIGEL
THIS IS
SYDNEY COAST GUARD RADIO
OVER

Coast Station Traffic Lists

At scheduled times, Canadian Coast Guard radio stations broadcast a list of telegrams and telephone calls they have on hand. An announcement, made on the calling frequencies and addressed to all stations, states that the traffic list will follow on a working frequency. However, these radio stations will transmit ONLY when they have traffic on hand. Times and working frequencies for all Canadian Coast Guard radio station broadcasts are listed in the *Radio Aids to Marine Navigation*.

Example on Channel 16

ALL STATIONS, ALL STATIONS, ALL STATIONS
THIS IS
HALIFAX COAST GUARD RADIO (repeated up to 3 times)
TRAFFIC LIST, LISTEN CHANNEL 26
HALIFAX COAST GUARD RADIO
OUT

Replying

When you hear a call directed to your station, reply as soon as possible. Advise the calling station to proceed with the message by means of the words GO AHEAD, or, if you are occupied, by saying STAND BY followed by the estimated number of minutes until your reply. Do not ignore the call. This may result in unnecessary calling, which uses up valuable air time in a crowded environment.

Example

SEA FIRE CZ1234
THIS IS
VANCOUVER COAST GUARD RADIO
GO AHEAD
OVER

Replying to Calls when Information Is Missing

When you hear a call, but are uncertain the call is intended for your station, do not reply until the call is repeated and understood.

Termination of Communications

To terminate communications, simply conclude your transmission with the command OUT (which means “conversation is ended and no response is expected”).

Example

CANSO LOCK
THIS IS
TAG-A-LONG VY4412
RECEIVED CANSO LOCK CLEARANCE
TAG-A-LONG VY4412
OUT

Components of a Communication

Radiotelephony contacts generally consist of four parts:

1. the call,
2. the reply,
3. the message, and
4. the acknowledgement or ending.

Examples of Contacts

Call by vessel

HALIFAX COAST GUARD RADIO
THIS IS
BLACK PRINCE VY4321
ON CHANNEL 26
OVER

Reply by coast station

BLACK PRINCE VY4321
THIS IS HALIFAX COAST GUARD RADIO
GO AHEAD
OVER

The message - vessel

HALIFAX COAST GUARD RADIO
THIS IS
BLACK PRINCE VY4321
REQUEST TELEPHONE CALL CONNECTION
OVER

The message - coast

BLACK PRINCE VY4321
THIS IS
HALIFAX COAST GUARD RADIO
STAND BY - 5 MINUTES
OVER

Acknowledgement - vessel

HALIFAX COAST GUARD RADIO
THIS IS
BLACK PRINCE VY4321
ROGER, STANDING BY

Corrections and Repetitions

Corrections and Repetitions during Transmission

When an error has been made in transmission, the word CORRECTION should be spoken, the last correct word or phrase repeated and the correct version transmitted.

Examples

AT POSITION SIX, ONE
CORRECTION SIX, TWO DEGREES ...

PROCEED TO DOCK FOUR
CORRECTION DOCK FIVE, ADVISE ETA.

Repetitions after Completion

Transmissions or items of transmissions should not be repeated unless requested by the receiving operator.

Repetitions should be requested if reception is doubtful.

If the receiving operator desires a repetition of a message, the words SAY AGAIN should be transmitted. If repetition of only a portion of a message is required, the receiving operator should use the following appropriate phraseology:

SAY AGAIN ALL BEFORE ... (first word satisfactorily received).

SAY AGAIN ALL BETWEEN ... (last word correctly received prior to the missing segment) and ... (first word correctly received after the missing segment).

SAY AGAIN ALL AFTER ... (last word satisfactorily received).

Examples

VANCOUVER COAST GUARD RADIO

THIS IS

NORTH WIND VY3344

SAY AGAIN ALL BEFORE "DOCK"

OVER

HALIFAX COAST GUARD RADIO

THIS IS

SEADOG VZ1234

SAY AGAIN ALL BETWEEN "PROCEED" AND "TIME"

OVER

ST. JOHN'S COAST GUARD RADIO

THIS IS

M/V BOUNTY VC3312

SAY AGAIN ALL AFTER "LATITUDE"

OVER

Request for repetition of specific items of a message should be made by speaking the words SAY AGAIN followed by the identification of the message desired.

Examples

SAY AGAIN OFFICE OF ORIGIN

SAY AGAIN POSITION

SAY AGAIN TIME

Control of Communications

As a general rule, except in cases of priority communications, the control of radiocommunications between a coast station and a ship station lies with the coast station.

In communications between coast stations and ship stations, the ship station shall comply with instructions given by the coast station in all matters relating to the order and time of transmission, to the choice of frequency and to the duration and suspension of work.

In communications between ship stations, normally the station called is the controlling station. If the station is in agreement with the calling station, it shall transmit an indication from that moment onwards that it will listen on the working frequency or channel announced by the calling station.

However, if the station called is not in agreement with the calling station on the working frequency or channel to be used, it shall transmit an indication of the working frequency or channel to be used.

Note: In cases of distress or urgency communications, the control of the communications lies with the station initiating the priority call.

Unsuccessful Call

When a station called does not reply to a call sent three times at intervals of two minutes, the calling station shall cease and not renew the call until after an interval of three minutes. Before renewing the call, the calling station shall attempt to ascertain that the station being called is not in communication with another station.

Examples

Ship calling a coast station
(the coast station has control of radiocommunications)

HALIFAX COAST GUARD RADIO

THIS IS

SEA FOX VC4331

ON CHANNEL 16

OVER

Coast station replying to a ship
(the coast station has control of radiocommunications)

SEA FOX VC4331
THIS IS
HALIFAX COAST GUARD RADIO
GO AHEAD ON CHANNEL 26
OVER

One ship to another ship
(the ship being called has the control of radiocommunications)

SEA FOX VC4331
THIS IS
SANDPATCH VY1234
OVER

The called ship replies
(the ship being called has the control of radiocommunications)

SANDPATCH VY1234
THIS IS
SEA FOX VC4331
CHANGE TO CHANNEL 69
OUT

Signal Checks

It is sometimes necessary to verify that your transmitter and receiver are operational. This can be done by:

1. establishing contact with another ship or a coast station on Channel 16, and changing to a working channel,
2. establishing contact on the working channel and conducting your tests (the actual wording of the test is given in the example below),
3. not exceeding ten seconds for signal checks,
4. using the readability scale listed below when giving the report, remembering that a readability of 3 to 5 indicates to the receiving station that it is being copied 100 percent.

Readability Scale

- 1 = Bad (unreadable)
- 2 = Poor (readable now and then)
- 3 = Fair (readable with great difficulty)
- 4 = Good (readable with minor difficulty)
- 5 = Excellent (perfectly readable)

Example

Call

VANCOUVER COAST GUARD RADIO
THIS IS
PACIFIC HIGH CY2632
ON CHANNEL 26
SIGNAL CHECK. 1, 2, 3, 4, 5
HOW DO YOU READ?
OVER

Reply

PACIFIC HIGH CY2632
THIS IS
VANCOUVER COAST GUARD RADIO
READABILITY 4
OUT

Distress Communications**General**

Distress communications should be conducted in accordance with the procedures outlined below. These procedures do not, however, prevent a station in distress from making use of any means at its disposal to attract attention to make known its position, and to obtain help.

Frequencies to Be Used

The first transmission of the distress call and message by a vessel should be on the distress, calling and answering frequency of Channel 16, 156.800 MHz (VHF). If no response is heard on

this frequency, the use of any other available frequency in an effort to obtain assistance is permitted.

Control of Distress Traffic

The control of distress traffic is the responsibility of the vessel in distress or of the station that relays the distress message. These stations may, however, delegate the control of distress traffic to another station such as a Coast Guard Radio Station. During many distress situations, Coast Guard Radio Stations control distress traffic. Their powerful coastal transmitters can be readily heard by other ship and land stations over a wide area.

Distress Signal

Some years ago, the Canadian Coast Guard included "a person" when discussing the use of the MAYDAY signal in our film "IT'S GOOD FOR LIFE". Under the new ITU regulations for the Global Maritime Distress and Safety System (GMDSS) in the section entitled Distress Alerting it states: "The transmission of a distress alert indicates that a mobile unit or a person is in distress and requires immediate assistance."

In radiotelephony, the spoken word for distress is MAYDAY. The distress signal indicates that the station sending the signal is:

1. threatened by grave and imminent danger and requires immediate assistance, or
2. aware that a ship, aircraft or other vehicle is threatened by grave and imminent danger and requires immediate assistance.

Distress Call

The distress call will only be sent on the authority of the person in command of the station. The distress call should comprise the following:

1. the distress signal MAYDAY spoken three times,
2. the words THIS IS,
3. the name and call sign of the vessel in distress spoken three times.

Example

MAYDAY, MAYDAY, MAYDAY

THIS IS

SEAFOX VC1234, SEAFOX VC1234, SEAFOX VC1234

The distress call will not be addressed to a particular station and acknowledgement of receipt shall not be given before the distress message is completed.

Distress Priority

The distress call has absolute priority over all other transmissions. All stations that hear it shall immediately cease any transmission capable of interfering with distress traffic and shall continue to listen on the frequency used for the distress call.

Distress Message

The distress call shall be followed as soon as possible by the distress message. The distress message shall include the following:

1. the distress signal MAYDAY,
2. the call sign of station in distress (once),
3. particulars of its position,
4. nature of distress and kind of assistance required (that is, what has happened),
5. the number of persons on board and injuries (if applicable),
6. any other information that might facilitate rescue,
7. OVER.

Note: As a general rule, a ship will signal its position in latitude and longitude. When practicable, the bearing and distance in nautical miles from a known geographical position may be given.

Example

MAYDAY

M/V SEADOG VX3456

POSITION: LATITUDE 49° 52' 5" NORTH
 LONGITUDE 064° 35' 5" WEST

OR

POSITION: 090 DEGREES 8 NAUTICAL MILES FROM WEST POINT ANTICOSTI
SHIP ON FIRE
15 METRE CAPE ISLAND, YELLOW AND BLUE IN COLOUR
4 PERSONS ON BOARD
ABANDONING SHIP TO LIFE RAFTS
OVER

Repetition of a Distress Message

The distress message shall be repeated at intervals by the vessel in distress until an answer is received or until it is no longer feasible to continue. The intervals between repetitions of the distress message shall be sufficiently long to allow time for stations, which have received the message, to reply.

When a vessel in distress receives no answer to its distress call sent on the distress frequency of 156.800 MHz (Channel 16), the distress call and message should be repeated on any other available frequency on which attention might be attracted.

Any station that is not in a position to render assistance but has heard a distress message that has not been immediately acknowledged, after acknowledging receipt, the station shall take all possible steps to attract the attention of other stations that are in a position to render assistance.

In addition, all necessary steps shall be taken to notify the Coast Guard or appropriate search and rescue authorities of the situation.

Action by Station in Distress

When a vessel is threatened by grave and imminent danger, and requires immediate assistance, the person in command should direct appropriate action as follows:

1. transmit the distress call,
2. transmit the distress message,
3. listen for acknowledgement of receipt,
4. exchange further distress traffic as applicable,
5. turn on automatic emergency equipment (Emergency Position Indicating Radio Beacon - EPIRB) if provided and when appropriate.

Action by Stations Other than the Station in Distress

A station becoming aware that a ship station is in distress should transmit the distress message when:

1. the station in distress is not in a position to transmit the message, or
2. the person in command of the station that intervenes believes that further help is necessary.

When a distress message is received and it is known that the vessel in distress is not in the immediate vicinity, sufficient time should be allowed before the distress message is acknowledged. This will permit stations nearer to the station in distress to reply.

Acknowledgement of Receipt of a Distress Message

The acknowledgement of receipt of a distress message shall be given in the following form:

1. the distress signal MAYDAY,
2. the call sign of the station in distress (three times),
3. the words THIS IS,
4. the call sign of the station acknowledging receipt (three times),
5. RECEIVED MAYDAY,
6. MY POSITION IS ... ,
7. PROCEEDING TO RENDER ASSISTANCE,
8. estimated time of arrival,
9. OVER.

Example

MAYDAY

SEADOG VZ1234, SEADOG VZ1234, SEADOG VZ1234

THIS IS

BLACK PRINCE VY4321, BLACK PRINCE VY4321, BLACK PRINCE VY4321

RECEIVED MAYDAY

WE ARE 2 TO 3 MILES AWAY FROM YOU

WE ARE PROCEEDING TO YOUR CO-ORDINATES
WE SHOULD ARRIVE WITHIN A HALF HOUR
OVER

Action by Station Acknowledging Receipt of a Distress Message

1. Forward information immediately to the appropriate Coast Guard or search and rescue agencies or organizations.
2. Continue to guard the frequency on which the distress message was received and, if possible, any other frequency that may be used by the station in distress.
3. Notify any station with direction-finding or radar facilities which may be of assistance.
4. Cease all transmissions that may interfere with the distress traffic.

Action by Other Stations Hearing a Distress Message

1. Continue to guard the frequency on which the distress message was received and, if possible, establish a continuous watch on appropriate distress and emergency frequencies.
2. Notify any station with direction-finding or radar facilities and request assistance, unless it is known that this action has been or will be taken by the station acknowledging receipt of the distress message.
3. Cease all transmissions that may interfere with the distress traffic.

Distress Traffic

Distress traffic consists of all transmissions relative to the immediate assistance required by the station in distress. Essentially, all transmissions made after the initial distress call are considered as distress traffic. In distress traffic, the distress signal MAYDAY, spoken once, shall precede all transmissions. This procedure is intended to alert stations unaware of the initial distress call, and now monitoring the distress channel, that traffic heard relates to a distress situation.

Any station in the Maritime Mobile Service that has knowledge of distress traffic and cannot itself assist the station in distress shall, nevertheless, follow such traffic until it is evident that assistance is being provided. Until a message is received indicating that normal working may be resumed (there has been a cancellation of distress), all stations that are aware of distress traffic but are not taking part in it are forbidden to transmit on the frequencies being used for distress traffic.

Relay of a Distress Message

A distress message repeated by a station other than the station in distress shall transmit a signal which includes the following:

1. the signal MAYDAY RELAY spoken three times,
2. the words THIS IS,
3. the name and call sign of the station relaying the message (three times),
4. the distress signal MAYDAY (once),
5. the particulars of the station in distress such as the distress station's identification, location, nature of distress, number of persons on board (repetition of the distress message as

Imposition of Silence

The station in distress, or any station in the immediate vicinity, may impose silence on a particular station or stations in the area if interference is being caused to distress traffic.

The station in distress shall use the expression SILENCE MAYDAY or SEELONCE MAYDAY (the international expression).

Other stations imposing silence during a distress situation shall use the expression SILENCE DISTRESS or SEELONCE DISTRESS (the international expression).

If radio silence is imposed during a distress situation, all transmissions shall cease immediately except from those stations involved in distress traffic.

Examples

Imposition of silence on a specific station by the station in distress. (M/V Bounty VC3312 is causing interference to distress traffic.)

MAYDAY

M/V BOUNTY VC3312, M/V BOUNTY VC3312, M/V BOUNTY VC3312

THIS IS

SEAFOX VC1234, SEAFOX VC1234, SEAFOX VC1234

SILENCE MAYDAY

OUT

Imposition of silence on all stations by a station other than the station in distress.

MAYDAY

ALL STATIONS, ALL STATIONS, ALL STATIONS

THIS IS

BLACK PRINCE VY4321, BLACK PRINCE VY4321, BLACK PRINCE VY4321

SILENCE DISTRESS

OUT

Cancellation of Distress

When a station is no longer in distress, or when it is no longer necessary to observe radio silence (that is, rescue operation has concluded), the station that was in distress, the rescue vessel or the station that controlled distress traffic shall transmit a message addressed to ALL

STATIONS on the distress frequency(ies) advising that the distress traffic has ended. The proper procedure for cancelling a distress message is as follows:

1. the distress signal MAYDAY (once),
2. the words ALL STATIONS (three times),
3. the words THIS IS,
4. the name or call sign of the station transmitting the message, or both, (three times),
5. the filing time of the message,
6. the call sign of the station in distress (once),
7. the words SILENCE FINISHED or SEELONCE FEENEE (the international expression),
8. a short plain-language description of why the distress situation is being cancelled (that is, vessel clear and under tow),
9. the name and call sign of the station transmitting the message,
10. the word OUT.

Example

MAYDAY

ALL STATIONS, ALL STATIONS, ALL STATIONS

THIS IS

NORTH WIND VY3344, NORTH WIND VY3344, NORTH WIND VY3344

ONE SIX ONE FIVE, EASTERN STANDARD TIME

SEADOG VZ1234

SILENCE FINISHED (SEELONCE FEENEE)

ALL PERSONS ARE SAFE ON BOARD THIS VESSEL - THE VESSEL SEADOG SUNK

PORT OF DESTINATION HALIFAX, NOVA SCOTIA

NORTH WIND VY3344

OUT

Note: The procedure outlined above is mainly for the benefit of other stations to allow the resumption of regular service on the distress frequencies. To ensure that Coast Guard and Search and Rescue Stations are advised that a station is no longer in distress, a normal call to the nearest Coast Guard Radio Station detailing the reasons for cancelling the distress call must be made.

Urgency Communications

Signals

The urgency signal is PAN PAN spoken three times. It is sent before the call.

The urgency signal indicates that the station calling has a very urgent message to transmit concerning the safety of a ship, an aircraft, another vehicle or a person on board or within sight.

When used by a Maritime Mobile Station, the message, preceded by the urgency signal, may be addressed to all stations or to a specific station.

The urgency signal and message following it shall be sent on the distress, calling and answering Channel 16 (156.800 MHz).

Priority

The urgency signal has priority over all other communications - except distress.

Stations that hear only the urgency signal shall continue to listen for at least three minutes on the frequency on which the signal is heard. After that, if no urgency message has been heard, stations may resume normal service.

All stations that hear the urgency signal must take care not to interfere with the urgency message which follows it. Stations that are in communication on frequencies other than those used for the transmission of the urgency message, may continue normal work without interruption, provided that the urgency message is not addressed to ALL STATIONS.

Urgency Call

The urgency call shall only be sent on the authority of the person in command of the station. The urgency call will comprise the following:

1. the urgency signal PAN PAN, PAN PAN, PAN PAN,
2. the words THIS IS,
3. the name and call sign of the vessel sending the urgency call spoken three times.

Examples

PAN PAN, PAN PAN, PAN PAN
ALL STATIONS, ALL STATIONS, ALL STATIONS
THIS IS
SEAFOX VC1234, SEAFOX VC1234, SEAFOX VC1234

PAN PAN, PAN PAN, PAN PAN
HALIFAX COAST GUARD RADIO (repeated 3 times)
THIS IS
SEAFOX VC1234, SEAFOX VC1234, SEAFOX VC1234

Urgency Message

The urgency signal and call shall be followed by a message giving further information of the incident that necessitated the use of the urgency signal. The message shall be in plain language. An urgency call can be directed to a specific station or to ALL STATIONS. This would be included after the priority call of PAN PAN, PAN PAN, PAN PAN and preceding the identification of the calling station.

When the urgency message does not contain a specific address and is acknowledged by a ship station, that station will forward the information to the appropriate authorities (Coast Guard Radio Station or search and rescue organizations or both).

Example of Call and Message

PAN PAN, PAN PAN, PAN PAN
ALL STATIONS, ALL STATIONS, ALL STATIONS
THIS IS
NORTH WIND VY3344, NORTH WIND VY3344, NORTH WIND VY3344
HAVE RUN OUT OF FUEL AND ADRIFT IN HEAVY SEAS
REQUIRE A TOW
MY POSITION IS 20 MILES DUE EAST OF HALIFAX
NORTH WIND VY3344
OVER

PAN PAN, PAN PAN, PAN PAN
HALIFAX COAST GUARD RADIO (repeated three times)
THIS IS

NORTH WIND VY3344, NORTH WIND VY3344, NORTH WIND VY3344
ONE OF THE RESCUED PERSONS HAS GONE INTO DEEP SHOCK
REQUEST HELICOPTER AIR LIFT
MY POSITION IS 20 MILES SOUTH OF HALIFAX
NORTH WIND VY3344
OVER

Example of Reply

PAN PAN
NORTH WIND VY3344, NORTH WIND VY3344, NORTH WIND VY3344
THIS IS
HALIFAX COAST GUARD RADIO (repeated three times)
HELICOPTER HAS BEEN DISPATCHED, ESTIMATED TIME OF ARRIVAL IS
1215Z
HALIFAX COAST GUARD RADIO
OVER

Cancellation of Urgency Message

When the urgency signal has been used before a message addressed to ALL STATIONS, which calls for action by stations receiving the message, the station responsible for its transmission shall cancel it as soon as it knows that action is no longer necessary. The cancellation message shall be addressed to ALL STATIONS.

Example

PAN PAN
ALL STATIONS, ALL STATIONS, ALL STATIONS
THIS IS
NORTH WIND VY3344, NORTH WIND VY3344, NORTH WIND VY3344
TIME: 1340Z
URGENCY ENDED
HELICOPTER HAS EVACUATED INJURED PERSON
ENROUTE TO HALIFAX, N.S.
THIS VESSEL NOW PROCEEDING NORMALLY TO HALIFAX
NORTH WIND VY3344

OUT

Safety Communications

Safety Signal

In radiotelephony, the safety signal is the word SÉCURITÉ spoken three times. It is sent before the call.

The safety signal indicates that the station calling is about to transmit a message containing an important navigational or meteorological warning.

Priority

The safety signal has priority over all other communications except distress and urgency.

All stations hearing the safety signal shall continue to listen on the frequency on which the signal has been transmitted. They may stop listening when they are satisfied that the message is of no interest to them. All stations that hear the safety signal must take care not to interfere with the message which follows it. No transmission shall be made that may interfere with these messages.

Safety Call and Message Procedure

The safety signal call may be sent at any time on the international distress frequency of 156.800 MHz (Channel 16). It shall be sent only on the authority of the person in command of the station. The safety message that follows the call is sent on a suitable working frequency such as 156.300 MHz (Channel 6). A short announcement giving the working channel and the area affected is made at the end of the safety call.

In the Maritime Mobile Service, safety calls and messages are normally addressed to ALL STATIONS. In some cases, however, they may be addressed to a particular station, such as a Coast Guard radio station. If the message is addressed to a Coast Guard station, it would be sent on a Coast Guard working frequency such as Channel 26.

Meteorological and navigational warning messages that contain information on imminent danger to marine navigation must be transmitted without delay.

Example

SÉCURITÉ, SÉCURITÉ, SÉCURITÉ
ALL STATIONS, ALL STATIONS, ALL STATIONS
THIS IS
TUG CRUSADER VG2010, TUG CRUSADER VG2010, TUG CRUSADER
VG2010
SAFETY MESSAGE CONCERNING THE MERRY ISLAND AREA TO
FOLLOW ON CHANNEL SIX
TUG CRUSADER VG2010
OUT

The safety message is then transmitted on the appropriate working channel.

Example

SÉCURITÉ
ALL STATIONS, ALL STATIONS, ALL STATIONS
THIS IS
TUG CRUSADER VG2010, TUG CRUSADER VG2010, TUG CRUSADER VG2010
LOG BOOM ADRIFT AND BREAKING UP SIX MILES SOUTH OF MERRY
ISLAND
HAZARD TO NAVIGATION
TUG CRUSADER VG2010
OUT

The Global Maritime Distress and Safety System

General

Safety of life at sea and assistance to persons in distress are matters of great concern and importance. The existing system requires that certain classes of vessels, when at sea, keep watch on international distress frequencies. Since the range of these conventional frequencies is limited, assistance for vessels in distress could only be rendered by other ships in the vicinity of the incident.

The introduction of modern communications technology, including satellites and digital selective calling (DSC), now allows distress alerts to be transmitted and received over long ranges, regardless of meteorological and interference conditions. This technology has led to the development of the Global Maritime Distress and Safety System (GMDSS), which will be phased in over a seven-year period commencing February 1, 1992.

The basic concept of the system (shown in Figure 1) is that search and rescue authorities ashore, as well as shipping in the immediate vicinity, will be rapidly alerted to a distress incident. All parties can, therefore, immediately assist in a co-ordinated search and rescue operation. The system also provides for urgency and safety information, including navigational and meteorological warnings. When the system is fully operational, every ship, irrespective of its operational area, will be able to perform those communication functions considered essential for the safety of all concerned.

One of the important principles used in formulating the global radio equipment carriage requirements is that every ship must be capable of performing each of the functions appropriate to its area of operation. Provisional carriage requirements for ships sailing in GMDSS areas are summarized in Table 7.

Alerting

Distress alerting is the rapid and successful reporting of a distress incident to a station that can provide or co-ordinate assistance, such as another ship in the vicinity or a Search and Rescue Co-ordination Centre (RCC). When an alert is received by the RCC, it is relayed to search and rescue vehicles as well as to ships in the vicinity of the distress incident. The distress alert should contain the identification and position of the distress and, where practicable, its nature and other information that could be used for rescue operations.

A distress alert will normally be initiated by a Digital Selective Calling (DSC) Alert. The manual acknowledgement is also digital. Voice communications are then established on an appropriate channel. In addition, when a ship equipped with an Emergency Position Indicating Radio Beacon (EPIRB) sinks, the EPIRB floats free. It is automatically activated and transmits a coded signal to an orbiting satellite. The satellite advises the ground station that a signal has been received and with computer assistance, the position of the station in distress is determined. This information is made a part of the distress alert and transmitted to the assisting stations.

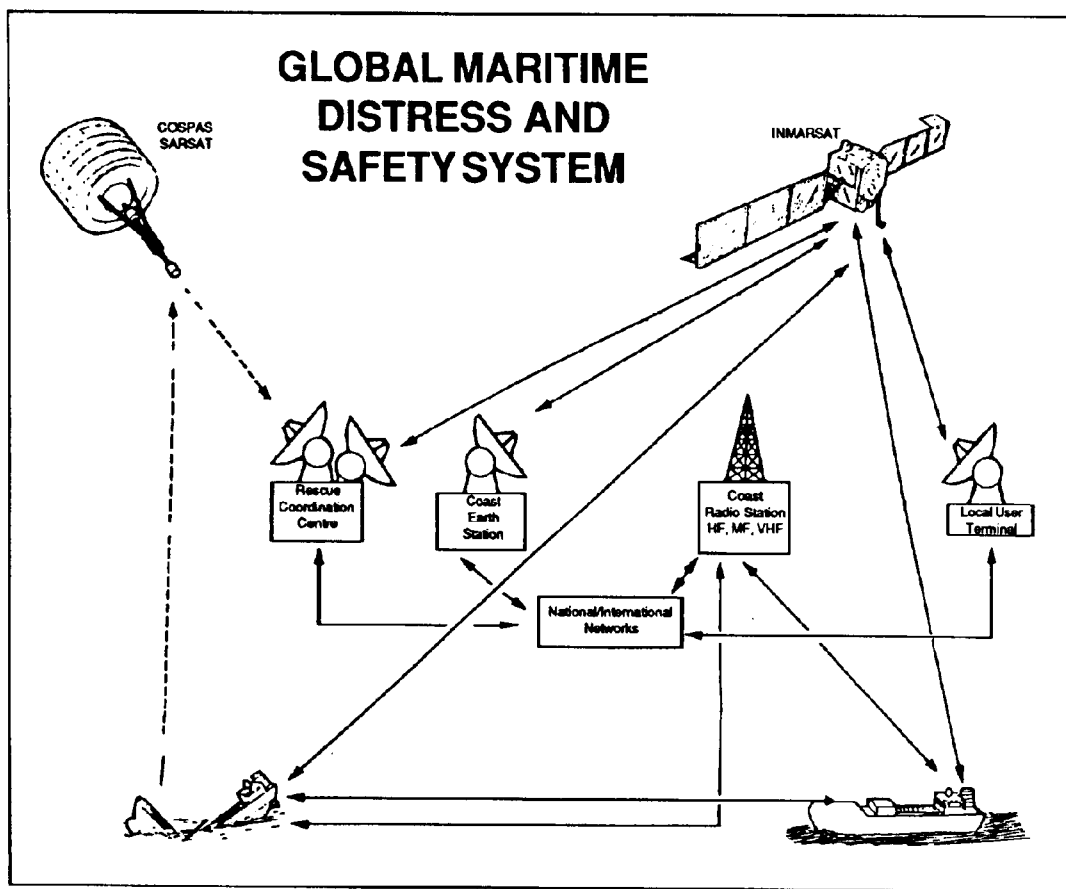


Figure 1

Note: The following table has been promulgated by the International Marine Organization (IMO). This is a blueprint for the establishment of the GMDSS for ships required to be fitted under the *Safety of Life at Sea Convention* (SOLAS) starting in 1992. A similar system is proposed for Canada, but modifications are expected. For up-to-date developments on this system refer to the latest copy of RIC-16, *Professional Radio Operator's Certificate*, the latest editions of the *Radio Aids to Marine Navigation* and the annual edition of *Notices to Mariners*.

Table 7

Area of Operation	Equipment to be Carried
A1- All ships operating within the range of shore-based VHF coast stations (60-80 km).	By 1999, all ships will carry VHF DSC*. Distress alerts will be initiated by DSC on Channel 70 or by the activation of an EPIRB**.
A2- All ships operating within range of shore-based MF coast stations.	By 1999, all ships will carry VHF and MF equipment fitted with DSC. Distress alerts will be initiated with DSC on VHF and MF or by the activation on an EPIRB.
A3- All ships operating between approximately 70 degrees N and 70 degrees S or within the appropriate coverage area of the geostationary maritime communications satellites.	By 1999, all ships will carry VHF, MF (fitted with DSC) and either HF or satellite equipment. Distress alerts will be initiated by DSC on VHF, MF, HF and earth stations or by the activation of an EPIRB.
A4- All remaining sea areas.	By 1999, all ships will carry VHF, MF (fitted with the DSC) and HF equipment. Distress alerts will be initiated by means of either DSC or EPIRB activation.

* Digital Selective Calling

** Emergency Position Indicating Radio Beacon

Emergency Position Indicating Radio Beacons (EPIRBs)

Marine Emergency Position Indicating Radio Beacons (EPIRBs) are designed to be carried aboard ships and survival craft for use in emergency situations. Specifically, EPIRBs are used to make it easier to determine the position of survivors in search and rescue operations.

The EPIRBs are packaged in a waterproof single unit container, resistant to corrosion and other environmental effects that may occur in connection with use and long-period stowage on ships at sea. After deployment, the EPIRBs float. All new units are equipped with a strobe light.

They are finished with a highly visible yellow or orange colour and are clearly labelled with information regarding their manufacturer, class designation, model/serial number and type-approval number. Concise operational and testing instructions, as well as information regarding the shelf life of the battery and its replacement date, are permanently and conspicuously displayed on the exterior of the EPIRBs in both official languages.

There are two classes of EPIRBs, Class I and Class II.

Class I EPIRBs are designed to float free and may be either automatically activated by hydrostatic pressure, or may be manually activated by a switch.

Class II EPIRBs are manually activated.

When an EPIRB is activated, either automatically or manually, it transmits a signal on 406.025 MHz to alert Search and Rescue authorities through the COSPAS-SARSAT satellite system. This system indicates the location of the EPIRB within approximately 5 kilometres. The unit also transmits on 121.5 or 243.0 MHz, or both, enabling surface vessels and aircrafts engaged in the rescue to pinpoint the EPIRB's exact position.

Class I EPIRBs are located in an upper area of the ship where their deployment will not be obstructed by the superstructure. The EPIRB's transmitter can be activated manually by setting the unit's switch to the ON position. Normally, however, the switch is left in the armed position, which automatically triggers the transmitter, when the EPIRB floats free of the sinking ship.

Class II EPIRBs are designed for carriage on the ship's bridge or in its life rafts. These units are manually deployed and are activated by an external switch. There are three modes of operation: OFF, ON and TEST.

Tests on the EPIRBs should be undertaken on a scheduled basis. Care should be taken when testing the EPIRB that it does not transmit signals that may be detected by the satellite system, thereby causing false alerts. After completion of all tests, EPIRBs should be inspected visually. They should not show any sign of corrosion due to intrusion of water, or any sign of physical damage to the transmitter module, antenna system or connectors, which could prevent the EPIRB from functioning satisfactorily.

Technical specifications, as well as additional information about these devices, appear in Radio Standards Specification 187 (RSS-187), *Marine Emergency Position Indicating Radio Beacon (EPIRB) Transmitters Operating at 121.5 MHz, 243.0 MHz or 406.025 MHz*, and in Transport Canada's publication, *Performance Standards for 406 MHz Satellite Emergency Position Indicating Radiobeacons (EPIRBs), Class I and Class II (TP4522)*.

Equipment Fundamentals and General Electronic Information

Radiotelephone Transceiver Controls

Radiocommunication equipment is very complex in design but simple to operate. The following descriptions provide a basic outline of standard face plate controls.

Channel Selector

Selects the specific frequency that is to be transmitted or received.

On/Off and Volume Control

Turns the set on and controls the volume of audio from the receiver.

Squelch Control

Controls the receiver squelch circuit. When operating a receiver on a fixed frequency over an extended period of time, the constant background noise and undesired distant signals can be very annoying. A squelch circuit automatically cuts off undesired distant signals and background noise. The squelch circuit allows local signals to be amplified and passed through the audio circuits.

VHF - Power Selection

Switches the VHF transmitter from its high output power of 25 watts to its lower power setting of 1 watt. The switch is designed so that the transmitter is set in either the 1-watt or the 25-watt position.

Connectors

Cables have various connectors which are attached to the electronic equipment. Each connector requires its own assembly technique. Care should be exercised when repairing or replacing connectors.

The most common problems with connectors are bared wires touching one another or the case (short circuits), and broken wires (open circuits) at the point of connection or inside the plastic sheath.

All connections should be tight and clean. Where connectors are exposed to the weather, they should be protected with a coating of silicone to prevent build-up of corrosion and to keep water out.

Fuses

Electric circuits are protected against overload and short circuits through the use of fuses or circuit breakers which are rated for a given current.

Most fuses used in marine radios and navigational aids are mounted on the rear of the equipment chassis. This type of fuse is usually made of a transparent glass cylindrical case with a thin metallic strip between two metal end caps. The current and voltage ratings of the fuse are stamped on one end. When excessive current passes through the fuse, the thin strip of metal melts and pulls apart, effectively turning the equipment off.

Never replace a fuse with one of a higher rating as this simply negates its protective function and creates a fire hazard. When the fuse fails, it is a warning. Correct the fault before replacing the fuse.

Note: Always exercise caution when changing a fuse. (See the section entitled "Repair and Maintenance Tips".)

Repair and Maintenance Tips

Never attempt to do any repairs with the power on. Disconnect the main or primary power source from the unit and at the point of disconnection, put up a sign indicating to others that this circuit has been turned off because of maintenance. When it is necessary to work on any electrical equipment, make sure that your hands are dry. Never stand in wet or damp areas. If necessary, lay down dry boards and wear rubber-soled shoes.

Always analyze and familiarize yourself with the particular repair job that you are going to attempt before proceeding with your task. Check the troubleshooting section of the manual for the equipment to be examined.

Many of the problems that you encounter will be caused by loose connectors or connections, and broken or shorted wires. Before doing any extensive checks on the radio or electronic unit, do a visual confirmation on all connections, connectors and wires.

Extreme caution should be exercised with respect to tool usage. Do not poke screwdrivers or pliers inside equipment.

Remember: SAFETY FIRST!

Lead Acid Storage Batteries

Lead acid storage batteries are used extensively as a source of primary and emergency power for radiotelephone equipment. It is important that they be fully charged at all times.

The batteries should be kept in a suitable location designed to protect them from the elements, with proper ventilation to the outside. The battery compartment should be readily accessible for routine and emergency maintenance.

To ensure that maximum energy can be obtained from storage batteries, the recommended procedures for care and maintenance are as follows:

1. Electrolyte (battery solution) should be kept about 1/4 inch above plates by adding pure (distilled) water when needed.
2. Batteries should be frequently checked. Use a hydrometer to determine the state of charge. The typical specific gravity for a fully charged cell is 1.250 to 1.280. For a fully discharged cell it is 1.200 or less.
3. Keep exterior dry and terminals clean and coated with vaseline or other suitable lubricants to prevent corrosion on the posts.
4. Keep all connections tight and clean.
5. Daily voltage readings should be taken. The full load/no load voltage readings should not differ by more than five per cent (5%). For example, in the battery bank, if the voltage with no load is 24 volts, then the voltage under full load should be no less than 22.80 volts.

Hazards

The following precautions should be observed when storage batteries are being charged or discharged, whether in large banks or singly:

1. Charge or discharge the batteries in a well ventilated space in order to dissipate the hydrogen gas.
2. If the batteries are equipped with gassing caps, remove the caps during charging.
3. Keep open flames and sparks away from the batteries.
4. While batteries are charging, do not make or break any electrical connections near them as this produces sparks.

Note: Hydrogen gas is extremely explosive in air, and failure to observe the above precautions may create an incident with potentially disastrous results.

Charging and Discharging Storage Batteries

Most battery chargers have two settings, trickle charge and full charge. A trickle charge is a slow continuous charge applied to the battery in order to keep it at full charge even as it is being used. Full charge is used to charge a battery from a low state of charge to a full or nearly full state of charge in a short time. When a fully charged battery is under heavy load or is accidentally shorted out by connecting the positive and negative terminals together, it discharges very rapidly.

When a storage battery is charged or discharged quickly, a significant amount of hydrogen gas is produced and there is a rapid heat build-up. As mentioned previously, the hydrogen gas can produce an explosion. Rapid heating can eventually destroy the plates in a battery.

Appendix

List of Industry Canada District Office Locations by Region

Atlantic Region

Saint John, N.B.
St. John's, Nfld.
Halifax, N.S.
Charlottetown, P.E.I.

Prairies & Northern Territories Region

Calgary, Alta.
Edmonton, Alta.
Grande Prairie, Alta.
Regina, Sask.
Saskatoon, Sask.
Winnipeg, Man.
Yellowknife, N.W.T.

Quebec Region

Chicoutimi, Que.
Montreal, Que.
Quebec, Que.
Sherbrooke, Que.

British Columbia & Yukon Region

Cranbrook, B.C.
Kelowna, B. C.
Prince George, B. C.
Vancouver, B. C.
Victoria, B. C.
Whitehorse, Y.T.

Ontario Region

Belleville, Ont.
Hamilton, Ont.
Kitchener, Ont.
London, Ont.
Ottawa, Ont.
Sault Ste. Marie, Ont.
Toronto, Ont.