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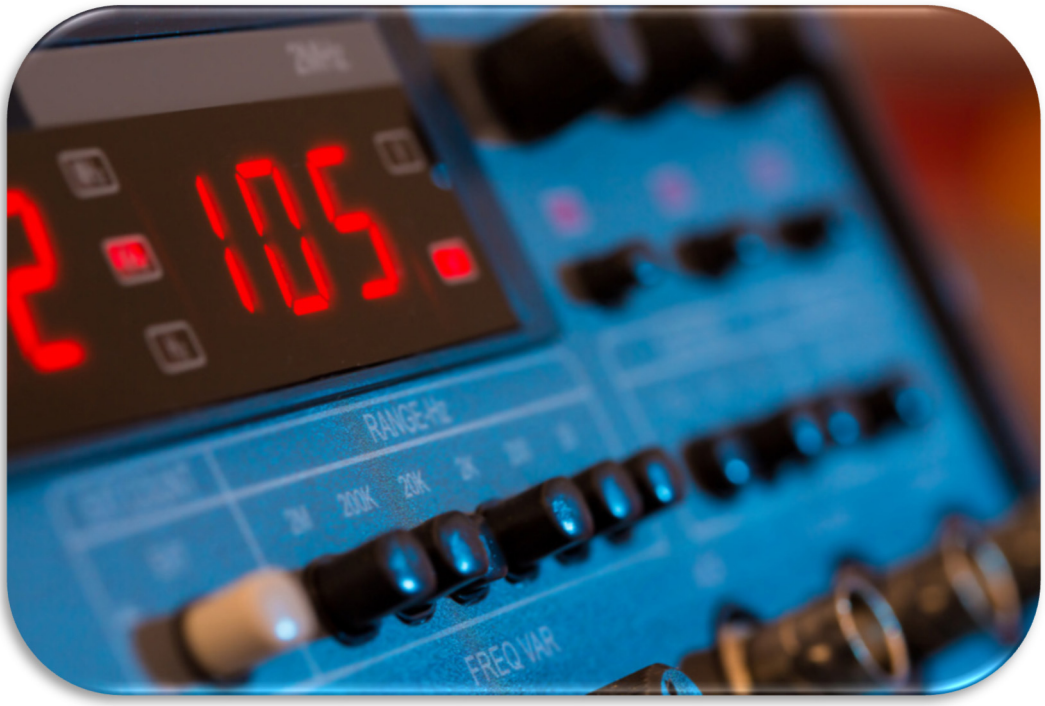

MARINE COMMUNICATIONS COURSE NOTES

CERTIFICATION FOR VHF RADIO OPERATIONS AND SHORT RANGE CERTIFICATE (SRC)

(IYT PASSPORT TRAINING PROGRAMME MODULE 12)

International Yacht Training
WORLDWIDE

Revised December 2016

List of IYT Courses

Recreational Courses

Dinghy Sailing - Bronze Level – Start Sailing
Dinghy Sailing – Silver Level – Safe Sailing
Dinghy Sailing – Gold Level - Independent Sailing
Dinghy Sailing – Platinum Level – Perfected Sailing
International Yacht Racing
Introduction to Yachting
International Crew Power or Sail
International Bareboat Skipper Power or Sail
VHF Radio Operator
Personal Watercraft Operator (PWC)
Small Powerboat & RIB Master (MCA Approved)
Powerboat Skipper
Navigation Master
Weather Master
International Certificate of Competency <10m Power Coastal
International Certificate of Competency <10m Power Coastal & Inland
International Certificate of Competency <24m Power Coastal
International Certificate of Competency <24m Power Coastal & Inland
International Certificate of Competency <24m Sail & <10m Power Coastal
International Certificate of Competency <24m Sail & <10m Power Coastal & Inland
International Certificate of Competency PWC Coastal
International Certificate of Competency PWC Coastal & Inland
Yachtmaster Coastal Power or Sail
Yachtmaster Offshore Power or Sail
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STCW Basic Fire Prevention & Fire Fighting
STCW Proficiency in Maritime Security Awareness
STCW Personal Survival Techniques
STCW Personal Safety & Social Responsibilities
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Master of Yachts Limited

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Diveboat Coxswain
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Commercial-Tactical-Rescue

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PREFACE

Introduction

These Marine Communication Course Notes have been produced to be used in conjunction with the IYT Marine Communication Course that enables students to obtain the VHF Radio Operations Short Range Certificate.

Any comments or suggestions for this document should be directed to International Yacht Training. Please e-mail: info@IYTworld.com or telephone Canada 778-477-5668.

Scope

The IMO has 4 professional certification levels in descending order for SOLAS (Compulsory Fit) vessels:

a. First Class radio electronic certificate
b. Second Class radio electronic certificate
c. General Operators Certificate - GOC
d. Restricted Operators Certificate –ROC

The IMO recognises two recreational levels for NON-SOLAS (Voluntary fit) vessels:

a. **Short Range Certificate** –GMDSS Sea area A1 only (VHF)
b. Long Range Certificate – GMDSS Sea Areas A1-A2 (VHF,HF/MF)

This IYT **Short Range Certificate** (SRC) Course covers the training recommendations contained within World Radio Conference 2012 (WRC-12) Resolution 343 for SRC for NON-SOLAS Vessels. The 2012 Radio Regulations Chapter 9 – Maritime services Article 47 – Operator's Certificates –refers out to Resolution 343 for GMDSS licensing for Non-SOLAS Vessels.

A trainee successfully completing this course and passing the prescribed examination should be able to efficiently operate the GMDSS equipment, and to have primary responsibility to radio communications during distress-, urgency-, safety and routine incidents for non-SOLAS (Voluntary fit) vessels fitted for sea areas A1 only.

He/she will not be able to operate GMDSS equipment on a SOLAS registered vessel regardless of which sea area that vessel is operating or fitted to. A Restricted Operators Certificate (ROC) or above will need to be achieved as a minimum in this instance.
He/she will not be certified to operate HF or MF equipment on a Non-SOLAS vessel. A Long Range Certificate (LRC) or above will need to be achieved as a minimum in this instance.

Amendments

Amendments and updates to the Publication will be published as and when necessary. Edition number and date will be noted on the footer of each stage.

Publication information

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Chapter 1 Introduction

1.1 Key Objectives

IN THIS CHAPTER YOU WILL LEARN HOW MARINE RADIO COMMUNICATIONS REGULATIONS HAVE EVOLVED AND BE ABLE TO RECALL THE ORGANISATIONS THAT CONTROL POLICY.

1.2 Introduction

In 1912 the sinking of RMS Titanic changed the way the world regarded maritime safety. The event was the catalyst for the formation of the international treaty for Safety of Life at Sea (SOLAS). Over the years SOLAS has introduced minimum guidelines that flag states must comply. In particular Chapter IV of SOLAS V requirements deals with Radio Communications equipment.

Internationally Marine Communications are controlled by the international Maritime Organisation (IMO) and are advised by the International Telecommunications union (ITU). They developed the Global Maritime Distress and Safety System (GMDSS) an internationally agreed upon set or safety procedures, types of equipment and communication protocols to increase safety and make it easier to rescue distressed boats and aircraft. The GMDSS requirements are laid down in Chapter IV of SOLAS.

Whilst not all vessels are bound to carry GMDSS equipment, it is recommended that they should at least carry some form of radio communications in case of distress and danger. Mobile or Cell phones are readily available nowadays and have their uses, but should not be relied on alone when at sea. Coverage can be extremely limited off shore and would not prove effective in the case of an emergency.

1.3 Accuracy of Information

Whilst this course aims to teach as accurately as possible the International scope of each topic covered, it is impossible to list all differences for every country. It is the duty of all Marine VHF operators to know and understand any local Laws and Procedures required by their own Flag State when operating Marine Communications Equipment registered in that state.

1.4 Course Information

This course outlines the various types of communications equipment, the regulations concerning their correct use, types of radio equipment used and the correct procedures for emergency radio communications.
At the end of each chapter there is a knowledge review box that checks your knowledge of the key points of each section. Complete these as a self-study aid.
Successful completion of the course will enable you to use a VHF radio and introduces you to the correct operational procedures and common radio terminology.
These notes may be kept on board your vessel to serve as a quick reference guide.

1.5 Knowledge Review

1. What triggered the formation of SOLAS?

2. What does GMDSS stand for?

Chapter 2 Licensing

2.1 Key Objectives

THIS CHAPTER OUTLINES YOUR LEGAL OBLIGATIONS IN REGARDS TO OPERATOR AND OWNER LICENSING FOR VHF RADIO EQUIPMENT.

2.2 Licensing Requirements

In accordance with the most recent 2012 edition of International Radio Regulations (2012):

- All Marine Radio equipment (Including portable equipment) must carry a license issued in an appropriate form and in conformity with the provisions of International Radio Regulations by or on behalf of the government of the country to which the equipment or station is subject.
- All Marine Radio equipment using frequencies and techniques for GMDSS shall be controlled by an operator holding a certificate issued or recognized by the government to which the station is subject.

Attaining a VHF license through an agency that is IMO and ITU approved should allow the operator to use VHF equipment globally but it is always prudent to check specific local requirements to ensure you are following all applicable rules and regulations (Both National and International. Below shows some examples of such agencies:

FIGURE 2-1 VARIOUS VHF AGENCIES

There are six categories of Radio Operator certification:

- First Class electronic certificate
- Second Class electronic certificate
- General Operator's certificate
- Restricted Operator's certificate
- Long Range Certificate – (only for non SOLAS Vessels)
- Short Range Certificate – (only for non SOLAS Vessels)

This IYT course is the Very High Frequency (VHF) Short Range Certificate (SRC) and follows the World Radio Conference (WRC) 2012 syllabus guidelines. It is recognized by the Republic of the Marshall Islands. It is the outcome of the WRC that revises the Radio Regulations. For most coastal operations this SRC will be more than sufficient but if the vessel you are working with operates commercially offshore; more advanced certification in radiotelephony may be required. This will be further explained in the next chapter.

The Long Range certificate covers Medium Frequency (MF) and High Frequency (HF) equipment and is outside the scope of this course.

Table 1 below details four examples of minimum Maritime VHF certification requirements:

TABLE 1 EXAMPLES OF MINIMUM MARINE VHF CERTIFICATION REQUIREMENTS

Serial (1)	Country (2)	License Issued By: (3)	Certification Required: (4)	Complies with IMO & ITU (5)
1	 AUSTRALIA	ACMA* Issued by the OMC* a branch of the AMC* on behalf of the ACMA.	MROVCP*	YES
2	 CANADA	CPSS*	ROC (M)*	YES
3	 UK	RYA	SRC*	YES
4	 USA	FCC*	MP*	YES

The following abbreviations were used in Table 1 above:

*ACMA – Australian Communication & Media Authority.
*AMC – Australian Maritime College.
*CPSS – Canadian Power & Sail Squadron.
*FCC– Federal Communications Commission.
*MCA– Maritime & Coastguard Agency.
*MP – Marine Radio Operator Permit
*MROVCP – Marine Radio Operators VHF Certificate of Proficiency.
*OMC – Office of Maritime Communications.
*ROC (M) – Radio Operators Certificate (Maritime).
*RYA – Royal Yacht Association.
*SRC– Short Range Certificate.

2.3 Knowledge Review

1. Licensing requirements are defined in which document?

2. This IYT SRC course is recognised by which administration?

Chapter 3 Maritime Mobile Band

3.1 Key Objectives

THIS CHAPTER DESCRIBES THE MARITIME MOBILE BAND AND OUTLINES THE ACCEPTED INTERNATIONAL RADIO CHANNELS THAT YOU WILL BE USING ON A REGULAR BASIS UPON CERTIFICATION.

3.2 Maritime Mobile Band

The ITU refers to the Marine VHF Frequencies between 156.0 and 162.025 MHZ as the Maritime Mobile Band. This frequency band is split into a number of channels, which can be accessed by the operator.

3.3 Simplex and Duplex

Marine VHF mostly uses Simplex transmission, where communication can only take place in one direction at a time. A transmit button (presell) on the set or microphone determines whether it is operating as a transmitter or receiver.

Some channels are Duplex where communication can take place in both directions simultaneously when the equipment on both ends allows it. This would be similar to a normal landline telephone call where both parties can speak at the same time.

It is important to note that for Full Duplex operation, both the radio channel needs to be Duplex and also the radio equipment used, otherwise the transmission will be semi Duplex or Simplex.

3.4 International channels

There are a number of international channels with distinctive purposes. There is the likelihood that there may be additional local channels for these purpose that will vary from country to country.

- **Channel 16** is the international VHF distress frequency. It is used for distress, urgency and traffic safety.

- **Channel 70 DSC** (**Data communications only – NO Voice**) is used to establish initial contact between stations for distress, urgency and safety traffic. Following an alert by Digital Selective Calling (DSC), communications are then carried out by radio using voice. This will be explained in detail later in the course.

- **Channel 13 - Bridge to Bridge** - is set aside under GMDSS. It will normally be monitored by commercial vessels if a danger of collision exists.

- **Channel 80.** International Marina channel. Since marinas are not fitted with Channel 16 the initial call must be made on Channel 80.

- Other International Channel types:

    - **Inter-Ship Channels** These channels are for communications between ship stations.

    - **Port Operations and Ship movement.** Allocated by international agreement, they are assigned to a user, such as port or oil terminal where safe movement of ships is important.

    - **Public Correspondence.** Rarely used nowadays, these channels have been set aside, by international agreement for making calls to the public telephone network. Calls made on these channels are known as “link calls”

3.5 Knowledge Review

1. Which Channel is reserved for International Distress, Urgency and Safety?
2. Which Channel is only to be used for digital data transmissions?
3. State the difference between Simplex and Duplex operation.

Chapter 4 GMDSS Equipment

4.1 Key Objectives

THE GLOBAL MARITIME DISTRESS AND SAFETY SYSTEM HAS BEEN DEVELOPED WITH INTERNATIONAL COOPERATION TO ENSURE MAXIMUM SAFETY FOR VESSELS AND LIFE AT SEA. THIS CHAPTER LISTS THE INDIVIDUAL COMPONENTS THAT MAKE UP THE GMDSS AND OUTLINES THE FUNCTION OF EACH COMPONENT.

4.2 GMDSS Requirements

The IMO regulates the radio communications equipment carriage requirements and operation for vessels engaged on international voyages, except warships. These radio regulations generally affect all passenger ships and all other ships of **300 gross tonnage and above** on international voyages and are known as **SOLAS** or **compulsory fit** vessels. Details are published in Chapter IV of the Safety of Life at Sea (SOLAS) Convention which has been ratified by the IMO members which includes about 170 maritime administrations (Governments).

Recreational Vessels and those less than 300 gross tonnage are collectively known as **non-SOLAS** or **voluntary fit** vessels are limited. These do not have to comply or carry GMDSS equipment, however they may choose to equip themselves with components of GMDSS equipment if they wish to be able to communicate with SOLAS Vessels or shore stations.

4.3 GMDSS Components

The main components of the GMDSS system are:

- Maritime Safety Information Broadcasts
- Emergency Positioning Indication Radio Beacon (EPIRB)
- NAVTEX
- IMMARSAT
- High Frequency (HF) /Medium Frequency Radio (MF) (Sea areas A2 –A4 only. Outside Scope of this course)
- Search and Rescue Transponder (SART)
- Digital Selective Calling(DSC) *discussed in detail later*
- Power Supply Requirements

4.4 GMDSS Sea Areas

There are four classifications of GMDSS Sea areas; **A1, A2, A3 and A4**. These areas serve two purposes. They describe areas where GMDSS services are available and define which GMDSS equipment's a compulsory fit vessel must carry. The sea areas are categorised as follows:

- A1 An area within radiotelephone coverage of at least one VHF coast station in which continuous Digital Selective Calling (Ch70) alerting and radiotelephony services are available. Such areas could extend 30 - 40Km from the coast station.

- A2 An area outside of A1, within the radiotelephone coverage of at least one medium frequency coast station in which continuous Digital Selective Calling (DSC) alerting and radiotelephony services are available. Such areas extend 150 - 180Km offshore.

- A3 An area outside A1 and A2 within coverage of Inmarsat geostationary satellite. This area lies between 70 degrees North and South.

- A4 An area outside of A1 –A3. Essentially the Polar Regions.

NOTE: Presently the US Coast Guard maintains a sea area A1 service through its Rescue 21 system. Outside of this area a Compulsory Fit vessel must fit to A3 or A4 regardless of where they operate until a permanent A1 and A2 sea area is established.

4.5 Maritime Safety Information (MSI) Broadcasts

An essential component of the GMDSS is Maritime Safety Information broadcasts. As soon as a meteorological (weather) or navigational warning is issued an announcement is made on Channel 16. This will direct listeners to a working channel where further information is given. In addition to warnings, regular (normally 3 hour) weather forecasts are announced on Channel 16 and transmitted on working channels. Consult your local almanac for channel and timing information.

4.6 Emergency Position Indicating Radio Beacon (EPIRB)

Emergency Position Indicating Radio Beacon (EPIRBs) are transmitters which aid in the detection and location of craft in distress. Essentially they interface by radio signal with an international satellite system for Search and Rescue authorities (SAR). Once they are activated, either by immersion or manually, they transmit a distress signal which is detected by satellites, informing authorities of the distress situation. In the case of modern (406 MHz) EPIRBs they transmit digital signals and provide SAR organisations with both an identification of the distressed vessel and its position to within 100 meters, anywhere in the world. This

allows SAR aircraft and vessels to come swiftly to the aid of the distressed vessel. The figure below shows typical examples of EPIRB equipment.

FIGURE 4-1 EPIRB RADIO EQUIPMENT

EPIRB Systems /Organisations / Regulations

EPIRBs interface with COSPAS-SARSAT, the international satellite system for search and rescue.
Many countries regulations require that all 406 MHz EPIRBS fitted must be registered with the appropriate authority. Any changes to registered beacons must also be notified. It is an offence not to comply with these requirements. Ensure you register any EPIRB equipment with the relevant authority.

4.7 NAVTEX

Navigational Telex (NAVTEX) is an essential component of GMDSS. It is an international automated medium frequency direct printing service for delivery of navigational and meteorological warnings and forecasts, as well as urgent maritime safety information to vessels. NAVTEX was developed to provide a low cost simple means of receiving this information up to 370Km off shore.

FIGURE 4-2 NAVTEX

The original frequency of 518 kHz is now supplemented with 490 kHz on most new sets.

4.8 INMARSAT

Inmarsat is a satellite system capable of receiving maritime safety information not within range of the NAVTEXT system.
This figure shows a pictorial overview of the system.

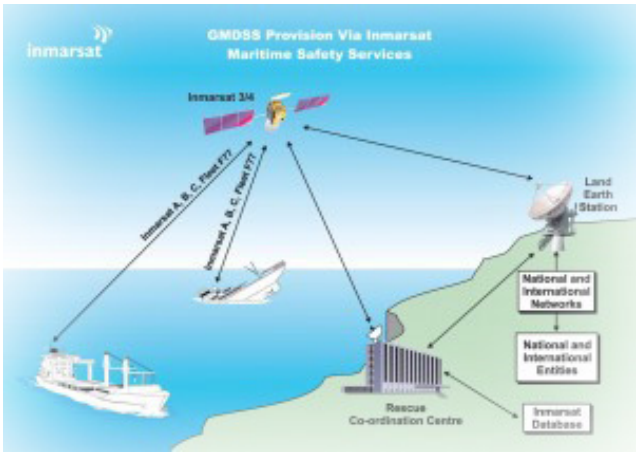


FIGURE 4-3 INMARSAT OVERVIEW

4.9 Search and Rescue Transponders (SART)

SARTs are location aid beacons (operating on a radar frequency - 9GHz) that actively respond to being "interrogated" by another vessel's radar within a range of approximately 8 nautical miles.

Compulsory fit Vessels must now carry at least two SARTs, one each side of the vessel, located so that they can be rapidly placed in a survival craft. Alternatively, one transponder can be carried in each survival craft, the SART being carried in lieu of a radar reflector in a life raft.

Once activated the SART will "paint" a marker on the screen of any "in range" search vessel's operating radar display as an easily recognized series of dots. Many of the available SARTs include visual and/or audible warning when illuminated by radar. They should be positioned as high up as possible for maximum detection.

The SART operates by receiving the pulse from the search radar and sending back a series of pulses in response, which the radar will then display as if they were normal echoes.

Initially a series of 12 in-line dots is shown, leading away from the position of the SART; as the rescue craft gets closer, the dots become arcs and then increase until eventually complete rings on the display. See figure below:

FIGURE 4-4 SART

FIGURE 4-5 SART RADAR SCREEN

4.10 Power Supply

GMDSS requirements state the Radio power supply should have sufficient capacity to power Radio transmissions for a considerable time without being charged by an alternator. i.e. In the event of a distress situation, exchange of vital information by VHF radio can still take place independently of engine power.

4.11 Knowledge Review

1. State two types of Vessel categories in regards to GMDSS
2. Name 4 components of GMDSS equipment and briefly explain their purpose.
3. What do the initials EPIRB stand for?

Chapter 5 VHF DSC Radio Equipment

5.1 Key Objectives

THIS CHAPTER OUTLINES THE FEATURES AND FUNCTIONS OF A DSC ENABLED VHF RADIO SET. IT IS A KEY REQUIREMENT THAT YOU UNDERSTAND THE FUNDAMENTAL PRINCIPLES OF VHF RADIOS TO BE ABLE TO USE THEM EFFECTIVELY.

5.2 Transmitter, Receiver, Transceiver, Antenna

A VHF radio set consists of a transmitter and receiver combined in one instrument, usually called a transceiver. The transmitter is the part that can send a radio signal and the receiver is the part that receives a radio signal from another transmitter. When you speak into the microphone the sounds of your voice are converted by the transmitter into radio waves, or signals, which are then transmitted (sent out) from the transmitter through an antenna or aerial.

A receiver can pick up these radio signals through its antenna and convert them back into intelligible sounds which are heard coming from the radio speaker.

FIGURE 5-1 VHF RADIO TRANSCEIVER

5.3 Antenna types

There are generally two types of antennas used in Marine communications. Each type has its own advantages and disadvantages:

High Gain Antenna: A spotlight has its beam focused into a narrower beam to make the light shine further. In much the same way an antenna can be designed so that it focuses the radio signal thus transmitting it further.

This type of antenna is called a high gain antenna but, because the beam is narrow, the antenna must remain reasonably upright and directed towards its target receiver.

A high gain antenna is therefore only really suitable for a motor boat rather than a sailing boat which will operate at an appreciable angle of heel most of the time.

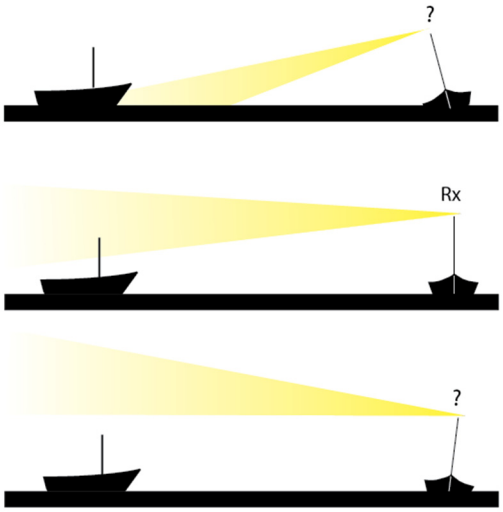


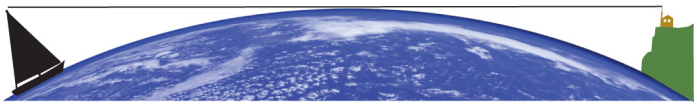
FIGURE 5-2 HIGH GAIN ANTENNA

Unity Gain Antenna: Aerials for sailing boats are usually 'Unity Gain' types, in other words they are designed without any gain. Sailing boats have the advantage of a high mast on which to mount their antennas and gain range in this way; the wide angle of the signal from an aerial without any gain reduces the risk of broken or interrupted transmissions.

5.4 Range

VHF radio waves travel in a straight line but the surface of the earth is curved; therefore, the maximum range between two VHF transceivers will depend on the height of the transmitting aerial and the height of the receiving aerial. Essentially the maximum range of a VHF signal is known as '**line of sight'**. Without the antennas "*seeing*" each other the stations will not be able to communicate. Increasing power will not increase range where the antennas are not in this line of sight.

The higher the aerial the greater the range, which is why coast radio stations put their aerials on hilltops. In the same vein a sailing boat, with the higher aerial location, would likely have a greater VHF radio range than a motor boat.



5.5 Frequency

Radio transmitters send out their signal on a precise carrier frequency and only a receiver tuned exactly to the same carrier frequency will receive that signal. The frequency selected is usually indicated on the radio by a pointer against a printed scale or by a digital readout. In order to find the frequencies used by a specific station, a publication listing radio stations will have to be consulted.

More sophisticated radio receivers may allow frequency information for a number of regularly used stations to be inputted into its memory, so that by just pressing a marked button the radio receiver automatically switches to the desired frequency. If the radio has this facility you can also switch from one frequency to another by simply pressing the correctly marked button.

5.6 Makes of VHF Equipment

There are a large number of manufacturers producing different types and models for both the recreational and commercial markets. Each unit has different controls and layouts but essentially the functions of the controls on all types are similar. It is important that every crew member or anyone using VHF should be familiar with the specific radios operation and the manufacturers' guidance. The radio set shown in below is a typical DSC enabled VHF transceiver which has all the international channels fitted.

NOTE

Vessel Owners and operators should ensure the radio set is in compliance with any local and international regulations. Not all VHF radios are built to the same standard.

FIGURE 5-3 DSC ENABLED VHF RADIO

5.7 Controls

The figure below illustrates a typical front panel set up of a VHF radio.

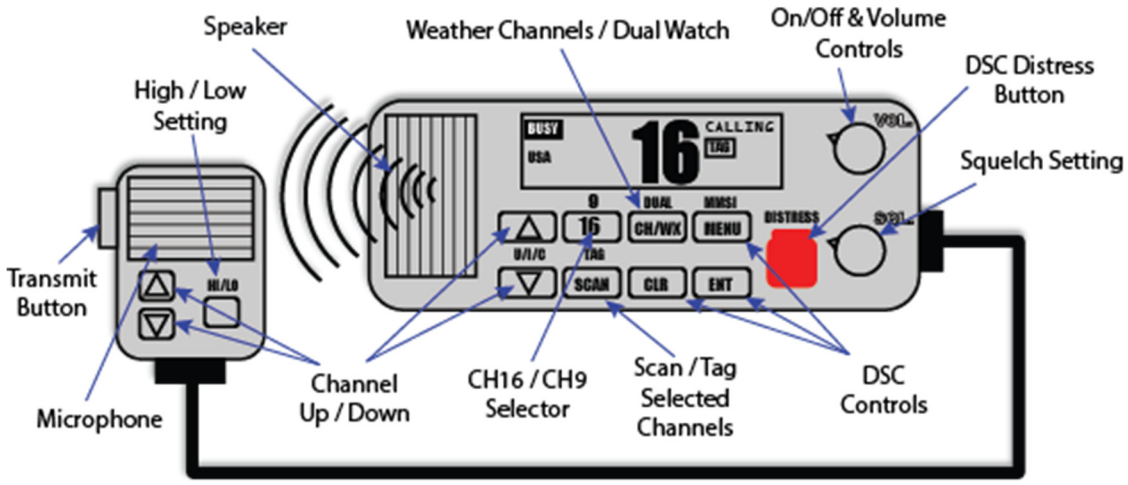


FIGURE 5-4 TYPICAL DSC ENABLED VHF RADIO CONTROLS

On / Off / Volume:

- The set is switched on and off by turning the on/ off knob; this also controls the volume of sound from the speaker. Adjusting the volume increases or decreases the sound coming from the speaker; it does not increase or decrease the power output from the transmitter.

DSC Distress Button:

- The red DSC Distress Button is found on sets fitted with Digital Selective Calling (DSC). It should be protected in some way to prevent accidental activation. When activated it will send out a pre-defined distress data message. DSC is covered in greater detail later on.

Squelch:

- The 'squelch' control increases or decreases the sensitivity of the receiver. In practice the set is switched on and the squelch control is adjusted until continuous loud background noise is heard.

- The squelch control is then turned back slightly until the background noise disappears; at this setting the receiver is tuned to its optimum sensitivity allowing it to pick up signals within range.

Channel (CH):

- The "Arrow Up" and "Arrow Down" Buttons are used to select the required channel. The channel selected is indicated by the number displayed in the screen of the set. Some sets use digital keypads, similar to the keypad on a calculator, to select the required channel.

Channel 16 (Distress/Safety/Calling):

- As a safety feature most modern sets automatically select channel 16, Distress and Safety channel, when first switched on. The set illustrated has a channel 16 selector button. It is usually the bright red button next to the volume control. Pressing this button will automatically select channel to 16 at full power.

Dual Watch (DW):

- Channel 16 is the Distress, Safety and Calling channel so it makes sense to listen to this channel at all times; in fact it is a legal requirement for commercial shipping to do so. However it is often desirable to be able to listen in to another channel at the same time; for example Channel 13 in order to hear Bridge to Bridge Calls from other vessels in the area. A dual watch facility allows you to listen to both channels 16 and any one other channel at the same time. To use dual watch select the channel you wish to listen to, say channel 13, and then press the DW button. The receiver will then switch momentarily from channel 13 to channel 16 and back to 13 again and will repeat this cycle continuously until the dual watch is switched off. If the receiver detects a signal on CH 16 it will lock on to that channel when in dual watch mode.

High/Low – (H/L):

- The maximum power output from a VHF set allowed by law is 25 Watts. Most of the time a much lower output is quite sufficient, such as when talking to another boat, which is close by. Virtually all fixed VHF sets can (in theory) transmit at the legal maximum power of 25 Watts and they also have a switch, which reduces the power output to 1 Watt for close range communications. The power level will be displayed on the screen; 'HI' indicates 25 Watts and 'LO' indicates 1 Watt. Simply pushing the button marked 1/25 or H/L changes the power output. Handheld VHF Radio power settings are typically 1 and 5 Watts.

NOTE

This only affects the power output when transmitting and has no effect on the set's ability to receive signals.

HI power should ONLY be used when calling distant stations or in emergency. Using low power is a courtesy, so other distant users are not overwhelmed by your signal. Additionally, this allows users who have an emergency to enable their message to be transmitted successfully.

Transmit (TX):

- TX is 'shorthand' for transmit. When you are transmitting some sets show a little red light to confirm that the set is transmitting. ('RX' is shorthand for receive).

Microphone (MIC):

- The lead from the microphone cable is plugged in to the socket marked 'MIC'.

Antenna Connection:

- This is the socket into which the aerial lead is connected. On no account press the transmit button on a radio without an aerial connected because serious, or irreparable, damage to the transmitter may result if you do. You may also experience a RF burn which can be painful.

GPS Connection:

When connected to a GPS the use of the DSC Channel 70 Alarm button transmits not only the Distress Alert data message but also the position of the vessel.

5.8 Digital Selective Calling

Digital Selective Calling is a radio data paging system that is used to automate distress alerts sent over VHF, MF and HF radio systems. Ch70 is the international DSC Data channel.

The DSC systems utilise digital processing techniques combined with narrower receiver bandwidths. This provides a better signal to noise ratio compared with voice transmissions resulting in increased range of data messages over VHF voice transmissions.

There are several types of DSC equipment available. This course deals only with Class D DSC which is specifically designed for recreational vehicles. Class D equipment includes a dedicated channel 70 receiver so you will never miss a DSC call.

DSC is used to establish initial contact between stations. Rather than just a general indication that the sending station is in distress, the DSC system allows for greater information to be transmitted including:

- Priority of Call – DISTRESS, URGENCY, SAFETY or ROUTINE
- Address – i.e. All Ships or single Ship or station
- Identification of ship in distress using MMSI number (see below)
- Position of ship in distress
- Nature of Distress- Sinking, Fire, Medical etc.

5.9 Maritime Mobile Service Identity (MMSI) Number

All DSC equipment is programmed with a unique nine digit identification number, known as a Maritime Mobile Service Identity (MMSI). The MMSI is sent automatically with each and every DSC transmission made.

Each MMSI number consists of a country designation code called Maritime Identification Digits (MID). Normally 3 digits.

5.10 Handheld VHF Radios

Small hand held portable VHF transceivers are readily available; their operation is similar to that of the fixed set explained above including DSC functions if fitted.

Handheld radios have a self-contained, rechargeable battery and an aerial connected directly to the top of the set.

The maximum power output is normally between 1 to 5 Watts. Any more power would make no difference to the range of the set due to the low antenna height.

FIGURE 5-5 HANDHELD VHF RADIO

Most hand held radios have the full range of channels, various different methods being used to select them.

Usually the battery pack is removable allowing a fully charged spare to be carried. Some sets have provision for an external microphone to be fitted. Nowadays most hand held radios are waterproof.

Chargers suitable for mains and 12 volt systems should be supplied with the set; never let the batteries remain flat for any length of time or they may not recharge.

A hand held radio is useful on a small boat and makes an ideal back up for the larger boat. In the case of an emergency a hand held radio will allow communications from the life raft or dinghy.

The regulations and licensing requirements for hand held radios are the same as for fixed sets. Remember it is the vessel that is licensed, not the radio.

5.11 Knowledge Review

1. Which type of VHF antenna is best suited to a motor boat?
2. Which factors determine the range of a VHF Radio transmission?
3. Describe the correct operation of squelch
4. What does Dual Watch enable the operator to do?
5. Explain the purpose of the DSC Distress button.
6. Explain why having a GPS connected to a DSC is important?

Chapter 6 Radio Operation Code of Practice

6.1 Key Objectives

VHF AT SEA MAKES AN IMPORTANT CONTRIBUTION TO NAVIGATION AND SAFETY, BUT ITS MISUSE CAN ALSO BECOME A DANGER TO SAFETY AT SEA.
CORRECT RADIO PROCEDURE HAS BEEN DEVELOPED IN ORDER TO REDUCE TO THE MINIMUM THE AMOUNT OF TIME USED DURING COMMUNICATIONS. ONE OF THE WAYS THIS IS ACCOMPLISHED IS BY USING AN INTERNATIONALLY AGREED FORMAT, THUS CUTTING OUT ALL UNNECESSARY WORDS AND REDUCING THE RISK OF MISUNDERSTANDINGS WHICH REQUIRE EXTRA TIME TO CLARIFY. THIS CHAPTER EXPLAINS THE ACCEPTED CODE OF PRACTICE OF RADIO COMMUNICATIONS. PRACTICE TIME WILL BE ALLOCATED TO PRACTICE THIS INFORMATION USING PHYSICAL RADIO SETS.

6.2 Radio Regulations

Since the global use and management of frequencies and the maritime radio operational procedures require a high level of international cooperation, one of the Principal tasks of the International Telecommunications Union (ITU) is to develop legally binding agreements between sovereign states. These agreements are covered in the ITU Radio Regulations. They include amongst others the following guidance and rulings:

- The international radio language is English.
- Each radio installation (Station) must be licensed and the license displayed and available for inspection.
- Each radio installation must be operated by a qualified operator or under the supervision of a qualified operator.
- **Secrecy of Correspondence** Individuals are legally bound to ensure the secrecy of radio communications and not to improperly divulge the contents or even the existence of correspondence transmitted, received or intercepted.
- The ship's master is responsible for all radio messages sent.

- Stations must obey instructions from any Coast Radio station and once engaged are to be stood down from coastguard prior to closing down radio communications.

- Stations must identify themselves by using the station's name and/or call sign. The vessel's name must be stated on each transmission.

- Before transmitting, a station must first listen to ensure that its transmission will not interfere with communications already in progress.

- Channel 16 the international channel for distress and safety can be used for initial calls and replies required to commence communications between stations, but as soon as contact has been established both stations must transfer immediately to an appropriate working channel/frequency.

- To facilitate reception of Distress calls, all transmissions on Channel 16 should be kept to an absolute minimum.

- Channel 70 DSC (data communications only – NO Voice) is used to establish initial contact between stations for distress, urgency and safety traffic.

- Following an alert by DSC, communications are then carried out by radio.

- Swearing, profanity or indecent language is forbidden.

- It is a criminal offence to transmit a false distress message.

6.3 Language (Pro Words)

English is the chosen language for VHF Radio communications utilizing a specific set of Procedure Words, Phonetic Alphabet and Numerals. The purpose of this is to aid in clear communications even when operators may not speak the same language fluently.

Procedure Words
Procedure words are single words which are used to define a specific and unambiguous meaning. They are used internationally for the sake of brevity and clarity.

ALL AFTER - Everything that follows word or phrase indicated

ALL BEFORE - Everything before word or phrase indicated

CORRECT - Confirms that station has correctly repeated message.

CORRECTION - I have made an error (followed by I SAY AGAIN …..)

IN FIGURES - The following figures are to be written as figures (i.e. '2')

IN LETTERS - The following numerals are to be written in letters (i.e. 'two')

I SAY AGAIN - I repeat (e.g. important words). Used with the pro-words **WORD AFTER, WORD BEFORE, ALL AFTER, ALL BEFORE**

I SPELL - I will spell the last word using the phonetic alphabet

OVER - Invitation to reply

OUT - End of working (NEVER SAY "OVER AND OUT")

RADIO CHECK - Please tell me the strength and clarity of my transmission

READ BACK - Receiving station will now repeat the message received

RECEIVED - Receipt acknowledged (NOT 'ROGER')

SAY AGAIN - Repeat your message

STATION CALLING - Used when a station is uncertain of the identity of the station calling

TRAFFIC - Radio / telephone communications

THIS IS ….. - This transmission is from the station whose name follows

WRONG - The message has been read back incorrectly

WAIT….MINUTES - If a station is unable to accept traffic immediately it will indicate how long before it can accept traffic.

NOTHING HEARD - When there is no reply from a station being called.

6.4 Phonetic Alphabet

When spelling a word during a message the following pronunciation (Table 2 Phonetic Alphabet below) should be followed.

TABLE 2 PHONETIC ALPHABET

Letter	Word	Pronounced as
A	Alpha	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 BAH
O	Oscar	OSS KA
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

6.5 Phonetic Numerals

Numbers too have pronunciation for use when transmitting using the pronunciation listed below in Table 3 below:

TABLE 3 PHONETIC NUMERALS	
Numeral	Spoken as
1	WUN
2	TOO
3	TREE
4	FOW ER
5	FIFE
6	SIX
7	SEV EN
8	AIT
9	NIN ER
0	ZERO

NOTE:

When reading out numbers read phonetically digit by digit:

> *Example: "and I expect to arrive at Miami, - I spell: Mike India Alpha Mike India, (Miami) , - at One Five Zero Zero tomorrow afternoon". (1500).*

Decimal Numbers should be stated digit by digit with any decimal points stated as "Decimal" NOT "Point".

Examples:
23 = TOO, TREE
NOT Twenty Three.
2.3 = TOO, DECIMAL, TREE
NOT 2 Point Three

6.6 Correct Radio Operation Procedure

To use the VHF, correct procedure should be used to reduce the time of communications to a minimum:

1. Switch the VHF on,
2. Select the required channel (Usually channel 16 is used to initiate contact and then once this is established both stations move to a "working channel" to complete their call).

3. Adjust squelch control.
4. Ensure channel is not in use. Listen for any transmissions to ensure you will not interrupt another station.
5. Plan what you want to say in advance.
6. Press the microphone transmission switch.
7. Speak clearly into the microphone, with the microphone directly in front of the mouth. If you are on deck or on the fly bridge, ensure the microphone is shielded from the wind before you start transmitting.
8. Keep the message as brief as possible.
9. Complete the message with the word "OVER".
10. Release the transmission switch
11. Wait for a reply. If no reply, wait at least 2 minutes before calling again. General guidelines state that you can call 3 times at2 minute intervals.

For example a typical call and move to a working channel might be:

Caller: "Misty, Misty, Misty this is this is Motor Yacht Ruma, Motor Yacht Ruma, Motor Yacht Ruma"

Reply: "Motor Yacht Ruma, this is Misty."

Caller: "Misty, switch to six-eight."

Reply: "Received, Ruma, switching to six-eight."
Both vessels switch to Channel 68 (USA)

Caller: "Misty this is Motor Yacht Ruma and then the conversation continues until it is completed with the word "**OUT**"

After the communication has ended, both vessels should return to Channel 16.

If reception conditions are bad, the names of the calling and called boats may be repeated not more than three times. The person on board Misty will normally recognize their own boat quickly but might have difficulty catching the name of the calling boat; for this reason the name of the calling boat can be repeated not more than three times. If a boat has a particularly odd or difficult name it may be better to use the boat's call sign rather than her name.

In the event of no reply, wait three minutes before repeating the call again. If the receiving boat is not sure if they are being called, they should wait and see if called again.

Note:
If your station is registered with an MMSI number it is good practice to include it in your transmission such as in the example below:

Radio exchange with MMSI number.

Caller; *Hello Planet Earth, Planet Earth, Planet Earth*
THIS IS Major Moto, Major Moto, Major Moto
MMSI Number 123 456 789
OVER

6.7 Radio Checks

It is a good idea to perform a radio check before departing safe harbour. Common responses can be ”Loud and Clear” or “5 by 5” for a good transmission. For an unclear transmission you may hear “loud, but a lot of static” or “5 by 3”.

The response with numbers indicates the quality and loudness of the received signal. It was a system that is relevant to analogue communications but not so relevant to modern digital communications.

The first number 1-5 is an answer to the question *How Do you read me?*
With 1 being unreadable and 5 being perfectly clear.

The second number 1-5 is an answer to the question “how strong is my signal?” With 1 being weak and 5 being very loud.

NOTE:
When using a Handheld, ensure the antenna is in a vertical position for maximum range.

The specific sequence for radio transmissions will vary slightly around the globe but all follow the same basic guidelines. It is a good idea to listen to multiple VHF communications in a new area before contacting a local station to avoid unnecessary confusion and / or a delayed response.

6.8 DSC Routine Calling Procedure / Specific Station Calling

Routine individual calls to other DSC equipped vessels or coastal stations are relatively straightforward.

Before a caller can contact another station using DSC it is essential that the caller use the number (MMSI) of the station being called just as one would do with a radio pager.

On many DSC radios a memory or directory is available to store the name and MMSI of frequently called numbers or favourites.

- The caller selects the channel on which the voice communications are to be carried out. Note that with DSC you select the MMSI number of the station you are calling.
- Then transmit the message digitally on Channel 70.
- The other vessel receives an audible alert indication the caller's MMSI and proposed channel on which voice communication is desired.
- When acknowledged, some radios will automatically change to the voice channel pre-selected for communication, and voice communication can begin, without having to manually select the working channel.

6.9 Repeating a Routine call

The DSC call will trigger an audible tone at the called DSC radio if it is turned ON.

If an acknowledgement is not received, it may be that the called station in not turned ON, or the operator is not available to answer the call. If ON, most DSC radios will log and display a message indicating a call had been received and an acknowledgement is requested. Some DSC radios also have a built in 5 minute delay before a second attempt may be repeated.

Group Calling

You can also send an alert to a group of stations requesting communication or to make an announcement. You will need all the individual MMSI numbers to be entered into all the VHF equipment and stored as a group MMSI. This is commonly used if navigating as a group such as a racing regatta.

6.10 Knowledge Review

1. Memorize the Phonetic alphabet.
2. Practice by reading out your home address using Phonetic letters and numerals.
3. Prepare a simple radio message containing at least 3 procedure words and practice communicating with a friend or colleague.
4. Describe how you can call a specific station using DSC.

Chapter 7 Distress Messaging

7.1 Key Objectives

LEARNING TO MEMORY THE PRECISE ACTIONS NECESSARY TO SEND A DISTRESS MESSAGE IN THE EVENT OF AN EMERGENCY WILL BE CRITICAL FOR THE SUCCESS OF ANY SUBSEQUENT RESCUE ATTEMPT. THIS CHAPTER PROVIDES YOU WITH THE BASIC INFORMATION TO BE ABLE TO CONFIDENTLY AND ACCURATELY REQUEST OR EVEN PROVIDE URGENT ASSISTANCE.

7.2 Emergency Radio Communications – Distress Calls (MAYDAY)

The Procedure words used for a Distress Calls are “MAYDAY” stated 3 times at the beginning of the message.
“MAYDAY MAYDAY MAYDAY”

The Distress signal “MAYDAY” comes from the French “m’aidez”, which means “help me”.

A Distress signal is the most important transmission that can be made and has priority over all other radio transmissions. Nothing is allowed to interfere with a Distress message.

Due to the importance given to this type of message its meaning is defined clearly and this definition must be understood.

Distress defined:

“*the distress signal indicates that life or vessel (ship, aircraft, or vehicle) is threatened by grave and imminent danger and requests immediate assistance.”*

The key words are GRAVE AND IMMINENT. If these two conditions are not simultaneously fulfilled the situation does not justify the sending of a distress message. The skipper, or person in charge, decides whether a situation is both grave and imminent. It is accepted practice to use MAYDAY in cases of man overboard.

The distress procedure is in two sections:

- **Distress call** is transmitted on VHF Channel 16, using high power (25watts).

- This is followed by the **Distress message** which must include the vessel's position, given first, as accurately as possible, either in latitude and longitude or as a bearing and distance FROM a known feature. For example "position 2miles east from Port Everglades".

A position as a bearing and distance from a landmark or location might alert someone nearby that they are close to the distressed vessel faster than having to first plot the latitude and longitude on a chart. The bearing should be in the 360^{o} notation from True North and be that of the position *FROM* the mark.

Example 1: "my position is two seven zero degrees from Battery Point Lighthouse two decimal eight miles."

The nature of the distress is given next so that the rescue services know what assistance is needed. The number of people on board is the next most important piece of information so that the rescuers will know how many people to search for in the event of the crew being unable to remain together. If there is sufficient time, give any other information that may be relevant. Finally finish with the word "over".

A useful acronym to remember to help formulate the distress message in the correct order once the Distress call has been transmitted is **MIPDANIO**. Table 4 below shows how the acronym **MIPDANIO** is broken down for simple message formation:

TABLE 4 MAYDAY MESSAGE STRUCTURE (MIPDANIO)

M	***MAYDAY***
I	***IDENTITY*** *(THIS IS) followed by MMSI number*
P	***POSITION*** *(AS ACCURATE AS POSSIBLE)*
D	*NATURE OF* ***DISTRESS*** *(SINKING,FIRE ETC)*
A	***ASSISTANCE*** *REQUIRED*
N	***NUMBERS*** *ON BOARD*
I	*ANY OTHER* ***INFORMATION***
O	***OVER***

The figures below give examples of MAYDAY messages:

FIGURE 7-1 MAYDAY EXAMPLE 1

EXAMPLE 1

Calling All Stations (CH16) :

MAYDAY X3	MAYDAY, MAYDAY, MAYDAY
THIS IS	THIS IS
Station Calling X3	Cayman Sun, Cayman Sun Cayman Sun
MAYDAY X1	MAYDAY, Cayman Sun
Station Calling X1	Our Position is (19'22.165N, 081'25.240W)
MMSI (if registered)	Sinking quickly
Distress Message	We require Immediate Assistance
Additional Information	12 souls aboard
OVER	We are a 50foot flat top vessel with blue canopy
	All souls are wearing lifejackets and abandoning the vessel
	OVER

FIGURE 7-2 MAYDAY EXAMPLE 2

EXAMPLE 2

Calling All Stations (CH16) :

MAYDAY X3	MAYDAY, MAYDAY, MAYDAY
THIS IS	THIS IS
Station Calling X3	Cayman Sky, Cayman Sky Cayman Sky
MAYDAY X1	MAYDAY, Cayman Sky
Station Calling X1	We are currently moored to Round Rock dive site at the north end of seven mile beach
MMSI (if registered)	Boat will not start
Distress Message	Medical Emergency Onboard, suspected heart attack
Additional Information	We Require Immediate Assistance
OVER	22 souls aboard
	We are a 50foot Cabin Cruiser, V-hull Dive Vessel
	CPR and O2 are currently being administered
	OVER

7.3 DSC Distress Messages

With DSC (Digital Selective Calling) it is accepted practice to send out a DSC Distress Alert message before the standard verbal distress call and message. This allows all stations in range to be aware of the MAYDAY in the time it takes to press and hold the Distress button. The DSC Alert, once acknowledged by a coast station can then be followed by the verbal MAYDAY message. This figure shows the DSC button behind the small red cover

FIGURE 7-3 DSC RED BUTTON

7.4 Making a DSC Distress Call

There are two methods of sending out a DSC Distress call; **Non-Designated** and **Designated**:

- **Non-Designated**: By pressing and holding the special "DISTRESS" button for five seconds, a DSC radio will automatically send a generic Distress call and message to all coast stations and other DSC equipped vessels in the immediate area.

- **Designated**: By pressing and releasing quickly the "DISTRESS" button a selection of 10 designations will appear on the screen. Select one of these items from list below. Press and hold the special "DISTRESS" button for five seconds. The DSC radio will then automatically send a designated Distress call and message to coast stations and other DSC equipped vessels in the immediate area. This method gives instant notification of what assistance might be required.

    - Abandoning Ship
    - Fire or explosion
    - Flooding
    - Collision
    - Grounding
    - Listing

- Sinking
- Disabled
- Adrift
- Piracy or attack
- Man Overboard

As all radios might not have DSC, mariners should follow up their DSC transmission with a MAYDAY call and message on VHF Channel 16 to ensure maximum awareness in the immediate vicinity.

To further enhance safety, interfacing a GPS with the DSC is highly recommended to ensure that the vessel's accurate positon is transmitted.

If GPS interface is not possible, the operator is required to input a position manually at frequent intervals (at least every 4 hours).

This automated distress message provides information regarding the identity of the vessel, nature of the distress, and location of the vessel. In addition, it sounds an alarm at other DSC equipped stations.

Receiving the Distress Call

The International Regulations state: *"The Obligation to accept Distress calls is absolute in the case of every station without distinction, and such messages must be accepted with priority over all other messages, they must be answered and the necessary steps must immediately be taken to give effect to them".*

A coast station which receives a DSC distress alert will immediately send an acknowledgement. The sending device will then both stop repeating the alert and tune to the designated channel for the distress message to be sent. Ships receiving a distress alert who are outside coast station range or do not receive an acknowledgement are required to relay the distress alert by any means to land.

Note: that some radios on commercial vessels have the ability to turn off a distress vessel's DSC Distress call by responding digitally, however, they should not do so unless they are advised to by the Coast Guard or a Rescue Coordination Center.

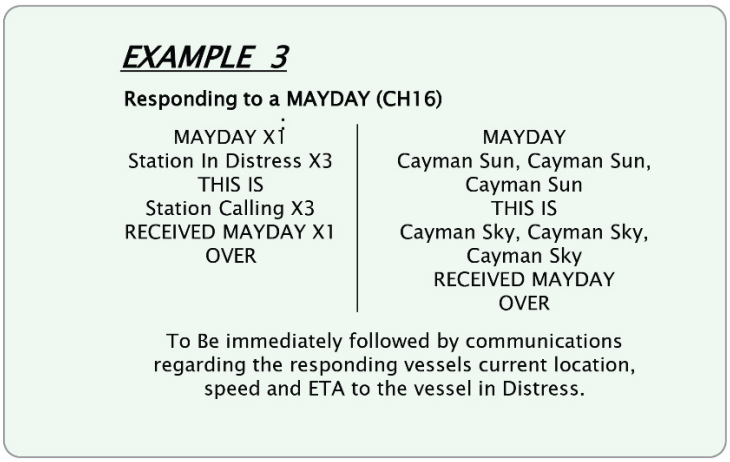
On receiving a Distress alert, do the following:

- Record time and all information into the ship's log.
- Continuously record all information heard and inform the most senior member of the crew.
- Maintain a close watch on Channel 16 for a coast station to acknowledge the MAYDAY.

- If no station acknowledges the MAYDAY after 4 minutes and the message is repeated, you MUST transmit a MAYDAY RELAY.

If no digital acknowledgement is received then it is likely the shore station will respond by voice as in the figure below.

FIGURE 7-4 MAYDAY RESPONSE



7.5 MAYDAY Relay

A MAYDAY RELAY is used when:

- The station in distress is not able to send a message itself.
- A non-verbal Distress signal is observed (See Chapter 9)
- You hear a MAYDAY but are not in a position to render assistance and do not hear an acknowledgement of the message within 4 minutes.

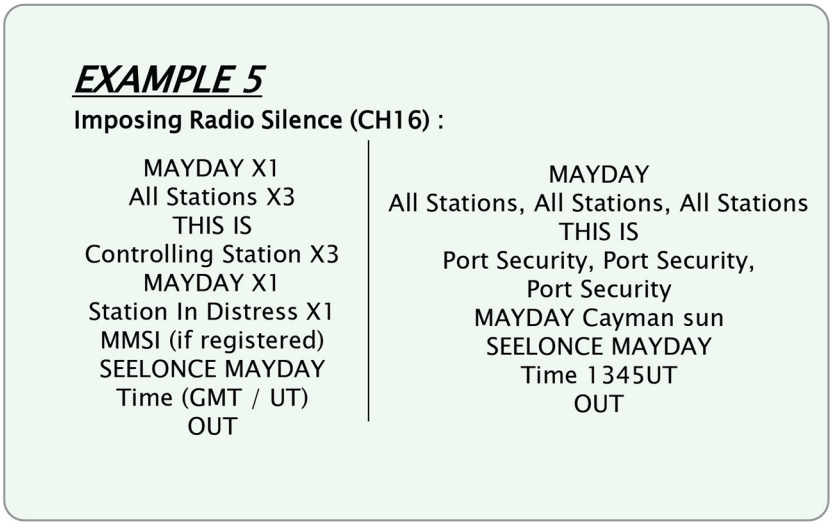
NOTE:
A Class D VHF radio does not allow you to RELAY a MAYDAY using DSC. Instead you can send out an Urgency Alert which will alert other stations and switch their VHF to Channel 16 in order to receive a verbal MAYDAY RELAY.

FIGURE 7-5 MAYDAY RELAY

7.6 Radio Silence (See-Lonce MAYDAY)

The station controlling Distress traffic may declare radio silence to avoid any interference with important messages regarding the search and rescue efforts. An example is shown in the figure below:

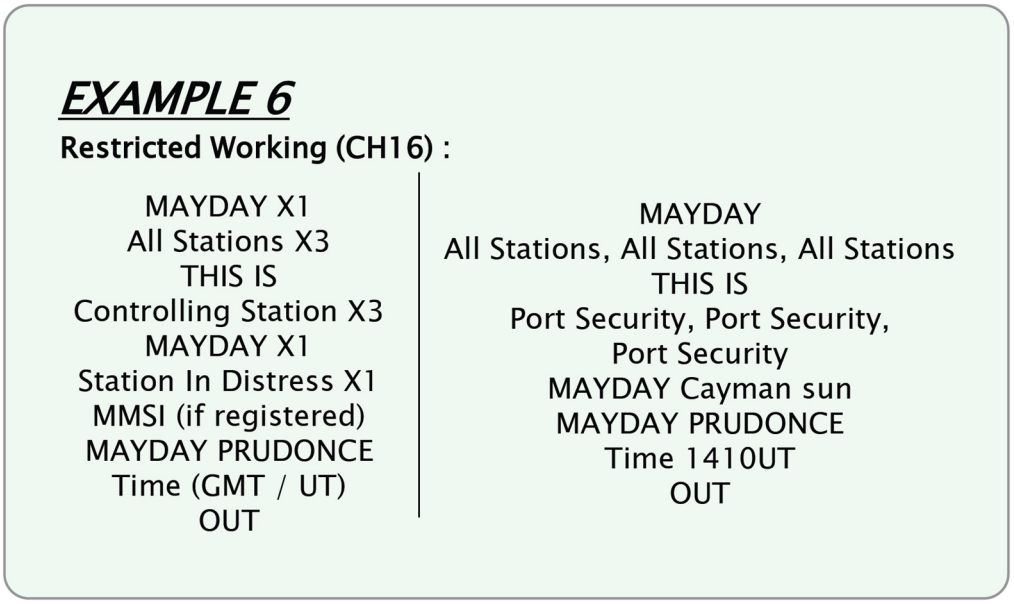
FIGURE 7-6 IMPOSING RADIO SILENCE



7.7 Restricted Working (Pru-Donce)

The station controlling Distress traffic may end radio silence, but require restricted use of channels due to the possibility of further distress traffic. This figure shows an example message.

FIGURE 7-7 MAYDAY RESTRICTED WORKING



7.8 End of Radio Silence (See-Lonce Fee-Nee)

The station controlling Distress traffic removes any form of radio silence or restricted working, allowing communications to resume as normal. The figure below gives an example message.

FIGURE 7-8 END OF RADIO SILENCE

EXAMPLE 7

End of Radio Silence (CH16) :

MAYDAY X1 All Stations X3 THIS IS Controlling Station X3 MAYDAY X1 Station In Distress X1 MMSI (if registered) SEELONCE FEENEE Time (GMT / UT) OUT	MAYDAY All Stations, All Stations, All Stations THIS IS Port Security, Port Security, Port Security MAYDAY Cayman sun SEELONCE FEENEE Time 1500UT OUT

7.9 Cancelling a Distress Call

If a DSC Distress call is transmitted in error then it should be cancelled using the procedure in the figure below:

FIGURE 7-9 CANCELLING AN ACCIDENTAL DSC DISTRESS MESSAGE

Accidental Distress Messages

If a Distress Alert is sent using DSC allow the transmission to complete the first time. If there is no acknowledgement, switch off the equipment to prevent another transmission then switch the equipment back on and transmit using Channel 16:

All Stations X3
THIS IS
Station Calling X3
MMSI (if registered Position)

Distress Message sent in error
Cancel Distress Alert sent at Time (UT)
OUT

7.10 Knowledge Review

1. Define in what circumstances should a MAYDAY message be transmitted.
2. State the two components of a MAYDAY transmission.
3. Prepare a simple MAYDAY message using the MIPDANIO acronym.
4. Describe the advantage of using DSC to initiate a Distress message.
5. Recall 5 of the 10 DSC designations.
6. Prepare a MAYDAY RELAY message for the distress message used in Qu 2 above.
7. Recall what should be done in the event of an accidental distress message transmission.

Chapter 8 Urgency and Safety Messaging

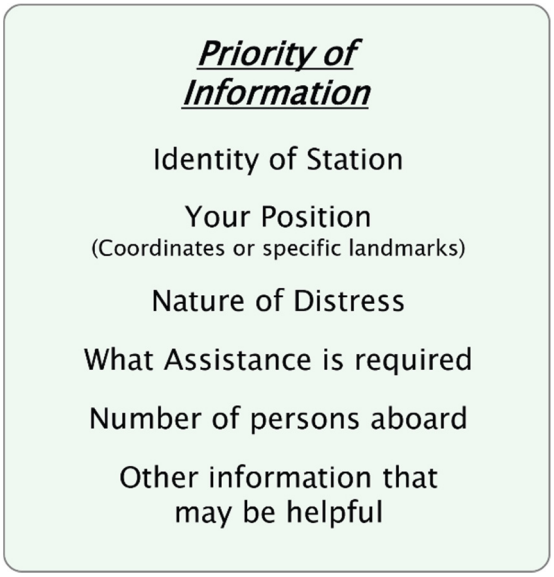
8.1 Key Objectives

THIS CHAPTER DEALS WITH ALL OTHER EMERGENCY CIRCUMSTANCES THAT WHILST NOT CLASSIFIED AS DISTRESS MESSAGES MAY REQUIRE URGENT ASSISTANCE. JUST AS DISTRESS MESSAGES IT IS JUST AS IMPORTANT TO REMEMBER HOW TO TRANSMIT AN URGENCY OR SAFETY MESSAGE.

8.2 Urgency Message Protocol

The Procedure words used for an Urgency Message are "PAN-PAN" stated 3 times at the beginning of the message. This figure shows the structure of a PAN PAN message:

FIGURE 8-1 PAN PAN STRUCTURE



The purpose of an Urgency message is to communicate to all stations in the area that you have a serious problem and require assistance.

It is common for vessels to be unsure if they should send an Urgency message (PAN-PAN) or a Distress message (MAYDAY). The important difference is that a Distress message is defined by "Grave and Imminent Danger requiring immediate assistance". An Urgency message is anything less than that.

For example, if a vessel has lost all power and is drifting, but is not yet in danger of running aground or colliding with another vessel it would most likely send an Urgency Message. However, if the vessel is drifting toward shore and will run aground shortly, causing severe damage and possibly serious injury to the crew, it would send a Distress message.
Urgency messages are commonly sent to "All Stations" asking for assistance, but it is also common practice to contact a specific station such as the local Coastguard or Search and Rescue service if available.

8.3 Transmitting a DSC Urgency Alert:

If you have a DSC VHF radio, then initiate the Pan Pan message with an Urgency Alert prior to the Urgency message:

- Select the "All Ships" function
- Specify the working channel as 16.
- The Urgency alert will be transmitted on Channel 70 along with your MMSI number
- Wait briefly to allow the other vessels to change to Channel 16 (or specified channel)
- Broadcast your urgency message using standard VHF procedures preceded by the PAN PAN, PAN PAN, PAN PAN prefix.

As in a Distress situation, the Urgency requires cancellation when concluded.
The figure below gives an example of an urgency Pan Pan message.

FIGURE 8-2 EXAMPLE PAN PAN MESSAGE

EXAMPLE 1

Calling All Stations (CH16) :

PAN-PAN X3	PAN-PAN, PAN-PAN, PAN-PAN
All Stations X3	All Stations, All Station, All Stations
THIS IS	THIS IS
Station Calling X3	Cayman Sun, Cayman Sun Cayman Sun
MMSI (if registered)	We are 1 mile west of North West Point
Urgency Message	We have lost all power and are drifting West
Additional Information	We require a tow back to Georgetown anchorage
	10 souls aboard
	We are a 50foot flat top vessel with blue canopy
OVER	OVER

8.4 Safety Messages

The Procedure word used for a safety message is “SECURITE” being stated 3 times at the beginning of the message. “SECURITE SECURITE SECURITE”, “Pronounced: SAY_CURE_EE_TAY”

The purpose of a safety message is to communicate urgent information to all stations in the area, typically regarding navigational or meteorological warnings. These messages are most commonly sent from a shore based station but can also be sent by vessels at sea if there is significant reason to do so.

For example, if there is a large submerged object drifting in a heavy traffic area it would be prudent to communicate the sighting with all other vessels in the area to avoid a collision.

FIGURE 8-3 – CAPSIZED VESSEL

8.5 Transmitting a DSC Safety Alert

The Safety signal indicates that a station has an important message to transmit concerning an important navigational aid or a meteorological warning.

To transmit a DSC Safety Alert:

- Select the All Ships function
- Specify a working channel other than 16, such as 06
- The Safety alert will be transmitted on Channel 70
- Wait briefly to allow other vessels to change to the specified channel
- Broadcast your safety message using standard VHF procedures which are preceded as usual by the SECURITE, SECURITE, SECURITE prefix.

The figures below script some samples of SECURITE messages. Follow through each one in turn to ensure you understand the procedure.

FIGURE 8-4 – SAMPLE SECURITE MESSAGE

EXAMPLE 1

From a Coast Station (CH16) :

SECURITE X3	SECURITE, SECURITE, SECURITE
All Stations X3	All Stations, All Stations, All Stations
THIS IS	THIS IS
Station Calling X3	Dover Coastguard, Dover Coastguard
Safety Message	Dover Coastguard
OUT	Urgent Weather Warning Listen on Channel 67
	OUT

FIGURE 8-5 EXAMPLE SECURITE MESSAGE 2

EXAMPLE 2

From a Vessel Sighting a hazard (CH16) :

SECURITE X3	SECURITE, SECURITE, SECURITE
All Stations X3	All Stations, All Stations, All Stations
THIS IS	THIS IS
Station Calling X3	Cayman Sky, Cayman Sky Cayman Sky
Safety Message	We have sighted a large submerged tree drifting south from Jackson point terminal
OUT	OUT

FIGURE 8-6 EXAMPLE SECURITE MESSAGE 3

EXAMPLE 3

From a Vessel operating within narrow waterways (CH09) :

SECURITE X3	SECURITE, SECURITE, SECURITE
All Stations X3	All Stations, All Stations, All Stations
THIS IS	THIS IS
Station Calling X3	Cayman Sky, Cayman Sky Cayman Sky
Safety Message	We are Outbound on the new river approaching little Florida, any concerned traffic contact Cayman Sky Standing by on Channel 09
OUT	OUT

8.6 Knowledge Review

1. Which message is to be used for Urgent situations that are not yet in grave and imminent danger?

2. Prepare a simple PAN PAN message and practice reading out loud.

3. Describe how a DSC urgency alert would be transmitted.

Chapter 9 International Distress Signals

9.1 Key Objectives

THIS CHAPTER IS A USEFUL REFERENCE FOR INTERNATIONALLY RECOGNISED DISTRESS SIGNALS. DURING THIS COURSE YOU HAVE LEARNT HOW TECHNOLOGY AND ELECTRONIC SYSTEMS CAN HELP KEEP YOU SAFE AT SEA, BUT TECHNOLOGY CAN FAIL AND SO THIS LIST GIVES YOU SOME ALTERNATIVE OPTIONS TO ALLOW YOU TO RAISE AN ALERT IF YOUR EQUIPMENT FAILS. YOU SHOULD ALSO BE MINDFUL OF THIS LIST IN CASE YOU EVER SEE THEM FROM ANOTHER VESSEL AND BE ABLE TO RECOGNISE THEY ARE IN DISTRESS AND ACT ACCORDINGLY.

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

- A gun or other explosive signal fired at intervals of about a minute
- A continuous sounding alarm with any fog-signaling apparatus
- Rockets or shells, throwing red stars fired one at a time at short intervals
- A signal made by radiotelegraphy or by any other signaling method consisting of the group . . .- - -. . . (SOS) in the Morse code
- A signal sent by radiotelephony consisting of the spoken word “Mayday”
- The International Code Signal of distress indicated by Flags NOVEMBER and CHARLIE.
- A signal consisting of a square flag having above or below it a ball or anything resembling a ball
- Flames on the vessel (as from a burning tar barrel, oil barrel, etc.)
- A rocket parachute flare or a hand flare showing a red light
- A smoke signal giving off orange-colored smoke
- Slowly and repeatedly raising and lowering arms outstretched to each side
- The radiotelegraph alarm signal
- The radiotelephone alarm signal
- Signals transmitted by emergency position-indicating radio beacons
- Approved signals transmitted by radio communication systems, including survival craft radar transponders

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 strictly prohibited.

9.2 Knowledge Review

1. What is the Morse code signal for distress regardless of the means it is sent from?
2. If you have no other means available to raise an alarm other than your person, what could you do?
3. State 5 other international signals of distress.

Acronyms and Abbreviations

The following acronyms and abbreviations are listed and included at the discretion of the Publication Authority:

ACMA	Australian Communication and Media Authority
AMC	Australian Maritime College
AMERC	Association of Maritime Electronic and Radio Colleges
CH	Channel
CPSS	Canadian Power and Sail Squadron
DSC	Digital Selective Calling
DW	Dual Watch
EPIRB	Emergency Position Indicating Radio Beacon
FCC	Federal Communications Commission
GMDSS	Global Maritime Distress and Safety System
GPS	Global Positioning System
HF	High Frequency
H/L	High/Low
HZ	Hertz (Unit of Frequency)
IMO	International Maritime Organisation
ITU	International Telecommunications Union
IYT	International Yacht Training
KHZ	Kilo Hertz
MCA	Maritime and Coastguard Agency
MCC	Mission Control Centres
Mic	Microphone
MF	Medium Frequency
MHZ	Mega Hertz
MMSI	Maritime Mobile Service Identity
MP	Marine Radio Operator Permit
MRCC	Maritime Rescue Co-Ordination Centre
MROVCP	Marine Radio Operators VHF Certificate of Proficiency
MSI	Maritime Safety Information
NOAA	National Oceanic and Atmospheric Administration
NBDP	Narrow Band Direct Printing
OMC	Office of Maritime Communications
SAR	Search and Rescue
SART	Search and Rescue Transponder
SRC	Short Radio Certificate
SOLAS	Safety of Life at Sea
TX	Transmit
USCG	United States Coastguard
VHF	Very High Frequency

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