

# **RESTRICTED R/T OPERATOR'S CERTIFICATE - MARINE (VHF ONLY)**

## **PREAMBLE**

The study guide hereunder contains the material that is required to pass the Restricted R/T operator's certificate – Marine (VHF only).

The candidate will be examined on the correct operating procedures for use in Distress, Urgency and Safety situations plus the routine use of the VHF marine radio and the legalities involved plus knowledge of the phonetic alphabet. The only technical aspects covered by the exam are basic fault finding procedures and battery care and maintenance.

This introduction will hopefully introduce the candidate to the basic concept of VHF radio communications and the difference between VHF (short range) and SSB (long range).

A marine VHF radio consists of a transmitter (TX) and a Receiver (RX) built into one unit which operates on the VHF (very high frequency) marine bands between 156.0 Mhz. and 174.0 Mhz. The different operating frequencies are divided up into "channels" which have a corresponding frequency determined by the ITU (International Telecommunication Union).

Eg. Channel 16 = 156.8 Mhz.

The candidate is not expected to know these frequencies but a basic knowledge of the channels and their use is required.

A VHF marine radio consists of three components:-

- 1) Power supply (battery)
- 2) Transmitter/Receiver (radio)
- 3) Antenna

These basic components are the same whether for a mounted (25 Watt) set or a handheld set and each of these separate components is vital for the proper operation of the radio.

It must always be kept in mind that although a VHF marine radio is a vital safety tool and has saved many lives, it is basically a short range radio.

### **Please note**

**The following explanation is purely to assist the candidate to have a basic understanding of marine radio communications and does not form any part of the examination.**

One should never mistake a VHF marine radio with a SSB marine radio as they operate on different frequencies which determine their range. (A basic overview of SSB radio will follow later in this introduction.)

### **Determination of VHF range and the factors involved**

The wavelength of the frequencies within the VHF band is approximately 2 Meters (the higher the frequency the shorter the wavelength).

It is the wavelength that determines the length of the antenna, practically the antenna does not have to be longer than 1 meter.

Electromagnetic (radio) waves of such short wavelength travel in an almost straight line between the TX and Rx (i.e. do not benefit from propagation to increase the range which is the case with SSB).

This means that the radio waves extend only as far as the visible horizon. This is referred to as "line of sight", therefore the height of the antenna is directly related to the range of the radio (higher the better).

The range of a VHF radio – distance from antenna to the visible horizon – is calculated as follows:-

Range in Nautical Miles – (1 nautical mile is 1,852 meters and equates to 1 minute of latitude)

$\sqrt{\quad}$  = square root

Range (nautical miles) = 2.25 x ( $\sqrt{\text{height of antenna - in meters}}$ )

Antenna heights are above the waterline.

This will give you the basic range of the individual radio but obviously (unless you are talking to yourself) for practical purposes radio communications are between 2 or more radios.

The radios talking to each other will be on different types and sizes of vessels or even coastal radio stations (CRS), therefore the antenna heights will differ. This has to be factored in when working out the range between 2 radio stations.

Formula:

Range (in nautical miles) =  $2,25 \times (\sqrt{\text{height of antenna 1 in meters}} + \sqrt{\text{height of antenna 2 in meters}})$

Example 1 – range between 2 yachts with antenna heights of 9 meters each.

$2,25 \times (\sqrt{9} + \sqrt{9})$  i.e.  $2,25 \times (3 + 3) = 13,50$  nautical miles (practical communications range)

Example 2 – range between a yacht with an antenna 9 meters high and a coast station with an antenna mounted on the coast at a height of 62 meters.

$2,25 \times (\sqrt{9} + \sqrt{62})$  i.e.  $2,25 \times (3 + 7,87) = 24,45$  nautical miles.

Hopefully this explanation will give the candidate a basic understanding of VHF marine radio communications.

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The following brief explanation does not form any part of the examination for the Restricted RT operator's certificate marine (VHF) only, but is included purely to demonstrate the difference between VHF and SSB radios.

(For operation of SSB radios the Restricted R/T operator's certificate marine is a requirement, this entitles the holder to operate both SSB and VHF radios)

#### SSB (HF/MF) Radio

Long range radios which operate on significantly lower frequencies than VHF in the medium frequency (MF) marine band (1.6 to 4 Mhz. – eg. 2182 Mhz.) and the high frequency (HF) - (4 to 27.5 Mhz. – 4, 6, 8, 12, 16 and 22 Mhz. marine bands - Eg. 4125/4417 Mhz. (Channel 421). Again these marine bands are specified by the ITU (International Telecommunication Union) and except in the 2 mhz. band are also channelized.

SSB radios use "propagation" for their operational range (which can be thousands of miles depending on conditions).

Due to the wavelengths (much longer than VHF) associated with these lower frequencies, these radio waves do not only travel in line of sight as do the VHF radio waves, but in all directions thus one gets what are called "ground waves" and "sky waves".

Very simply put these radio waves are bounced around the world between the "Ionosphere" and the earth and this process is called propagation.

"Ionosphere" is a region of the atmosphere where ionization is caused by incoming solar radiation. Radio waves cannot penetrate this layer and are bounced back to earth. This process is repeated over and over enabling the radio waves to travel great distances.

Basic rule of thumb -

Sun low – use lower frequencies

Sun High – use higher frequencies.

This is due to the fact that the ionosphere sinks closer to the earth when the sun is low (or night) and moves further away as the sun rises.

The optimal use of a SSB radio is largely determined by the skill and experience of the operator in selecting the best frequencies for the time and conditions and unlike VHF radio there is no formula for working out the range of the set.

Due to the differing lengths required for the antenna when using different frequencies (wavelengths) SSB radios are equipped with an ATU (Antenna Tuning Unit) which electronically alters the operational length of the antenna (not a physical change). The operator thus does not have to worry about this tuning function as it is performed automatically by the set.

Please note that the basic operating procedures are similar for both VHF and SSB, it is only the sets and the range of the radios that differ.

There are numerous other marine radio communication systems that are utilized onboard vessels and basically whatever systems are available in the comfort of your office are also available to marine mobile stations. However these other systems do not form any part of the requirements under consideration and will not be discussed here.

Now that you are familiar with the two different methods of terrestrial (earth) voice radio communications, please familiarize yourself thoroughly with the study guide hereunder to prepare yourself for the Restricted R/T operator's certificate Marine (VHF) only.

## **THE RADIOTELEPHONY REGULATIONS AND PRESCRIBED PROCEDURES APPLICABLE TO THE MARITIME MOBILE SERVICE: FOR THE GUIDANCE OF RADIOTELEPHONE OPERATORS OF SHIP STATIONS OPERATING WITHIN THE MARITIME VHF BAND ONLY.**

### **1. SHIP STATION LICENSES**

Every radio installation shall be licensed. Licenses are issued by the Independent Communications Authority of South Africa (ICASA) and should be kept aboard, readily available for inspection by Inspectors appointed by ICASA or by Radio Surveyors appointed by SAMSA. The conditions of issue of the license shall be observed at all times. **SHIP STATION LICENSES ARE NOT TRANSFERABLE** and all changes of ownership of the vessel, equipment or addresses shall be reported to ICASA through the nearest office within 14 days.

### **2. RADIO OPERATOR'S QUALIFICATIONS**

Maritime radiotelephone apparatus shall only be operated by, or under the supervision of, operators in possession of at least a Restricted Radiotelephone Operator's certificate (Marine) issued by ICASA.

### **3. PRESCRIBED BOOKS AND DOCUMENTS**

The following books and documents **MUST** be carried by all vessels equipped with a VHF radiotelephone installation:-

- a) The ship station radio license;
- b) The radio operator's certificate;
- c) A list of the working channels and services offered by the Coast Stations with which the vessel normally communicates;
- d) The International Radio Regulations, , 2008 or summary thereof (this brochure will suffice).

### **4. SECRECY OF COMMUNICATIONS**

The interception of communications, other than those which the station is licensed to receive, is forbidden. If such communications are received involuntarily, they may not be reproduced in writing, communicated to other persons or used for any purpose whatsoever.

### **5. CLOCK**

A reliable clock, with a dial of approximately 13cm (5 inches) in diameter, should be securely mounted within sight of the operating position of the radio installation.

### **6. EMERGENCY LIGHT**

An electric lamp, operated from the emergency supply, shall be provided. The lamp should provide adequate illumination of all the controls of the radio installation, as well as the card of instructions of the emergency operating procedure.

## **7. CARD OF INSTRUCTIONS**

A card of instructions, giving a clear summary of the DISTRESS procedure, the vessel's name and call sign and, if possible, the name and address of the owner, should be displayed in clear view of the operating position.

## **8. ANTENNA INSULATORS AND ANTENNAS**

To prevent possible damage to apparatus and/or harm to persons, antenna lead-out insulators which are mounted in the cabin or wheelhouse must be so sited that no extraneous matter may be placed on or become lodged thereon, and so sited that the antennas and connecting wires cannot be touched by anybody out of sight of the operating position.

## **9. IRREGULAR USE OF RADIO INSTALLATIONS**

The radio installation is licensed in accordance with the Electronic Communications Act, 2005 (Act No.36 of 2005) read with the associated Radio Regulations, 1979, as amended, and must conform to the requirements of the Merchant Shipping (Radio Installations) Regulations, 2002. Any communication or usage other than that prescribed in the Act or Regulations is considered to be irregular and may result in the cancellation of the ship station license, sealing or confiscation of the radio apparatus and suspension or cancellation of the operator's certificate.

## **10. USE OF THE RADIO INSTALLATION WHILST IN PORT OR AT ANCHOR**

The VHF radio installation on board a vessel berthed in a port, or at anchor in a harbour, in the Republic of South Africa may **ONLY** be used in the following circumstances:-

- a) to exchange traffic (i.e. general communications) with the nearest Coast Station;
- b) to communicate with the Port Operations services; and
- c) to communicate with another vessel on its way to the harbour or berth, provided the communication is limited to navigational safety.

## **11. RESTRICTIONS ON THE USE OF RADIO INSTALLATIONS**

### **IT IS FORBIDDEN TO:-**

- a) exchange traffic, other than Distress, Urgency or Safety traffic on Channel 16;
- b) exchange unnecessary signals of any kind;
- c) use radio installations for conversations other than those necessary for the transmission of authorised messages and telephone calls;
- d) use offensive or abusive language;
- e) disclose the contents of telegrams, messages or radiotelephone calls;
- f) install, or be in possession of, unlicensed radio apparatus;
- g) interfere with, or cause interference to, other transmissions; and
- h) engage in communications of any kind without the use of the vessel's registered name and/or call sign at least once during every transmission.

## **12. POWER OUTPUT**

The maximum power output of any maritime mobile VHF installation shall not exceed 25 watts, provided that the maximum power output on Channels 15 and 17 shall not exceed 1 watt and no voice transmission shall be possible on Channel 70.

## **13. CONTROL OF WORKING**

**EXCEPT IN THE CASE OF DISTRESS**, the Coast Station controls the communications in its area and ship stations may not interfere with the working of the Coast Station. In Distress situations, the **STATION IN DISTRESS** controls communications unless it hands over control to another station, usually the nearest Coast Station or rescue vessel.

## **14. STATION IDENTIFICATION SIGNALS**

When calling, only the station's registered name or call sign may be used, e.g. "DURBAN RADIO/ZSD" in the case of a Coast Station or "ALPHA/ZR2211" in the case of a ship station. No other forms of identification may be used such as nicknames or person's names, unless the vessel is so registered. **TRANSMISSIONS WITHOUT IDENTIFICATION ARE STRICTLY PROHIBITED!**

## 15. OTHER REGULATIONS AND REQUIREMENTS

The authorities of any country where a vessel calls may require the production of the ship station license and/or operator's certificate. Failure to produce a valid license or certificate may result in the sealing or confiscation of the radio apparatus and detention of the vessel.

The holder of a ship station radio license and all employees having access to the radio apparatus **MUST** preserve the secrecy of communications.

Any station making transmissions for test, adjustments, etc., must transmit its name or call sign at short intervals.

Stations should not close before (i) all operations resulting from Distress, Urgency or Safety signals are concluded, and (ii) as far as possible, all traffic originating at, or destined for, coast stations in range has been disposed of.

Radio Operators must, as far as possible, ensure that the terms and conditions of issue of their ship station radio licenses are complied with at all times.

## 16. ORDER OF PRIORITY OF COMMUNICATION IN THE MARITIME MOBILE SERVICE

All stations in the maritime mobile service and the maritime mobile-satellite service shall be capable of offering four levels of priority in the following order:

- 1) Distress calls, distress messages, and distress traffic.
- 2) Urgency communications.
- 3) Safety communications.
- 4) Other communications.

## 17. DISTRESS TERMINOLOGY AND DISTRESS PROCEDURE

The radiotelephone DISTRESS SIGNAL is the expression "MAYDAY". This signal indicates that the station transmitting it is threatened by grave and imminent danger and requires immediate assistance. It is used in the DISTRESS CALL, which precedes the DISTRESS MESSAGE, and may only be transmitted on the authority of the Master or person responsible for the vessel. It must also be used before each call and before each message concerning Distress working.

## 18. THE DISTRESS CALL

This consists of the DISTRESS SIGNAL "MAYDAY" transmitted three times, followed by the words "THIS IS" transmitted once, followed by the "NAME OF THE STATION IN DISTRESS" transmitted three times.

E.g. "MAYDAY MAYDAY MAYDAY THIS IS ALPHA ALPHA ALPHA"

## 19. THE DISTRESS MESSAGE

This consists of the DISTRESS SIGNAL "MAYDAY" transmitted once, followed by the name and/or call sign of the vessel in distress, its position (either in latitude and longitude or by a bearing in degrees and distance in nautical miles from a KNOWN GEOGRAPHICAL POINT), the nature of the Distress, the type of assistance required and any further information which may assist rescue operations.

## 20. PRIORITY

DISTRESS traffic has ABSOLUTE PRIORITY over all other transmissions. Stations receiving a distress call and message **MUST** immediately cease all operations on the Distress channel and maintain a listening watch to assist in rescue operations if required.

## 21. EXAMPLE OF A DISTRESS CALL AND MESSAGE

**MAYDAY MAYDAY MAYDAY THIS IS ALPHA ALPHA ALPHA**

**MAYDAY ALPHA/ZR2211, position 30 nautical miles due South of TUGELA MOUTH, have struck submerged object and am sinking, require immediate assistance, will fire distress flares at intervals (plus any other information which may assist in rescue operations, e.g. five persons aboard, EPIRB or PLB activated, etc.),  
OVER.**

**22. ACKNOWLEDGMENT OF RECEIPT OF A DISTRESS MESSAGE**

An acknowledgment of receipt of a Distress message should be made according to the following example. For the purposes of the example, the vessel ALPHA has transmitted a Distress message which has been received by the vessel BETA:-

**“MAYDAY  
ALPHA THIS IS BETA BETA BETA  
RECEIVED MAYDAY  
OVER.”**

**N.B.**

**IT IS INCUMBENT UPON EVERY STATION RECEIVING A DISTRESS MESSAGE TO ACKNOWLEDGE RECEIPT, WHETHER OR NOT THEY ARE IN A POSITION TO ASSIST.**

**23. VESSEL IN THE IMMEDIATE VICINITY OF A DISTRESS**

Such vessels should acknowledge receipt immediately, but when in the vicinity of a Coast station a short time should be allowed for the Coast Station to acknowledge without interference.

**24. VESSELS NOT IN THE IMMEDIATE VICINITY**

Such vessels should allow a short interval to elapse before acknowledging receipt to permit stations which may be closer to the Distress to acknowledge first.

**25. AFTER INITIAL ACKNOWLEDGMENT**

Every vessel acknowledging receipt of a Distress message should, upon the order of the Master or person responsible for the vessel and as soon as possible **AFTER** the acknowledgment, supply its NAME, POSITION, SPEED at which it is proceeding and ETA at the Distress scene, to the station in Distress and also to the nearest Coast Station.

**26. MAYDAY RELAY**

When not in a position itself to render assistance, a station hearing a Distress message which has not been acknowledged by another station should take all possible action to attract the attention of other stations who may be more favourably placed to assist. The **“MAYDAY RELAY”** signal **MUST** be used. Additionally, any station learning of a mobile station in Distress should relay a Distress message in the following instances:-

- a) when the station in Distress cannot transmit a message itself (e.g. due to radio failure, etc.); or
- b) when the Master or person responsible for the vessel receiving the Distress considers that further assistance is required.

The Distress should be relayed as follows:-

**“MAYDAY RELAY MAYDAY RELAY MAYDAY RELAY  
THIS IS**

(Name of the station RELAYING the Distress message, transmitted three times)

**FOLLOWING DISTRESS MESSAGE RECEIVED FROM...(Name of the vessel in Distress)....then repeat the Distress message EXACTLY AS RECEIVED  
OVER”.**

**NOTE:**

WHEN RELAYING A DISTRESS MESSAGE IT IS EXTREMELY IMPORTANT TO USE THE SIGNAL **“MAYDAY RELAY”** TO AVOID CONFUSION AS TO WHICH VESSEL IS ACTUALLY IN DISTRESS.

**27. USE OF THE DISTRESS SIGNAL**

The transmission of a distress alert or a distress call indicates that a mobile unit or person is threatened by grave and imminent danger and requires immediate assistance. It may not be used for any other purpose and a false alert is an infringement in accordance with the ITU Radio Regulations 2008.

**28. RESTRICTIONS DURING DISTRESS COMMUNICATIONS**

All stations not involved in Distress operations **MUST MAINTAIN SILENCE** on the channel, or channels, being used for Distress communications. The VESSEL IN DISTRESS and/or the STATION CONTROLLING DISTRESS TRAFFIC, should the station in Distress have handed over control to another station, may impose silence on all other stations with the use of the expression “**SEELONCE MAYDAY**” followed by its name and call sign on the channel being used for Distress communications. **NO OTHER STATION MAY USE THIS EXPRESSION!**

ANY OTHER STATION wishing to impose silence may use the expression “**SEELONCE DISTRESS**” followed by its own name and call sign.

**29. CONCLUSION OF DISTRESS OPERATIONS**

At the end of the Distress phase, when no further assistance is required, the CONTROLLING STATION must cancel the silence imposed on the Distress channel by broadcasting a message to all other stations as follows:-

“**MAYDAY**  
ALL STATIONS ALL STATIONS ALL STATIONS  
THIS IS  
(Name of the controlling station, transmitted three times)  
TIME (in UTC)  
NAME OF THE DISTRESSED VESSEL  
**SEELONCE FEENEE**  
**OUT**”.

When the initial Distress phase has been completed and rescue operations are well underway, RESTRICTED working on the Distress channel may be allowed by the controlling station by the use of the expression “**PRUDONCE**”. The message broadcast would take a similar form to that above, with the phrase “**SEELONCE FEENEE**” being replaced by “**PRUDONCE**”. However, full silence may be re-imposed at any time, if found to be necessary, until the Distress situation is completely over.

**N.B.**

When normal working has been resumed on the Distress channel, care must be taken to avoid interfering with any **URGENCY** or **SAFETY** messages which frequently follow Distress operations.

**30. THE URGENCY SIGNAL**

The radiotelephone URGENCY SIGNAL is the expression “**PAN-PAN**” repeated three times before the call to all stations, and may be sent only on the authority of the Master or person responsible for the vessel.

The signal is transmitted to indicate that a station has a very urgent message to communicate concerning the safety of a ship or aircraft, or the safety of a person aboard a vessel, **BUT NOT IN IMMEDIATE DANGER**.

The URGENCY SIGNAL has priority over all other communications except Distress and stations hearing the signal should avoid interfering with the transmission. The message which follows the signal may be transmitted to either ALL STATIONS or to a particular station, e.g. a Coast Station such as DURBAN RADIO.

Typical reasons for transmitting Urgency messages are:- engine failure and drifting into danger (but not in IMMEDIATE danger), requiring a tow from another vessel, serious injury or illness aboard, man overboard, etc.

**31. CANCELLATION OF AN URGENCY MESSAGE**

If an Urgency message was transmitted to ALL STATIONS, it must be cancelled by an appropriate message (again to ALL STATIONS) when no further assistance is required, or when the Urgency situation is over. This message should also be preceded by the URGENCY SIGNAL “PAN-PAN”.

**32. MEDICAL ADVICE OR ASSISTANCE**

Medical advice may be obtained, free of charge, from any Coast Station by means of a message prefixed “MEDICO” and addressed to “PORHEALTH” at any convenient port in the Republic.

Information as to what medical supplies are available on board should form part of the message, together with the patient’s age, sex and all relative symptoms. Additionally, the last port of call, destination and distance to the nearest port are also important to the Health Department.

If urgent medical advice or assistance is required, the URGENCY SIGNAL (PAN PAN) may be used during the initial call to the Coast Station.

**33. THE SAFETY SIGNAL**

The radiotelephone SAFETY SIGNAL consists of the expression “SECURITE” (pronounced SAYCUREETAY) transmitted three times. This signal is used to announce Navigational Warnings, Gale or rough sea warnings or any other messages concerning the safety of navigation of vessels.

**34. PRIORITY**

The SAFETY SIGNAL has priority over all other messages except Distress or Urgency messages and stations hearing the signal should take care not to interfere with the message which follows.

**35. TRANSMISSION OF SAFETY MESSAGES**

Messages preceded by the SAFETY SIGNAL are announced on the Distress and Calling channel (CH.16) and then broadcast on a working channel. However, if the message is not likely to exceed 1 minute in broadcast duration, it may be transmitted on Channel 16.

**36. EXAMPLE OF A SAFETY SIGNAL AND MESSAGE**

A navigation warning would be broadcast as follows:

“SECURITE SECURITE SECURITE

ALL SHIPS ALL SHIPS ALL SHIPS

THIS IS

(Name of the station sending the warning, transmitted three times)

NAVIGATION WARNING TO FOLLOW ON CHANNEL 6 GO UP AND STAND BY”.

The warning would then be transmitted on channel 6 after a suitable pause to allow other stations to switch to that channel.

**N.B.**

Channel 6 is used purely as an example and will not necessarily be the channel used in actual practice (e.g. a Coast Station would use its working channel which could be channel 26). Generally a ship station may use ANY SIMPLEX channel available for transmitting a navigation warning.

**37. RE-BROADCAST OF A NAVIGATION WARNING**

A navigation warning transmitted by a ship station is normally intercepted and acknowledged by a coast station and re-broadcast in its daily series. However, when necessary, ships should repeat their



warnings at regular intervals, e.g. when towing another vessel a position, course and speed update should be made every six hours. If the nearest coast station has not acknowledged receipt of the warning, the ship should continue to broadcast until the situation is over, or until the coast station does acknowledge and undertakes to broadcast the warning itself.

### 38. EPIRB SIGNALS

The essential purpose of an EPIRB (Emergency Position Indicating Radio Beacon) is to facilitate the determining of the position of survivors in Search and Rescue operations. The signal indicates that one or more persons are in Distress, may no longer be aboard the parent vessel and that receiving facilities may not be available. EPIRBs operate on the frequency 406,025 MHz direct to orbiting satellites which then re-broadcast the signal to the nearest ground station (known as a Local User Terminal or LUT) which in turn relays the alert to the Maritime Rescue Co-ordination Centre (MRCC) closest to the EPIRB's position. Older types of EPIRB relied on the satellites to establish the EPIRB's position by Doppler shift of the transmitted signal's frequency, however, several models of EPIRB available now have a GPS device included which automatically transmits the beacon's position as part of the alert. This greatly increases the accuracy of the Distress position and thus enhances the chances of a successful rescue operation.

### 39. ACCOUNT CODE

Often referred to as "Controlling Company" the correct term is Accounting Authority Identification Code (AAIC) which indicates the name and address of the person, or organisation, responsible for the payment of any charges debited to the vessel for radio communication services provided by a coast station.

### 40. THE PHONETIC ALPHABET

In the case of language difficulties, or when transmitting coded words or mixtures of letters and figures (e.g. call signs), the use of the phonetic alphabet is essential to avoid mistakes.

#### LETTERS

A : ALPHA	J : JULIET	S : SIERRA
B : BRAVO	K : KILO	T : TANGO
C : CHARLIE	L : LIMA	U : UNIFORM
D : DELTA	M : MIKE	V : VICTOR
E : ECHO	N : NOVEMBER	W : WHISKY
F : FOX-TROT	O : OSCAR	X : X-RAY
G : GOLF	P : PAPA	Y : YANKEE
H : HOTEL	Q : QUEBEC	Z : ZULU
I : INDIA	R : ROMEO	

#### FIGURES

0 : ZERO	4 : FOUR (FOWER)	8 : EIGHT
1 : ONE	5 : FIVE (FIFE)	9 : NINER
2 : TWO	6 : SIX	
3 : THREE	7 : SEVEN	

### 41. PROCEDURE FOR MAKING A RADIOTELEPHONE CALL (R/T LINK CALL)

When requiring a radiotelephone call to a subscriber via a coast station, the following procedure should be adopted:-

Alpha calls Durban radio on channel 16 as follows:

"DURBANRADIO DURBANRADIO DURBAN RADIO  
THIS IS  
ALPHA ALPHA ALPHA  
I WISH TO MAKE A RADIOTELEPHONE LINK CALL  
OVER".

Durban radio will reply on channel 16:

“ALPHA  
THIS IS  
DURBANRADIO  
GO UP TO CHANNEL 26 AND STAND BY  
OVER”.

Alpha should respond as follows:

“DURBAN RADIO  
THIS IS  
ALPHA  
GOING UP AND STANDING BY”.

Alpha should then switch over to channel 26 and wait for Durban radio to call him. When Durban radio is ready to work the Alpha, he will call him on channel 26 as follows:

“ALPHA ALPHA ALPHA  
THIS IS  
DURBAN RADIO DURBAN RADIO DURBAN RADIO  
ON CHANNEL 26, DO YOU RECEIVE ME?  
OVER”.

Alpha would respond:

“DURBAN RADIO  
THIS IS  
ALPHA  
RECEIVING YOU LOUD AND CLEAR, I HAVE ONE LINK CALL, MAY I PASS THE  
PARTICULARS PLEASE?  
OVER”.

Durban radio invites Alpha to continue:

“ALPHA  
THIS IS  
DURBAN RADIO  
GO AHEAD PLEASE  
OVER”.

All coast stations require not only the particulars of the call but also the vessel's particulars, which should be passed in the following manner:

“DURBAN RADIO  
THIS IS  
ALPHA  
CALLSIGN ZULU ROMEO 2211, ACCOUNT CODE (as per para.39), THE CALL IS FROM THE  
MASTER TO DURBAN 3057521, I WOULD LIKE TO SPEAK TO MR. VAN DER MERWE (only  
necessary if you **do** wish to speak to a particular person),  
OVER”.

If Durban radio has received all the particulars correctly, he will ask Alpha to stand by whilst the call is connected. When the connection is made he will advise Alpha accordingly:

“ALPHA  
THIS IS  
DURBAN RADIO  
YOU ARE CONNECTED, GO AHEAD PLEASE

OVER”.

Alpha then begins the conversation to the shore subscriber in the normal manner. When the call has been completed, Alpha should advise Durban radio accordingly so that the telephone line may be disconnected. Durban radio will then advise Alpha of the duration of the call and the charge per minute, if required. The two stations should then conclude communication as follows:

“DURBANRADIO  
THIS IS  
ALPHA  
THANK YOU, I HAVE NOTHING FURTHER TO COMMUNICATE (if this is the case)  
OUT”.

Durban radio will respond:

“ALPHA  
THIS IS  
DURBAN RADIO  
ROGER  
OUT”.

#### NOTE

Calls may be made to subscribers in any country in the world, however the charges vary considerably according to the International Tariff rates so it is wise to check the cost to a particular destination before booking a call. The minimum charge for a link call is three minutes, thereafter the call is charged at 1 minute intervals.

#### **42. SHORTENED CALLING PROCEDURE ON VHF**

Due to the usually exceptional clarity of VHF transmission and reception, the calling procedure may be shortened to using the CALLED and CALLING stations names twice only, e.g. DURBAN RADIO DURBAN RADIO THIS IS ALPHA ALPHA, etc., except in the case of Distress, when it should ALWAYS be three times.

#### **43. BATTERIES**

As most stations operate by the use of batteries as their prime source of power, a basic knowledge of the operation of a battery is required to successfully maintain the apparatus in good working order.

Marine batteries are usually of the lead-acid type which are made up of a number of cells consisting of two sets of lead plates, separated by wooden or porous plastic separators, and filled with a dilute Sulphuric acid solution called the electrolyte.

One set of plates are the positive plates, made of lead peroxide, and are a chocolate brown colour when the battery is fully charged. The other set are the negative plates, made of pure lead, which should be a slate or purple-grey colour when fully charged.

When discharged, both the positive and negative plates form lead sulphate. This is caused by the chemical reaction during discharge when Sulphur and Oxygen are transferred from the electrolyte to the plates, thus reducing the Specific Gravity, or density, of the electrolyte. Plates in a discharged condition are easily recognised by this formation of lead sulphate, which appears as a white deposit on the plates.

Upon recharging, providing the battery has not been left for too long in a discharged condition, the Sulphur is transferred back to the electrolyte and Hydrogen is given off to the air, thus increasing the Specific Gravity. If the battery has been left in a discharged condition for too long, the lead sulphate crystallizes and becomes hard, causing the plates to buckle and possibly touch each other, resulting in a short circuit and making the battery unserviceable. In extreme cases, the casing may be damaged, allowing the electrolyte to leak out and corrode the battery box or locker.

A Hydrometer is used to measure the Specific Gravity (S.G) of the electrolyte, which will vary between 1270-1280 for a fully charged battery and 1150-1200 for a discharged battery. It is advisable not to allow the S.G to fall much below 1200 to prevent the formation of lead sulphate on the plates. Ideally, the S.G should be maintained around 1250 by regular charging or by keeping the battery on float charge. Try and develop the habit of checking the S.G weekly, it only takes a few minutes and can save you money, or your life!

The level of the electrolyte should be approximately 5 mm above the tops of the plates and should be maintained at this level by the addition of distilled water when necessary (**NEVER ADD ACID!!**).

The voltage of a single cell is normally 2 volts on load, i.e. when the radio apparatus is switched on and drawing power, and therefore the voltage of a complete six-cell battery (the type normally used for Marine purposes) is 12 volts. Most vessels use a 24 volt supply, but many small craft operate on a 12 volt system, particularly if there is only VHF fitted.

#### **44. BATTERY MAINTENANCE**

- a) Ensure sufficient initial charge.
- b) Give batteries plenty of work and liberal charging.
- c) **DO NOT** charge at too high a rate.
- d) **DO NOT** allow batteries to reach a low level of either volts or S.G.
- e) **DO NOT** allow batteries to stand discharged for too long.
- f) Charge batteries daily if possible.
- g) Keep plates covered by electrolyte, topping up with distilled water when necessary
- h) Test S.G weekly.
- I) Check battery voltage daily if possible.
- j) Keep terminals clean and covered with petroleum jelly to prevent build up of lead sulphate.
- k) Because batteries give off Hydrogen when being charged, **DO NOT ALLOW NAKED LIGHTS** in their vicinity.
- l) Keep batteries and battery box/locker dry and well ventilated.
- m) Check connections to terminals are tight and secure.
- n) **DO NOT** drop the battery or treat it roughly.
- o) **DO NOT** leave metal objects or tools lying loose in the battery box/locker.

#### **45. SIMPLE SYSTEMATIC FAULT TRACING ON FAULTY APPARATUS**

- a) Ensure the power supply is switched on.
- b) Ensure the supply voltage is correct (i.e. the batteries are not flat).
- c) Check fuses (**SWITCH OFF POWER SUPPLY FIRST TO PREVENT ELECTRIC SHOCK**).
- d) Check that the volume control is not turned down too far.
- e) Check that the squelch control is not turned up too much.
- f) Check that the equipment is switched to the correct channel.
- g) Check that all visible switches and connections are OK.
- h) Check that the antenna is properly connected and not damaged or short-circuited.
- i) If your equipment is working satisfactorily but you still cannot establish communication, check that you are in fact within range of the station you are trying to communicate with

#### **46. VHF CHANNEL ALLOCATIONS**

<u>CHANNEL</u>	<u>ALLOCATED USE</u>
16	International Distress, Calling and Answering
70	International Distress, safety and calling using Digital Selective Calling (DSC) techniques. <b>NO VOICE COMMUNICATIONS ARE ALLOWED ON THIS CHANNEL!</b>
8, 10	Intership working
6	Intership and Air to Ship working
09, 14	Port operations

24, 25, 26, 27, 28

Coast station working and public correspondence.

There are of course many other channels in the VHF band but the above are those most commonly used around the coast of South Africa. It is worth remembering that two vessels cannot communicate with each other on a Duplex channel, e.g. channel 26 or 28, but only on the Simplex channels such as 6 or 8. Also **NOBODY** may claim exclusive use of a particular channel, they are all available for everybody's use. However, it is recommended that channel 72 is not used as this has been allocated to a digital paging service and is subject to a high degree of interference.

## EXAMINATION ARRANGEMENTS

1. Bring three identical black and white, or colour, photographs (as small as possible)
2. Personal Identity Document or passport (a Driver's Licence is **NOT** acceptable)
3. Proof of payment of the prescribed examination fee (currently **R350.00**).

### R/T EXAMINATION PAYMENTS

Candidates may pay the examination fee at the SAMSA office when making a booking to sit the exam.

Cards, Cash or Cheques are acceptable.

### **ALTERNATIVELY (Preferred method)**

EFT payment may be made into the following account and proof of payment is to be produced when making a booking.

Account : SAMSA

Bank - ABSA

Branch – HATFIELD

Code - 632005

Account Number – 2140 000 674

Reference – Candidate name, plus, RADIO EXAM

Kindly **fax proof of payment to 031-3064983 to secure a booking**. Please **bring the original deposit slip** with you when coming to write the exam.

4. When the contents of this brochure are fully understood and all prescribed formats memorised, contact the SAMSA office at Tel: **031 - 3071501** to arrange an appointment to take the examination. **Prior booking is essential (at least a week in advance)**.
5. Examinations are conducted on Mondays at 1000 hrs and 1400 hrs (depending on availability) in the SAMSA offices on the 14th Floor ,Kingsfield Place, 30 Field Street, Durban. Kindly be here by either 09h30 or 13h30 (depending on which session you are booked for) to complete paperwork.
6. **N.B. Latecomers will not be allowed to write as the exams start punctually at the above times.**
7. **Please bring a pen!**