ΑΚΑΔΗΜΙΑ ΕΜΠΟΡΙΚΟΥ ΝΑΥΤΙΚΟΥ
Α.Ε.Ν ΜΑΚΕΔΟΝΙΑΣ

ΠΤΥΧΙΑΚΗ ΕΡΓΑΣΙΑ
ΜΕ ΘΕΜΑ:
PROCEDURES FOR SURVIVAL AT SEA

ΤΟΥ ΣΠΟΥΔΑΣΤΗ: ΖΟΥΡΙΔΗ ΝΙΚΟΛΑΟΥ
Α.Γ.Μ.: 3056
ΕΠΙΒΛΕΠΟΥΣΑ ΚΑΘΗΓΗΤΡΙΑ: ΠΑΠΑΛΕΩΝΙΔΑ ΠΑΡΑΣΚΕΥΗ

ΑΠΡΙΛΙΟΣ 2017

ΑΚΑΔΗΜΙΑ ΕΜΠΟΡΙΚΟΥ ΝΑΥΤΙΚΟΥ
Α.Ε.Ν ΜΑΚΕΔΟΝΙΑΣ

ΠΤΥΧΙΑΚΗ ΕΡΓΑΣΙΑ

ΕΠΙΒΛΕΠΟΥΣΑ ΚΑΘΗΓΗΤΡΙΑ: …….....

ΘΕΜΑ:
PROCEDURES FOR SURVIVAL AT SEA

ΤΟΥ ΣΠΟΥΔΑΣΤΗ: ΖΟΥΡΙΔΗ ΝΙΚΟΛΑΟΥ
Α.Γ.Μ: 3056

Ημερομηνία ανάληψης της εργασίας: .....
Ημερομηνία παράδοσης της εργασίας: .....

Α/Α	*Ονοματεπώνυμο*	*Ειδικότης*	*Αξιολόγηση*	*Υπογραφή*
1	***ΤΣΟΥΛΗΣ ΝΙΚΟΛΑΟΣ***	***ΔΙΕΥΘΥΝΤΗΣ ΣΠΟΥΔΩΝ***		
2				
3				
ΤΕΛΙΚΗ ΑΞΙΟΛΟΓΗΣΗ				

Ο ΔΙΕΥΘΥΝΤΗΣ ΣΧΟΛΗΣ : ΤΣΟΥΛΗΣ ΝΙΚΟΛΑΟΣ

Table of contents **page**

ABSTRACT

This dissertation deals with the procedures of survival at sea and focuses on practical advice that increase chances of survival. After a short introduction, in the second chapter we will see the importance of training and knowledge about sea survival before you come face to face with the inhospitable oceans and seas. We will talk about of the first regulations of SOLAS, and what must be done when you try to survive in a cold and hot climate. In the third chapter we will talk about liferafts and how we use the equipment properly in any case of survival. In the fourth chapter we wil see two of the most important devices (EPIRB and SART) and how we use them. In the fifth chapter we will learn about immersion suits, lifejackets and rescue procedures with helicopter. Chapter six mentions SAR procedures and regulations which apply in Greece. Finally, this dissertation states the most important points which are critical in order to stay alive in case of survival.

INTRODUCTION: PRACTICAL ADVICE

Perhaps the most difficult survival situation to be in is sea survival. Short- or long-term survival depends upon rations and equipment available and your ingenuity. You must be resourceful to survive. Water covers about 75 percent of the earth's surface, with about 70 percent being oceans and seas. As a seafarer, there is always the chance that the ship you are on will become crippled by such hazards as storms, collision or fire. Your survival at sea depends upon precautionary Measures, your knowledge of and ability to use the available survival equipment. Your special skills and ability to apply them to cope with the hazards you face. Your will to live. When you board a ship find out what survival equipment is on board, where it is stowed, and what it contains. For instance, how many life preservers and lifeboats or rafts are on board? Where are they located? What type of survival equipment do they have? How much food, water, and medicine do they contain? How many people are they designed to support? If you are responsible for other personnel on board, make sure you know where they are and they know where you are.When it comes to survival in an emergency situation, the most important fact is the knowledge about how to use the equipment of the liferaft and also the first thoughts before you live from the ship and what you must take with you. Planning is the most important thing compared with training on that, so that when an emergency occurs you know what to do and where you must go. Nowadays to be found becomes day by day more accurate and quicker with various methods. You must know what to expect from the weather in the search and rescue region where you are. Your first priority when isolated in the open sea is to stay afloat. This means that you need to find any floating items that will support you

within swimming distance. Your preference would be a life boat or raft, but any item will be better than exerting the energy required to paddle and keep yourself afloat. In the open ocean, there's not a lot of options regarding controlling where you go. Your best chance of survival relies on the current taking you to land or getting rescued. It is the easiest way to simply allow the current to take you where it must. Don't waste your energy trying to fight it. Only when you see land and it is within paddling distance, should you take the time to paddle ashore. If you see a ship in the distance, your more likely to get rescued by signaling it, rather than paddling toward the ship.

2. LEADERSHIP AND PLANNING BEFORE THE DISASTER AND SOLAS CONVENTION PRIORITY

2.1 Training and knowledge for survival

Preparation is vital it involves training and planning and includes minimising risks, especially those that can result from the cost-cutting measures that everyone is too guilty of when purchasing safety equipment. When a disaster happens it is too late to discover that there is no liferaft aboard, that the EPIRB is registered in the name of another vessel, and that the flares are out of date. Good seamanship is the result of knowledge and common sense and helps to ensure safety at sea.

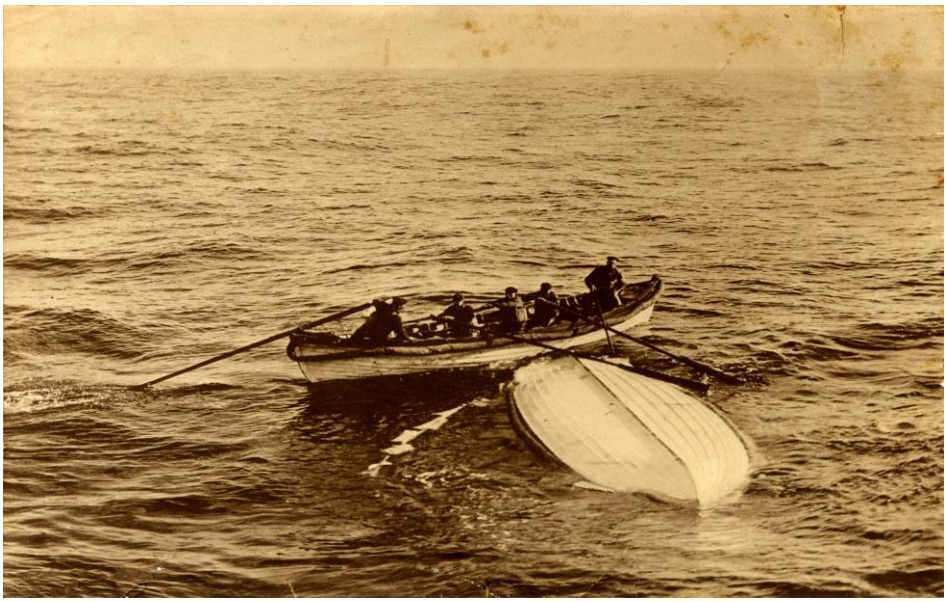
With planning and forethought many disasters can be prevented, but sadly not all. The training needed by the crew, together with the equipment chosen for the ship, depends to a large extent on the areas in which she sails or plans to sail, the weather conditions likely to be encountered and to a much lesser extent, upon the size of the craft. The most important factors influencing the choice of equipment are how likely the vessel is to be caught out in rough weather and how close she will be to the shore.

An emergency can happen anywhere, at any time, through no one's fault, and research and experience have shown that at the moment when disaster strikes, most people will be stunned and bewildered. However, those who have been trained to expect and to cope with such possibilities show infinitely greater survival rates than those who have not. People caught in a crisis or emergency frequently respond by falling back on well-learned patterns of behaviour. For those who are untrained, other often inappropriate – patterns of behaviour may emerge.

While this may be expressed as panic, it is mostly displayed as denial or disbelief. In contrast, calmness is contagious, and leadership, training and knowledge can contain and therefore stop the spread of panic and ensure that everyone works together.

2.2 The first time SOLAS was introduced in shipping history

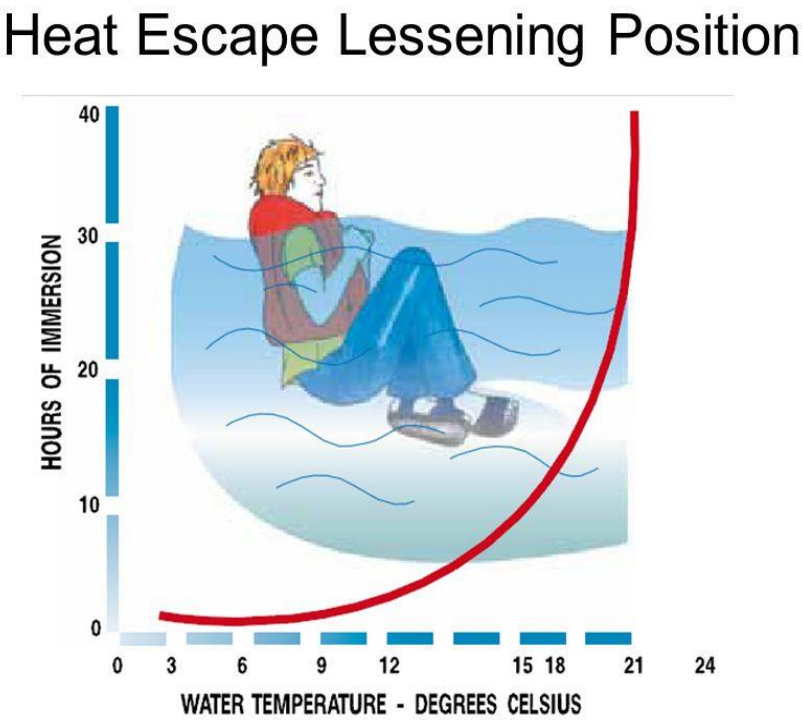
Out of disaster often comes some good, and so it has been in the maritime world. The loss of the Titanic shortly before midnight on 15 April 1912 had a huge impact, greater than any previous maritime disaster. This was partly because over 1,500 people died, and partly the wisdom of allowing individual countries to set standards of safety with the inherent risk that commercial considerations would take precedence. As a direct result of this disaster, the first International Convention for Safety of Life at Sea (known as SOLAS) was convened in London in November 1913.



For probably the first time in shipping history, the protection of life was stated as a priority over property and the first SOLAS convention came into force in 1915. The main objective of the SOLAS convention is to specify minimum standards for the construction, equipment and operation of ships, compatible with their safety.

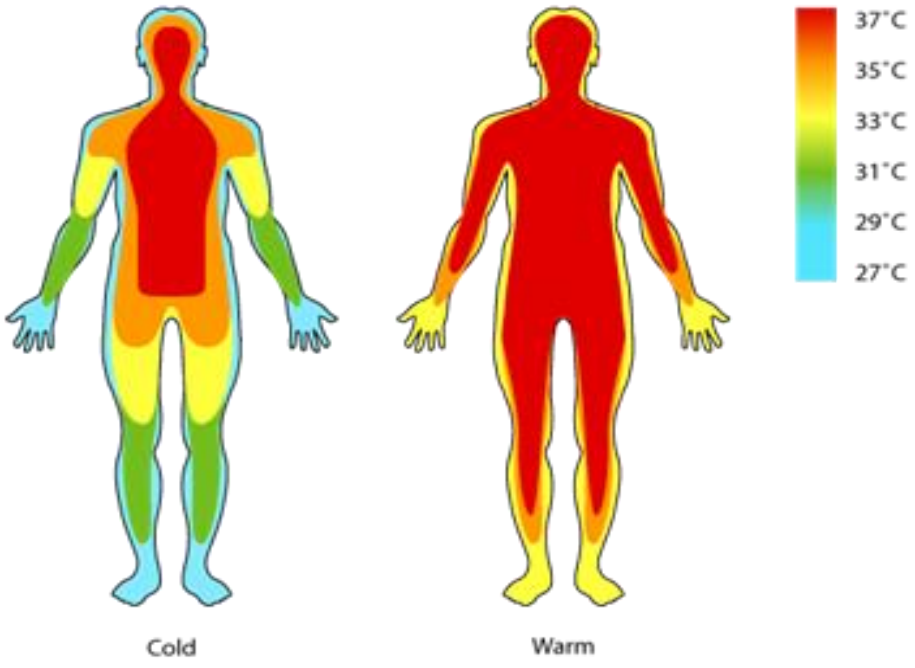
2.3 Hypothermia and exposure to cold

Hypothermia is a potentially dangerous drop in body temperature, usually caused by prolonged exposure to cold temperatures. The risk of cold exposure increases as the winter months arrive. Normal body temperature averages 37 celsius. With hypothermia, core temperature drops below 35 celsius. In severe hypothermia, core body temperature can drop to 27,7 celsius or lower.



When the balance between the body's heat production and heat loss tips toward heat loss for a prolonged period, hypothermia can occur. Accidental hypothermia usually happens after cold temperature exposure without enough warm, dry clothing for protection wearing an anti–exposure suit will extend your life expectancy considerably. If unavailable, put on any extra clothing, keep clothes loose and comfortable.

Try to keep the floor of the raft dry. Cover it with cloth for insulation. Huddle with others to keep warm, moving enough to keep the blood circulating. Spread any insulating material over the group. Give extra rations, if available, to survivors suffering from exposure to cold. Try to stay dry and insulate your body from the cold surface of the bottom of the raft. If these actions are not possible, remember keep your head and neck well insulated from the cold's effects when the temperature is below 19°C (66°F). Wearing life preservers provides extra insulation and increases the predicted survival time.



2.4 If you are in a hot climate

Rig a sunshade or canopy. Leave enough space for ventilation and try to keep out of the direct sun as much as possible. Cover your skin, where possible, to protect it from sunburn. Use sunburn cream, if available, on all exposed skin. Your eyelids, the back of your ears and the skin under your chin sunburn easily. Keep quiet and rest as much as possible.

3. LIFERAFT CHARACTERISTICS AND USE OF EQUIPMENT

3.1 Types of liferafts and solas approval

Life rafts are vulnerable between the time they are inflated and when they are cut free from the mother ship. While durable when at sea, they are made from relatively thin fabric that can be cut by a damaged hull, a wind vane, part of a mast, or virtually any sharp object on the vessel.

Therefore, it makes sense to launch the raft on the leeward side of the vessel and to keep it on a short tether. But when should it be launched? Therein lies a problem. In many sea survival instances, sailors have launched their rafts prematurely, “just in case” things get worse quickly. The problem is two-fold. Rafts become increasingly attractive compared to the vessel that is sinking/burning/losing her rudder/losing her keel.

The motivation to jump ship increases by the second. Rafts are also vulnerable, as discussed above. It becomes more urgent to abandon ship because the raft may fail if it is kept alongside the vessel. These two issues have resulted in instances of crews abandoning vessels that are later found to be floating. SOLAS or Coast Guard approved rafts are similar to ocean category rafts but have much more equipment and may have insulated canopies for colder climates. These rafts may have a strong feature list, but it rapidly becomes a matter of how much one wants to spend and how much weight one can deal with compared to the incremental advantages.

3.2 Use of liferaft equipment

Remember, rescue at sea is a cooperative effort. Use all available visual or electronic signalling devices to signal and make contact with rescuers. For example, raise a flag or wave reflecting material fastened to an oar as high as possible to attract attention. If your raft has a signal kite, launch it or try making one. A brightly coloured object floating high up over the ocean is more easily spotted than a tiny raft bouncing up and down in the waves.

Check the physical condition of all on board. Give first aid if necessary. Take seasickness pills if available. (It is best to take these pills 30 minutes before abandoning ship if at possible.) The best way to take these pills is to place them under the tongue and let them dissolve. There are also suppositories or injections against seasickness. Vomiting, whether from seasickness or other causes, increases the danger of dehydration. Try to salvage all floating equipment: Rations; any type of container; clothing; seat cushions; parachutes and anything else that will be useful to you.

Secure the salvaged items to the safety lines inside or outside your raft. Make sure the items have no sharp edges that can puncture the raft. If there are other rafts, lash the rafts together so they are about 7.5 metres (25 feet) apart. Be ready to draw them closer together if you see or hear an aircraft. It is easier for an aircrew to spot rafts that are close together, rather than scattered. If all the rafts have beacons, make a rota so not all of them are switched on at the same time to conserve battery power. The best way to communicate between rafts is by using Morse Code.

Have signalling devices, such as kites, flares, mirrors or laser lights ready for instant use. Angles of sight are narrow on the ocean and there may only be a small window of opportunity that a passing ship or plane will see you. Only fire off your flares if you are certain a ship will see them. Many modern freighters use autopilots and often there is not a 24 hr/365 lookout posted. Modern rafts may have a built in emergency beacon that activates when the raft is inflated; check it is working.

Use charts and other paper items as insulation stuffed inside your clothing. Take care not to snag the raft with shoes or sharp objects. Keep the repair kit tied where you can readily reach it. If you are not in a modern raft, rig a windbreak, spray shield and canopy. Decontaminate the raft of all fuel. Petroleum and diesel oil will weaken its surfaces and break down its glued joints do this by scrubbing the raft down with seawater and use soap if you have it as this will emulsify petroleum oils and make them easier to remove.

The best technique for rescuing personnel from the water is to throw them a life preserver attached to a line. Another is to send a swimmer (rescuer) from the raft with a line attached to a flotation device that will support the rescuer's weight. This device will help conserve a rescuer's energy while recovering the survivor. In all cases, the rescuer wears a life preserver. A rescuer should not underestimate the strength of a panic-stricken person in the water. A careful approach can prevent injury to the rescuer.

When the rescuer approaches a survivor in trouble from behind, there is little danger the survivor will kick, scratch, or grab him. The rescuer swims to a point directly behind the survivor and grasps the life preserver's backstrap. The rescuer uses the sidestroke to drag the survivor to the raft. If you are in the water, make your way to a raft. If no rafts are available, try to find a large piece of floating debris to cling to. Relax a person who knows how to relax in ocean water is in very little danger of drowning. The body's natural buoyancy will keep at least the top of the head above water, but some movement is needed to keep the face above water.

Throw out the sea anchor or improvise a drag from the raft's case, bailing bucket or a roll of clothing. A sea anchor helps you stay close to your ditching site, making it easier for searchers to find you if you have relayed your location. Without a sea anchor, your raft may drift over 160 kilometres (86 nautical miles) in a day, making it much harder to find you. You can adjust the sea anchor to act as a drag to slow down the rate of travel with the current or as a means to travel with the current.

You make this adjustment by opening or closing the sea anchor's apex. When open, the sea anchor acts as a drag that keeps you in the general area. When closed, it forms a pocket for the current to strike and propels the raft in the current's direction. Additionally, adjust the sea anchor so that when the raft is on the wave's crest, the sea anchor is in the wave's trough. Wrap the sea anchor rope with cloth to prevent its chafing the raft.

The anchor also helps to keep the raft headed into the wind and waves. It could be that you want the raft to move closer to shipping lanes, for example, if the sea is calm and you want the raft to move faster pull in the sea anchor. In stormy water, rig the spray and windshield at once if you are in an older style open raft.

Keep your raft as dry as possible. Keep it properly balanced. All personnel should stay seated, the heaviest one in the centre. Calmly consider all aspects of your situation and determine what you and your companions must do to survive. Make an inventory of all equipment, food and water. If at all possible, protect items that saltwater may affect. Even tiny items of seeming insignificance, such as a paper clip or pin may become precious belongings.

These include compasses, watches, sextant, matches and lighters. Wrap any sharp items to stop them from chafing or puncturing the raft. Ration food and water from the outset, as you do not know how long it will be before rescue. Deploy solar stills immediately to check they work and to ensure a supply of potable water; don't wait until your water supplies run out before using the stills because they work very slowly. Keep a log or journal. Record, the time of ditching, the names and physical condition of personnel and the ration schedule. Also, record the wind, weather, direction of swells, times of sunrise and sunset and other navigational data that may help you assess the situation as you go along. Decide whether to stay in position or to travel.

Ask yourself, 'How much information was signalled before the accident? Is your position known to rescuers? Do you know it yourself? Is the weather favourable for a search? Are other ships or aircraft likely to pass your present position? How many days supply of food and water do you have? Check the raft for inflation, leaks and points of possible chafing. Make sure the main buoyancy chambers are well rounded but not overly tight. Check inflation regularly. Air expands with heat on hot days, the safety valves will release some air so you will need to pump up the raft when the air cools at night and the raft sags.

3.3 Proper management of water

When you have a limited water supply and you can't replace it by chemical or mechanical means, use the water efficiently. Protect fresh water supplies from seawater contamination. Keep your body well shaded, both from overhead sun and from reflection off the sea surface. Allow ventilation of air dampen your clothes with seawater during the hottest part of the day.

Do not exert yourself. Relax and sleep when possible. Fix your daily water ration after considering the amount of water you have, the output of solar stills and desalting kit and the number and physical condition of your party.

If you don't have water, don't eat. If your water ration is 2 litres (3.5 pints, 0.5 US gallons) or more per day, eat any part of your ration or any additional food that you may catch, such as birds, fish and shrimp. The life raft's motion and anxiety may cause nausea. If you eat when nauseated, you may lose your food immediately. If nauseated, rest and relax as much as you can and take only water.

To reduce your loss of water through perspiration, soak your clothes in the sea and wring them out before putting them on again. Don't overdo this during hot days when no canopy or sun shield is available. This is a trade–off between cooling and saltwater boils and rashes that will result. Watch the clouds and be ready for any chance of showers. Keep a tarpaulin handy for catching water. If your skin is encrusted with dried salt, wash it in seawater and let the rain shower you off.

Normally, a small amount of seawater mixed with rain (brackish water) is safe to drink but be aware that over several days your ability to taste the concentration of salt will decrease and you must be careful that you are not drinking water with a higher than safe level of salt. You can drink salty water safely for two or three days if the salt content does not exceed 2.5 g per 0.6 litres. In very rough seas, you cannot get uncontaminated fresh water from rain as the spray from the waves will get into everything even your open mouth.

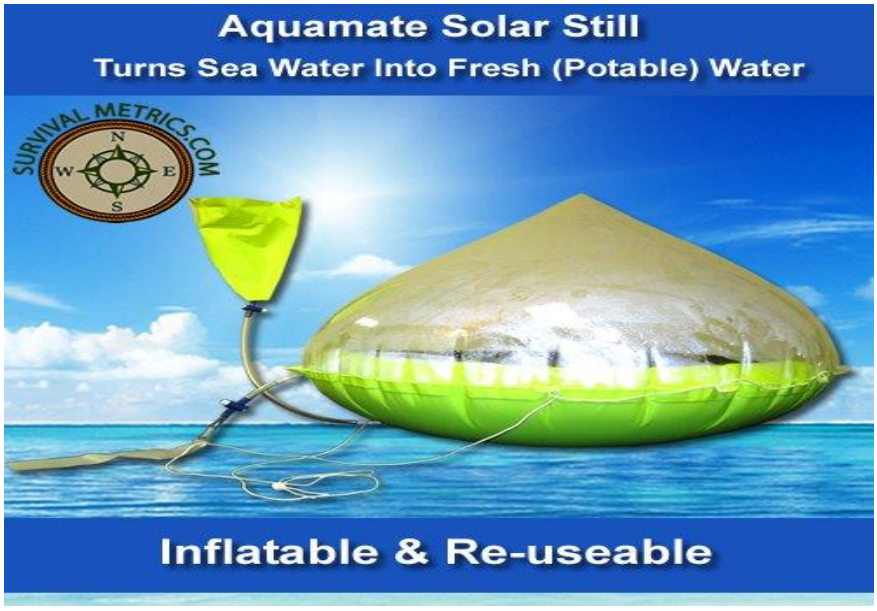
It is also possible to collect dew along the sides of the raft using a sponge or cloth squeeze this into the mouth but only swallow a small amount at first, as it will have a strong taste of rubber that will make you gag. As you get used to it you can manage to drink a little more. The rubber taste will not harm you. When it rains, drink as much

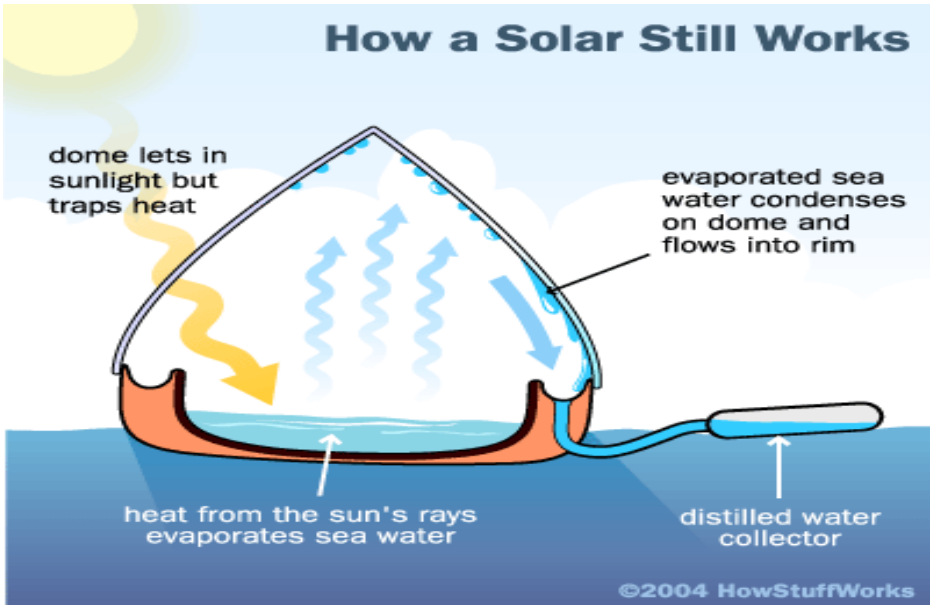
as you can hold and fill up all possible containers do this even if you are weak and feel lethargic.

3.4 Desalting of water

Never drink seawater. Do not drink urine. Do not drink alcohol. Do not smoke if you have limited water supplies. Do not eat unless water is available. Sleep and rest are the best ways of enduring periods of reduced water and food intake. However, make sure that you have enough shade when sleeping during the day.

When desalting kits are available in addition to solar stills, use them only for immediate water needs or during long overcast periods when you cannot use solar stills. In any event, keep desalting kits and emergency water stores for periods when you cannot use solar stills or catch rainwater.





3.5 Identification mark of land

You should watch carefully for any signs of land. There are many indicators that land is near. A fixed cumulus cloud in a clear sky or in a sky where all other clouds are moving often hovers over or slightly downwind from an island. In the tropics, the reflection of sunlight from shallow lagoons or shelves of coral reefs often causes a greenish tint in the sky. In the arctic, light-colored reflections on clouds often indicate ice fields or snow-covered land. These reflections are quite different from the dark gray ones caused by open water.

Deep water is dark green or dark blue. Lighter color indicates shallow water, which may mean land is near. At night, or in fog, mist, or rain, you may detect land by odors and sounds. The musty odor of mangrove swamps and mud flats carry a long way. You hear the roar of surf long before you see the surf. The continued cries of

seabirds coming from one direction indicate their roosting place on nearby land. There usually are more birds near land than over the open sea. The direction from which flocks fly at dawn and to which they fly at dusk may indicate the direction of land. During the day, birds are searching for food and the direction of flight has no significance.

Mirages occur at any latitude, but they are more likely in the tropics, especially during the middle of the day. Be careful not to mistake a mirage for nearby land. A mirage disappears or its appearance and elevation change when viewed from slightly different heights. You may be able to detect land by the pattern of the waves (refracted) as they approach land (Figure 16-20). By traveling with the waves and parallel to the slightly turbulent area marked "X" on the illustration, you should reach land. Try not to land when the sun is low and straight in front of you. Try to land on the lee side of an island or on a point of land jutting out into the water.

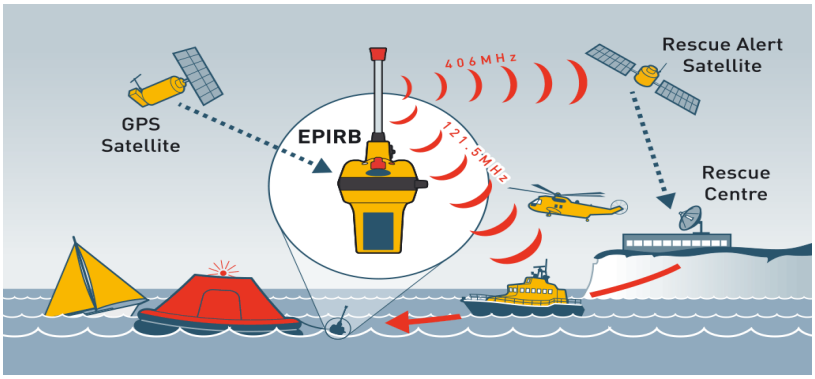
Keep your eyes open for gaps in the surf line, and head for them. Avoid coral reefs and rocky cliffs. There are no coral reefs near the mouths of freshwater streams. Avoid rip currents or strong tidal currents that may carry you far out to sea. Either signal ashore for help or sail around and look for a sloping beach where the surf is gentle. If you have to go through the surf to reach shore, take down the mast.

4. CRITICAL USE OF EPIRB AND SART IN AN EMERGENCY SITUATION

4.1 Using the EPIRB

An Emergency Position Indicating Radio Beacon (EPIRB) is used to alert search and rescue services in the event of an emergency. It does this by transmitting a coded message on the 406 MHz distress frequency. This message is relayed via satellite and earth station to the nearest rescue co-ordination centre. The satellite system is run by COSPAS-SARSAT. Using the characteristics of the received signal, the orbiting satellites can establish the position of the transmitting EPIRB to within approximately 5 km.

The EPIRB transmits a message that identifies the exact vessel to which it was registered. Knowing which vessel is in distress allows the rescue services to eliminate false alarms and launch an appropriate rescue. The EPIRB also has a secondary distress transmitter. This transmits on 121.5 MHz and is used for „homing“ purposes. When the rescue services get close, this allows them to direction find on the signal. To cater for searches at night, the EPIRB has a bright falshing light that aids final visual location.



If possible, the EPIRB should be recovered and tied (using its lanyard) to one of the liferafts. An EPIRB is meant to mark survivors, not he accident scene. For best operation leave the EPIRB floating in the sea near the liferaft. If your EPIRB has been activated for a cumulative period in excess of 2 hours then its battery will need replacing. This is necessary to ensure that the next time it gets used it will operate for the full 48 hours required by government regulations.

The satellite system is run by COSPAS-SARSAT. When you activate your EPIRB in an emergency, the nearest maritime search and rescue coordination centre (MRCC) will receive the message and decode the country code. They will then access the registration database for that country and expect to find details of your vessel, its radio equipment and who to contact. If they fail to find this information, this may slow down any rescue.

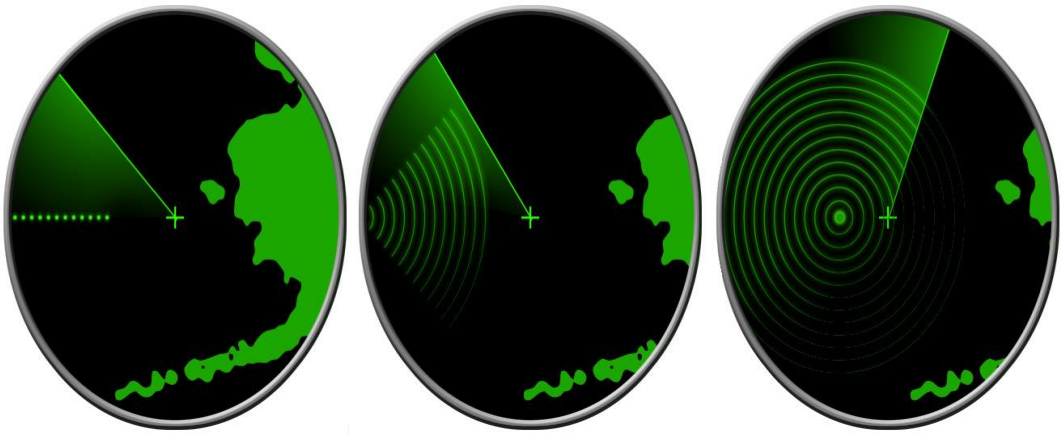
4.2 Using the SART

SART or Search and Rescue Transponder, is an extremely vital equipment on the ship as it performs the job of a signal-man. It is a vital machine during distress for it helps in locating the position of the vessel in case it goes off-track. SARTs are made of waterproof components which protects it against damage by water. SARTs are essentially battery-operated, hence can be operative for a long time. SARTs are of use in ships, lifeboats and liferafts. They are the most supportive machines in case of an unprecedented emergency. SARTs are designed to remain afloat on water for a long time in case the vessel finds itself submerged in water.

The bright color of SARTs enables their quick detection, whereas the combination of transmitter and receiver enables it to transmit as well as receive radio signals. SART machines have been instrumental in rescuing several crafts and ships by

reacting to the search signal sent from an X-band radar, typically of 9 GHz. These signals are known as homing signals.

The response is usually displayed on radar screens as a sequence of dots on a X band-radar, which helps rescuers reach the vessels in time. A SART is basically an electronic device that automatically reacts to the emission or interrogation by radar. This enhances the visibility of the party in need of assistance on the radar display (PPI). They operate on the 9 GHz band and only transmit, when they are switched on, when interrogated by a radar.



5. IMMERSION SUITS, LIFE JACKETS AND RESCUE FROM HELICOPTER

5.1 Immersion suits

Survival suits are not designed to keep all water out; they are designed to keep heat in. They do this by providing a layer of insulation, typically 5mm of neoprene, and restricting the flow of water next to the body. Designed to be put on within a minute, right over your clothes and shoes. Donning in the water is difficult and borders on unlikely in bad conditions, but it can be done, and any water inside will be heated by the body.

The first survival suits in Europe were invented by Daniel Rigolet, captain of a French oil tanker. Others had experimented on similar suits abroad. Unlike work suits, "quick don" survival suits are not normally worn, but are stowed in an accessible location on board the craft. The operator may be required to have one survival suit of the appropriate size on board for each crew member, and other passengers. If a survival suit is not accessible both from a crew member's work station and berth, then two accessible suits must be provided.

An adult survival suit is often a large bulky one-size-fits-all design meant to fit a wide range of sizes. It typically has large oversize booties and gloves built into the suit, which let the user quickly don it on while fully clothed, and without having to remove

shoes. It typically has a waterproof zipper up the front, and a face flap to seal water out around the neck and protect the wearer from ocean spray.

5.2 Life jackets

Each lifejacket shall be fitted with a whistle firmly secured by a lanyard. Lifejacket lights and whistles shall be selected and secured to the lifejacket in such a way that their performance in combination is not degraded. Each lifejacket shall be provided with a releasable buoyant line or other means to secure it to a lifejacket worn by another person in the water.

Each lifejacket shall be provided with a suitable means to allow a rescuer to lift the wearer from the water into a survival craft or rescue boat. A life jacket will help protect a person against hypothermia, an important threat when a rescue might be slow in coming. The jacket will help keep a person's head above water, so it stays dry, and it will help hold in body heat. Instead of exerting heat and energy in treading water, people wearing life jackets can pull their legs into their chests, which slows the escape of body heat.

Most life jackets are brightly colored to aid in rescue efforts. Life jackets can absorb some of the impact of a fall and minimize injuries. Few people plan to fall overboard. When someone ends up in the water who didn't expect to be there, a life jacket can provide some valuable time in adjusting to the shock. Most people thrash around when panicked; a life jacket helps the user right himself and keep the head above water.

5.3 Use of Helicopters for Rescue

The primary purpose of any SAR action is the speedy return to a place of safety of the survivors or a distress situation. It is essential that from the start of any SAR action, the coordinating SAR Authority plans for the rescue of survivors and ensures that appropriate resources are alerted, briefed and positioned so that the rescue may take place with a minimum of delay after the location of the survivors.

Without jeopardising the ultimate safety of survivors, foremost consideration is given to the potential impact on any medical condition of survivors by the method of recovery or the actions of unqualified persons. To reduce delay, the SAR facilities that are likely to be used should be alerted and deployed to a suitable location while the search is still in progress. Helicopters can be used to rescue survivors by winching or by landing at a suitable location. Owing to their unique flying characteristics, helicopters should be considered for use as a rescue unit as a matter of course.

They are particularly suitable for rescues at locations where surface units are unable to operate. At the same time, some helicopter evacuations may be hazardous, particularly in mountainous areas at high altitudes and over rough seas. Such evacuations should therefore only be carried out by specially qualified and experienced crews and then only in the event of serious injury or illness or when lack of other means of rescue might result in loss of life.

It is important that any information on the condition of survivors is considered by specialists before committing to helicopter use. Operations by surface parties may be hampered by the noise and rotor wash produced by helicopters. To avoid damage to rotor blades, the landing site should be cleared to a diameter specified by the pilot-in-command for each proposed operation.

To facilitate the coordination between helicopters and surface rescue units and to minimise the hazard of collision associated with helicopters operating in a confined space during rescue operations, their operations should be carefully planned by the RCC and coordinated by the ATS unit in communication with them. The helicopter's mass may be a factor limiting the number of survivors that may be taken aboard each trip. It may, therefore, be necessary to reduce weight by all possible means, e.g. removal of non-essential equipment, minimum fuel, use of advance bases with fuelling capabilities.

A medically qualified person, medical equipment and respiratory equipment, when available, should be carried on a helicopter recovery mission, at least on the first flight to the distress scene. When being rescued by helicopter, survivors in a life raft may have to leave the raft to catch the sling since the rotor downwash below the helicopter will blow the raft away Survivors may not know how to operate a strop.

A two-person winch is preferred to a single winch. A double strop allows one rescuer to supervise while being winched down and up again with each survivor. A helicopter should not be approached unless directed and/or escorted by a member of the helicopter's crew. Helicopters may require approach from different aspects dependant on type.

6. SEARCH AND RESCUE REGULATIONS AND PROCEDURES

6.1 The SAR service

The SAR service provider ensures the availability of sufficient accommodation, equipment, and resources to coordinate not less than two civil aviation search and rescue operations at any one time. The SAR service provider establishes a contingency plan that includes completed arrangements to secure access to alternative accommodation and resources in order to ensure the ongoing provision of civil aviation search and rescue services in the event of primary accommodation or equipment becoming unavailable for any reason.SAR plans of operation include details of actions to be taken with respect to:

1. Available communication systems and facilities

2. Alerting en-route aircraft and ships at sea;

3. Duties and prerogatives of all participating personnel;

4. Possible redeployment of personnel and equipment that may be necessitated by meteorological or other dynamic conditions;

5. Particular assistance appropriate to distressed aircraft confronted with the need to ditch, including rendezvous with surface craft;

6. In-flight diversion to and intercept and escort of aircraft in distress; and

7. Cooperative procedures taken in conjunction with ATS, security and other appropriate authorities to assist aircraft known or believed to be subject to unlawful interference or a bomb warning.

The designated SAR service provider ensures the provision of an RCC which must be staffed on a 24-hour basis by a complement of personnel who are trained, qualified, proficient and certified to levels of competence relevant to the functions and responsibilities appropriate to a civil aviation SAR .The SAR service provider ensures that RCC and, as appropriate, RSC staff are given regular proficiency training and exercises to maintain skills, knowledge and attitudes as appropriate to the provision of civil aviation SAR services to domestic and international civil aviation operations.

6.2 Hellenic responsibility for search and rescue

With regards to sea search and rescue in particular, Greece coordinates operations within the Athens FIR ever since the latter was created in the 1950s. This reflects the geographical reality in the region, given the number of islands scattered around the Aegean Sea, enabling, from an operational standpoint, the most effective and swift provision of services for the protection of human life at sea.

Furthermore, this is in accordance with the relevant recommendations of IMO and ICAO regarding the need that Search and Rescue areas are identical with the limits of the FIRs, both for air and sea accidents. Upon signature of the Convention, Greece stated that its area of responsibility for search and rescue at sea coincided with the Athens FIR, as notified to the IMOs predecessor, the Intergovernmental Naval Advisory Organisation, in 1975.

Upon ratification of the Hamburg Convention in 1979, Greece reiterated to the IMO that the Greek area of responsibility for accidents at sea corresponded to the Athens FIR and this declaration was included in the 1989 Law transposing this Convention into Greek legislation (Law 1844/1989). According to this Convention, the member-states' areas of responsibility for sea search and rescue services are determined by agreement of the coastal states concerned.

Within this framework, Greece has signed agreements for search and rescue services in the event of accidents at sea with Italy (2000), as well as Malta (2008) and Cyprus (2014), explicitly stipulating that the Greek area of responsibility for accidents at sea corresponds to the Athens FIR, while agreements with other neighbouring states are also pending signature.

However, in 1988, in Regulation 1988/13559 (which was later modified by Regulation 2001/3275) Turkey also designated its area of responsibility for search and rescue services – without making it clear if said services would be provided to endangered air- or sea-craft – in an area which included a section of the Athens FIR almost up to the middle of the Aegean, thus designating a large section of Greek territory as being within the Turkish search and rescue area. In all publications, articles, and case histories written about searching for lost or missing persons, there are some basic management concepts that appear to remain consistent on successful searches. Early confinement of the subjects movements, coordination and rapid deployment of trained and/or skilled searchers, lost subject behavior patterns, quick development of an incident action plan, on-going interviews or investigation, and the exchange and sharing of information to all decision-makers, and sharing vital searching data with all the searchers.

Essentially, the basic principles and theories of search management are divided into organization, management, leadership, strategy, tactics, and clue awareness. These fundamentals, when used effectively and efficiently, will normally render successful searches. It is impossible to explain all the complexities of search management in this short document and SAR management courses are conducted for this purpose. However, there are several key actions and decisions that must be made

by SAR management personnel. In the majority of searches, these actions have proven to be highly successful in locating the lost or missing subject.

8. SOURCES

The following websites were used, retrieved in April 2017.

- www.equipped.com/21-76/ch16.pdf: The Definitive Source for Independent Reviews & Informationon Outdoors Gear and Survival Equipment and Techniques
- http://www.survival-expert.com/Adrift_at_Sea.html
- http://www.webmd.com/a-to-z-guides/what-is-hypothermia#1
- https://play.google.com/store/books/details/Chris_McNab_Survival_at_Sea?id=amuZBgAAQBAJ
- https://play.google.com/store/books/details/Frances_Howorth_The_Sea_Survival_Manual?id=Md1VAQAAQBAJ
- http://www.bwsailing.com/cc/a-guide-to-life-rafts-their-equipment-storage-and-deployment/
- http://drsircus.com/light-heat/low-body-temperature-symptoms-causes-treat/
- http://transportsafety.vic.gov.au/maritime-safety/recreational-vessel-operators/powerboat/what-to-do-in-an-emergency/cold-water-immersion
- https://gr.pinterest.com/eddyvannerom/titanic-disaster/
- http://www.nauticexpo.com/boat-manufacturer/coastal-liferaft-21104.html
- https://www.westmarine.com/WestAdvisor/Selecting-a-Life-Raft
- http://matchau.en.made-in-china.com/product/evOJpkZdQKhu/China-Daylight-Signal-Mirror-for-Liferaft-and-Lifeboat.html

- http://www.maritime-executive.com/blog/over-100-years-of-pyrotechnic-flares
- http://www.force4.co.uk/department/safety/emergency-equipment/sea-anchors-drogues.html
- http://www.landfallnavigation.com/viking.html
- http://buyonline.greatcircleliferafts.com.au/cms.php?id_cms=11
- http://www.richardprice.io/post/68616150790/survival-at-sea-when-your-boat-sinks
- https://wanderwisdom.com/misc/How-to-Survive-in-a-Humid-Climate
- http://www.carnegiecouncil.org/publications/articles_papers_reports/0175.html
- http://www.solar-energy-for-homes.com/solar-water-purifier.html
- http://www.src-lrc.cz/docs/406-EPIRB.pdf
- http://oceansignal.com/products/epirb1/
- http://www.mcmurdomarine.com/sart/92-s4-rescue-sart
- http://www.maritimejournal.com/news101/onboard-systems/safety,-survival-and-training/new-sarts-extend-range-for-mcmurdo2
- http://www.yachtingmagazine.com/survival-suits-more-important-you-think
- http://www.safety4sea.com/changes-to-the-lsa-code-and-solas-requirements-for-lifejackets/
- https://natsar.amsa.gov.au/documents/NATSAR-Manual/Chapter6.pdf
- http://jcsda.com/docs/sar_mgt.pdf

- https://www.gcaa.gov.ae/en/epublication/admin/Publication%20History/Civil%20Aviation%20Regulations%20(CARs)/CAR%20PART%20VIII%20-%20AIR%20NAVIGATION%20REGULATIONS/SUBPART%208%20-%20SEARCH%20AND%20RESCUE%20SERVICE%20REGULATIONS.pdf
- http://www.mfa.gr/en/issues-of-greek-turkish-relations/relevant-documents/search-and-rescue.html
- https://www.123rf.com/photo_41519765_stock-vector-search-and-rescue-is-the-search-for-and-provision-of-aid-to-people-who-are-in-distress-or-imminent-d.html