

Setrac College of Offshore Training

Refresher Course

Proficiency in Survival Techniques



Trainee Handout

ISSUE DATE – Oct 2014		
DATE	REVISION	REVISED BY
01 Jan 2016	Rev 01	Training Coordinator
01 Jan 2020	Rev 02	Training Coordinator
01 Jan 2023	Rev 03	Training Coordinator
01 Jan 2024	Rev 04	Training Coordinator

COURSE OBJECTIVE

1. The 2010 Manila Amendments to the STCW Convention entered into force on 1st January 2012, through the Tacit Amendment Procedure as laid down in the STCW Convention.
2. As per the convention, seafarers in possession of Certificates issued more than five years ago are required to undertake Refresher Training and demonstration of competence to ensure continued maintenance of standards of competence.
3. The objective of the course therefore is to provide refresher training to seafarers in the following aspects:

Personal Survival Techniques (PST)		
Sl	Topic	Training Duration
1	Survive at sea in the event of ship abandonment:	
2	don and use an immersion suit	20
3	safely jump from a height into the water	20
4	right an inverted liferaft while wearing a lifejacket	40
5	swim while wearing a lifejacket	20
6	keep afloat without a lifejacket	20

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1- Survive at sea in the event of ship abandonment:

Records show that many ships sink in less than 15 minutes. This affords little time to formulate a plan of action, so careful preplanning is essential to be ready in an emergency. Here are some sound pointers for you to remember when abandoning ship:



Put on as much warm clothing as possible, making sure to cover head, neck, hands and feet. If an immersion suit is available put it on over the warm clothing. If the immersion suit does not have inherent flotation, put on a lifejacket and be sure to secure it correctly.

All persons who know that they are likely to be affected by seasickness should, before or immediately after boarding the survival craft, take some recommended preventive tablets or medicine in a dose recommended by the manufacturer. The incapacitation caused by seasickness interferes with your survival chances; the vomiting removes precious body fluid, while seasickness in general makes you more prone to hypothermia.

Avoid entering the water if possible, e.g. board davit-launched survival craft on the embarkation deck. If davit-launched survival crafts are not available, use over-side ladders, or if necessary lower yourself by means of a rope or fire hose.

While afloat in the water, do not attempt to swim unless it is to reach a nearby craft, a fellow survivor, or a floating object on which you can lean or climb. Unnecessary swimming will pump out any warm water between your body and the layers of clothing, thereby increasing the rate of body heat loss. In addition, unnecessary movements of your arms and legs send warm blood from the inner core to the outer layer of the body. This results in a very rapid heat loss. Hence it is most important to remain as still as possible in the water, however painful it may be. **Remember, pain will not kill you, but heat loss will!**

The body position you assume in the water is also very important in conserving heat. Float as still as possible with your legs together, elbows close to your side and arms folded across the front of your lifejacket. This position minimizes the exposure of the body surface to the cold water. Try to keep your head and neck out of the water.

Try to board a lifeboat, raft, or other floating platform or object as soon as possible in order to shorten the immersion time. Remember, you lose body heat many times faster in water than in air. Since the effectiveness of your insulation has been seriously reduced by water soaking, you must now try to shield yourself from wind to avoid a wind-chill effect (convective cooling). If you manage to climb aboard a lifeboat, shielding can be accomplished with the aid of a canvas cover or tarpaulin, or an unused garment. Huddling close to the other occupants of the lifeboat or raft will also conserve body heat.

Keep a positive attitude of mind about your survival and rescue. This will improve your chances of extending your survival time until rescue comes. **Your will to live does make a difference!**

2. Don and use an immersion suit

An **immersion suit**, or **survival suit** (or more specifically an immersion survival suit), is a special type of waterproof dry suit that protects the wearer from hypothermia from immersion in cold water, after abandoning a sinking or capsized vessel, especially in the open ocean. They usually have built-on feet (boots), and a hood, and either built-on gloves or watertight wrist seals.

Unlike work suits, "quick don" survival suits are not normally worn, but are stowed in an accessible location onboard the craft. The operator may be required to have one survival suit of the appropriate size onboard 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.

This type of survival suit's flotation and thermal protection is usually better than an immersion protection work suit, and typically extends a person's survival by several hours while waiting for rescue.

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. Because of the oversized booties and large mittens, quick don survival suits are often known as "Gumby suits," after the 1960s-era children's toy.

The integral gloves may be a thin waterproof non-insulated type to give the user greater dexterity during donning and evacuation, with a second insulating outer glove tethered to the sleeves to be worn while immersed.

A ship's captain (or master) may be required to hold drills periodically to ensure that everyone can get to the survival suit storage quickly, and don the suit in the allotted amount of time. In the event of an emergency, it should be possible to put on a survival suit and abandon ship in about one minute.

The Submarine Escape Immersion Equipment is a type of survival suit that can be used by

sailors when escaping from a sunken submarine. The suit is donned before escaping from the submarine and then inflated to act as a life raft when the sailor reaches the surface.

Suit construction

Survival suits are normally made out of red or bright fluorescent orange or yellow fire-retardant neoprene, for high visibility on the open sea. The Neoprene material used is a synthetic rubber closed-cell foam, containing a multitude of tiny air bubbles making the suit sufficiently buoyant to also be a personal flotation device.

The seams of the neoprene suit are sewn and taped to seal out the cold ocean water, and the suit also has strips of SOLAS specified retroreflective tape on the arms, legs, and head to permit the wearer to be located at night from a rescue aircraft or ship.

Safety features

Survival suits can also be equipped with extra safety options such as:

- A whistle on a lanyard to permit the wearer to signal for help
- An emergency strobe light beacon with a water-activated battery
- An inflatable air bladder to lift the wearer's head up out of the water
- Tethered mittens to better insulate the hands
- An emergency radio locator beacon
- A "Buddy line" to attach to others' suits to keep the group together for rescue

Inflatable survival suits

The inflatable survival suit is a special type of survival suit, recently developed, which is similar in construction to an inflatable boat, but shaped to wrap around the arms and legs of the wearer. This type of suit is much more compact than a neoprene survival suit, and very easy to put on when deflated since it is just welded from plastic sheeting to form an air bladder.

Once the inflatable survival suit has been put on and zipped shut, the wearer activates firing handles on compressed carbon dioxide cartridges, which punctures the cartridges and rapidly inflates the suit. This results in a highly buoyant, rigid shape that also offers very high thermal retention properties.

However, like an inflatable boat, the inflatable survival suit loses all protection properties if it is punctured and the gas leaks out. For this reason, the suit may consist of two or more bladders, so that if one fails, a backup air bladder is available.

3. Safely jump from a height into the water

Avoid staying in the water for one second longer than you need to. Body heat will be lost to the surrounding water more rapidly than it can be generated. This leads to hypothermia (cold exposure), unconsciousness and death. Wearing extra clothing will help delay the start of

Hypothermia.

Get into the liferaft as soon as possible. When you are in the water, whether or not you are in a liferaft, try to stay near the boat. It may not sink and you may be able to reboard. If it stays afloat, searches will be able to spot it more easily than they can spot you. Staying close to the boat also keeps you closest to the position reported in your distress call. If you cannot get into a liferaft, do not swim aimlessly; swimming increases heat loss. Remain as still as possible using flotation to keep you high in the water. Heat loss occurs much faster in water than in air, so the more of your body you can keep out of the water the better. Now is the time to inflate the external bladder on your exposure suit by means of the mouth tube. You may be able to get on top of floating debris (a lifebuoy, a board, even a dead body) to help keep you out of the water.

If you don't have an exposure suit, use the H.E.L.P. (heat escape lessening posture) technique. If your exposure suit or PFD has a whistle attached, use it to attract attention. You may not be visible, but using the whistle will enable you to let others know where you are. If you have taken the time to prepare a personal survival kit, you may have other signalling devices that will boost your chances of rescue. Use them wisely. If possible, form a group with other survivors in the water. There is safety in numbers, and a group is more easily located and more likely to maintain morale. Huddling together will also decrease heat loss.

BOARDING THE RAFT FROM THE WATER

Boarding a liferaft from the water without help is hard. Pull yourself in head first using the boarding ladder and lifelines at the raft entrance to get your upper body aboard. It may help to bob down and use the buoyancy of your PFD or exposure suit to help lift you out of the water. Once your upper body is on the buoyancy tube, there should be internal lifelines to help you pull yourself all the way in. Try to pull yourself in with the boarding ladder and lifelines rather than the canopy, which could be torn by your weight.

GETTING AN INJURED MAN INTO THE RAFT

If one of your crewmates is injured and unable to help himself aboard the raft, pull him in carefully to avoid aggravating his injuries. Hold him so he is facing the raft until you get his upper body aboard. Pulling him in with his back to the raft could harm him if he has a back injury. Once his hips are resting on the buoyancy tube, gently turn him until he is on his back and pull him into the raft. Keep him lying on his back until you have determined the extent of his injuries.

RIGHTING A CAPSIZED RAFT

One person can easily right a capsized raft if it is done soon enough, before the canopy fills with water. Swim to the side marked Right Here. If there is no marking, go to the side with the CO2 cylinder. Maneuver the cylinder side of the raft so that it is downwind, then reach up and grab the righting strap. Start by pulling yourself up onto the raft. It may help to kick your feet out as if swimming. If this doesn't work, try putting your feet or knees into the external lifelines to help you pull yourself up on the raft. Some rafts may right while you are climbing onto them. If not, stand on the very edge, where the CO2 cylinder is located. Lean back with all your weight and pull on the righting strap. If the canopy is clear of the water, the raft will begin to follow you. If the raft is large, it will land on top of you unless you spring backwards just as the raft begins to right. If the raft does land on top of you, don't panic. The bottom of the raft is soft and flexible and your head will form an air pocket. Stay face up, catch a breath of air and pull yourself out from underneath. If you try to swim out face down, your PFD or exposure suit could get hung-up and make it difficult for you to get free.

RIGHTING A CAPSIZED RAFT WITH WATER TRAPPED IN THE CANOPY

If the inverted canopy fills with water, the raft will be more difficult to right. Put as many people as you can on the righting strap and try to pull it over. If you still can't right it, you may have to cut a hole in the non-vulnerable part of the canopy, taking care not to deflate the canopy or the raft.

SURVIVING ABOARD THE LIFERAFT

If your boat is still afloat, remain secured to it unless fire or some other danger means that you must cut the painter. There are two good reasons for remaining attached to your boat.

- It may not sink, and as long as it remains afloat it is a potential form of shelter. If it sinks in shallow water, it may serve as an anchor for the liferaft.
- Staying close to your boat keeps you closest to your distress position and makes you easier to spot both visually and on radar.

If you decide to cut the painter, use the safety knife stowed near the entrance. Its curved blade is designed to avoid accidental damage to the raft. If there is more than one raft in the water, tie them together with doubled rescue line. Again, there is safety in numbers. You will have more survival gear between the two, and it is easier to spot two rafts than one. If there are heavy seas, leave adequate slack between the rafts. When rafts are tied by a short line in big seas, they tend to snatch, which may allow wind to get underneath and cause a capsize. Look for other survivors. The survival pack aboard the raft should include a flashlight that will aid a night search and serve as a signalling device. Look for lights or reflective tape on other life-

saving equipment. Listen for whistles. If it is necessary to swim to a survivor, use a safety line because the raft will drift faster than you can swim.

If you have cut the raft free of the vessel, check to be sure that your sea anchor or drogue has been deployed. Liferafts can drift rapidly. The sea anchor reduces the rate of drift and assists the search by reducing your distance from your distress position. The sea anchor is deployed automatically on many rafts, and there is usually a spare packed aboard.

Close the liferaft entrance when everyone is inside to keep out the cold and wet and keep in the warmth generated by the occupants. Leave only a small opening for ventilation. Post a look-out.

Rafts are made so that you have the choice of pumping the floor up with air or not. This is because in tropical climates, the water under the raft will help cool the inside. In northern latitudes, regardless of the time of the year, you should pump up the floor with the hand pump inside the raft. Some rafts have seating positions which also must be pumped up by hand. Inspect the liferaft for damage. If there are leaks, use the repair clamps. Take seasickness tablets as soon as possible. Even hardened sailors are probably going to get seasick on a raft, and seasickness results in loss of body fluid and incapacitation. If you have an EPIRB make sure it is working. Leave it on, don't switch it on and off or work the switch unnecessarily. If you have a hand-held VHF radio, transmit distress messages to help rescuers home-in on the signal. Any portable two-way radio available should be taken aboard the raft.

Distress flares and rockets should be used sparingly, and only where there is a likelihood of their being seen. If they are sighted by a searching aircraft, it may be some time before rescue is at hand, but your location will be known. Lash down all gear so that in case the raft capsizes or is swamped, nothing is lost. If a metal radar reflector has not been supplied, metal paddles can be used to reflect radar signals, but a raft is never a good radar target. Recovering survivors in a raft usually depends on visual sighting. Never waste your distress signals, flash light batteries, etc. Distress signals should only be used with the permission of the leader, and only when there is a reasonable chance that they will be seen. Use the whistle and shout in thick weather.

USE OF THE SEA ANCHOR OR DROGUE

Your liferaft should have a sea anchor or drogue, which is used to reduce the rate of drift away from the distress position, and thereby reduce the likely search area. The drogue is normally attached to a strong point on the raft and lightly lashed so that it is released automatically when the raft is launched. A spare drogue is usually stowed with the other equipment. It is essential to use the drogue continuously, hence the drogue and its line should be inspected frequently.

By varying the point of attachment, the drogue can be used to alter the position of the raft openings relative to the seas. The drogue can thus help you gain more shelter, or better

ventilation. If both drogues in the liferaft have been lost, every attempt should be made to jury-rig another using whatever is available on the raft, for example: paddles tied to lifejackets, discarded clothing or a pair of trousers with legs tied and the waist held open. You may be able to use a section of the raft canister if it has been retained. Or, temporary drogue can be made using two buckets and a heaving line. With the bight of the heaving line inboard, make each end fast to the handle of a bucket (and around the bucket, for safety), and pay out one bucket on each bow. Until recently, liferaft drogues have not been rigged with tripping lines, although such lines are now being installed on Coast Guard approved rafts. If there is no trip line and you need to increase your rate of drift (to clear obstacles to reach a landfall, for example), the liferaft must be hauled up to the drogue, which must then be removed from the water.

TREAT ALL INJURIES

You must assess and treat serious injuries with one exception. You cannot perform the chest compressions required for cardio-pulmonary resuscitation (CPR) because of the soft floor of the raft. A suggested method of performing chest compressions is to place the victim on his back, on top of another crewman. The man on the bottom wraps his arms around the victim's chest, locks his hands and performs the chest compressions as if he is giving a bear hug.

Where crewmen are recovered from the water apparently drowned, mouth-to-mouth rescue breathing should be started immediately and continued until help arrives, or you are too exhausted to continue. In cold water (below 21°C / 70°F), near-drowning victims have been revived after being submerged for as long as an hour because of a body response known as the mammalian diving reflex. It is the same response that enables whales and seals to remain underwater for long periods. Don't give up on a neardrowning victim.

INITIAL SITUATION IN THE LIFERAFT

Immediately after abandoning ship and gaining the shelter of a liferaft, survivors are likely to be cold, wet, exhausted, and suffering from varying degrees of shock. Mental and/or physical let-down leading to collapse is likely at this stage, but you must maintain your self-control and your will to live if you are going to survive.

At this point, you will be faced with multiple problems and you must decide the order in which you deal with them. Inventory and shelter are high priorities. You must be sure that all survivors have found the liferaft, and make it a real shelter by insulating it against the cold. You must treat serious injuries and seek to prevent seasickness. And, you should examine the equipment and supplies carried aboard the liferaft, and read the instructions for their use. If there are enough hands, several actions may be accomplished simultaneously. You must establish the priorities keeping in mind the seven steps.

PRESERVATION OF BODY HEAT

Remember that cold is the greatest killer. Every attempt should be made to pump or ball out the liferaft, and to dry out the interior by using the sponges provided in the survival pack, extra clothing, etc. If your clothing is wet, remove it, wring it out as dry as possible and put it back on.

In general, clothing should be shared among survivors, but take special care of the sick and injured. Waterproof or windproof clothing should be made available to those on lookout duty in the open.

Once the liferaft has been dried out as much as possible, make every effort to raise the body temperature of the survivors. This is vital in cold weather or when survivors have had prolonged immersion in the water. Keeping dry also helps guard against immersion foot (also known as trench foot). Close the canopy entrances, inflate the floor and have the survivors huddle together to warmth. The body heat of the occupants will raise the temperature inside the raft and maintain it. Tests in sub-zero temperatures have shown that the temperature inside a liferaft can be raised to 16°C / 60°F inside an hour.

LEADERSHIP AND MORALE

Good leadership and high morale are crucial for survival. Good leadership creates high morale, and the leader must take on the responsibility of keeping the other survivors as organized, calm and comfortable as possible.

The vessel's officer will normally be the leader aboard the liferaft, unless he is injured or missing. In some survival circumstances, however, unlikely leaders emerge. The leader should be the person who is in the best physical and emotional shape to establish priorities and maintain morale. If you are in charge, it is important for you to communicate with the other survivors. You must reassure them and assess who is best able to carry out vital tasks. Do everything you can to reduce fear and panic. Use the materials in the liferaft to show the survivors that there is shelter, means of signalling, water and food. Try to establish a sense of companionship and a firm but positive level of discipline. If you must deal with someone who has lost his emotional control, don't let him disrupt the rest of the crew. It may help to give him an aimless task. One survival instructor suggests rigging a fishing line with a weight but no hook (which may tear the raft), throwing the weighted end over the side and instructing the man to catch a fish.

While the leader has the greatest responsibility, each survivor must strive to maintain a positive attitude and carry out the tasks which he is assigned. The survival of the group depends on each man's contribution, and it is here that preparation and training pay off. A man who has foreknowledge of survival procedures and can focus his mind on constructive tasks is much more likely to make a positive contribution than one who has only his panic for

company.

In striving to maintain morale, don't forget that one of the seven steps is play.

ESTABLISH THE ROUTINE

The discipline of a routine not only helps ensure that vital tasks get done, but helps focus attention on the positive work of survival. The following suggestions should help you establish a routine:

-- Assign one-hour watches in pairs, with one man on duty outside and one man on duty inside.

OUTSIDE

- a. Look for ships, survivors, aircraft and useful wreckage.
- b. Flash the signalling mirror all around the horizon when there is sunshine. Someone else can see your mirror before you can see them.
- c. Look for land. At night, listen for surf.

INSIDE

- a. Maintain the liferaft (bailing, drying, ventilation, etc.)
- b. Attend to injury victims.
- c. Maintain equipment.
- d. Keep rations.

Keep the minds of the survivors occupied during waking hours, but don't overdo it. Avoid unnecessary work.

WATER USE

Your body is about 70 percent water. Maintaining your body's water balance is a prime requirement for survival. Remember that water is a higher priority than food. You can probably live for weeks without food, but your survival will be measured in days if you have no water. Because the digestion of food drains needed water from your body, don't eat if you have no water. Every bit of water you conserve, even perspiration, increases your survival time.

While conserving water is vital, however, so is maintaining enough physical strength to cope with the ordeal of survival. Survival experts recommend that you begin drinking rationed quantities of water soon after boarding the liferaft, the amount depending upon how much you have been able to bring aboard. They suggest drinking one half of the daily ration at a time, rather than sipping very small quantities.

Thirst may be reduced by chewing a gum, or practically anything else. However, this relief

does not reduce the body's need for water.

Drinking seawater will exaggerate thirst, promote water loss through the kidneys and intestines, and shorten your survival time. Under conditions of lack of water, urine is too toxic to drink and will also cut down your survival time. Alcohol will promote heat loss through the skin and water loss through the kidneys. Drinking alcohol under the conditions of lack of water is suicidal.

First Day Abstinence Drink no water on the first day. This causes the body to activate water-saving mechanisms. Thereafter, you need to spread out your consumption of drinking water in sips throughout the day, to help minimise urination.

Coping with salt-water boils If you're adrift for weeks, you may develop salt-water boils on your buttocks, knees, elbows and hands, caused by the constant rubbing on the wet raft floor. Don't wear clothes over them, and try to wash them in rainwater. Do not squeeze the pus as this hinders healing

5 Survival in Water with Life Jacket

Any person involved in an emergency should strive to remain alive. It is known that the body loses its heat twenty six times higher when immersed in water than when kept in a dry environment. For this reason a waterproof suit must be considered extremely essential for survival. However, for persons finding themselves in water, the following actions are recommended:

- (a) **Avoid Unnecessary Swimming.** This will only use up valuable energy and increase the body's heat loss to surrounding water.
- (b) **Float on the Surface in a HELP.** (Heat Escape Lessening Posture) *position* with the knees clasped up against the chest. This position conserves body heat.
- (c) **Secure the Face Visor of your Lifejacket if Attached.** Failing this, protect your airways against breaking seas by using your hands to form a face bar.
- (d) **If there is More than one Person, Group Together.** There is safety in number as you are making a larger target when grouped on the surface. If survivors form a circle group, free flowing water is restricted in the centre of the circle and the loss of heat is reduced. Casualties can also be kept warmer by being placed in the middle of the circle and supported by the others. Lifelines fitted to certain suits can also be employed to link survivors together.

(e) ***Keep your Morale up. Keep the will to Survive.***

(f) **Maintain as much of your Body out of the Water as Possible.** Throughout and avoid panic actions.

