PONDICHERRY MARITIME ACADEMY
Approved by DG Shipping India

BASIC OFFSHORE SAFETY INDUCTION AND EMERGENCY TRAINING (BOSIET)

Scope

The emergency training that is offered to people who work in an offshore facility or are about to join offshore vessels is known as BOSIET (Basic Offshore Safety Induction and Emergency Training). BOSIET is a very simple training program that covers all major and minor points of safe working in the offshore facility.

COURSE CONTENT

1. Introduction
    - 1.1 Basic Safety induction
    - 1.2 Offshore hazards & its effects
    - 1.3 PPE requirements
    - 1.4 Role of medic & Medicines
    - 1.5 Alcohol and substance abuse policy.
2. Helicopter safety & escape
    - 2.1 Actions for ditching and an emergency landing
    - 2.2 Donning a survival suit
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3. Sea survival
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    - 3.2 Body posture during helicopter winching
    - 3.3 Survival techniques
    - 3.4 Boarding a marine liferaft
    - 3.5 Survival First aid
4. Firefighting & self rescue

1. Introduction

The BOSIET emergency training is offered in all countries. The training that is imparted contains both theory and practical application so that the learner can understand all the aspects easily. The total hours of training comes to around 22.5 hours. In order to certify that a person has successfully completed the training, a certificate is issued to the person.
Working in offshore areas is very difficult. But, as much as risky offshore drill areas are, it cannot be denied that they are equally necessary. This is why with the help of BOSIET a very important preventive measure towards reducing the chances of any human loss is carried out.

The various aspects of the BOSIET training program can be explained below:

1. First step in the offshore training program is about Safety Inductions
This aspect deals with all the necessary steps that a newly inducted person is required to follow while working in the oil drill. Points on how to react in case there is any emergency situation like fire, accidents of waste-water disposal systems and drugs and alcohol abuse are covered under this BOSIET head.

2. Second step in the BOSIET emergency training about Safety and Escaping
This point covers all about training a person on how to board a helicopter in case of an emergency, how to use breathing equipments in case of any hazard and how to help co-workers during a critical situation.

3. Sea Survival is the third aspect of BOSIET
This includes the point of knowing when to abandon the offshore drill and how to survive in the high sea for extended periods of time until rescue operators arrive on the scene.

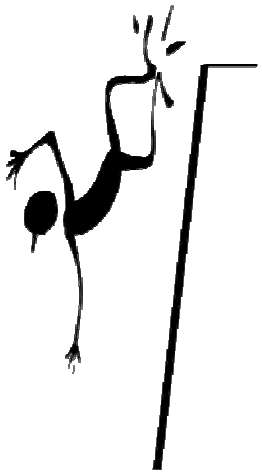
4. Fire fighting and Self-Rescue is the fourth point covered by BOSIET
Fire fighting application in offshore drill areas includes knowledge about operating hoses and other smaller fire extinguishers. In addition, workers also need to know about the causes and reasons for the start of fire. Other points in the fourth BOSIET emergency training deal with individual safety in case of reduced sight due to smoke.

1.1 Basic safety induction

1.1.1 Offshore Accidents

- falls from height
- fire and explosion
- exposure to a hot or harmful substance
- trapped by something collapsing or overturning
- contact with electricity or electrical discharge
- struck by a flying/falling object during machine lifting of m
- contact with moving machinery or material being machined

1.1.2 Height HAZARDS on offshore



- Using ladders or scaffolding without proper fixing is crazy
- Never use incomplete scaffolding.
- Make sure there are hand rails and toe boards at all edges
- Things fall on sites, wear your helmet
- Before starting work at heights check for clearance from any overhead power lines

1.1.3 LETHAL LADDERS:

Ladders kill a lot of people.

Make sure the ladder is:-

- Right for the job.
- In good shape
- Secured near the top
- On a firm base and footing 4 up – 1 out
- Rising at least 1 meter beyond the landing place OR that there is a proper hand hold

Always have a firm grip on the ladder and keep a good balance

1.1.4 CRANE SAFETY

- The weight of the load must be carefully estimated.

- The crane must be fitted with an automatic safe load indicator.
- The crane must always work on a hard, level base.
- The load must be properly fixed and secured.
- The operator must be trained to give clear signals.
- NEVER,NEVER be carried with a load.

1.1.5 ELECTRICITY

- Treat electricity with respect
- Check constantly that cables are not damaged or worn
- Keep trailing cables off the ground and away from water
- Never overload or use makeshift plugs and fuses

1.2 Offshore hazards and its effects

1.2.1 Health risks

The primary objective of occupational health is to protect the health of employees from adverse effects of work activities. There are five main groups of health hazards in the offshore oil and gas industry:

- musculoskeletal disorders (manual handling, ergonomics)
- hazardous substances
- physical hazards (noise, vibration, asbestos and radiation)
- biological hazards (food/water hygiene)
- psychosocial hazards (stress)

1.2.2 Biological hazards

Food-poisoning outbreaks are typical manifestations of biological hazards in the offshore workplace. They tend to occur more commonly in less developed areas, often related to poor hygiene associated with water dispensers, ice makers and ice cream machines. Also galley space can be limited, so cold storage can be deficient. Airborne diseases can spread rapidly through ventilation systems on offshore installations because accommodation is pressurized and living space is usually at a premium.

Robust health risk management is required to control health risk from potential Legionella contamination of water pipes, particularly in showers of accommodation blocks and air-conditioning plants.

1.2.3 Chemical hazards

Benzene is a natural component of crude oil and natural gas, a few studies have reported data on benzene exposure. Substances, such as hydrogen sulphide (H_2S), are usually well controlled through sealed systems, permit to work systems, gas purging, area and personal monitoring, training, emergency plans, etc.

In the past, the composition of drilling 'mud' had considerable toxicity for both the humans and the environment. However, the composition has changed over the years, with a general trend to materials of lower toxicity.

1.2 4 Ergonomic hazards

Ergonomic health issues are usually associated with the musculoskeletal system and principally the upper limbs, neck and lower back. They can also be associated with impaired visual function arising from working on visually demanding tasks over extended durations with inappropriate task lighting.
The critical factor that identifies a health issue as being 'ergonomic' is that the injury arises because the way the environment and equipment are arranged requires people to adopt postures, movements, apply force and read material in conditions that are potentially damaging to health in order to complete what is expected of them in the normal course of their work.

1.2.5 Psychological hazards

Psychological hazards are different from other occupational hazards (e.g. noise and chemicals) because

- The level of stress within an organization varies both rapidly and significantly over time;
- Stress occurs in hot spots in an organization and is rarely uniform;

Nevertheless, it is possible to identify stressors that are common to the offshore environment that require special attention. Examples include work overload, lack of job clarity and frequent change. Also relevant are prolonged periods of limited interaction with people (phone, Internet, etc.), poor leisure activities, limited sleep quality and quantity (as a result of shift patterns and noise). The increased use of higher risk methods of transport (e.g. helicopters) can also increase perceived levels of stress.

1.3 PPE requirements

Personal protective equipment includes all equipment and accessories to the equipment that the employee uses to protect himself against dangerous conditions during work.
Offshore workers must wear at least:

- ❖ Safety helmet
- ❖ Safety Boots
- ❖ Safety gloves
- ❖ Safety Glasses

Wear them always for your safety.

1.3.1 MANDATORY PERSONAL PROTECTIVE EQUIPMENT

The following must be worn by all personnel when outside the accommodation area:

- ❖ Orange/red coverall or coat/trousers as outer wear.
- ❖ Hard hat w/ear protection
- ❖ Protective gloves
- ❖ Safety glasses or CE approved personal glasses w/side protection. For maximum protection, the glasses should fit the shape of face to the extent possible.
- ❖ Protective footwear, ankle boots or higher with lacing

1.3.2 Eye protection for special jobs

- Face shields and/or chemical glasses shall be worn when handling chemicals
- Approved types of hood w/ear protection and fresh air supply shall be used when sandblasting
- Face shield or goggles shall be used when doing high pressure water washing
- Welding masks /fresh air supply shall be used for all welding

1.3.3 Protection against chemicals

Chemical protection equipment shall be used in accordance with recommendations in approved Material Safety Data Sheet for the substance concerned
Protection against hazardous chemicals consists of:

- Aprons
- Gloves
- Eye/face protection
- Footwear
- The user must make sure that the personal protective equipment and chemical protective equipment is appropriate and gives protection against the chemicals it is meant to protect against.

1.3.4 Fall arrest equipment

Safety harnesses used shall be worn as fall arrest equipment.

Handling fall arrest equipment

- Fall arrest equipment shall be checked according to requirement in the BP lifting equipment manual to secure that the BP fall arrest equipment is marked with the name of the department and has a unique number controlled and marked with the control tag with the date for last inspection.
- It must be kept in a separate cabinet when not in use.
- The contractor's offshore representative shall ensure that all fall arrest equipment belonging to the contractor is marked with the name of the department and has a unique number.
- It should be certified and marked with the colour code of the year.
- Fall arrest equipment shall be cleaned with mild soapy water and hung up to dry.
- Water jetting is not allowed as it may damage the fibers and seams.

1.3.5 RESPIRATORY PROTECTION

Equipment such as

- Portable compressed air apparatus
- Airline equipment connected to permanent compressed air supply which gives complete respiratory protection.
- To be used when necessary for complete protection against the ambience.
- When entering vessels/closed rooms, complete respiratory equipment must be used.
- Users of complete respiratory protection equipment must have undergone necessary training and be familiar with the use of such equipment.
- Users who have a beard must only use overpressure masks.

- ❖ Air line apparatus can be connected to the instrument air system provided that the instrument air system is protected against suffocating/toxic gases entering the system.
- ❖ An approved filter is installed between the instrument air outlet and hose connection.

1.4 Role of medic & Medicines

1.4.1 Offshore medicines

Never use another person's medication. They have been prescribed by a doctor for a specific patient's condition but could be harmful to other people.
If you are taking medications, you will not be allowed to work at an unmanned destination where there is no medic present.
For reasons of space, we can't go on to write about every possible drug that you might be taking and how they can affect your ability to work offshore. However, here is some useful information about several medications:

Medicines – Need permission

Type of Medicines

- Antidepressants – For controlling depression
- Epipen – self administration of adrenaline in acute allergic emergencies (anaphylaxis)
- Immunosuppressants – diminish the activity of the body's immune system
- Painkillers – Killing/reducing the pain
- Sleeping pills – For sleeping disorders
- Warfarin – Warfarin is an anticoagulant medication that helps prevent blood clotting and is used to treat several conditions. Your medic needs to know if you are taking Warfarin because of the danger of an injury causing a haemorrhage due to the blood-thinning effect of the drug.

1.4.2 Role of offshore medic

Primary role of medics, which are summarised below

- ❖ Treatment of injury and illness including:
- ❖ On-site first aid;
- ❖ Skilled treatment under the directions of a registered medical practitioner
- ❖ Arrangement of evacuation of a patient and liaison with onshore medical services; treatment of divers under pressure Consultations over minor ailments.
- ❖ Giving assistance in implementing emergency plans.
- ❖ Giving advice on occupational health and on the provision of a healthy living and working environment.

Secondary role of medics

- Giving advice on health-based risk assessments under other regulations, such as those relating to hazardous substances, manual handling and noise.
- Undertaking routine health surveillance as required by COSHH.
- Monitoring food and water hygiene.
- Providing basic first aid training.
- Providing refresher training on the use of defibrillators to offshore first aiders.
- While performing a secondary duty, the medic must always be immediately available to respond to emergencies;
- The use of a medic as a radio operator or as a helicopter landing officer may mean that in an emergency, the medic is expected to carry out two key roles simultaneously. The medic should only undertake such tasks if there is adequate provision for trained backup to promptly take over should a medical emergency arise.
- A medic may not be able to work as a steward because this could compromise the hygiene needs of a medic's primary role.
- A medic working as a food handler could compromise the hygiene needs of both food handling and the medic's primary roles.
- Any secondary duties may be physically demanding. Fatigue would compromise a medic's ability to carry out their duties.

1.5 Alcohol and substance abuse policy

- The rule for offshore personnel when onboard a vessel, platform or rig, is that their blood alcohol level shall be zero tolerance when joining or checking in at heliport.
- Whilst offshore, it is prohibited to produce, supply, offers to supply, possess or consume any alcohol at any work location.
- Off duty contractors assigned to a vessel in port, but not expected to sail immediately, are reminded that sailing plans are often changed at short notice.
- Contractors assigned to base will not be permitted on companies, premises if it is thought the contractor is not in a fit and safe to work condition due to alcohol.
- Solvents & Other Substances
- The abuse of solvents or other substances by contractors is forbidden whilst on duty at any work location.

1.5.1Drug and Alcohol Testing

Workplaces can often be faced with dilemmas concerning drug and alcohol use. While the potential risks and dangers are understood, few companies have adopted a policy robust enough to manage this effectively.

Drug and alcohol testing for employers is a critical service that helps improve health and safety at work.

For employees it is equally critical, as the result of a test could have a significant impact on their career.

1.5.2 Alcohol testing - alcohol testing is done using a calibrated breathalyser similar to those used by police forces. The units used by Abermed are calibrated regularly to ensure their accuracy and reliability.

2. Helicopter safety & escape

2.1 Introduction to Helicopters

- Helicopters can fly in rougher weather than fixed-wing aircraft, and they can deliver injured passengers directly to hospitals or other emergency facilities. Helicopter that is capable of air-sea rescue can take part in a wide variety of other operations including those on land.

2.2 Helicopter Emergencies

Emergency such as:

- Tail Rotor Failure While Hovering (Autorotation)
- Electrical Fire
- Engine Fire
- Ditching
- Alternator / Generator failure
- Shaft failure
- Ditching

- **DITCHING**
  Emergency landing or forced landing of helicopter on water is known as ditching.

During a ditching, it will most likely be every-man-for-himself in escaping from a sinking aircraft.

2.3 Survival may depend on one's ability

- To protect himself from an incapacitating injury
- To successfully locate and operate emergency exits
- To reach the water's surface with all the needed survival equipment, within the limited time span of a breath of air.

2.4 Points to remember during ditching

- You may become disorientated if the helicopter is rolling.
- As it sinks keep a tight grip on your exit, this is your lifeline.
- keep calm and concentrate on how you are going to get out.
- Helicopter windows are strong plastic, normally held in by rubber beading.
- Don't try to smash them, kick them out with your feet.

2.5 Actions in event of Helicopter Ditching

- Inflate lifejacket on LEAVING helicopter.
- Release your buckle, you will immediately float.
- Use your grip on the exit and pull yourself out.
- Don't swim, you increase your chance of becoming entangled.
- If necessary observe the air bubbles as to which way is up.
- Move to board liferaft when instructed.
- Assist others in liferaft.

2.6 Seven steps to escape from a submerged helicopter

- Step 1: Don't panic-Maintain a positive mental attitude, focus on what's actually needed to be done.
- Step 2: Inflate personal life vest-Establish buoyancy, help others to do the same.
- Step 3: Assist others out of the aircraft – Be careful not to become tangled in crash debris.
- Step 4: Account for all aircrew and passengers-Keep everyone grouped together.
- Step 5: Attend to life threatening injuries-breathing in the first priority.

- Step 6: Extract emergency equipment from helicopter-Be careful not to become tangled in crash debris, inflate raft.
- Step 7: Board raft- Assist all injured survivor

2.7 Immersion suits

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. They usually have built-on feet (boots), and a hood, and either built-on gloves or watertight wrist seals.

2.7.1 Donning instructions of immersion suit

- Take it
- Open it carefully
- First put your legs inside
- Pull the runner zip
- Wear the head cover & tight with your chin.(wear lifejacket)
- Jump to the water

2.8 ESCAPE BREATHING DEVICE (EBS)

Emergency breathing systems is another tool which will assist you in ditching situations. The extra minutes the purpose built compressed air bottle gives you makes it worth its weight in gold... but it may as well be made of lead if you don't know how to use it properly and safely.
It is a compressed air system, similar to a SCUBA (self-contained underwater breathing apparatus).

2.8.1 COMPRESSED AIR SYSTEM

- Working pressure 1800 lbs psi - 3400 lbs
- Volume 42 litres - 80 litres
- System weight approximately 3 lbs.
- Regulator - first stage
- Demand valve - second stage
- Duration of air supply approximately 21 breaths at 21 feet

2.8.2 EBS Performance

To be effective, EBS must be:

- Simple in design
- Quick to deploy
- Easy to use in realistic conditions:
  - Cold water
  - Whilst inverted or prone in the water
  - Whilst escaping through exits/escape windows
- Compatible with other equipment
- Provide an overall safety benefit

3. SURVIVAL AT SEA

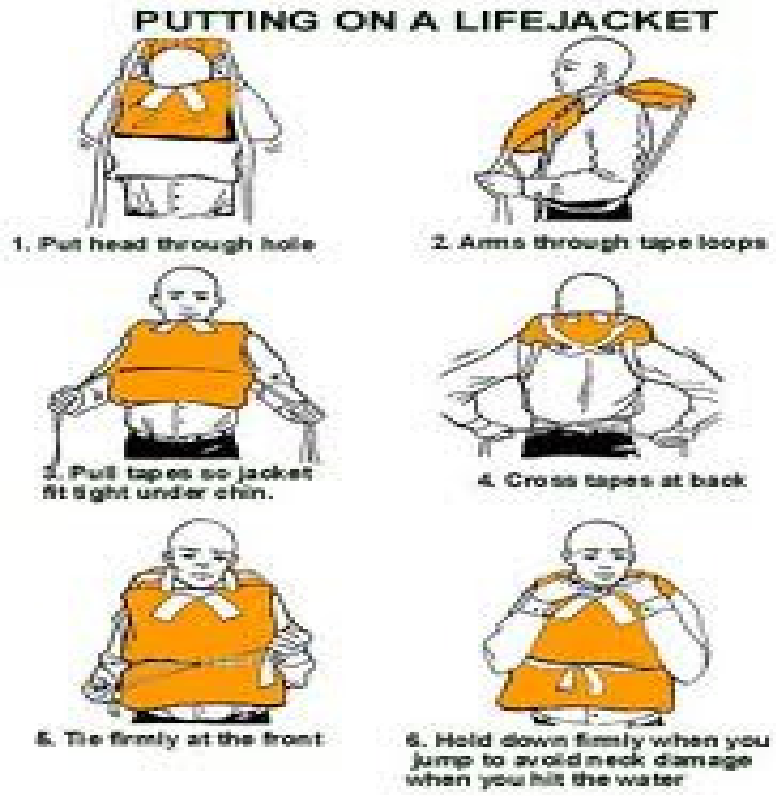
3.1 Permanent buoyancy Lifejacket donning
3.2 Body posture during helicopter winching
3.3 Survival techniques
3.4 Boarding a marine liferaft
3.5 Survival First aid

3.1 Lifejacket

A lifejacket is a type of personal flotation device designed to keep a person's airway clear of the water whether the wearer is conscious or unconscious.

3.1.1 Lifejacket Donning Instructions

1. Put head through hole
2. Arms through tape loops
3. Pull tapes for tight under chin
4. Cross tapes at back
5. Firmly at the front
6. Hold down firmly when you jump to avoid neck damage



3.2 Body Posture during Helicopter winching

3.3 Sea survival techniques

3.3.1 Swimming

Swimming in a sea is completely different from swimming in a regular pool.
You will need to prepare properly and use the right measures for staying safe when you are swimming in the sea though.

3.3.2 HELP (Heat Escape Lessening Posture)

The HELP position in swimming is a survival method used to conserve heat if you have fallen in to cold water.

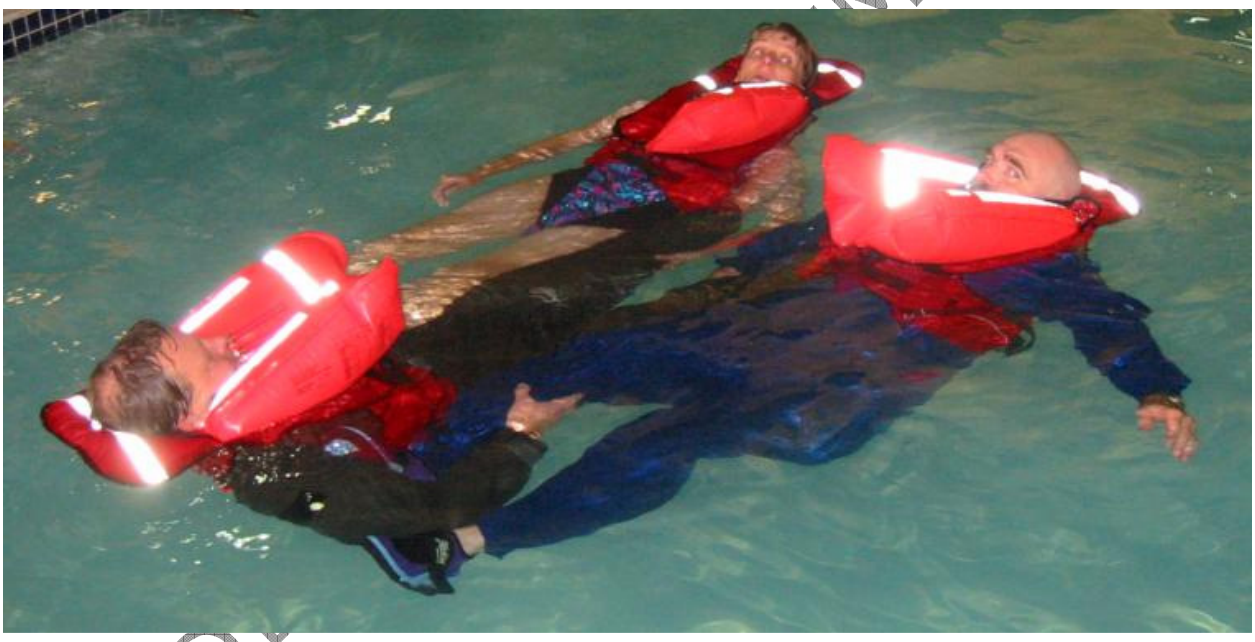
- Draw the knees up to the chest.
- Keep the face forward and out of the water.
- Hold the upper arms at the side
- Fold the lower arms across the chest
- Hug yourself and put your hands under your armpits.

3.3.3 Huddle position

The HUDDLE position is used as a heat conservation method in cold water.
A small group circles and stays close, by doing so, the water inside the circle is much warmer from the given off body heat, allowing people of the circle to avoid hypothermia longer.

3.3.4 Human Chain

3.3.5 Human Carpet



Survival Factors in Cold Water

- Will to Live - Most important in all survival situations.
- Flotation - Personal Flotation Device (PFD) essential.
- Heat Retention - Clothing / Raft / Survival Gear

3.4 Life raft

3.4.1 Boarding a marine liferaft 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 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.

3.5 SURVIVAL FIRST AID

3.5.1 What is First Aid?

First Aid is the immediate treatment given to the victim of an accident or sudden illness, before medical aid is obtained.

3.5.2 Aims of First Aid

The main aims of First Aid are:

- To preserve life
- To promote recovery
- To prevent the worsening of the victim's condition

3.5.3 Principles of First Aid

The First step that a rescuer should take is to examine the victim to know the details of injuries and their nature. This constitutes the Diagnosis section of First Aid.

The next step is to actually perform the First-Aid measure or manoeuvre that is deemed appropriate. This constitutes the Treatment section of First Aid.

The third step is to arrange for the casualty to be seen by a qualified doctor or have him shifted to a nearby hospital.

3.5.4 Possible hazards when survival at sea

- ❖ Heat stroke
- ❖ Sea sickness
- ❖ Sun burn
- ❖ Shock
- ❖ Dehydration
- ❖ Hypothermia
- ❖ Burns & fracture
- ❖ Respiratory failure
- ❖ Sea snake bite
- ❖ Wound
- ❖ Bleeding
- ❖ Drowning

3.5.5 Sea sickness

Seasickness is the nausea and vomiting caused by the motion of the raft.
It can result in

- ❖ Extreme fluid loss and exhaustion.
- ❖ Loss of the will to survive.
- ❖ Others becoming seasick.
- ❖ Attraction of sharks to the raft.
- ❖ Unclean conditions.

First aid for seasickness

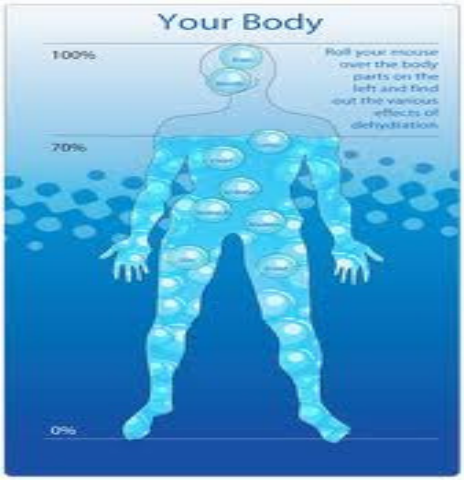
- Wash both the patient and the raft to remove the sight and odor of vomit.
- Keep the patient from eating food until his nausea is gone.
- Have the patient lie down and rest.
- Give the patient seasickness pills if available. If the patient is unable to take the pills orally, insert them rectally for absorption by the body.

3.5.6 Dehydration

Dehydration is defined as excessive loss of body fluids.
It occurs when more water and fluids are exiting the body than are entering the body.

Causes:

- Vomiting
- Sweating
- Frequent urination
- Burns & Diarrhea
- Yellow fever also causes Dehydration



Symptoms of dehydration

The first symptoms of dehydration include thirst, darker urine, and decreased urine production.

Other symptoms include:

- Dry mouth
- Few or no tears when crying
- Weakness in muscles
- Headache
- Dizziness
- Unconsciousness
- Fever & Increased heart beat

Dehydration first aid

- Dehydration must be treated by replenishing the fluid level in the body.
- This can be done by consuming clear fluids such as water, clear broths, frozen water or ice pops, or sports drinks.
- People who are dehydrated should avoid drinks containing caffeine such as coffee, tea, and sodas.
- Dehydration should also be treated with the appropriate medication.
- This may include anti-diarrhea medicines, anti-emetics (stop vomiting), and anti-fever medicines.

3.5.7 Why to avoid drinking of seawater?

- Sea water has a high concentration of salinity (salt) which is a common food ingredient that causes dehydration.
- Salt is a natural dehydrator, of sorts.
- Hence, sea water, if consumed, causes dehydration

3.5.8 Shock

Shock is a condition of collapse, which should be treated as top priority, second only to attending to obstructed breathing, stoppage of the heart or severe bleeding.

Conditions in which shock is seen

- Severe Bleeding
- Heart Attacks
- Severe burns
- Severe Bacterial Infections
- Abdominal Emergencies
- Excessive Loss of Body Fluids
- Crush Injuries

First aid Shock

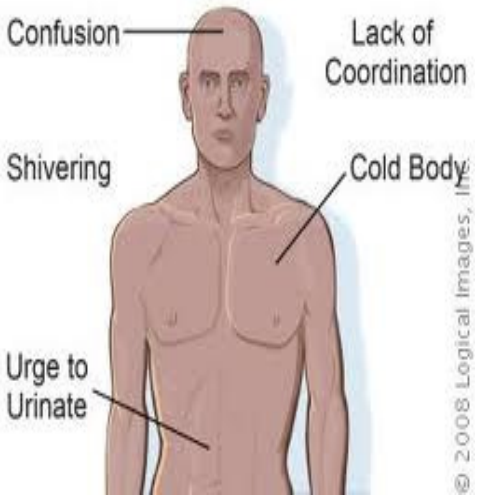
- Reassure the patient if the patient is conscious.
- Place the patient comfortably on his back.
- Loosen tight clothing but do not remove clothing.
- Wrap in light bed sheet or a thin rug.
- Do not rub any part of the body with anything.
- If the patient is conscious and there is no injury to the chest or abdomen, give a little water, hot coffee or tea. Never give any alcoholic drinks.
- Transport the patient quickly to the hospital.

3.5.9 Hypothermia

Hypothermia occurs when a person's body temperature drops below the normal range. People at sea can become hypothermic when they get wet and cold, and when they are in cool or windy places without proper clothing or protection.

Hypothermia contains 3 stages

1. Mild hypothermia (32.2oC to 35oC)
2. Moderate hypothermia (27.8oC to 32.2o C)
3. Deep hypothermia (<27.8oC)



Causes for Hypothermia

- ❖ Person fall into cold water
- ❖ Body exposed to the cold temperature for the prolonged period
- ❖ Diseases of the adrenal glands and pituitary gland
- ❖ Poor nutrition
- ❖ Parkinson's disease & alcohol toxicity

Treatment for hypothermia

- Check the ABCs, or the airway, breathing, and circulation of the patient.
- Do not begin chest compressions if the patient has any heart beat or pulse, even if it is very slow.
- Move the patient to a warm sheltered area as soon as possible.
- Remove any wet or cold clothing.
- Dry the patient and replace with dry warm coverings over and under the patient and around the head.
- As soon as possible, contact offshore medical personnel for further assistance.

3.5.10 Burns

Burns are injuries that result from dry heat like fire/flames, pieces of hot metal, contact with live wires, etc.

Degrees of Burn

The degree of burns indicates the degree of damage to the tissues.

- First Degree Burns: The skin is reddened.
- Second Degree Burns: There are blisters on the skin.
- Third Degree Burns: There is destruction of deeper tissues with scarring.

Why are burns Dangerous?

Burns are dangerous because:

- ❖ They can very quickly lead to shock in the immediate period following the burn due to loss of excessive fluids from the body.
- ❖ They produce intense pain.
- ❖ They lead to infection in the affected area.
- ❖ When they heal they leave scars behind, which are disfiguring and can restrict movements.

First aid for burns

- ❖ Cover the burnt area with a sterile or clean dressing and bandage.
- ❖ Keep the patient warm but do not over heat.
- ❖ Do not immerse the extensively burnt area or apply ice water over it because cold may intensify the shock reaction.
- ❖ However a cold pack may be applied to the face or hands or feet.
- ❖ Do not open the blisters on the victim's skin.
- ❖ Remove quickly from the body anything of constricting nature like rings, belt and boots.

3.5.11 First Aid for a Severe Spinal Injury

- ❖ Do not move the person unless his life is in danger.
- ❖ To immobilize the Head, Neck, and/or Back Tell the person to lie still and not move his or her head, neck, back, etc.
- ❖ Don't interfere with the person's breathing.
- ❖ If necessary, use both of your hands, one on each side of the person's head to keep the head from moving.
- ❖ Monitor for Bleeding and Shock.
- ❖ Keep the person warm with blankets, coats, etc.

3.5.12 ABC FIRST AID

Cardio-pulmonary resuscitation

Cardiopulmonary resuscitation **(CPR)** is a lifesaving technique useful in many emergencies, including heart attack or near drowning, in which someone's breathing or heartbeat has stopped.

CPR involves chest compressions at least 5 cm deep and at a rate of at least 100 per minute in an effort to create artificial circulation by manually pumping blood through the heart.

Steps for CPR

C-Circulation
A-Airway
B-Breathing

Circulation: Restore blood circulation with chest compressions

- Put the person on his or her back on a firm surface.
- Kneel next to the person's neck and shoulders.
- Place the heel of one hand over the center of the person's chest, between the nipples. Place your other hand on top of the first hand. Keep your elbows straight and position your shoulders directly above your hands.
- Use your upper body weight (not just your arms) as you push straight down on (compress) the chest at least 2 inches (approximately 5 centimeters). Push hard at a rate of about 100 compressions a minute.
- If you haven't been trained in CPR, continue chest compressions until there are signs of movement or until emergency medical personnel take over. If you have been trained in CPR, go on to checking the airway and rescue breathing.

Airway: Clear the airway

- If you're trained in CPR and you've performed 30 chest compressions, open the person's airway using the head-tilt, chin-lift maneuver. Put your palm on the person's forehead and gently tilt the head back. Then with the other hand, gently lift the chin forward to open the airway.
- Check for normal breathing, taking no more than five or 10 seconds. Look for chest motion, listen for normal breath sounds, and feel for the person's breath on your cheek and ear. Gasping is not considered to be normal breathing. If the person isn't breathing normally and you are trained in CPR, begin mouth-to-mouth breathing.

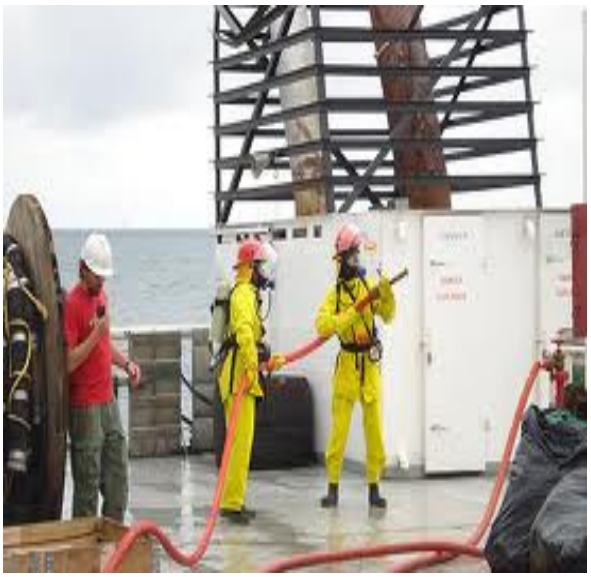
- If you believe the person is unconscious from a heart attack and you haven't been trained in emergency procedures, skip mouth-to-mouth rescue breathing and continue chest compressions.

Breathing: Breathe for the person

Rescue breathing can be mouth-to-mouth breathing or mouth-to-nose breathing if the mouth is seriously injured or can't be opened.

- With the airway open (using the head-tilt, chin-lift maneuver), pinch the nostrils shut for mouth-to-mouth breathing and cover the person's mouth with yours, making a seal.
- Prepare to give two rescue breaths. Give the first rescue breath — lasting one second — and watch to see if the chest rises. If it does rise, give the second breath. If the chest doesn't rise, repeat the head-tilt, chin-lift maneuver and then give the second breath. Thirty chest compressions followed by two rescue breaths is considered one cycle.
- Resume chest compressions to restore circulation.
- If the person has not begun moving after five cycles (about two minutes) and an automatic external defibrillator (AED) is available, apply it and follow the prompts. Administer one shock, then resume CPR — starting with chest compressions — for two more minutes before administering a second shock. If you're not trained to use an AED, a 911 or other emergency medical operator may be able to guide you in its use. Use pediatric pads, if available, for children ages 1 through 8. Do not use an AED for babies younger than age 1. If an AED isn't available, go to step below.
- Continue CPR until there are signs of movement or emergency medical personnel take over.

4. Firefighting & self rescue



4.1 THEORY OF FIRE

FIRE

Fire is the rapid oxidation of a material in the exothermic chemical process of combustion, releasing heat, light, and various reaction products.

Fire triangle is used to show the rule that a fire needs three things to burn.

- Heat
- Fuel
- Oxygen

If one of these three is removed, the fire will be put out.

4.2 ASSOCIATED TERMS AND DEFINITIONS

Auto Ignition: The ignition of a combustible material, without initiation by a spark or flame, when the material has been raised to a temperature at which self-sustaining combustion occurs.

Auto-ignition Temperature: The lowest temperature to which a solid, liquid or gas requires to be raised to cause self-sustained combustion without initiation by a spark or flame.

Boil over: A phenomenon produced when water falls on oil that is it temperature close to, or higher than the boiling temperature of water (100°C). Water gets converted into steam and rises with particles of oil in the form of a cloud, which get ignited instantaneously in an extremely dangerous manner. Such an occurrence can spread the fire and cause injuries to persons nearby.

BLEVE: Boiling Liquid Expanding Vapour Explosion is the phenomenon of bursting of a container (can/cylinder0, having liquid under pressure, when the container gets heated. Due to heating, some of the liquid inside the container gets vapourised giving rise to excessive pressure, which leads to explosion, and if the contents are flammable the consequences get worse. BLEVE can also occur when a flammable liquid under pressure gets released and vapourises and forms a cloud of explosive mixture, which has a similar effect of an explosion when it gets ignited.

Exothermic: Referring to the process which is accompanied by evolution of heat.

Explosion: The sudden release of a high-pressure gas into the environment.

Fire: A chemical reaction producing light, flame, and heat.

Fire Classification: A system of classifying fires in terms of the nature of the fuel (Class "A', Class 'B', Class 'C', & Class 'D' type of fire). There are two systems of classification, one as per International Standards Organisation (I.S.O) and the other by National Fire Prevention Association (N.F.P.A)

Flash point: the lowest temperature at which a liquid gives off sufficient inflammable vapour to produce a flash, when a small flame is brought to the surface of the liquid. It is measured in the laboratory in a standard apparatus using a prescribed procedure.

Flame: The glowing gaseous part of a fire emanating radiant heat.

Flammable/Combustible: capable of being ignited and of burning.

Ignition point: The ignition point is the lowest temperature at which the vapour above the surface of a liquid will ignite when a flame is brought near it. The surface of the liquid can then be considered to be alight.

Smolder: to burn sluggishly without flame and often with much smoke.

Spontaneous combustion: The ignition of material brought about by a heat producing (exothermic) chemical reaction within the material itself without exposure to an external source of ignition.

4.3 EXTINGUISHING MEDIA

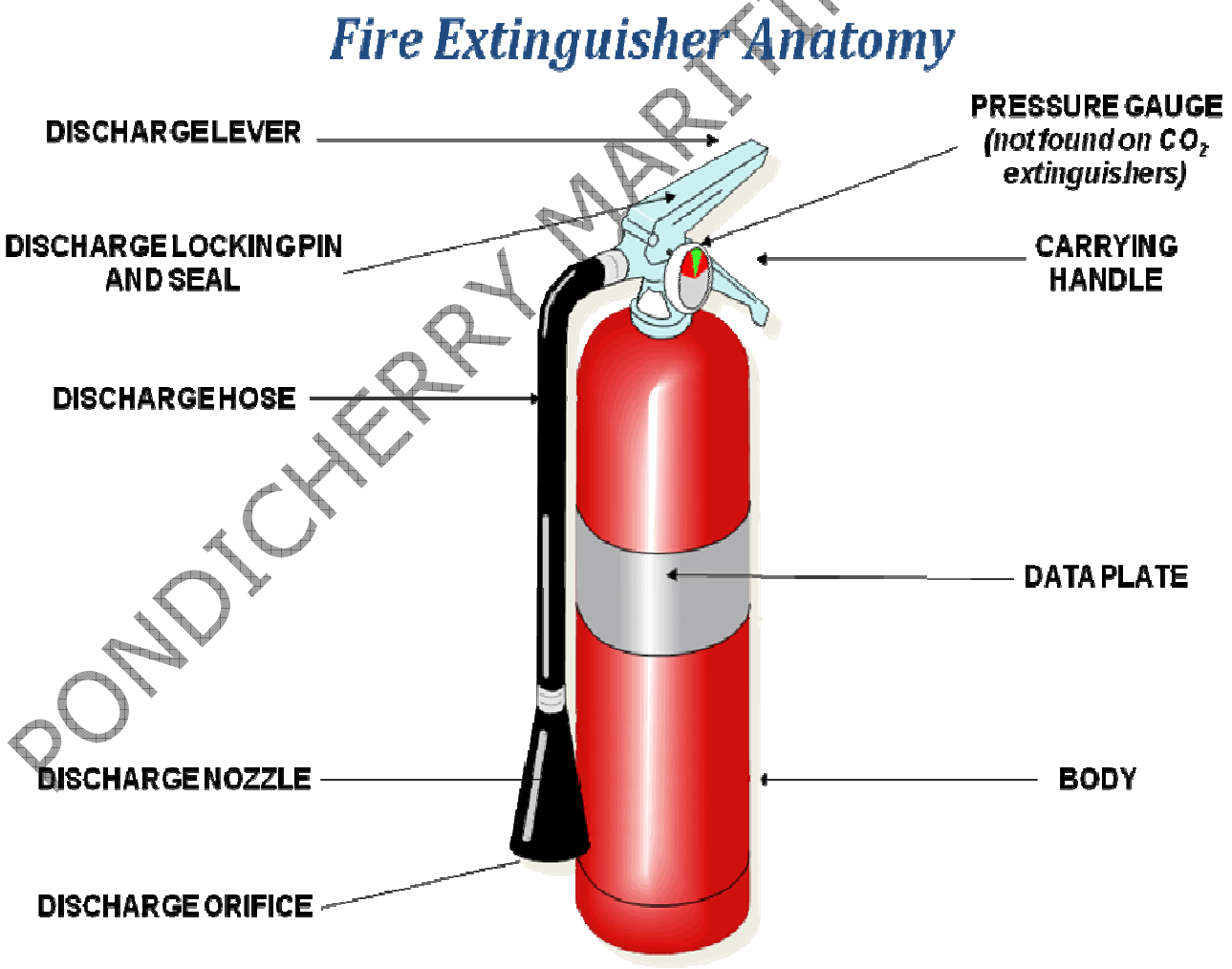
Dry Chemical powder: A flame inhibiting powder used in fire fighting
Foam: result of mixing foam concentrate, water, and air to produce bubbles.

Halon: A halogenated hydrocarbon used in fire fighting which inhibits flame propagation.
Water Fog: A suspension in atmosphere of very fine droplets of water usually delivered at s high pressure through a fog nozzle.
Water spray: Water divided into coarse drops and delivered through a special nozzle.
Carbon dioxide: Carbon dioxide gas does not support combustion, and is used as a smothering agent. Its application results in depletion of oxygen and as such extinction.
Steam: Function of steam is similar to that of carbon dioxide. It is not much used now because of some drawbacks.
Sand: Sand is generally used for small oil fires.

4.4 TYPES OF FIRE

4.5 Untrained people cannot use a fire extinguisher safely because they are:

- UNABLE to evaluate a fire
- UNAWARE of DANGER
- LACKING JUDGEMENT regarding:
  - Safe and correct use of, and
  - Limitations of portable extinguishers
- Don't know about the proper type of extinguisher
- Don't know how to make a *"Fight or Flight"* analysis
- Unfamiliar with the "P.A.S.S. method"



4.6 Firefighting Decision Criteria

- Know department emergency procedures and evacuation routes.
- Know locations of extinguishers in your area and how to use them.
- Always sound the alarm regardless of fire size.
- Avoid smoky conditions.
- Ensure area is evacuated.
- Don't attempt to fight unless:
    - Alarm is sounded.
    - Fire is small and contained.
    - You have safe egress route (can be reached without exposure to fire).
    - Available extinguishers are rated for size and type of fire.
- If in doubt, evacuate!

4.7 REACT

upon discovery of fire or smoke

- Remove persons in immediate danger!
- Ensure doors are closed! (*confine fire/smoke*)
- Activate the alarm !
- Call the Fire Department !
- Treat ALL fires as DANGEROUS!

4.8 Use a portable extinguisher

ONLY if the:

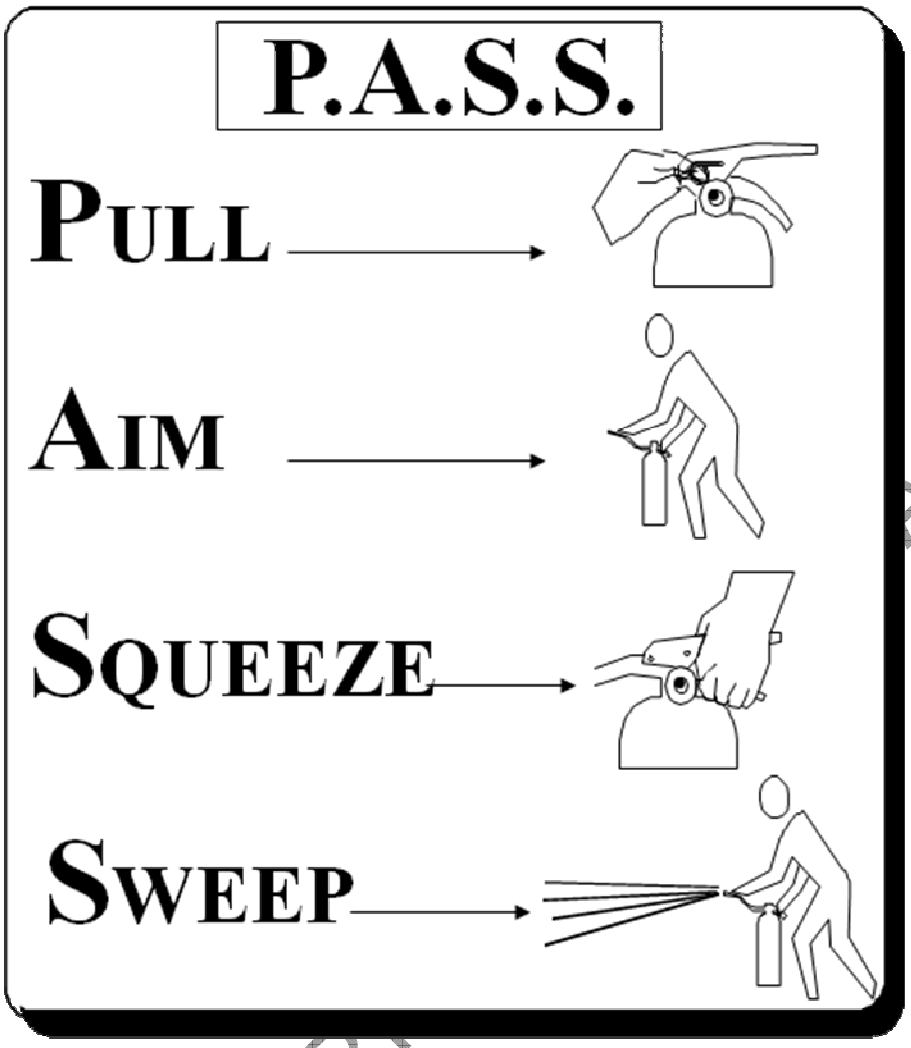
- Building is being evacuated (*Fire alarm has been pulled*)
- Fire Department has been called (*Dial 911!)*
- Fire is NOT spreading *(small and contained)*
- EXIT IS CLEAR (fight fire with your back to an exit)
- Proper extinguisher is at hand, and...
    - You have been trained and know how to use it!
    - You use "Buddy System" - have someone back you up!
    - Get assistance BEFORE trying to fight a fire!

4.9 Remember the PASS word:

1) Keep your back to a clear escape route,

2) Stand back 6 to 8 feet from the fire,

3) Then >>:



OK, It' s out…Now What

- **WATCH the fire area**
  - If the fire flares up again repeat!
  - If you can't control the fire, **LEAVE** immediately!
- **Call the fire department to inspect the scene!**
- **Recharge or replace any used fire extinguisher!**

THE END