

COURSE CONTENT

1. KNOWLEDGE OF CLEANLINESS OF THE WORK PLACE, STORES, TOOLS ETC.
2. KNOWLEDGE ABOUT USAGE OF UNIFORM, PERSONAL SAFETY, APPLIANCES AND THEIR USAGE AND USAGE OF VACCUM CLEANER
3. CAUSE OF FIRE IN VARIOUS PLACES – FIRE FIGHTING
4. TYPES OF FIRE EXTINGUISHERS AND THEIR USAGE.
5. KNOWLEDGE OF FIRE ALARM AND FIRE FIGHTING AGENCY.
6. PROCEDURES TO BE FOLLOWED TO AVOID FIRE ACCIDENTS.
7. PRECAUTIONS TO BE TAKEN DURING FIRE ACCIDENT ON HUMAN BODY.
8. FIRST AID
 - A. AIM OF FIRST AID
 - B. DRESSINGS AND STINGS.
 - C. WOUNDS AND HEOMORHAGE
 - D. ELECTRIC SHOCK
 - E. POISONS, GASES ACIDS.
 - F. ARTIFICIAL RESPIRATION
 - G. TRANSPORT OF CAUSALITIES.
9. KNOWLEDGE ABOUT TRANSPORTATION, STORING OF CONSUMABLE, PERISHABLE, INFLAMMABLE AND FRAGILE STORES
10. PREVENTION OF DAMAGE DUE TO STORM, RAIN, CORROSION AND FIRE.

SKILL: -

- a) USAGE OF FIRE EXTINGUISHERS.
- b) FIRST AID.

LESSON PLAN

S/No.	TOPIC	No. of Hours		No. of Hours	
		Theory	Practical	Theory	Practical
1.	Knowledge about cleanliness of work place, Stores & Tools etc.	1			
2.	Knowledge about usage of uniform, personal safety appliances and their usage and usage of vacuum cleaner.	1	1		
3.	Cause of fire in various places – fire fighting.	2	2	OHP chart	Demo
4.	Types of extinguishers and their usage	2	3	OHP chart	Demo
5.	Knowledge of fire alarm and fire fighting agency.	1	2	OHP chart	Demo
6.	Procedure to be followed to avoid fire accidents.	1	1.	OHP chart	Demo
7.	Precautions to be taken during fire accidents on human body.	1	1	OHP chart	Demo
8.	First aid			OHP chart	
	a) Aim of first aid	1			
	b) Dressings and stings	2	2	„	Demo
	c) Wounds and hemorrhage	2	1	„	Demo
	d) Electric shock	2	2	„	Demo
	e) Poisons, gases and acids	1		„	
	f) Artificial respiration	2	3	„	Demo
	g) Transport of casualties	2		„	
9.	Knowledge about transportation, Storing Consumable, Perishable, Inflammable & Fragile stores	1			
10.	Prevention of damage due to storm, rain, corrosion & fire	1			
	Skill:-				
	Usage of Fire extinguishers	4			
	ii) First Aid	3			

Trainee Notes

1) Knowledge about cleanliness of work place

The work place should be clean and tidy. Cleanliness is a good environment for working. Hence care should be taken to ensure that the work place is clean and tidy. Where ever possible greenery plants should be grown to keep environments free of pollution

Materials in the stores should not be scattered and mixed. Item wise they should be segregated and place in proper place. Loose materials such as bolts, nuts and pins should be put in bins.

Tools should be neat and clean and the correct tools should be utilized for the correct purpose it serves.

2) Knowledge about usage of uniform, personal safety appliances and their usage and usage of vacuum cleaner

Wearing of uniform is for identification. Hence uniform should be wore always on duty Uniform gives a feeling of workmanship and unity amongst workers

Always use insulated tools whenever working on high voltage circuits. Use rubber gloves and mats whenever working in R.E. area. Wear protective glasses at welding points. Do not wear loose clothes at the place fire furnace Always wear shoes at the work place.

Usage of vacuum cleaner:

Vacuum cleaners are used for effective cleaning purpose. Where it is not possible for cleaning physically, vacuum cleaner is very useful for cleaning in those places. Vacuum cleaner has an advantage of blowing and sucking. These are used in telephone exchanges, computer lab with air condition and relay rooms. Using of vacuum cleaner in these places ensures proper cleaning and hygienic conditions

3) Cause of fire in various places, fire fighting

Fire: - Fire is defined as chemical reaction among three basic ingredients with evolution of light and heat. The ingredients are

- a) Combustible material
- b) Heat
- c) Oxygen

The combustible materials may be in the form of solids, liquids, and gases. These three basic requirements are called *triangle of fire*. If any one of these three ingredients is removed the fire will be extinguished.

Kinds of Fire:- There are four kinds of fire.

- 1) 'A' Class fire – All carbonaceous solid materials such as paper, wood, cloth are included in this kind of fire.
- 2) 'B' Class fire – All inflammable liquids such as kerosene, petrol, diesel paints, grease are included in this category of fire.
- 3) 'C' Class fire – All inflammable gases like hydrogen etc. are included in this type of fire.
- 4) 'D' Class fire – All kinds of metals are included in this type of fire. Example – Sodium, Barium, Potassium etc.

Methods of Extinction:- There are three methods of extinction of fire.

- 1) Starvation – Extinguishing the fire by removing the combustible material is called starvation.
- 2) Cooling – Extinguishing the fire by removing the heat is called cooling.

3) Blanketing/Smoothing - Extinguishing the fire by cutting supply of oxygen is called blanketing/smoothing.

4) *Fire Extinguishers:-*

Portable fire extinguishers are only useful to extinguish the fire in initial stage. Four types of portable fire extinguishers are in use –

- 1) Soda fire extinguishers are available in two shapes, Cylindrical and Conical.
- 2) Dry chemical powder type fire extinguisher.
- 3) Carbon dioxide fire extinguisher.
- 4) Palon fire extinguisher.

Soda Fire Extinguisher – Take the fire extinguisher very near to the site of the fire. Lift the ‘T’ shaped handle and keep it in small groove. Hold the fire extinguisher horizontally; shake it well for two or three times. Turnover the extinguisher and direct the jet at the inner edge of the container.

Duration – 60 to 90 seconds.

Distance of jets – 20 to 25 feet.

Such types of fire extinguishers are kept mainly at fueling points and paint stores.

Dry Chemical Powder type Extinguisher – By hitting hard the knob, it pierces the carbon dioxide cartridge and this causes the powder of fluidity and comes out from nozzle through discharge tube with pressure. The fire extinguisher should always be used in a “sweeping” manner. While operating the fire extinguisher, advantage of wind direction should always be taken.

Working duration – 45 seconds.

Carbon dioxide Fire Extinguisher – Take the fire extinguisher very near to the site of fire, hold the discharge horn in the left and remove the safety pin. Turn the wheel valve anti-clockwise to open and clockwise to close. These types of extinguishers are provided at Electrical sub-station, Computer room, Telephone Exchange etc.

Palon Fire Extinguisher – Take the fire extinguisher very near to the fire. Remove the safety pin or clip. Press the knob and direct the jet on the fire. These fire extinguishers are provided at Computer room and Telephone Exchange etc.

5) Knowledge of fire alarm and fire fighting agency -

6) Procedures to be followed to avoid fire accidents -

7) Precautions to be taken during fire accidents on human body – Burns are injuries that results from dry heat like fire, flame, a piece of hot metal or contact with wire carrying high tension electric current or by lighting or friction

Degree of burns: -The degrees of burns indicate the damage to the tissues. There are three degrees of burns.

First degree: - When the skin is saddened.

Second degree: - When there are blisters on the skin

Third degree: - When there is destruction of deeper tissues and of charring

Precautions: - Put out the flames by whatever means (specially with water) available.

Do not allow the person to run about, this only fans the fire and makes the flame spread. Lay him down quickly on the ground and wrap tightly with any thick piece of cloth.

Do not touch the burnt one with bare fingers.

Do not apply cotton, wool directly to the burnt.

8. First Aid: - First aid is an immediate help rendered by trained person to a victim who met with sudden illness or accident before medical aid is obtained.

Aims / Objects

i) Preserved life

ii) Promote recovery

iii) Prevent further worsening

iv) Arrange transport for further medical aid

Scopes of first aid: -

i) The first aider should examine the casualty to know the details of injuries and their nature. This known as diagnosis.

ii) The diagnosis will give an idea of the treatment to be given till the doctor takes charge

iii) Send the casualty to his house or to a hospital, as the case may be, in a suitable manner. This is known as disposal.

Diagnosis – Diagnosis of a case is based on its history, sign and symptoms.

- a) History of the case is the story of the accident, namely how the accident actually occurred. The casualty will give the history, if he is unconscious, then someone who saw the accident would give the history. The surroundings will add to the information.
- b) Symptoms are what the casualty tell the first aider like pain, shivering, faintness etc. which will lead to the first aider to the reason of injury without waste of time.
- c) Signs are what the first aider feels and finds out for himself like paleness, swelling of parts injured, bleeding, deformity of limbs etc.

Treatment – If the cause of the accident is still there, it should be removed, e.g. a live electric wire, pillars or logs on the body etc. or remove the casualty from the danger, e.g. a burning house, a room with poisonous gases etc.

See that the casualty is comfortable, promote recovery and see that the condition does not become worse. First aiders prompt attention requires when failure of breathing, stoppage of heart, severe bleeding and shocks, poisoning, major burns, head injuries and fractures. Continue treatment until the doctor takes charge.

Disposal – The earlier the doctor takes charge the greater chances of recovery. Take the casualty to the nearest shelter or hospital by quickest means of transport.

Dressings and Stings -

Dressings – A dressing is a protecting covering applied to a wound to prevent infection, absorb discharge, control bleeding and to avoid further injury. An efficient dressing should be sterile (Germ free) and have a high degree of porosity to allow oozing and sweating.

Dressings are of different types –

- 1) Adhesive Dressing – It consists of a pad of absorbent gauze of cellulose, held in place by a layer of adhesive material.
- 2) Non-Adhesive Dressing – It consists of layers of gauze covered by a pad of cotton wool with an attach roller bandage to hold in position.

- 3) Gauze Dressing – Gauze in layers is commonly used as a dressing for large wounds as it is very absorbent, soft and pliable.
- 4) Improvised Dressing – This can be from any clean, soft absorbent material.

Application of Dressing –

Great care must be taken in handling and applying dressing. Therefore, hands should be washed thoroughly. Avoid touching any part of the wound with the finger or any part of the dressing, which will be in contact with wound. Dressing must be covered with adequate pads of cotton extending well beyond them and retain in position by a bandage or strapping. If a dressing adheres to wounds do not try to remove it. Covers it with sterile dressing after cutting away whatever can be removed.

Stings –

Stings are used to immobilize and support the fractured limbs and to prevent pull by upper limb of injuries to chest, solder and neck.

Different type of Stings –

- 1) Arm Sting – Used for fractured rib, injured arm, wrist and hand.
- 2) Collar and Cuff Sting – Used as support for wrist only.
- 3) Triangular Sting – Used for treating a collarbone.
- 4) Improvised Sting

Applying the Stings –

- 1) Face the casualty, put one end of the spread triangular bandage over the injured solder with point on the injured side.
- 2) Pass the end around the neck and bring it over the injured side solder. The other end will now be hanging down over the chest.
- 3) Place the forearm horizontally across the chest and bring the hanging end up. The forearm is now covered by bandage
- 4) Tie the two ends in such a way that the fore arm is horizontal or slightly tilted upward and the knot is placed in the pit above the collar bone
- 5) Take the part of the sting that is loose at the elbow behind the elbow end and bring the fold to the front and pin it up to the front of the bandage.
- 6) Place the free base of the bandage in such a way that its margin is just at the base of the nail of the little finger. The nails of all the fingers should be exposed.
- 7) Inspect the nails to see if there is any bluish colour. A bluish colour shows that there is a dangerous tightening of splints or plasters and therefore free flow of blood is not possible.
- 8) If the casualty is not wearing a coat, place a soft pad under the neck portion of the sting to prevent rubbing of skin at that place.

Wounds and bleeding (Hemorrhage)

When any tissue of the body e.g., skin, muscle bone etc. is torn or cut by injury, a wound is caused. The depth of a wound is often more important than the area. Small deep wound caused by knives, bullets etc. are often be more dangerous.

Types of wounds: -

- i) Incised wounds: - Caused by sharp instruments like knife, razor etc. These wounds bleed very much.
- ii) Confused wounds: - Caused by blows by blunt instruments or by crushing The tissues are bruised.
- iii) Lacerated wounds: - Caused by machinery, falls on rough surfaces, pieces of shells, claw of animals etc.
- iv) Punctured wounds: - Caused by stabs by any sharp instruments like a knife, or a dagger. They have small openings, but may be very deep.

Wounds cause two great dangers – a) Bleeding b) Infection

Bleeding (Hemorrhage) is a common cause of death in accident. It is caused by the rupture of the blood vessels due to severity of the injury.

Types of Bleeding – Bleeding may occur from arteries, veins, capillaries or from the combination of the three.

Sign and Symptom of Bleeding –

1. The casualty feels pain and may even collapse.
2. Skin becomes pale, cold and clammy.
3. Pulse gets rapid but very weak.
4. Breathing becomes shallow, casualty grasps for breath and sighs deeply.
5. There is profuse sweating.
6. The casualty feels thirsty.

Bleeding are of two natures –

1. External Bleeding – It is from the surface of the body.
2. Internal Bleeding – It is within chest, skull or abdomen etc.

Management in the case of severe external bleeding

1. Bring the sides of the wound together and press firmly.
2. Place the casualty in a comfortable position and raise the injured part (if no bone fracture is suspected.)
3. Press on the pressure point firmly for 10 to 15 minutes.
4. Apply a clean pad larger than the wound and press it firmly with the palm until bleeding becomes less and less and finally stops.
5. If bleeding continues, do not take off the original dressing, but add more pads.
6. Finally, bandage firmly but not too tightly.
7. Treat for shock.
8. Get the casualty to hospital as soon as possible.

Management in the case of internal bleeding

1. Lay the casualty down with head low, raise his legs by use of pillows etc.
2. Keep him calm and relaxed. Re-assure him. Do not allow him to move.
3. Keep up the body heat with thin blankets, rugs or coats.
4. Do not give anything to eat or drink because he may have to be given an anesthetic later.
5. Do not apply hot water bottles or ice bags to chest or abdomen. This might only make things worse.
6. Take him to a hospital as quickly as possible. Transport gently.

Bleeding from the nose

1. Place the victim near a window or against current of air in sitting position with the head slightly bent forward.
2. Pinch the junction of the nose just below the hard part, if available put ice piece over the nose.
3. Advise him to use his mouth to breathe and avoid breathing from nose.
4. Warn him not to blow the nose.
5. Do not block the nostril.
6. Arrange medical aid.

Bleeding from the ear

1. Place the victim on suitable place on side-ways, and see that the affected ear is down. (If both ears bleeding keep face upward and head little bit low for free drainage of blood.)
2. Do not block the ear.
3. Arrange medical aid.

SHOCK

Shock is severe depression of vital function of organs like brain, heart, lungs etc. due to less blood supply to the brain. There are two types of Shocks, i) Nerve Shock & ii) Established Shock.

- i) Nerve shock - It is due to hearing of good/bad news, fear and pain.
- ii) Established shock (True shock) – This kind of shock is mainly due to loss of blood from body or loss of body fluids other than blood in case of severe vomiting etc.

Sign and Symptoms of Shock:

- i) Giddiness
- ii) Pale colour of face
- iii) Coldness
- iv) Cold clammy skin
- v) Rapid and weak pulse
- vi) Nausea (Vomiting sensation)
- vii) Vomiting
- viii) Unconsciousness

General Treatment

- i) Reassure the casualty, if he is unconscious.
- ii) Keep the casualty on his back comfortably (except in case of injury of head, chest or abdomen), lower the head slightly and turn it to a side.
- iii) Loosen the clothing but do not remove it.
- iv) Wrap in light bed sheet or thin rug. (Note: Do not use hot water bottles, do not apply massage and never give alcoholic drinks. If there is no chest or abdominal injury, hot tea, coffee or milk can be given.
- v) Give pain relievers and arrest bleeding if necessary.
- vi) Arrange medical aid.

Electric Shock

If any part of the body comes in contact with live electric wire, which is either exposed or not covered with insulators, or with a cable or rail in which current is leaking, a person gets an electric shock.

The effect of Electric Shock

1. There may be fatal paralysis of heart.
2. There may be sudden stoppage of breathing due to paralysis of muscles used in breathing.

3. Heart may continue to beat, while breathing has stopped.
4. There may be burns, either superficial or deep. They depend on the strength of the electric current causing the injuries.

Management

Intelligent and prompt action is required. If the first aider is not cautious, he may also receive severe electric shock or even die along with the casualty.

If the casualty is still in contact with the conductor, switch off the current. If the switch is not available, remove the plug or break the wire to cut off the current.

Note:- Before cutting off the current ensure that you stand on a dry piece of insulated board. Do not use scissors or knife.

If casualty is not breathing normally or heart has stopped beating, give artificial respiration and external cardiac massage for a long time. Treat for shock and burns. Transfer to a hospital or seek the help of a medical practitioner.

Artificial respiration

Respiration:- Respiration means breathing in and breathing out of air. This function is necessary to supply oxygen to all the organs in the body. Stoppage of oxygen supply to the organs results in death, sooner or later.

There have been several methods of artificial respiration practices. Out of which Sylvester's method is felt the best. Mouth to mouth method was discovered and found to be best and easiest method to be used under normal condition.

Mouth to mouth Artificial respiration

1. Place the casualty on his back and hold his head tilted back.
2. Take a deep breath with mouth open widely.
3. Keep nostrils of the victim pinched.
4. Cover the mouth of the victim with your mouth snugly.
5. Watching the chest, blow into his lungs until the chest blows up. Withdraw your mouth; note the chest falls back. (**Note:-** It is hygienic to cover the mouth of casualty with your handkerchief or some clean cloth)
6. Repeat the above for 15 to 20 times per minute.
7. If the chest does not rise look for an obstruction.
8. Turn the victim to a side and thump his back. This will make the obstructing material come to the front of the throat. Open the mouth and remove it with your fingers covered with a piece of a cloth.
9. Use mouth to nose respiration if mouth-to-mouth respiration is not possible where the thumb of the first aider should close mouth of the victim.
10. If the heart is working, continue artificial respiration until normal breathing occurs.
If the heart is not working, it will be noticed that
 - i. The face is blue or pale
 - ii. Pupils are dilated
 - iii. Heart beat and pulse are not felt
11. Call an ambulance

Management

1. Place the victim flat on his back on a hard surface (bench, table etc.)
2. Give a smart hit with the edge of your hand on the lower and left angle of the sternum. This usually stimulates the heart to work.

3. In case the heart dose not work, persist the striking for 10 to 15 seconds, at the rate of one stroke per second. Feel for the pulse regular and continuous – stop beating.
4. All the while artificial respiration has to go on.
5. Even if the victim is breathing, but the breathing is not normal it is wise to start artificial respiration
6. Do not begin thumping the heart until you are sure that the heart is stop beating.

External heart compression (If there are two trained persons)

- 1) This should be going along with artificial respiration. Therefore ask the first aider giving mouth to mouth breathing to set to the right of the victim and placed you on the left side.
- 2) Feel and mark the lower part of the sternum.
- 3) Place the heel of your hand on the marked part
- 4) Place the heel of the other hand over it.
- 5) With your right arm, press the sternum backwards towards the spine.
- 6) Press timely but carefully, careless may cause injury to ribs and deeper tissues
- 7) If the treatment is effective
 - a) Colour becomes normal
 - b) Pupils will contract as improvement begins.
 - c) Carotid pulse begins with each pressure

When the pulse is restored, continue compression till the victim reaches hospital.

Poisons, Gases and acids

A by substances (liquid, solid or gas)when enters into body in sufficient quantity which has power to injure health or destroy life is called poisons

Methods of poisoning: -

- a) By swallowing
- b) By breathing or by injection

Poisoning by swallowing: - Acids, alkalies, disinfectants etc. are swallowed by mistake

Poisoning by gases: - Gases cause choking (asphyria), which may result in unconsciousness in addition to difficulty in breathing.

Poisoning by injection: - Poisons get into the body through injection bites of poisonous snakes, rabid dogs or stings by scorpions and insects.

First Aid in Gas Poisons:- Take the victim to a safe place and start artificial respiration.

First Aid in Swallowed poison:- Check whether the victim is conscious or not. If un-conscious, check breathing and pulse. If there is no breathing, start artificial respiration and if there is no pulse, start cardiac message except corrosive chemicals like alkalies. Aid vomiting by tickling the back of the throat or make him drink tepid water mixed with two tablespoons of common salt for a tumbler of water. If proper antidote is not available immediately, give soft drink like milk, white part of an egg, barley/wheat flour mixed with water.

First Aid in case of Injected poisons:-

- i. Put rubber bandage if the bite took place on legs or hands,
- ii. Wash the area immediately, if readily available with potassium permanganate solution or other antiseptic solution.
- iii. Do encourage bleeding and do not cover the wounds.

iv. Arrange medical aid

9. *Knowledge about transportation, storing of Consumables, Perishables, Inflammables and Fragile Stores*

All the stores should be transported from one place to another very carefully. While transporting, care should be taken to avoid any damages. No material should be thrown. They have to be taken physically to the appropriate place. Heavy material should be carried on trolleys or carts. Care should be taken while loading and unloading into trolleys or carts.

While storing the materials, care should be taken to avoid any damages to the materials. Materials like consumables, perishables, inflammable and fragile should be stored separately.

Inflammable material such as oil, spirit and petrol should be stored separately and away from cotton waste, stationary and furniture. Bags of cement must be stored in a dry go-down with a masonry floor.

Transportation and storing of fragile store should have proper dry grass packing and handle with utmost care.

10. *Prevention of damage due to storm, rain, corrosion and fire*

- All the stores and tools should be in proper condition and protecting them from deterioration.
- All materials must be kept clean, duly oiled where necessary and fit for immediate use.
- Materials must not be allowed to rust or otherwise deteriorate.
- Stores enclosures should be paved with stone or brick so as to keep material away from dust, protection from weather.
- Bags of cement must not be stored in too large quantity.
- Naked light and smoking should not be allowed inside such go-down.