

JOB ROLE –PLUMBER (GENERAL)

Sector – Plumbing
(Qualification Pack Code: PSC/Q0104)



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UNIT 6: MAINTAINING A HEALTHY, SAFE AND SECURE WORK ENVIRONMENT

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Session Objectives

The student will be able to:

- Describe the various hazards to the plumber,
- List the safety checks and precautions at workplace,
- List the possible injuries, diseases and danger at work place,
- Read the signs and symbols on site,
- Demonstrate the use of personal protective equipment (PPE) at workplace,
- Demonstrate the use of different types of fire extinguisher,
- Perform the use of first aid and emergency services,
- Execute the safety guidelines.

Introduction

- Construction sector is the number one sector for employing maximum number of employees. It is important to that workers are oriented about hazards and their controlling. An accident can occur anywhere or everywhere if we do not follow or maintain a secure environment/ condition.
- In plumbing industry, the plumber may be involved in a range of work activities, such as:
 1. Installing hot water and gas services,
 2. Replacing guttering and downpipes,
 3. Laying and connecting water and sewage pipes and
 4. Fixing washbasin or sewage blockage.

Hazards to the Plumber

1. Use of powered tools
2. Use of hand tools
3. Falls
4. Manual handling
5. Hazardous substances
6. Biological hazards
7. Electricity
8. Burns
9. Trenches and confined spaces
10. Sunburn and heat stress
11. Scaffolding

Use of Power Tools

- Power tools are used to carry out everyday tasks in the plumbing industry. Power tools are operated by an additional power source, using electric motors, engines, compressed air, etc.



Using power drill machine

Use of Hand Tools

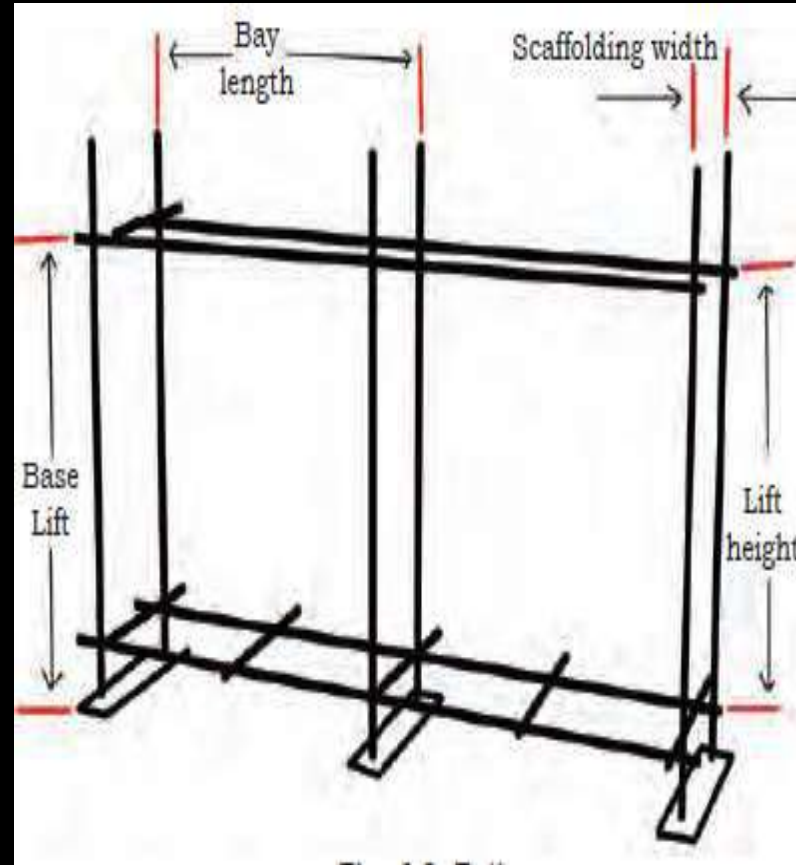
- These tools are manually operated and do not rely on a power source. Some commonly used hand tools include hammers, pliers, monkey wrenches, etc.



Hand Tool

Falls

- Many plumbing tasks are carried out at varied heights and depths. The options for work at height are as follows:
 1. Use fall protection devices.
 2. Use a work positioning system.
 3. Use a fall injury prevention system.
 4. Use a ladder, as long as it can be employed safely for the duration of the task.



Fall

Protection from falls

- A number of factors are often involved in falls, including unstable working surfaces, misuse or failure to use fall protection equipment and human error.
- Using guardrails, fall arrest systems, safety nets, covers and restraint systems can prevent many deaths and injuries from falls.

Precautions

- I. Aerial lifts or elevated platforms should be considered to provide safer elevated working surfaces.
- II. Erect guardrail systems with toe boards and warning lines or install control line systems.
- III. Cover floor holes; and/or use safety net systems or personal fall arrest systems.

Ladders: Ladders and stairways are another source of injuries and fatalities among construction workers.

Precaution

1. Use a ladder which is strong for the task.
2. Make sure that ladders are long enough to safely reach the work area.
3. Mark or tag ('Do Not Use') damaged or defective ladders for repair or replacement, or destroy them immediately.
4. Never load ladders beyond the maximum intended load or beyond the manufacturer's rated capacity.
5. Ensure that the load rating can support the weight of the user, including materials and tools.
6. Avoid using ladders with metallic components near electrical work and overhead power lines.

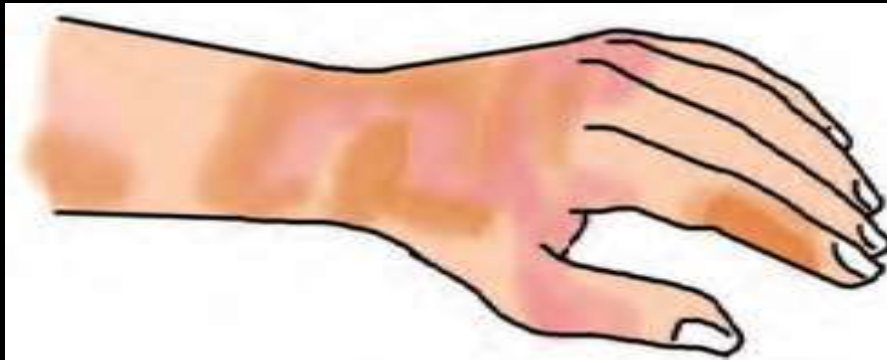
Stairways: Slips, trips and falls on stairways are a major source of injuries and fatalities among the construction workers.

Precautions

1. Stairway treads and walkways must be free of dangerous objects, debris and materials.
2. Slippery conditions on stairways and walkways must be corrected immediately.
3. Make sure that treads cover the entire step and landing. The treads should be made enough wide so that there is no slipping. Stairways having four or more risers or rising more than 30 inches must have at least one handrail.

Manual Handling

- A plumber's work often involves significant manual handling hazards. Handling heavy objects and moving them, often in uncomfortable postures because of lack of space to move freely, creates a risk of traumatic.



Acid injury on hands

Hazardous Substances

- Hazardous substances are chemicals used to carry out work, or present in the work environment. It may be Oxy-acetylene, Fluxes, Lead, Hydrochloric acid, Degreasers, adhesive etc.,



Fire hazard

Biological Hazards: Health effects of exposure to sewage include tetanus (caused by a toxin produced by a bacteria common in soil and sewage), leptospirosis (caused by a parasitic worm), hepatitis A, and parasites, such as giardia and cryptosporum.

1. Assume anything touched by sewage as contaminated.
2. Do not eat or drink in any sewage handling area.
3. Wash hands well with soap and clean water, preferably hot, before eating or drinking.
4. After touching any surface or object that may be contaminated by sewage.
5. Immediately wash and disinfect any wound that comes in contact with sewage.
6. Change out of work clothes before leaving the work site.
7. Wear appropriate protection. It includes rubber boots and gloves, overalls and eye protection.

Electricity

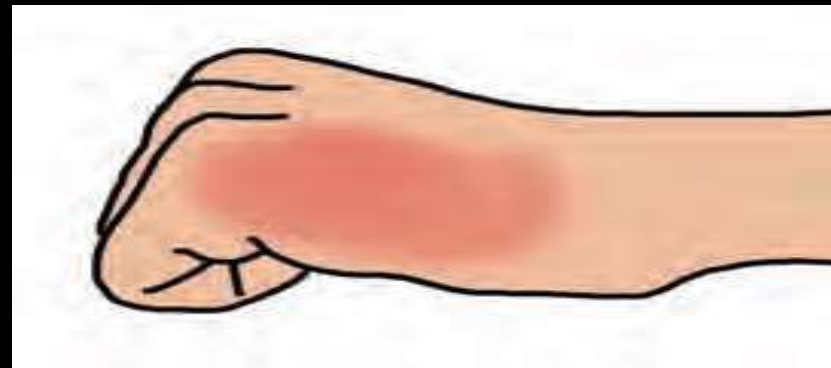
- Electric leads must be kept away from water. Because plumbers use powered tools in proximity to water supply in all weather conditions, there is always the possibility of electrocution.



Electric plug

Burns

- Hot water services store water at high temperatures. Maintenance and repair work must be carried out carefully to avoid scalds and steam burns.



Burn on hand

Trenches and Confined Spaces

- Plumbers working in trenches, pits, tanks, beneath houses and in roof cavities must understand and plan for the significant hazards in confined spaces. In sewage systems, the release of toxic gases can cause the plumber to collapse, become unconscious and die.



Hazardous Toxic Gas

Trenching : Trench collapses cause dozens of fatalities and hundreds of injuries each year.

Precautions

1. Never enter an unprotected trench.
2. While entering a trench, proper support like ladder, ropes, oxygen cylinder, goggles, etc., should be provided to the worker at a certain interval of depth.
3. Employ a registered professional engineer to design a protective system for trenches 20 feet deep or greater.
4. Always provide a way to exit a trench, such as a ladder, stairway or ramp—no more than 25 feet of lateral travel for employees in the trench.
5. Keep soil at least two feet behind the edge of a trench.
6. Make sure that trenches are inspected by site engineer.

Sunburn and Heat Stress

- Workers who are exposed to extreme heat or work in hot environments may be at risk of heat stress.
- Heat stress, sunburn and skin cancer can all result from prolonged exposure to ultraviolet radiation from the sun.



Blisters due to Sunburn

Scaffolding

A scaffold is a temporary structure made of bamboo or iron pipe to support workers to carry out the work. When scaffolds are not erected or used properly, fall hazards can occur.



Precautions

1. Scaffold must be sound, rigid and sufficient to carry its own weight. It must be erected on solid footing.
2. Unstable objects, such as barrels, boxes, loose bricks or concrete blocks.
3. The scaffold must be equipped with guardrails, mid rails and toe boards.
4. Scaffold accessories, such as braces, brackets, trusses, screw legs or ladders that are timely repaired or replaced.
5. Scaffold platforms must be tightly planked with scaffold plank grade material or equivalent.
6. Synthetic and natural rope is used in suspension scaffolding, that is a hanging-type scaffolding.
7. The scaffold can be accessed by using ladders and stairwells.
8. The scaffolds must be at least 10 feet from electric power lines at all times.

Safety Check

For quality control of any work, a checklist for safety is prepared. A checklist is a list of items you need to verify, check or inspect. This checklist should be followed in routine practice to maintain standard and quality. Adoption of these checklists will reduce accidents and hazards.



Precautions at workplaces

1. For safe operation, following precautions should be ensured at the workplace.
2. Precautions must be taken against a person falling from a working platform erected at various heights in a building.
3. Protection against structural collapse.
4. Safeguards to be used when a person is working in excavations like well or mines.
5. Care should be taken to prevent drowning (falling into water).
6. For safe traffic routes (on sites) to avoid accidents.
7. Prevention and control of emergencies services.
8. Provision of welfare facilities — washroom, washing facilities, canteens/rest areas, shower facilities, (if required).
9. Provision of site-wide issues — clean and tidy sites, adequate lighting, constant and fresh air supply, etc.
10. Training, inspection and reports must be known by workers.

Reporting of Injuries, Diseases and Danger

1. Maintain a Material Safety Data Sheet (MSDS) for each chemical in the facility.
2. Train employees on how to read and use the MSDS.
3. Follow the manufacturer's MSDS instructions for handling hazardous chemicals.
4. Train employees about the risks of each hazardous chemical being used.
5. Provide spill clean-up kits in areas where chemicals are stored.
6. Have a written spill control plan.
7. Train employees to clean up spills, protect themselves and properly dispose of used materials.
8. Provide proper personal protective equipment and enforce its use.
9. Store chemicals safely and securely.

Signs and symbols on site

Sign and symbols are used to inform and alert the people on all aspects. Some common safety symbols are discussed here.



No Smoking



Wear Eye Protection



Danger Electric Shock Risk



First Aid Facilities

Personal Protective Equipment(PPE) at workplace

Safety Equipments

- (a) **Eye protection:** It comes in the form of:
1. Safety glasses — a typical application could be during lead welding
 2. Safety goggles — it provide a higher level of protection than safety glasses, as they fit closely to the face
 3. Welding goggles — it include specialist coloured lenses.



Eye protection

(b) Hand protection: It is usually used in plumbing and includes the following.

1. General-purpose gloves — these help protect against cutting or puncture, wounds.
2. Specialist gloves — these are typically used to deal with hazardous substances
3. Rubber gloves — these help protect against contact with waste systems and sanitary appliances.



Hand protection

(c) Head Protection: Such injuries occur when we are not prepared to protect our head. Serious head injuries can get fatal. It is a mandatory requirement to wear a safety helmet when working on construction sites.

A safety helmet must

1. To be properly adjusted to fit.
2. To be replaced if it becomes defective or damaged.



Head protection

(d) Foot protection: It is necessary to protect foot from injuries caused during plumbing installation work. It is necessary for workers to wear the standard safety boots.



Boot

(e) Ear protection: It is used while working in noisy areas or with equipment that generate high levels of noise. Ear protection gear includes:

- a) Ear defenders
- b) Ear plugs



Ear Plug

(f) Respiratory protection:

When there is dust at workplace, the efficiency of workers gets affected, hence, it is necessary to use respiratory protection system.

Some important respiratory equipment are.

1. Simple dust mask.
2. Cartridge-type respirator.
3. Full breathing apparatus.



Respiratory protection

Fire

Fire is classified into groups according to the type of fuel:

- I. Class A — fires involving solid materials, extinguished by water.
- II. Class B — fires involving flammable liquids, extinguished by foam or carbon dioxide.
- III. Class C — fires involving flammable gases, extinguished by dry powder.
- IV. Class D — fires involving flammable metals, extinguished by dry powder.

Different types of fire extinguisher

Type of Extinguisher	Colour Code	Main Use
Water	Red	Wood paper or fabrics
Foam	Cream	Petrol oil, fats and paints
Carbon oxide	Black	Electrical equipment
Dry powder	Blue	Liquids, gases, electrical equipments

Emergency Services and First Aid

During an emergency period, the following actions should be taken:

1. Find a telephone in a safe environment, well away from the emergency.
2. Dial the emergency service number — Fire 102, Police 100, Ambulance 101.

Summoning the Emergency Services

1. Minimise the time taken for the emergency services.
2. Minimise the risk to operators.
3. Include environmental and other emergencies in your plan
4. Employers and the self-employed need to assess the first aid requirements of their work.

First Aid: It is necessary to have the following items in a first aid kit. These items help provide the patient immediate relief from pain or injury.

1. Plasters
2. Sterile dressings
3. Triangular bandage
4. Safety pins(sling)
5. Disposable gloves
6. Crepe bandages
7. Scissors, tweezers
8. Cotton wool tap/faucet
9. Alcohol-free antiseptic wipes
10. Sterile pads



First Aid Box

Safety Guidelines

Step 1 – Identify potential causes of workplace injury and illness

1. Does the nature of the work being carried out pose a hazard to people's health and safety?
2. Have these hazards been identified in work that is being carried out?
3. Has incident and injury data been reviewed?
4. Has consultation with workers and their health and safety representatives occurred?
5. Is specialist or external assistance required?

Step 2 – Assess the risk of workplace injury and illness

1. How often does a hazard have the potential to cause harm?
2. What type of injuries would the hazard cause?
3. How serious are the injuries?
4. Does the number and composition of workers and other people affect how first aid should be provided?
5. Could the size and location of the workplace affect how first aid is provided?

Step 3 – What first aid is required?

(a) First aiders

- (i) How many first aid helpers are needed?
- (ii) What competencies do they require?
- (iii) What training do they need?

(b) First aid kits and procedures

- (i) What kits or modules are needed and where should they be located?
- (ii) Is other first aid equipment needed?
- (iii) Who is responsible for maintaining the kits?
- (iv) What procedures are needed for my workplace?

(c) First aid facilities

- (i) Is a first aid room or health centre required?

Summary

- In this units, we have covered the knowledge of maintaining a healthy, safe and secure work environment in the construction site. A plumber should aware about all the hazards like use of power and hand tools, falls, manual handling, hazardous substances, biological hazards, electricity, burns, trenches and confined spaces , sunburn and heat stress, scaffolding.
- He also know about the emergency services, first aid and safety guidelines.

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