



& ENTREPRENEURSHIP



Transforming the skill landscape





Sector Plumbing

Sub-Sector Contractors

Occupation Plumbing

Reference ID: PSC/Q0104, Version 1.0 NSQF Level 3 Plumber General

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Shri Narendra Modi Prime Minister of India



#### Acknowledgements

Indian Plumbing Skills Council (IPSC) is a company incorporated under Section 25 of the Indian Companies Act 1956. The Plumbing Industry faces the mammoth challenge of huge gap between the supply of skilled labour and the demand of skilled labor. A very small percentage of the plumbing workforce is actually skilled in India.

Plumbing Industry since a longtime has been awaiting an opportunity to skill its work force, and through the mandate of the National Skills Development Corporation (NSDC) has got an excellent opportunity to train its workforce with the latest skills and technology and best practices in the Industry. IPSC has been formed as the official Plumbing Sector Skills Council (SSC) under the National Skill Development Corporation (NSDC), an umbrella organization created under Ministry of Skill Development and Entrepreneurship. NSDC is an initiative of the Govt. of India and the Vision of our Prime Minister Shri Narendra Modi to transform India as a hub of skilled manpower not only for India but for the World.

The IPSC acts as an accreditation and certifying body; and will work to fill the gap of skilled and unskilled labor in India. For this purpose we are partnering associations and organizations who share same vision, and work to upgrade the skills in deficit in the plumbing industry.

This Participant book has been developed for Plumber General Level3 to drive competency based training for this role which specify the standard of performance an individual must achieve when carrying out a functions for execution of installation, repair and maintenance activities in Plumbing together with the knowledge and understanding of communications and discussions of work flow and reporting to senior about process flows.

In addition, the purpose of completion of this Qualification Pack is to progress to Level4.

This handbook will lead to successful roll out the skill development initiatives, helping greatly our stakeholders particularly trainees, trainers and assessors etc.

We acknowledge the support from Plumbing Industry in compiling this Handbook; it won't be possible without their contribution.

It is expected that this publication would meet the complete requirements of QP/NOS based training delivery, we welcome the suggestions from users, Industry experts and other stakeholders for any improvement in future.

31th December, 2016 New Delhi Dr. R.K. Somany Chairman, Governing Body Indian Plumbing Skills Council (IPSC)

#### About this Book-

This manual has been developed by IPSC to assist the trainer as a reference guide while giving training of the course - Plumber General to trainees.

This manual is based on the course - Plumber General, which is designed for participants who want to start a career in plumbing and Is aligned to the:

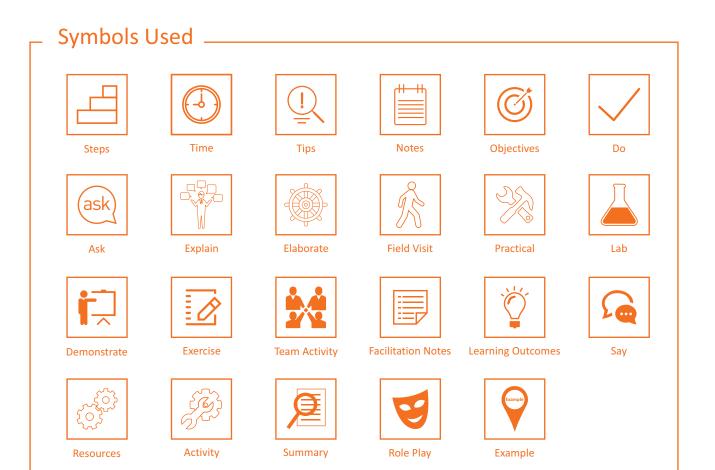
PSC/N0101 (Installation of basic sanitary fixtures, fittings related & piping and accessories)

PSC/N0102 (Repair of basic plumbing & Systems)

PSC/N0108 (Coordinate With the senior and other working team)

PSC/N0109 (Maintain a healthy, safe and secure working environment)

Indian Plumbing Skills Council's qualification pack number PSC/Q 0104. It will help a trainer to teach the basics of Plumbing to trainee and make them qualify as a certified Plumber General equivalent to Level -3 of the NVEQF / NVQF / NSQF. This course aims to develop a participant Into a Plumber General who is "responsible for installation, minor repair and maintenance of pipes and sanitary fixtures in housing. commercial and institutional setups".



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# **1. Introduction**

Unit 1.1 - Getting Familiarized

Unit 1.2 - Opportunity in plumbing

Unit 1.3 - Safety, Maintenance and Housekeeping



## Key Learning Outcomes

#### At the end of this module, students should be able to :

- 1. Identify what will be discussed in the training program
- 2. Discuss the plumbing sector in India, and its sub-sectors
- 3. Identifying and developing component shapes for a plumbing activity.
- 4. Identify your Roles and responsibilities
- 5. Establish skills required for the job (behavioral, professional, technical and communication)
- 6. Maintain a safe, hygienic and secure working environment
- 7. Demonstrate how maintenance and housekeeping can be performed

#### UNIT 1.1: Getting Familiarized



At the end of this unit, students will be able to:

- 1. Get introduction of students
- 2. Build rapport with students
- 3. Create Rules for class

# - Resources to be Used 🤷

- White Board + Marker /Black Board + Chalk
- Duster
- Laptop + Projector / Computer + Projector / Flipcharts
- Participant Handbook / Copies of Handout

## - Notes for Facilitation

- Start the first session with very high energy.
- Be ready with course curriculum.
- Make list of benefit from the course for students.
- It would be good if you have some success stories of previous batch students, it will create enthusiasm in new students.
- Make list of expectation from students.
- Prepare some questions related to the job roles for asking from students for generating curiosity, for example Ask student if they know what is Plumbing or what is the use of Plumbing?
- Be ready for answering any question related to the job role, you should give a feeling to the students that you have authority over the subject.
- Ensure all the resources, such as white board, marker or projector are in working condition before students arrive.
- Create some Plumbing related stories to start the session for making the first session interesting and engaging.
- Arrive early in class before students.
- Start class on time and close the session on time, so that you can give clear message of valuing your and students time.

Do

- Make the small circle of students.
- Welcome all the participants and appreciate them for choosing this course.

- Introduce yourself with your name, qualification and work experience.
- Give details of Objectives of this course.
- Give details of today's session and what they are going to learn.
- Give Safety Instructions to be followed during class.
- Brief them about the rules of class and Do's and Don'ts.
- Encourage them to share their thoughts and doubts now and during the process of this course.

- Ask

- Ask all students to introduce themselves.
- Ask their expectations from the course.

#### - Notes for Facilitation

- Make rules for class, for ex-
  - All student will come on time
  - In case of leave, students will inform atleast a day in advance
  - No talk over mobile will be allowed in class
  - Mobile will always be in silent / switch off mode in class
  - No gossip in class
  - Any break in class will be taken with trainer permission only
  - If any student wants to say anything, he/she will raise his/her hand. He / she will only speak when trainer ask for it.
- You can add any other rules, which will increase effectiveness of training.
- Objectives of this Program is that after completing the course, the student will be able to -
  - Understand requirement of skilled work force for making strong India
    - Discuss about related Sector and Sub Sector
    - Describe the job role in detail
  - Perform all the responsibilities of job role
  - Get developed as a job ready person
  - Get recognized certificate for acquired skill
  - To get job in related industry based on certificate received after completing the course.
- Some of the Roles and Responsibilities of a Trainer are
  - To provide training as per QP and NOS defined.
  - To clear all doubts of students related to the job role during training
  - To create required discipline in class
  - To ensure health and safety of all students during class training and field visits
  - Provide maximum practical exposure to students for job role

Sav

- Thank the students for their participation.
- Inform them rules of the class.

- Inform them about course curriculum.
- Inform them about assessment and assessment procedure.
- Inform them about your Role and responsibility.

## · Notes for Facilitation $\lfloor$

- To know students better, you can ask their hobbies, the sport they like, the sports person or film star they like. It will help you open them up and create some bonding.
- Learn their name, this is very important in order to have a feeling of connectivity.
- Create your own rules for class. Rules should be flexible, still ensure discipline in the class.
- It is necessary to let students know about assessment procedures so that they can do study in line with that and assessment should not come as a surprise.
- Anticipate questions from new students and prepare in advance.
- You can also inform them about PMKY, Skill India mission and NSDC, so that they feel connected to a bigger cause of nation building.
- Create your own notes for improvement in next session.
- If students appear bored then have some activity in class.
- Stay organised in class, student give respect to organised teachers.
- Use variety of teaching techniques, so that you can engage all the students.
- Set high but realistic expectation from students.

## Activity

- Ask the students to assemble together.
- Explain the purpose and duration of the activity
- Set guidelines pertaining to discipline and expected tasks

Skill Practice	Time	Resources
Introduction to the fellow students, sharing of contact details so that every student has minimum 4 contacts in class, which help them in case they are absent from class and other help.	30 miutes	Notebook, pen

#### Unit 1.2: Opportunities in Plumbing



At the end of this unit, students will be able to:

1. Identify and understand opportunities in plumbing

Ø

- 2. Understand the basic tasks and theories within the plumbing industry
- 3. Understand the job description and attributes of a Plumber General
- 4. Identify various skills required to perform the role of a Plumber General

#### 1.2.1 - Work Opportunity in Plumbing

Resources to be Used

- Laptop
- Projector
- White Board
- Marker
- Duster

# — Do 🗠

- Greet the participants for the day.
- Give Summary of previous Session.
- Ask for any doubts in previous Session.
- Acknowledge for their doubt-raising, if any. Clear the doubts.
- Give details of today's session and what they are going to learn.
- Encourage them to share their thoughts and doubts now and during process of this course.



- Ask students what they know about Plumbing.
- Ask students the work involved in Plumbing activities.

#### Say

- 1. The Plumbing Industry faces big challenge of skill gap between the availability and demand of skilled workforce.
- 2. India is among the few providential nations of the world where the working population is in far excess of the dependent (World Bank, 2011). Census (2011) placed a 430 million i.e. 35% of the population in the age group of 15-34 hereby have a working age population far exceeding its dependent. Plumbing industry has a market size of 23,300 Crores.

- 3. Other than construction, the services of plumbers are required in the following sectors: Fire Fighting, Air- conditioning, Industrial Waste Management, Gas Supply, Sewage and drainage, Water Supply and Water Treatment.
- 4. Orissa's Kendrapada district is home to more than 70% Plumbers.
- 5. Only 10% are organized, 90% of the total Plumbers are from the unorganized sector.
- 6. Most of the Plumbers learn their work on the job (unorganized OJT), they do not get any formal training.
- 7. There are three main divisions in the Plumbing Industry plumbing consultants, manufacturers of plumbing related products, contractors and plumbers in the construction industry.

#### Notes for Facilitation

- You could tell students the need and importance of plumbing in day to day life.
- Give students some time to think and discuss about how plumbing has evolved in last so many years.
- Set the context and describe the industry trends in Plumbing.

#### 1.2.2 Job Description and Attributes

Ask

- Ask students why plumbing is integral part of construction industry.
- Ask students what would be the main job roles of a Plumber.
- Ask students what would be the other important aspects of job role of a Plumber.

### Elaborate

Plumber (General) is an important job role in installation and repair of plumbing fittings and fixtures in 'contractors' segment. A Plumber (General) is responsible for installation, minor repair maintenance and servicing of pipes and sanitary fixtures in housing, commercial and institutional setups. The person should be able to work independently on the assignment. The person should be comfortable in performing laborious work, should be a good listener, good at taking and following instructions, a good team player and result oriented with positive attitude.

#### Notes for Facilitation

- You could tell students about the fixtures and fittings a plumber fixes.
- Try to portray a good picture of Plumbing profession.
- Elaborate on soft skills importance in Plumbing profession.

#### 1.2.3 Skills

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łs	k	

- Ask students what are the key skills required for a Plumber.
- Ask students what would be the main job roles of a Plumber.
- Ask students what would be the other important aspects of job role of a Plumber.

## Explain 🗋

To complete the work accurately, an individual should possess the ability to do the following:

- 1. Solve problems: Identify and resolve issues efficiently and as fast as possible.
- 2. Display technical skills: Be able to exhibit technical skills, in addition to being able to judge own competence; take advantage of opportunities to learn, get trained and develop; try to improve personal skills and knowledge.
- 3. Demonstrate interpersonal skills: Be open to suggestions presented by others and show willingness to try out new methods and processes.
- 4. Communicate orally: Listen patiently, observe keenly, understand and interpret quickly, clarify doubts whenever needed and answer queries with discretion and sensitivity.
- 5. Participate in a group: Integrate well in situations where problems have to be resolved in groups.
- 6. Show team spirit: Delegate work efficiently and work well within a team in a balanced manner.
- 7. Follow ethical practices: Respect others and interact well with one and all; fulfil commitments; motivate and inspire; display high level of integrity and ethics; be aware of, promote and uphold organisational values.
- 8. Be supportive of organisation: Follow organisational policies and procedures; encourage and support positive and favourable action; respect, welcome and be tolerant towards diversity.

# Activity

- Conduct a skill practice activity.
- Ask the students to assemble together.
- Explain the purpose and duration of the activity
- Set guidelines pertaining to discipline and expected tasks

Skill Practice	Time	Resources
Students need to explain the requirement of different skills required for plumbin profession.		Notebook, pen, Flip charts

#### Unit 1.3: Safety, Maintenance and Housekeeping

Unit Objectives

At the end of this unit, students will be able to:

- 1. Demonstrate how maintenance and housekeeping can be performed
- 2. Explain the good practices to be followed in Housekeeping

# Resources to be Used

- Laptop
- Projector
- White Board
- Marker
- Duster

# Do

- Greet the participants for the day.
- Give Summary of previous Session.
- Ask for any doubts in previous Session.
- Acknowledge for their doubt-raising, if any. Clear the doubts.
- Give details of today's session and what they are going to learn.
- Encourage them to share their thoughts and doubts now and during process of this course. ٠



- Ask students what they know about Maintenance.
- Ask students the activities involved in Maintenance.
- Ask students the meaning of Housekeeping.
- Ask students the purpose of Housekeeping.

### 1.3.1 Maintenance and Housekeeping

## **Elaborate**

'Housekeeping' is the term used to describe the daily activities related to ensuring that the site is clean, tidy and in proper order. Good housekeeping ensures that the working environment is clean and pleasant. It not only keeps accidents at the workplace in check, but also ensures that the site operates efficiently. Good housekeeping is all about cleaning the premises regularly, storing materials properly, disposing rubbish on a regular basis, maintaining the facilities and ensuring the staff is cooperative at all times.

#### **1.3.2 Good Practices**



- Ensure that all toolsand equipment are kept in good working condition at all times. Their safety fittings/ features should be checked frequently to see whether they are working properly.
- To ensure that all equipment used for cutting work properly, their sharpness should be maintained, for which they should be kept sharp. Also, while cutting, the equipment should be kept away from the face and body of the worker to prevent injury of any kind.
- Work area should be tidy and free of mess or clutter. All materials and equipment should be kept neatly stacked so that they do not come in any one's way or cause any harm to anybody.



#### Fig-1.3.1 Health & Safety

#### 1.3.3 Workers Responsibility

## Elaborate

- As a worker, worker responsibilities are to: Know and follow health and safety requirements affecting worker job.
- If you don't know how to do something safely, ask for training before you begin work.
- Wear appropriate safety gear and encourage others to also wear, so as to avoid accidents.
- Immediately report unsafe working conditions to worker supervisor.
- Immediately report any injury to a first aid attendant or supervisor
- Keep all the tools in an organized manner so as to avoid accidents

#### 1.3.4 Risk Assessment

## Elaborate

The following checklist can be used to assess the health risk at the workplace. If the answers to any of these questions indicate 'potential hazards', it is a sign of shortcomings in the safety system. In other words, there are deficiencies that can lead to accidents or cause damage to health.

#### **General Cleanliness**

- 1. Is there a routine of cleaning activities done on a daily basis at the site?
- 2. Is the trash being disposed of daily? Are the garbage bins emptied every day?
- 3. Is the floor littered? Does the floor show spillage?
- 4. Are there any signs of rotting food or plant material at the site?

- 5. Are there insects, rodents or cockroaches at the site?
- 6. Are the walls, windows or lighting fixtures and furniture covered in dust?
- 7. Is there mould growth on the walls or furniture?
- 8. Is the storage room cleaned annually?

#### Storage

- 9. Are documents, machine parts and goods stored in areas specifically assigned for them?
- 10. Are the documents, machine parts and goods easily accessible without obstructing the movement and functioning of the staff?
- 11. Are the documents, and parts of machinery or goods stored in such a way that they can be accessed and handled with ease?

#### **Space Occupancy**

12. Is there adequate space to work or is the site overcrowded?

#### Maintenance

- 13. Is there a procedure or schedule in place for the disposal of out-dated and useless waste?
- 14. Is there any defective machinery or furniture requiring repair but lying unattended for over a year?
- 15. Are there specific members of staff with clear instructions assigned to carry out housekeeping and maintenance responsibilities?

#### **General Overview**

- 1. Regular inspection of the entire system on a regular basis is a must.
- 2. The frequency with which the cleaning is done needs to be documented. The number of times the basin has been cleaned needs to be recorded.
- 3. A record has to be maintained of the volume of waste collected.
- 4. Waste should be stored in proper containers following cleaning activities in such a way that no waste reenters the system or the incoming waterways.

# Explain

- a) Choice of equipment should be made as per the type of cleaning required.
- b) Examine all equipment for cleanliness and safety before using them.
- c) Make use of appropriate dry and wet cleaning agents and chemicals according to the safety and occupational health needs, and as specified by the manufacturer.
- d) Choose appropriate protective clothing for use as per the requirement.
- e) Assess use furniture, fixtures, ceilings and walling materials.
- f) Select appropriate cleaning equipment and chemicals in accordance with the type of material used.
- g) Apply appropriate procedures in accordance with the technique.

## Activity

- Conduct a skill practice activity. •
- Ask the students to assemble together. •
- Explain the purpose and duration of the activity. ٠
- Set guidelines pertaining to discipline and expected tasks. ٠

Skill Practice	Time	Resources
Students need to explain the purpose of good work practices, create presentation on good work practices while doing plumbing work and present to the team.	60 Minutes	Notebook, pen, Flip charts



- Conduct a skill practice activity.
- Ask the students to assemble together. ٠
- Explain the purpose and duration of the activity. •
- Set guidelines pertaining to discipline and expected tasks. •

Skill Practice	Time	Resources
Students need to do a risk assessment activity for plumbing area, create presentation and present to the team.		Notebook, pen, Flip charts, Plumbing Work Area





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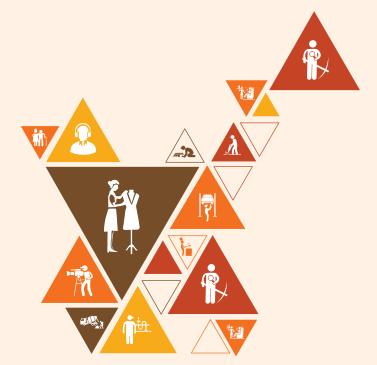


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# 2. Installation Of Basic Sanitary Fixtures

- Unit 2.1 Tools, Equipment And Materials (Pre-Installation Activity)
- Unit 2.2 Measurement (Pre-Installation Activity)
- Unit 2.3 Pipes Fitting, Cutting, Bending, Joining And Testing Of Pipelines (Pre-Installation And Installation Activities)
- Unit 2.4 Plumbing And Sanitary Fixtures And Their Installation
- Unit 2.5 Pumps And Their Installation
- Unit 2.6 Water Meters
- Unit 2.7 Assessment



### PSC/N0101

## Key Learning Outcomes

#### At the end of this module, students will be able to:

- 1. Identify, understand and demonstrate the different types of tools
- 2. Identify and understand different measuring systems
- 3. Repair of various types of fitting and fixtures
- 4. Different types of pipes, fitting, cutting, bending, joining and testing of pipelines
- 5. Install Tap/Faucets, Washbasins, water closets, urinals, bidet, shower and other accessories.
- 6. Cutting opening structure, chasing, masonry tool, mortar preparation and filling etc.
- 7. Pumps and their types, installation and water meters etc.

### Unit 2.1: Tools, Equipment And Materials



#### At the end of this unit, students will be able to:

- 1. Understand and demonstrate the use of holding devices
- 2. Understand and demonstrate the use of fitting tools
- 3. Understand and demonstrate cutting tools
- 4. Understand and demonstrate pipe threading and bending tools
- 5. Understand and demonstrate miscellaneous tools screw drivers, file, chisels and hammers. Sealing materials, drill machines etc.

# Resources to be Used

- Laptop
- Projector
- White Board
- Marker
- Duster
- Tools
- Holding device, Blow Torch, Pipe cutter, Pipe Threader, Pipe bending tool, Drill machine, Measuring tape, Spirit level
- Masonry tools

# – Do

- Greet the participants for the day.
- Give Summary of previous Session.
- Ask for any doubts in previous Session.
- Acknowledge for their doubt-raising, if any. Clear the doubts.
- Give details of today's session and what they are going to learn.
- Encourage them to share their thoughts and doubts now and during process of this course.

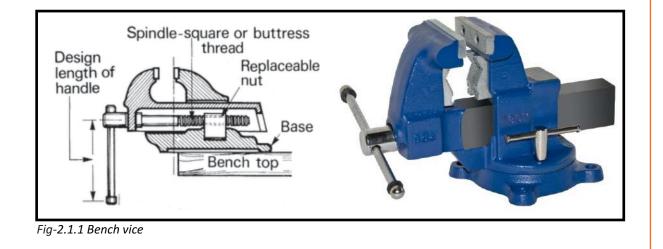
## Ask ask

- Ask students if they have seen plumbing equipment.
- Ask students the name of some plumbing equipment they know.
- Ask students the equipment name used for thread making in pipes.
- Ask students the purpose of thread seal tape in plumbing.

### 2.1.1 Holding Devices (Bench Vice)

# Elaborate

- a) Bench Vice is a holding device bolted to a work bench.
- b) It can be opened and closed by turning a handle attached to a spindle. This way it can control the level of tightness with which a thing is held.
- c) One of its jaws is fixed, while the other can be moved.
- d) While bench vices are holding objects, the other tools are free to complete a task.
- e) While filing edges on a block, one can concentrate on filing evenly instead of holding an object and struggling to file properly.



## 2.1.2 Holding Devices (Pipe Vice)

### Elaborate

# Pipe Vice is an apparatus which enables a pipe to be held tightly.

- a) Often a feature of a common bench vice, the addition of a pipe vice makes the bench vice an all-purpose tool capable of performing many more tasks.
- b) Complete with two half-circle jaws, the pipe vice can be tightened to grip a pipe and hold it securely while it is being worked on.
- c) The teeth of a pipe vice are critical in the gripping success of the tool, as rounded or dull

teeth allow the pipe to slip and roll even though the pipe vice is tightened.



Fig-2.1.2 Pipe Vice

#### 2.1.3 Fitting Tool (Pipe Wrench)

## Elaborate

- a) Pipe Wrench is a slide wrench that can turn soft iron pipes and fittings that have a rounded surface.
- b) The slide jaw is so designed that it rocks in the frame, so that any forward pressure on the handle will pull the jaws closer and tighter.
- c) Teeth dig into the soft pipe as they are angled in the direction of turn.
- d) Pipe wrenches are made of cast steel.
- e) They are available in different handle lengths: 10, 14, 18, 24, 36, and 48 inches. They are also sold in smaller and larger sizes.



Fig-2.1.3 Pipe Wrench

#### 2.1.4 Fitting Tool (Slide Wrench)

Elaborate

a) Slide Wrench, unlike a conventional fixed spanner, is a wrench with a "jaw" of slide width. This makes it possible to use for various sizes of fastener heads, such as nuts and bolts, instead of just one fastener.



#### Fig-2.1.4 Adjustable Wrench

#### 2.1.5 Parrot Pliers

- a) Parrot Pliers are similar to slip-joint pliers.
- b) They help turn and hold nuts and bolts, as they are capable of gripping objects with uneven shapes, and can also clamp things.
- c) Their jaws are jagged, like a saw, and usually set at 45 to 60 degrees from the handles.
- d) It is possible to move the lower jaw to different positions by sliding it along a tracking section below the upper jaw.
- e) These pliers are so designed that they can adjust to many sizes without the distance in the handle widening.



#### 2.1.6 Spanners

# Elaborate

- a) Spanners are used mostly by plumbers to unscrew water pipes taps/faucets and other plumbing pipes.
- b) They can be called open head wrenches, and are mainly used in cases where the fittings are such that the ordinary type of wrench is of no use.
- c) These can be bought in different sizes to accommodate most plumbing jobs.



Fig-2.1.6 Spanners

Fig-2.1.7 Open & Close Head Wrench

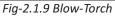
#### 2.1.7 Blow-Torch

## Elaborate

A blow-torch or blow-lamp is a fuel-burning tool employed to apply flame and heat to different applications, and is commonly used in metalworking. The blowlamp is most useful in cases where a naked flame of high temperature and covering a wide area is needed, but at the same time, not hot enough to burn or weld. Therefore, it is ideal for softening paint for removal, soldering, brazing and melting roof tar. It can also be used in repairing to pre-heat large castings before welding.



Fig-2.1.8 Blow-Torch



### 2.1.8 Chisel

 Elaborate
 Second contraction

 Chisel- They are used to cut through concrete. The diamond point chisel is sometimes used to give grooves a pointed bottom.

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### 2.1.9 Punch

Elaborate

A punch is simply a hard metal rod with one end in the form of a shaped tip while the other end is blunt. The butt, that is, the blunt end is hit by a hammer. Two types of punches are available, depending on the shape of the tip

Fig-2.1.12 Flat & Point Punch	

## 2.1.10 Chain Wrench

Elaborate

A chain wrench is a self-tightening wrench, similar to a pipe wrench. However, it has a chain or a leather, rubber or metal strap attached to a handle, which is used to grasp and turn smooth cylindrical objects. The extended pegs on the links of the chain can be fitted into grooves in the front of the handle. One end of the chain is permanently fixed to the handle. This is advantageous in scenarios where it is not possible for pipe wrenches to properly clasp an object, especially if it is wet or oily.



Fig-2.1.13 Chain Wrench

### 2.1.11 Rowel Jumper

– Elaborate 🔍

Rowel Jumper is used to make a hole on the wall to fix a pipe.





Fig-2.1.14 Rowel Jumper

Fig-2.1.15 Rowel Jumper

### 2.1.12 Pocker



A Pocker is a tool used to turn (drive or remove) screws. It could be manual or powered. A basic pocker has a handle, a shaft, and a tip that can be inserted into the screw head to turn it. The tough steel of the shaft prevents it from bending or twisting



#### 2.1.13 Trowel



Trowel is a small handheld tool with a flat, pointed blade, used to apply and spread mortar or plaster.



Fig-2.1.17 Small trowel

Fig-2.1.18 Big Trowel

#### 2.1.14 Pipe Cutter



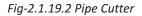
- a) Pipe Cutter is a device commonly used in plumbing jobs, to cut pipes.
- b) The tool is capable of rotating around the pipe and the tip of the cutter can be tightened till it cuts the pipe completely.



Fig-2.1.19.1 Pipe Cutter

- c) Two types of cutters are available:
  - a. Plastic pipe/tube cutters: These are ideal for cutting sprinkler pipes and tubes as they are similar to pruning scissors
  - b. Standard pipe cutters: These have a pipe cutter with a sharp wheel and jaw grips that can be adjusted. Therefore, these are ideal for cutting thick pipes.
- d) The pipe cutter is not only faster and cleaner, but also offers a clean cut. It is much easier to cut pipes with a pipe cutter than a hacksaw. A suitable cutter or hacksaw can be selected according to the metal of the pipe.





#### 2.1.15 Hack Saw

Elaborate

- a) Hack Saw is used for cutting materials such as metal or plastics.
- b) It is a fine-tooth hand saw with a blade held under tension in a frame.
- c) Blades are available in standardized lengths, usually 10 or 12 inches for a standard hand hacksaw.
- d) Powered hacksaws may be fitted with bigger blades in various sizes, while small machines may employ the same hand blades.



Fig-2.1.20 Hack Saw

#### 2.1.16 Pipe Threader

### Elaborate

- a) Pipe Threader allows plumbers or builders to fasten a length of pipe securely to a coupling or connector.
- b) It is used to cut grooves or threads into the end of a metal pipe. These grooves are similar to those found on a traditional screw, and serve the same basic function.
- c) The threads on the pipe fit into a pattern of threads in the connector, allowing users to screw the two components together by hand.
- d) Before threading the pipe, plumbers use a pipe-cutting tool to cut the pipe to the desired length.
- e) The end of the pipe is then inserted into the pipe threader.
- f) Special cutting tools, or dies, within the threader can be used to create the proper thread profile and depth.



Fig-2.1.22 Pipe Threader

### 2.1.17 Steps For Threading A Pipe



a) Inspect the pipe threader before beginning. Worn or damaged dies can result in poor thread

quality.



Fig-2.1.23 Threading Die

using a pipe cutter.

b) Mount your pipe firmly in the pipe vice by placing it in the vice and then tightening until it is held tightly.



Fig-2.1.24 Pipe Mounted on Threader

c) Cut the end of the pipe cleanly and squarely by d) Ream the cut end of the pipe to remove any burrs from the cut using a reamer, which is a cylindershaped rotary cutting tool that you run smoothly across the freshly cut edges of the pipe to remove rough edges.



Fig-2.1.25 Cut the pipe end

e) Select your die head according to the size and type of pipe you are threading and the thread form you require. Die heads come in different shapes and sizes that include different threads for pipes that have different diameters.



Fig-2.1.27 Die Selection

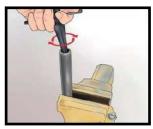


Fig-2.1.26 Reaming The Cut

f) Place the die head over the pipe on the threader.



Fig-2.1.28 Die Header Placement

g) Press steadily on the front of the die head, while simultaneously pushing the handle down to start the threader. Before placing too much pressure on the handle, check to be sure the ratchet pawl is engaged



Fig-2.1.29 Die Head Press

I) Apply threading oil generously while threading. Using oil too thin as a substitute for threading oil can result in sub-standard threading.

j) Reverse the ratchet mechanism and turn the die head in the opposite direction. Be careful to maintain control of the threader as the dies are removed. Threads can become damaged when the die head is being removed if you don't maintain control and move the piece smoothly.

h) Clean the pipe with a cloth, removing any oil. Be careful, the threads will be very sharp. Seal the threading with Teflon Tap/Faucete or a pipe thread compound when attaching the pipe to the connector.

 h) Use your weight as leverage to apply pressure on the handle, while holding it firmly. Be sure to maintain proper footing and balance for maximum control. This can be dangerous and could result in injury.

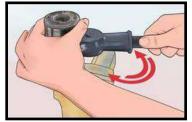


Fig-2.1.30 Applying Pressure

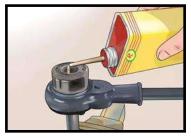


Fig-2.1.31 Applying Threading Oil



Fig-2.1.32 Reverse Ratchet Movement



Fig-2.1.33 Cleaning The Pipe

#### 2.1.18 Pipe Threading Tools (Pipe Benders)

#### Elaborate

a) Pipe-bending machines are meant to be used to bend pipes or conduits/tubes.

b) The tube is bent over a former which is curved to the radius of the required bend and shaped to support half the wall of the tube.

- c) A separate guide block supports the upper half of the tube as it is bent.
- d) Long handles provide the necessary leverage.
- e) Pipe benders are produced in a variety of sizes, from small domestic tools to large scale hydraulic benders for the trade.
- f) Pipe-bending machines function quite like bending presses. The only difference is that they use special dies according to the size of pipe that needs to be bent. The tube bender gives support to the walls of a conduit/tube during the bending procedure, only in a slightly different fashion.

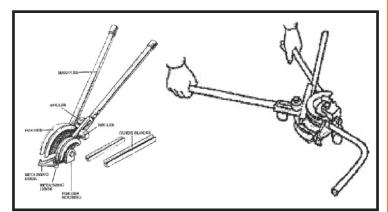


Fig-2.1.34 Pipe Bending Tool and Its Working

#### 2.1.19 Screw Drivers



- a) Screw Drivers are hand-held tools used to turn or drive screws, bolts and other machine components with a mating drive system.
- b) A screwdriver typically consists of a cylindrical handle that can be grasped by a normal human hand. An axial shaft is embedded in the handle, and protrudes from it. There is a tip at the end of the shaft, opposite the handle.
- c) It is possible to position the screwdriver and support it because of the handle and shaft.When the handle is rotated, torque is applied to the tip through the shaft of the screwdriver

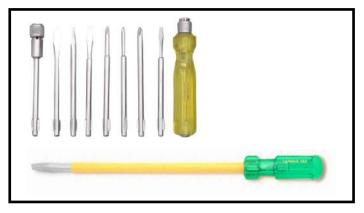


Fig-2.1.35 Screw Driver

#### 2.1.20 Chisels

## Elaborate

- a) Chisels are a tool with a characteristically shaped cutting edge.
- b) Handle and blade of a few chisels are made of metal or wood with a sharp edge in it.
- c) Chisels are forced into the material to cut it.

The driving force may be manually applied or applied using a mallet or hammer



### 2.1.21 Hammers



- a) Hammer is used to drive nails, fit parts, forge metal and break apart objects. .
- b) It gives an impact to an object.



Fig-2.1.37 Hammer

## 2.1.22 Files



- a) Files are used to smoothen the edges and to rub the surfaces.
- b) It is a roughened surface typically made of steel



## 2.1.23 Caulking Tools



 Caulking is just one of the many techniques employed to seal joints or seams of different structures and piping.



Fig-2.1.39 Caulking Tools

## 2.1.24 Thread Seal Tap/Faucete



- a) Thread Seal Tap/Faucete can be used in many ways, the most common of which is to seal pipe threads.
- b) It is a poly tetrafluoroethylene (PTFE) film cut to specified widths for use in sealing threads.
- c) It is commonly used commercially in pressurized water systems, such as central heating systems, as well as in air compression equipment and thread joints with coarse threads.
- d) The Tap/Faucete is wrapped around the exposed threads of a pipe before it is screwed into place.

#### 2.1.25 Plumber's Putty

#### Elaborate



- a) Plumber's Putty is a sealant frequently used by plumbers.
- b) It is a pliable substance capable of creating watertight seals around taps and drains.
- c) The putty is an essential part of a plumber's toolkit and is often used while replacing plumbing fixtures

### 2.1.26 Drills and Drill Machine

## Elaborate

- a) Drill is used for drilling holes in various materials or fastening various materials together with the use of fasteners.
- b) It is fitted with a cutting tool attachment or driving tool attachment, usually a drill bit or driver bit.
- c) The attachment is gripped by a chuck at one end of the drill and rotated while pressed against the target material.

#### 2.1.27 Hammer Drill Machine

## Elaborate

A hammer drill, also known as a "rotary hammer", "roto-drill" or "hammering drill", (see also rotary drill) is a rotary drill with a hammering action. The hammering action provides a short, rapid hammer thrust to pulverize relatively brittle material and provide quicker drilling with less effort.

#### 2.1.28 Hangers

## Elaborate

Pipe Hanger is used to support a pipe or group of pipes from a slab, beam, ceiling, or other structural element. This category contains many clamps, hangers and straps including Beam Clamps, C Clamps, Band Irons, Clevis Hangers, Copper Clevis Hangers, Copper Straps, Galvanized Straps, Stud Brackets.



Fig-2.1.40 Hangers

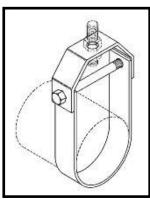




Fig-2.1.41 Clamps

## 2.1.29 Measuring Tap/Faucete

- Elaborate

Measuring Tap/Faucete is used to measure length breadth and height.

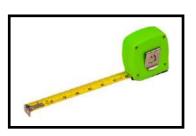


Fig-2.1.42 Measuring Tap/Faucete

## 2.1.30 Spirit Level



Spirit Level or bubble level is an instrument designed to indicate whether a surface is horizontal (level) or vertical (plumb).



Fig-2.1.43 Spirit Level

#### 2.1.31 Masonry Tools





a) Spade: Spade is used for earth work excavation, mixing --mortar and mixing concrete. It is manufactured out from toot steel. It consists of flate form with eye hole to hold handle. Wooden handle is fixed with help of a wedge at an inclination in the eye hole. Size is designated by its width and length.

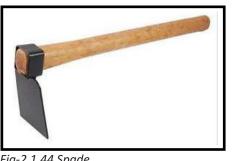


Fig-2.1.44 Spade

 b) Shovel: Shovel is used for mixing concrete and also for carrying concrete to mortar pans. Shovels are made of tool steel sheets. The size is designates by its lengths and widths.



Fig-2.1.45 Shovel

c) Pickaxe is used to excavate hard soils. It is manufactured from tool steel. One end of the Pickaxe is flat and the other end is sharp. It helps for two different operations. The size is denoted by its lengths.



Fig-2.1.46 Pickaxe

d) Mortar pan: Mortar pan is used to carry the excavated —material, cement mortar, concrete etc. It should never be used as a measure for mixing cement mortar etc. It is manufactured from mild steel sheet. The size is designated by its radius at top.



Fig-2.1.47 Mortar Pan

e) Masons' square (Tri-square) -Masons' square (Tri-square) is used to check whether the external and internal corners are at right angle one side of the L is 60cm and the other side is 30cm. It is marked on the both sides either in inch or centimeter. It is made of carbon steel sheet.

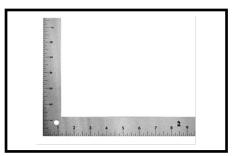


Fig-2.1.48 Mason's Square

f) Plumb rule -It consists of a wooden plank thread and weight. There will be a marking on the centre of the plank. The thread is fixed at the centre of plank at one end and other end is tied to the weight Keep one side of the plank close to the surface to be checked, if the surface is vertical the thread will rest exactly over the line.

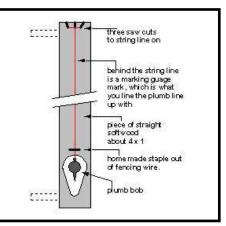
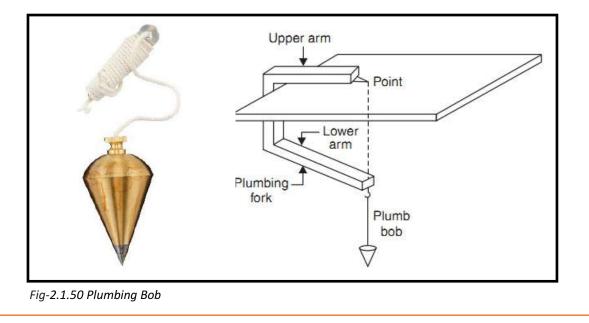


Fig-2.1.49 Plumb rule

- g) Water level -It is based on the principle that water remain in one level when it is connected. polythene tubes of varying dia from 10 to 15mm and lengths varying according to requirement are used. It is used to check levels, transfer levels etc. water is poured inside tube at the time of use.
- h) Plumbing Bob Plumb-Bob or plummet is a weight, usually with a pointed tip on the bottom that is suspended from a string and used as a vertical reference line, or plumb-line. It is essentially the y-axis equivalent of a "water level".



#### Notes for Facilitation

 Following video can be shown for elaborating more on the subject: https://www.youtube.com/watch?v=GfNUaVFmxaY

## - Activity

- Conduct a skill practice activity.
- Ask the students to assemble together.
- Explain the purpose and duration of the activity
- Set guidelines pertaining to discipline and expected tasks

Skill Practice	Time	Resources
Students need to explain the purpose of the holding devices and demonstrate working procedure of the different holding devices.		Bench vice, Pipe vice, Pipe wrench, Slide wrench, Parrot plier, Spanners.



- ty 💯
- Conduct a skill practice activity.
- Ask the students to assemble together.
- Explain the purpose and duration of the activity
- Set guidelines pertaining to discipline and expected tasks

Skill Practice	Time	Resources
Student needs to explain the purpose of a blow torch and to demonstrate working procedure of a blow torch.	120 Minutes	Different kind of Blow torches

# Activity 🤔



- Conduct a skill practice activity.
- Ask the students to assemble together.
- Explain the purpose and duration of the activity
- Set guidelines pertaining to discipline and expected tasks

Skill Practice	Time	Resources
Students need to explain the purpose of a Pipe Cutter and demonstrate working procedure of a Pipe Cutter.	120 Minutes	Pipe Cutter, full length pipe for cutting demonstration

### Activity

- Conduct a skill practice activity. •
- Ask the students to assemble together. •
- Explain the purpose and duration of the activity •
- Set guidelines pertaining to discipline and expected tasks ۰

Skill Practice	Time	Resources
Students need to explain the purpose of a Pipe Threader and demonstrate the working procedure of a Pipe Threader.		Pipe Threader.





- Conduct a skill practice activity. •
- Ask the students to assemble together. •
- Explain the purpose and duration of the activity
- Set guidelines pertaining to discipline and expected tasks

Skill Practice	Time	Resources
Students need to explain the purpose of a Pipe Bender and demonstrate the working procedure of Pipe Bender.	120 Minutes	Pipe Bender

# Activity



- Conduct a skill practice activity. •
- Ask the students to assemble together.
- Explain the purpose and duration of the activity ٠
- Set guidelines pertaining to discipline and expected tasks ٠

Skill Practice	Time	Resources
Students need to explain the purpose of a spirit level and demonstrate the working procedure of a spirit level.	120 Minutes	Spirit Level

# Activity

- Conduct a skill practice activity.
- Ask the students to assemble together.
- Explain the purpose and duration of the activity
- Set guidelines pertaining to discipline and expected tasks

Skill Practice	Time	Resources
Students need to explain the purpose of a water level pipe and demonstrate the working procedure of a water level pipe.	60 Minutes	Water Level Pipe



- ty 💯
- Conduct a skill practice activity.
- Ask the students to assemble together.
- Explain the purpose and duration of the activity
- Set guidelines pertaining to discipline and expected tasks

Skill Practice	Time	Resources
Students need to explain the purpose of a plumbing bob and to demonstrate the working procedure of a plumbing bob.	120 Minutes	Plumbing Bob

#### Unit 2.2: Measurement

## Unit Objectives

#### At the end of this unit you will be able to:

- 1. Understand the different measurement systems used for plumbing purpose.
- 2. Demonstrate and explain calculation methods
- 3. Understand the different symbols for plumbing purpose in drawings

# Resources to be Used

- Laptop
- Projector
- White Board
- Marker
- Duster
- Scale
- Measuring Tape
- Pressure gauge
- Vernier Caliper
- Flow Meter

# Do

- Greet the participants for the day. •
- Give Summary of previous Session.
- Ask for any doubts in previous Session.
- Acknowledge for their doubt-raising, if any. Clear the doubts.
- Give details of today's session and what they are going to learn. ٠
- Encourage them to share their thoughts and doubts now and during process of this course.

ask Ask

- Ask students what is measurement.
- Ask students why measurement is important in plumbing.
- Ask students the difference between inch and milimeter.
- Ask students what they know about metric and Imperial system of measurement.

### 2.2.1 Measurement of length



Plumber uses the metallic Tap/Faucetes, cloth Tap/Faucetes, scale, and foot rule for measuring. Metallic Tap/Faucete should be used for accuracy in the measurement. Meter and its divisions are printed on measuring Tap/Faucetes.

The symbol of feet is (') and symbol of inch is (").

For example the meaning of 4'-9" is 4 feet 9 inches.

Both the systems i.e. metric system and F.P.S. are used in plumbing.

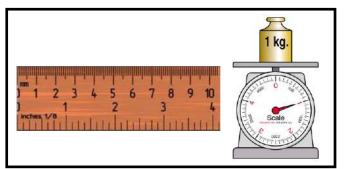


Fig-2.2.1 Scale & Measuring Equipment

#### a) In metric systems

c	a)	in metric systems		
		1 meter	=	10 decimeter (dm)
		1 meter	=	100 centimetre (cm)
		1 meter	=	1000millimetre (mm)
		The same can be more	simplifi	ed
		10 millimetre	=	1 centimetre (cm)
		10 centimetre	=	1 decimeter (dm)
		10 decimeter	=	1 meter (m.)
k	c)	In the F.P.S. system		
		1 feet	=	12 inches
		3 feet	=	1 yard
I	nter-rel	ation of Metric and F.P.	S. Syster	n Both type of measuring systems can be interrelated, for taking
I	ength, i	n the following manner	·:	
		1 inch	_	$25.4 \mathrm{mm}$ - $2.54 \mathrm{cm}$

1 inch	=	25.4 mm	=	2.54 cm
1 meter	=	39.37 inches	=	1.09 yard

#### **Measurement of Weight**

Weight measurement, using both the systems, is done in the following:

Conversion Tables Weight

1 kilogram	=	10 hectograms
1 kilogram	=	100 decagram
1 kilogram	=	1000 gram
100 kilogram	=	1 Quintal
1000 kilogram	=	1 metric ton
1 kilogram	=	2.2046 pounds

# 2.2.2 Measurement of Length

- Elaborate

Length conversion is depicted in the following:

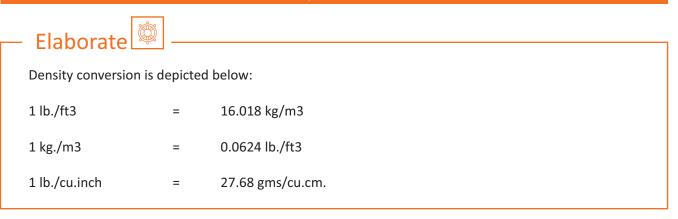
1 millimeter (mm)	= 0.03937079 in., or about 1/25 in	
10 millimeter	= 1 centimeter (cm.)	= 0.3937079 in
10 centimeters	= 1 decimeter (dm.)	= 3.937079 in
10 decimeters	= 1 meter (m.)	= 39.37079 in., 3.2808992 ft., or 1.09361 yd
10 meters	= 1 decameter (Dm.)	= 32.808992 ft
10 decameters	= 1 hectometers (Hm.)	= 19.927817 rods
10 hectometers	= 1 kilometer (Km.)	= 1093.61 yd., or 0.621377 mit
10 kilometers	= 1 myriameter (Mn.)	= 6.21377 ml
1 inch	= 2.54cm.	1 foot = 0.3048 m., 1 yard = 0.9144 m
1 rod	= 0.5029 Dm.	1 mile = 1.6093 Km

### 2.2.3 Measurement of Capacity

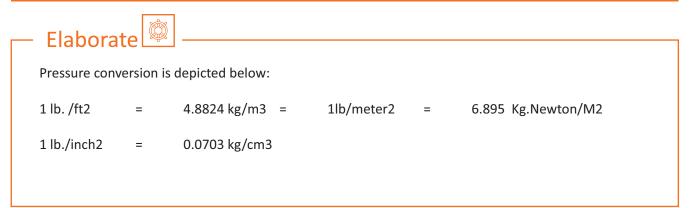
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Elaborat	a 🖗	
Capacity conve	rsion, is	depicted below:
1 liter (l.)	_ 00.0	ic decimeter = 61.0270515 cu.in. or 0.03531 cu. ft. or 1.0567 tr. 0.908 dry qt.
10 liters 10 deciliters 10 hectoliters 1 cubic foot	= = =	1 deciliter (Dl.) = 2.6417 gal., or 1.135 pk. 1 hectoliter (Hl.)= 2.8375 bu. 1 kiloliter (Kl.) = 61027.0515 cu.in. or 28.375 bu. 28.317
1 gallon, Amer 1 gallon, Brit 1 gallon	= = =	3.785 l. 4.543 l. 4.546 liter

# 2.2.4 Measurement of Density



### 2.2.5 Measurement of Pressure



# 2.2.6 Comprehensive Conversion Table

Millimeters	= 25.400	x inches
Meters	x 3.2809	= feet
Meters	= 0.3048	x feet
Kilometers	x 0.621377	= miles
Kilometers	= 1.6093	x miles
Square centimeters	x 0.15500	= square inche
Square centimeters	= 6.4515	x square inche
Square meters	x 10.76410	= square feet
Square meters	= 0.09290	x square feet
Square kilometers	x 247.1098	= acres
Square kilometers	= 0.00405	x acres
Hectares	x 2.471	= acres
Hectares	0.4047	x acres

# Explain

- a) To calculate the circumference of a pipe or circle, multiply the diameter by 3.1416 (C=D x π) or (C=D x 3.1416)
- b) The circumference = radius of a circle x6.283185. (C=R x 6.283185)
- c) To calculate the diameter of a pipe, multiply the circumference by .31831 (D=C/ $\pi$ ).
- To find the area of a circle, or cross-section of a pipe, multiply the square of the diameter by .7854. (A = x .7854)
- e) The area of a circle = square of the circumference of a circle x .07958. (A = x .07958)
- f) The area of a circle = Half the circumference of a circle x half its diameter. (A= C/2 xD/2).
- g) The Radius = circumference of a circle x 0.159155.
- h) The Radius = The square root of the area of a circle x 0.56419.
- i) The Diameter=The square root of the area of a circle x 1.12838.
- j) For obtaining the Diameter of a circle equal in area to a given square, multiply a side of the square by 1.12838.
- k) To obtaining the side of a square equal in area to a given circle, multiply the diameter by .8862.
- I) Side of a square inscribed in a circle = diameter of circle x 0.7071.
- m) Side of a hexagon inscribed in a circle=diameter of a circle x 0.500.
- n) Diameter of a circle inscribed in a hexagon=side of the hexagon x 1.7321.
- o) Side of an equilateral triangle inscribed in a circle=diameter of a circle x 0.866

#### 2.2.7 Measuring Instruments

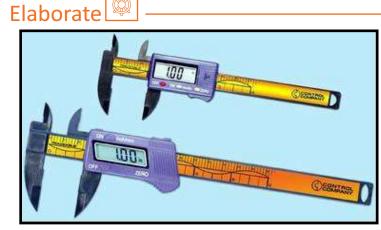
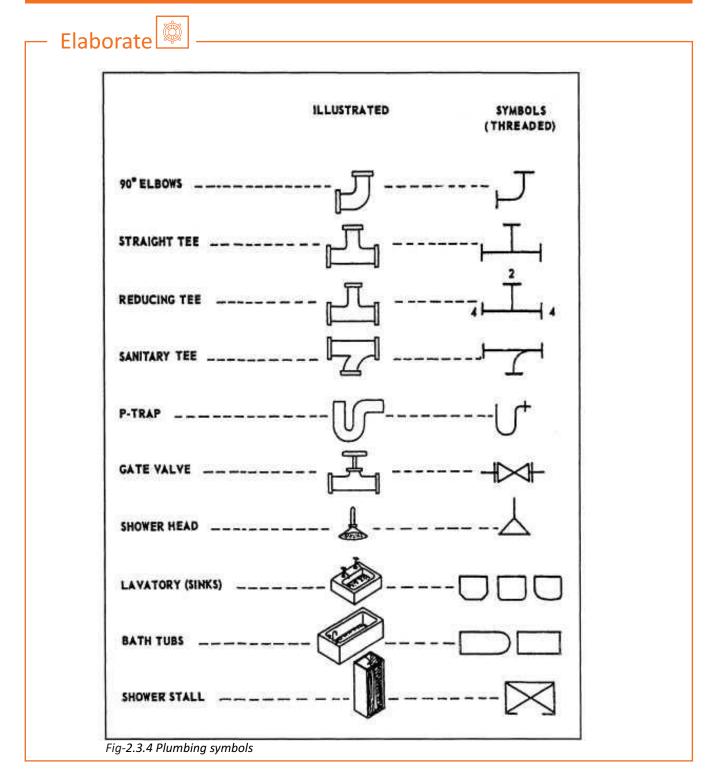




Fig-2.2.2 Callipers

Fig-2.2.3 Pressure Gauge

### 2.2.8 Plumbing symbols



#### Notes for Facilitation

 Following video can be shown for elaborating more on the subject: https://www.youtube.com/watch?v=80XC\_1MRVew

# Activity

- Conduct a skill practice activity.
- Ask the students to assemble together.
- Explain the purpose and duration of the activity
- Set guidelines pertaining to discipline and expected tasks

Skill Practice	Time	Resources
Students need to explain the purpose of measurement and unit conversion and demonstrate few unit conversion.	60 Minutes	Unit conversion table and some question for unit conversion



- Conduct a skill practice activity.
- Ask the students to assemble together.
- Explain the purpose and duration of the activity
- Set guidelines pertaining to discipline and expected tasks

Skill Practice	Time	Resources
Students need to explain the purpose of a pressure gauge and to demonstrate the working procedure of a pressure gauge.	60 Minutes	Pressure Gauge

### Activity

- Conduct a skill practice activity.
- Ask the students to assemble together.
- Explain the purpose and duration of the activity
- Set guidelines pertaining to discipline and expected tasks

Skill Practice	Time	Resources
Students need to explain the purpose of a vernier caliper and demonstrate the working procedure of a vernier caliper.	60 Minutes	Vernier Caliper

## Activity

- Conduct a skill practice activity.
- Ask the students to assemble together.
- Explain the purpose and duration of the activity
- Set guidelines pertaining to discipline and expected tasks

Skill Practice	Time	Resources
Students need to explain the purpose of a flow meter and demonstration the working procedure of a flow meter.	60 Minutes	Flow meter



- Conduct a skill practice activity.
- Ask the students to assemble together.
- Explain the purpose and duration of the activity
- Set guidelines pertaining to discipline and expected tasks

Skill Practice	Time	Resources
Students need to explain the purpose of the plumbing symbols and demonstrate identification of some of the plumbing symbols.	60 Minutes	Plumbing Symbols

### Unit 2.3: PIPES - Fitting, Cutting, Bending, Joining And Testing of Pipelines

### Unit Objectives

Ø.

At the end of this unit, students will be able to:

- 1. Identify and understand different types of pipes
- 2. Identify and understand allied fitting of pipes
- 3. Understand and demonstrate bending, threading and joining of pipe
- 4. Testing of pipe lines

# Resources to be Used

- Laptop
- Projector
- White Board
- Marker
- Duster
- Metallic Pipes
- Non-Metallic Pipes
- Allied Fittings
- Joints cut models
- Different types of Valves
- Traps
- Pipe cutter, Pipe Threader & dies
- Pressure Gauge

Do

- Greet the participants for the day.
- Give Summary of previous Session.
- Ask for any doubts in previous Session.
- Acknowledge for their doubt-raising, if any. Clear the doubts.
- Give details of today's session and what they are going to learn.
- Encourage them to share their thoughts and doubts now and during process of this course.

Ask (ask)

- Ask students what is pipe.
- Ask students the purpose of using pipes in plumbing.
- Ask students the types of pipes being used in plumbing.
- Ask students about the material being used in different kind of pipes.

### 2.3.1 Types of Pipes



There are various types of pipes that are used in plumbing industry, you will study about them further in chapter.

#### 2.3.2 Metallic Pipes



- a) Cast Iron- It is used as a pressure pipe for transmission of water, gas and sewage, and as awater drainage pipe. These are available with flanged ends or one end with socket & other with spigot.
- b) Ductile Iron –It is commonly used for potable water transmission and distribution. It is made of ductile iron. These pipes are improved version of Cast Iron Pipes.
- c) Copper-It is made up of copper. It is most often used in supply of hot and cold Tap/Faucet water, as refrigerant line in HVAC systems Copper offers a high level of resistance to corrosion however, it is becoming very costly.
- d) Stainless Steel It is used in marine environments where salt water would erode other metal pipe. These pipes are strong and highly resistant to corrosion. However, even more expensive than copper pipes.
- e) Galvanized Iron Pipe is mainly used in water supply distribution. These pipes are made of different grade i.e. Light, Medium and Heavy depending upon the thickness of pipe used. These are colour coded for identification - light – yellow band, medium – blue band and heavy – red band Pipes with diameters in size from 15 mm to 150 mm are used in distribution.

#### 2.3.3 Non-Metallic Pipes

# Elaborate

- a) CPVC -Chlorinated Polyvinyl Chloride (CPVC) Pipe is primarily used for supplying hot and cold potable water. It is also used in industrial liquid applications Chlorinated polyvinyl chloride is a thermoplastic pipe material.
- b) PEX or XLPE- It is a form of polyethylene with cross-links, formed into tubing. PEX Pipe is primarily used in building services, pipe work systems, domestic water piping, natural gas and offshore oil applications, chemical transportation and transportation of sewage and slurries.
- c) Polypropylene -These are made of polypropylene "random copolymer". Polypropylene Pipe is primarily used for inner hot water and cold water supply conduits, industrial pipe-lines.

 d) Stone Ware-These are made of clay. They are primarily used in

 sewerage systems for underground drainage, industrial drainage, irrigation, chemical industry for transporting the highly corrosive chemical etc.



Fig-2.3.1 Stone Ware

- e) Un-Plasticized Un-plasticized Polyvinyl (UPVC) Pipe is primarily used in ventilation pipe work, rain water applications, soil and waste water discharge system
- (f) High Density Polyethylene (HDPE) pipes are commonly used in the majority of municipal and industrial water transmission systems. Based on the density, polyethylene is classified into three categories:
  - Low density polyethylene (LDPE) Medium density polyethylene (MDPE) High density polyethylene (HDPE)

HDPE pipes have the following advantages:

- a) They are not poisonous, lethal or toxic
- b) They are capable of withstanding all types of weather
- c) They can withstand high pressure
- d) They are resistant to tearing.
- e) They are most suited to convey radioactive waste.



Fig-2.3.2 HDPE Pipe

(g) PPR Pipes are used both as cold water as well as hot water pipes. They have many advantages they are moderately priced, give a consistent performance, provide heat insulation, are resistant to corrosion, have smooth inner wall, are safe and dependable, do not penetrate, and last for up to 50 years. Its main disadvantage is that only special tools and professionals can be employed for construction so that system safety is ensured.

### 2.3.4 Allied Fittings for Pipe

Elaborate

Depending on the layout requirements, different fittings are employed by plumbers for connecting pipes or tubing sections.

Elbow	Gasket	Coupling
Union	Reducer	Тее
Nipple	Valve	Тгар

#### 2.3.5 Elbow

Elaborate

An elbow is a pipe fitting fixed between two lengths of pipe or tubing to bring about a change of direction, usually a 90° or 45° angle. The ends may be machined for butt welding, threaded (usually female), or socketed, etc. If the two ends are of different sizes, the fitting is referred to as a reducing elbow or reducer elbow.

Elbows are categorized based as below:

Long Radius (LR) Elbows-radius is 1.5 times the pipe diameter

Short Radius (LR) Elbows-radius is 1.0 times the pipe diameter

90° Elbow-where change in direction required is 90°

45° Elbow where change in direction required is 45°

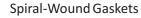
#### 2.3.6 Gaskets

(a)



Gaskets are used for sealing of flange joints. Various types of gaskets are available depending upon their construction, materials, and features. The following are the type of gaskets commonly used:

Non-Metallic Gaskets



(c) Ring Joint Gaskets



Fig-2.3.4 Gaskets



(b)



#### 2.3.7 Coupling



A coupling is used to connect or join two pipes. If the pipes are of varying sizes, a reducer or reduced coupling is used, also called an adapter. Conventionally, even though coupling may be used to increase the pipe size, the term 'reducer' is used instead of 'expander'.

#### 2.3.8 Union

Elaborate

Much like a coupling, a union can be used to quickly and easily disconnect pipes during repair or maintenance procedures. It offers a simple transition so that pipes can be disconnected conveniently at any time, unlike a coupling, which requires solvent welding or soldering. Also, a coupling should be capable of rotating with all the pipes next to it with a threaded coupling. In a standard pipe union, there are three components — a nut, a female tip, and a male end. Once the male and female tips are connected, the nuts provide the pressure needed for sealing the joint. The mating ends of the union can be interchanged. Therefore, a valve or any other tool can be changed quickly without losing any time. Basically, pipe unions are a type of flange connector, as will be clear in the subsequent paragraphs.

#### 2.3.9 Reducer



A reducer allows for a change in pipe size to meet hydraulic flow requirements of the system, or to adapt to existing piping of a different size. Reducers are usually concentric but eccentric reducers are used when required to maintain the same top- or bottom-of-pipe level.



Fig-2.3.5 Reducer

#### 2.3.10 Tee



A tee is a commonly-used pipe fitting, which is shaped like a T. It has two outlets, at 90° to the connection to the primary line. It is a short piece of pipe with a lateral outlet. Tees with different types of threaded joints are available. Some may have all female thread sockets, while others may have only solvent weld sockets. Some may come with opposed solvent weld sockets and a side outlet with female threads. A tee helps to either combine or split a fluid flow. A tee could be used not only to connect pipes of different diameters but also to change the direction of pipe runs. Tees can vary in terms of size, finish and material. They are also widely used in pipeline networks which transport two-phase fluid mixtures.

#### 2.3.11 Nipple

Elaborate

It is a short piece of pipe or pipe stub, with external male pipe threads at each end. It could be made of only bare copper, or also threaded steel, brass or chlorinated polyvinyl chloride (CPVC). Nipples are commonly used in plumbing and hoses, to connect two fittings, and can also serve as valves for funnels and pipes.

Elaborate

#### 2.3.12 Types of Pipe Joints

Connecting two or more pipes together is called fitting. Different pipe joints are for different pipes. These joints are as followed:-

### 2.3.13 Butt - Welded Joints

## Elaborate

- A common technique of connecting pipes, especially in big piping systems of industries, institutions or commercial establishments, is called butt-welding. While material costs are not high, this method of joining pipes requires specialized welders and fitters. This results in increased labour costs.
- Butt-welding is preferred for its leakage integrity in the long run, in addition to its structural and mechanical strength.
- Butt-welded joints require exacting fit-up requirements and special machining for butt weld end preparation.

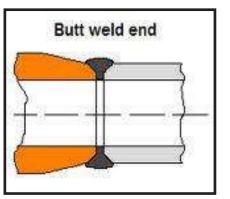
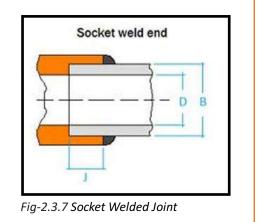


Fig-2.3.6 Butt-Welded Joint

### 2.3.14 Socket - welded Joints



- Socket-welded systems are not as suitable when it comes to corrosive or radioactive applications, because of the internal gaps or cracks that remain in them.
- Their low-fatigue resistance makes socket-weld joints better than butt-welded joints. This is because socket-welded joints use fillet welds and abrupt fitting geometry. They are also preferred over other mechanical joining techniques.
- Socket-welded joints are aesthetically more appealing.



### 2.3.15 Brazed and Soldered Joints

# Elaborate

- The widely used techniques to join copper and copper-alloy piping systems are brazing and soldering. It is also possible to braze steel and aluminium pipes and tubes.
- In both these techniques—of brazing and soldering—molten filler metal is poured or put on a closely fitted annular joint.
- Capillary action draws the molten metal into the joint, where it solidifies and fuses the parts together. This ensures leakage integrity. The metal, of which the pipes are made, does not melt during brazing or soldering. In both these joining techniques, not only is the leakage integrity high but the installation productivity increases too.

### 2.3.16 Threaded or Screwed Piping

# Elaborate

- a) In case of low-cost applications, the most widely used technique of jointing pipes, is the threaded or screwed piping. It is also commonly employed in domestic water supply, fire-fighting, industrial water cooling systems, and other noncritical applications.
- While no specialized installation skills are really required, the installation productivity is quite high. b)

#### 2.3.17 Grooved Joints



- a) It is not difficult to assemble grooved joints. They incur very low labour cost and provide high leakage integrity.
- b) Grooved joints are capable of accommodating axial misalignment. They permit a reasonable extent of axial movement owing to thermal expansion.
- c) Grooved joints are widely used primarily in fire protection, ambient temperature service water, as well as low-pressure drainage applications, such as floor and equipment drain systems and roof drainage pipes.
- d) They are the preferred choice in piping systems that require frequent disassembling and reassembling for maintenance, location or process alterations.

#### 2.3.18 Flanged Joints





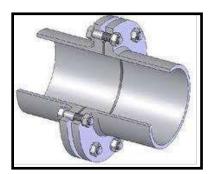


Fig-2.3.8 Flanged Joints

- a) Although expensive, flanged connections are widely used in piping systems because they are easy to assemble and disassemble.
- b) Flange connections are expensive because of the cost of material used in the flanges. Also, it involves labour costs for the process of jointing.
- c) Threading or welding may be used to connect the flanges to the pipe. In certain situations, a flangetype joint called a lap joint is made by forging and machining the ends of the pipe.
- d) In services wherein quick and fast changes in temperature are experienced, leakages may occur in flanged joints.

#### 2.3.19 Compression Joints

# Elaborate

- a) Although expensive, flanged connections are widely used in piping systems because they are easy to assemble and disassemble.
- Flange connections are expensive because of the cost of material used in the flanges. Also, it involves labour costs for the process of jointing.
- c) Threading or welding may be used to connect the flanges to the pipe. In certain situations, a flangetype joint called a lap joint is made by forging and machining the ends of the pipe.
- In services wherein quick and fast changes in temperature are experienced, leakages may occur in flanged joints.

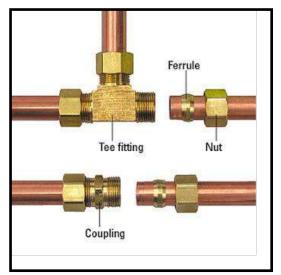


Fig- 2.3.9 Compression Joints

### Notes for Facilitation

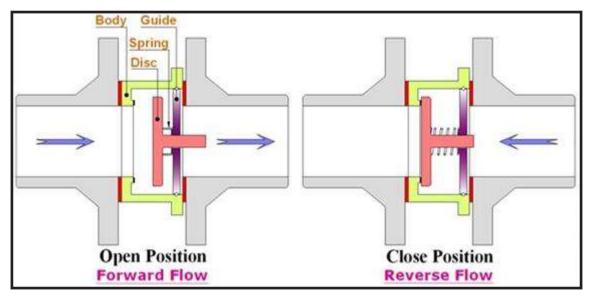
 Following video can be shown for elaborating more on the subject: https://www.youtube.com/watch?v=Y3qCwtjkhw https://www.youtube.com/watch?v=FH\_IA8RO7iM

#### 2.3.20 Valves

# Elaborate

These are devices designed such that they can control, stop or regulate flow of any fluid—liquid, gas, condensate, stem, slurry, and so on— in its path. Valves are classified on the basis of their applications, such as isolation, throttling, and non-return. Based on the construction type, there are several types of valves as follows:

a) Check Valve- It is used for preventing reverse flow (non-return) A check valve, clack valve, non-return valve or one-way valve is a valve that normally allows fluid (liquid or gas) to flow through it in only one direction. Check valves are two-port valves, meaning they have two openings in the body, one for fluid to enter and the other for fluid to leave.



#### Fig- 2.3.10 Check Valve

b) Globe Valve- It is a valve used to throttle or regulate flow in a pipeline. It has a movable disk-type element and a stationary ring seat within a largely spherical body.

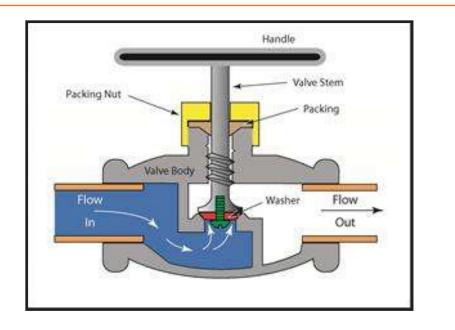


Fig-2.3.11 Globe Valve

c) Sluice valve-gate valve or sluice valve, is a valve which opens by lifting a round or rectangular gate/wedge out of the path of the fluid.

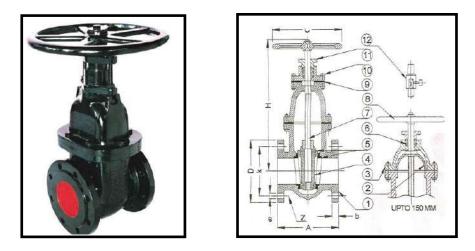


Fig-2.3.12 Sluice valve- gate valve or sluice valve

d) Foot Valve- It serves as a one-way valve, which permits water to be sucked through the valve with a pump. Once the flow of water stops, the seal prevents the backflow of the water. There is a strainer on the outside, which stops obstructions and a check valve that closes once the pump stops pumping.

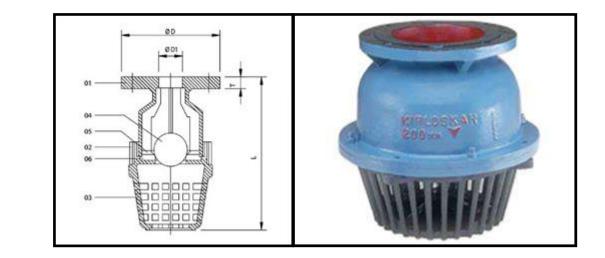


Fig- 2.3.13 Foot Valve

- e) Air release valve: There are two main functions of air release valves installed in pipeline systems:
  - a. Their primary purpose is to let out the collected air that is emitted by the solution inside a pressurized pipeline. This air comes from bubbles that gather at localized high points along the side of the pipeline. These air bubbles gather when the bubble buoyancy exceeds the force of liquid flow. The air release valves get rid of this free air from the piped system.
- f) Air release valves also let in air into the system, when there is a fall in the internal pressure of the pipeline, that is, when this pressure is less than the atmospheric pressures, or when a vacuum force is created. By allowing air into the pipeline, the magnitude of the internal vacuum pressure can be decreased. Such a decrease in vacuum pressure protects the pipeline from excessive deflection or collapse. When the vacuum pressure drops, the creation of a full vacuum condition is also prevented, wherein vapour cavities may be created by the vaporizing fluid. The air valves used in such cases are called air & vacuum valves.
  - i) Air & vacuum valves are also ideal for releasing huge amounts of air from the pipeline system, when the pipeline is initially filled and after the water column is separated.





Fig -2.3.14 Air release Valve

g) Needle Valve- It is valve equipped with a small port and a threaded, plunger in the shape of a needle.
 It allows precise regulation of flow, although it is generally only capable of relatively low flow rates.
 These valves are usually made up of plastic.



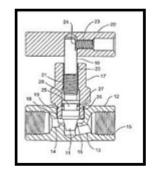


Fig-2.3.15 Needle Valve

 Stop Valve:- A valve that can be closed or opened at will, as by hand, for preventing or regulating flow, as of a liquid in a pipe; - in distinction from a valve which is operated by the action of the fluid it restrains.

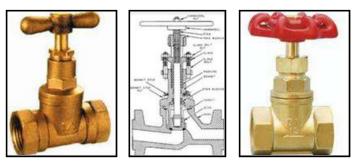


Fig-2.3.16 Stop Valve

I) Pressure reducing Valves: - The reducing valve (RV) is a type of valve used to control or limit the pressure in a system or vessel which can build up by a process upset, instrument or equipment failure, or fire. The pressure is relieved by allowing the pressurized fluid to flow from an auxiliary passage out of the system.

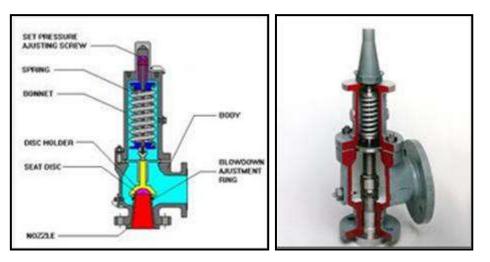


Fig-2.3.17 Pressure reducing Valves

j) Safety Valve- This is a valve mechanism for automatic release of a substance/ material from a boiler, pressure vessel, or any other system.

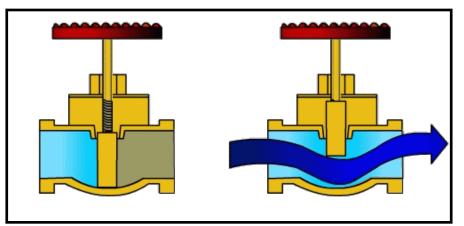


Fig-2.3.18 Safety Valves

k) Plug valve –It is used for isolation only

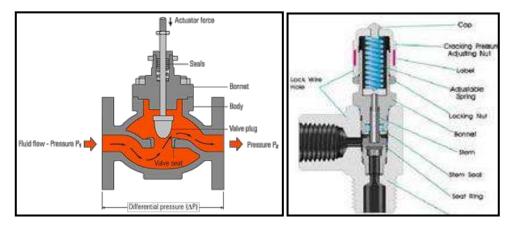


Fig-2.3.19 Plug Valves

I) Butterfly valve - It is used for isolation as well as throttling

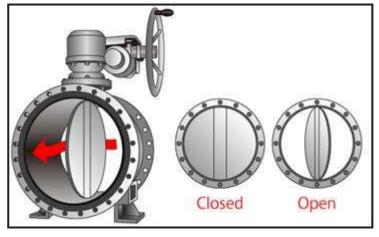


Fig-2.3.20 Butterfly Valve

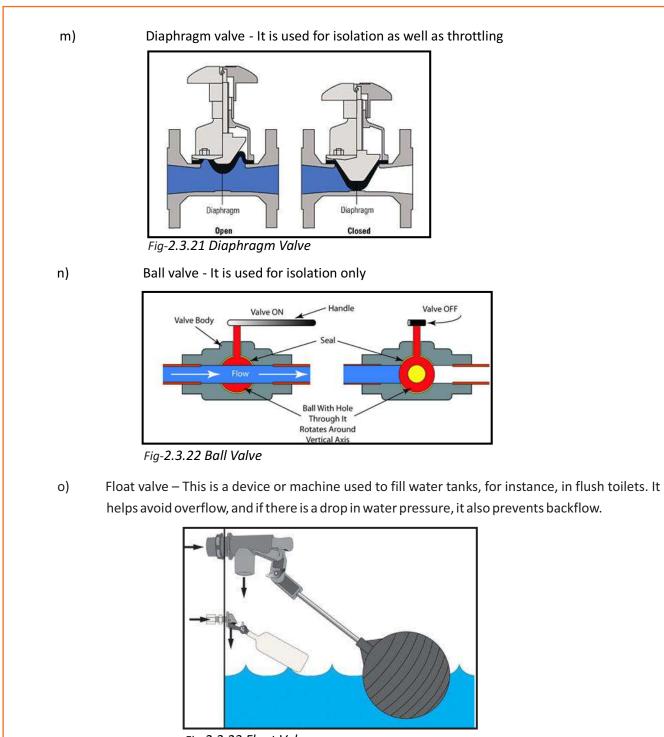


Fig-2.3.23 Float Valve

Notes for Facilitation

• Following video can be shown for elaborating more on the subject:

https://www.youtube.com/watch?v=pF9wtNco4Hk

#### 2.3.21 Traps

Elaborate

 A trap is a pipe found under or within a fixture in plumbing systems. It is in the shape of a U, S, or J. The bend prevents the entry of sewer gases into buildings. The different types of traps are as follows:

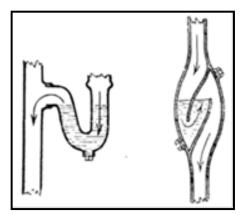


Fig-2.3.24 Traps

b) A p-trap consists of a tailpiece and a curved trap piece, along with a drain elbow. This drain elbow fits inside the drain pipe of a p-trap, which enters directly into the wall. Along the curve of this p-trap, there is a water seal whose purpose is to stop the backflow of toxic air or gases from from the sewer line. However, the original waste may still go out into the sewage system. If the poisonous gases are permitted to return, they would not only emit a stench, but may also result in illnesses or in worse cases, explosions.

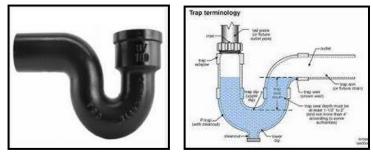


Fig-2.3.25 P-Traps

c) Q-TRAP

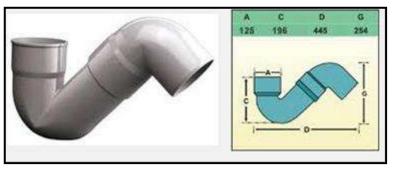
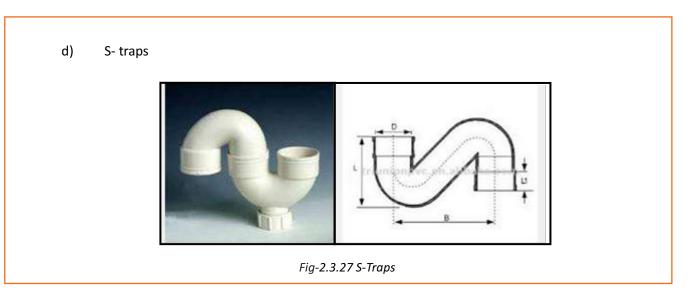


Fig-2.3.26 Q-Traps



# 2.3.22 Cutting of Pipes



c)

Various techniques for pipe cutting include:

- a) Use of plastic tubing cutters, for sprinkler pipes and similar thin pipes and tubes.
- b) Use of wheel cutters with adjustable jaw grips and sharp wheel for pipes which are thick :



Fig-2.3.28 Pipe Cutting Tool

- It is ideal for use in cases where a complete turn looks impossible.
- These are rotated around the pipe repeatedly. With each rotation there is further tightening till it cuts through all the way.
- The cut may cause a rough edge or burr around tube's inside.
- It is essential to clean or ream this rough edge or burr.
- Use of hacksaws, which are capable of cutting any metal or plastic pipe, irrespective of size.



Fig-2.3.29 Cutting pipe with Hexa

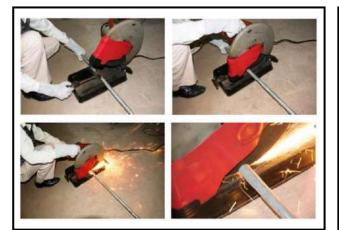


Fig-2.3.30 Pipe cutting with wheel cutters



Fig-2.3.31 Pipe cutting using Hacksaws

Steps: It is the process of creating screw thread. A common method of threading is with Tap/Faucets and dies. The process of threading can be done using cutting tools, such as tap/faucets and dies, for creating screw threads on pipes.

- a) A tap/faucet cuts threads on the inside surface of a pipe. This surface is also known as the female part of the mating pair, for instance, a nut. Tap/fauceting is the name given to the procedure of using a tap/faucet.
- b) The outer surface threads, that is the male part of the mating pair, such as a screw, are cut using a die. The name given to the procedure that uses a die is called threading.
- c) Chasing is the use of either of these tools for cleaning up an existing thread.
- d) A tap/faucet is capable of cutting a thread on the inside surface of a hole or pipe, enabling it to operate as a nut.
- e) The die can cut a thread on the outer surface of a cylindrical rod, or pipe which works as a bolt.
- f) It is not possible for hand tap/faucets to automatically eliminate the chips or metal cuttings created by them.



Fig-2.3.32 Tap/Faucets and dies



Fig-2.3.33 Pipe threading using Pipe Threading Machine



Fig-2.3.34 Pipe threading using Pipe Threading Machine

Bending: The pipes are manufactured straight in factories but we need to provide the bends at various positions as per the requirement

#### 2.3.23 Joining



The method of joining non-metallic, plastic pipes does not require threading of ends. CPVC pipes are joined using the solvent cementing technique.

#### a) CPVC Solvent Cementing

- I. CPVC solvent cementing is basically used to create reliable joints in a consistent manner. It is important to clearly understand that:
- II. The joining surfaces have to be made soft and semifluid.
- III. The gap existing between the pipe and fitting needs to be filled with adequate amount of cement.
- IV. Pipe and fittings should be assembled before the cement dries, that is while the surfaces are wet and the cement is still in fluid state.
- V. As the cement dries, the joint becomes stronger. The portion of the joint that is tight will have surfaces, which are inclined to fuse together. In the loose portion of the joint, the cement will tend to will connect with both surfaces. These portions have to be made soft and should be penetrated.





### 2.3.24 Methods of Testing Pipelines

# Elaborate

a)

Testing of pipe line is necessary after installation. There are four different testing methods of pipe line.

- Smoke Test: This test is used in case there is suspicion of leakage within a piped system.
  - I. This test involves pumping or pushing the smoke in from the lower end of the pipe.
  - II. If there is a leakage, smoke will be emitted from the ruptured parts.
  - III. This non-destructive physical test is used in closed systems of pipes for detection of crevices, cracks, breaks or leakages.
  - IV. The procedure involves artificial creation of smoke, which is then forced through drain pipes and even waste pipes, under a little pressure, to discover leaks, if any.
  - V. Smoke is let out of the cracks or breaks in the piped system, which helps in their identification and facilitates their repair.
  - VI. It is possible to perform smoke tests whether the plumbing is old or out-dated or new / recent. However, it is mostly used to detect gas leaks in sewers, which may lead to problems within a building or an area.
  - VII. If smoke is seen escaping from any point, that could possibly be a leakage letting sewer gas.

Plumbing smoke tests help detect spots from where fluids can spill out of pipes. They also help detect cracks or breakages from where ground or storm runoff water can enter sanitary sewer systems.

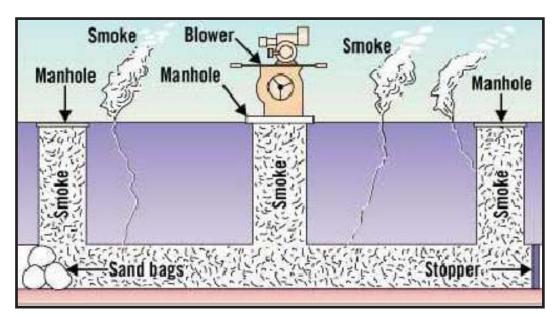


Fig-2.3.36 Smoke Test

#### b) **Pressure Hydraulic Test**

- Ι. Pressure Test: After opening the ball valve on the pressure tester, attach a garden hose to it.
- Π. Turn on the hose for a few minutes to permit the pressure in the pipes to touch 30psi.
- III. Once the pressure touches 30psi on the gauge, turn off the ball valve on the pressure tester assembly before closing the hose. Then detach the hose from the pressure tester assembly.
- IV. The pressure should be maintained at 30 psi.
- V. Let this pressure remain for several hours to ensure that there is not even the tiniest leak.
- VI. In case there is a drop in the gauge gradually, look out for water leakages in the plumbing.



Fig-2.3.37 Pressure Hydraulic Test



- Conduct a skill practice activity.
- Ask the students to assemble together.
- Explain the purpose and duration of the activity
- Set guidelines pertaining to discipline and expected tasks

Skill Practice	Time	Resources
Students need to demonstrate the pipe type identification skill.	60 Minutes	Samples of Cast Iron pipe, Ductile Iron Pipe, Copper Pipe, Stainless Steel Pipe, Galvanised Iron pipe, PVC Pipe, XLPE Pipe, Polypropylene pipe, Stone ware, HDPE Pipe, PPR Pipe

# Activity



- Conduct a skill practice activity. •
- Ask the students to assemble together.
- Explain the purpose and duration of the activity
- Set guidelines pertaining to discipline and expected tasks

Skill Practice	Time	Resources
Students need to demonstration skill of identifying different kind of Allied Fittings for Pipes.	60 Minutes	Different kind of Allied Fittings for Pipes, like - Elbow, Gaskets, Couplings, Unions, Reducers, Toes, Nipples, Valves, Traps.

# Activity

- Conduct a skill practice activity. •
- Ask the students to assemble together.
- Explain the purpose and duration of the activity
- Set guidelines pertaining to discipline and expected tasks

Skill Practice	Time	Resources
Students need to demonstrate skill of identify different kind of Pipe joints.	60 Minutes	Different kind of Pipe joints

# Activity



- Conduct a skill practice activity. •
- Ask the students to assemble together. •
- Explain the purpose and duration of the activity •
- Set guidelines pertaining to discipline and expected tasks •

Skill Practice	Time	Resources
Students need to demonstrate non- metallic pipes joining process.	60 Minutes	Non-metallic Pipes, CPVC Cement

## Activity

- Conduct a skill practice activity. •
- Ask the students to assemble together. •
- Explain the purpose and duration of the activity •
- Set guidelines pertaining to discipline and expected tasks

Skill Practice	Time	Resources
Students need to demonstrate the pipe testing process.	60 Minutes	Smoke creating device, Pressure tester

### Unit 2.4: Plumbing And Sanitary Fixtures And Their Installation

Unit Objectives

At the end of this unit, students will be able to:

- 1. Understand and demonstrate various types of Tap/Faucets and showers
- 2. Understand and demonstrate various types of Washbasins and their installation
- 3. Understand and demonstrate various types of water closets, urinals and their working
- 4. Understand and demonstrate bidets, bath shower trays and geysers
- 5. Identify and understand standard height of sanitary fixtures

# Resources to be Used

- Laptop
- Projector
- White Board
- Marker
- Duster
- Taps, Single lever Mixer, joy stick, Push button tap, Sensor Tap, Shower
- Washbasin
- Water Closet Indian & Western
- Urinals
- Drill machine, Chisel and hammer
- Masonry tools & Mortar material

# – Do 🗠

- Greet the participants for the day.
- Give Summary of previous Session.
- Ask for any doubts in previous Session.
- Acknowledge for their doubt-raising, if any. Clear the doubts.
- Give details of today's session and what they are going to learn.
- Encourage them to share their thoughts and doubts now and during process of this course.

### Ask (ask)

- Ask students the types of sanitary fixtures they have seen.
- Ask students the difference between various types of taps and their purpose.
- Ask students the difference between various types of washbasin and their purpose.
- Ask students the difference between Indian and Western water closet and their purpose.

# 2.4.1 Types of Plumbing and Sanitary Fixtures



#### **Tap/Faucets**

a- Tap/Faucet is a valve controlling release of liquids or gas. There are variety of options for the simple act of turning a tap / faucet on or off



Fig-2.4.1 Tap/Faucet



Fig-2.4.2 Single Lever Mixer

Fig-2.4.3 Joystick



Fig-2.4.4 Push Button Tap/Faucet

b- Single Lever Mixer: It is to control the water and temperature. Lever Handle Tap/Faucet is easy to grip and turn. These are available in many decorative styles.

c- Joystick: It is similar to lever handle Tap / Faucet, yet with as different range of motion.

d- Push Tap / Faucet: It turns the water on with a push instead of turning a handle or knob. It is used for predetermined flow of water.

e) Sensor Tap/Faucet- It requires no handles or knobs. They are automatic tap/faucets and largely battery powered. They are equipped with an inert infrared sensor, which detects hand movements. They are commonly seen in public toilets or rest rooms, such as in airports and hotels. Their advantage is that they help bring down the consumption of water, and also control the transmission of disease-causing by microbes.



Fig-2.4.5 Sensor Tap/Faucet

### 2.4.2 Shower



Modern showers are so designed that their temperature and spray pressure settings can be configured. They also have showerhead nozzle settings that can be adjusted.



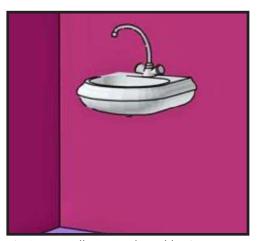
### 2.4.3 Washbasin

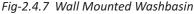


Washbasin is a bowl-shaped fixture used for washing hands, for dishwashing or other purposes. The most significant difference between the major Washbasin types is the manner in which they are installed.

#### a) Wall Mounted

Wall-mounted washbasins are suspended directly from the wall. Therefore, they do not take up much space and are easily accessible, when it comes to plumbing hook-ups. They are the top choice for bathrooms that are small in size or half baths.





#### b) Pedestal

Pedestal Washbasin is also a wall-mounted Washbasin that rests on a pedestal that may or may not provide actual support to the Washbasin bowl. Usually the pedestal conceals plumbing. The drawback of this type is the lack of storage space under the Washbasin bowl.



Fig-2.4.8 Pedestal Washbasin



Fig-2.4.9 Console Washbasin



Fig-2.4.10 Self Riming Washbasin



Fig-2.4.11 Integral Washbasin

#### c) Console

Console Washbasin is also a wall-mounted Washbasin that rests on legs. The legs support the front two corners while an apron often masks the plumbing hook-ups. A small storage space can be created underneath simple by placing a basket or a shelving unit.

Self-rimming Wash-basin drops into a cut-out in the counter top and usually are secured with mounting clips

from below. The rim overlaps the cut-out edges.

d) Self-Rimming

#### (e) Integral

Integral Washbasin is usually made of solid surface material like corian and acrylic. The bowl and the counter top are one piece and are easy to clean and maintain.

### 2.4.4 Water Closets

Elaborate

Water Closet is a fixture for the toilets used to carry out the human excreta.

#### Indian

In order to use it, the user is required to sit by placing the feet on it. Its basin comprises an inverted slop at the back end of the closet, where there is a trap excluding the drain or sewer pipe from it.

#### Western

The Western water closet is the most popular type of closet and is widely used in the West. It is not only shaped more like a chair but also used like one. It slopes towards the back and there is a trap that attaches it to the house drain.

Based on the structure, these closets can be categorized into two:

- One-piece water closet, which has a basin and trap manufactured together, as a single unit
- Two-piece water closet where the basin and trap are separately manufactured.



One Piece Water Closet Fig-2.4.12 Western Water Closet



Two Piece Water Closet

### 2.4.5 Flushing Cistern



Flushing Cistern is required to store and discharge water to flush the contents from a urinal or a water closet (W.C.). Flushing cistern is also known as water waste preventer. It stops wastage of water. These are used to throw water with pressure after the use of W.C. and urinals.

Flush Tank: is a tank which holds fluid in reserve for flushing. It is the tank attached to a toilet. Modern-day toilets comprise two sets/pieces of plumbing fixtures made of vitreous china— the tank and the bowl. The mechanical parts, found within the tank, work as a joint system to achieve a gravity flush.



Fig-2.4.13 Flushing Cistern

## 2.4.6 Bell flushing Cistern

## Elaborate

Flushing Cistern is required to store and discharge water to flush the contents from a urinal or a water closet (W.C.). Flushing cistern is also known as water waste preventer. It stops wastage of water. These are used to throw water with pressure after the use of W.C. and urinals.

Flush Tank: is a tank which holds fluid in reserve for flushing. It is the tank attached to a toilet. Modern-day

 $to ilets \ comprise \ two \ sets/pieces \ of \ plumbing \ fixtures \ made \ of \ vitreous \ china-the \ tank \ and \ the \ bowl.$ 

- I. Bell flushing cisterns are only suited for high-level cisterns.
- II. These are manufactured out of cast-iron and possess a capacity of five to 15 litres
- III. These are now rarely seen except in old factories, schools and establishments.

- IV. They have a bell attached to a flushing chain via a lever.
- V. On pulling the chain, the bell gets lifted up and the water from the tank flows/gushes out by siphon action, through the flushing pipe.
- VI. The float valve then lets the water from the inlet enter the cistern.
- VII. When the water begins to flow down the pipe, it launches a siphon effect, which draws the remaining water from the cistern until the air is drawn under the bottom of the bell.
- VIII. The emptying action requires just a few seconds to cause a strong flush in the water closet underneath.
- IX. By releasing the chain immediately after pulling, the water is forced out of the flush pipe.
- X. A ball valve arrangement supplies water to this type of cistern. Therefore, the water inlet closes once the cistern is full of water up to the water line and is opened when it is empty, allowing water to enter.
- XI. There is also an overflow pipe which drains out extra water that enters, in case the ball cock stops functioning. This helps stop the water from spilling over the cistern in the toilet. the tank, work as a joint system to achieve a gravity flush.

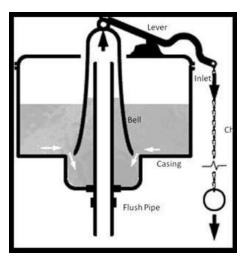


Fig-2.4.14 Flushing Cistern

## 2.4.7 Flat Type

Elaborate

- I. It is placed at a height of 3ft. above the floor
- II. These cisterns are now using in modern time
- III. This cistern is generally composed of plastic
- IV. It has a flat valve inside
- V. It stops the water after the tank gets fully filled and starts after the tank get va cant
- VI. It flushes out by pressing a button

### 2.4.8 Automatic Cistern



I. It is used in urinals.

- II. Nowadays these cisterns are mainly used.
- III. These cisterns are mainly used in public places for example bus stand, railway station, offices etc.
- IV. Lot of water used in these cisterns.

## 2.4.9 Urinals - Manual Handles

Elaborate

There is small lever or a button provided in each urinal, which makes the flush work. The user has to press it to activate or operate it before leaving the toilet. Being under direct control of the user, this kind of system is very efficient, as long as the users do not forget to activate/operate it.

## 2.4.10 Timed Flush

Elaborate

The cistern gets filled with water that keeps drip-feeding at a consistent pace, till the point is reached where the valve opens. At this 'tipping point', either the valve will open or the cistern will be drained of all water by a siphon. As a result, all the urinals in the cluster get flushed. Sometimes, electronic controllers are used for the same function.

### 2.4.11 Automatic Flush

## Elaborate

ate

Electronic automatic flushes offer a solution to the issues that arise in timed/manual flushes. Such automatic flushes are quite common in modern installations.

Passive infrared sensors are able to sense whenever the urinal is used. Sometimes, they are able to sense when a person stands in front of it or when he moves away. Accordingly the flush gets activated.

Therefore, the urinal gets flushed/cleaned every time it is used unlike a manual flush, where the cleaning is dependent on the user, but water does not get wasted if the toilet is not really used.

## 2.4.12 Waterless Urinals

Elaborate

In such urinals there is a trap insert, which is full of a sealant liquid.

The sealant floats on top of the urine that accumulates in the Ubend as it is lighter than water. This keeps the odour/stench from escaping into the air.

However, it is essential to replace the cartridge and sealant at regular intervals.



Fig-2.4.15 Urinal

### 2.4.13 Bidets



Bidets are primarily used to wash and clean. They may also be used to clean any other part of the body such as feet.

Despite appearing similar to a toilet, it would be more accurate to compare it to the washbasin or bathtub.



Fig-2.4.16 Bidet

## 2.4.14 Bath Tub



Bathtub is large containers for holding water in which a person may bath Tubs is manufactured from many different materials.

The most common materials used are:

- a) Acrylic
  - I. It can be moulded into just about any shape and size.
  - II. The colour runs through the entire substance rather than just in the surface coat, making it less likely to show scratches or to fade.
- b) Enamelled Steel
  - I. Enamelled steel tubes are pressed from sheets of steel and coated with baked-on enamel.
  - II. The enamel layer is usually thin, though susceptible to chipping.
  - III. In addition, enamelled steel doesn't retain heat.

#### c) Cast Iron enamelled Bath tub-Cast iron moulded into a bathtub shape and finished with enamel. Generally thicker than other materials.

- I. They are durable and solid
- II. Available in a range of colours
- III. Retain heat well
- IV. Excellent soundproofing
- V. They may require structural reinforcement



## 2.4.15 Bath Tub



Bathtub is large containers for holding water in which a person may bath Tubs is manufactured from many different materials.

## 2.4.16 Basic Building Construction

## Elaborate

The illustration shown below represents the essential elements of a modern Building.

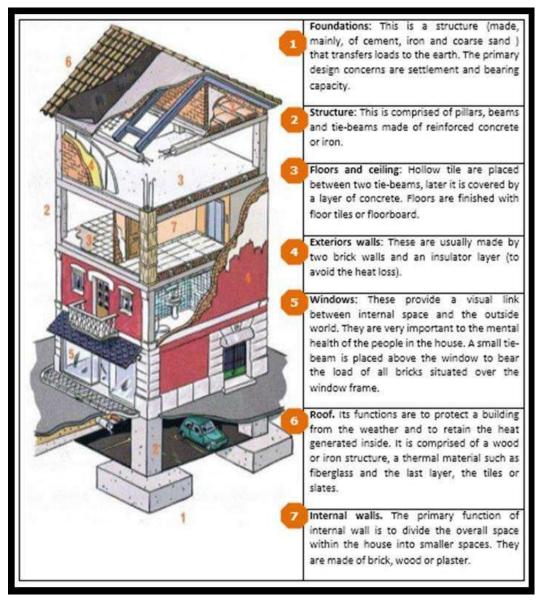


Fig-2.4.18 Building Structure illustration

## 2.4.17 Cutting Opening in Structures

## Elaborate

#### a) Drilling

Drills are very powerful and potentially dangerous tools. They can just as easily put holes in your walls or holes. However we have to be mindful of the following:

- I. Always check for any electricity cables running through the wall before start drilling.
- II. Catching a live cable when drilling is potentially fatal so it's worth taking the extra time to check.
- III. Never wear loose clothing or dangling jewellery which could catch in the drill as one lean over it.
- IV. The drill bit will become hot with use so keep hands off it.
- V. Make sure you use the correct drill bit for the type of wall you are drilling into.
- VI. If you are drilling into tiles use a specialist tile drill bit and stick a little piece of masking Tap/Faucete over the area to stop the drill from wandering.
- VII. If drilling into plasterboard, Tap/Faucet the wall to find where it is not hollow as this will be where the wooden joist is aim to drill only into this.
- VIII. Always use a proper purpose made extension cord if one need a longer wire for drill and never pick the drill up by its flex.



Fig-2.4.19 Drilling

**b)** Nailing - It is done to fasten to a surface or to something else with a nail and a hammer.

+	-	
Roofing nail	Box nail	
		Shank Head
Finishing nail	Ring-shank nail	
Flooring nail	Drywall nail	
		Lenght
Common nail		
3 8		
Duplex nail		· 13

Fig-2.4.20 Nailing

c) Chase / Core -It is to bury (or, in builders terms, chase) running cables or pipes up (or along) a masonry wall.

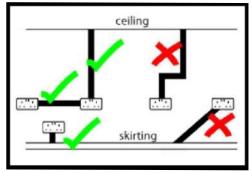


Fig-2.4.21 Chase/Core

- I. Chase cut-outs should always be vertical or horizontal between start and finish on the wall never cut a chase at an angle between these two, nor step the channel.
- II. Vertical chases should be no deeper than one third of the wall thickness with standard 100mm bricks and blocks, that going to be 33mm, which is quite deep anyway – that's not allowing for any plaster coating which could be 10mm so the maximum depth then works out at 36mm from the front face of the plaster.



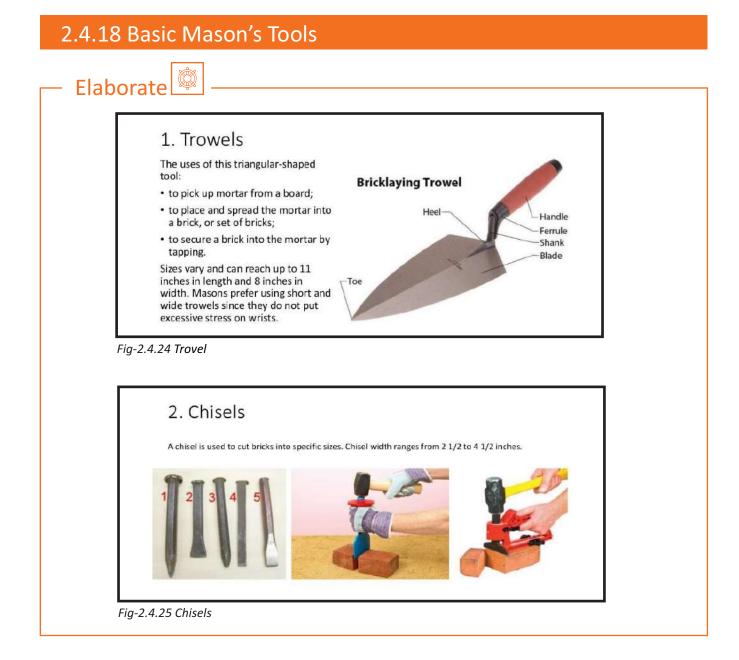
Fig-2.4.22 Measurement for vertical chasing



- III. Horizontal chases should be no deeper than one sixth of the wall thickness - with standard 100mm blocks, that going to be 16mm which is usually quite sufficient – that's not allowing for any plaster coating.
- IV. Chases on opposite sides of a wall should not be in line, i.e. 'back to back'.
- V. If chasing in a cable, it should be noted that any new wiring circuit falls under Part P of the Building Regulations



Fig-2.4.23 Chase Marking & Cutting



## 2.4.19 Preparation of Building Material / Cement Mortar

## Flaborate

Mortar is a workable paste used to bind construction blocks together and fill the gaps between them. Mortar may be used to bind masonry blocks of stone, brick, cinder blocks, etc. Mortar becomes hard when it sets, resulting in a rigid aggregate structure.

Modern mortars are typically made from a mixture of sand, a binder such as cement or lime, and water. Mortar can also be used to fix, or point, masonry when the original mortar has washed away. Mortar is mixed by hand in a mortar box. It should be as watertight as possible.

#### **Preparation Method**

- I. Determine the type of cement will work best for the project.
- II. Take fine sand and coarse sand. Take 1part cement, 2 parts sand, and 3 parts coarse sand into the wheelbarrow.
- III. Mix the ingredients thoroughly with spade to ensure they are well combined. Pour a small amount of water and make paste.

## 2.4.20 Mortar Filling

Elaborate



Filling mortars are useful in a range projects and repairs. Mortar is an essential filling ingredient that helps to stick together bricks and other components used to build homes. Mortar is also ideal for patching up crevices, holes, and so on.; it can hold together or fasten fences too, among other things.

Mortar is usually a blend of lime, concrete and sand, and therefore, hardly difficult to mix together in small or big volumes. Good quality workmanship and masonry work is heavily reliant on good quality mortar. Only if the mortar is good will it bind the masonry components together into a robust structure.

## **Activity**

- Conduct a skill practice activity.
- Ask the students to assemble together.
- Explain the purpose and duration of the activity
- Set guidelines pertaining to discipline and expected tasks

Skill Practice	Time	Resources
Students need to demonstrate the process of preparing cement mortar.	60 Minutes	Cement, Sand, Water, Spade, water, mortar box .

## Activity

- Conduct a skill practice activity.
- Ask the students to assemble together.
- Explain the purpose and duration of the activity
- Set guidelines pertaining to discipline and expected tasks

Skill Practice	Time	Resources
Students need to demonstrate the skill of plumbing & sanitary Fixtures identification.	60 Minutes	Tap/Faucets, Single Lever Mixer, Joystick, Push Button Tap, Sensor Tap, Shower, Wall mounted Wash Basins, Pedestal Wash Basin, Console Wash Basin, Self- Rimming Wash Basin, Integral Wash Basin, Indian / Western Water Closets, Flushing Cistern, Bell Flushing Cistern, Urinals, Bath tubs

### Unit 2.5: Pumps and Their Installation

## – Unit Objectives 🎯

At the end of this unit, students will be able to:

- 1. Identify and understand various types of Pumps
- 2. Explain advantages and disadvantages of various types of pumps

## Resources to be Used

- Laptop
- Projector
- White Board
- Marker
- Duster
- Working model / Cut section of :
  - Airlift Deep Well Pump
  - Centrifugal Pumps
  - Reciprocating Pumps
  - Jet well Pump
  - Rotary Pump

## Do 🗹 ———

- Greet the participants for the day.
- Give Summary of previous Session.
- Ask for any doubts in previous Session.
- Acknowledge for their doubt-raising, if any. Clear the doubts.
- Give details of today's session and what they are going to learn.
- Encourage them to share their thoughts and doubts now and during process of this course.

## - Ask

- Ask students what they know about water pumps.
- Ask students the basic purpose of water pumps.
- Ask students the difference between air lift deep well pump and centrifugal pump.
- Ask students where reciprocating pump are used.

## 2.5.1 Types of Pumps - Air Lift Deep Well Pumps

## Elaborate

Pump is a device that moves fluids (liquids or gases), or sometimes slurries, by mechanical action.

- I. These pumps are very reliable and durable.
- II. Air lift pumps are often used in deep dirty well where the nature of sand is Acid and Alkali.
- III. It is also used where simple pumps do not work.
- IV. These are used to collect more water than simple pumps.
- V. The compressed air enters at the bottom level of pump and water lifts above the well.

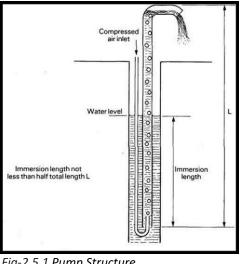
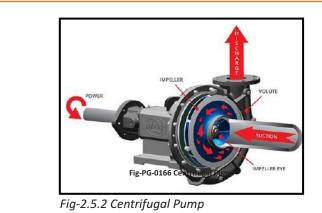
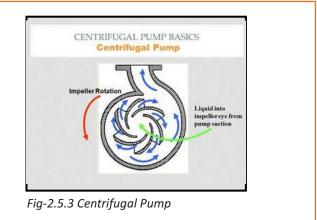


Fig-2.5.1 Pump Structure

## 2.5.2 Centrifugal Pump

- Elaborate
  - ١. These pumps are more useful than other pumps.
  - Ш. This pump works on the principle of centrifugal force.
  - 111. These pumps are used to take water and other liquid at higher level.
  - IV. Where less space is available these pumps are placed.
  - V. Initial cost and operational cost is low.
  - VI. Efficiency is satisfactory.
  - VII. These pumps are easy to operate and placed.
  - VIII. These pumps are available in many range and capacity.
  - IX. It does not have any discharging sound.
  - Х. The usage of these pumps is as follows:
  - XI. These pumps are available in singe stage and multi stage.
  - XII. It has no valve.
  - XIII. It is casted out in iron and has steel shaft, bronze sleeves, cast iron impeller or cast iron vanes. Sometimes impeller and vanes are in bronze.

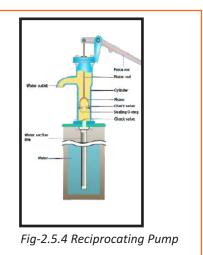




## 2.5.3 Reciprocating Pump

## Elaborate

- I. It is called hand pump.
- II. These pumps are mainly used for domestic works. It is often used where relatively small quantity of liquid is to handled and where delivery pressure is quite large.



## 2.5.4 Jet Well Pump

## Elaborate

Jet Well Pumps circulates water in loop systems and is available in several Horsepower (HP) options for different pumping performance rates. Jet well pumps are mainly used in low capacity installation. It delivers water and water pressure to a household, cottage or small sprinkler systems.

I. Shallow Well Jet Pumps

It is used when the pump is located above the water source, drawing water from 25' depth to water or less vertically. It uses a single suction pipe to draw from wells or surface water.

II. Deep Well Jet Pumps

They are used when the pump is located above the water source, drawing water from 25' to 110' depth to water vertically.

#### III. Convertible Jet Pumps

They are used for Deep Wells when installed with a jet assembly, built-in or attached to the pump. They are used when the pump is located above the water source, drawing water from 110' depth to water or less vertically. It uses two pipes on the suction side to draw from wells. They are mainly used for household water supply from a well, driven point system, or open water source. Pumps should be used with standard or pre-charged pressure tank. These pumps are mainly used to take lot of water, oil or liquids.

### 2.5.5 Rotory Pump

Elaborate

In rotary pumps two gear are placed. These gears are rotate on center. It does not have valve and it does not lift water where sand, silt are mixed in water. It capacity to pump water totally depends on the tightening of its body. It pumps water without any obstruction but low maintenance cost. Work capacity is 60 to 80% of these types of pumps.

### Notes for Facilitation

 Following video can be shown for elaborating more on the subject: https://www.youtube.com/watch?v=1huJZ1XChYE

## - Activity

- Conduct a skill practice activity.
- Ask the students to assemble together.
- Explain the purpose and duration of the activity
- Set guidelines pertaining to discipline and expected tasks

Skill Practice	Time	Resources
Students need to demonstrate working procedure of different kind of pumps.	60 Minutes	Working models / diagrams of different kind of pumps

## Unit 2.6: Water Meter

### – Unit Objectives 🮯

At the end of this unit, students will be able to:

- 1. Identify and understand various types of Water meters
- 2. Explain advantages and disadvantages of various types of Water meters

## - Resources to be Used

- Laptop
- Projector
- White Board
- Marker
- Duster
- Water meters -
  - Displacement type
  - Positive Displacement type
  - Velocity meters

## — Do 🔽

- Greet the participants for the day.
- Give Summary of previous Session.
- Ask for any doubts in previous Session.
- Acknowledge for their doubt-raising, if any. Clear the doubts.
- Give details of today's session and what they are going to learn.
- Encourage them to share their thoughts and doubts now and during process of this course.

## - Ask

- Ask students what they know about water meter.
- Ask students about the various types of water meter.
- Ask students the benefits of using water meter.
- Ask students the working principal of displacement water meter.

### 2.6.1 What is Water Meter

## Elaborate

Water metering is the process of measuring water use. The purpose of meter is to measure the quantity of water consumed by the building. There is different types of meters to measure the different quantities of water. For example 15mm size meter measures 2000 liter of water per hour while the 50mm size of water meter can measure 15000 liter water per hour.

1 kilo liter = 1000 liter o 1 gallon = 4.546 liter



Fig-2.6.1 Water Meter

#### **Advantages - Water Meter**

- a) This quantifies the amount of water consumed by the people.
- b) In conjunction with volumetric pricing it provides an incentive for water conservation.
- c) It helps to detect water leaks in the distribution network, thus providing a basis for the reduction of Non-revenue water.

#### Disadvantages

- a) Uncertainty over the extent to which meters do actually reduce consumption. The evidence for optional metering in particular is inconclusive and metered customers may be less likely to reduce consumption during times of drought.
- b) Potential impacts on affordability, since less well-off customers may limit their use to save money with a consequent risk to health or hygiene. There is therefore a tension between pricing to encourage customers to use water wisely and making water affordable for all.

## 2.6.2 Types of Water Meter

## Elaborate

- a) Displacement water meters are used to measure the amount of water required to fill a given space over a time period, that is preset. The water flows in to displace the measuring device, according to the volume of water (gallons or cubic feet) passing through the meter. The water volume register is activated by a magnet whose movement is controlled by a mutating disk or piston.
- b) Positive displacement meters, popularly referred to as PD meters are commonly used in homes and small businesses. They are capable of measuring, very accurately, small volumes of water at small flow rates. PD meters can help measure individual usage of water if they are fixed in individual units of an apartment or house.
- c) Velocity Meters are used to measure the speed of water flow. After measuring the velocity through the meter's specific volume, it is converted into units of volume (gallons or cubic feet). It is possible to calibrate these meters to ensure accurate measurement.

- Exce	rcise		
Q1.	Jointing of CPVC Pipes is done by	Q8.	Wrench required for twisting 150 mm
	a.PVC Cement Solvent	GIpipe	
	b. Teflon Tape		a. Pipe wrench
	c. Fusion welding		b. Slide wrench
	d. CPVC Cement Solvent		c. Chain wrench
			d. Parrot Plier
Q2.	How will you recognize 'B' grade GI		
	Pipe	Q9.	The size of chase to accommodate
	a. Yellow colour band		15mm GI pipe on half brick wall should
	b. Red colour band		be
	c. Blue colour band		a. 30mm X 25mm
	d. Green colour band		b.50mmX30mm
			c. 40mm X 40mm
Q3.	The Cock fixed at wash basin is called		d. 25mm X 25mm
	a. Long body Bibcock	Q10.	The Gully trap is provided with
	b. Ball cock		a. Single stack system
	c. Pillar cock		b. Double stack system
	d. Swan neck Bibcock		c. Rain water harvesting system
Q4.	The length of SW Pipes generally	Q11.	The Caulking Tool is required for
	available in market is		jointing of
	a. 1000mm		a. SW pipe
	b. 600mm		b. PVC pipe
	c. 500mm		c. RCC pipe
	d. 2000mm		d. Cl pipe
Q5.	'P' Trap is required to fixed with	Q12.	Convert 230mm to inches
	a. Wall mounted WC		a. 10″
	b. Orissa Pattern WC		b.9″
	c. Anglo Indian WC		c. 8"
	d. Floor mounted WC		d. 7"
		Q13.	Non return valve is provided near
Q6.	Minimum height of Angle Valve for		a. Water tank
	wash basin should be		b. Water meter
	a. 450mm		c. Fire hydrant
	b. 300mm		d. Gully trap
	c. 600mm	014	where a later of the base of the
	d. 800mm	Q14.	The Ferrule is provided to take
			a. Sever connection
07	Donth of water coal in floor tran should		b. Water connection
Q7.	Depth of water seal in floor trap should be		c. Gas connection
	a. 35mm to 40mm	Q15.	The Height of half stall Urinal from the
	b. 20mm to 25mm	floor s	hould be
	c. 45mm to 50mm		a. 500mm
	d. 50mm to 60mm		b. 600mm
			c. 650mm
			d. 750mm

Q16. with	a. CPVC Cement solvent b. UPVC Cement solvent c. Teflon Tap	Q19.	How many parts are there in an Union a. 2 b. 3 c. 4 d. 5
	d. Special arrangement	Q20.	Heal rest sanitary band in provided
Q17.	Minimum height of Angle valve for	with	
Q17.	Geyser should be	vv1011	 a. Rain water pipe stack
	a. 1800mm		b. Soil waste & vent pipe stack
	b. 2100mm		c. Vent shaft
	c. 2000mm		
	d. 1600mm		
Q18.	Generally the quantity of water per person per day is assumed to decide the size of tank a. 100 ltr b. 170 ltr c. 135 ltr d. 200 ltr		





GOVERNMENT OF INDIA MINISTRY OF SKILL DEVELOPMENT & ENTREPRENEURSHIP



Transforming the skill landscape



## **3. Repairing of Basic** Plumbing Systems

Unit 3.1 - Repairing of various types of fitting and fixtures Unit 3.2 - Assessment



## Key Learning Outcomes 🛛 🖗

#### At the end of this module, students will be able to:

- 1. Diagnosis and Repair activities which includes the understanding of the installed system, basic inspection and identification of the fault therein. Repair and replacement with minimal damage to other systems
- 2. Diagnosis of problems and/or failures in plumbing system and undertaking activities necessary to maintain the system
- 3. Maintenance and servicing of pipes and sanitary fixtures in housing, commercial and institutional setups

## Unit 3.1: Repairing of basic plumbing systems

## Unit Objectives

At the end of this unit, students will be able to:

- 1. Diagnose the problems in fittings and fixtures
- 2. Repair the problems in fittings and fixtures
- 3. Repair the problems in Plumbing system
- 4. Plan and schedule routine maintenance

Resources to be Used

- Laptop
- Projector
- White Board
- Marker
- Duster
- Plumbing defect samples for repairing demonstration

## Do

- Greet the participants for the day.
- Give Summary of previous Session.
- Ask for any doubts in previous Session.
- Acknowledge for their doubt-raising, if any. Clear the doubts.
- Give details of today's session and what they are going to learn.
- Encourage them to share their thoughts and doubts now and during process of this course. .



- Ask students what are the normal plumbing issues which require repair.
- Ask students what are the defects which occur in pipe lines.
- Ask students what is planned or schedule maintenance.
- Ask students what is the difference between wet and dry maintenance.

## 3.1.1 Repair Of Various Types Of Fittings And Fixtures

Elaborate

Pipe lines and plumbing systems can be damaged due to various reasons:

- a) defective jointing material
- b) cracking of pipe owing to a blow to the body of the pipe with any sharp device during jointing
- c) displaced jointing material, such as rubber rings or lead
- d) corrosion of external surface of pipe due to nature of soil
- e) damaged vertical or horizontal supports or anchorages, either due to buried pipes or those placed above the ground.
- f) soil movement from digging, filling or excavation work, such as for laying pipes or cables etc.
- g) alteration in water table or moisture content in soil
- h) expansion of structure expansion resulting in extreme compression, or end crushing.
- i) Contraction of structure, resulting in pull out or joint separation
- j) deposits and splits resulting in blockage of pipes
- k) high pipe pressure, or test pressure
- I) irregular pressure from vacuum creation, surge of water or water separation.
- m) lack of planning and precautions while extending pipe connections
- n) harm to the inside surface of pipe or lining material

#### Steps to be followed for repair of pipes:

- 1. Locate and mark
- 2. Plan the repair and arrange resources
- 3. Use most suitable technique to carry out the actual repair
- 4. Run a dry test on the system
- 5. Restore

## 3.1.2 Steps For Repair

## – Explain 🖞

- 1. Inspect the site and determine the nature of the failure.
- 2. Understand the side-effects that could possibly cause harm or give rise to a dispute, and be prepared to handle such eventualities.
- 3. Examine the access to the site and do a survey of the plant and equipment, planning and arrangement.
- 4. Determine isolating valves/techniques, for appropriate flow control, and convenience of the relevant activities needed to accomplish the repair work.

### 3.1.3 Type of Repair



When a repair is carried out while maintaining a nominal pressure in the pipeline, it is called a 'wet' repair. It is possible to install identical fittings, split collars or repair small local defects using this technique provided the conditions are suitable.

When the complete main is drained out in isolation, during repair, it is called 'dry' repair. To replace a pipe section or joint, a dry main is required to be worked on, and the pipeline needs to be drained out.

### 1. Repair of Small, Local Defects - 'Wet Repair'

For small cracks, punctures, ruptures and other such local defects, all that is required is a single split collar or wraparound clamp. It could be a process of either a 'wet' or 'dry' repair. If it is a wet repair process, then a consistent, gentle flow has to be maintained so that the sealing elements are not displaced

### 2. Cut Out - 'Dry Repair'

In case of a longitudinal fracture or similar serious or widespread damage, the damaged portion of the pipe is cut out and a new pipe is connected in its place, with the help of two suitable couplers. If it is not possible to gauge the entire extent of pipe fracture, then a minimum of 300mm (12 inches) beyond either end of the visible fracture/crack or defect should be replaced. If there is still some doubt, then the entire length of fractured pipe should be replaced. To accomplish this, it will become necessary to cut out the joint at both ends of the damaged pipe. Therefore, the repair may normally require two portions of replacement pipe and three couplers.

### 3. Replacement Repairs

- Carry out accurate measurements, while ensuring provision for expansion to happen.
- Make clean and square cuts; stick to what the manufacturer recommends.
- Treat and prepare the exposed ends of the existing pipe in an identical manner.
- When it comes to A.C pipes, consider replacing an entire section; avoid cuttings.
- Centre all couplers and collars on the joints;
- It is important to ensure that collars are aligned exactly, especially if one is using narrow couplers.
- If it is recommended that coupler sealing rings be lubricated, then it should be done.
- Accurate gaps should be permitted to allow for expansion.
- Tighten all the bolts in an even manner;
- Excessive tightening of bolts or compression joints should be avoided;
- Restore the spoiled coatings on the parent pipes;
- Ensure that all bolts and bare metal (exposed), are fully protected before burying.

### 3.1.4 Site Management

## - Explain 🗳

#### a) Maintaining records of repair

All repairs should be recorded and documented in great detail. Ideally, this should be done while the repair is still noticeable.

#### b) Keeping repair site clean

The repair trench or area should be clean at all times. Regular removal of waste matter, debris, and contaminants from the site should be ensured. Strict checking is essential to ensure that no unsafe or harmful material, plant or equipment contaminates the trench.

#### c) Preventing contamination during repair work

Spray disinfectant and clean all surfaces coming into contact with potable water, such as the broken main, repair fittings and replacement pipe. Make sure that no contaminant seeps into the main from the point it is cut for repair. On completion of repairs, flush the main at the nearest hydrant to get rid of any filth or dirt from the system.

#### d) Disinfection procedure

All precaution should be taken to stop contaminants from seeping into the system. In case the repairs are so small that there is no need to cut the main, clean and disinfect the fracture and all surfaces along with the collar used in the repair work. If the repairs required are major, and there is a need to cut sections, take care to prevent any kind of contamination.

#### e) Clearing site

Remove all undesirable materials and protective barriers from the site once the work is complete. Ensure that the working area is left clean, tidy and functional. Submit all relevant records, duly completed, to the concerned/relevant authority.

## 3.1.5 Problems in Plumbing System & its repair - Bibcock

## Explain 🖺

Bibcock is commonly referred as Tap/Faucet and it is the most frequently used water supply fitting. There are Tap/Faucets of many designs available in the market. It is advisable to read the manufacturers' instructions also while repairing the Tap/Faucets.

The defects commonly encountered during the functioning of Tap/Faucets, their causes and remedial measures to be taken are listed below.

#### Defect

- i. Water flows/drips from the Tap/Faucet even when the Tap/Faucet is firmly closed
- ii. Water flows from around the spindle or stuffing box
- iii. Difficulty to turn on or tune off the Tap/Faucet
- iv. Spindle continuously slipping when the Tap/Faucet is turned and Tap/Faucet does not shut off
- v. There is lot of noise in the Tap/Faucet when Tap/Faucet is turned on

#### Causes

- i. Worn out defective washer Accumulation of grit, dust or other foreign matter Defective seating
- ii. Gland nut is loose The packing in the stuffing box is defective
- iii. Stuffing box packing is dry Spindle bent
- iv. Spindle thread worn out

## 3.1.6 Problems in Plumbing System & its repair - Stopcock

## Explain 🗋

It is similar in construction to a bibcock except that it is placed in the pipeline instead of the outlet. The defects commonly encountered during the functioning of stopcock, their causes and remedial measures to be taken are listed below.

#### Defect

I. Water drippings from the stopcock even after it is firmly closed

- ii. Water flows from around the spindle or stuffing box screw
- iii. It is difficult to turn on or tune off the cock
- iv. Spindle slips down continuously when the cock is turned and Tap/Faucet does not close

#### Causes

I. Worn out defective washer Accumulation of grit, dust, or other foreign matter Defective stopcock seat

- ii. Gland nut is loose The packing in the stuffing box is defective
- iii. Stuffing box packing is dry Spindle bent
- iv. Spindle thread worn out badly

## 3.1.7 Problems in Plumbing System & its repair - Gatevalve

## Explain

Gate valve is one of the most common valves used in the main supply lines of a water supply system and pump-lines. The commonly encountered defects during the operation of gate valves, their causes and remedial measures to be taken are listed below.

#### Defect

ii. Water flow from around the stuffing box screw

- ii. Valve is hard to turn on or turn off
- iii. Spindle rotates continuously and the gate valve does not close

#### Causes

- I. Gland nut is loose Tighten the packing in the gland nut stuffing box is Renew packing defective with asbestos hemp and water pump grease
- ii. Stuffing box packing Tighten the is dry gland nut Spindle is bent Replace the spindle
- iii. Spindle thread is worn Replace the out badly worn-out part

# 3.1.8 Problems in Plumbing System & its repair - Cistern & Float valve

Explain

The commonly encountered defects during the operation of flushing cisterns and flush-valves, their causes and remedial measures to be taken are listed below:

#### Defect

I. Water flows from the over-flow pipe of the cistern

ii. Water is leaking from the -flush

iii. Water is running continuously into the bowl

#### Causes

I. The position of the float valve is not correct

ii. Check nut is loose

iii. Check nut washer is defective

### 3.1.9 Problems in Plumbing System & its repair - Washbasin

## Explain 🗋

The most-used drain is the one in the kitchen Washbasin and that is the drain most often clogged. Washbasin stoppages are usually caused by liquid fats, emulsified by warm dishwater and carried through the pipes. The water cools as it proceeds to the main sewer and leaves the fatty deposits along the way. A film of grease forms on the pipe wall, then another and another. Coffee grounds and bits of food add to this accumulation layer until the pipe becomes impassable.

#### Repair

(a) Use of plunger – a large rubber suction cup with a wooden handle.

- (b) Drain piping can also be cleaned by removing the J-bend on the trap below the fixture.
- (c) When the clogging material has been removed from the trap, pour a pail or two of hot water into the drain to wash out any loose material.

## 3.1.10 Problems in Plumbing System & its repair - Floor drains

## Explain 🖺

To clean out a floor drain, remove the strainer or grating which covers the drain box. The dirt and grease can then be dug out with a spoon or a stick. After a hooked wire or coil spring-steel auger will clean out the bend or trap.

The floor drain should be regularly checked, especially if it is not frequently used. This is because water in the trap may evaporate and cause solid sediments to be deposited. This, in turn, will allow sewer gases to enter the room.

### 3.1.11 Problems in Plumbing System & its repair - Water Closet

## Explain

Water closets are commonly made of vitreous china, which is prone to cracking on exposure to very hot water. It is essential to clear simple toilet clogs with a plunger. If the blockages are major, an auger containing an adjustable, crank-type handle can be used to do the needful. It is easy to work this tool, known as a 'snake' in plumbers' language, past the trap and down the pipe, as it uses spring-steel coil. Using a three-foot auger, which is not expensive, it is possible to quickly drill through most clogs. However, if the auger is handled without care, the toilet may crack. So utmost care has to be taken while handling the tool.

## 3.1.12 Problems in Plumbing System & its repair - Toilet Tanks

## Explain

- Even after flushing the toilet, if water keeps leaking into the closet bowl, this could be an indication of the malfunction of some part of the mechanism. This kind of leakage could be a result of either the supply valve, or because the rubber tank ball or flapper is not seated properly on the discharge opening.
- If there is a low humming noise, it is an indication of leakage from the cistern or tank.
- If the collar or seat of the discharge opening appears to have been corroded or is covered with grit, it needs to be scraped or smoothened out with sand paper to form a uniform seat for the stopper.
- If need be, straighten or replace bent lift wires to ensure that the ball falls squarely into the hollowed seat.
- A damaged or waterlogged float ball can cause the inlet of the float valve to open or develop a leak. A leakage. It could also result from the bending of the rod connecting the tank float to the supply valve. This keeps the float from attaining its full height. The standard repair procedure would involve replacement of the float ball, straightening of the rod and lubrication of the lever joints to ensure everything works smoothly.
- To adjust the water level in the tank, one can bend the rod attached to the tank float either in the upward or downward direction. The problem associated with the tank of water not filling sufficiently or filling up to overflow—can be rectified by merely bending the rod. To lower the water level, the rod has to be bent downward. To raise the water level, the rod has to be bent upward.

### 3.1.13 Problems in Plumbing System & its repair - Fittings

## Explain

- Fittings (tap/faucets and valves) are most commonly seen of all the parts in a plumbing system. Their design is meant for frequent and maximum use. Modern-day fittings are largely manufactured in brass with chrome plating, and are very long lasting. They can be easily cleaned with normal soap and warm water.
- Since the chrome plating can get dissolved and corroded easily in hydrochloric acid and sulphuric acid, it is advisable to clean bathroom tiles with warm oxalic acid. Muriatic or sulphuric acids should never be used where chrome-plated fittings exist because the fumes from the acid will damage or scar the chrome-plated fittings permanently. Even covering the chromium surfaces with cloth does not offer protection.
- While polished brass fittings are becoming quite popular, it is best to avoid abrasive cleaners on them because they can leave scratches on the protective finished coating of the brass. Eventually, this will result in deterioration or pitting of the brass plating. Certain solvent-based cleaners can also damage the polished brass finish and should be avoided.
- Before attempting any repair, it is important to read the guidelines provided by the manufacturer and also check the product's warranty.

## 3.1.14 Problems in Plumbing System & its repair - Tap / Faucets

## Explain

- Washerless tap/faucets: These come in two types —single handle or two handle. In such tap/faucets, the flow of water is controlled by a replaceable cartridge or arrangement of seals permitting water flow while the holes or ports are lined up properly. Merely giving the handle an extra tough twist will not have any effect on the flow of water. In such tap/faucets, the washer compression strength is not used to halt the flow of water.
- In a compression type tap/faucet, the maximum wear and tear happens in the washer and seat. Both these parts have to be thoroughly checked during repair work. Replacing the washer could prove to be ineffective if the tap/faucet seat is worn out, scratched or grooved.
- To replace the washer pad, use a smooth-jawed wrench with a cloth, and then, resort to the padded wrench to unscrew the large packing nut and then the tap/faucet stem. Then, use a screw driver to remove the screw from the base of the stem and remove the damaged washer. Then, after cleaning out the washer seat or compartment replace with a new washer of the appropriate size and material, depending on whether hot or cold water is used.
- The more recent, soft neoprene washers, which can be used with both hot and cold water, are quite long lasting. The washer should be an exact fit. That is, there should be no need to force it into position. Once the washer is placed or fixed, the screw should be replaced and tightened.
- It is usually impossible to replace the washer seat. It may be more economical to replace rather than repair tap/faucets that are badly worn out.
- A cloth wrapped around a finger should be used to clean the valve seat inside the tap/faucet. Smoothen the surface and edges to get rid of deep nicks, if any. In case the valve seat is badly worn, opt to replace the seat or replace the Tap/Faucet entirely.

• Now, replace the tap/faucet stem before tightening the packing nut. Avoid tightening the nut more than required to arrest the seepage.

### 3.1.15 Problems in Plumbing System & its repair - Sinks

- Explain 🕎

- Sink bowls made of various materials are available. They could be made of stainless steel, enamelled cast iron, or other solid surface materials. The choice of material is based on its durability and resistance to stains. Remember to follow the guidelines / instructions stated by the manufacturer regarding the material with which the bowl is made.
- Using abrasive cleaners frequently can spoil the finish. Therefore, choose a non-abrasive cleaner, which will not make it more porous or vulnerable to stains. However, prolonged use of even enamelled or cast iron tubs can result in wearing off of the finish over a period of time.

### 3.1.16 Problems in Plumbing System & its repair - Washbasin

- Explain 上
  - Clogs in washbasins can be removed with block remover. The clogging can be removed by closet auger also, force cup and plungers.
  - The easiest and most simple technique of opening a clogged drain is to use a plunger. This does noinvolve undoing of any pipes. The objective is to break up whatever it is that is choking or blocking the drain and force it further down the drain.
  - Plumbing snakes are long strips of extremely flexible and tightly wound wire that can easily go around the sharp right angled bends of drain lines.



Fig-3.1.1 Plunger



Fig-3.1.2 Plumbing Snake

# 3.1.17 Problems in Plumbing System & its repair - Noise in Plumbing system

## Explain

- Noises heard in plumbing systems are of three kinds, especially in the not so recent systems—chattering, hammer and whistling.
- The thump that we hear inside piping systems on turning off the tap/faucets abruptly is called water hammer. This can be got rid of by installing an air chamber or short length of pipe in the wall, at the point where each of the supply pipes enters a plumbing fixture.
- Chattering is the sound emitted by loose pipes, or by pipes rubbing against projecting metal, or even by worn out tap/faucet washers.
- Whistling is a noise resulting from the speed at which water flows through pipes that are very small. It would help to use a pressure- reducing valve. If the plumbing system is generally straightened out this can be taken care of. It is the bends of the pipe and the tees where whistling is commonly heard.

# 3.1.18 Problems in Plumbing System & its repair - Odour in Plumbing system

- Explain If a plumbing system is designed properly and ac

If a plumbing system is designed properly and accurately, it will be odour free. Odours are commonly caused by leakages in the waste or vent piping. Odours also emanate from traps where the water seal is missing. If a system is not installed properly or correctly, there will be many causes for odours to be released from various flaws in the system, especially if proper vents are absent.

## 3.1.19 Problems in Plumbing System & its repair - Pipes



Some of the methods of repair for different types of pipes are given in the following tables

MATERIAL CAST		IRON
Burst	Action	Repair
Joint failure	Enclose joint Two couplers	Special joint clamp Two couplers and new section
Brittle failure	Remove section/joint Enclose failure	Two couplers and new section Repair collar or clamp
Corrosion	Remove section/joint Rehabilitation technique Enclose failure	Two couplers and new section Sliplining etc. Repair collar or clamp

MATERIAL	DUC	TILE IRON
Burst	Action	Repair
Joint failure	Enclose joint	Special joint clamp
Factor Contained II	Remove section/joint	Two couplers and new section
Extensive pinholing	Rehabilitation technique	Sliplining etc.
	Remove section/joint	Two couplers and new section
Ductile failure	Remove section/joint	Two couplers and new section
	Enclose burst	Repair collar or clamp
Localised pinholing	Enclose burst	Repair collar or clamp

MATERIAL	STEEL		
Burst	urst Action Rep	Repair	
Extensive pin holing	Rehabilitation Technique Remove section/joint	Slip lining etc. Two couplers and new section	
Joint failure	Remove section/joint Enclose joint	Two couplers and new section Special joint clamp	
Isolated pin holing	Enclose burst	Patch and weld Repair collar or clamp	

MATERIAL	PRESTRESSED CONCRETE		
Burst	Action	Repair	
Surface softening	Remove complete length/joint or cracking	Two couplers and new pipe section	
Joint failure	Remove complete length/joint Enclose joint	Two couplers and new pipe section Special joint clamp	

MATERIAL	POLYETHYLENE/P.V.C.			
Burst	Action	Action Repair	Repair	
Fast crack propagation	Remove damaged section	Two couplers and new section		
Brittle failure	Remove damaged section Enclose burst	Two couplers and new section Repair collar or clamp		
Joint failure	Cut out joint	Two couplers and new section		

# 3.1.20 Plan and Schedule Routine Maintenance, Repairs and Modifications

Elaborate

Plan and schedule routine maintenance, repairs and modifications

- a) The first step is to determine the requirement for repairs or replacements.
- b) The next step is to check the warranties and service agreements to determine whether there are documents that talk of covering such maintenance.
- c) The third step is to draw up an estimate, and if needed, quote and give details of the expenses involved in the work to be carried out.
- d) Remember to obtain a written approval for the work and budget from the relevant authorities and personnel
- e) Organize the material and personnel required and confirm all the relevant details pertaining to site access and specific needs, if any.
- f) Identify the workers who will be involved and arrange all the tools and equipment that will be needed for the work.
- g) Ensure that the labour involved have adequate skills as well as the licenses and qualifications required to fulfil the job requirements.
- h) Ensure that workers are available as per a fixed schedule, based on the volume and nature of work.

## Notes for Facilitation

 Following video can be shown for elaborating more on the subject: https://www.youtube.com/watch?v=QrD\_oPhMVWs https://www.youtube.com/watch?v=PPrBXtCthsE https://www.youtube.com/watch?v=Y4pA09RcluA https://www.youtube.com/watch?v=oDI\_GRMbVP8

– Excei	rcise 🕜 ———		
Q1. leakin	What will you do if Pillar cock is g	Q8. line	Why the Union is installed in pipe
	a. Change washer		a. To divert water flow
	b. Change pillar lock		b. To repair water line
	c. Change Spindle		c. To make branch line
	d. Change Face		d. To extend pipe length
Q2.	Water is leaking / flowing in WC. How	Q9.	Why the scour pipe the provided in
	will you repair?		water tank
	a. Change siphon valve		a. For overflow
	b. Change Cistern		b. To clean tank
	c. Change ball valve		c. For air pipe
	d. Change lever		d. To control distribution line
Q3.	he water is overflowing from Cistern how will you repair?	Q10.	What is the minimum diameter of SW pipes
	a. Adjust ball		a. 15mm
	b. Adjust Siphon		b. 80mm
	c. Adjust float valve		c. 50mm
	d. Adjust knob		d. 100mm
Q4.	A Lead joint of CI water pipe line is	Q11.	Maximum length of GI nipple is
	leaking, what materiel is required to		a.50mm
	repair it ?		b.80mm
	a. Pig lead		c. 300mm
	b.M-Seal		d. 150mm
	c. Lead wool	010	Compared an anter for finishing shares
	d. Plumber Putty	Q12.	Cement mortar for finishing chase
			work should be in the ratio of
Q5.	What is the size of Gully trap cover?		a. 1:1 (1 cement : 1 coarse sand)
	a. 300mm X 300mm		b. 1:3 (1 cement : 3 coarse sand)
	b. 450mm X 450mm		c. 1:6 (1 cement : 6 coarse sand)
	c. 400mm X 400mm		d. 1:8 (1 cement : 8 coarse sand)
	d. 600mm X 600mm		
Q6.	The Seepage is visible at ceiling	Q13.	The standard size of house manhole
corne	r, what may be the cause?		is
	a. Water line leakage at joint		a. 60cmX60cmX30cm
	b. Floor Trap		b.75cmX75cmX40cm
	c. Cistern overflowing		c.90cmX80cmX45cm
	d. Bottle Trap		
		Q14.	Which of the following Tool should be
Q7.	PVC connection pipes are used with		used to remove CP brass long body
	a. Water tank		bibcock
	b. Bath Tub		a. Pipe wrench
	c. Kitchen sink		b. Parrot plier
	d. Wash basin		c. Slide wrench
			d. Chain wrench

Q15. should	The height wash basin from the floor d be a. 28" to 32" b. 34" to 36" c. 24" to 35"	Q18.	Which of the following test is required for testing CI soil waste and vent pipe line. a. Smoke test b. Pressure test c. Water test
Q16.	Water hammer arrestor is provided in water line to a. Remove impurities b. Remove floating particles c. To carry raw water d. Remove hammering effect	Q19. with	GI pipe installed in chase should be painted a. White paint b. Blue paint c. Cement paint d. Bitumastic paint
Q17.	<b>The jet is installed with</b> a. European WC b. Wall mounted WC c. Indian WC	Q20. should	The height of air pipe with water tank be a. Equal to the tank height b. More than tank height c. Less than tank height





GOVERNMENT OF INDIA MINISTRY OF SKILL DEVELOPMENT & ENTREPRENEURSHIP



Transforming the skill landscape



# 4. Maintenance and Servicing of Plumbing Systems

- Unit 4.1 Source Of Water
- Unit 4.2 Treatment of Water
- Unit 4.3 Types of Water Supply Systems
- Unit 4.4 Drainage System
- Unit 4.5 Common Terms In Plumbing



## Key Learning Outcomes 🛛 😨

At the end of this module, students will be able to:

- 1. Explain about various types of water
- 2. Describe rain water harvesting
- 3. Explain concept of catchment and storage dams
- 4. Explain dug well, Sub-surface water harvesting system
- 5. Explain various types of water intakes
- 6. Describe various steps involved in water treatment.
- 7. Explain process of waste water treatment, domestic water treatment, industrial water treatment, portable water treatment.
- 8. Describe various types of water supply system
- 9. Explain various types of water
- 10. Describe various drainage system being adopted in plumbing
- 11. Describe the process of selection of drainage systems
- 12. Explain the drainage system used in residential and commercial building
- 13. Describe common terms used in plumbing

#### Unit 4.1: Source Of Water



At the end of this unit, students will be able to:

- 1. Explain about various types of water
- 2. Describe rain water harvesting
- 3. Explain concept of catchment and storage dams
- 4. Explain dug well, Sub-surface water harvesting system
- 5. Explain various types of water intakes

# Resources to be Used

- Laptop
- Projector
- White Board
- Marker
- Duster

# — Do 🔽

- Greet the participants for the day.
- Give Summary of previous Session.
- Ask for any doubts in previous Session.
- Acknowledge for their doubt-raising, if any. Clear the doubts.
- Give details of today's session and what they are going to learn.
- Encourage them to share their thoughts and doubts now and during process of this course.



- Ask students what are the known source of water.
- Ask students what they know about rain water harvesting.
- Ask students the difference between catchment or storage dam and spring water collection.
- Ask students the difference between dug well and drilled well.
- Ask students what they know about sub surface harvesting system.
- Ask students what they know about various types of water intakes.

## 4.1.1 Source of Water and Supply System

Elaborate

Rainwater

• Rooftop rainwater harvesting

• Catchment and storage dams Groundwater

- spring water collection
- dug well
- drilled wells
- subsurface harvesting systems

Surface water

- river-bottom intake
- floating intake
- Sump intake

### 4.1.2 Rooftop Rainwater Harvesting

### Elaborate

Rooftop catchment systems gather rain-water from the roofs of houses, schools, etc. using gutters and down pipes (made of local woods, bamboo, galvanized iron or PVC), and lead it to storage containers that range from simple pot to large tanks.

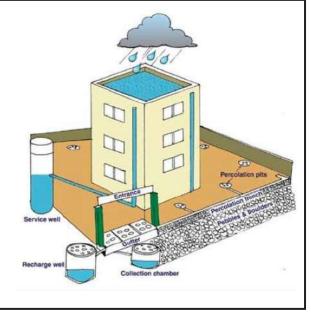


Fig-4.1.1 Rain Water Harvesting

### 4.1.3 Catchment and Storage Dams

# Elaborate

Damming of a valley or similar natural rainwater catchment area can make water available. The reservoir created as a result of the dam can be used to store the water, which can also be diverted to some other reservoir. Certain significant factors in the planning of dams include the yearly pattern of rainfall and evaporation; demand for water ; present use and runoff coefficient of the catchment area; and the geology and layout of the catchment area and building site.

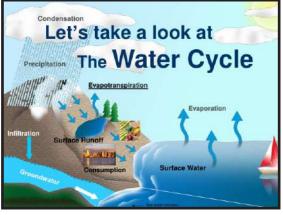


Fig-4.1.2 Rain Water Harvesting

#### 4.1.4 Spring Water Collection



When groundwater surfaces in a natural way, it is called spring water is. When layers of clay or solids block the flow of water under the ground, it has no option but to force its way up to the surface. Spring water may be visible as an open spring, or hidden in the form of an outflow into the sea, stream, lake or river.

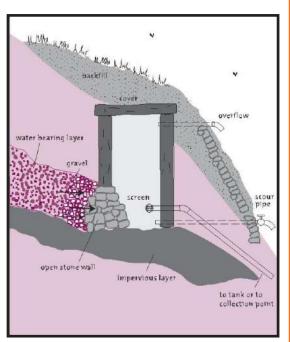


Fig-4.1.3 Spring Water Collection

## 4.1.5 Dug Well

# Elaborate

A dug well helps reach a groundwater aquifer and enables its abstraction. It is possible to easily clean or deepen dug wells by entering them. Their diameter is rarely less than 0.8 m.

- Tools, skills and materials that are locally available are used to construct dug wells.
- If there is a fault in the functioning of the water-lifting system, and repair is not possible, water can still be drawn using a rope and bucket.
- In case the groundwater level falls, water can be accessed by deepening the dug wells further.
- Storage capacity of dug wells is huge.
- It is not difficult to repair or de-silt dug wells, especially if the whole community gets together.
- Dug wells are built in places where it is tough to drill mechanically or using hands.

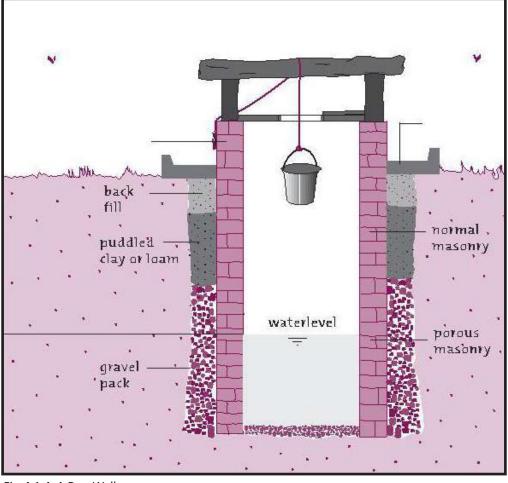
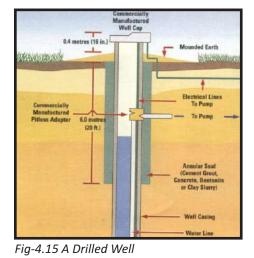


Fig-4.1.4 A Dug Well

#### 4.1.6 Drilled Wells

# Elaborate

The purpose of drilled wells, tube wells or boreholes is to allow access to ground-water aquifers and enable water abstraction. They are smaller than dug wells in terms of diameter. With a diameter ranging between 0.10–0.25 m for the casing, it is not possible for anyone to enter it to either clean or deepen it. The costliest portion of the handpump is the well.



#### 4.1.7 Subsurface Harvesting Systems

## Elaborate

Flow of groundwater can be retained and their abstraction enabled using subsurface harvesting systems. There are two primary systems:

- a) Subsurface dams: These are waterproof dams constructed across a surface aquifer. For instance, they can be built across beds of seasonal sand-filled rivers, with their base atop an impermeable layer.
- b) Raised-sand dams: These are impermeable dams created across the beds of seasonal sand-filled rivers. Their crest reaches a few decimetres above the upstream river bed. Whenever the

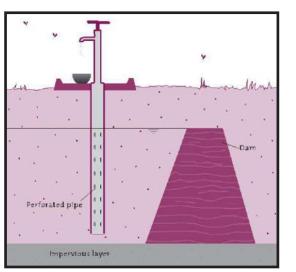


Fig. 4.1.6 Surface Harvesting

upstream portion of the river fills up with sand, the crest is raised slightly more to form a groundwater reservoir.

#### 4.1.8 Protected Side Intake

## Elaborate

A protected side intake creates a stable spot in the bank of a lake or river, from where it is possible for water to enter a channel or the suction pipe of a pump. It is so constructed that it is capable of withstanding damage by floods, and also causes minimal problems pertaining to sediment. Therefore, side intakes are robust constructions, commonly created from reinforced concrete, and may contain valves or sluices for flushing any sediment that may settle.

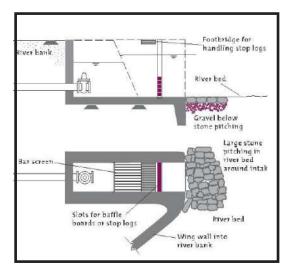


Fig-4.1.7 Protected Side Intake

#### 4.1.9 River-bottoam Intake

Elaborate

River-bottom or Tyrolean intakes for drinking-water systems are used in small rivers and streams as the sediment content and bed load transport are low. The abstraction of water takes place through a screen over a canal (constructed from concrete and built into the river bed). The placement of the bars follows the direction of the current. The slope is downwards, preventing coarse material from entering. Water from the canal flows into a sand trap before passing a valve and flowing by gravity (or sometimes pumped) into the rest of the system.

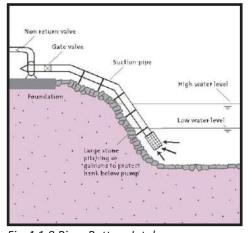
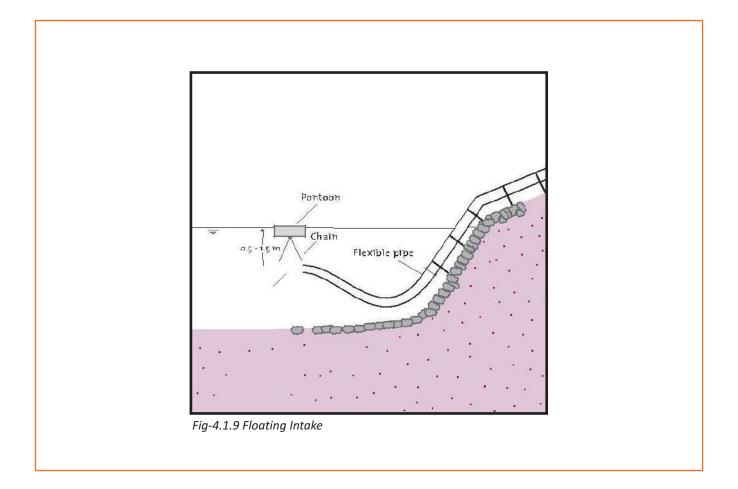


Fig-4.1.8 River Bottom Intake

#### 4.1.10 Floating intake

# Elaborate

Floating intakes for drinking-water systems enable water abstraction from near the river or lake surface. This helps avoid the heavier volumes of silt deposited during floods, near the bottom. Just below the water level, the inlet pipe of a suction pump connects to a floating pontoon secured to the bank or to the bottom of the river or water body.



#### 4.1.11 Sump Intake

Elaborate

In a sump intake, river or lake water enters via an underwater pipe to flow into a well or sump. From here, it is lifted, for the early stages of a drinking-water purification system. The opening of the underwater pipe from where the water flows in is screened and is situated under the low-water level. A well offers a place for sediments to settle down and therefore, provides protection to the pump from harmful floating objects. Often, two sump intakes are constructed for a single pump only to enable cleaning.

#### Unit 4.2: Treatment of Water

### - Unit Objectives 🏼 🖾

At the end of this unit, students will be able to:

- 1. Describe various steps involved in water treatment.
- 2. Explain process of waste water treatment, domestic water treatment, industrial water treatment, portable water treatment.

## Resources to be Used

- Laptop
- Projector
- White Board
- Marker
- Duster

# — Do 🖂

- Greet the participants for the day.
- Give Summary of previous Session.
- Ask for any doubts in previous Session.
- Acknowledge for their doubt-raising, if any. Clear the doubts.
- Give details of today's session and what they are going to learn.
- Encourage them to share their thoughts and doubts now and during process of this course.



- Ask students what they water treatment.
- Ask students why water treatment is important.
- Ask students the steps of water treatment.
- Ask students the difference between domestic water treatment and industrial water treatment.
- Ask students about portable water treatment.

#### 4.2.1 Steps of water treatment

# Elaborate

The water may contain organic and inorganic impurities in the form of suspended and dissolved states. Harmful living organisms like bacteria may also be present. Therefore the water is to be treated according to the use for which it is supplied.

The raw water is treated in a number of ways. The water for drinking purposes is treated in the various steps listed below.

- (a) Screening
- (b) Plain sedimentation
- (c) Sedimentation with coagulation
- (d) Filtration
- (e) Aeration and chemical treatment
- (f) Disinfection

All the above steps may not be necessary and different treatments are given depending upon quality of water taken from different sources.

Treatment for drinking water production involves the removal of contaminants from raw water to produce water that is pure enough for human consumption without any short term or long term risk of any adverse health effect. Substances that are removed during the process of drinking water treatment include suspended solids, bacteria, algae, viruses, fungi, and minerals such as iron and manganese. The processes involved in removing the contaminants include physical processes such as settling and filtration, chemical processes such as disinfection and coagulation and biological processes such as slow sand filtration.

- 1. Wastewater treatment is the process that removes the majority of the contaminants from wastewater or sewage and produces both a liquid effluent suitable for disposal to the natural environment and sludge. Biological processes can be employed in the treatment of wastewater and these processes may include, for example, aerated lagoons, activated sludge or slow sand filters.
- Industrial water and wastewater treatment: Boiler water treatment and cooling water treatment are two of the primary procedures or methods treating industrial water. Absence of adequate water treatment can cause the solids and bacteria inside the pipe and boiler housing to react.

#### **Important Points**

- It is impossible to boil water in water works. Disinfection with iodine and bromine are costly, hence not used in water works.
- The method of use of ozone can be used only if electricity is easily and cheaply available at the water works.
- Disinfection by potassium permanganate is commonly used in rural areas for treating individual well water.
- Plain chlorination is used where good surface water is available. When water is to be treated in large water works gaseous chlorine is use. It should not be applied directly. It is applied through chlorinator specially designed for this purpose.

### Unit 4.3: Types of Water Supply Systems

## - Unit Objectives 🏼 🚳

At the end of this unit, students will be able to:

- 1. Describe various types of water supply system
- 2. Explain various types of water

# Resources to be Used

- Laptop
- Projector
- White Board
- Marker
- Duster

# Do 🗸

- Greet the participants for the day.
- Give Summary of previous Session.
- Ask for any doubts in previous Session.
- Acknowledge for their doubt-raising, if any. Clear the doubts.
- Give details of today's session and what they are going to learn.
- Encourage them to share their thoughts and doubts now and during process of this course.

# Ask (ask)

- Ask students what they know about water supply system.
- Ask students why water supply system is important in plumbing.
- Ask students the difference between continuous and intermittent water supply system.
- Ask students the difference between gravity and pumping water distribution.
- Ask students what is dual system in water distribution.

### 4.3.1 Types of Water Supply Systems

# Elaborate

#### There are two systems of water supply.

- 1. Continuous -In the continuous supply system, water is available to consumers throughout the days.
- 2. In the intermittent supply system, water is supplied during fixed hours and for the remaining period the supply is shut off. Intermittent supply has many disadvantages
  - a) Water has to be stored for non supply hours
  - b) Water will not be available for fire extinguishing if fire breaks out during non supply hours.
  - c) The sizes of the pipes are required to be larger.
  - d) There is chance of wastage of water as the Tap/Faucets may be left open during non-supply hours.
  - e) The only advantage is that water can be supplied to high level areas also with adequate pressure as different areas of the town may be supplied with water in different hours.
- 3. The water supply distribution systems are laid in the following forms.
  - a) Tree or dead end system-Tree or dead end system: In this system the main line is laid along the main road and goes on diminishing in size. Branch lines are taken in many places along the road and there are many dead ends in the system. This system is suitable for towns growing irregularly. The dead ends cause stagnation of water. Also in case of any repair, the area beyond that point will not get water. However this system requires less number of valves and design of pipe sizes is easy.

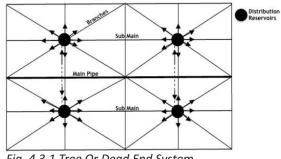


Fig. 4.3.1 Tree Or Dead End System

#### 4.3.2 Types of water

– Elaborate

- 1. Non-potable water: water that is not of drinking water quality.
- Soft water- Soft water is water which has relatively low concentration of calcium carbonate and other ions. The water that lathers with soap easily is called soft water. It describes type of water that contain few or no minerals like calcium (Ca) or magnesium (Mg) ions.

- 3. Hard Water is full of inorganic minerals, such as calcium, iron and magnesium. Water found inside wells of great depth, in lakes, rivers, as well as in the ground are of the hard water category.
- 4. Raw Water is water that is not boiled. It could be hard or soft. It is saturated with germs and viruses of all kinds.
- 5. Rain Water is water that condenses from the clouds. While the first drop is definitely distilled, on falling in the form of rain it gathers chemicals and pollutants, including dust, minerals, germs, smoke, strontium 90, and lead. By the time rain water reaches the earth it is so full of pollutants that its colour may turn yellow.
- 6. Filtered Water is the name given to water that has been finely strained. Some calcium and other solids are retained in the filter, but even the ultra fine mesh of a filter cannot stop germs from passing through. Every single pore of a filter, no matter how fine, can let through a million viruses in no time.
- De-ionized Water. A process of exchanging "hard" ions for "soft." The total ions are still present. The end result is the same. But the water has the appearance of being distilled.
- 8. Distilled Water. This is water that has first been turned into steam so that all of its impurities are left behind. Then through condensation, it is turned back into pure water. It is the only pure water. The only water free from all contamination. Distilled water may well be considered the only pure water on earth.

### 4.3.3 Classification of the Water Distribution is on the basis of Pumping Ways

## Elaborate

- Gravity system
- Pumping system
- Dual systems

#### Notes for Facilitation

• Following video can be shown for elaborating more on the subject:

https://www.youtube.com/watch?v=5NzMt6PErYo

## Unit 4.4: Drainage Systems

### Unit Objectives 🞯

At the end of this unit, students will be able to:

- 1. Describe various drainage system being adopted in plumbing
- 2. Describe the process of selection of drainage systems
- 3. Explain the drainage system used in residential and commercial building

### Resources to be Used

- Laptop
- Projector
- White Board
- Marker
- Duster

# - Do 🗠

- Greet the participants for the day.
- Give Summary of previous Session.
- Ask for any doubts in previous Session.
- Acknowledge for their doubt-raising, if any. Clear the doubts.
- Give details of today's session and what they are going to learn.
- Encourage them to share their thoughts and doubts now and during process of this course.

# \_ Ask

- Ask students what they know about drainage system.
- Ask students how to select drainage system.
- Ask students what are the guidelines for selecting drainage system.
- Ask students the difference between two-pipe and one-pipe system.
- Ask students which type of drainage pipes used in residential buildings.
- Ask students what is septic tank.
- Ask students what is grease traps.
- Ask students what is strom water drainage.

# 4.4.1 Drainage Systems being adopted in plumbing

# - Elaborate

- 1. The systems adopted in plumbing of drainage work in a building:
  - 1.1. Pipe Systems—The design is selected on the basis of the type and plan of the building, where its installation required. One of the following types is selected:
    - a) two-pipe system
    - b) one-pipe system
    - c) single-stack system
  - 1.2. Selection of Plumbing System
    - I. In cases where it is possible to deal with the waste water from showers and kitchen sinks separately, for use in other ways, for instance, for watering gardens, the two pipe system is preferred.
    - II. The one-pipe system is an inexpensive option in cases where all types of waste waters flow through a common sewer line leading to the place of disposal or treatment.

Ventilation for both these systems is ensured by a ventilating pipe system. In recent times, the single-stack system has become popular. It has no vent pipe system, but the stack itself fulfils the vent requirements by curbing the flow in the stack. For a five-storey building, a system with a diameter of 100 mm is recommended. A maximum of two toilets can release into the single stack on each floor.

- III. When it comes to high rise structures, a partly ventilated single-pipe system is made use of, where the vent stack connects to the drainage stack or the WCs at each floor or every alternate floor. The completely ventilated system does not require any special protection or precautions.
- 1.3. Typical Design Guidelines
  - Branches and stacks receiving discharges from WC pans should be of minimum 100 mm diameter, except in cases where the outlet from the siphonic water closet is 80 mm. In the latter case, a branch pipe of 80 mm can be employed; for outlet of floor traps, pipes of 75 mm diameter should be used.
  - II. The incline of a horizontal branch should be maximum 1 in 50 flat and not steeper than 1 in 10.
  - III. Layout of pipes— The arrangement of pipe work and appliances should be such that close grouping of connections is facilitated. A water closet near the main soil pipe is preferable. The level of the trap outlet of an appliance will be examined in relation to the level of the floor and the branch pipe.

### 4.4.2 The types of drainage pipes used in residential buildings

# Elaborate

1

Soil Pipe-A soil pipe that transmits to a drain any solid or liquid waste has to be circular with a diameter of at least 100 mm.

- I. The soil pipe is placed outside the building or within suitably designed pipe shafts. They continue upwards without any decrease in diameter, and do not bend or form an angle, unless unavoidable. They reach such a height where the open end is able to safely release foul air.
- II. Wherever pipe shafts exist the cross-sectional area should be capable of facilitating free and unhindered access to the pipes to be fixed in the shaft. It is mandatory for the crosssection to at least have a square of 1 metre side.
- III. All pipe shafts should have an access door at the ground level along with provision for ventilation.
- IV. Soil pipes made of cast iron are preferred. Asbestos cement building pipes can also be used as soil pipes, but only above the ground level.
- 2 Each pipe used to clear off the waste water from kitchens, baths and wash basins of a building into a drain should have a minimum diameter of 32 to 50 mm. The water should be trapped right below such a wash basin using a good siphon trap with appropriate provision for cleaning and inspection whenever required. Such traps need to be ventilated into the outside atmosphere, so as to protect the seal of the trap.
  - I. Waste pipes, traps, and so on are usually made of iron, lead, brass, stone, asbestos cement or other approved material. The overflow pipe from wash basins, baths, and so on should have a connection to the waste pipe right above the trap. Vertical pipes transmitting waste water should be of at least 75 mm diameter.
  - II. The waste pipe should be ultimately connected to the wall with a gap of minimum 5 cm. if it is a cast iron pipe. The pipe should be properly fastened to the walls using holder bats or any suitable and secure means.
- 3 Storm water pipe- A storm pipe in drainage system is designed to drain excess rain and ground water from impervious surfaces. Pipes are available in various cross-sectional shapes. They are also made of various kinds of materials —concrete, galvanized steel, brick, high-density polyethylene, and so on.

4

Ventilating Pipe- The installation of ventilating pipes should be done vertically and in such a way that they are unable to retain any water. Horizontal installation is best avoided. Ventilating pipe should be placed at a height and position where it is convenient and safe to release foul air into the atmosphere without causing any harm or nuisance to anybody.

- I. Branch ventilating pipes should be connected to the top of the BSP and BWP between 75 mm and 450 mm from the crown of the trap.
- II. The ventilating pipe shall always be taken to a point 150 cm above the level of the eaves or flat roof or terrace parapet whichever is higher or the top of any window within a horizontal distance of 3 m. The least dimension shall be taken as a minimum and local conditions shall be taken into account. The upper end of every ventilating pipe shall be protected by means of a cowl.
- III. If the adjacent building is higher, the ventilation pipe should definitely be higher than the roof of that building, as far as possible.

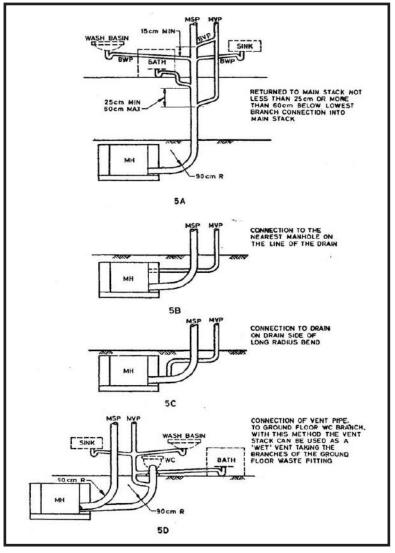


Fig-4.4.1 End Connections of Vent Pipe

## 4.4.3 Sewerage Plans of Buildings and Designs of Sewer Pipes

# Elaborate

- a) Quantity of Flow: The flow in the drainage pipes of a house sewerage system is irregular in nature and is not continuous. The quantity is also small. The average rate of flow is usually based on a water supply of 135 litres per capita per day for average Indian conditions. The maximum flow may be taken as three times this average.
- Waste pipes: Every pipe for carrying water or overflow water from every bath, wash basin or Washbasin to a drain shall be of 32 to 50mm diameter. Waste stacks shall have a minimum dia of 75mm.
- c) Ventilating pipes: The building drain ventilating pipe should be not less than 75mm in diameter when, however, it is used as main soil pipe or main waste pipe (MSP or MWP). The upper portion should not be of smaller proportion in terms of diameter, thatn the other portion, even if it is not carrying discharges. The main ventilating pipe should hae a diameter of not less than 50mm. Both one pipe and two-pipe systems have a branch ventilating pipe on a waste pipe, which should be at least two-thirds of the diameter of the branch waste ventilated pipe—a minimum of 25mm. In case of a branch ventilating pipe on a soil pipe, the diameter should be at least 32m.
- d) Anti Siphonage pipes: Water seals of traps in multi-storied buildings or houses may sometimes get broken due to siphonic action

### 4.4.4 Installation of Drains

# Elaborate

Where any drain is constructed adjacent to or under or through a structural part of any building, adequate measures must be taken to ensure that the trench in which such drain is laid in no way impairs the stability of such building or the stability of any other building or interferes with or affects any existing services.

- All drains should be strong enough and well supported to sustain maximum loads and forces and should have enough protection against damage of any kind.
- The following conditions should be fulfilled:
  - i. At least 300 mm of covering should be there over the outside of the drain or
  - Precast or cast-in-situ concrete slabs should be fixed over the drain, with at least a 100 mm thick soil cushion separating the crown of the pipe. The slabs should have enough width and strength to prevent extreme and unwarranted loads from being transferred directly to the pipes.

- Drains should:
  - i. Be laid out in a straight line between any points where the direction or gradients change.
  - ii. Have planned flexible joints to allow movement throughout the life of the drainage installation.
  - iii. Be able to resist penetrating roots and not depreciate or weaken on coming in contact with water or sewage; nor should it cause any obstruction on the inside of such drain.
- Be laid at a gradient of at least 1:60 for 100 ø and 1:100 for 150 ø pipes. But the project manager may use his discretion to allow lesser gradients.
- If the gradient is more than 1:5, it should be equipped with anchor blocks to fix and secure such a drain in its right place.

#### 4.4.5 The parts of drainage systems are as follows:

# Elaborate

#### I. INSPECTION EYE (IE)

- a) There have to be inspection eyes:
  - i. at all bends and intersections (except the junction of vent pipes) in the drainage system;
  - ii. within 0.5m downstream of each cleaning eye;
  - iii. beneath and above each vertical or sloping ramp and also above each ramp leading to an inspection chamber.

#### II. CLEANING EYE (CE)

There should be cleaning eyes:

- a) at each intersection above ground and at the bend of all pipes (soil and waste);
- b) below the ground at a maximum of 25m (in case of a 100mm drain);
- c) at the head of each branch drain more than 3m long;
- d) at each ramp and also at 1.2m within the boundary of one house.

#### **III. OPEN INLETS**

There should be no gulleys or other open inlets to drains, within a building or below any roofed portion.

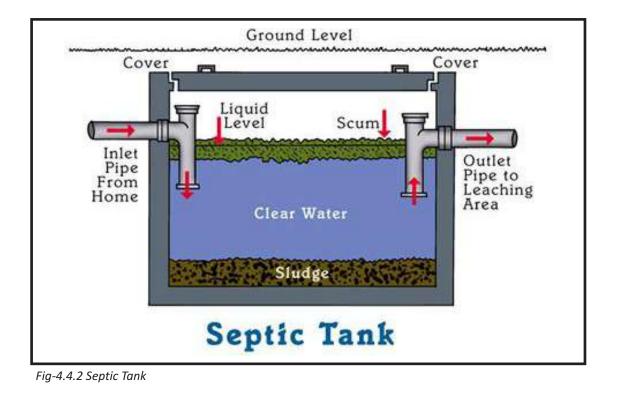
#### IV. VENT AND ANTI-SIPHON PIPES (VP AND ASP)

A vent pipe the same size as the drain pipe which it ventilates must be provided.

- a) at the head of every drain or branch drain into which 2 or more fittings discharge;
- b) at each vertical waste water pipe longer than 3.5m and
- c) an additional vent must be provided where 8 or more WC's are connected in a row, for example at schools.

#### V. SEPTIC AND CONSERVANCY TANKS

A septic tank is significant part of a septic system— a small-scale sewage treatment system commonly found in areas that are not connected to primary sewage pipes laid by local governments or private corporations. The location of septic and conservancy tanks should be min. 3 m away from any building. In case of French drains, soakage pits or agricultural drains, a minimum distance of 5m should be maintained from any building. Precautions have to be taken to ensure that no underground water supplies are polluted. Effluents, if any, should flow away from any underground water supply at a minimum distance of 50m. If effluents happen to flow in the direction of any underground water supply, there should be a considerably greater distance depending on how deep the water supply is, and also depending on the soil, the water table and rock formations. The term 'septic' is used to describe the anaerobic bacterial environment created in the tank where the waste discharged is decomposed or mineralized.



#### VI. GREASE TRAPS

There should be grease traps installed at all huge kitchens and even at homes where the kitchen waste is linked to a trench drain.

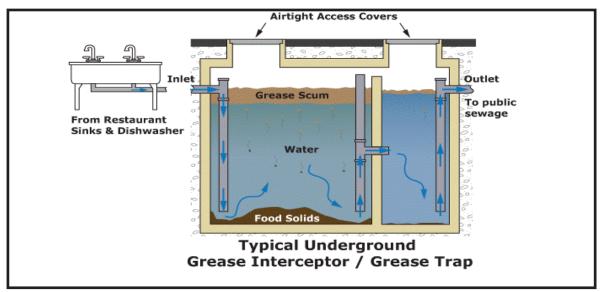


Fig-4.4.3 Grease Trap

#### VII. STORM WATER DRAINAGE

Under normal circumstances, storm water is conveyed through low and narrow channels made of either brick or concrete. Sometimes they are also carried by chutes or concrete pipes. The pipes used for the purpose should have a minimum diameter of 200 mm. Pipes that drain roads should be at least 300 mm. The size of the concrete storm water pipe is determined by:

- the surface of the area, for instance, roof or tar surface; rocky, clay, or sandy ground; grassed surface, and so on;
- incline of the ground;
- slope of the pipe and
- area / region (coastal, inland, etc.)

It should be noted that:

- Storm water should not be permitted to enter the drainage system;
- If storm water pipes are laid below a building, they should have a diameter of at least 300 mm and should be provided with catch pits on the sides of the building.
- It is essential to dispose off storm water from paved areas, roads and sport fields in an efficient manner;
- The drawing pad should clearly show all pipes (of all grades and sizes) and of all levels (ground and invert levels), and channels.

• There should be clear outlines and guidelines for finally disposing storm water from a stile. The local authorities should be consulted while drawing up and designing a plan for the same.

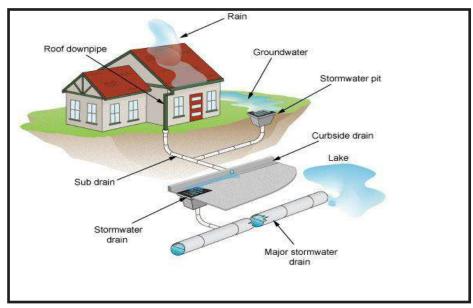


Fig-4.4.4 Building

#### Design Factors of a drainage system

Certain factors need to be kept in mind while designing a drainage scheme. Let us look at some of them:

- Water released from toilets and waste water from basins, baths, showers, and so on are referred to as foul water.
- The one-pipe system is preferred to the two-pipe system as there are lesser number of pipes involved and the hygiene level is higher.
- In a two-pipe system there are separate vents from each sanitary appliance, which then come together in a vent stack, while the single-stack system is much simpler.
- All systems are provided with traps and ventilation to get rid of foul smells and air.
- Traps consist of a water-seal with a diameter of approx. 50mm to 75mm that stop gases from being released into sanitary fittings, such as wash basins, water closets, baths and showers.
- Foul water pipes that have a length of more than 6.4 m usually need to be vented.
- If the waste pipe leading out of a wash basin is at gradient that is excessively steep, there may be chances of self-siphonage taking place. This is the point at which the contents of the trap get sucked out into the waste pipe as the water flows away very fast, and causes the trap to empty out.

 If there develops a suction pressure within the drainage system, induced siphonage can happen. A suction pressure of 500 N/m2 (50mm water gauge) will decrease the water level in a basin trap by 25mm.

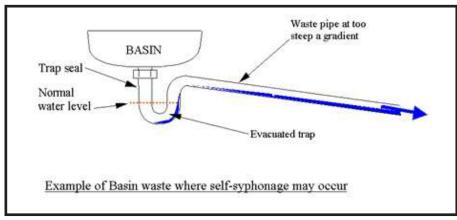


Fig. 4.4.6 Basin Waste

• If the system is not adequately designed, backpressure can take place, which is enough to get rid of water from a trap.

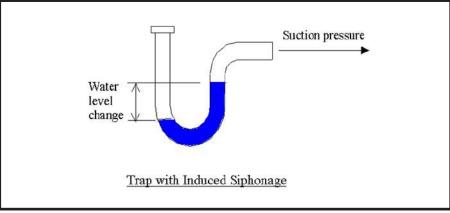
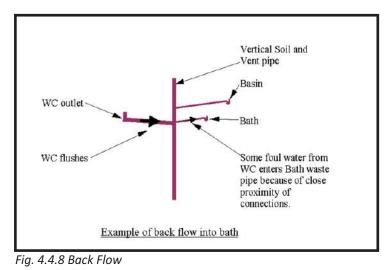


Fig. 4.4.7 Induced Sponge



- Waste pipes from appliances discharging into bigger pipes do not encounter siphonage issues as the larger pipes rarely run full.
- Waste pipes from appliances discharging into pipes of the same size/diameter have restrictions in terms of length, frequency of bends and gradients to decrease problems of siphonage.

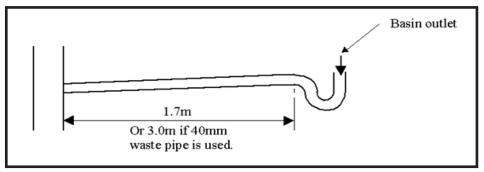


Fig. 4.4.9 Waste Pipe

- Self-Siphonage rarely occurs in case of baths, showers and Washbasins, as the base of each appliance is almost flat. This allows the trap to re-fill in case it becomes empty.
- Soil and vent stacks should not have any waste branch near the WC connection.

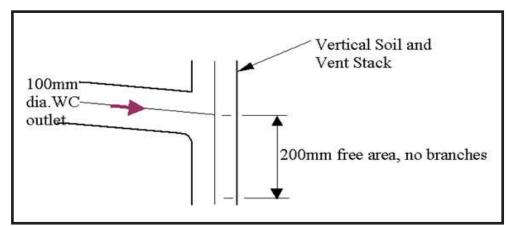


Fig. 4.4.10 Soil and Vent Stacks

- Sometimes it is impossible to stop pressure fluctuations in pipe-work. If that happens, separate vent pipes need to be installed. It may be impossible to restrict the length of branches or provide sensible gradients in certain installations.
- A flow velocity of 0.6 to 0.75 m/s should ensure that solid matter is not stranded in horizontal pipes.

- Proper velocities of flow are provided by gradients from 1 in 40 to 1 in 110.
- Normally, a ground floor water closet is connected directly to a manhole. Since the pipe from the WC is large, with a diameter of 100 mm, and there is a vent in the drain, there is little or no chance of self-siphonage or induced siphonage.

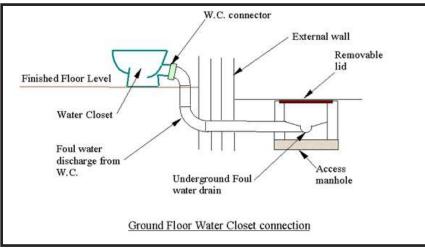


Fig. 4.4.11 Water Closet Connection

- There should be access points situated:
  - (a) At a bend or point of change in direction
  - (b) At a junction, except if clearing of each run is possible from an access point.
  - (c) On or near the head of each drain run.
  - (d) On long runs
  - (e) At a change of pipe size
- The soil and vent stack or branch connecting at least one WC is should have an internal diameter of minimum 100 mm. Outlets from wash basins should have a branch pipe diameter of minimum 32 mm. Washbasins and baths should have branch discharge pipes of minimum 40 mm diameter.
- In case of bigger drainage systems, the pipe size can be decided based on discharge units and suitable graphs.
- Drains should be laid at a minimum depth of 900mm beneath roads and at least 600mm below fields and gardens.

## 4.4.6 Traps

# Elaborate

Traps-Foul air should not be allowed to enter the building. This can be ensured by using relevant traps at the appropriate spots/locations.

- ١. Traps should be able to follow a process of self-cleansing. A trap, if not a vital part of an appliance should be connected directly to its outlet; while the pipe bore should not only be even throughout but also possess a smooth surface.
- Traps found in domestic waste fittings and so on should be easy to access and be fitted with II. cleaning eyes, or other cleaning devices.
- III. Traps for Various Purposes

MINIMUM INTERNAL DIAMETERS FOR WASTE APPLIANCES		
ITEM	DIAMETER mm	
Drinking fountains	25	
Wash basins	30	
Bidets	30	
Domestic Washbasins and baths	40	
Shower bath trays	40	
Domestic bath tubs	50	
Hotel and canteen Washbasins	50	
Urinals: Stall urinals (with not more than 1-20 m of channel drainage)	50	
Floor traps (outlet diameter)	65	

SL NO	ITEM	TW O- PIPE mm	ONE-PIPE mm	SINGLE STACK mm
I	Water closets	50	50	50
ii	Floor traps	50	50	50
iii	Other fixtures, directly connected to the stack:			
	a) Where attached to branch waste pipes of dia 75 mm or more	40	40	40
	b) Where, attached to branch waste pipe of less than 75 mm dia	40	40	75

	RECOMMENDATIONS FOR DESIGN OF SINGLE STACK SYSTEM				
SL NO.	COMPONENT	ACTION TO BE GUARDED AGAINST	DESIGN RECOMMENDATIONS		
(1)	(2)	(3)	(4)		
i)	Wash basin waste	Self-siphonage	Use 75 mm seal P-trap. The slope of a waste pipe should not be more than 40 mm, and should be decided on the basis of the length of the waste pipe. Bends should have a minimum radius of 75 mm to the centre line. Waste pipes with a length more than the recommended maximum of 165 cm should have provision for ventilation, else their diameter should be larger or they should be provided with an approved resealing trap.		

ii)	Bath and Washbasin wastes 38 mm trap and 38 mm waste pipe	Self-siphonage	Use 75 mm seal traps. Self-siphonage is of little importance. There may not be any issues regarding length and gradient of waste branch. However, long waste pipes may encounter some issues due to sedimentation. Also, provision should be made to access for cleaning.
		Backing up of discharge from W.C. branch into bath branch	Point of entry of bath waste into stack to be as the bath waste pipes may be connected to the stack so the centre line joins the centre line of the stack at or above the point where the centre line of the WC branch meet the centre line of the stack, or at least 20 cm below it21
iii)	Soil branch connection to stack	Lower induced siphonage in the stack on discharge of W.C.	W.C. needs to be swept in the direction of flow. Fittings need a minimum sweep of 5 cm radius
iv)	Bend at foot of stack	Back pressure at lowest branch. Build-up of detergent foam	Either two bends of 135° should be used or the bend should have a big radius. The distance between the lowest branch connection and the invert of drain (vertically), should be minimum 750 mm (450 mm for two-storied houses with 100 mm stack)
v)	Offsets in stacks	Back pressure above offset	Stacks below the topmost appliances should have no offsets except in cases where ventilation relieves back pressure if any. Offsets existing above the topmost appliances are hardly important.
vi)	Floor traps and 75 mm branch pipe	Induced Siphonage	Use 50-mm seal trap. Slopes of the branch pipe may be in the range of 1 in 50 to 1 in 10

Note—These recommendations are applicable to systems with swept-inlet WC branches. In case of straight inlet branches, a 100 mm stack without vents has given satisfactory results, for up to four storeys. A 150 mm stack without vents has been found to serve well for up to 15 storeys.

Source of Tables (IS: Code of practise for Plumbing and Water supply)

### Unit 4.5: Common Terms used in Plumbing

### Unit Objectives Ø

At the end of this unit, students will be able to:

1. Describe common terms used in plumbing

# Resources to be Used

- Laptop
- Projector
- White Board
- Marker
- Duster

# Do

- Greet the participants for the day.
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- Ask students what they understand by terminology. .
- Ask students the importance of knowing terminology.
- Ask students the meaning of few common terminology of plumbing.

# Elaborate

Some of common terms in Plumbing (IS: Code of practice for Plumbing and Water supply)

- 1. Air Gap—The distance between the lowest point of a water inlet or feed pipe to an appliance and the spill-over level (or the overflowing level) of the appliance.
- 2. Appliance—A receptacle or apparatus in which water is heated, treated or measured, or in which it is utilized before passing to waste.
- 3. Approved—Accepted or acceptable under an applicable specification stated or cited in this code or accepted as suitable for the proposed use under the bye-laws or regulations of the Authority.
- 4. Area of a Floor or Floor Area of a Building—The area of a horizontal section taken at the plinth or floor level of any storey of a building inclusive of all projecting and overhanging parts of the external walls and of such portions of the partition walls as belong to the building.
- 5. Available Head—The head of water available at the point of consideration due to main's pressure or overhead tank or any other source of pressure.
- 6. Authority Having Jurisdiction—The authority which has been created by a statute and which for the purpose of administering the code may authorise a committee or an official to act on its behalf; hereinafter called the 'Authority'
- 7. Backflow—The flow of water or other liquids, mixtures or substances into the distributing pipes of a potable supply of water system from any source or sources other than its intended source.
- 8. Backflow Prevention Device—Any approved measure or fitting or combination of fittings specifically designed to prevent backflow or back-Siphonage in a water service.
- 9. Back Siphonage—The flowing back of used contaminated or polluted water from a plumbing fixture or vessel into a water supply pipe due to a reduced pressure in such pipe
- 10. Branch—Any part of the piping system other than a main.
- 11. Building—Any permanent or temporary structure built for the support, shelter or enclosure for persons, animals, chattels or property of any kind, and includes a house, out-house, stable, shed, hut and every other such structure, whether of masonry, bricks, wood, mud, metal or any other material but does not include a watchman's booth, a mandap or other similar kinds of temporary structures erected on ceremonial occasions.
- 12. Branch Ventilating Pipe (B.V.P.) In this pipe, one end connects to the system adjacent to the trap of an appliance wheras the other connects to a primary ventilating pipe or a drain-ventilating pipe. It can prevent loss of water seal from a trap due to partial vacuum back pressure, or surging resulting from air movement inside the pipe system. It also offers ventilation to the branch waste pipe.
- 13. Branch Soil Pipe (B.S.P.) This connects one or more soil appliances to the primary soil pipe.
- 14. Branch Waste Pipe (B.W.P) This connects one or more waste appliances to the primary waste pipe.

- 15. Branch Soil Waste Pipe (B.S.W.P.) This is a pipe, which connects one or more soil and/or waste appliances to the primary soil waste pipe (one-pipe system).
- 16. Building Drain— This is part of the lowest horizontal piping of a drainage system receiving the discharge from soil, waste, and other drainage pipes within the walls of the building. It carries it to the building sewer, which begins a metre outside the building wall.
- 17. Building Sewer It is a portion of the horizontal piping of a drainage system extending from the end of the building drain and receiving the discharge of the building drain. It also transmits it to a public sewer, private sewer, individual waste-disposal system, or any other disposal facility of point.
- 18. Cleaning Eye— It is an opening that in a pipe or pipe fitting that gives access for the purpose of getting rid of blockages or obstructions. It has a cover than can be removed if required.
- 19. Crown of Trap— It is the topmost point of the inside of a trap outlet.
- 20. Diameter It is the nominal diameter of pipes fittings.
- 21. Drain— A pipe that transmits waste/discharge from sanitary appliances and delivers the same into a drainage system.
- 22. Drain Ventilating Pipe (D.V.P.) It is a pipe that facilitates flow of air to or from a drain so as to stop foul are from getting concentrated inside the drain. The primary soil pipe or main waste pipe may play the role of drain ventilating pipe in cases where their upper parts, which do not receive discharges, extend to reach the roof level and are able to release into the open to air.
- 23. Diameter—Unless specifically stated, the nominal (internal) diameter of the pipe.
- 24. Direct Tap/Faucet—A Tap/Faucet which is connected to a supply pipe and subject to pressure from the water main.
- 25. Domestic Purposes—All purposes incidental to the occupation of a dwelling.
- 26. Downtake Tap/Faucet—A Tap/Faucet connected to a system of piping not subject to water pressure from the water main.





GOVERNMENT OF INDIA MINISTRY OF SKILL DEVELOPMENT & ENTREPRENEURSHIP



Transforming the skill landscape



# 5. Coordinating with Seniors and Working with Team

- Unit 5.1 Team building and its management
- Unit 5.2 Resolving Conflicts
- Unit 5.3 Team working skills
- Unit 5.4 Interact with colleagues and seniors within and outside the team
- Unit 5.5 Diaries and log reports
- Unit 5.6 Assessment



## Key Learning Outcomes 🛛 Ϋ

#### At the end of this module, students will be able to:

- 1. Work as a team with colleagues and share work as per the work load and skills
- 2. Work with colleagues of other teams
- 3. Receive work instructions and raw materials from reporting senior
- 4. Communicate to senior about task status, repairs and maintenance of tools and equipment as required
- 5. Communicate any potential hazards and expected process disruptions
- 6. Handover completed task to reporting senior
- 7. Receive feedback from senior
- 8. Report any anticipated reasons for delays Interact with colleagues within and outside the team
- 9. Communicate and discuss work flow related difficulties in order to find solution with mutual agreement Taking instructions from the reporting senior
- 10. Work as a team with colleagues and share work as per the work load and skills
- 11. Work with colleagues of other teams
- 12. Report problem/incident etc.
- 13. Put team over individual goals
- 14. Resolve conflicts

### Unit 5.1: Team Management – Meaning and Concept

### - Unit Objectives 🏼 🎯

At the end of this unit. students will be able to:

- 1. Explain team management concept
- 2. Describe characteristics of a good and effective team
- 3. Resolve disputes with team members

## Resources to be Used

- Laptop
- Projector
- White Board
- Marker
- Duster

# Do

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(ask) Ask

- Ask students what is the meaning of team.
- Ask students the importance of team management.
- Ask students how they would define a good team.
- Ask students what is team work.
- Ask students why it is important to resolve disputes in team.
- Ask students how you can avoid conflict.

### 5.1.1 Team Management – Meaning and Concept

Some tasks cannot be accomplished by an individual alone. However, if many individuals team up, discuss the problem with each other, and work together to achieve a common goal, the work will definitely be accomplished. These individuals who come together to form a group or team should be able to think alike or somewhat on similar lines, only then can they achieve what they set out to achieve. If they have similar interests and objectives things will only look better.



Fig-5.1.1 Representative Image

#### 5.1.2 What is Team Management?



Team management is the collective term used for activities that bring together people to work as a team, give them the opportunity to bond with each other and work towards the achievement of a common goal.

#### 5.1.3 Characteristics of a Good/Effective Team

### Elaborate

- **Clear and inspirational goal:** A goal that everyone in the team is aware of and understands.
- **Committed members:** The goal should be agreeable to all in the team and preferably decided jointly; only then will all the team members work sincerely and wholeheartedly to achieve the goal.
- **Proficient team members:** Each member of the team should have the competence and capability required to help the team achieve its objectives.
- **Commitment:** Goals can be achieved only if those pursuing it are committed towards their achievement. Each team member should be totally committed to the goal and loyal to the organization in order to achieve success.
- **A collaborative environment:** A collaborative team consists of committed team members and an efficient leader. All this combined together results in increased productivity.
- **Standards of excellence:** Orientation towards quality is essential for any organization to succeed.

#### 5.1.4 What is Team Work?



Team work refers to the efforts put in by all the team members in totality, to achieve the goals of the team. Simply put, team work forms the backbone of a team.

- I. The team should always come first and should be top priority
- II. Each team member is significant and capable. Therefore, no should be underestimated.
- III. Any idea or suggestion should first be discussed with the team members, preferably sitting together, that is, at a common platform, before implementation.
- IV. Avoid criticising or ridiculing any member of the team. Try to be a good team worker or team player by helping others.
- V. Be transparent and encourage everyone to be so too so that there is healthy interaction among the team members.
- VI. The team leader should be responsible for motivating the team members and inspiring them to put in their best. In case of disputes, the leader should step in to resolve the issue without delay.
- VII. Ensure that the team members do not get into fights or arguments over trivial issues. Each member should avoid finding faults in others. Each one should be tolerant and accommodating so that unnecessary arguments and unpleasant situations are avoided.
- VIII. Be generous with appreciation and rewards so that healthy competition is promoted among the team members.

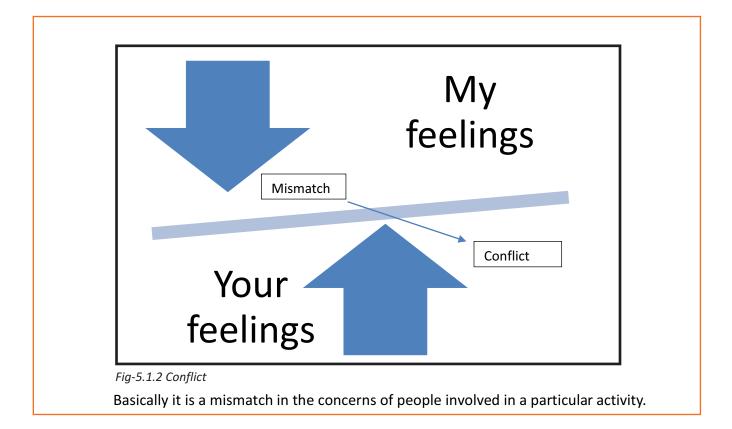
#### 5.1.5 Resolving Disputes



There are two ways of solving a dispute:

- a) Consensual process: Collaborative Law, Conciliation or Negotiation-It is a dialogue between two or more people or parties intended to reach a beneficial outcome.
- b) Litigation: Litigation or arbitration is the most costly and time-consuming way to resolve a dispute.
   Each party is represented by an attorney while witnesses and evidence are presented. Once all information is provided on the issue, the arbitrator makes a ruling which provides the final decision. The arbitrator provides the final decision on what must be done and it is a binding agreement between each of the disputing parties.

Conflict-Everyone, rich or poor, young or old, at workplace or even at home, if is in contact with others, faces one kind or the other type of conflict at many points of time. Conflict is a situation in which one person or a group perceives that its interests are being opposed or negatively affected by another person or group.



#### 5.1.6 How You Can Avoid Conflict

# Elaborate

No one wants to be in a conflict situation. By adopting some minor attitudinal changes one can easily avoid conflicts. These are:

- a) Focus on solution than problem Rather than dwelling on the past happenings and events, talk about how you want things to be.
- b) Avoid blaming and criticising others by using words 'You should...., You make me feel......'
- c) Instead of talking about your beliefs base your talk on observation.
- d) Never give any personal comments. If you do not like at any given point of time any action or reaction of any of your colleagues, do not comment on the person, just talk about the behaviour not about the person.
- e) Offer support and collaboration and make it obvious that you are a part of the solution.
- f) Recognize the positive intention.

### Unit 5.2: Resolving Conflict

– Unit Objectives 🏻 🎯

At the end of this unit, students will be able to:

- 1. Explain the reasons of conflicts
- 2. Describe how to resolve conflicts

### Resources to be Used

- Laptop
- Projector
- White Board
- Marker
- Duster

## --- Do [

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- Ask students what they know about conflict.
- Ask students how to avoid conflict.

#### 5.2.1 What is Conflict?

# Elaborate

When a team oversteps the mark of healthy difference of opinion, resolving

conflict requires respect and patience.

There are the following ways of solving a conflict:

- a) Negotiation
- b) Mediation
- c) Arbitration
- d) Litigation

#### 5.2.2 Preventing Conflict

# Elaborate

- a) Dealing with conflict immediately avoid the temptation to ignore it.
- b) Being open if people have issues, they need to be expressed immediately and not allowed to fester.
- c) Practicing clear communication articulate thoughts and ideas clearly.
- d) Practicing active listening paraphrasing, clarifying, questioning.
- e) Practicing identifying assumptions asking yourself "why" on a regular basis.
- f) Not letting conflict get personal stick to facts and issues, not personalities.
- g) Focusing on actionable solutions don't belabor what can't be changed.
- h) Encouraging different points of view insist on honest dialogue and expressing feelings.
  - (i) Not looking for blame encourage ownership of the problem and solution.
  - (j) Demonstrating respect if the situation escalates, take a break and wait for emotions to subside.
- k) Keeping team issues within the team talking outside allows conflict to build and fester, without being dealt with directly.
  - (I) To explore the process of conflict resolution in more depth, take our Bite-Sized Training session on Dealing with Conflict.

#### Unit 5.3: Team Working Skills

- Unit Objectives 🏼 🖉

At the end of this unit, students will be able to:

- 1. Explain importance of team work
- 2. Describe various skills important for team work

### - Resources to be Used 🧬

- Laptop
- Projector
- White Board
- Marker
- Duster

# Do

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# Ask (ask)

- Ask students what are skills required to work in a team.
- Ask students what is reliability and why it is important for team building.
- Ask students the importance of communication for a team.
- Ask students why listening is a important habit for a team member.
- Ask students the importance of problem solver in a team.

# Elaborate

Team work is important because it helps us synergize, it complements our individual weaknesses, it does help in productivity and it helps one build new and better skills.

Team work is an important part of a working culture. Good team works enhance effective and efficient achievement of an organization's work. Members of a team are more committed to work on goals that they helped to create.

The most important thing about team work is that it enables individuals in the team to focus on one main objective. Team work is also important since everyone contributes their unique abilities, which make the result of their objective more diverse. Team work is generally important because it gives everyone a sense of belonging

#### 5.3.1 Demonstrates Reliability



- a) A trustworthy or dependant team member who is capable of getting work done and also contributes considerably through hard work and commitment.
- b) She or he not only completes assignments but also does a thorough follow up, consistently.

#### 5.3.2 Indulges in constructive communication



- a) Successful teams are made of people who can speak up, voice their thoughts and express their ideas clearly, directly, honestly. Team members should respect each other as well as the work they are doing. That's when communication becomes constructive.
- b) Team members should be bold enough to state their opinions and make a point in the best possible way, that is, with confidence, positivity and respect.

#### 5.3.3 Is a Good Listener



- a) Good listeners are crucial to the success of a team.
- b) Team players are those who are capable of absorbing, understanding and considering ideas and points of view of others without getting into unnecessary arguments and debates at the slightest opportunity.
- c) A team member who listens well will also be open to criticism and will refrain from getting defensive or giving knee-jerk reactions.
- d) Most importantly, to ensure effective communication and solutions to problems, team members should be disciplined enough to first lend a patient ear before speaking so that there is a meaningful and fruitful dialogue.

#### 5.3.4 Participates Actively



- a) Good team players always participate in an active manner. They not only attend meetings but also prepare for them; they listen and speak up at meetings and discussions.
- b) They're completely involved in the work the team is assigned. They hate to be just sitting on the fence. They want to be part of the action, and are proactive. They initiate action and do not shy away from volunteering for tasks.

#### 5.3.5 Are Willing to Share

# Elaborate

- a) Those who are willing to share knowledge, experience and information with the team members are the real team players.
- b) They keep all team members informed at all times, and in an informal way.
- c) The sharing of knowledge is not restricted to simply meetings and formal discussions. Team members are willing to pass along important information that is relevant to their daily activities.
- d) They do not refrain from sharing expertise that will take the team closer to their goals or help survive contingencies.

#### 5.3.6 Cooperates and Pitches in to-Help

#### Elaborate

- a) Cooperation is the act of working with others and acting together to accomplish a job.
- b) Effective team players work this way by second nature.
- c) Good team players, despite differences they may have with other team members concerning style and perspective, figure out ways to work together to solve problems and get work done.
- d) They respond to requests for assistance and take the initiative to offer help.

### 5.3.7 Display flexibility

# Elaborate

- a) Teams are often required to handle changing conditions; they often bring about the change on their own.
- b) Good team players change with the situations and adapt willingly and suitably.
- c) Flexible team members are not ruffled by anything new. Instead of complaining, they try to learn and move in the new direction without getting stressed.
- d) Flexible team members not only take into account others' points of view but also compromise if the need arises. They try not to be too rigid, particularly when the team is required to arrive at a decision or move forward and closer to a goal.
- e) While strong team players stick to their opinions firmly, they are also flexible enough to remain open to what others have to express or present.

#### 5.3.8 Shows Commitment to the Team

# Elaborate

- a) Strong team players care about their work, the team, and the team's work.
- b) They show up every day with this care and commitment up front.
- c) They want to give a good effort, and they want other team members to do the same.

#### 5.3.9 Works as a Problem Solver

#### Elaborate

- a) Teams, of course, deal with problems. Sometimes, it appears, that's the whole reason why a team is created to address problems.
- b) Good team players are willing to deal with all kinds of problems in a solutions-oriented manner.
- c) They're problem-solvers, not problem-dwellers, problem-blamers, or problem-avoiders.
- d) They don't simply rehash a problem the way problem-dwellers do.
- e) They don't look for others to fault, as the blamers do. And they don't put off dealing with issues, the way avoiders do.
- f) Team players get problems out in the open for discussion and then collaborate with others to find solutions and form action plans.

#### Unit 5.4: Interact With Colleagues And Seniors Within And Outside The Team

Unit Objectives



At the end of this unit, students will be able to:

- 1. Explain relation of interaction for creating good relationship
- 2. Describe characteristics of good relationship
- 3. Develop skills required for building good relationship

### Resources to be Used

- Laptop
- Projector
- White Board
- Marker
- Duster

# Do

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- Ask students why it is important to have good relationship in an organisation. •
- Ask students how to build good relationship.

### Elaborate



Interaction with seniors is extremely essential and should be done with lot of care. Seniors by virtue of a prolonged experience will offer guidance and support, which will also help to improve your skills. Interaction with seniors should be based on the principles of mutual respect and should not confrontational in nature.

Good relationships are also often necessary if we hope to develop our careers. After all, if your boss doesn't trust you, it's unlikely that he or she will consider you when a new position opens up. Overall, we all want to work with people we're on good terms with.

#### 5.4.1 Good Relationship



There are several characteristics that make up good, healthy working relationships:

- a) Trust This is the foundation of every good relationship. If you trust the people you work with, you can be open and honest in your thoughts and actions, and you don't have to waste time and energy "watching your back."
- b) Mutual Respect When you respect the people that you work with, you value their input and ideas, and they value yours. Working together, you can develop solutions based on your collective insight, wisdom and creativity.
- c) Mindfulness This means taking responsibility for your words and actions. Those who are mindful are careful and attend to what they say, and they don't let their own negative emotions impact the people around them.
- d) Welcoming Diversity People with good relationships not only accept diverse people and opinions, but they welcome them. For instance, when your friends and colleagues offer different opinions from yours, you take the time to consider what they have to say, and factor their insights into your decision-making.
- e) Open Communication We communicate all day, whether we're sending emails and IMs, or meeting face-to-face. The better and more effectively you communicate with those around you, the richer your relationships will be. All good relationships depend on open, honest communication.

#### 5.4.2 Where to Build Good Relationships



Although we should try to build and maintain good working relationships with everyone, there are certain relationships that deserve extra attention.

#### 5.4.3 How to Build Good Work Relationships?

### Elaborate

- a) Develop Your People Skills
- b) Good relationships start with good people skills
- c) Schedule Time to Build Relationships
- d) Appreciate Others
- e) Be Positive

#### Unit 5.5: Diaries and Log Report

### - Unit Objectives 🏻 🎯

At the end of this unit, students will be able to:

- 1. Explain importance of Log reports
- 2. Describe what is Daily Log and incident report
- 3. Describe what is site diary and daily field report

### Resources to be Used

- Laptop
- Projector
- White Board
- Marker
- Duster

### — Do

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- Ask students what they know about daily log report.
- Ask students what is incident report.
- Ask students the importance of site diary.
- Ask students the purpose of daily field report.

#### 5.5.1 Importance of Log Reports

### Elaborate

A supervisor is the crew leader on a construction jobsite. It's up to him to plan, organize, and direct work in a safe, and timely, manner. All supervisors will experience conflict at some point, as well as safety violations and workplace injuries. By keeping a daily record of all activities, your construction site supervisor can protect your business from arbitration and/or litigation.

### 5.5.2 What is a Daily Log?

Elaborate

The daily log is a book, or software program, into which a supervisor records the day's activities. Record keeping helps ensure project organization, as well as keeps tabs on day-to-day employee happenings. The daily log is essential because it keeps a consistent record, which could be useful if you're ever sued, and need to prove that your workers performed a safety inspection, or conflict was handled immediately and efficiently.

Daily log sections include:

- Date
- Times of incidents
- Work performed
- Safety topics
- Problems and delays
- Employee conflict
- Equipment usage
- Materials purchased
- General management

#### 5.5.3 What is an Incident Report?

#### Elaborate

In order to understand the incident report, you'll first need to understand what constitutes an incident. There are two types of events that are considered "incidents."

- a) An event that resulted in an injury. For example: An employee is handling materials and suffers a cut to the finger.
- b) An event that resulted in a near-miss, otherwise known as an event that almost resulted in injury or damage. For example: An employee is handling materials and almost suffers a cut to the finger.

#### 5.5.4 Importance of Site Diaries

# Elaborate

- a) Diaries: Members of the project team should maintain a project diary containing summaries of the day's events in the member's own words. All information shared by seniors during interactions should be jotted down. They should record all daily work activity, conversations, observations, or other relevant information pertaining to the construction. Diaries are used for reference in case of conflicts or disputes as it may contain relevant information that may help settle the disagreements. Handwritten diaries are often used as the perfect evidence in courts of law.
- b) Logs: These record the regular activities on the job site. They are of many types— phone, transmittal, delivery, and RFI (Request for Information) logs.

#### 5.5.5 Daily Field Reports



These are more formal records pertaining to the site. They record information including the day's activities, weather details, delivered equipment or materials, visitors details, and equipment used that day. These reports should be shown to the seniors every day.

- a) The diaries and daily or other reports are meant to supplement each other and do not need to contain identical information.
- b) The diaries and other reports are public record and may be used in case of litigation
- c) Include only factual information in them.
- d) Minimize personal remarks, which may not be factual, about operations or personnel of the Contractor, Agency, or other organization. Such remarks may be used to demonstrate the inspector was hostile and did not behave in a manner consistent with good faith.
- e) All entries should be clear, neat, and most importantly, legible.
- f) Summarize key points of any discussion of work activities with the Contractor.
- g) Be specific.

Q1.	After reaching at work place, the plumber should report to a. Contractor b. Engineer c. Helper d. Supervisor	Q4.	Which Telephone number is require to call the Police a. 101 b.102 c. 103 d. 100
Q2. Q3.	The plumber should be capable to speak in a. Hindi b. English c. Mother Tongue d. Regional Language If the mock drill for firefighting is	Q5.	At the completion of work if som material is balance with you, wha will you do? a. Keep it for next day b. Keep it at work place c. Return on the same day d. Handover it to guard
Q3.	<ul> <li>a. You should attend</li> <li>b. Can do some other work during this period</li> <li>c. You should not attend</li> <li>d. Complete your personal works</li> </ul>	Q6.	What will you do if there is quarrel a site o fwork? a. Call Police b. Inform supervisor c. Compromise





GOVERNMENT OF INDIA MINISTRY OF SKILL DEVELOPMENT & ENTREPRENEURSHIP



Transforming the skill landscape



# 6. Maintaining a Healthy, Safe & Secure Work Environment

- Unit 6.1. Type of hazards
- Unit 6.2 Hazard analysis
- Unit 6.3. Hazard communication and responsibilities
- Unit 6.4. Safety gears and first aid
- Unit 6.5. Safety guidelines
- Unit 6.6. Assessment



### Key Learning Outcomes

#### At the end of this module, students should be able to:

- 1. Avoid accidents related to use of sharp tools and equipment
- 2. Attend and actively participate in the health and safety campaigns organized by the company or any other authority State importance of taking precautions while working
- 3. Use or wear safety gear (helmet, gloves, goggles, safety shoes, ear plugs, etc.) as per the rules of the company
- 4. Attend fire drills or any other safety drills organized by the company or any other authority
- 5. Learn first-aid procedure
- 6. Use insect repellents and safe drinking water
- 7. Use site toilets and follow other hygienic practices
- 8. Understand the evacuation and emergency procedures

#### Unit 6.1: Hazards

### - Unit Objectives 🏼 🎯

At the end of this unit, students will be able to:

- 1. Explain hazards available in construction and plumbing sector
- 2. Describe hazardous activities, situations and prevention from them
- 3. Describe hazardous substances and prevention from them

### Resources to be Used

- Laptop
- Projector
- White Board
- Marker
- Duster

## — Do

- Greet the participants for the day.
- Give Summary of previous Session.
- Ask for any doubts in previous Session.
- Acknowledge for their doubt-raising, if any. Clear the doubts.
- Give details of today's session and what they are going to learn.
- Encourage them to share their thoughts and doubts now and during process of this course.



- Ask students what are the known hazard in plumbing profession.
- Ask students the hazard associated with powered tool.
- Ask students what are the hazardous substances used in plumbing.
- Ask students what are the biological hazardous substances used in plumbing.
- Ask students how electricity is hazardous in plumbing.

#### 6.1.1 Hazards



#### Construction

The fatal injury rate for the construction industry is higher than the national average in this category for all industries. There are common hazards in the plumbing industry. It is important to learn about these hazards and how they can be controlled so people at work are not exposed to risk.

- **Powered Tools**
- Hand Tools
- **Prevention of Falls**
- Manual Handling
- Hazardous Substances
- **Biological Hazards**
- Electricity
- Burns
- **Trenches and Confined Spaces**
- Sunburn and Heat Stress

Within the plumbing industry, plumbers may be involved in a range of work activities such as:

- installation of gas and hot water services
- replacement of guttering and downpipes
- laying of water and sewage pipes and their connection
- removal of blockages in washbasins or sewage pipes

#### 6.1.2 Powered Tools

### Elaborate

Powered tools are required to carry out simple tasks in the plumbing industry. These can prove to be dangerous if used incorrectly or without care. Fingers and hands can be easily cut, broken, crushed or badly injured if the user is not careful. Bits of flying material (during cutting) could hit the eye and cause fatal injuries. It handle powered tools with utmost care or else accidents can result even in everlasting disability.

#### 6.1.3 Hand Tools

## Elaborate

Hand tools can also cause accidents if not used in a proper way. Mishaps take place when wrong tools are used for a job. Personal protective equipment (PPE) should be used if hazards cannot effectively controlled or checked using engineering controls or safe working procedures. PPE, such as earplugs/earmuffs to shut off noise; glasses or goggles to shield the eyes; protective gloves to cover hands while handling sharp objects or harmful substances; shoes and boots equipped with reinforced toe-caps to keep the feet safe from heavy and sharp objects; and overalls or other close fitting clothing for safety of the body; should be worn.

#### 6.1.4 Fall Prevention

Elaborate

Plumbers are frequently required to carry out tasks at heights, such as on roof tops, or while fixing gutters and downpipes. The worker should follow safe techniques.

- a. They should ensure that there are temporary platforms to work on or scaffolding that can serve as fall protection devices.
- b. They should make use of a work positioning system, such as a rope access system that will help in positioning and also offer support while the task is being performed.
- c. Ensure that a safety net or harness or similar system to prevent fall injuries, is used.
- d. If the nature of the work allows it, use of a ladder for the task should be considered, provided the worker is trained to use it and comfortable using it.

#### 6.1.5 Manual Handling

# Elaborate

The work of a plumber involves manual handling hazards. If heavy objects are lifted or handled in a wrong posture due to paucity of space or suitable devise, the back can be injured or strained. Tasks where repetitive movements are involved can cause injuries due to excessive use of certain body parts, such as the back (if the work involves a lot of bending), hands and arms (if the worker does a lot of lifting, pressing or other motions), and neck (if the individual has to continuously look down or up), over a certain time period. The arrangement and schedule of work should be such that overuse of certain parts of the body is kept to the minimum. For this, some level of work monitoring will also be required.

### 6.1.6 Hazardous Substances

### Elaborate

Hazardous and dangerous substances/goods – chemicals used in various work or those that exist in the plumbing environment are called hazardous as they are capable of harming the plumbers if they are not used cautiously. Such hazardous substances include the following:

- solvents
- oxy-acetylene
- fluxes (solder)
- lead

- degreasers
- Caulking compounds
- adhesives
  - hydrochloric acid

#### 6.1.7 Biological Hazards

Elaborate

Biological Hazards – Exposure to sewage could adversely affect health. Tetanus can be caused by a toxin produced by a bacteria widely found in soil and sewage. A parasitic worm found in sewage could spread leptospirosis. Many parasites, such as giardia and cryptosporum are the cause of widespread diseases. The extent of harm depends on the presence of microbes, degree of exposure and the duration for which the individual is exposed. It is possible for microbes existing in raw sewage to gain entry into the body via the nose or mouth, especially if a person consumes water that is contaminated. It can also be transmitted from hand to mouth.

- a. Understand that sewage contaminates anything that it touches.
- b. Avoid eating or drinking while near sewage of any kind.
- c. Use soap and hot water to wash hands before consuming food or water, especially after touching any sewage-contaminated surface or object.
- d. No wound should come into contact with sewage at any cost. If it does, it should be promptly washed, cleaned and disinfected.
- e. Keep your work clothes away from other clothes. Preferably, work clothes should not reach home. One should change before leaving the site of work, and make sure to wash work clothes separately; not with other clothes.
- f. Use protective clothing, such as overalls, rubber boots, rubber gloves, goggles, glasses and so on.

#### 6.1.8 Electricity

### Elaborate

Electricity – No electric lead should be placed near water. Plumbers have to be extra careful since they have to work with water or near water, and often need to use powered tools. Most of their work requires them to be outdoors, irrespective of all weather conditions. Risk of electrocution always exists if precaution against electrical hazard is not taken. In modern-day residences, insulated hot water pipes with 240-volt heat-trace cables are used for maintenance of water temperature. If power to the heat trace cable is not isolated, there is risk of electrocution if a plumber accidentally severs the insulated pipe. Merely turning off the water supply will not help the situation because that will not switch off the power to the cable.

#### 6.1.9 Burns

### Elaborate

Burns – Water is stored at high temperatures in hot water services. Repair and maintenance work should be carried out with great care so that there is no chance of scalding or suffering steam burns. Contact with hot water or steam unexpectedly can cause grave injury and even permanent defacement.

#### 6.1.10 Narrow Spaces and Trenches

## Elaborate

When plumbers are required to occupy ditches, pits, tanks and trenches underneath houses or within roof cavities, they should understand the dangers involved in working in constricted spaces. Poisonous gases let out into sewage systems, can cause people to faint, collapse, or even die. Absence of oxygen is also potentially fatal. Before a worker starts working in an enclosed/confined space (for instance, a pit or tunnel) where there could be presence of gases or deficiency of oxygen, the site should be completely assessed and proper precautions should be taken.

### 6.1.11 Sunburn and Heat Stress



Heat stress, sunburn and skin cancer are caused due to long and continuous exposure to ultraviolet radiation from the sun. The longer the exposure of the skin to the sun, the higher is the risk – irrespective of tan or pigmentation.

#### 6.1.12 Potential hazards for workers in construction: Scaffolding



Hazard: When scaffolds are not erected or used properly, fall hazards can occur. About 2.3 million construction workers frequently work on scaffolds. Protecting these workers from scaffold-related accidents would prevent an estimated 4,500 injuries and 50 fatalities each year.

#### Solutions:

- i. Scaffold must be sound, rigid and sufficient to carry its own weight plus four times the maximum intended load without settling or displacement. It must be erected on solid footing.
- ii. Unstable objects, such as barrels, boxes, loose bricks or concrete blocks must not be used to support scaffolds or planks.
- iii. Scaffold must not be erected, moved, dismantled or altered except under the supervision of a competent person.
- iv. Scaffold must be equipped with guardrails, midrails and toeboards.
- v. Scaffold accessories such as braces, brackets, trusses, screw legs or ladders that are damaged or weakened from any cause must be immediately repaired or replaced.
- vi. Scaffold platforms must be tightly planked with scaffold plank grade material or equivalent.
- vii. Synthetic and natural rope used in suspension scaffolding must be protected from heatproducing sources.
- viii. Ladders and stair wells can help people access scaffolds
- ix. Scaffolds must be at least 10 feet from electric power lines at all times.

### 6.1.13 Potential hazards for workers in construction: Fall protection

# Elaborate

Hazard: Each year, falls consistently account for the greatest number of fatalities in the construction industry. A number of factors are often involved in falls, including unstable working surfaces, misuse or failure to use fall protection equipment and human error. Studies have shown that using guardrails, fall arrest systems, safety nets, covers and restraint systems can prevent many deaths and injuries from falls.

Solutions:

- i. Consider using aerial lifts or elevated platforms to provide safer elevated working surfaces;
- ii. Erect guardrail systems with toe boards and warning lines or install control line systems to protect workers near the edges of floors and roofs;
- iii. Cover floor holes; and/or Use safety net systems or personal fall arrest systems (body harnesses).

#### 6.1.14 Potential hazards for workers in construction: Ladder



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

- i. Use the correct ladder for the task.
- ii. Make sure that ladders are long enough to safely reach the work area.
- iii. Mark or tag ("Do Not Use") damaged or defective ladders for repair or replacement, or destroy them immediately.
- iv. Never load ladders beyond the maximum intended load or beyond the manufacturer's rated capacity.
- v. Be sure the load rating can support the weight of the user, including materials and tools.
- vi. Avoid using ladders with metallic components near electrical work and overhead power lines.

#### 6.1.15 Potential hazards for workers in construction: Stair way



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

Solutions:

- i. Stairway treads and walkways must be free of dangerous objects, debris and materials.
- ii. Slippery conditions on stairways and walkways must be corrected immediately.
- iii. Make sure that treads cover the entire step and landing.
- iv. Stairways having four or more risers or rising more than 30 inches must have at least one handrail.

#### 6.1.16 Potential hazards for workers in construction: Trenching

Elaborate 🚇 —

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

- i. Never enter an unprotected trench.
- ii. Always use a protective system for trenches feet deep or greater.
- iii. Employ a registered professional engineer to design a protective system for trenches 20 feet deep or greater.
- iv. Protective Systems:
  - Shoring to protect workers by installing supports to prevent soil movement for trenches that do not exceed 20 feet in depth.
  - Shielding to protect workers by using trench boxes or other types of supports to prevent soil cave-ins.
- v. 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.

#### 6.1.17 Potential hazards for workers in construction: Cranes

# Elaborate

Hazard: Significant and serious injuries may occur if cranes are not inspected before use and if they are not used properly. Often these injuries occur when a worker is struck by an overhead load or caught within the crane's swing radius. Many crane fatalities occur when the boom of a crane or its load line contact an overhead power line.

Solutions:

- i. Check all crane controls to insure proper operation before use.
- ii. Inspect wire rope, chains and hook for any damage.
- iii. Know the weight of the load that the crane is to lift.
- iv. Ensure that the load does not exceed the crane's rated capacity.
- v. Raise the load a few inches to verify balance and the effectiveness of the brake system.

#### 6.1.18 Potential hazards for workers in construction: Cranes



Hazard: Approximately 100 employees are fatally injured and approximately 95,000 employees are injured every year while operating powered industrial trucks. Forklift turnover accounts for a significant number of these fatalities.

Solutions:

- i. Properly maintain haulage equipment, including tires.
- ii. Do not modify or make attachments that affect the capacity and safe operation of the forklift without written approval from the forklift's manufacturer.
- iii. Examine forklift truck for defects before using.
- iv. Follow safe operating procedures for picking up, moving, putting down and stacking loads.
- v. Drive safely--never exceed 5 mph and slow down in congested or slippery surface areas.

#### Unit 6.2: Hazard Analysis

### Unit Objectives Ø

At the end of this unit, students will be able to:

- 1. Describe various hazards and their probable causes
- 2. Decide to choose PPE for prevention of various hazards present in plumbing sector
- 3. Explain benefits of cleaning in hazard prevention

### Resources to be Used

- Laptop
- Projector
- White Board
- Marker
- Duster

# Do

- Greet the participants for the day.
- Give Summary of previous Session.
- Ask for any doubts in previous Session.
- Acknowledge for their doubt-raising, if any. Clear the doubts. •
- Give details of today's session and what they are going to learn.
- Encourage them to share their thoughts and doubts now and during process of this course. •



- Ask students what is the hazard from chemicals and how we can prevent them.
- Ask students what is the hazard from trenching and how we can prevent them.
- Ask students what is the hazard from handheld power tools and how we can prevent them. •
- Ask students what is the hazard from lifting heavy weights and how we can prevent them.
- Ask students what is the hazard from power hacksaw and how we can prevent them.

### 6.2.1 Chemical Pouring / Handling

ask	Hazard	Cause	Prevention
General Use	Eye Injury	Splash, fumes	Goggles
	Contact	Splash, skin	Gloves (appropriate type for
	irritation,	contact	chemical), apron (if
	burn or		necessary), long sleeves
	absorption		
	Ingestion	Breathing fumes	Wear respirator if needed
	Face	Splash	Wear Face Shield (if
			necessary)

PPE Required:

I. Goggles

ii. Gloves, protective clothing (Apron)

iii. Respirator (as per requirement)

iv. Face shield (as per requirement)

## 6.2.2 Cleaning: Sweeping / mopping / buffing



Task	Hazard	Cause	Prevention
General Use	Trauma	Projectiles,	Situational awareness, gloves,
		impact,	protective clothing
		chemical	
		contact	
	Foot Injury	Dropped	Wear safety shoes
		object on foot	
	Ingestion	Chemicals,	Wear respirator or dust mask if
		dust	needed

#### PPE Required:

- i. Safety Shoes/boots
- ii. Gloves (optional) protective Clothing (long pants recommended to prevent chemical splash on skin)
- iii. Respirator or dust mask (as needed)

## 6.2.3 Trenching



Task	Hazard	Cause	Prevention
Routine	Hand Injury	Confined work areas,	Gloves,
Maintenance/Repair		sharp edges/objects,	situational
		rotating parts	awareness
	Foot Injury	Equipment rolls over	Wear safety
		foot, object drops on	shoes
		foot	
	Trauma	Rotating parts	Situational
			awareness,
			appropriate
			clothing
	Eye Injury	Flying particles	Safety glasses
	Noise	Equipment Operation	Use hearing
			protection
Routine Operation	Noise	Equipment Operation	Use hearing
			protection
	Head Injury	Bump head, objects fall	Wear hard hat (as
		on head	necessary)
	Foot Injury	Equipment rolls over	Wear safety
		foot, object drops on	shoes
		foot	
	Hand Injury	Sharp edges/objects	Wear Gloves

#### **PPE Required:**

- i. Protective Clothing
- ii. Safety shoes / boots
- iii. Safety Glasses
- iv. Hard gloves and hearing protection

### 6.2.4 Drill bit sharpener



Task	Hazard	Cause	Prevention
General	Eye Injury	Projectiles, filings	Safety glasses with side
Use			shield or appropriate safety
			goggles
	Hand	Point of operation, ingoing	Situational awareness
	Injury	nip points, rotating parts,	
		flying chips and sparks	
	Electrical	Improper grounding,	Proper grounding of frame,
	Shock	improper operations and	manufacturer's instructions
		maintenance	strictly followed

#### PPE Required:

- i. Safety Glasses w/side shield
- ii. Protective Clothing
- iii. Safety Shoes/Boots
- iv. Hearing Protection

### 6.2.5 Handheld portable power tool

Task	Hazard	Cause	Prevention
General	Inhalation	Dust/particles	Appropriate natural
Use		generated during	ventilation, disposable
		machine operation	respirators (if necessary),
			automatic vacuum machine
	Eye Injury	Projectiles	Safety glasses with side
			shield or appropriate safety
			goggles
	Foot Injury	Drop object on foot	Wear safety shoes
	Hand Injury	Point of operation,	Machine guards, situationa
		ingoing nip points,	awareness
		rotating parts, flying	
		chips & sparks	
	Head Protection	Projectiles	Face Shield
	Fire	Sparks	Appropriate placed fire
			extinguisher, remove all
			combustibles and fire
			hazards from machine area
	Noise	Machine operation	Hearing protection
	Electrical Shock	Improper grounding,	Proper grounding of frame,
		improper operations	manufacturer's instructions
		and maintenance	strictly followed

PPE Required:

- i. Protective Clothing
- ii. Safety Shoes/Boots
- iii. Safety Glasses
- iv. Hard Gloves
- v. Hearing Protection

## 6.2.6 Lifting / carrying objects / working on loft / mezzanine

Task	Hazard	Cause	Prevention
General	Trauma	Impact	Situational awareness, gloves, back
Use			brace/belt (optional)
	Foot	Dropped object	Wear safety shoes/boots
	Injury	on foot	
	Trauma	Impact, falls	Situational awareness, gloves, fall
			protection (restraint)

PPE Required:

I. Safety shoes / boots

ii. Gloves

iii. Back brace / belt (optional)

## 6.2.7 Pipe threading and cutting

Task	Hazard	Cause	Prevention
General	Foot	Drop object on foot	Safety Shoes
Use	Injury		
	Electric	Improper operation and	Manufactures instructions
	Shock	maintenance, improper	strictly followed, proper
		grounding	grounding
	Hand	Point of operation, rotating	Gloves, situational awareness
	Injury	parts	
	Eye	Flying particles	Safety glasses w/side shields
	Injury		
	Noise	Running equipment	Hearing protection for noise
			in excess of 85db

#### PPE Required:

- i. Safety glasses, w/side shields
- ii. Safety shoes / boots
- iii. Safety Gloves
- iv. Back brace / belt (optional)
- v. Hearing protection

### 6.2.8 Valves (operating)



Task	Hazard	Cause	Prevention
General	Eye	Projectiles,	Safety glasses w/side shields or goggles
Use	Injury	fumes, dusts	(for chemical piping), face shield (if
			needed)
	Trauma	Projectiles,	Situational awareness, gloves, protective
		impact, burns	clothing (long sleeves/pants)
	Foot	Dropped object	Wear safety shoes
	Injury	on foot	

#### PPE Required:

- i. Safety Shield/Helmet with Filter Lens
- ii. Safety shoes/boots
- iii. Safety glasses w/side shields or Goggles
- iv. Protective Clothing (long sleeves/pants)

#### 6.2.9 Vice (operating)

<b>ask</b>	Hazard	Cause	Prevention
eneral	Eye Injury	Projectiles	Safety glasses with side shield or
se			appropriate safety goggles
	Foot Injury	Drop object on foot	Wear safety shoes
	Hand	Impact, penetration,	Gloves, situational awareness
	Injury	compression	

#### PPE Required:

- i. Safety shield / helmet with filter lense
- ii. Safety shoes / boots
- iii. Safety glasses w/side shields or goggles
- iv. Protective clothing (long sleeves / pants)

## 6.2.10 Power Hacksaw

Task	Hazard	Cause	Prevention
General	Inhalation	Dust/particles	Appropriate natural
Use		generated during	ventilation, respirators when
		machine operation,	needed
		exhaust fumes	
	Eye Injury	Projectiles, burns	Safety glasses with side shield
			or appropriate safety goggles
	Head	Projectiles	Face shield (as necessary)
	Protection		
	Trauma	Projectiles, point of	Situational awareness, PPE,
		operation, flying chips &	protective clothing, machine
		sparks, improper use	guards, manufacturer's
		and operation	instructions strictly followed
	Foot Injury	Drop object on foot	Safety shoes
	Hand Injury	Point of operation, in-	Machine guards, situational
		going nip points,	awareness
		rotating parts, flying	
		chips and sparks	
	Fire	Sparks	Appropriate placed fire
			extinguisher, remo ve all
			combustibles and fire hazards
			from machine area

PPE Required:

i. Safety shield / helmet with filter lense

ii. Safety shoes / boots

iii. Safety glasses w/side shields or goggles

### Unit 6.3: Hazard Communication and Responsibilities

### Unit Objectives Ø

At the end of this unit, students will be able to:

- 1. Describe Organisation and his responsibilities for Hazard
- 2. Explain Safety control and Precautions exercised by organisation
- 3. Explain types and uses of various PPEs
- 4. Explain Types of fires and how to fight with them

### Resources to be Used

- Laptop
- Projector
- White Board
- Marker
- Duster

# Do

- Greet the participants for the day.
- Give Summary of previous Session.
- Ask for any doubts in previous Session.
- Acknowledge for their doubt-raising, if any. Clear the doubts. •
- Give details of today's session and what they are going to learn. •
- Encourage them to share their thoughts and doubts now and during process of this course. •



- Ask students what they know about MSDS.
- Ask students what is the use of MSDS.
- Ask students the responsibility of employees in the event of hazard.
- Ask students the importance of reporting hazard to management.
- Ask students the purpose of PPEs.
- Ask students what they know about classes of fire.

### 6.3.1 Organisation's Responsibility

Elaborate

Oraganization's main responsibilities under the are:

- a) Maintain a Material Safety Data Sheet (MSDS) for each chemical in the facility.
- b) Make this information accessible to employees at all times in a language or formats that are clearly understood by all affected personnel.
- c) Train employees on how to read and use the MSDS.
- d) Follow manufacturer's MSDS instructions for handling hazardous chemicals.
- e) Train employees about the risks of each hazardous chemical being used.
- f) Provide spill clean-up kits in areas where chemicals are stored.
- g) Have a written spill control plan.
- h) Train employees to clean up spills, protect themselves and properly dispose of used materials.
- i) Provide proper personal protective equipment and enforce its use.
- j) Store chemicals safely and securely.
- k) Hazard Communication
- I) Safety Checklists
- m) The following checklists may help you take steps to avoid hazards that cause injuries, illnesses and fatalities. As always, be cautious and seek help if you are concerned about a potential hazard.

#### 6.3.2 Employee Responsibility



Main employee responsibilities under the are:

- a) Do not intentionally or recklessly interfere with or misuse anything
- b) Co-operation with employer on health and safety matters
- c) Inform employees of the risk and train them in the effective application of the control measures and periodically review the risk assessments

#### 6.3.3 Types of Safety Controls Used by Firms

### Elaborate

There are a variety of control systems that can be used by plumbing companies:

- Risk assessments an identification of the work activities carried out by the plumbing firm that could cause harm to staff or others.
- In undertaking the risk assessment, safety control measures are then identified that will minimize the risk to the lowest practicable level.

#### 6.3.4 Precautions at Work Places



The generally ensuring a safe place of work.

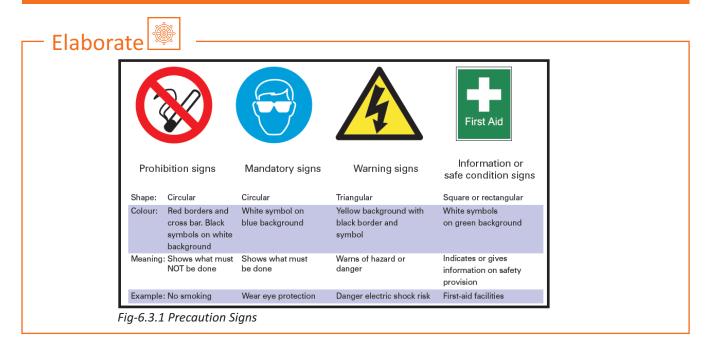
- a) Precautions against falls from height or into excavations
- b) Protection against falling objects
- c) Protection against structural collapse (while work is taking place), i.e. The building falling down
- d) Safeguards when working in excavations
- e) Prevention of drowning (falling into water)
- f) Provision of safe traffic routes (on sites)
- g) Prevention and control of emergencies (site emergency evacuation procedures, etc.)
- h) Provision of welfare facilities wcs, washing facilities, canteens/rest areas, shower facilities (if required)
- i) Provision of site-wide issues clean and tidy sites, adequate lighting, constant and fresh air supply, etc.

#### 6.3.5 Reporting of Injuries, Diseases and Danger



- a) Injuries fatalities (including members of the public) or injuries
- b) Diseases if a doctor advises that an employee is suffering from a work related disease
- c) Dangerous occurrences something that happened that could have resulted in a reportable injury, e.g. The collapse of an excavation
- d) Maintaining Accident book a document where detail of all accidents is recorded, no matter how minor.

#### 6.3.6 Signs and symbols at site



#### 6.3.7 The Personal Protective Equipment at Work (PPE)

Elaborate

PPE is defined as equipment (including clothing affording protection against the weather) which is intended to be worn or held by a person at work and which protects him against one or more risks to his health.

#### 6.3.7.1 Eye protection



It comes in the form of:

Elaborate

- i. Safety glasses a typical application could be lead welding.
- ii. Safety goggles these provide a higher level of protection than safety glasses, as they should fit closely to the face.
- iii. Welding goggles these include specialist colored lenses.

#### 6.3.7.2 Hand protection

Hand protection that is normally used in plumbing includes:

- General-purpose gloves these help protect against cutting or puncture, wounds; an example of their use could be lifting concrete blocks or lifting steel tube.
- Specialist gloves these are typically used to deal with hazardous substances such as dry ice used in pipe-freezing applications.
- Rubber gloves these help protect against contact with used soil and waste systems and sanitary appliances. Gloves also provide protection against a disease known as dermatitis, which is caused by the hands coming into contact with materials class as irritants.

#### 6.3.7.3 Head protection



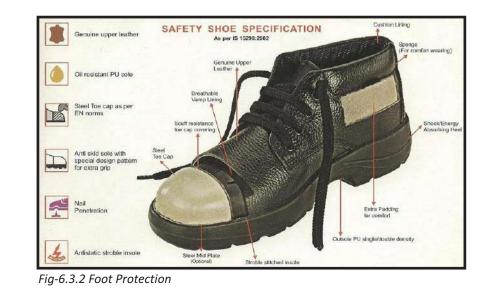
It is a mandatory requirement to wear a safety helmet on new-built and major construction site. In addition a safety helmet will need to be worn when work is taking place at heights or above the points where people are working - that could be in a trench. A safety helmet is must:

- I. Be properly adjusted to fit
- II. Be replaced if it becomes defective or damaged

#### 6.3.7.4 Foot protection

# - Elaborate

It is important to wear adequate foot protection for the majority of plumbing installation work carried out, owing to the weight of the component used. Adequate foot protection (which can be in the form of a safety shoe) usually includes:



#### 6.3.7.5 Ear protection



Ear protection should be worn when working in noisy areas or with equipment that generates high level of noise. Ear protection is usually in the form of :

- i. Ear defenders
- ii. Ear plugs.

The need to wear ear protection may be indicated by safety signs or through riskssessments carried out by construction or plumbing companies.

### 6.3.7.6 Respiratory protection



There are many form of respiratory protection:

- I. Simple dust mask
- II. Cartiradge-type respirator
- III. Full breathing apparatus

#### 6.3.8 Classes of Fire

— Elaborate

- **1.** Fires are classed into groups according to the fuel type:
- 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.
- 2. Fire-fighting equipment- Thereare a variety of different types of firefighting equipment. In undertaking plumbing work you are more likely to come across the fire extinguisher as the main source of protection; here are some points to its use:
  - I. An extinguisher should be kept in the immediate work area when hot working, e.g. Using lpg gas heating equipment
  - II. A fire extinguisher should only be used when it is safe to do so, personal safety must come before attempts to contain a fire
  - III. Fire extinguishers should only be used by those trained in their use
  - IV. The following shows the color coding for extinguishers for dealing with the different types of fire.

Type of extinguisher	Colour code	Main use
Water	Red	Wood, paper or fabrics
Foam	Cream	Petrol, oil, fats and paints
Carbon dioxide	Black	Electrical equipment
Dry powder	Blue	Liquids, gases, electrical equipment

Fig-6.3.3 Different types of Fire

#### Unit 6.4: Safety Gears and First Aid

- Unit Objectives 🏼 🎯

At the end of this unit, students will be able to:

- 1. Create Emergency response skill
- 2. Describe various emergencies and response to make in such emergency
- 3. Contact appropriate authority in case of any emergency

### Resources to be Used

- Laptop
- Projector
- White Board
- Marker
- Duster

### — Do 🗠

- Greet the participants for the day.
- Give Summary of previous Session.
- Ask for any doubts in previous Session.
- Acknowledge for their doubt-raising, if any. Clear the doubts.
- Give details of today's session and what they are going to learn.
- Encourage them to share their thoughts and doubts now and during process of this course.



- Ask students what they know about First aid.
- Ask students what are emergency services.
- Ask students how to contact emergency services.
- Ask students what is emergency processes.

# Elaborate 1. These procedures apply to a range of different type of emergencies including fire: Find a telephone in a safe environment, well away from the emergency Dial the emergency service number

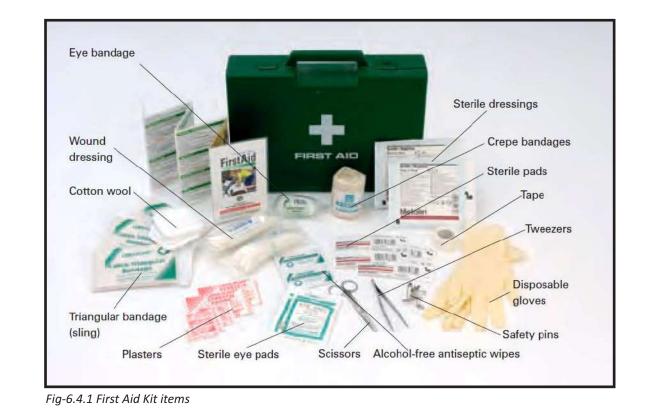
Fire 102

Ambulance 101

III. First-aid arrangements- The following shows the typical contents of a first-aid kit.

Police 100

- a) Plasters
- b) Sterile dressings
- c) Triangular bandage
- d) (sling) Safety pins
- e) Disposable gloves
- f) Crepe and age
- g) Scissos, Tweezers
- h) Cotton wool Tap/Faucete
- i) Alcohol-free antiseptic wipes



#### j) Sterile pads

#### 2. Contacting emergency services-

- a) Ensure that emergency services reach you in the minimum time
- b) Eliminate risk to operators in case of an emergency
- c) Your plan should include environmental and other emergencies
- d) Assessment of the first aid needs of the workplace should be done by the employers as well as the self-employed
- e) Sufficient number of trained first aiders should be available when required
- f) It should be possible to call for facilities to assist casualties (resulting from illness or injury) without delay
- g) Ambulance and other professional help should be called for immediately, without a minute's delay.

#### 3. First aid should be assessed taking into consideration the following:

- a) Nature of work
- b) Past records/after-effects of injuries
- c) Workforce strength, nature and distribution
- d) ow far the site is located from the emergency services, its terrain, and weather conditions at the time
- e) Working on shared sites or those with multiple occupants
- f) Leaves/holidays or absence of first-aid facilitaters
- g) Number and nature of trainees/public present
- h) Likelihood of allergies or specific medical conditions

#### 4. Emergency processes

To ensure that emergency procedures work perfectly, it is essential that all operators and managers be aware of them. In fact, each one should be given a chance to test them out, assess them and make alterations if the need is felt so. You should be aware of your location well enough to give OS grid references or GPS coordinates, to the emergency service providers. You should also know the access points very well, not only from the main road but also side lanes or short cuts.

Before assessing the first aid and evaluating the same or suggesting improvements, ask yourself the following questions:

- a) Are the first aid boxes and units at your place of work adequate for the potential hazards as per the nature of the work?
- b) Are there enough first aid boxes available?
- c) Can the first-aid kits be easily accessed by the workers?

#### Unit 6.5: Safety Guidelines

#### – Unit Objectives 🏼 🎯

At the end of this unit, students will be able to:

- 1. Recognize potential source of injury at work place
- 2. Evaluate risk of injury at work place
- 3. Decide required first aid in different kind of injury situation

#### Resources to be Used

- Laptop
- Projector
- White Board
- Marker
- Duster

### – Do 🗠

- Greet the participants for the day.
- Give Summary of previous Session.
- Ask for any doubts in previous Session.
- Acknowledge for their doubt-raising, if any. Clear the doubts.
- Give details of today's session and what they are going to learn.
- Encourage them to share their thoughts and doubts now and during process of this course.



- Ask students what they know about safety guidelines.
- Ask students how to recognize potential source of injury.
- Ask students how to evaluate risk of injury at workplace.
- Ask students how to understand the kind of first aid needed.

Steps

#### Step 1. Recognize the potential sources of injury/illness at the workplace

- i. Is the nature of work hazardous to the health and safety of workers?
- ii. Have these potential hazards been identified?
- iii. Has the review of incidents of injury and illness been done?
- iv. Have the workers/staff and the health/safety representatives been consulted?
- v. Is there a need for specialists or external assistants?

#### Step 2 Evaluate risk of injury/illness at the workplace

- i. How frequently can a hazard really result in grave harm?
- ii. What are the kind of injuries or wounds that the hazard(s) can inflict?
- iii. What is the level of seriousness of the injuries?
- iv. Is there any impact of the strength of workforce and its composition on the first aid provided?
- v. Could the size of the workplace and its location have an impact on the first aid provided?

#### Step 3 Understand the kind of first aid needed

- a) First aiders
  - i. How many first aiders would be needed?
  - ii. How skilled or competent should the first aiders be?
  - iii. What all should they be trained to do?
- b) First aid boxes/units and procedures
  - i. Where should the first-aid kits/modules be placed, and what should they be packed with?
  - ii. What kind of first-aid equipment is required?
  - iii. Who is in charge of maintenance of the first-aid boxes and modules?
  - iv. What are the first-aid procedures required and ideal for my workplace?
- c) First aid facilities
  - i. Is there a need for a separate first-aid room/infirmar or health centre at my workplace?

#### Activity

- Conduct a skill practice activity.
- Ask the students to assemble together.
- Explain the purpose and duration of the activity
- Set guidelines pertaining to discipline and expected tasks

Skill Practice	Time	Resources
Students need to demonstrate risk assessmentskill.	60 Minutes	Plumbing work area, Notebook, pen

# Excercise

Q1.	How many types of safety belts are
	there?
	a. One
	b.Two
	c. Three
Q2.	Standard length of lane yard of safety
	belt is:
	a. 1500mm
	b. 1800mm
	c. 2000mm d. 2500mm
Q3.	
Q5.	Which colour Helmet the plumber should use:
	a. White
	b. Yellow
	c. Red
	d. Green
Q4.	You are working at 12th floor and
~	suddenly fire spreads, what you will
	use to come out of the building?
	a. Lift
	b. Staircase
	c. Rope
	d. Or you will go quickly on roof.
Q5.	When plumber is to work inside the
	manhole, which gloves he should use?
	a. Cotton gloves
	b. Leather gloves
	c. Rubber gloves
Q6.	Leather Gloves are used by :
	a. Plumber
	b. Masson
	c. Electrician
	d. Welder
Q7.	At which angle the ladder should be
	placed on floor for safe working?
	a. 60 Degree
	b. 75 Degree
	c. 45 Degree
	d. 90 Degree
Q8.	If you handover any sharp edge tool to
-	your assistant the sharp edge should
	be:
	a. Any Side
	b. Any Of Above
	c. Towards assistant

	Q9.	At which height the plumber should
		use safety belt:
		a. Above 6 meter
		b. Above 2 meter
		c. Above 10 meter
y	Q10.	The number parts in helmet are:
		a.2
		b. 3
		c. 4
	Q11.	At the time of cutting chase plumber
		should use:
er		a. Sun Glass
		b. Plain Glass
	Q12.	How much time you can work on ladder
		in one instance?
		a. One hour
		b.Halfan hour
d		c. Two hour
II		d. Four hour
	Q13.	Red colour helmet is used by:
		a. Plumber
		b. Masson
		c. Electrician
		d. Welder
е	Q14.	Which PPE should be used while getting
		down in manhole?
		a. Safty Belt
		b. Gas Mask
		c.Safty Shoes
		d. All of above
	Q15.	What you will do if bleeding is there
		due to injury?
		a. Dressing
		b. Apply Beta dine
е		c. Get ATS injection
		d. Wash with clean water
	Q16.	What should you do after completion
		of days work?
		a. Cleaning Fixtures and Work place
		b. Recheck the days work
		c. Return unused material
0		d. All of Above
d		

Notes	





GOVERNMENT OF INDIA MINISTRY OF SKILL DEVELOPMENT & ENTREPRENEURSHIP



Transforming the skill landscape



## 7. Employability & Entrepreneurship Skills

Unit 7.1 – Personal Strengths & Value Systems

Unit 7.2 – Digital Literacy: A Recap

Unit 7.3 – Money Matters

- Unit 7.4 Preparing for Employment & Self Employment
- Unit 7.5 Understanding Entrepreneurship
- Unit 7.6 Preparing to be an Entrepreneur



#### Introduction: Employability and Entrepreneurship Skills

This Facilitator's guide includes various activities which will help you as a facilitator to make the sessions participative and interactive.

#### Ice breaker

• You can begin the module with the following ice breaker:

#### Five of Anything Ice Breaker Steps:

- Divide the participants into groups of four or five by having them number off. (You do this because people generally begin a meeting by sitting with the people they already know best.)
- Tell the newly formed groups that their assignment is to share their five favourite movies of all time, their five favourite novels or their five least liked films. The topic can be five of anything most liked or disliked.
- This ice breaker helps the group explore shared interests more broadly and sparks lots of discussion about why each person likes or dislikes their selected five.
- Tell the groups that one person must take notes and be ready to share the highlights of their group discussion with the class upon completion of the assignment.

#### **Expectation Mapping**

- 1. During the first session and after ice breaker session, ask the participants to answer the following question: "What do I expect to learn from this training?"
- 2. Have one of the participants write their contributions on a flip chart sheet.
- 3. Write down your own list of covered material in the training on another flip chart sheet.
- 4. Compare the two sheets, commenting on what will and what will not be covered during the training.
- 5. Set some ground rules for the training sessions. Ask the participants to put these rules on a flipchart and display it in the class.
- 6. You may get back to those sheets once again at the end of the last session of the training.
- 7. Benefits of doing this activity:
  - Participants feel better as their opinions are heard.
  - Participants get to know what they should expect from the training.
  - The facilitator gets to know which points to emphasize, which to leave out, and which to add during the training.
- 8. Expectations from the participants:
  - Must sign the attendance sheet when they arrive for class.
  - Conduct themselves in a positive manner
  - Be punctual, attentive, and participative
- 9. Explain the contents that are going to get covered one by one and connect it with the expectation mapping done earlier.
- 10. By the end of this exercise, the participants should have a clear understanding of what to expect from the session and what are the areas that will not get covered.

#### **Defining Objectives**

- 1. Defining the objectives in the beginning of the units sets the mood for the unit.
- 2. To begin with the end in mind sets the expectations of the participants as what could be the important takeaways from the session.
- 3. It is also a way of making participants take responsibility of their own learning process.
- 4. For the facilitator, the objectives decide a designed path to progress on so that the learning stays aligned and on track.

- 5. Read the objectives slowly, one by one, and ask the participants to explain what they think it means.
- 6. At the end of the session, you could again revisit the objectives to find out from the participants about how many objectives have been achieved.

#### In order to effectively facilitate this workshop:

- 1. You must have thorough knowledge of the material in the Participant Handbook, and be prepared to answer questions about it.
- 2. You may also wish to read other material to enhance your knowledge of the subject.
- 3. There may be issues raised with which you are not able to deal, either because of lack of time or knowledge. You can either state that you will obtain answers and get back to the participants with the information. Incase the query can be turned to an assignment to the class, do so. You can work with the the participants on the assignement.
- 4. You must have a very clear understanding of what the participants want to accomplish by the end of the workshop and the means to guide the participants.
- 5. As the facilitator, it is your responsibility to make sure that all logistical arrangements are made for the workshop. This may involve doing it yourself or confirming that someone else has made all necessary arrangements associated with the workshop. Assume nothing and check everything before the workshop begins.
- 6. To break the monotony and boredom during sessions, introduce mini breaks in the form of stretching exercises, jokes, some group songs or games.
- 7. Invite discussion from the participants.
- 8. Probe the participants further and lead them to come to affirmative conclusions.
- 9. Let the participants answer. No answer is incorrect.
- 10. Ask one participant to write all the points on the whiteboard.
- 11. Build the sessions from the answers provided by the class.
- 12. Prepare for the sessions in advance so that the resources like flipcharts, handouts, blank sheets of paper, marker pens, etc. can be kept ready.
- 13. Ensure that resources like board, markers, duster etc. is available before your session starts.

#### General instructions for role playing:

- 1. You are not being asked to be an actor or to entertain. The purpose of the role play is to provide a situation in which you can practice certain skills.
- 2. When you read the brief, try to imagine yourself in the situation described and behave in a way you feel to be natural but be conscious of the fact that your role may require a different approach from that which you might normally use.
- 3. You (and others) may benefit from the change in approach and behaviour. Therefore, try to use the approach you feel to be most appropriate for the circumstances described in your brief.
- 4. The brief is just the starting point. It simply sets the scene and the tone of session or activity. Try not to keep referring to the brief as this will affect the spontaneity of the meeting. Allow the role play to develop as you think it might in real life and change your reactions in line with the behaviour and responses of others involved.
- 5. If you find that you have too little information to answer questions or to describe what has happened in the situation, do feel free to add your own thoughts and ideas. Try to keep these within the framework of the role you are taking and try to make your improvisations as realistic as possible.

#### Unit 7.1: Personal Strengths & Value Systems

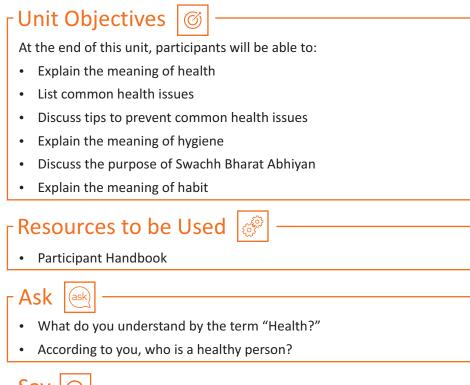
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#### **Key Learning Outcomes**

At the end of this unit, participants will be able to:

- 1. Explain the meaning of health
- 2. List common health issues
- 3. Discuss tips to prevent common health issues
- 4. Explain the meaning of hygiene
- 5. Discuss the purpose of Swacch Bharat Abhiyan
- 6. Explain the meaning of habit
- 7. Discuss ways to set up a safe work environment
- 8. Discuss critical safety habits to be followed by employees
- 9. Explain the importance of self-analysis
- 10. Discuss motivation with the help of Maslow's Hierarchy of Needs
- 11. Discuss the meaning of achievement motivation
- 12. List the characteristics of entrepreneurs with achievement motivation
- 13. List the different factors that motivate you
- 14. Discuss the role of attitude in self-analysis
- 15. Discuss how to maintain a positive attitude
- 16. List your strengths and weaknesses
- 17. Discuss the qualities of honest people
- 18. Describe the importance of honesty in entrepreneurs
- 19. Discuss the elements of a strong work ethic
- 20. Discuss how to foster a good work ethic
- 21. List the characteristics of highly creative people
- 22. List the characteristics of highly innovative people
- 23. Discuss the benefits of time management
- 24. List the traits of effective time managers
- 25. Describe effective time management technique
- 26. Discuss the importance of anger management
- 27. Describe anger management strategies
- 28. Discuss tips for anger management
- 29. Discuss the causes of stress
- 30. Discuss the symptoms of stress
- 31. Discuss tips for stress management

#### 7.1.1: Health, Habits, Hygiene: What is Health?



### Say 뎙

• Discuss the meaning of health and a healthy person as given in the Participant Handbook.

### Ask (ask

• When did you visit the doctor last? Was it for you or for a family member?

### Say 뎙

- Discuss the common health issues like common cold, allergies etc. Refer to the Participant Handbook.
- Let us do a small activity. I will need some volunteers.

### -Role Play 😴

- Conduct a small skit with volunteers from the class. Consider one of the villagers has been appointed as a health representative of the village, what measures will you as a health representative suggest to the common villagers to prevent common health issues discussed.
- You will need at least 4 volunteers (Narrator, Health Representative, Head of the Village, Doctor).
- Explain the health concerns of the village to the Narrator. The Narrator will brief the class about the skit.
- Give the group of volunteers, 5 minutes to do discuss.
- At the end of 5 minutes, ask the group to present the skit to the class assuming them as the villagers.
- The class can ask questions to the group as a common villager.

#### Summarize 🔎

• Through this activity we got some tips on how can we prevent these common health issues.

### Say 뎙

• Let us now see how many of these health standards we follow in our daily life.

#### - Activity

• Health Standard Checklist from the Participant Handbook.

### Ask ask

· How many of you think that you are healthy? How many of you follow healthy habits?

### Say 🔓

- Let's do an exercise to find out how healthy you are.
- Open your Participant Handbook section 'Health, Habits, Hygiene: What is Health?', and read through the health standards given.
- Tick the points which you think are true for you.
- Try to be as honest as possible as this test is for your own learning.

#### Do 🗸

- Ensure that all the participants have opened the right page in the Participant Handbook.
- Read aloud the points for the participants and explain if required.
- Give them 5 minutes to do the exercise.
- At the end of 5 minutes, ask the participants to check how many ticks have they got.

### Summarize 🔎

• Tell them that they need to follow all the tips given in this checklist regularly in order to remain healthy and fit.

#### Ask 🤅

#### Discuss:

- Is it necessary to practice personal hygiene every day? Why?
- How does a person feel when they do not practice good personal hygiene? Why?
- Can good personal hygiene help a person feel good about his/her self? How?

### Say 🔓

• Discuss the meaning of hygiene as given in the Participant Handbook.

#### Activity 💯

Health Standard Checklist: Hygiene

### Say 뎗

- Let's do an exercise to find out if we maintain good hygiene habits or not.
- Open the Participant Handbook and read through the Health Standard checklist given.
- Tick the points which you think are true for you.
- Try to be as honest as possible as this test is for your own learning.

#### Do 🗸

- Ensure that all the participants have opened the right page in the Participant Handbook.
- Read aloud the points for the participants and explain if required.
- Give them 5 minutes to do the exercise..
- At the end of 5 minutes, ask the participants to check how many ticks have they got.
- Ask them to calculate their score.
- Tell them what each score indicates by reading aloud what has been mentioned in the Participant Handbook.

#### Ask a

- How many of you have heard about "Swachh Bharat Abhiyan"?
- Can you tell the class what it is about?

#### · Summarize 🏻 🔎

• Tell them about Swachh Bharat Abhiyan as given in the Participant Handbook and request them to take a pledge to keep our country clean.

#### Ask as

• What is a habit?

#### Say 🔓

• Discuss some good habits which can become a way of life.

#### Summarize 🔎

• Tell them about good and bad habits and the reasons to make good habits a way of life.

#### 7.1.2: Safety

Unit Objectives Ø

At the end of this unit, participants will be able to:

- Discuss ways to set up a safe work environment
- Discuss critical safety habits to be followed by employees

#### Resources to be Used

- Participant Handbook
- Safety signs and symbols
- Safety equipments
- Blank papers
- Pens

### Say 뎗

- There are many common safety hazards present in most workplaces at one time or another. They include unsafe conditions that can cause injury, illness and death.
- Safety Hazards include:
  - Spills on floors or tripping hazards, such as blocked aisles or cords running across the floor.
  - Working from heights, including ladders, scaffolds, roofs, or any raised work area.
  - Unguarded machinery and moving machinery parts; guards removed or moving parts that a worker can accidentally touch.
  - Electrical hazards like cords, missing ground pins, improper wiring.
  - Machinery-related hazards (lockout/tag out, boiler safety, forklifts, etc.)

### - Team Activity 🙀

#### **Safety Hazards**

Γ

Ask

(ask)

- There are two parts to this activity.
- First part will cover the potential safety hazards at work place.
- Second part will cover a few safety signs, symbols and equipments at work place.
- Use this format for the first part of the activity.

PART 1		
Hazard	What could happen?	How could it be corrected?

How could you or your employees get hurt at work?

### Say 뎗

• Let's understand it better with the help of an activity. You will be given a handout within your groups. You have to think about the possible hazards of your workplace, what damage these hazards could cause and about the corrective action.

### Do 🗸

- Divide the class into five to six groups of four participants each.
- Put the format on the board for the activity.
- Give blank papers and pens to each group.
- The group is expected to think and discuss the potential safety hazards in the workplace.
- Ask the group to discuss and fill the format using the blank sheet.
- Give the groups 5 minutes for the activity.
- For the second part of the activity, show the class some pictures of safety signs, symbols and equipments.
- Now they will put down a few safety symbols, signs or equipment against the safety hazards identified.
- Give them 5 to 10 minutes to discuss and draw/note it.
- At the end of 10 minutes the groups will present their answers to the class.

#### Say 🔓

- Now, let's discuss the answers with the class.
- All the groups will briefly present their answers.

#### Do 🗸

- Ask the audience to applaud for the group presentation.
- Ask de-brief questions to cull out the information from each group.
- Keep a check on time.
- Tell the group to wind up the discussion quickly if they go beyond the given time limit.

### Ask ask

#### **De-briefing**

- What did you learn from the exercise?
- As an entrepreneur, is it important to ensure the safety of your employees from possible hazards? Why?

### Summarize 🔎

- Ask the participants what they have learnt so far.
- Ask if they have any questions related to what they have talked about so far.
- Close the discussion by summarizing the tips to design a safe workplace and non-negotiable employee safety habits.

#### 7.1.3: Self Analysis- Attitude, Achievement Motivation: What is Self Analysis?

#### - Unit Objectives 🏼 🎯

At the end of this unit, participants will be able to:

- Explain the importance of self- analysis
- Discuss motivation with the help of Maslow's Hierarchy of Needs
- Discuss the meaning of achievement motivation
- List the characteristics of entrepreneurs with achievement motivation
- List the different factors that motivate you
- Discuss the role of attitude in self- analysis
- Discuss how to maintain a positive attitude
- List your strengths and weaknesses

#### Resources to be Used

- Participant Handbook
- Old newspapers
- Blank papers
- Pencils/ pens

### Activity §

• This is a paper pencil activity.

What are the three sentences that describe you the best?

What do you need to live happily?

What are your strengths and weaknesses?

### Do 🗸

- Write the three questions on the board/flipchart before the session begins.
- Give plain papers and pencils/ pens to each participant.
- Tell participants to write the answer for the three questions on the paper.
- Tell them the purpose of this activity is not to judge anyone but to understand more about self.

### Say 🔓

• Discuss the concept of Self Analysis and motivation with reference to Maslow's Hierarchy of Needs as discussed in the Participant Handbook.

#### Team Activity 🛉

#### Tower building

• Each group which will create tower using the old newspapers.

### Do 🗸

- Divide the class into groups.
- Give them some old newspapers.
- The task is to create a tower out of the newspapers.
- The group which will create the highest tower standing on its own will be considered the winning group.
- Groups can use as many newspapers as they want to and in any way they want.

### Ask ask

- What did the winning group do differently?
- If you were given a chance, how would you have made the tower differently?
- How did you feel while making the tower?
- Did you feel motivated?

#### Say 뎗

• Discuss the concept of achievement motivation and characteristics of entrepreneurs with achievement motivation as discussed in the Participant Handbook.

### - Ask

• Is your attitude positive or negative?

### Say 🔓

• Let me tell you a story :

#### It's Little Things that Make a Big Difference.

There was a man taking a morning walk at the beach. He saw that along with the morning tide came hundreds of starfish and when the tide receded, they were left behind and with the morning sun rays, they would die. The tide was fresh and the starfish were alive. The man took a few steps, picked one and threw it into the water. He did that repeatedly. Right behind him there was another person who couldn't understand what this man was doing. He caught up with him and asked, "What are you doing? There are hundreds of starfish. How many can you help? What difference does it make?" This man did not reply, took two more steps, picked up another one, threw it into the water, and said, "It makes a difference to this one." What difference are we making? Big or small, it does not matter. If everyone made a small difference, we'd end up with a big difference, wouldn't we?

### Ask ask

• What did you learn from this story?

### Activity

#### What Motivates You?

- This is an individual activity.
- It is an exercise given in the Participant Handbook.

### Do

- Ask the class to open their Participant Handbook and complete the exercise given in the section What Motivates You?
- Ensure that the participants have opened the correct page for the activity.
- Give the class 5 minutes to complete the activity.



• Discuss the concept of attitude and how to cultivate a positive attitude as discussed in the Participant Handbook.

#### - Summarize / 🕭

• Close the discussion by summarizing how self-analysis, knowledge about what motivates you and your positive attitude can help in your business as well in life.

#### 7.1.4: Honesty & Work Ethics

### Unit Objectives 🞯

At the end of this unit, participants will be able to:

- Discuss the qualities of honest people
- Describe the importance of honesty in entrepreneurs
- Discuss the elements of a strong work ethic
- Discuss how to foster a good work ethic

#### Resources to be Used

• Participant Handbook



- What do you understand by honesty?
- Why is it important for entrepreneurs to be honest?
- Do you remember any incident where your honesty helped you in gaining confidence?
- Do you remember any incident where someone lost business due to dishonesty?

### Say 뎗

- Talk about honesty, qualities of an honest person, and the importance of honesty in entrepreneurs as discussed in the Participant Handbook.
- "Let's understand it better with the help of some case scenarios. You will be given some cases within your groups. You have to analyse the case scenario that has been given to you and then find an appropriate solution to the problem.
- Keep your discussion focussed around the following:
  - What went wrong?
  - Who was at fault?
  - Whom did it impact- the customer or the businessman?
  - How would it impact the business immediately? What would be the long term impact?
  - What could be done?
  - What did you learn from the exercise?

### Do 🗸

- Divide the class into four groups of maximum six participants depending on the batch size.
- Give one case study to each group.
- Instruct them to read the case carefully.
- Put down the de-brief questions on the board and ask the groups to focus their discussion around these questions.
- The group is expected to analyse and discuss the case amongst them and find a solution to the given problem. Give the class5-10 minutes to discuss the case and note down their solutions.
- At the end of 10 minutes the team should present their case solution to the class. The presentation can be a narration or a role play.
- Ask the group to select a group leader for their group. The group leader to discuss and assign roles to the group members for the presentation.

### Team Activity 🛃

#### **Case Study Analysis**

#### Scenario 1

Aakash has a small mobile retail sales and repair shop in Allahabad. He has one of the most popular outlets and has great rapport with his customers.

It's around 11 AM when a customer barges in to the shop and starts shouting at Aakash for giving her a faulty instrument. The screen of her mobile is cracked from one side. Aakash remembered thoroughly checking the handset before handing it over to the customer. The customer threatens to sue him and to go to Consumer Court for cheating her. Now, the problem occurred somewhere outside the shop but as other customers were listening to the conversation, it might impact his business. The situation needs to be managed very sensitively. What would you do if you were in Aakash's place?

#### Scenario 2

Rajni does beautiful Phulkari embroidery on suits and sarees. She has a small home-based business. She has a huge list of customers on Facebook and WhatsApp who give her orders regularly. Smita is one of her old and regular customers. As her sister-in-law's weddingwas around the corner, Smita wanted to buy few handcrafted Phulkari duppatta. She placed an order for three duppattas via WhatsApp and requested Rajni to send them as soon as possible. When the parcel reached Smita through courier she found that out of the three duppatas, only one was hand embroidered and the other two had machine embroidery on them. Even the length and the quality of the material was not as desired. Smita was heartbroken. It was a complete waste of money and moreover she couldn't wear what she had planned to during the wedding functions. She sent a message to Rajni on WhatsApp, expressing her anger and disappointment.

Smita has also sent a feedback and expressed her disappointment on the social media... this will directly affect Rajni's business. What would you do if you were in Rajni's place?

#### Scenario 3

Shankar is a tattoo artist who has a small tattoo showroom in a big, reputed mall in New Delhi. Mr Saksham had an appointment for today, at 11:00 am but he reached at 11:50 am. Meanwhile, Shankar had to reschedule his next appointment. After availing Shankar's services, Mr Saksham started yelling in an abusive language, refusing to pay the requisite amount, and finding faults in the services provided by him. Who was at fault in this case? What should Shankar do? Should he confront Saksham or give in to the demands of the client?

#### Scenario 4

Shailender is an online cloth reseller who does business through social networking sites such as Facebook and WhatsApp. Priyanka made online payment for a dress to Shailander. But she did not receive the dress for a month. When she asked for a cancellation, Shailander started misleading her. For almost 45 days, he kept promising her that he will pay the amount today, tomorrow, day after etc. Even after repeated calls and messages when she did not receive the payment or the dress, she decided to write a post against him on a popular social media platform. As a result, Shailender lost lots of customers and his flourishing business faced a major crisis. How could this situation have been managed?

### Say 🔓

- Now, let's discuss the problem and solution with the larger group.
- The group will first briefly describe the case to the class.
- Then discuss the issue identified and the proposed solution.
- Once the presentation is over, the class can ask their questions.

### Do 🗸

- Congratulate each group for the group presentation.
- Ask the audience to applaud for them.
- Ask de-brief questions to cull out the information from each group.
- Keep a check on time. Tell the group to wind up the discussion quickly if they go beyond the given time limit.

### Summarize 🔎

- Ask the participants what they have learnt from the exercise/activity.
- Ask if they have any questions related to what they have talked about so far.
- Close the discussion by summarizing the importance of honesty and work ethics for entrepreneurs.

#### 7.1.5: Creativity and Innovation



At the end of this unit, participants will be able to:

- List the characteristics of highly creative people
- List the characteristics of highly innovative people

#### Resources to be Used 💣

- Participant Handbook
- Chart papers
- Marker pens

### - Ask ask

- You must be aware of the term 'Rags to riches' and heard stories related to the term.
- What do these stories tell us?
- What was so special about these people?

### Say 뎙

- Let's have a look at these stories.
- There are some inspiring stories about people which I would like to share with you.
- Narrate these stories to the class.

#### A.P.J. Abdul Kalam

Who has not heard of A.P.J. Abdul Kalam: Avul Pakir Jainulabdeen Abdul Kalam hailed from a very humble background. His father was a boat owner. To help his family, Kalam would work as a newspaper vendor. With limited resources, he graduated in Physics and studied aerospace engineering. He was instrumental in India's step towards nuclear energy. In 2002, he became the 11th President of India.

#### Water filter/purifier at source

Two young boys studying in classes 4 and 5, from Lingzya Junior High School, Sikkim designed a simple innovative low cost water purifier.

Inspiration behind the idea: Most people today prefer to use a water filter/purifier at their home.

Both the children have given idea to have filter/purifier at the source of water so that everyone has access to clean water without having to make an investment in purchasing a filter/purifier.

Soring's idea is to have a centralised purification system at the point of distribution like water tank while Subash's idea is to have such purifiers attached to public taps.

Source: <u>http://www.rediff.com/getahead/report/achievers-top-31-amazing-innovations-from-young-indians/20151208.htm</u>

#### Solar seeder

This is a story of a innovative solar seeder and developed by Subash Chandra Bose, a class 8, student from St Sebasthiyar Matriculation School, Pudukkottai, Tamil Nadu. Subash has developed a solar powered seed drill, which can undertake plantation for different size of seeds at variable depth and space between two seeds.

Source: <u>http://www.rediff.com/getahead/report/achievers-top-31-amazing-innovations-from-young-indians/20151208.htm</u>

#### Looms for physically challenged

Now this is really inspiring of two sisters, Elakkiya a Class 6 student and Pavithra a Class 9 student of SRC Memorial Matriculation, Erode, Tamil Nadu.

The two sisters have come up with loom for lower limbed physically challenged. In their loom they have replaced the pedal operated system with a motor and a gearbox attached to a pulley mechanism.

Source: <u>http://www.rediff.com/getahead/report/achievers-top-31-amazing-innovations-from-young-indians/20151208.htm</u>

### - Ask ask

- If they can, why can't you?
- Discuss concepts related to 'Creativity and Innovation' with the participants as given in the Participant Handbook.

### Say 뎗

- Recall the stories on motivation.
- What is the inner drive that motivates people to succeed?
- Let's learn more about such creative and innovative entrepreneurs with the help of an activity.

### Team Activity 🙀

- This is a group activity.
  - Think of any one famous entrepreneur and write a few lines about him or her.

#### **Activity De-brief**

- Why did you choose this particular entrepreneur?
- What is his/her brand name?
- What creativity does he/she possess?
- What was innovative about their ideas?

#### Do 🗸

- Instruct the participants that this is group work.
- Divide the class into small groups of 4 or 6 depending on the batch size.
- Give each group a chart paper.
- Tell the participants they have to write a few lines about any one famous entrepreneur.
- Give the participants 10 minutes to discuss and write.
- Keep a check on time. Tell the group to wind up quickly if they go beyond the given time limit.
- Ask each group to read out what they have written.
- Ask the de-brief questions.

Summarize 🔎

- Summarize the unit by asking participants if they know of some people who are highly creative and innovative in their approach.
- Ask them to share some experiences about these people with the class.

#### - Notes for Facilitation

• Source for stories on innovations:

http://www.rediff.com/getahead/report/achievers-top-31-amazing-innovations-from-youngindians/20151208.htm

#### 7.1.6: Time Management



At the end of this unit, participants will be able to:

- Discuss the benefits of time management
- List the traits of effective time managers
- Describe effective time management techniques

#### - Resources to be Used 🔗

• Participant Handbook

#### Ask ask

#### Does this sound like you?

- I can never get enough time to finish what I am doing in a day.
- I have so many things to do that I get confused.
- I want to go for a walk and exercise, but I just do not have the time.
- I had so much to do, so I could not deliver that order on time.
- I would love to start my dream business; but, I just do not have the time.

#### Example 🖓

Let's look at these two examples:

#### Example 1:

Ankita works from home as a freelance writer. She says she can easily put in 8 hours of dedicated work in a day. Because she works from home, she saves money on travel and has a comfortable work routine. But there is a challenge and it is distraction. As she works from home, she can easily just get up and sit down on the sofa to watch TV, wasting valuable time. She may have chores to do, errands to run and bills to pay. She ends up working only two to three hours a day and the result is, her work gets piled up. She is unable to take on more work due to this. Even though her quality of work is appreciated her clients are not very happy about the delay in submission.

#### Example 2:

Javed has started a successful online selling company from home and makes a good living from his sales. He has set up a small office space in his living room. As both his parents are working full-time, he also has the role of taking care of his two younger siblings. He almost spends half of his day with the younger kids. He does not mind it but it means taking time away from the work. He is still able to manage his online business with these commitments. He wants to spend some more dedicated hours so as to increase his profits. He also wants to look into new business avenues. What should he be doing.

### Ask ask

- Does this happen with you too?
- Do you find it difficult to prioritize your work?
- Are you able to manage your time effectively?

### Activity 😥

- Conduct a group discussion based on the above examples.
- Direct the discussion on how to prioritize work and manage time effectively.

#### Say Say

- Time management is not only about how hard you work but also about how smart you work.
- Discuss "What is Time Management" with the participants as given in the Participant Handbook.

#### Ask (

- Why is it important to manage time? How does it help?
- What happens when you don't manage your time effectively?
- Do you find it difficult to prioritize your work?

### Say 뎙

- Discuss the benefits of time management given in the Participant Handbook.
- Let's learn effective time management with the help of an activity.

#### Activity

#### **Effective Time Management**

• This activity has two parts:

#### PART 1

#### **TO-DO LIST**

- You have to make a to-do list.
- List all of the activities/ tasks that you have to do.
- Try to include everything that takes up your time, however unimportant it may be.
- If they are large tasks, break them into action steps, and write this down with the larger task.
- You can make one list for all your tasks or have separate to-do lists for personal and professional tasks.

#### PART 2

#### **URGENT-IMPORTANT GRID**

- You have to make a grid as shown on the board here..
- This grid has four boxes. As you can see, each box has a different heading.
- At the heart of the urgent-important grid, are these two questions:
  - Is this task important?
  - Is this task urgent?
- Now, you have to think about each activity that you have written in your to-do list and put it into one of the four categories.
- What do these categories depict?
- Category 1: Urgent/Important
  - This category is for the highest priority tasks. They need to get done now.

#### • Category 2: Not Urgent/Important

- This is where you want to spend most of your time.
- This category allows you to work on something important and have the time to do it properly.
- This will help you produce high quality work in an efficient manner.
- The tasks in this category are probably the most neglected ones, but also the most crucial ones for success.
- The tasks in this category can include strategic thinking, deciding on goals or general direction and planning all vital parts of running a successful business.

#### Category 3: Urgent/Not Important

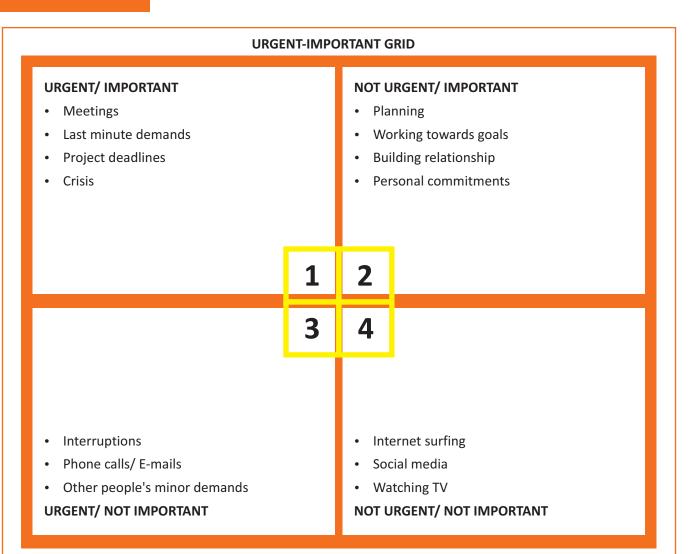
- This is where you are busy but not productive. These tasks are often mistaken to be important, when they're most often busywork.
- Urgent but not important tasks are things that prevent you from achieving your goals.
- However, some may be activities that other people want you to do.

#### • Category 4: Not Important and Not Urgent

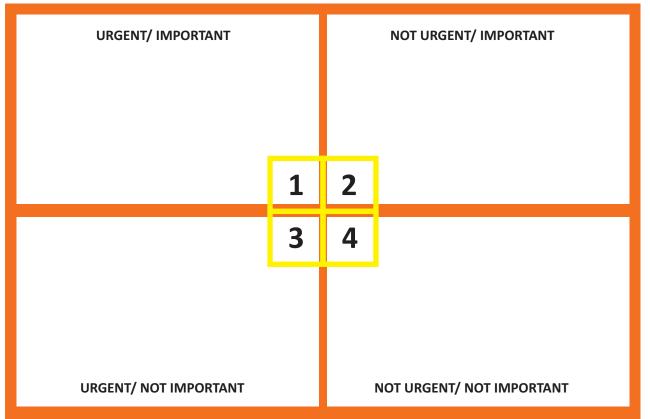
- This category doesn't really include tasks, but rather habits that provide comfort, and a refuge from being disciplined and rigorous with your time management.
- Some may be activities that other people want you to do.
- These might include unplanned leisure activities as well.

#### **TO- DO list format**

1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	
11.	
12.	
13.	
14.	
15.	



#### **URGENT/ IMPORTANT GRID format**



### Do

- Put down the formats for the to-do list and the urgent/important grid on the board.
- Instruct the participants to prepare their to-do list first.
- Give the participants 10 minutes to prepare the list.
- Once done, instruct them to divide the tasks in to-do list into the four categories.
- Explain the four categories to the participants giving examples specific to their context.
- As you explain the categories fill the grid with the type of tasks.
- Give the participants 40 minutes to fill the grid.
- Then explain how to balance the tasks between the four categories.
- Keep a check on time. Tell the group to wind up quickly if they go beyond the given time limit.

### Say 뎗

#### **Activity De-brief:**

#### How can we balance tasks between the four categories?

#### How to manage time through this grid?

- Category 1: Urgent/Important
  - Try to keep as few tasks as possible here, with the aim to eliminate.
  - If you spend too much of your time in this category, you are working solely as a trouble shooter, and never finding time to work on longer-term plans.
- Category 2: Not Urgent/Important
  - Plan these tasks carefully and efficiently as they are most crucial ones for success.
  - If necessary, also plan where you will do these tasks, so that you're free from interruptions.
  - Include strategic thinking, deciding on goals or general direction and planning in your planning process.
- Category 3: Urgent/Not Important
  - Ask yourself whether you can reschedule or delegate them.
  - A common source of such activities is other people. Sometimes it's appropriate to say "no" to people politely, or to encourage them to solve the problem themselves.
- Category 4: Not Important and Not Urgent
  - You also want to minimize the tasks that you have in this category.
  - These activities are just a distraction avoid them if possible.
  - You can simply ignore or cancel many of them.
  - Politely say "no" to work assigned by others, if you can, and explain why you cannot do it.
  - Schedule your leisure activities carefully so that they don't have an impact on other important tasks.
- Discuss the traits of effective time managers and effective time management techniques as given in the Participant Handbook.

#### Summarize 🔎

• Discuss the traits of effective time managers and effective time management techniques as given in the Participant Handbook.

### Notes for Facilitation

- Here is a short story. You can conclude the session narrating the story. To make it more interesting you can perform the demonstration described and discuss the short story.
  - One day an expert in time management was speaking to a group of students. As he stood in front of the group, he pulled out a large wide-mouthed glass jar and set it on the table in front of him. Then he took out a bag of about a dozen rocks and placed them, one at a time, into the jar. When the jar was filled to the top and no more rocks would fit inside, he asked, "Is this jar full?" Everyone in the class said, "Yes." Then he said, "Really?"
  - He reached under the table and pulled out a bucket of gravel (small stones). He dumped some gravel in and shook the jar causing pieces of gravel to work themselves down into the space between the rocks. Then he asked the group once more, "Is the jar full?" By this time, the class began to understand. "Probably not," one of them answered. "Good!" he replied.
  - He reached under the table and brought out a bucket of sand. He started dumping the sand in the jar and it went into all of the spaces left between the rocks and the gravel. Once more he asked the question, "Is this jar full?" No!" the class shouted. Once again he said, "Good." Then he grabbed a jug of water and began to pour it in until the jar was filled to the brim. Then he looked at the class and asked, "What is the point of this illustration? "One student raised his hand and said, "No matter how full your schedule is, if you try really hard you can always fit some more things in it!" "No," the speaker replied, "that's not the point. The truth this illustration teaches us is: If you don't put the big rocks in first, you'll never get them in at all." What are the 'big rocks' in your life? Your children; your loved ones; your education; your dreams; a worthy cause; teaching or mentoring others; doing things that you love; time for yourself; your health; your mate (or significant other). Remember to put these BIG ROCKS in first or you'll never get them in at all. If you sweat about the little stuff (the gravel, sand, and water) then you'll fill your life with little things you worry about that don't really matter, and you'll never have the time you need to spend on the big, important stuff (the big rocks).
- End the story with these lines...

So, tonight, or in the morning tomorrow, when you are reflecting on this short story, ask yourself this question: What are the 'big rocks' in my life? Then, put those in your jar first

#### 7.1.7: Anger Management



At the end of this unit, participants will be able to:

- Discuss the importance of anger management
- Describe anger management strategies
- Discuss tips for anger management

#### - Resources to be Used

• Participant Handbook

#### Ask 🤅

- What is anger? Is anger good or bad?
- Is anger normal or an abnormal behaviour? How can anger harm you?
- Why is it important for entrepreneurs to manage their anger?

#### Say 🔓

- Talk about anger and the importance of anger management in entrepreneurs as discussed in the Participant Handbook.
- Let us do a small activity. This is an individual activity.
- Think of the incidents and situations that angered you and hurt you.

#### Do

- Instruct them to note down these situations under different categories (as given in the Activity).
- Give the class 3-5 minutes to think and note down their answers.
- At the end of 5 minutes, ask some participants to volunteer and present their answers.
- They can also share these situations with their fellow participants if they do not wish to share it with the
  entire class.

#### - Activity

- Do you remember any incident which has hurt
  - you physically
  - you mentally
  - your career
  - your relationships.

#### - Ask 🤘

- Do you ever get angry?
- What are the things that make you angry?
- Do you remember any incident where your anger management helped you in maintaining healthy relationship?
- Do you remember any incident where someone lost business/ friend/ relationship due to temper (anger)?

#### Facilitator Guide

### Say 뎗

- There are a few strategies which can help in controlling your anger. Let's do an activity to understand the anger management process better.
- This is an individual activity.
- Think of the incidents/ situations which trigger your anger (the cause).
- Then think what happened as a result of your anger (the effect).
- You need to come up with some techniques to manage your anger.

#### Do

- Give the class the anger triggers (the cause) as listed in the activity.
- Put down the activity format (Anger Triggers, Result of your Anger, Anger Management Techniques) on the board and instruct the class to write the answers under different categories.
- Give the class 3-5 minutes to think and note down their answers.
- At the end of 5 minutes, ask the participants who wish to volunteer and present their answers.

### Activity 💯

#### Trigger points and Anger Management Techniques Activity

#### Anger Triggers

List of triggers that make you angry:

Someone says you did something wrong.

You want something you can't have now.

You get caught doing something you shouldn't have been doing.

You are accused of doing something you didn't do.

You are told that you can't do something.

Someone doesn't agree with you.

Someone doesn't do what you tell him to do.

Someone unexpected happens that messes up your schedule.

#### **Result of your anger:**

Write the techniques that you use to manage your anger:

#### **Anger Management Techniques**

#### Say 🔓

- Now, let's discuss the problems and solution with all.
- The individual will first briefly describe trigger points to the class.
- Then discuss the result of the anger. Other participants are requested to remain quiet while one is making the presentation.
- Post presentation, other participants may ask questions.

#### Do

- Congratulate each individual for sharing their points.
- Ask the audience to applaud for them.
- Ask de-brief questions after the presentation to the class.
- Keep a check on the time. Ask the participants to wind up the activity quickly if they go beyond the given time limit.

### Ask ask

#### **De-brief questions:**

- In the situation described by the presenter, who was at fault?
- How could you have handled this situation alternatively?

### Summarize 🔎

- Close the discussion by summarizing the strategies and tips of anger management for entrepreneurs.
- Ask the participants what have they learnt from this exercise/ activity.
- Ask if they have any questions related to what they have talked about so far.

#### -Notes for Facilitation

- Encourage the participants to share information about them while presenting the situations to the class.
- Keep the format of the Activity prepared in a chart paper so that it can be displayed during the session.

### 7.1.8: Stress Management: What is stress?



At the end of this unit, participants will be able to:

- Discuss the causes of stress
- Discuss the symptoms of stress
- Discuss tips for stress management

## - Resources to be Used

- Participant Handbook
- Ask 🤤
- You are waiting in the reception for an interview or a very important meeting, suddenly your legs are shaky, your hands are cold, you are feeling nervous. Have you ever been in this kind of situation?
- Have you had days when you had trouble sleeping?
- Have you ever been so worried about something that you ended up with a terrible headache?

## Say Sa

• You've probably heard people say, I'm really stressed out" or "This is making me totally stressed."

# Ask as

- What do you understand by stress?
- What gives you stress?
- How do you feel when you are stressed or what are the symptoms of stress?
- How can stress harm you?
- Why is it important for entrepreneurs to manage stress?

# Say 🔓

- When we feel overloaded or unsure of our ability to deal with certain challenges, we feel stressed.
- Discuss about stress, causes of stress, and symptoms of stress as discussed in the Participant Handbook.
- Let's understand the causes of stress and how to deal with them with the help of some case scenarios.
- You will be given some cases.
- You have to analyse the case scenario and then find an appropriate solution to the problem.
- This will be a group activity.

## Do 🗸

- Divide the class into four groups of 5-6 participants (depending on the batch size).
- Assign one case scenario to each group.
- Instruct them to read the case carefully.
- The group is expected to analyse and discuss the case amongst them and find a solution to the given problem.
- Explain their discussion should result in getting answers for the following questions:

- What was/were the cause(s) of stress?
  - Was the stress avoidable or manageable under the given circumstances?
  - If yes, how do you think that the stress could be avoided (managed)?
  - If no, then why not?
- Give the class 10-12 minutes to discuss the case and note down their solutions.
- At the end of 12 minutes, the team should present their case solution to the larger group.
- Ask the group to select a group leader for their group.
- The group leader to discuss and assign roles to the group members for the presentation.



#### **Case Study Analysis**

#### Scenario 1

Akash's alarm doesn't go off and he gets late getting out of the house. He hits traffic and ends up 15 minutes late to work, which his boss notices. He gets to his desk and finds he has to complete 2 reports in next one hour. Just when he is about to begin work, a message pops up "Telecon with the client begins in 10 minutes. Please be in the conference room in 5 minutes."

His is not prepared for the call. He is stressed. He does not want to speak to his boss about this. He is stressed, feeling uncomfortable and sick. Not in a position to attend the call or finish the reports on time.

#### Scenario 2

While paying his overdue bills, Rahul realised that it's the middle of the month and he has only Rs 500 left in his account. He has already asked all of his friends, and family for loans, which he hasn't paid back yet. He is still contemplating over the issue when his phone rings. His sister's birthday is due next week and she has seen a beautiful dress which she wants to buy but cannot tell the parents as it is a bit expensive. She wishes if Rahul could buy the dress for her. Rahul has promised to buy her the dress for her birthday.

Rahul is stressed, does not understand what to do. He is unable to concentrate on his work and unable to complete the tasks assigned. His team leader has already warned him of the delay.

#### Scenario 3

Sheela calls the cable company as she has unknown charges on her bill. She has to go through the automated voice mail menu three times and still can't get through to a customer care executive. After 15 minutes of repeated efforts, her call is answered. She explains the entire issue to the customer care executive but before the person could suggest a way out, the call drops.

Now Sheela has to call back and repeat the whole process all over again with a new customer care executive. She is very angry and calls again but cannot connect this time.

She has to leave to office so she decides to call from office and check. When she connects this time she is angry and argues with the executive on the call. All her co-workers around are looking at her as her volume has suddenly increased. She bangs the phone and ends the call.

Her co-worker Neelam enquires what has happened to her. She ignores her and just walks off. She has become irritable and her behaviour and tone with other co-workers is not acceptable.

#### Scenario 4

Arpit is a young entrepreneur who started doing business through Facebook few weeks back. He had always been into a job. Although Arpit has very few financial liabilities, it wasn't an easy decision to leave a comfortable job at once and look for newer pastures. Arpit's boss warned him of the consequences and the challenges of starting a business when nobody ever in his family had been in business.

He has not been able to get a good deal till now. This is an important life shift for him which comes with unknown variables. Arpit is nervous and is wondering if he has what it takes to fulfill the requirement of his new role, or the new experiences he's likely to face.

### Ask 🔤

#### **De-brief questions:**

- What was/ were the cause(s) of stress?
- Was the stress avoidable or manageable under the given circumstances?
- If yes, how do you think that the stress could be avoided (managed)?
- If no, then why not?

### Say Say

- Now, let's discuss the problem and solution with the larger group.
- The group will first briefly describe the case to the class.
- Then discuss the issue identified and the proposed solution.
- Post presentation, the other groups may ask questions to the group that has presented.

#### Do 🔍

- Congratulate each group for sharing their points.
- Ask the audience to applaud for them.
- Ask de-brief questions to cull out the information from each group.
- Keep a check on time. Tell participants to wind up the discussion quickly if they go beyond the given time limit.

## Say 🔓

- While it is common and normal to feel some tension. This feeling nervous and tensed can interfere with your thinking process and can have a negative impact on your performance.
- Stress can deplete the most vibrant of souls. It can have a negative effect on every aspect of a person's life including their health, emotional well-being, relationships, and career. However, one needs to understand the causes and types of stress before looking for ways to manage it.

#### De-brief:

#### Scenario 1

The cause of stress was lack of time management and the habit of procrastinating. If Akash would have managed his time well, planned alternate ways to get up on time, finished prior tasks on time and planned for client meetings in advance then he wouldn't have faced stress.

#### Scenario 2

The cause of stress was lack of financial planning. Rahul should have planned his financial resources well in advance and saved some money for the rainy day. Also, differentiating between needs and wants and keeping a check on non-essential expenditure would have saved Rahul from this situation.

#### Scenario 3

Sometimes, stress is caused due to external factors instead of internal ones. In this case, the stress was unavoidable because we have no control over this customer care system. Every time, you will get in touch with a new executive and will have to explain all over again. This might cause stress but despite being frustrated and angry there is little that we can do about it. All Sheela could do was to find ways to calm herself down through some breathing exercises and meditation, reading some good book or listening to music and then start afresh.

#### Scenario 4

A positive, major life change can be a source of good stress. Regardless of how good the change is, it can be stressful. Stress caused by a positive and major life change can be beneficial because it causes a person to step out of their comfort zone and learn new skills. Here, Arpit may become a successful entrepreneur or learn new ways to do things differently.

Now let us see this scenario, can I have a volunteer to read out this case to the class.

# Do 🗸

• Ask one of the participant who can volunteer and read out this scenario to the class.

#### Scenario 5

Rakesh lives in Kathmandu with his wife and two beautiful daughters Sarah and Sanya. Nepal was hit by a massive earthquake and Rakesh's building collapsed during the earthquake. During evacuation, Rakesh realised that though his wife and Sarah were fine and suffered only minor bruises, Sanya was nowhere in the scene. Panic stricken, he started calling her name and searching her frantically. A little later, he heard a meek voice from beneath the debris. He quickly removed the rubble to find a huge bed. Rakesh was pretty sure that Sanya was trapped underneath. Though he was badly bruised, he gathered all his courage and with all his might, he lifted the several-ton bed to save Sanya's life. Everyone was relieved to see Sanya alive and also extremely surprised to see this father's ability to access superhuman strength.

- Ask the audience to applaud for the participant after the scenario is read completely.
- Discuss the scenario, ask de-brief questions:
  - What kind of stress was Rakesh undergoing in this case?
  - Was the stress avoidable or manageable under the given circumstances?
  - What was the result of the stress?

# Say 🔓

#### De-brief:

 Not all stress is harmful; good stress is actually energizing. This was a case of lifesaving stress, or hero stress, which is an important example of good stress. You may have heard stories in which a person performs an impossible feat of physical strength in order to save their life or the life of someone they love. This type of stress causing a surge of adrenaline is good for us. Summarize 퇻

- Close the discussion by summarizing the tips to manage stress as given in the Participant Handbook.
- Ask the participants what they have learnt from this exercise/ activity.
- Ask if they have any questions related to what they have talked about so far.

### - Notes for Facilitation 🛛 🗐

- Keep printed copies of the activities/ scenarios ready for the session.
- Put down the de-brief questions on a flip chart so that it can be displayed in the class during the activity.
- Encourage participation and make the discussions interative.

- Notes

## Unit 7.2: Digital Literacy: A Recap

## **Key Learning Outcomes**

At the end of this unit, participants will be able to:

- 1. Identify the basic parts of a computer
- 2. Identify the basic parts of a keyboard
- 3. Recall basic computer terminology
- 4. Recall the functions of basic computer keys
- 5. Discuss the main applications of MS Office
- 6. Discuss the benefits of Microsoft Outlook
- 7. Identify different types of e-commerce
- 8. List the benefits of e-commerce for retailers and customers
- 9. Discuss Digital India campaign will help boost e-commerce in India
- 10. Describe how you will sell a product or service on an e-commerce platform

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## 7.2.1: Computer and Internet Basics: Basic Parts of a Computer

### - Unit Objectives 🏼 🎯

At the end of this unit, participants will be able to:

- Identify the basic parts of a computer
- Identify the basic parts of a keyboard
- Recall basic computer terminology
- Recall the functions of basic computer keys

## Resources to be Used

- Participant Handbook
- Computer Systems with the required applications

## Say 🔓

- Let's take a quick recap of the basic computer parts.
- Discuss 'Basic Parts of Computer' and 'Basic Parts of a Keyboard' with the class as given in the Participant Handbook.

## Explain

• Explain all the parts of the computer and the keyboard by demonstrating on the real system.

## Ask as

- Do you know about internet?
- Have you ever used internet?
- Why do you think internet is useful?
- What was the last task you performed on internet?

# Say 🔓

- Let's look at some basic internet terms.
- Discuss 'Basic Internet Terms' with the participants as given in the Participant Handbook.

## Summarize 🔎

- · Ask the participants what they have learnt from this exercise/ activity.
- Ask if they have any questions related to what they have talked about so far.
- Close the discussion by summarizing the importance of computer and internet for entrepreneurs.

# Practical 🛞

- Conduct a practical session.
- Ask the participants to assemble in the computer lab.
- Give some hands on practice exercises.

### Do 🗸

- Group the participants for the activity depending on the batch size and the number of computer systems available in the lab.
- Explain the purpose and duration of the activity.
- Ensure the participants complete the practical exercises assigned.

## 7.2.2: MS Office and Email: About MS Office



At the end of this unit, participants will be able to:

- Discuss the main applications of MS Office
- Discuss the benefits of Microsoft Outlook

### -Resources to be Used

- Participant Handbook
- Computer Systems with MS Office

### -Ask 🔤

- What is the most frequent activity that you do on the computer?
- Do you know how to make presentations on the computer?

# Say 뎗

- Give a brief introduction of MS Office as given in the Participant Handbook.
- Discuss the most popular office products. Explain in brief their application, benefits and working.
- **Microsoft Word** is a word processing program that allows for the creation of documents. The program is equipped with templates for quick formatting. There are also features that allow you to add graphics, tables, etc.
- Microsoft Excel is a tool for accounting and managing large sets of data. It can also simplify analysing data. It is
  also used to create charts based from data, and perform complex calculations. A Cell is an individual data box
  which will have a corresponding Column and Row heading. This gives the cell a name, referred to as the Cell
  Reference. There can be multiple pages in each workbook. Each page, or sheet, is called a Worksheet. When
  you open a new Excel file, it automatically starts you with three worksheets, but you can add more.

## -Explain 🗟

• Explain the working and frequently used features of Office on a real system.

# -Ask

- What do you know about e-mails?
- Do you have an email id?
- How often do you check your e-mails?

### Say 🔓

- Communication is vital for every business. The fastest and the safest way to communicate these days are through emails. MS Outlook helps to manage your emails in a better way and also offers a host of other benefits.
- Discuss "Why Choose Microsoft Outlook?" with the participants as given in the Participant Handbook.

# -Do 🗸

- Ask the participants to assemble in the computer lab.
- Explain the working of Outlook on a real system..

## Demonstrate 🖡

- Demonstrate how to create email id.
- Demonstrate how to write new mails, send mails.
- Demonstrate how to use MS Office application to create a letter and send it as attachment in an email.
- Demonstrate how to use other MS Office applications.

### -Practical 🞇

- Give some hands on practice exercises
- Group the participants for the activity depending on the batch size and the number of computer systems available in the lab.
- Explain the purpose and duration of the activity.

## Summarize

- Ask the participants what they have learnt from this exercise/ activity.
- Ask if they have any questions related to what they have talked about so far.

### 7.2.3: E-Commerce



At the end of this unit, participants will be able to:

- Identify different types of e-commerce
- List the benefits of e-commerce for retailers and customers
- Discuss Digital India campaign will help boost e-commerce in India
- Describe how you will sell a product or service on an e-commerce platform

### Resources to be Used 💣

- Computer System with internet connection
- Participant Handbook

## -Ask

- How many of you have done shopping online?
- Can you name at least five shopping websites?
- What is the product that you most frequently buy online?
- Why do you do shopping online instead of going to the market?

## Say 뎗

- Give a brief introduction of "What is E-commerce". Refer to the Participant Handbook.
- E- commerce emerged in the early 1990s, and its use has increased at a rapid rate. Today, many companies sell their products online. Everything from food, clothes, entertainment, furnitureand many other items can be purchased online.

## -Ask as

• What other types of transactions have you performed on the internet other than buying products?

### -Say 🔓

• Give examples of e-commerce activities from Participant Handbook.

# -Team Activity 뵭

#### **E-commerce examples**

- Instruct the participants to list some of the payment gateways that they have used for e-commerce activities.
- Give them 5 minutes to make this list.
- Discuss payment gateways and transaction through payment gateways.
- Conclude the discussion by mentioning how important e-commerce has become in our day to day transactions.

# -Say 痛

- E-commerce activities can be classified based on the types of participants in the transaction.
- Discuss "Types of E-commerce" from the Participant Handbook.

#### -Do |~

- Discuss all types of E-commerce by giving examples and names of some popular websites which use them.
- Make the discussion interactive by asking the class to share some popular e-commerce sites of each type.

### -Say โ

- E-commerce activities bring a host of benefits for both, retailers and customers.
- Discuss benefits of E-commerce from the Participant Handbook.

## -Explain 🖓

- The majority of the population that uses E-commerce activities lives in tier-1 and tier-2 cities. To encourage the use of digital money in tier-3 and 4 areas, PM Mr. Modi launched the "Digital India Campaign".
- Discuss "Digital India Campaign" from the Participant Handbook.
- By Digital India project the government will deliver services via mobile connectivity and in doing so, is expected to bring the internet and broadband to remote corners of the country. This connectivity will in turn enhance e-commerce activities also. Furthermore, the Indian Government is also modernizing India Post and aims to develop it as a distribution channel for e-commerce related services.

# Say 뎗

- Now let us discuss how to sell a product using E-commerce.
- Every product has to be sold on a platform on the internet. Think of it as a shop that you have to sell your product. Now this shop can be your own or shared or rented. If the shop is your own or rented there will be only your products in that shop. If the shop is shared, there will be products of multiple sellers in that shop. A common example is a departmental store which has products from multiple brands in the shop.
- Similarly, in E-commerce the shop is the website where your products are displayed. If it is your own website it will exclusively showcase your products. In this case the cost that you will incur will be:
  - Developing the website
  - Hosting the website
  - Maintenance of the website
- If you rent a website it will also showcase your own products but the development, hosting and maintenance parts goes to the owner. This saves time and the cost to manage these activities.
- Smaller companies usually go for renting a website and the bigger ones develop their own website.
- The concept of shared platforms has become very popular in recent times. In this platform the sellers have to register and then they can sell their goods on a common platform. Among the most popular of these are Amazon, Myntra, Flipkart, etc.

# -Role Play 🥰

- Tell the participants to choose a product or service that they want to sell online.
- Tell them to write a brief note explaining how they will use existing e-commerce platforms, or create a new e-commerce platform to sell their product or service.



- How much money are you carrying in your wallet?
- Do you have a credit/debit card?
- · How do you make payments while doing online shopping?

## Say 뎙

- Demonetization has made carrying cash in the wallet very difficult. People either shop through cards or some other form of digital money.
- So what do you think is digital money?
- In this form the money is both paid and received digitally. There is no hard cash involved. It is an instant and convenient way to make payments.
- There are various types of digital payments. Let us discuss some of them in brief here.
- The first one is the most commonly used system i.e. the cards. Debit card, credit card, prepaid card, all fall under this category.
- Then is the e-wallet or the mobile wallet. This has become the most used form of digital money after demonetization. Examples are Paytm, state bank buddy, Freecharge, etc.
- Many other forms of digital money are also coming up in market like mobile apps, Aadhar card based payment, etc.

### -Do 🗸

• Demonstrate how to make and receive payments through digital models like Paytm and state bank buddy.

-Ask

 Why do you think people have started using digital money instead of hard cash? Is demonetization the only reason?

### -Say | ົ

- Digital money gives a lot of advantages over the conventional hard cash. Some of them are:
  - Digital payments are easy and convenient. You do not need to take loads of cash with you, a mobile phone or a card will suffice.
  - With digital payment modes, you can pay from anywhere anytime.
  - Digital payments have less risk.

## -Summarize 🔎

- Ask the participants what they have learnt from this exercise/ activity.
- Ask if they have any questions related to what they have talked about so far.
- Close the discussion by summarizing the importance of e-commerce and digital money.

### Unit 7.3: Money Matters

## Key Learning Outcomes

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At the end of this unit, participants will be able to:

- 1. Discuss the importance of saving money
- 2. Discuss the benefits of saving money
- 3. Discuss the main types of bank accounts
- 4. Describe the process of opening a bank account
- 5. Differentiate between fixed and variable costs
- 6. Describe the main types of investment options
- 7. Describe the different types of insurance products
- 8. Describe the different types of taxes
- 9. Discuss the uses of online banking
- 10. Discuss the main types of electronic funds transfer

### 7.3.1: Personal Finance – Why to Save?

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At the end of this unit, participants will be able to:

- Discuss the importance of saving money
- Discuss the benefits of saving money

## -Resources to be Used

Participant Handbook

#### -Ask ask

- How many of you save money?
- Why do you feel the need to save it?
- Do you plan your savings?
- Where do you keep the money you save?
- How do you use the money that you have saved?

## -Example

Let's look at these two examples:

#### Example 1:

Suhani works in a good company and earns Rs.30, 000 month. She always saves 5000 per month and keeps it aside as a personal saving. She keeps the money at home and has saved quite a lot. One day her mother has a medical emergency and has to be taken to the hospital. Her family is worried about the amount they have to spend for the treatment. It will cost them atleast 40,000.

Suhani says tells her family not to worry and that she has about 50,000, which she has saved over the months.

#### Example 2:

Jasmeet works in the same company and earns the same as Suhani. She is very fond of shopping and spends most of her money on buying new clothes. At the end of the month, she is always asking her father for money as her pay is finished.

## Ask as

- Who do you identify with –Suhani or Jasmeet ?
- How do you think Suhani manages to save money which Jasmeet is unable to do?

#### Say 🔓

- We should always set aside some and save some money from our monthly pay. The future is unpredictable. Saving money not only gives you a sense of financial security but it can be used in case of emergencies.
- Discuss "Importance of Saving" with the participants as given in the Participant Handbook.

### -Ask

- What are the benefits of saving money?
- What does being financially independent mean to you?



- Discuss "Benefits of Saving" with the participants as given in the Participant Handbook.
- Now let us continue with Suhani's story. Suhani has told her family not to worry and that she has about 50,000, which she has saved over the months. The family is happy about Suhani's decision of saving money, which will be of great help for them now.

Suhani is going to the hospital today to pay the first instalment for the treatment. Suddenly finds only 35,000 in her cash box when she counts and does not remember using it. She has not kept any record and now she is upset.

# -Ask ask

- Was it a good decision by Suhani to save a part of her earnings every month?
- Was it a wise decision to keep all her savings as cash in a cash box?
- Could she have managed to save money in a better and more effective manner?
- Do you want to learn how to save money and use it effectively?

## Say 뎙

• Let's learn personal saving with the help of a group activity.

# -Team Activity 🙀

#### Personal Finance-Why to save

• This activity has two parts:

#### PART 1

#### WAYS TO SAVE MONEY

- You are earning 30,000/- per month. You have recently changed your job and have to move to a metropolitan city. You are now living as a paying guest paying 10,000/- per month. Your other estimated expenditures like travel, food, recreation would be around Rs. 17,000 per month.
- Make a list of different ways to save money.

#### PART 2

#### HOW WILL YOU USE THE MONEY

- After a year how much have you been able to save?
- How will you use the money that you have saved?

### Do 🗸

- Divide the class into groups of four.
- Instruct the participants to think and prepare a list of the various ways they can save money.
- Give the participants 10 minutes to prepare the list.
- Once done, instruct them to think of how they could use the money they have saved.
- Give the participants 10 minutes to prepare the list.
- Keep a check on time. Tell the group to wind up quickly if they go beyond the given time limit.

#### **Activity De-brief**

- What were the different ways you could save money?
- How much money were you able to save?
- How will you use the money you have saved in one year?



• Discuss the importance of personal finance and why it is important to save money.

### Summarize 🔎

#### You can summarize the session by discussing:

- The importance of saving money.
- Ways to save money.
- How the money saved can be used for different purposes.

### 7.3.2: Types of Bank Accounts, Opening a Bank Account



At the end of this unit, participants will be able to:

- Discuss the main types of bank accounts
- Describe the process of opening a bank account

### -Resources to be Used

- Account opening sample forms
- Participant Handbook

### -Ask ask

- How many of you save money?
- Where do you keep the money you save?
- How many of you have a bank account?
- What type of account do you have?

## -Example

• Let's look at the given example:

Reena is in the third year of college but in the evening she gives tuitions for children living in her colony. She earns 15,000/- per month. As her students stay in different parts of the city, she has to walk a lot.

To save time, she decides to buy a second hand scooter for herself. But she has to save money for it. Her class mate advises her to open a recurring deposit account in the bank.

She goes to the bank close to her home. The personal manager gives her some forms to fill. She is confused as she has never done this before. Her elder sister has an account in the same bank. She asks for help from her sister. She goes to the bank the next day with her sister. The personal banker gives her a list of documents that she will need to submit with the form for opening an account. The banker advises her to open a 6 months recurring deposit.

# -Ask

- Do you try to save money monthly but have to spend it on unforeseen expenditure?
- Have you ever thought of depositing your savings in a bank?

### Say 🔓

- Before opening a bank account, you need to know the types of accounts we have in India.
- Discuss "Types of Bank Accounts" with the participants as given in the Participant Handbook.

### -Ask

Can someone say what are the different types of bank accounts?



• Let's learn about the different types of bank accounts through an activity.

## -Team Activity 🛃

- Divide the class in four groups.
- Label the groups as savings account, current account, recurring account and fixed deposit.
- On a chart paper, ask them to write the key points of their account.

#### **Activity De-brief**

• Ask each group to present the key points of their account.

### -Say | ໂ

- Now that you know about the four different types of accounts, let's learn how to open a bank account.
- Discuss "Opening a Bank Account" with the participants as given in the Participant Handbook.
- Discuss "Tips" that the participants should keep in mind while opening a bank account as given in the Participant Handbook.

## -Ask ask

- What are the main documents required for opening a bank account?
- What are some important points to ask the bank personnel while opening an account?

## Say 🔓

- Mention officially valid KYC documents (refer to the Participant Handbook)
- Now, let's understand the procedure of opening a bank account through an activity.

## -Team Activity 🙀

#### **Opening a Bank Account**

- This activity is done in groups.
- Divide the class in groups of four or six.

#### PART 1

#### FILLING A BANK ACCOUNT OPENING FORM

- You have to fill a bank opening form.
- You can refer to the section "Opening a Bank Account" of your Handbook for reference.
- List all the steps that you will be required to fill in the form.
- List the documents that you needs for filling the form.
- Now fill in the form.

#### **Activity De-brief**

#### How did you design the form?

- What all details did you fill in the form?
- What were your KYC documents?
- How would this activity help you in future?

## -Do 🗸

- Instruct the participants to read the section "Opening a Bank Account' of the Participant Handbook.
- Give each group one sample account opening form.
- Give the participants 5 minutes to read the form.
- Give them 15 minutes to fill it.
- Assist them by explaining each category and how to fill it.
- Keep a check on time.
- Tell the group to wind up quickly if they go beyond the given time limit.

# -Summarize 🔎

#### Note:

- You can summarize the unit through a role play.
  - A person wanting to open an account in the bank.
  - What is the procedure that he will go through?
  - Discuss the key points of different types of bank accounts.
  - How to select the type of account
  - How to fill the account opening form.
- A sample account opening form is given in the following page for reference. Use it for the activity in the class.

#### Sample Bank Account Opening form.

Photograph		XXX Bank
	SAVING BANK ACCOUNT OPE	NING FORM
Account No.:		Date:
Name of the Branch		
Village/Town		
Sub District / Block Name		
District		
State		
SSA Code / Ward No.		
Village Code / Town Code	Name of Vi	illage / Town
<b>Applicant Details:</b>		
Full Name Mr./Mrs./Ms.	First Middle	Last Name
Marital Status		
Name of Spouse/Father		
Name of Mother		
Address		
Pin Code		
Tel No. Mobile		Date of Birth
Aadhaar No.		Pan No.
MNREGA Job Card No.		
Occupation/Profession		
Annual Income		
No. of Dependents		

	Owning Hous Y/N	e :	Y/N	Owning Farm :
	No. of Animal	s :		Any other :
Existing Bank A/c. of family members /	Y	/ N	lfy	yes, No. of A/cs
nousehold				
Kisan Credit Card	Whether Eligi		Y/N	
request you to is				after satisfactory operation of my
account after 6 m needs subject to	onths of open the condition aft facility. I sh	ing my that only	account for y one mem	meeting my emergency/ family ber from the household will be ms and conditions stipulated by
				be in force from time to time. It facility from any other bank.
Place: Date:				Signature / LTI of Applicant
Date: Nomination:	Vice of Renzer and other			Signature / LTI of Applicant
Date: Nomination: I want to nomin		A.c.	Data of	
Date: Nomination:	ate as under Relationship	Age	Date of Birth in case of minor	Signature / LTI of Applicant Person authorised in case to receive the amount of deposit on behalf of the nominee in the event of my /minor(s) death.

## 7.3.3: Costs: Fixed vs. Variables: What are Fixed and Variable Costs?

#### - Unit Objectives 🏻 🎯

At the end of this unit, participants will be able to:

• Differentiate between fixed and variable costs

### -Resources to be Used 🧬

- Participant Handbook
- Blank sheets of paper
- Pens

## -Ask ask

- What is cost?
- Will a telephone bill fall under the category of a fixed or variable cost?

### Say 뎗

• Discuss: Fixed and Variable cost with examples.Let us do a small activity.

## -Team Activity 🛃

#### Identify the type of cost

- 1. Rent
- 2. Telephone bill
- 3. Electricity bill
- 4. Machinery
- 5. Insurance
- 6. Office supplies/ Raw materials
- 7. Employee salaries
- 8. Commision percentage given to sales person for every unit sold
- 9. Credit card fees
- 10. Vendor bills

#### ·Do |~

- Divide the class into two groups. Read out the list of costs given in the activity.
- Read out each item from the cost list and ask the groups in turns to identify whether it is a fixed or variable cost.

-Summarize 🤶

• Note: You can summarize the unit either by having a role play between a consultant and a budding entrepreneur explaining the differences between fixed and variable costs or by discussing the key points of the unit.

# ┌ Notes for Facilitation 🛛 🗐

• ,	Answers for the activity - Identify the type of cost	
1.	Rent	(Fixed)
2.	Telephone bill	(Fixed)
3.	Electricity bill	(Fixed)
4.	Machinery	(Fixed)
5.	Insurance	(Fixed)
6.	Office supplies/ Raw materials	(Variable)
7.	Employee salaries	(Fixed)
8.	$Commission\ percentage\ given\ to\ sales\ person\ for\ every\ unit\ sold$	(Variable)
9.	Credit card fees	(Variable)
10.	Vendor bills	(Variable)

#### 7.3.4: Investments, Insurance and Taxes



At the end of this unit, participants will be able to:

- Describe the main types of investment options
- Describe the different types of insurance products
- Describe the different types of taxes

#### -Resources to be Used

• Participant Handbook

### -Ask ask

- Ask the participants- "What do you see first thing in when you get your mobile bill? Apart from the amount and due date do you have a look at the taxes you are being billed for?
- Why do you think people get their cars insured or have a medical insurance?
- You have saved money and want to invest it, how would you decide what is the best investment for your money?

## -Example

Let's have a look at a few scenarios.

Ranbir has sold his house and deposited the money in his bank. His Chartered Accountant tells him that he will have to re-invest the money otherwise he will have to pay capital tax. What is capital tax and how is it different from income tax?

Jasmeet and Anup are blessed with a baby girl. They decide to have an insurance policy that will mature when their daughter is ready to higher education.

Shivani is working in a corporate office and getting good pay. She will have to pay income tax so she decides to invest her money in tax saving schemes. She goes to the bank manager to discuss the best products in which she can invest.

# -Say 🔓

• Discuss the Investment, Insurance and Taxes as given in the Participant Handbook.



• How do investments, insurances and taxes differ from each other?

#### Say 🔓

Let's learn the differences between the three by having an activity.

### -Say | ଜି

• We will have a quiz today.

# -Team Activity 🙀

• The activity is a quiz.

#### Do 🗸

- Divide the class into groups of three and give a name to each group
- Explain the rules of the quiz. For each correct answer the group gets 1 mark. If the group is unable to answer the question is rolled over to the next group.
- Explain the purpose and duration of the activity.
- On the blackboard write the names of the groups.
- Ask the questions of the quiz.
- Keep a score for the groups.
- Set guidelines pertaining to discipline and expected tasks.

### Summarize 🔎

• Summarize the unit by discussing the key points and answering question

## Notes for Facilitation

#### Questions for the quiz

1. What are bonds?

Bonds are instruments used by public and private companies to raise large sums of money.

2. Who issues the bonds?

Private and public companies issue the bonds.

3. Why are bonds issued?

To raise large amount of money as it cannot be burrowed from the bank.

4. Who is the buyer of stocks and equities?

The general public is the buyer.

5. What types of scheme is the Sukanya Samriddhi Scheme?

Small Saving Scheme

6. What is the difference between mutual and hedge funds?

Mutual funds are professionally managed financial instruments that invest the money in different securities on behalf of investors. Hedge funds invest in both financial derivatives and/or publicly traded securities.

- 7. Why is a loan taken from the bank to purchase real estate? To lease or sell to make profit on appreciated property price.
- 8. Name the two types of insurances? Life Insurance and Non-life or general insurance
- 9. Which insurance product offers financial protection for 15-20 years? *Term Insurance*
- 10. What is the benefit of taking an endowment policy? It offers the dual benefit of investment and insurance.
- 11. Mr. Das gets monthly return on one of his insurance policies. Name the policy? Money Back Life Insurance

12. What are the two benefits of a Whole Life Insurance? It offers the dual benefit of investment and insurance 13. Which policy covers loss or damage of goods during transit? Marine Insurance 14. After what duration is the income tax levied? One financial year 15. What is long term capital gain tax? It is the tax payable for investments held for more than 36 months. 16. Name the tax that is added while buying shares? Securities Transaction Tax 17. What is the source of corporate tax? The revenue earned by a company. 18. Name the tax whose amount is decided by the state? VAT or Value Added Tax 19. You have bought a T.V. What tax will you pay? Sales Tax 20. What is the difference between custom duty and OCTROI?

Custom duty is the charges payable when importing or purchasing goods from another country. OCTROI is levied on goods that cross borders within India.

### 7.3.5: Online Banking, NEFT, RTGS, etc.

# -Unit Objectives 🎯

At the end of this unit, participants will be able to:

- Discuss the uses of online banking
- Discuss the main types of electronic funds transfer

### -Resources to be Used

- Participant Handbook
- Computer System with internet connection
- Debit card

## -Ask

- When was the last time you visited a bank?
- How do you pay your bill for electricity and telephone?
- Have you ever tried to transfer money from one bank account to another bank account using the online banking facility?

### -Say | ନ୍ଦ

- Most of us lead a busy life. Time has become more important than money. In this busy schedule no one has time to stand in bank queues. That's where Online Banking comes in. Online banking or internet banking means accessing your bank account and carrying out financial transactions through the internet.
- Discuss "What is online banking?" from the Participant Handbook.
- There are various advantages of online banking:
  - It saves time, as you need to visit the branch..
  - You can conduct your banking transactions safely and securely without leaving the comfort of your home.
  - Online Banking also gives you round the clock access.
  - Online Banking makes it possible for you to pay your bills electronically.

# Do 🗸

- Show them how they can use the internet banking.
- Use the computer system and show the demo videos on how to use internet banking provided on most banking sites. the computer system.
- Tell the class the various features of online banking:
  - Through their website set-up your online account.
  - Choose a secure username and password.
  - Set-up your contact information.
  - Once your information is verified, you are good to go.
  - Once you enter the portal explore all the features and learn your way through the portal.
- Discuss about maintaining the security of the online account.

# -Say 痛

- One of the biggest advantage that online banking offers, as discussed earlier, is transferring money from one account to another. This transaction is called electronic funds transfer. Electronic transfers are processed immediately with the transferred amount being deducted from one account and credited to the other in real time, thus saving time and effort involved in physically transferring a sum of money.
- Discuss "Electronic Funds Transfer" from the Participant Handbook.

# Do 🗸

- Discuss how to transfer money from one account to another using online banking (NEFT/ RTGS, etc.).
- Illustrate with an example.

## -Summarize 🔎

- Close the discussion by summarizing the about online banking.
- Ask the participants if they have any questions related to what they have talked about so far.

Notes 🗐 —	 	 	

**Facilitator Guide** 

# Unit 7.4: Preparing for Employment & Self Employment

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# Key Learning Outcomes

At the end of this unit, participants will be able to:

- 1. Discuss the steps to follow to prepare for an interview
- 2. Discuss the steps to create an effective Resume
- 3. Discuss the most frequently asked interview questions
- 4. Discuss how to answer the most frequently asked interview questions
- 5. Identify basic workplace terminology

### 7.4.1: Interview Preparation: How to Prepare for an Interview?

### -Unit Objectives 🏻 🎯

At the end of this unit, participants will be able to:

• Discuss the steps to follow to prepare for an interview

### Resources to be Used

• Participant Handbook

### -Ask 🤅

- Have you ever attended an interview?
- How did you prepare before going for an interview?

# -Say 뎙

- An interview is a conversation between two or more people (the interviewer(s) and interviewee) where questions are asked by the interviewer to obtain information from the interviewee.
- It provides the employer with an opportunity to gather sufficient information about a candidate and help them select the ideal candidate.
- It also provides the interviewee with an opportunity to present their true potential to the employer, build confidence and help make a decision about the job by asking questions regarding designation, salary, perks, benefits, promotions, transfers, etc.
- Let's do an activity to understand how to prepare for interviews better.

# -Activity 1 🎉

• Introducing Yourself

### -Do 📐

- Select a participant and ask him/her to answer the following questions: "What can you tell me about yourself."
- Give the participant at least one minute to speak.
- Once he/she is done, ask the rest of the participant what they gathered about the participant who was
  providing information.
- Now repeat the exercise with five other participants.

## -Ask

- What information you should include when you are describing or introducing yourself in an interview?
- What information you should not include when you are describing or introducing yourself in an interview?

- Say 뎗
- Tell the participants that when an interviewer asks you to say something about yourself, he/she is not asking you to present your life history.
- Introduction should be short and crisp, and should present you in a positive light. It should include the following points:
  - Any work experience that you might have
  - A brief summary of your educational qualifications
  - Your strengths and achievements
  - Any special projects that you might have been part of
- The following topics should be avoided during an introduction:
  - Detailed description of your family (unless you are specifically asked to do so)
  - Too much information about your weaknesses
  - Information that is not true

### Do 🗸

- Congratulate each participant for sharing their points.
- Ask the audience to applaud for them.
- Ask de-brief questions to cull out the information from each group.
- Keep a check on time.

# -Activity 2 👮

Planning the right attire

# -Do 🗸

• Describe 2 individuals to the participants. One is wearing a casual t-shirt, jeans, and slippers. He has not combed his hair and neither has he trimmed or shaved his beard. The other individual is dressed formally with a shirt and pant, and is well-groomed. He has also worn formal shoes and a belt. Ask the participants which person would they prefer to hire in their organization and why?

## -Summarize 🔎

- Close the discussion by discussing 'how to prepare for an interview' as discussed in the Participant Handbook.
- You can add the following points to it:
  - Tell the participants to create a positive and good impression in an interview. It is important for them to prepare for an interview beforehand.
  - The interviewer analyses not only your technical knowledge in relation to the job, but also whether or not you are a fit for the organization.
  - Every employer looks at the whole package and not just one or two things in isolation. Therefore, the way you dress and the way you present yourself is also important along with your skills and talents.
  - The participants will get only one chance to create a good first impression.

### 7.4.2: Preparing an Effective Resume: How to Create an Effective Re

## -Unit Objectives 🤘

At the end of this unit, participants will be able to:

• Discuss the steps to create an effective Resume

### Resources to be Used

- Participant Handbook
- Blank papers
- Pens

## -Ask ask

- When preparing for an interview, what are the most important things that you need to do?
- What documents do you carry with you, when you go for an interview?
- What is a resume?
- Why do you need a resume?

## Say 🔓

- Resume is not just a sheet of paper with your qualifications printed on it.
- It is a selling tool that will help the employer to see how and what you can contribute for company.
- Talk about the steps involved in creating an effective/attractive resumes discussed in the Participant Handbook.
- Now let's prepare a resume to understand the process in a better way.

### Do 🗸

- This is an individual activity.
- Give the details of the activity.
- Instruct them to read the activity carefully.
- The participant is expected to make an attractive resume based on the information provided.
- Give the class 25-30 minutes to study the case and create a resume.
- At the end of 30 minutes, the participants should exchange the resume with the person sitting next to him or her.
- Every participant will evaluate the resume prepared with their fellow participants.

## Say 🔓

- Do you think the candidate should apply for the job posting described in the advertisement?
- We have already discussed the steps involved in creating an effective/attractive resumes.
- Now let's prepare a resume for the candidate details given in the activity.



#### **Case Study Analysis**

- In the first section of the activity, you are being given the information about a candidate who is applying for a particular job.
- In the second section, you are being given the detailed description of the job posting. Create a resume for the candidate to apply for the job posting.
- Use the information that has been provided about the candidate to create this resume.

#### **Candidate Details**

Nipesh Singla was born on 20th April, 1988 in Chandigarh, India. He currently resides at 1XX7, Sector XX D, Chandigarh –160018. His mobile number is 988XXXX01, and e-mail address is nxxxxxxxla@gmail.com. Nipesh attended middle and senior school at Government Boys Senior Secondary School, Sector 15, Chandigarh. He has been a very talented boy since school. He was fond of painting and watching old Hindi movies. As part of a school charity program, he volunteered at the children's hospital during his senior years.

In July 2007, he joined Westwood School of Hotel Management, Zirakpur to pursue a diploma course in Hotel Management and Catering. After completing this course, he joined XYZ Group of Hotels as a Housekeeping intern in June 2010 for six months. In this role, he was responsible for cleanliness and maintenance of one floor in the hotel. Taking advantage of his strong interpersonal skills, he also got opportunities to make housekeeping arrangements for corporate meetings. While pursuing education, he gained working knowledge of Microsoft Word, Excel, Access and PowerPoint.

Nipesh is detail-oriented, flexible and adaptable. He has successfully worked with a diverse work force. He gelled well with his peers, both in college and during his internship. After completing the internship, his objective has been to find a job opportunity where he can use his skills and experience. Backed by experience, he is confident about his skills as housekeeping assistant.

#### **Job Posting**

#### \* Do you see yourself as a HOUSEKEEPING SUPERVISOR?

What's your passion? Whether you're into cricket, reading or hiking, at IHG we are interested in YOU. At IHG, we employ people who apply the same amount of care and passion to their jobs as they do in their hobbies - people who put our guests at the heart of everything they do. And we're looking for more people like this to join our friendly and professional team.

#### THE LOCATION:

At the moment, we are looking for HOUSEKEEPING SUPERVISOR to join our youthful and dynamic team at Holiday Inn Amritsar, Ranjit Avenue in Amritsar, Punjab (India). Holiday Inn Amritsar is ideally located in Amritsar's commercial district on Ranjit Avenue with the world famous Golden Temple located only a short distance away. Sparkling chandeliers mark an incomparable arrival experience as you escape to the welcoming environment that is, Holiday Inn Amritsar. The fresh international brand to celebrate and explore Amritsar.

Salary: Negotiable

Industry: Travel / Hotels / Restaurants / Airlines / Railways

Functional Area: Hotels, Restaurants

Role Category: Housekeeping

Role: Housekeeping Executive/Assistant.

**Desired Candidate Profile** 

Friendly, pleasant personality, Service - oriented.

You should ideally be Graduate/ Diploma holder in HM and at least 2 years of experience as a supervisor in good brand with good communication skills, English is a must.

In return we'll give you a competitive financial and benefits package. Hotel discounts worldwide are available as well as access to wide variety of discount schemes and the chance to work with a great team of people. Most importantly, we'll give you the room to be yourself.

\*Please get in touch and tell us how you could bring your individual skills to IHG.

Education-

UG: Any Graduate/ Diploma holder

PG: Post Graduation Not Required

## Say 🔓

• Now, let's share the resume with the fellow participant sitting next to you and evaluate each other's effort.

#### Do 🔍

- Congratulate each participant for making their first attempt towards creating an effective resume.
- As a follow up activity, you can suggest them to prepare their own resume and show it to you the next day.

### Summarize 🔎

- Close the discussion by showing some effective resume samples to the candidates.
- Ask the participants what they have learnt from this activity.
- Ask if they have any questions related to what they have talked about so far.

### Notes for Facilitation

- Keep printed copies of the activity ready for the session.
- Put down the suggested format of the resume on the board while explaining the steps in preparing a resume.
- Do check the participants' resume and suggest necessary changes.
- Suggested example for the case presented:

#### Nipesh Singla

#1XX7, Sector XX-D

Chandigarh-160018

Mobile No: 91-988XXXXX01

E-mail: nxxxxxxxla@gmail.com

**Objective:** Seeking an opportunity to use my interpersonal skills and experience to contribute to your company's growth, profitability and objectives.

#### **Professional strengths:**

- Proficient in housekeeping
- Experienced in and capable of working with a diverse work force
- Team player and friendly in nature
- Successful working in a multi-cultural environment

- Detail oriented, flexible, and adaptable
- Knowledge of Microsoft Word, Excel, Access and PowerPoint

#### Educational background:

- Diploma in Hotel Management and Catering, Westwood School of Hotel Management, Zirakpur
- High School, Government Boys Senior Secondary School, Sector 15, Chandigarh

#### **Professional internships:**

- Housekeeping Intern, XYZ Group of Hotels, New Delhi (June 2010 August 2010)
  - \* Responsible for cleanliness and maintenance of one floor in the hotel.
  - Got opportunities to make housekeeping arrangements for corporate meetings.

#### Volunteer Work:

• Student volunteer at children's hospital in Chandigarh.

#### Nipesh Singla

#### 7.4.3: Interview FAQs



At the end of this unit, participants will be able to:

- · Discuss the most frequently asked interview questions
- Discuss how to answer the most frequently asked interview questions

## -Resources to be Used 🧬

Participant Handbook

## Say 🔓

- Tell the participants you will provide them with interview situation and questions and they have to try to answer them.
- Tell them you will also explain the different ways to approach these questions.

# Do 🗸

- Divide the class in pairs and ask the participants to perform a role play.
- One partner will play the role of the interviewer while the other will play the role of the interviewee.
- Tell them the interviewer can start the interview by asking the interviewee to introduce himself/herself.
- Call all the pairs one by one in front of the class to enact the role play.
- Follow the same pattern for all other situations.
- Time allotted for each situation is 8-10 minutes.
- Congratulate each participant for giving their input.
- Ask the class to applaud each time a team has completed their role play.
- Keep a check on time.

## -Role Play 😴

Conduct a role play for the situation given.

#### Situation 1

- The interviewer will start by asking the interviewee a few generic questions such as:
  - What is your name?
  - Tell me something about yourself?
  - Can you tell me something about your family?
- Then, the interviewer will bluntly ask the following questions:
  - How do you explain this huge time gap in your resume?
  - What is the reason for this?
  - Weren't you looking for a job or is it that no one selected you?

# -Say 痛 -

#### **De-brief:**

- When you put information on your resume, you should be prepared to answer any questions about it.
- Be present and focused on the questions being asked to you.
- One way of tackling the blunt questions is to tell the interviewer you did not come across an opportunity where you were sufficiently satisfied with both the remuneration offered as well as the profile. Therefore, you waited for the right opportunity to come along while looking for an ideal job.

# -Role Play 😈

Conduct a role play for the situation given.

#### Role Play – Situation 2

- The interviewer will start by asking the interviewee a few generic questions such as:
  - What is your name?
  - Tell me something about yourself?
  - Can you tell me something about your family?
- Then, at the end of the interview, ask the interviewee:
  - There are over 200 people who have applied for this job, some with excellent work experience. Why should I hire you?

## Say 뎗

#### De-brief:

- There is nothing wrong with stating your strengths and achievements. However, do not come across as arrogant or too boastful.
- You need show the interviewee that you have unique skills or talents to contribute to the company. The interviewer needs to know how you stand apart from the rest of the crowd.
- Tell the interviewer you are looking forward to working with the company and that you are a hard-working individual.

## -Role Play 😼

Conduct a role play for the situation given.

#### Role Play – Situation 3

- The interviewer will start by asking the interviewee a few generic questions such as:
  - What is your name?
  - Tell me something about yourself?
  - Can you tell me something about your family?
- Then, lean forward, clasp your hands on the table and in a soft voice ask the interviewee:
  - Did you ever experience any neglect or disregard from your previous office? In other words, did you ever suffer because your office or team displayed favouritism?

### Say 🔓

#### De-brief:

- Keep this in mind: Do not criticize anyone during an interview.
- You are free to express your opinion, however, your language, answers, body language, and the tone of your voice should remain constructive and neutral.
- Since criticism will show you in negative light, you should keep your answers honest yet diplomatic.
- You can tackle such questions by saying, "I got along well with most of my faculty and peers."

## -Role Play 😴

Conduct a role play for the situation given.

#### Role Play – Situation 4

- The interviewer will start by asking the interviewee a few generic questions such as:
  - What is your name?
  - Tell me something about yourself?
  - Can you tell me something about your family?
- Then very bluntly ask the interviewee:
  - How long do you plan to stay with this company if you are selected?
- After the candidate responds, ask sarcastically:
  - Do you seriously mean that?

### Say 🔓

#### De-brief:

- Don't provide unreal and idealistic answers.
- Your answers should be honest yet diplomatic. In a situation like this, the interviewer does not expect you to provide a specific timeline.
- You can say something like, "I would like to stay with the company as long as I can contribute constructively and develop as an employee, within the organization, professionally and financially."

## -Role Play 🔽

Conduct a role play for the situation given.

#### Role Play – Situation 5

- The interviewer will start by asking the interviewee a few generic questions such as:
  - What is your name?
  - Tell me something about yourself?
  - Can you tell me something about your family?
- Ask him/her how important he/she thinks it is to be punctual in the corporate world.
- After he/she answers, look up sternly at the interviewee and in a crisp voice, say:
  - You were late for this interview by 10 minutes. That surely does not seem to be in line with what you just said?

## Say 뎙

#### De-brief:

- Politely apologize for being late.
- You can add something such as, "I assure you this is not a habit". All your future actions should be in line with this statement.
- Avoid giving any excuses.
- You might feel obligated to provide a justification for your tardiness, but the interviewer is not interested in that.
- Do not over apologize. Once this response is out of the way, turn your focus back to the interview.

## Role Play 😴

Conduct a role play for the situation given.

#### Role Play – Situation 6

- The interviewer will start by asking the interviewee a few generic questions such as:
  - What is your name?
  - Tell me something about yourself?
  - Can you tell me something about your family?
  - After asking a few academic or job-related questions, ask the interviewee:
    - If you get this job, what salary package do you expect us to give you?

## -Say 🔓

#### **De-brief:**

• If there is no way for you to avoid this question, respond to the interviewer by providing a reasonable and well-thought out salary range.

## -Role Play 🔽

Conduct a role play for the situation given.

#### Role Play – Situation 7

- The interviewer will start by asking the interviewee a few generic questions such as:
  - What is your name?
  - Tell me something about yourself?
  - Can you tell me something about your family?
  - Then, bringing the interview to a close, ask the interviewee:
  - Do you have any questions for me?

#### Say 🔓

#### De-brief:

- Ask relevant questions.
- Don't bombard the interviewer with questions.
- If you have questions about the result of the interview, you can limit your questions to 1 or 2. Keep them short and relevant like:
  - When will I be informed about the results of the interview?
  - What are the working hours?
  - Will the job require me to travel?

## -Explain

- Tell the participants to be prepared for answering different types of questions in an interview.
- Stay calm and focused, and take a moment to think about how you should respond. Always maintain a confident tone.
- Even if you don't intend to, your body language conveys your level of discomfort with a particular question. Try to keep your actions, tone, and gestures neutral.
- Maintain your composure while answering personal question.

# -Do 🗸

- Tell all the participants to form pairs again.
- Tell them to use the following list of frequently asked interview questions to conduct mock interviews.
- They will use all or some of these questions to conduct mock interviews with their partners.
- One partner will play the role of the interviewer while the other will play the role of the interviewee.
- After they are through asking and answering the questions, the roles will be reversed.
- The same list of questions will be used again.
- After each mock interview ask the interviewer to provide feedback and clear any doubts that may arise.
- Time allotted for each situation is 30-35 minutes.

## -Activity 🅬

#### **Mock Interview Questions**

Mock Interview Questions

Tell me something about your family.

What qualities would you look for in a Manager or a Supervisor?

Why did you apply for this job?

What do you know about this company?

How do you deal with criticism?

How do you plan to strike a good work-life balance?

Where do you see yourself five years from now?

Have you applied for jobs in other companies?

What kind of salary do you expect from this job?

Do you have any questions for me?

## -Summarize 🔎

- Close the discussion by discussing the questions in the both activities.
- Ask the participants what they have learned from this activity.
- Ask if they have any questions related to what they have talked about so far.

## 7.4.4: Work Readiness – Terms and Terminology

## -Unit Objectives 🛛 🎯

At the end of this unit, participants will be able to:

Identify basic workplace terminology

### -Resources to be Used 🔗

- Participant Handbook
- Chart papers
- Blank sheets of paper
- Pens

### -Ask

- What do you understand by workplace terminology?
- Are offer letter and contract of employment the same?

## Say 뎙

• Let's start this unit with an activity.

### -Team Activity 🛃

#### Workplace terminology

• This is a group activity conducted in three parts.

#### Part 1

Sheila received a call from the recruiter of MND Company. Before she is recruited by the company, think of the recruitment process she will have to go through. Start from the telephone call to signing her letter of acceptance. Write down all the words that come to your mind.

#### **Activity De-brief**

- · Have the participants read out the words they have written
- Encourage all the participants to participate in the activity

### -Do

- Divide the class into small groups of 4 or 6.
- Instruct the participants that they will be doing a brainstorming activity.
- Give them one chart paper each. Tell them to divide the chart in two parts.
- Instruct them that they have to use one half of the chart paper now. The other half will be used later.
- The participants have to write all the words that come to their mind related to the recruitment process.
- Give them 10 minutes to do the activity.
- Tell them that there are no right or wrong answers.
- Keep a track of the time.

## -Say 뎗

- You all know quite a few words related to the terms used in the office.
- Let us talk about some new terms that have been missed out.
- Discuss "Work Readiness Terms and Terminology" with the participants as given in the Participant Handbook.

## Ask ask

- Why is it important to know the workplace terms?
- How do they help?
- Can the words be categorised further?

## Say 뎗

• Let's now continue the activity.

### -Team Activity 🙀

#### **Terms and Terminology**

• This is again a group activity. The members of the group remain the same as in Activity 1.

#### Part 2

With the help of the new terms you have learned, make a flow chart of the hiring process of MND Company.

#### **Activity De-brief**

Ask the groups to share the flow charts and the new terms they added while preparing the flow chart.

## -Do 🗸

- Instruct the participants that they have to use the 2nd half of the same chart they had used before.
- Using the new terminology and the terms they had previously written on the chart, they have to make a flow chart of the hiring process of the MND Company.
- Give them 10 minutes for this activity.
- Keep a check on time. Tell the group to wind up quickly if they go beyond the given time limit.

### Say 🔓

• Let's go ahead with the activity.

## -Team Activity 🙀

#### **Terms and Terminology**

• The activity continues with the same group members.

Part 3

Sheila now works for the MND Company. She is not aware of the company culture and policies. She goes to the HR Department to get her doubts clarified. Can you think of the terms for which she wants clarity? Make a list of those words.

#### **Activity De-brief**

• Ask the groups to share their list of words. Some of the words are benefits, comp. time, deduction, employee training, holidays, lay-off, leave, maternity leave, mentor, notice, paternity leave, and time sheet.

### Do 🗸

- Instruct the participants to identify the key terms an employee of a company should know. They can use the same chart paper for this activity.
- Give them 5 minutes for this activity.
- Keep a check on time. Tell the group to wind up quickly if they go beyond the given time limit.



• Note: You can either summarize the key points of the unit or have a role play where an employee has just joined a company and the HR Manager explains the terms of employment.

### Unit 7.5: Understanding Entrepreneurship

### **Key Learning Outcomes**

At the end of this unit, participants will be able to:

- 1. Discuss the concept of entrepreneurship
- 2. Discuss the importance of entrepreneurship
- 3. Describe the characteristics of an entrepreneur
- 4. Describe the different types of enterprises
- 5. List the qualities of an effective leader
- 6. Discuss the benefits of effective leadership
- 7. List the traits of an effective team
- 8. Discuss the importance of listening effectively
- 9. Discuss how to listen effectively
- 10. Discuss the importance of speaking effectively
- 11. Discuss how to speak effectively
- 12. Discuss how to solve problems
- 13. List important problem solving traits
- 14. Discuss ways to assess problem solving skills
- 15. Discuss the importance of negotiation
- 16. Discuss how to negotiate
- 17. Discuss how to identify new business opportunities
- 18. Discuss how to identify business opportunities within your business
- 19. Explain the meaning of entrepreneur
- 20. Describe the different types of entrepreneurs
- 21. List the characteristics of entrepreneurs
- 22. Recall entrepreneur success stories
- 23. Discuss the entrepreneurial process
- 24. Describe the entrepreneurship ecosystem
- 25. Discuss the purpose of the Make in India campaign
- 26. Discuss key schemes to promote entrepreneurs
- 27. Discuss the relationship between entrepreneurship and risk appetite
- 28. Discuss the relationship between entrepreneurship and resilience
- 29. Describe the characteristics of a resilient entrepreneur
- 30. Discuss how to deal with failure

## 7.5.1: Concept Introduction (Characteristic of an Entrepreneur, types of firms/ types of enterprises)

### -Unit Objectives 🏼 🎯

At the end of this unit, participants will be able to:

- Discuss the concept of entrepreneurship
- Discuss the importance of entrepreneurship
- Discuss the characteristics of an entrepreneur
- Describe the different types of enterprises

### -Resources to be Used 🧬

• Participant Handbook

### Say 🔓

• Let's start this session with some interesting questions about Indian entrepreneurs.

# -Team Activity 🙀

#### **Quiz Questions**

- 1. Who is the founder of Reliance Industries? Dhirubhai Ambani
- 2. Who is the Chairman of Wipro Limited? Azim Premji
- 3. Who launched e-commerce website Flipkart? Sachin Bansal and Binny Bansal
- Who is the founder of Paytm?
   Vijay Shekhar Sharma
- 5. Who is CEO of OLA Cabs? Bhavish Aggarwal
- Who is the founder of Jugnoo?
   Samar Singla (autorickshaw aggregator)
- Who is the founder of OYO Rooms?
   Bhavish Aggarwal

### -Do 🗸

- Tell them that you will ask them few questions about a few entrepreneurs.
- Divide the class in to two groups.
- In turns ask the quiz questions to the groups.
- If the answer is incorrect pass the question to the other group.
- Share the answer if the groups are not able to answer.
- Congratulate the participants who answered correctly.

# -Ask ask

- What do you understand by entrepreneurs?
- What is the importance of entrepreneurship in today's scenario?
- What do you think are the characteristics of successful entrepreneurs?
- What are different types of enterprises that an entrepreneur in India can own and run?

## Say 뎗

- Talk about entrepreneurs, importance of entrepreneurship, characteristics of successful entrepreneurs, and different types of enterprises in India as discussed in the Participant Handbook.
- Tell the participants, stories of successful Indian entrepreneurs- their struggles, the moments of heartbreak, the perseverance and triumph.
- Ask them if they know of any such entrepreneur.

## Summarize 🔎

• Close the discussion by summarizing about the opportunities for entrepreneurs in India.

### -Notes for Facilitation

- Check out different Government schemes for small entrepreneurs. Share the information with the participants.
- You can tell them about the government websites like Start Up India, mudra.org.in etc.
- Discuss about various schemes and policies by the Government of India for entrepreneurs.

### 7.5.2: Leadership and Teamwork

## -Unit Objectives 🛛 🎯

At the end of this unit, participants will be able to:

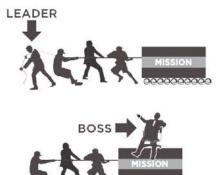
- · List the qualities of an effective leader
- Discuss the benefits of effective leadership
- List the traits of an effective team

#### -Resources to be Used

- Participant Handbook
- Blank sheets of paper
- Pens

#### -Do 📐

- Show the picture given below to the class.
- Ask them to quickly write on a piece of paper what comes to their mind after seeing the picture.
- Now ask them, "What do you understand from this picture?"
- Encourage participants to share their thoughts.



### -Say 뎙

- This picture depicts the qualities of a leader and the difference between a leader and a boss.
- A boss focuses on structure and inspires fear whereas a leader follows vision and generates enthusiasm.
- A boss blames employees for the breakdown whereas a leader fixes breakdowns.
- A boss depends on authority whereas a leader depends on goodwill.
- A boss says "I" and a leader says "We."
- A boss drives employees whereas a leader coaches them.
- A boss takes credit whereas a leader gives credit.

## -Say 🔓

• Talk about leadership and leadership qualities for an entrepreneur as discussed in the Participant Handbook.

### -Ask

• Why is it important for a leader to be effective? How does it help the organization?

## -Say 뎗

- Let us discuss benefits of effective leadership as discussed in the Participant Handbook.
- "Out-of-the-box thinking" is one of the new leadership styles. It means thinking differently and from a new perspective.

### -Ask

• Do you consider yourself a team player?

## -Team Activity 🍃

#### Long Chain

• This is a group activity.

### -Do 📐

- Divide the class into 2 teams.
- Ask each team to create a chain using materials they have in class such as shoe laces, belts, paper, handkerchief, ribbons, etc.
- The team that creates the longest chain wins the game.
- Observe if the participants are interacting with their team or working in isolation.
- Share your observations with the class.

### Say Say

#### De-brief:

- What did the winning team do differently?
- Who was responsible for the winning team's success?
- How does this activity explain the role of teamwork in entrepreneurial success?

### Say 🔓

- Tell the class that both the teams performed well.
- Discuss that the objective of this activity was to open communication channels and how this has been achieved.
- The participants should aim to keep the communication channels open when interacting with their peers and team members.
- It will set the pace and enthusiasm required for all the ensuing teamwork activities.
- Talk about teamwork and importance of teamwork in entrepreneurial success as discussed in the Participant Handbook.

## Summarize 🔎

- Close the discussion by summarizing about the importance of teamwork for employees.
  - Teamwork helps in reducing stress for the employees.
  - Teamwork helps employers in generating more number of solutions to a problem and developing improved communication amongst employees.
- Ask the participants what they have learned from these exercises.
- Ask if they have any questions related to what they have talked about so far.

## 7.5.3: Communication Skills: Listening & Speaking: The Importance of Listening Effectively

### -Unit Objectives 🏻 🎯

At the end of this unit, participants will be able to:

- Discuss the importance of listening effectively
- Discuss how to listen effectively
- Discuss the importance of speaking effectively
- Discuss how to speak effectively

### -Resources to be Used 🧬

• Participant Handbook



#### Activity - Chinese Whisper

Step 1: Form a circle.

Step 2: Start a whisper chain. Any one participant will whisper a message into his/her neighbour's ear. No one else must hear the message. The message can be serious or downright silly.

Step 3: The next person who first heard the message should whisper the message very quickly to the person sitting next to them.

Step 4: The game goes on until the last person says whatever they heard out loud and the first person reveals the real message.

Compare them and have a great laugh!

# -Ask 💽

#### **De-brief questions:**

- Was the original message the same as the message that is communicated at the end of the game?
- Why do you think there was a difference in the messages?

## Say Sa

- No, the original message was not same at the end of game.
- The barriers to communication like language, disturbance and noise, poor listening skills, boredom, poor speaking skills, etc. are the potential reasons this happens.
- There are various aspects to communication. Speaking skills and listening skills are two major components to any communication. There is always some room for improvement in the way we communicate.
- It is important to accept the reality of miscommunication and work to minimise its negative impacts.

## -Say 痛

- Communication is a two-way process where people exchange information or express their thoughts and feelings
- It involves effective speaking and effective listening.
- If I go to the store to get bread, I exchange money for the bread. I give something and get something in return. Communication takes place in the same manner. You have to provide and receive information for communication to take place.

# Ask ask

- How often do you hear these statements?
  - "You're not listening to me!"
  - "Why don't you let me finish what I'm saying?"
  - "You just don't understand!"
- What do you think the other person is trying to convey to you through these sentences?
- We will not talk about the importance of listening effectively as discussed in the Participant Handbook.

## Say 뎗

• Let's play a game to understand effective listening process better.

### Do 🗸

- This is a class activity.
- The participants need to answer the questions they hear.
- Instruct them to listen carefully.
- You will read it at a stretch and if need be repeat it once more.
- Tell the participants to raise their hand if they know the answer to the question asked.
- Keep a check on time.

# -Activity 2 😥

#### **Riddles:**

Is there any law against a man marrying his widow's sister?

If you went to bed at eight o'clock at night and set the clock's alarm to ring at nine o'clock, how many hours of sleep would you get?

Do they have a 26th of January in England?

If you had only one match and entered a dark room that had a kerosene lamp, oil heater, and a wood stove, what would you light first?

The Delhi Daredevils and the Chennai Super Kings play five IPL matches. Each wins three matches. No match was a tie or dispute. How is this possible?

There was an airplane crash. Every single person died, but two people survived. How is this possible?

If an airplane crashes on the border of two countries, would unidentified survivors be buried in the country they were travelling from?

A man builds an ordinary house with four sides except that each side has a southern exposure. A bear comes to the door and rings the doorbell. What is the colour of the bear?

#### Answers:

There's no law against a man marrying his widow's sister, but it would be the neatest trick in the book since to have a widow, the man would have to be dead.

You'd get one hour's sleep since alarm clocks do not know the difference between morning and night.

Oh, yes. They have a 26th of January in England. They also have a 27th, a 28th, and so on.

First of all, you would light the match.

Who said the Delhi Daredevils and the Chennai Super Kings were playing against each other in those games?

Every SINGLE person died, but those two were married.

You can't bury survivors under any law especially if they still have enough strength to object.

The bear that rang the doorbell would have to be a white bear. The only place you could build a house with four southern exposures is at the North Pole where every direction is in South.

## Ask (ask)

#### **De-brief question:**

- What were the barriers that came into your way of listening?
- How can you overcome barriers to listening?

### -Say 뎙

- There is a difference between hearing and listening.
- If you don't listen properly, the message may be misunderstood.
- Be open-minded while listening to someone.
- It is important to listen effectively and carefully without making assumptions.

## -Activity 3 😥

#### **Elevator Pitch:**

You are in the lift of a hotel and you bumped into your former client who is a famous businessman. He has financed a lot of small business ventures and can finance your new start-up too. After exchanging pleasantries, he asks you what your new company does. You open your mouth, and then pause. Where do you even begin?

Then, as you try to organize your thoughts, his meeting is called, and he is on his way. If you would been better prepared, you're sure that he would have stayed long enough to schedule a meeting with you too.

If you were given another chance, what would you have said to this person?

## Do 🗸

- Start off the task by providing a beginning sentence to get the story started, and then go around the classroom getting each one to add a new sentence to keep the story going.
- This task should be done spontaneously allowing only a little time to think (30 seconds).
- For example: There was once a student who was looking for a job after graduation.

### -Notes for Facilitation

- Tell the participants to follow these steps to create a great pitch, but bear in mind that you'll need to vary your approach depending on what your pitch is about.
  - 1. **Identify Your Goal:** Start by thinking about the objective of your pitch. For instance, do you want to tell the potential clients about your organization? Do you have a great new product idea that you want to pitch to an executive or do you want a simple and engaging speech to explain what you do for a living?
  - 2. **Explain What You Do:** Start your pitch by describing what your organization does. Focus on the problems that you solve and how you help people. Ask yourself this question as you start writing: what do you want your audience to remember most about you? Keep in mind that your pitch should excite you first. After all, if you don't get excited about what you're saying neither will your audience. People may not remember everything that you say, but they will likely remember your enthusiasm.
  - 3. **Communicate Your USP:** Your elevator pitch also needs to communicate your unique selling proposition or USP. Identify what makes you, your organization or your idea unique. You'll want to communicate your USP after you've talked about what you do.
  - 4. **Engage with a Question:** After you communicate your USP, you need to engage your audience. To do this, prepare open-ended questions (questions that can't be answered with a "yes" or "no" answer) to involve them in the conversation. Make sure that you're able to answer any questions that he or she may have.
  - 5. **Put it all Together:** When you've completed each section of your pitch, put it all together. Then, read it aloud and use a stopwatch to time how long it takes. It should be no longer than 20-30 seconds. Remember, the shorter it is, the better!

#### Example:

Here's how your pitch could come together:

"My company deals with cloth retail online business and we use various e-commerce platforms to sell our products. This means that you can do shopping with ease and spend time on other important tasks. Unlike other similar companies, we have a strong feedback mechanism to find out exactly what people need. This means that, on average, 95 percent of our clients are happy with our products. So, how can you help us in creating our own web portal?

6. **Practice:** Like anything else, practice makes perfect. Remember, how you say it is just as important as what you say. If you don't practice, it's likely that you'll talk too fast, sound unnatural or forget important elements of your pitch. Set a goal to practice your pitch regularly. The more you practice, the more natural your pitch will become. Practice in front of a mirror or in front of colleagues until the pitch feels natural.

### -Summarize 🔎

• Close the discussion by summarizing how to speak effectively as discussed in the Participant Handbook.

### 7.5.4: Problem Solving & Negotiation Skills

## Unit Objectives Ø

At the end of this unit, participants will be able to:

- Discuss how to solve problems
- · List the important problem solving traits
- Discuss ways to assess problem solving skills
- Discuss the importance of negotiation
- Discuss how to negotiate

### Resources to be Used 💣

• Participant Handbook

### Ask a

- What is a 'problem'?
- What do you think are the problems you may face in the process of becoming a successful entrepreneur?

## Say Sa

- Discuss the definition of problem as given in the Participant Handbook.
- In a hurdle race the hurdles are the obstacles on the way to reach your goal.
- Similarly, obstacles are the hurdles you may face while reaching your goal i.e. to set-up your own business. Your goal will be to reach the finishing line after crossing these hurdles.

# -Ask 🔤

- What do you do when you face a problem?
- How do you resolve it? You can pick examples from the question asked previously 'the problems they are likely to face in the process of becoming a successful entrepreneur'.

## -Say 🔓

• Discuss how to solve problems as given in the Participant Handbook.

## Team Activity 🙀

- This is a group activity.
- The groups will solve the problem and come up with the best solution in each case.
- Unable to arrange for some extra finance for setting up a beauty parlour. The loan sanctioned and disbursed is not enough. You have tried all your contacts, friends and relatives. But unable to manage the extra amount. Bank will not sanction more amount as you have used up the complete sanction limit.
- 2. You have rented a space for your business and all arrangements are done. You will be operating from the office space rented in two days. Now the owner comes up to you and says he wants to sell the place and wants you to vacate in 15 days.
- 3. You have just set up your business and need extra human resource. You have tried invieing a few also tied up with an agency for getting the right candidate. But you are unable to get the right candidate. If the candidate is good, you cannot offer the salary demanded. If the candidate agrees to the salary, he/she has other demands like working hours to be reduced, leaves etc. which may not work for your set up.

## Do 🗸

- Divide the class into three groups. Give one scenario to each group.
- Explain the purpose and duration of the activity.
- Ask the groups to build on the scenario and present their solution as a role play.

### Say 뎗

#### **De-brief questions:**

- 1. What was the problem?
- 2. Is there any other alternative solution?
- 3. Is this the best solution presented?

Ask as

• Try to think of some people around you who are able to solve problems very easily. Even you or your friends might be approaching them when there is a problem. What qualities do they have? What personality traits do such people possess?

### -Say 🔓

• Discuss the important traits for problem-solving as given in the Participant Handbook.

# -Ask ask

• In order to build a successful organization, you need to hire people who possess good problem solving skills. How would you assess the level of problem solving skills of potential candidates before hiring them?

# Say 뎙

• Discuss how to assess for problem-solving skills as given in the Participant Handbook.

## -Summarize 🔎

- Ask the participants the things that they have learnt so far.
- Ask if they have any questions related to what they have talked about so far.
- Summarize the discussion on problem solving.

## - Activity

• The activity is to organise an election event. Select three volunteers from the group. They have to give a speech on their election manifesto to the class. They have to negotiate with the fellow participants and convince them to vote for them. The best negotiator will win the election.

### Do 🗸

- Ask three participants to volunteer for the activity.
- Explain the purpose and duration of the activity.
- Set guidelines pertaining to discipline and expected tasks.

## Ask ask

- Out of the three contestants, whom would you support? Why? What did they say or do which convinced you to make your decision?
- Have you ever tried to negotiate in your personal or professional life?
- Ask the class to share some of their experiences where they have been able to strike a deal by negotiating.

### Say 🔓

• Discuss "What is Negotiation?" as given in the Participant Handbook.

### Ask a

 Why is it important to negotiate? As an entrepreneur, where do you think that negotiation skills will be needed?

#### Say 🔓

• Discuss the importance of negotiation while starting a business as given in the Participant Handbook.

## Say 뎙

• Discuss the important steps to negotiate as given in the Participant Handbook.

## -Role Play 🟹

- Conduct a role play activity.
- Ask the participants to assemble together.
- Explain the purpose and duration of the activity.
- Set guidelines pertaining to discipline and expected tasks.

# Do 🗸

- Divide them into groups of four (4) (depending on the batch size).
- Give them the hand-outs for role play scenarios.
- Two groups to be given scenarios on problem solving.
- Other two groups to be given scenarios on negotiation.
- The groups will build on the scenarios and prepare for the role play.
- Give the groups at least 5 mins to discuss and be ready with the role play.
- Invite each group one by one to come and present their role play.

#### Problem solving Scenario 1

Avinash has a Mobile Repair Store in Allahabad. His outlet is one of the most popular one in the vicinity and he has great rapport with his customers. He is always well-dressed, jovial and full of energy.

It's around 11 AM, when a customer barges in to the shop and starts shouting at Avinash for giving her back the instrument which is still not working. The screen of her mobile is also cracked from one side. Avinash remembered thoroughly checking the handset before handing it over to the customer. The customer threatens to sue the company and to go to Consumer Court for cheating her.

#### Problem solving Scenario 2

You are running a successful small scale business, Shreeji Aggarbattis,. Your staff members do door to door selling and organise marketing campaigns in local markets. Your brand has established it's name in last few years.

Recently, lot of customers have been coming to you and lodging complaints that your staff members indulge in malpractices. Few of them informed you that a staff member engaged them in a friendly conversation. In the meanwhile, the other gave them lesser packets of aggarbattis than they paid for.

Another set of customers lodged complaint about the misconduct and rude behaviour of a particular staff member.

You often hear from your customers that the orders don't get delivered on time or wrong products get delivered.

You have already been struggling with shortage of staff and such complaints are a serious concern as it is hampering your brand image. What strategies will you adopt to solve this problem?

#### **Negotiation Scenario 1**

You have interviewed a prospective new employee who could be a key member of your new entrepreneurial venture. The new person is demanding a salary that is 20% higher than you thought based on your business plan. Finances are tight, yet you believe this person could make a significant impact on future profits. If you paid the required salary for the new person, then you would have to restructure your entire business plan. You've been searching for an individual with this skill level for three months. to the candidate is waiting for your response. Now you have to call him in to make the final negotiations.

#### **Negotiation Scenario 2**

You are a young entrepreneur who has just registered his start up project and applied for a bank loan accordingly. You receive a letter saying that your loan application has been rejected as your start up idea did not appeal to the bank and they think that it is not a revenue generating model. You have taken an appointment to meet the manager and show your negotiation skills to get your loan approved.

#### Notes for Facilitation

#### **Facilitating Role Plays**

#### Preparing for the activity

- 1. Carefully review the details of the scenario and the character descriptions.
- 2. Become familiar with the key issues being addressed in the scenario.
- 3. Study the provided material so that you are ready to address issues related to the situations depicted in the role-plays.
- 4. Anticipate and know how to address issues participants might raise during the activity.

#### Conducting the activity

- 1. Introduce the activity. Emphasize that role-playing provides participants with an opportunity to apply their new knowledge, skills, and tools in situations that simulate actual interactions with customers.
- 2. Ask participants to form pairs. Direct the members of each group to choose who will play the roles. Remind the groups that each participant should be given the opportunity to play/practice the different roles.
- 3. Conduct a demonstration so that participants become familiar with the expectations related to the roles and support materials.
- 4. Give the pairs/groups 10 to 15 minutes to conduct the role-play (depending on the duration of the session).
- 5. After all the groups have finished with the role-play, conduct a debriefing session on each role-play.
- 6. Ask the groups to take five minutes to talk about what happened during the role-play. The groups should discuss the questions given in the debriefing for each role-play. Encourage participants to provide constructive criticism during their discussions.

## -Summarize 🎾

• Wrap the unit up after summarizing the key points and answering questions.

### 7.5.5: Business Opportunity Identification: Entrepreneurs and Opportunities

#### -Unit Objectives 🏻 🎯

At the end of this unit, participants will be able to:

- Discuss how to identify new business opportunities
- Discuss how to identify business opportunities within their business

### Resources to be Used 🖉

- Participant Handbook
- Blank sheets of paper
- Pens

## -Ask

- How does an entrepreneur identify an opportunity?
- What do you think are the common queries or concerns faced by entrepreneurs?
- How can you identify new business opportunity?

### Say 🔓

- Let's talk about opportunity, common queries or concerns faced by entrepreneurs, idea as an opportunity, factors to consider when looking for opportunities, ways to identify new business, and opportunity analysis as discussed in Participant Handbook.
- Let's do an activity to understand ways to identify business opportunities within your business.

## Do 🗸

- Tell the class that this is an individual activity.
- Tell the participants to create a matrix on their notebooks.
- There will be four boxes in your matrix.
- Strength, Weakness, Opportunity and Threats will be the four headings of the matrix. This is called the SWOT matrix.
- Read out the questions to them and tell the participants they need to answer the questions asked in each matrix.
- Tell them they can also use their own understanding of themselves to fill the SWOT matrix.

## Activity

#### Do your SWOT analysis

Strength	Weakness
What are your strengths?	What are your weaknesses?
What unique capabilities do you possess?	What do your competitors do better than you?
What do you do better than others?	
What do others perceive as your strengths?	
Opportunity	Threat
What trends may positively impact you?	Do you have solid financial support?
What opportunities are available to you?	What trends may negatively impact you?

# -Do 🗸

- Congratulate everyone for the class activity.
- Ask the audience to applaud for themselves.
- Allot the participants sufficient time to complete this activity, but do keep a check on time.
- Ask de-brief questions to cull out information from the participants.

## -Ask

#### **De-brief questions:**

- What are your weaknesses according to your SWOT analysis?
- Do you think you can change your weakness into strength? How?
- Do you think you can work on your threats? How?

### -Summarize 📜

- Close the discussion by summarizing ways to identify business opportunities within your business.
- Ask the participants what they have learned from this exercise.
- Ask if they have any questions related to what they have talked about so far.

### 7.5.6: Entrepreneurship Support Eco-System

## Unit Objectives 🞯

At the end of this unit, participants will be able to:

- Explain the meaning of entrepreneur
- Describe the different types of entrepreneurs
- List the characteristics of entrepreneurs
- Recall entrepreneur success stories
- Discuss the entrepreneurial process
- Describe the entrepreneurship ecosystem
- Discuss the purpose of the 'Make in India' campaign
- Discuss the key schemes to promote entrepreneurs

### -Resources to be Used 🛛

- Participant Handbook
- Chart papers
- Marker pens
- Pencils
- Colour pencils
- Scale
- Eraser
- Other requisite stationery material

## -Ask 🔤

- Do you think that entrepreneurs need support?
- What do you think is an eco-system?
- What do you think 'entrepreneurship support eco-system' means?

## -Say 🔓

- Let's learn what entrepreneurship support eco-system means.
- Discuss 'Entrepreneurship Support Eco-System' as given in the Participant Handbook.

## -Ask

- Can you define entrepreneurship support eco-system?
- What are the key domains of the support eco-system?

## -Say 🔓

- Let's learn more about these domains by conducting an activity.
- You have to make a poster showing the components of the six main domains of entrepreneurship support eco-system.



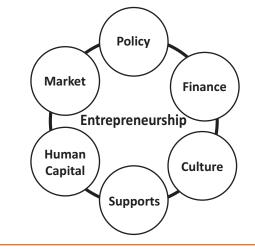
• Making a poster showing the entrepreneurship support eco-system.

# -Do 🗸

- Divide the class into groups of four or six.
- Hand out chart paper and coloured pens.
- Explain the purpose and duration of the activity.
- Go around checking the progress of each group.
- Set guidelines pertaining to discipline and expected tasks.

#### **Activity De-brief**

Ask each group to display their poster and explain the key domains of entrepreneurship support eco-system.



#### Ask 🔤

• What kind of government support eco-system is available for entrepreneurs in India?

## Say ᡗ

• Discuss 'Make in India' campaign as given in the Participant Handbook.

### Team Activity 🙀

• Presentation on key schemes to promote entrepreneurs

### Do 🗸

- Divide the class into pairs.
- Number each pair from 1-15.
- Assign a scheme, same as their group number, to each group.
- Ask them to read the scheme carefully and present it to the class.
- Explain the purpose and duration of the activity.
- Go around checking the progress of each group.
- Set guidelines pertaining to discipline and expected tasks.

#### **Activity De-brief**

• Ask each group to explain the scheme offered by government to promote entrepreneurs.

#### Summarize 🔎

• Summarize the unit by discussing the key points and answering questions the participants may have.

### 7.5.7: Risk Appetite & Resilience



At the end of this unit, participants will be able to:

• Discuss the relationship between entrepreneurship and risk appetite

(j<sup>e)</sup>

- Discuss the relationship between entrepreneurship and resilience
- Describe the characteristics of a resilient entrepreneur

#### -Resources to be Used

- Participant Handbook
- Chart papers
- Blank sheets of paper
- Pens
- Marker pens

### -Ask ask

- Can you define risk or explain what constitutes a risk?
- What do you people mean when they say, "This may be a risky proposition"?
- What risks are they talking about?

## -Example 💡

• Let's have a look at these two examples:

Rohit and his family were travelling by car from Delhi to Nainital. It was their second trip there. Rohit was familiar with the road. His friends told him that the highway after Rampur was in a bad condition. They advised him to take a shortcut and turn left from Moradabad and take the Kaladhungi road. This road is in a better condition.

Since he was going with his family, and did want take the risk of getting lost, he left early. He took the Kaladhungi road and reached Nainital well in time.

Suresh and his family too were travelling by car from Delhi to Nainital. It was their second trip there. His friends too advised him to take a shortcut and turn left from Moradabad and take the Kaladhungi road as this road was in a better condition.

Suresh too decided to take the Kaladhungi road but he left Delhi in the afternoon. It was dark by the time he reached Kaladhungi, and he was sure that he was taking the correct turn. As it was late, he could not find anyone to give him directions. He ended up being in an unknown place that was scarcely inhabited.

### Say 🔓

- Let's see what type of risks Rohit and Suresh took.
- Discuss 'Risk Appetite and Resilience' with the participants as given in the Participant Handbook.

### Say 뎗

• Let's learn more about risk appetite and resilience with the help of an activity.

## - Team Activity 🙀

#### **Risk Appetite**

- This is a group activity.
  - In the previous unit, you read success stories of Mr Dhirubhai Ambani and Dr Karsanbhai Patel.
  - Mr Ambani left his job and started his company Reliance with just Rs. 50,000/-.
  - Dr Patel kept his job, went door-to-door to sell Nirma, and only when the brand started gaining popularity did he start his own company.
  - What types of risk did both of them take?
  - What risk factors, do you think, did they keep in mind before launching their company?
  - Write the Risk Appetite Statement of both the companies.

#### **Activity De-brief**

- Who took a greater risk?
- What are the differences between the Risk Appetite Statement of both the companies?

## Do 🗸

- Instruct the participants that this is group work.
- Divide the class into small groups of 4.
- Give each group a chart paper.
- Tell the participants that they have to evaluate the risks taken by Mr Dhirubhai Ambani and Dr Karsanbhai Patel.
- Give the participants 15 minutes to discuss and write.
- Keep a check on time. Tell the group to wind up quickly if they go beyond the given time limit.

## Ask ask

- Do you think all entrepreneurial ventures are successful?
- What happens if the first venture is not successful?
- Should the entrepreneur stop when faced with challenges or face them?

### -Example

• Let's have a look at the following example:

Vijay Shekhar Sharma is the founder of Paytm, which is a giant Indian e-commerce. He was born in a middleclass family in Uttar Pradesh. He started his first job at an MNC. He quit after six months and built a company One97 with his friends. As One97 grew bigger, it needed more money because it was running more servers, bigger teams, and had to pay royalty. At that time, the tech bubble popped and technology companies were running in losses. Finally, money ran out. So One97 took loans and then more loans at higher rates of interest, as high as 24 per cent, and became caught in a vicious cycle.

In 2014, Paytm was launched with online wallet services after which, the company enabled online payment transactions. The company got licenses from RBI in 2016 to launch India's first ever payment bank. Moreover, the main motive of Paytm was to transform India into a cashless economy.

After demonetization came into effect, Vijay Shekhar Sharma started promoting online and digital transactions to deal with the cash crunch. In fact, the service of the company's mobile wallet is accepted across India. The logo of Paytm is now popular almost everywhere from tea stalls to major companies.

Say 뎗

- Let's see what qualities made Vijay Shekhar Sharma a resilient entrepreneur.
- Discuss Entrepreneurship and Resilience with the participants as given in the Participant Handbook.

### Say 🔓

• Let's learn more about entrepreneurship and resilience with the help of an activity.

## Team Activity 🛃

#### **Entrepreneurship and Resilience**

- This is a group activity.
  - Think of some entrepreneurship ventures that faced challenging times, but later resulted in success stories.
  - Who is the founder of that company?
  - What challenging times did it face?
  - How did it overcome those challenges?
  - List the resilient characteristics of the entrepreneur.

#### **Activity De-brief**

- Each group to give their presentation.
- Why did you choose this company?
- What is the success story of the company?

## Do 🗸

- Instruct the participants that this is group work.
- Divide the class into small groups of 4.
- Give each group a chart paper.
- Tell the participants that they have to think of an entrepreneur who faced challenging times, but eventually succeeded.
- Give the participants 15 minutes to discuss and write.
- Keep a check on time. Tell the group to wind up quickly if they go beyond the given time limit.

## Summarize 🔎

- You can summarize the key points of the unit.
- Ask the participants what they learned from the activities.
- Clarify any questions or doubts they might have.

#### 7.5.8: Success and Failures

Unit Objectives Ø

At the end of this unit, participants will be able to:

Discuss how to deal with failure

## Resources to be Used 🧬

#### • Participant Handbook

### -Ask

- Have you heard the quote 'nothing is impossible'?
- What do you think it means?
- Do you think that all successful entrepreneurs became famous overnight or did they have to struggle or face failure before succeeding?

### -Example 💡

• Let's have a look at this example.

Shah Rukh Khan, also known as, SRK or King Khan is a force to reckon with. Did he achieve stardom overnight? Shah Rukh Khan, who has seen many struggles in his life – he has slept on streets, struggled to support himself and his sister at a very young age, and lost his parents very early in life, which led to his sister seeking mental health support. Amidst all the chaos and challenges, he kept pushing himself, and today he stands tall as the 'Badshah of Bollywood'. Certainly those years were not easy for him.

When he was young, he stood at Marine Drive and said, "I will rule this city one day". Failure was not just his companion during or before his stardom, it is still a substantial part of his life. Success does not come easy. What made him a star was his acceptance of failure and the urge to improve.

## -Say 🔓

- How do you define success and failure?
- What is fear?
- Discuss "success and failure" with the participants as given in the Participant Handbook.

# -Ask ask

- Have you felt or experienced fear?
- What led you to feel that emotion?
- How did you handle it?

### Say 🔓

• Let's learn the about success and failure with the help of an activity.

# Team Activity

- Divide the class into groups of four.
- Instruct them to think of one scenario where they have to interview a successful entrepreneur.
- Explain the purpose and duration of the activity.
- Set guidelines pertaining to discipline and expected tasks.
- They have to choose one person from the group as the interviewee and one as the interviewer.
- Go around and make sure they have understood what is to be done and are discussing the roles properly.
- Check that everyone understands their role. Give clarifications if needed. Give the participants about 5 minutes to discuss and decide their roles.
- Ask the groups to stop the discussion as soon as the time is over.
- Invite each group one by one to come and present their interview as a role play.

## -Notes for Facilitation

#### **Facilitating Role Plays**

#### **Preparing for the activity**

- 1. Carefully review the details of the scenario and the character descriptions.
- 2. Become familiar with the key issues being addressed in the scenario.
- 3. Study the provided material so that you are ready to address issues related to the situations depicted in the role plays.
- 4. Anticipate potential questions that might be raised by the participants and be ready to address them.

#### Conducting the activity

- 1. Introduce the activity. Emphasize that role playing provides participants with an opportunity to apply their new knowledge, skills, and tools in situations that simulate actual interactions with customers.
- 2. Ask participants to form pairs. Direct the members of each group to choose who will play the roles. Remind the groups that each participant should be given the opportunity to play/practice the different roles.
- 3. Conduct a demonstration so that participants become familiar with the expectations related to the roles and support materials.
- 4. To maintain spontaneity of the interactions during the role play, ask the participants not to discuss the details of their roles prior to the role play.
- 5. Give the pairs 15-20 minutes to conduct the role play.
- 6. Circulate among the groups to answer any questions that may arise and provide guidance as needed.
- 7. After all the pairs have finished with the role play, conduct a de-briefing session on each role play.
- 8. Ask the groups to take five minutes to talk about what happened during the role play. The groups should discuss the questions given in the de-briefing for each role play. Encourage participants to provide constructive criticism during their discussions.
- 9. Conclude the activity by asking participants to think about whether and how they might use scripted role plays in their real life.

#### -Summarize | 🎗

• Wrap the unit up after summarizing the key points and answering questions.

### Unit 7.6: Preparing to be an Entrepreneur

## Key Learning Outcomes

At the end of this unit, participants will be able to:

- 1. Discuss how market research is carried out
- 2. Describe the 4 Ps of marketing
- 3. Discuss the importance of idea generation
- 4. Recall basic business terminology
- 5. Discuss the need for CRM
- 6. Discuss the benefits of CRM
- 7. Discuss the need for networking
- 8. Discuss the benefits of networking
- 9. Discuss the importance of setting goals
- 10. Differentiate between short-term, medium-term and long-term goals
- 11. Discuss how to write a business plan
- 12. Explain the financial planning process
- 13. Discuss ways to manage your risk
- 14. Describe the procedure and formalities for applying for bank finance
- 15. Discuss how to manage their own enterprise
- 16. List the important questions that every entrepreneur should ask before starting an enterprise

### 7.6.1: Market Study/ The 4Ps of Marketing/ Importance of an IDEA: Understanding Market Research

### - Unit Objectives 🏻 🎯

At the end of this unit, participants will be able to:

- Discuss how market research is carried out
- Describe the 4 Ps of marketing
- Discuss the importance of idea generation

### Resources to be Used

- Participant Handbook
- Chart papers
- Markers pens
- Blank sheets of paper

## Ask ask

- Suppose, you want to open a restaurant, what are the factors you will consider?
- How will you promote your restaurant?

## Example 💡

• Let's have a look at this example.

Arjun was an MBA working in a company. But he wanted to start a low cost budget hostel for foreign tourists coming to India. He did a lot or market research before starting the project. Based on the information he gathered, he made his business plan. His hostel is now flourishing and he is thinking of expanding to other tourist destinations.

### Say 🔓

- Discuss "Market Study" with the participants. Refer to the Participant Handbook.
- Let's learn about market study and research with the help of an activity.

# Team Activity 🙀

#### **Market Study**

- This is a group activity.
- You want to start your own tuition centre.
- What type of research will you do?

#### **Activity De-brief**

- Ask each group to come forward and give a brief presentation.
- Encourage other groups to be interactive and ask questions.
- What factors did you keep in mind while doing your research?
- Based on our research would you go ahead and open a tuition centre?



- Instruct the participants that this is group work.
- Divide the class into small groups of 4 or 6.
- Give each group a chart paper.
- Tell the participants that they have to start their own tuition centre.
- Give the participants 10 minutes to discuss and write the research work they need to do.
- Keep a check on time. Tell the group to wind up quickly if they go beyond the given time limit.

#### Say Say

• By opening a tuition centre you are offering a service.

#### Ask ask

What factors will you keep in mind before opening it?

#### Say 뎗

• Discuss "The 4Ps of Marketing" with the participants as given in the Participant Handbook.

## Say 🔓

• Let's learn about the 4Ps of Marketing with the help of an activity.

### Team Activity

#### 4 Ps of Marketing

- This is a group activity.
- You have to sell a pen to four different segments:
  - 1. Rural villagers
  - 2. Rural middle class
  - 3. Urban middle class
  - 4. Upper end rich people (Niche market)

Keeping the 4Ps of Marketing in mind, what marketing strategy will you design to sell the pen?

#### Activity De-brief

- Ask each group to to present their strategy.
- Encourage other groups to be interactive and ask questions.

## Do

- Instruct the participants that this is group work.
- Divide the class into four groups.
- Give each group a chart paper.
- Assign each group a target audience for selling the pens:
  - 1. Rural villagers
  - 2. Rural middle class
  - 3. Urban middle class

- 4. Upper end rich people
- Tell the participants that they have to design a marketing strategy keeping the 4Ps of Marketing in mind.
- Give the participants 20 minutes to discuss and come up with their strategy.
- Keep a check on time. Tell the group to wind up quickly if they go beyond the given time limit

#### **Activity De-brief**

- Ask each group to come forward and give a brief presentation.
- Ask each group what they kept in mind while designing their marketing strategy.
- Encourage other groups to be interactive and ask questions.

#### Say 뎙

- Each entrepreneur has an idea of wants he wants to sell. It may be a service or a product.
- Discuss "Importance of an IDEA" as given in the Participant Handbook.

### Summarize 🔎

- Summarize the key points of the unit.
- Ask the participants what they learnt from the activities.
- Encourage them to ask if they have any doubts.

### 7.6.2: Business Entity Concepts



At the end of this unit, participants will be able to:

Recall basic business terminology

## - Resources to be Used 🖉

Participant Handbook

#### Say 🔓

- Let's recall some basic business terminology.
- Discuss the Business Entity Concepts as given in the Participant Handbook.
- Let's learn some basic business terminology by having an activity.
- We will have a quiz today.

### Activity

• The activity is a quiz.

#### Do 📐

- Divide the class in two groups and give a name to each group.
- Explain the rules of the quiz. For each correct answer the group gets 1 mark.
- If the group is unable to answer the question is passed to the next group.
- Explain the purpose and duration of the activity.
- Ask the questions of the quiz.
- Keep a score of the groups.
- Set guidelines pertaining to discipline and expected tasks.

#### Summarize 🔎

• Summarize the unit by discussing the key points.

### Notes for Facilitation

#### QUESTIONS FOR THE QUIZ

- 1. What does B2B mean? Business to business
- 2. What is a financial report?

A comprehensive account of a business' transactions and expenses

#### 3. Who is a sales prospect?

A potential customer

4. How is working capital calculated? Current assets minus current liabilities

5.	What is an estimation of the overall worth of a business called?
	Valuation
6.	You are buying a house. What type of transaction is it?
	Complex transaction
7.	How will you calculate the net income?
	Revenue minus expenses
8.	How is Return on Investment expressed?
	As percentage
9.	How will you calculate the cost of goods sold?
	Cost of materials minus cost of outputs
10.	What is revenue?
	Total amount of income before expenses are subtracted.
11.	What is a Break-Even Point?
	This is the point at which the company will not make a profit or a loss. The total cost and total revenues are equal.
12.	What is the formula used to calculate simple interest?
	A = P(1 + rt); R = r * 100
13.	What are the three types of business transactions?
	Simple, Complex and Ongoing Transactions
14.	The degrading value of an asset over time is known as .
	Depreciation
15.	What are the two main types of capital?

Debt and Equity

#### 7.6.3: CRM & Networking

## Unit Objectives 🞯

At the end of this unit, participants will be able to:

- Discuss the need for CRM
- Discuss the benefits of CRM
- Discuss the need for networking
- · Discuss the benefits of networking

### Resources to be Used

Participant Handbook

### Ask as

- Can your business run without customers/buyers?
- Who is the most important entity in any business?

## Say 🔓

- The key to every success business lies on understanding the customer's expectations and providing excellent customer service.
- Discuss about CRM and its benefits. Refer to the Participant Handbook.
- Providing excellent customer service entails:
  - Treating your customers with respect.
  - Be available as per their need/ schedule.
  - Handling complaints effectively.
  - Building long lasting relationships.
  - Collecting regular feedback.
- Handle customer complaints proactively. Ask "what happened", "why it happened", "how can it be avoided next time", etc.
- Collecting feedback from the customers regularly will enable you to improve your good/service.
- "Let's understand it better with the help of some case scenarios. You will be given some cases within your groups. You have to analyse the case scenario that has been given to you and then find an appropriate solution to the problem."

## Do 🗸

- Divide the class into four groups of maximum six participants depending on the batch size.
- Give one case study to each group.
- Instruct them to read the case carefully.
- The group is expected to analyse and discuss the case amongst them and find a solution to the given problem.
- Put down the discussion points (de-brief questions) on the board. Give the class 5-10 minutes to discuss the case and note down their solutions.
- At the end of 10 minutes, the team should present their case solution to the class.

## Team Activity 🙀

#### **Case Study Analysis**

Raju runs a business of wooden furniture. He has a huge list of customers on Facebook and WhatsApp who give him orders regularly. Ankita is one of his old and regular customers. She placed an order for a new chester and TV cabinet via WhatsApp and requested Raju to send them as soon as possible. When the parcel reached Ankita through courier she found that chester was broken and the TV unit was chipped from the bottom. Ankita was heartbroken. It was a complete waste of money. She sent a message to Raju on WhatsApp, expressing her anger and disappointment. Raju might lose an old customer forever if he doesn't satisfy the customer. What should Raju do to retain his customer?

#### Scenario 2

Rajni runs a boutique shop. She sells suits and sarees. She is one of the most successful designer in her city. Rajni swears that all the clothes in her boutique have unique designs. Smita has to attend her cousin's wedding; she goes to Rajni's boutique to buy a saree. Smita wanted a unique designer saree. Rajni customized a saree for her and sent it over the courier. When Smita had a look at the saree she realised her two friends had the same design sarees. She sent a message to Rajni on WhatsApp, expressing her anger and disappointment. Did Rajni make a false promise? Were her designs copied? What could happen to Rajni's image after this incident? What would you do if you were in Rajni's place?

#### Scenario 3

Shama is a beautician who offers parlour services to ladies by making home visits. Recently, Shama got her name registered on an e- commerce website. Two days earlier, she got a message from Mrs Sushma. The appointment was fixed for next day, 11:00 am and the remuneration for the services was decided beforehand. When Shama reached there at 10:50 am, Mrs Sushma was not at home. When Shama called her, she asked her to wait for a while. Mrs Sushma reached home at 11:45 am. Meanwhile, Shama had to reschedule her next appointment. After availing Shama's services, Mrs Sushma refused to pay the requisite amount and started finding faults in the services provided by her. Who was at fault in this scenario? What should you do in case the customer behaves unreasonably? What would you do if you were in Shama's place?

#### Scenario 4

Shailender is the manager of a car showroom. He proactively takes part in all the transactions that happen in his showroom. Vinita wants to buy a new car. She has chosen a car from Shailender's showroom. The salesperson has given her a very good discount and has also promised free service for one year. Vinita goes to the showroom and asks to complete all the formalities to purchase the car. When she sees the final bill she realize that she has not received the promised discount neither was there any mention of the free services. She immediately demands to see the Shailender. When Shailender's head asks how much discount Vinita was promised, he realised the discount will make the sale in loss. The car showroom owner might lose a customer and deal due to false commitments made by his manager. Besides, the customer might tell this to other people, creating a bad name and image for the showroom. If you owned that showroom, how would you have convinced your customer?

## Say 뎗

- Now, let's discuss the problem and solution with the class.
- The group will first briefly describe the case to the class.
- Then discuss the issue identified and the proposed solution.
- Present the solution as a role play.
- Post presentation, the other groups may ask questions from the group that has presented.

## Do 🗸

- Congratulate each group for the presentation/role play.
- Ask the audience to applaud for them.
- Keep a check on time. Tell the group to wind up the discussion quickly if they go beyond the given time limit.

## Say 🔓

- If your customers are happy with you they will give referrals which will help to grow your business.
- One more way of growing business is 'Networking'.
- Discuss Networking and its benefits. Refer to the Participant Handbook.

## Activity 💯

#### **Group Discussion**

• Conduct a group discussion in the class on how they can do networking for their business.

## Summarize 🔎

- Ask the participants what they have learnt from this exercise/ activity.
- Ask if they have any questions related to what they have talked about so far.
- Close the discussion by summarizing the importance of CRM and Networking for entrepreneurs.
- Close the discussion by summarizing the importance of CRM and Networking for entrepreneurs.

## 7.6.4: Business Plan: Why Set Goals?

## Unit Objectives 🞯

At the end of this unit, participants will be able to:

- Discuss the importance of setting goals
- Differentiate between short-term, medium-term and long-term goals
- Discuss how to write a business plan
- Explain the financial planning process
- Discuss ways to manage your risk

## Resources to be Used

- Participant Handbook
- Chart papers
- Blank papers
- Marker pens
- Ruler

Ask as

- Remember we had written SMART Goals in a previous session? Let's try and recall why it is important to set goals?
- While framing SMART goals, we talked about 'T' in SMART, which was 'Time Bound'? What do we mean by time bound goals?
- What time limit did you set for your goal- 3 weeks, 3 years, 10 years?

## Say 뎗

• Talk about short term, long term and medium term goals, as discussed in the Participant Handbook.

### Ask ask

• As you are planning to become an entrepreneur, you must have thought of an idea for a start-up. What is your business idea?

Do

Ask few participants to share their business ideas.

Ask (ask)

- Have you created a business plan for your business idea?
- Do you think it is important to have a business plan in place? Why/ why not?

### Say 🔓

- Talk about 'Why Create a Business Plan' as discussed in the Participant Handbook.
- Let's understand it better with the help of an activity.

## Team Activity 🙀

#### Writing a business Plan

- This is a group activity.
- Give the groups the required resources such as chart paper and markers.
- This activity is divided into two parts:
  - 1. Create a business idea
  - 2. Develop a business plan
- The group will discuss and come up with a new business idea and present their idea to the class.
- In the second part of the activity the group will develop a business plan for the business idea.
- The business plan prepared will be presented by the groups to the class.

#### **MY BUSINESS PLAN**

Executive Summary: What is your Mission Statement?

Business Description: What is the nature of your business?

Market Analysis: What is your target market?

Organization and Management: What is your company's organizational structure?

Service or Product Line: What is the lifecycle of your product/ service?

Marketing and Sales: How will you advertise and sell your products?

Funding Request: How much fund is required and from where?

Say 🔓

- Teams will need to brainstorm for this part of the activity.
- Use the blank papers for the second part of this activity
- Make your business plan on a chart paper based on the following parameters:
  - 1. Executive Summary
  - 2. Business Description
  - 3. Market Analysis
  - 4. Organization and Management
  - 5. Service or Product Line
  - 6. Marketing and Sales
- Explain each parameter in detail as done in the Participant Handbook.
- Discuss each parameter with the business idea examples of the groups.
- Groups will discuss and develop the business plan for their business idea.

## Say 뎙

- Now, let's share our plan with the class.
- Each group will briefly describe the plan to the class.
- Post presentation, the other groups may ask questions to the group who have presented their plan.

## Do 🗸

- Congratulate each group for sharing their points.
- Ask the audience to applaud for them.
- Keep a check on time. Tell group to wind up the discussion quickly if they go beyond the given time limit.

## Say 뎗

- Along with a business plan, you need to create a financial plan and evaluate the risk involved with your start up.
- Discuss 'Financial Planning' and 'Risk Management' in detail as given in the Participant Handbook.

## Summarize

- Ask the participants what they have learnt from this exercise/ activity.
- Ask if they have any questions related to what they have talked about so far.

### - Notes for Facilitation 🛛 🗐

• Keep the business plan format ready in a flipchart to display it during the activity.

## 7.6.5: Procedures and Formalities for Bank Finance

Unit Objectives  $( \bigcirc )$ 

At the end of this unit, participants will be able to:

Describe the procedure and formalities for applying for bank finance

#### Resources to be Used

- Participant Handbook
- Bank loan/finance form sample

#### Ask (ask)

While preparing a business plan in the last session, we discussed financial planning to arrange financial resources for your start-up. Therefore, how will you collect funds to start your business?

## Sav

- While most entrepreneurs think 'product' is the most difficult thing to decide for a business, start-up capital poses an even a bigger obstacle. Though there are various ways of funding the business, to convince investors to invest money is the most challenging.
- Some of the funding options available in India are:
  - Bootstrapping: Also called self-financing is the easiest way of financing
  - **Crowd funding**: Funds are collected by consumers pre-ordering or donating for starting the business.
  - Angel investors: Individual or group of investors investing in the company
  - Venture capitalists: Venture capitals are professionally managed funds who invest in companies that have huge potential. They usually invest in a business against equity.
  - Bank loans: The most popular method in India.
  - **Microfinance Providers or NBFCs**
  - Government programmes
- Let us know discuss the most popular method i.e. bank finance in detail here.

### Do

- Discuss the list of documents that are required to apply for a loan like letter of introduction, business brochure, references of other banks, and financial statements.
- Explain the details to be filled in a loan application form.
- Divide the class into groups. Give each group a loan application form.
- Ask the groups to discuss and fill the form.

## Summarize |

- Close the discussion by summarizing the important documents needed for bank loan.
- Ask the participants if they have any questions related to what they have talked about so far.

## 7.6.6: Enterprise Management – An Overview: How to Manage Your Enterprise?

#### - Unit Objectives

At the end of this unit, participants will be able to:

• Discuss how to manage their own enterprise

### -Resources to be Used

• Participant Handbook

#### Ask ask

- Having set-up a business, do you think it is possible to do everything on your own?
- Does one require trained persons for help?
- What does management mean?

## Say 🔓

• Let's have a look at this example:

Kapil had a small business that was beginning to pick up pace. He wanted to expand his business, and therefore employed few more people. One day, as he was walking past Ramesh, one of his new employees, he overheard Ramesh talking rudely to a customer on the phone. This set him thinking. Kapil realised that he should have regular team meetings to motivate his employees and speak with them about any problems they might be facing during work. He should also conduct training sessions on new practices, soft skills, and technology, and develop work ethics manual for managing his enterprise.

### Say Sa

- Was Kapil correct in his approach or he should have scolded Ramesh instantly in front of his other employees?
- Discuss "Enterprise Management An Overview" with the participants as given in the Participant Handbook.

### Say 🔓

• Let's learn how to effectively manage an enterprise or business through an activity.

### Team Activity 🖢

#### **Enterprise Management**

- This is a group activity.
- Design a matrix listing the topics and key words that are needed to run an enterprise effectively and smoothly.

#### **Activity De-brief**

- Have each group present their matrix.
- Encourage participants of the other groups to ask question about each other's presentation.

## Notes for Facilitation

- Checklist of documents is provided as resources for the session.
- You can make some copies and distribute it during the group activity.
- Download sample loan application forms from any nationalised bank's website. Print sufficient copies to circulate it amongst the groups.

#### CHECKLIST OF DOCUMENTS TO BE SUBMITTED ALONG WITH LOAN APPLICATION (Common for all banks)

- 1. Audited financial statements of the business concern for the last three years
- 2. Provisional financial statements for the half year ended on \_
- 3. Audited financial statements of associate concern/s for the last three years
- 4. Copy of QIS II for the previous quarter ended on \_\_\_\_\_
- 5. Operational details in Annexure I
- 6. CMA data for the last three years, estimates for current year and projection for the next year
- 7. Term loan/DPG requirements in Annexure II
- 8. List of machinery in respect of machinery offered as security in Annexure III
- 9. Additional details for export advances furnished in Annexure IV
- 10. Property statements of all directors/partners/proprietor/guarantors
- 11. Copies of ITAO of the company for the last three years
- 12. Copies of ITAOs/WTAOs of the directors/partners/proprietor and guarantors
- 13. Copies of certificate from banks and financial institutions certifying the latest liability with them
- 14. Copy of board resolution authorizing the company to apply to your bank for the credit facilities mentioned in application
- 15. Copy of memorandum and article of association (in case of limited company)/partnership deed (in case of partnership firm)
- 16. Cash budget for the current year and next year in case of contractors and seasonal industries

### Do 🗸

- Instruct the participants that this is group work.
- Divide the class into small groups of 4.
- Give each group a chart paper and coloured pen.
- Tell the participants that they have make a matrix they need to fill.
- They have to write the main topics and key words that will them effectively manage their enterprise.
- Give the participants 15 minutes to discuss and write.
- Keep a check on time. Tell the group to wind up quickly if they go beyond the given time limit.

## Summarize 🔎

- Ask the participants what they have learned from this exercise/activity.
- Ask if they have any questions related to what they have talked about so far.
- Close the discussion by summarizing the importance of effective management to run an enterprise as given in the Participant Handbook.

## 7.6.7: 20 Questions to Ask Yourself before Considering Entrepreneurship

#### Unit Objectives

At the end of this unit, participants will be able to:

• List the important questions that every entrepreneur should ask before starting an enterprise

() ()

#### Resources to be Used

- Participant Handbook
- Blank sheets of paper
- Pens

### Ask as

• Why do you want to become an entrepreneur?

## Say 뎙

- It is very important to know why you want to become an entrepreneur. Your personal goals for becoming an entrepreneur play a key role in the success of your business. Your goals should be clear well before you start your business.
- Apart from the goals, the other aspects of business that you need to bear in mind are the potential problems that you may face to set-up, your areas of interest, and all the other dimensions of the business.
- Let's understand it better with the help of some questions that every entrepreneur should ask before starting their own business.
- Open the Participant Handbook section named '20 Questions to Ask Yourself Before Considering Entrepreneurship'. You have to answer the questions individually.
- Then, we will have a class discussion on all the questions.

## Do 🗸

- Read out the questions one by one in front of all the participants.
- Participants have to answer all the one by one questions.
- Give the class 10-15 minutes to note down their answers.
- At the end of 15 minutes, open the discussion for all the questions.
- Moderate the discussion by focusing on the relevant points.
- Keep a check on time and don't let the discussion get sabotaged or lose track of time. Ensure all the questions
  are covered and discussed.

### Summarize 🔏

- Ask the participants what they have learned from this exercise/activity.
- Ask if they have any questions related to what they have talked about so far.

Facilitator Guide
Notes





सत्यमेव जयते GOVERNMENT OF INDIA MINISTRY OF SKILL DEVELOPMENT & ENTREPRENEURSHIP



Transforming the skill landscape



# 8. Annexures

Annexure I: Training Delivery Plan Annexure II: Assessment Criteria



## Annexure I Training Delivery Plan

Program Name:	Plumber Genera	Plumber General					
Qualification Pack	Plumber Genera	al - PSC/Q0104					
Name & Ref. ID							
Version No.	1.0	Version Update Date	31/08/2016				
Pre-requisites to	Preferably Class	s X / the ability to read/write and con	nmunicate effectively for the				
Training (if any)	job role	job role					
Training Outcomes	ng Outcomes By the end of this program, the participants will be able to:						
	material prep 2- Install pipes a 3- Basic quality o 4- Understandin the system 5- Repair like rep 6- Coordinate wi	re-installation related activities involving paration, taking measurements and mark and sanitary fixtures check of the installed fittings and fixtures by the installed system, basic inspection a placement etc. with minimal damage to a ith seniors and other team members lthy and safe at secure working environm	ing the positions and identification of the fault in other systems				

SI. No	Module Name	Session Name	Session Objectives	NOS Reference	Methodology	Training Tools/Aids	Duration
1	Introduction						
	1.1	Getting familiarized	At the end of this module, you will be able to: Get introduction of students Build rapport with students Create Rules for class	NA	Group Activity: Contact Sharing	<ul> <li>White board &amp; Markers</li> <li>Notes</li> <li>Laptop/Sli des + Projector</li> <li>Videos</li> </ul>	0.5 Hrs.

SI. No	Module Name	Session Name	Session Objectives	NOS Reference	Methodology	Training Tools/Aids	Duration
	1.2	Opportunities in Plumbing	<ul> <li>Identify and understand opportunities in plumbing</li> <li>Understand the basic tasks and theories within the plumbing industry</li> <li>Understand the job description and attributes of a Plumber General</li> <li>Identify various skills required to perform the role of a Plumber General</li> </ul>		<ul> <li>Facilitator led discussions</li> <li>Quiz</li> <li>Videos</li> </ul>	<ul> <li>White board &amp; Markers</li> <li>Notes</li> <li>Laptop/Sli des + Projector</li> <li>Videos</li> </ul>	2 Hrs.
	1.3	Safety, maintenance and housekeeping	<ul> <li>Demonstrate how maintenance and housekeeping can be performed</li> <li>Explain the good practices to be followed in Housekeeping</li> </ul>	PSC/N0109 KA1, KA1, SA2, SA3	<ul> <li>Facilitator led discussions</li> <li>Quiz</li> <li>Videos</li> </ul>	<ul> <li>White board &amp; Markers</li> <li>Notes</li> <li>Laptop/Sli des + Projector</li> <li>Videos</li> </ul>	4 Hrs.
2	Installation	of basic sanitary f	ixtures				
	2.1	Tools, equipment and materials	<ul> <li>Understand and demonstrate the use of holding devices</li> <li>Understand and demonstrate the use of fitting tools</li> </ul>	PSC/N0101 KB5, SB1, SB2, Sb3 PSC/N0102 Kb5, SB1, SB2, Sb3	<ul> <li>Facilitator led discussions</li> <li>Question &amp; answer sessions</li> <li>Videos</li> <li>Demonstrati ons</li> <li>Practical activities</li> </ul>	<ul> <li>White board &amp; Markers</li> <li>Notes</li> <li>Laptop/Sli des + Projector</li> <li>Videos</li> <li>Tools - Pipe, wrench, parrot pliers</li> </ul>	40 Hrs.

SI. No	Module Name	Session Name	Session Objectives	NOS Reference	Methodology	Training Tools/Aids	Duration
			<ul> <li>Understand and demonstrate cutting tools</li> <li>Understand and demonstrate pipe threading and bending tools</li> <li>Understand and demonstrate miscellaneou s tools – screw drivers, file, chisels and hammers. Sealing materials, drill machines etc.</li> </ul>			slide wrench, hacksaw, Screwdrivers set, Double Ended spanner set, Allen Key set, Drill bit set.	
	2.2	Measurement	<ul> <li>Understand the different measurement systems used for plumbing purpose.</li> <li>Demonstrate and explain calculation methods</li> <li>Understand the different symbols for plumbing purpose in drawings</li> </ul>		<ul> <li>Facilitator led discussions</li> <li>Question &amp; answer sessions</li> <li>Videos</li> <li>Demonstrati ons</li> <li>Practical activities</li> </ul>	<ul> <li>White board &amp; Markers</li> <li>Notes</li> <li>Laptop/Sli des + Projector</li> <li>Videos</li> <li>Tools - measuring tape, Spirit Level, Hydraulic Testing Machine, Smoke Generator for testing of pipes and joints, balloon sets, weighing machine, pressure gauge.</li> </ul>	15 Hrs.

SI. No	Module Name	Session Name	Session Objectives	NOS Reference	Methodology	Training Tools/Aids	Duration
	2.3	Pipes - Fitting, Cutting, Bending, Joining and Testing of Pipelines	<ul> <li>Identify and understand different types of pipes</li> <li>Identify and understand allied fitting of pipes</li> <li>Understand and demonstrate bending, threading and joining of pipe</li> <li>Testing of pipe lines</li> </ul>	PSC/N0101 PC2, PC3, PC6, PC8, PC9, PC10, KB1, KB2, KB3, Sb4, SB5 PSC/N0102 KB1, KB2	<ul> <li>Facilitator led discussions</li> <li>Question &amp; answer sessions</li> <li>Videos</li> <li>Demonstrati ons</li> <li>Practical activities</li> </ul>	<ul> <li>White board &amp; Markers</li> <li>Notes</li> <li>Laptop/Slide s + Projector</li> <li>Videos</li> <li>Clamps and Hangers,</li> <li>pipes, fittings and accessories as required.</li> </ul>	50 Hrs.
	2.4	Plumbing and sanitary fixtures and their installation	<ul> <li>Understand and demonstrate various types of Tap/Faucets and showers</li> <li>Understand and demonstrate various types of Washbasins and their installation</li> <li>Understand and demonstrate various types of water closets, urinals and their working</li> <li>Understand and demonstrate bidets, bath shower trays and geysers</li> </ul>	PSC/N0101 Pc4, KB1, KB7	<ul> <li>Facilitator led discussions</li> <li>Quiz</li> <li>Videos</li> </ul>	<ul> <li>White board &amp; Markers</li> <li>Notes</li> <li>Laptop/Slide s + Projector</li> <li>Videos</li> <li>Taps, Single lever Mixer, joy stick, Push button tap, Sensor Tap, Shower</li> <li>Washbasin</li> <li>Water Closet - Indian &amp; Western</li> <li>Urinals</li> <li>Drill machine, Chisel and hammer</li> <li>Masonry tools &amp; Mortar material</li> </ul>	50 Hrs.

SI. No	Module Name	Session Name	Session Objectives	NOS Reference	Methodology	Training Tools/Aids	Duration
			<ul> <li>Identify and understand standard height of sanitary fixtures</li> <li>Identify &amp; understand basic building construction, cutting / opening in structures, mason tools, preparing mortar and filling etc.</li> </ul>				
	2.5	Pumps and their installation	<ul> <li>Identify and understand various types of Pumps</li> <li>Explain advantages and disadvantag- es of various types of pumps</li> </ul>	PSC/N0101	<ul> <li>Facilitator led discussions</li> <li>Quiz</li> <li>Videos</li> </ul>	<ul> <li>White board &amp; Markers</li> <li>Notes</li> <li>Laptop/Slide s + Projector</li> <li>Videos</li> <li>Working model / Cut section of :</li> <li>Airlift Deep Well Pump</li> <li>Centrifugal pump</li> <li>Reciprocating pump</li> <li>Jet well Pump</li> <li>Rotary Pump</li> </ul>	15 Hrs.
	2.6	Water Meter	<ul> <li>Identify and understand various types of Water meters</li> <li>Explain advantages and disadvantag- es of various types of Water meters</li> </ul>	PSC/N0101	<ul> <li>Facilitator led discussions</li> <li>Quiz</li> <li>Videos</li> </ul>	<ul> <li>White board &amp; Markers</li> <li>Laptop/Slides + Projector</li> <li>Videos</li> <li>Water meter:</li> <li>Displacement type</li> <li>Positive Displacement type</li> <li>Velocity meter</li> </ul>	15 Hrs.

SI. No	Module Name	Session Name	Session Objectives	NOS Reference	Methodology	Training Tools/Aids	Duration
3	Repairing o	f basic plumbing s	ystems				
	3.1	Repairing of various types of fittings and fixtures	<ul> <li>Diagnose the problems in fittings and fixtures</li> <li>Repair the problems in fittings and fixtures</li> <li>Repair the problems in Plumbing system</li> <li>Plan and schedule routine maintenance</li> </ul>	PSC/N0102 Pc1, PC2, PC3, PC4, PC5, PC6, PC7, PC8, PC9, PC10, PC11, Pc12, PC13, PC14, SB3, SB4, SB6	<ul> <li>Facilitator led discussions</li> <li>Question &amp; answer sessions</li> <li>Videos</li> <li>Demonstrati ons</li> <li>Practical activities</li> </ul>	<ul> <li>White board &amp; Markers</li> <li>Notes</li> <li>Laptop/Slide s + Projector</li> <li>Videos</li> <li>Plumbing defect samples for repairing demonstra tion</li> </ul>	50 Hrs.
4	Maintenan	ce & servicing of p	lumbing systems				
	4.1	Source of Water	<ul> <li>Explain about various types of water</li> <li>Describe rain water harvesting</li> <li>Explain concept of catchment and storage dams</li> <li>Explain dug well, Sub- surface water harvesting system</li> <li>Explain various types of water intakes</li> </ul>		<ul> <li>Facilitator led discussions</li> <li>Quiz</li> <li>Videos</li> </ul>	<ul> <li>White board &amp; Markers</li> <li>Notes</li> <li>Laptop/Slide s + Projector</li> <li>Videos</li> </ul>	5 Hrs.
	4.2	Treatment of water	<ul> <li>Describe various steps involved in water treatment.</li> </ul>	PSC/N0101	<ul> <li>Facilitator led discussions</li> <li>Question &amp; answer sessions</li> <li>Videos</li> </ul>	<ul> <li>White board &amp; Markers</li> <li>Notes</li> <li>Laptop/Slide s + Projector</li> <li>Videos</li> </ul>	5 Hrs.

SI. No	Module Name	Session Name	Session Objectives	NOS Reference	Methodology	Training Tools/Aids	Duration
			<ul> <li>Explain process of waste water treatment, domestic water treatment, industrial water treatment, portable water treatment.</li> </ul>				
	4.3	Types of water supply system	<ul> <li>Describe various types of water supply system</li> <li>Explain various types of water</li> </ul>	PSC/N0101	<ul> <li>Facilitator led discussion s</li> <li>Quiz</li> <li>Videos</li> </ul>	<ul> <li>White board &amp; Markers</li> <li>Notes</li> <li>Laptop/Slide s + Projector</li> <li>Videos</li> </ul>	5 Hrs.
	4.4	Drainage System	<ul> <li>Describe various drainage system being adopted in plumbing</li> <li>Describe the process of selection of drainage systems</li> <li>Explain the drainage system used in residential and commercial building</li> </ul>	PSC/N0101	<ul> <li>Facilitator led discussions</li> <li>Quiz</li> <li>Videos</li> </ul>	<ul> <li>White board &amp; Markers</li> <li>Laptop/Slides + Projector</li> <li>Videos</li> </ul>	10 Hrs.
	4.5	Common Terms Used In Plumbing	<ul> <li>Describe common terms used in plumbing</li> </ul>	PSC/N0101 Kb4, PSC/N0102 KB4	<ul> <li>Facilitator led discussions</li> <li>Quiz</li> <li>Videos</li> </ul>	<ul> <li>White board &amp; Markers</li> <li>Laptop/Slide s + Projector</li> <li>Videos</li> <li>Duster</li> </ul>	10 Hrs.

SI. No	Module Name	Session Name	Session Objectives	NOS Reference	Methodology	Training Tools/Aids	Duration
5	Coordinatin	g with Seniors an	d Working with Tea	Im		,	
	5.1	Team Management – Meaning and Concept	<ul> <li>Explain team management concept</li> <li>Describe characteristics of a good and effective team</li> <li>Resolve disputes with team members</li> </ul>	PSC/N0101 KA2, SA6 PSC/N0108 Pc7, PC8	<ul> <li>Facilitator led discussions</li> <li>Quiz</li> <li>Videos</li> </ul>	<ul> <li>White board &amp; Markers</li> <li>Notes</li> <li>Laptop/Slide s + Projector</li> <li>Videos</li> <li>Duster</li> </ul>	4 Hrs.
	5.2	Resolving Conflict	<ul> <li>Explain the reasons of conflicts</li> <li>Describe how to resolve conflicts</li> </ul>	PSC/N0108 PC13	<ul> <li>Facilitator led discussions</li> <li>Quiz</li> <li>Videos</li> </ul>	<ul> <li>White board &amp; Markers</li> <li>Notes</li> <li>Laptop/Slide s + Projector</li> <li>Videos</li> <li>Duster</li> </ul>	1 Hrs.
	5.3	Team Working Skills	<ul> <li>Explain importance of team work</li> <li>Describe various skills important for team work</li> </ul>	PSC/N0108 PC7, PC8, PC9	<ul> <li>Facilitator led discussions</li> <li>Quiz</li> <li>Videos</li> </ul>	<ul> <li>White board &amp; Markers</li> <li>Laptop/Slides + Projector</li> <li>Videos</li> <li>Duster</li> </ul>	2 Hrs.
	5.4	Interact With Colleagues And Seniors Within And Outside The Team	<ul> <li>Explain relation of interaction for creating good relationship</li> <li>Describe characteristic of good relationship</li> <li>Develop skills required for building good relationship</li> </ul>	PSC/N0108 Pc1, PC2, PC3, PC4, PC5, PC6, PC7, PC10, SB2	<ul> <li>Facilitator led discussions</li> <li>Quiz</li> <li>Videos</li> </ul>	<ul> <li>White board &amp; Markers</li> <li>Laptop/Slides + Projector</li> <li>Videos</li> <li>Duster</li> </ul>	2 Hrs.

SI. No	Module Name	Session Name	Session Objectives	NOS Reference	Methodology	Training Tools/Aids	Duration
	5.5	Diaries and Log Report	<ul> <li>Explain importance of Log reports</li> <li>Describe what is Daily Log and incident report</li> <li>Describe what is site diary and daily field report</li> </ul>	PSC/N0108	<ul> <li>Facilitator led discussions</li> <li>Quiz</li> <li>Videos</li> </ul>	<ul> <li>White board &amp; Markers</li> <li>Notes</li> <li>Laptop/Slide s + Projector</li> <li>Videos</li> <li>Duster</li> </ul>	5 Hrs.
6		a Healthy, Safe 8	& Secure Work Envi	roment			
	6.1	Hazards	<ul> <li>Explain hazards available in construction and plumbing sector</li> <li>Describe hazardous activities, situations and prevention from them</li> <li>Describe hazardous substances and prevention from them</li> </ul>	PSC/N0109 KA1	<ul> <li>Facilitator led discussions</li> <li>Quiz</li> <li>Videos</li> </ul>	<ul> <li>White board &amp; Markers</li> <li>Notes</li> <li>Laptop/Slide s + Projector</li> <li>Videos</li> <li>Duster</li> </ul>	1 Hrs.
	6.2	Hazards Analysis	<ul> <li>Describe various hazards and their probable causes</li> <li>Decide to choose PPE for prevention of various hazards present in plumbing sector</li> </ul>	PSC/N0109 KA1	<ul> <li>Facilitator led discussions</li> <li>Quiz</li> <li>Videos</li> </ul>	<ul> <li>White board &amp; Markers</li> <li>Laptop/Slides + Projector</li> <li>Videos</li> <li>Duster</li> </ul>	1 Hrs.

SI. No	Module Name	Session Name	Session Objectives	NOS Reference	Methodology	Training Tools/Aids	Duration
			<ul> <li>Explain benefits of cleaning in hazard prevention</li> </ul>				
	6.3	Hazards and Communicatio n And Resposibilities	<ul> <li>Describe Organisation and his responsibilit- ies for Hazard</li> <li>Explain Safety control and Precautions exercised by organisation</li> <li>Explain types and uses of various PPEs</li> <li>Explain Types of fires and how to fight with them</li> </ul>	PSC/N0109 KA1, SA1, SB1, SB2, SB3	<ul> <li>Facilitator led discussions</li> <li>Quiz</li> <li>Videos</li> </ul>	<ul> <li>White board &amp; Markers</li> <li>Notes</li> <li>Laptop/Slide s + Projector</li> <li>Videos</li> <li>Duster</li> </ul>	5 Hrs.
	6.4	Safety Gears and first Aid	<ul> <li>Create Emergency response skill</li> <li>Describe various emergencies and response to make in such emergency</li> <li>Contact appropriate authority in case of any emergency</li> </ul>	PSC/N0109 Sb3	<ul> <li>Facilitator led discussions</li> <li>Quiz</li> <li>Videos</li> </ul>	<ul> <li>White board &amp; Markers</li> <li>Laptop/Slides + Projector</li> <li>Videos</li> <li>Duster</li> </ul>	10 Hrs.
	6.5	Safety Guidlines	<ul> <li>Recognize potential source of injury at workplace</li> <li>Evaluate risk of injury at work place</li> </ul>	PSC/N0109 SB2	<ul> <li>Facilitator led discussions</li> <li>Quiz</li> <li>Videos</li> </ul>	<ul> <li>White board &amp; Markers</li> <li>Laptop/Slides + Projector</li> <li>Videos</li> <li>Duster</li> </ul>	10 Hrs.

SI. No	Module Name	Session Name	Session Objectives	NOS Reference	Methodology	Training Tools/Aids	Duration
7	Employabili	ty & Entrepreneu	Decide     required first     aid in different     kind of injury     situation  arship Skills				
	7.1	Personal Strengths & Value Systems	<ul> <li>Explain the meaning of health</li> <li>List common health issues</li> <li>Discuss tips to prevent common health issues</li> <li>Explain the meaning of hygiene</li> <li>Discuss the purpose of Swacch Bharat Abhiyan</li> <li>Explain the meaning of habit</li> <li>Discuss ways to set up a safe work environment</li> <li>Discuss critical safety habits to be followed by employees</li> <li>Explain the importance of self-analysis</li> <li>Discuss the pirpose of Succes the ployees</li> <li>Explain the meaning of habit</li> <li>Discuss ways to set up a safe work environment</li> <li>Discuss critical safety habits to be followed by employees</li> <li>Explain the importance of self-analysis</li> <li>Discuss motivation with the help of Maslow's Hierarchy of Needs</li> <li>Discuss the meaning of achievement motivation</li> </ul>	NA	<ul> <li>Facilitator led discussions</li> <li>Quiz</li> <li>Videos</li> </ul>	<ul> <li>White board &amp; Markers</li> <li>Notes</li> <li>Laptop/Slide s + Projector</li> <li>Videos</li> <li>Duster</li> </ul>	2 Hrs.

SI. No	Module Name	Session Name	Session Objectives	NOS Reference	Methodology	Training Tools/Aids	Duration
			<ul> <li>List the different factors that motivate you</li> <li>Discuss the role of attitude in self-analysis</li> <li>Discuss how to maintain a positive attitude</li> <li>List your strengths and weaknesses</li> <li>Discuss the qualities of honest people</li> <li>Describe the importance of honesty in entrepreneurs</li> <li>Discuss the elements of a strong work ethic</li> <li>Discuss how to foster a good work ethic</li> <li>List the characteristics of highly creative people</li> <li>List the characteristics of highly innovative people</li> <li>Discuss the benefits of time management</li> <li>List the traits of effective time managers</li> <li>Describe effective time management technique</li> <li>Discuss the importance of anger management</li> </ul>				

lodule Iame	Session Name	Session Objectives	NOS Reference	Methodology	Training Tools/Aids	Duration
		<ul> <li>Describe anger management strategies</li> <li>Discuss tips for anger management</li> <li>Discuss the causes of stress</li> <li>Discuss the symptoms of stress</li> <li>Discuss tips for stress management</li> </ul>				
7.2	Digital Literacy: A Recap	<ul> <li>Identify the basic parts of a computer</li> <li>Identify the basic parts of a keyboard</li> <li>Recall basic computer terminology</li> <li>Recall the functions of basic computer keys</li> <li>Discuss the main applications of MS Office</li> <li>Discuss the benefits of Microsoft Outlook</li> <li>Identify different types of e-commerce</li> <li>List the benefits of e-commerce for retailers and customers</li> </ul>	NA	<ul> <li>Facilitator led discussions</li> <li>Quiz</li> <li>Videos</li> </ul>	<ul> <li>White board &amp; Markers</li> <li>Notes</li> <li>Laptop/Slide s + Projector</li> <li>Videos</li> <li>Duster</li> </ul>	10 Hrs.

SI. No	Module Name	Session Name	Session Objectives	NOS Reference	Methodology	Training Tools/Aids	Duration
			<ul> <li>Discuss         <ul> <li>Digital India             campaign will             help boost e-             commerce in             India</li> </ul> </li> <li>Describe how         you will sell a         product or         <ul> <li>service on an             e-commerce             platform</li> </ul> </li> </ul>				
	7.3	Money Matters	<ul> <li>Discuss the importance of saving money</li> <li>Discuss the benefits of saving money</li> <li>Discuss the main types of bank accounts</li> <li>Describe the process of opening a bank account</li> <li>Differentiate between fixed and variable costs</li> <li>Describe the main types of investment options</li> <li>Describe the different types of insurance products</li> <li>Describe the different types of taxes</li> <li>Discuss the uses of online banking</li> <li>Discuss the main types of electronic funds transfer</li> </ul>	NA	<ul> <li>Facilitator led discussions</li> <li>Quiz</li> <li>Videos</li> </ul>	<ul> <li>White board &amp; Markers</li> <li>Notes</li> <li>Laptop/Slide s + Projector</li> <li>Videos</li> <li>Duster</li> </ul>	10 Hrs.

SI. No	Module Name	Session Name	Session Objectives	NOS Reference	Methodology	Training Tools/Aids	Duration
	7.4	Preparing for Employment & Self Employment	<ul> <li>Discuss the steps to follow to prepare for an interview</li> <li>Discuss the steps to create an effective Resume</li> <li>Discuss the most frequently asked interview questions</li> <li>Discuss how to answer the most frequently asked interview questions</li> <li>Discuss how to answer the most frequently asked interview questions</li> <li>Discuss how to answer the most frequently asked interview questions</li> <li>Identify basic workplace terminology</li> </ul>	NA	<ul> <li>Facilitator led discussions</li> <li>Quiz</li> <li>Videos</li> </ul>	<ul> <li>White board &amp; Markers</li> <li>Notes</li> <li>Laptop/Slide s + Projector</li> <li>Videos</li> <li>Duster</li> </ul>	4 Hrs.
	7.5	Understanding Enterprenuersh ip	<ul> <li>Discuss the concept of entrepreneurship</li> <li>Discuss the importance of entrepreneurship</li> <li>Describe the characteristics of an entrepreneur</li> <li>Describe the different types of enterprises</li> <li>List the qualities of an effective leader</li> <li>Discuss the benefits of effective leadership</li> </ul>	NA	<ul> <li>Facilitator led discussions</li> <li>Quiz</li> <li>Videos</li> </ul>	<ul> <li>White board &amp; Markers</li> <li>Notes</li> <li>Laptop/Slide s + Projector</li> <li>Videos</li> <li>Duster</li> </ul>	2.5 Hrs.

SI. No	Module Name	Session Name	Session Objectives	NOS Reference	Methodology	Training Tools/Aids	Duration
			<ul> <li>List the traits of an effective team</li> <li>Discuss the importance of listening effectively</li> <li>Discuss how to listen</li> <li>effectively</li> <li>Discuss the importance of speaking effectively</li> <li>Discuss how to speak</li> <li>effectively</li> <li>Discuss how to solve problems</li> <li>List important problem solving traits</li> <li>Discuss ways to assess problem solving skills</li> <li>Discuss the importance of negotiation</li> <li>Discuss how to identify new business</li> <li>Discuss how to identify new business</li> <li>Discuss how to identify new business</li> <li>Discuss how to identify business</li> <li>Discuss how to identify</li> <li>business</li> <li>opportunities</li> <li>Discuss how to identify</li> <li>business</li> <li>opportunities</li> <li>Explain the meaning of entrepreneur</li> <li>Describe the different types of entrepreneurs</li> <li>List the characteristics entrepreneurs</li> </ul>				

SI. No	Module Name	Session Name	Session Objectives	NOS Reference	Methodology	Training Tools/Aids	Duration
			<ul> <li>Recall entrepreneur success stories</li> <li>Discuss the entrepreneuri al process</li> <li>Describe the entrepreneurs hip ecosystem</li> <li>Discuss the purpose of the Make in India campaign</li> <li>Discuss key schemes to promote entrepreneurs</li> <li>Discuss the relationship between entrepreneurs hip and risk appetite</li> <li>Discuss the relationship between entrepreneurs hip and risk appetite</li> <li>Discuss the relationship between entrepreneurs hip and resilience</li> <li>Describe the characteristics of a resilient entrepreneur</li> <li>Discuss how to deal with failure</li> </ul>				
	7.6	Preparing To be Enterpreneur	<ul> <li>Discuss how market research is carried out</li> <li>Describe the 4 Ps of marketing</li> <li>Discuss the importance of idea generation</li> </ul>	NA	<ul> <li>Facilitator led discussions</li> <li>Quiz</li> <li>Videos</li> </ul>	<ul> <li>White board &amp; Markers</li> <li>Notes</li> <li>Laptop/Slide s + Projector</li> <li>Videos</li> <li>Duster</li> </ul>	4 Hrs.

SI. No	Module Name	Session Name	Session Objectives	NOS Reference	Methodology	Training Tools/Aids	Duration
			<ul> <li>Recall basic business terminology</li> <li>Discuss the need for CRM</li> <li>Discuss the benefits of CRM</li> <li>Discuss the need for networking</li> <li>Discuss the benefits of networking</li> <li>Discuss the importance of setting goals</li> <li>Differentiate between short-term, medium-term and long-term goals</li> <li>Discuss how to write a business plan</li> <li>Explain the financial planning process</li> <li>Discuss ways to manage your risk</li> <li>Describe the procedure and formalities for applying for bank finance</li> <li>Discuss how to manage their own enterprise</li> <li>List the important questions that every entropreneur should ask before starting an enterprise</li> </ul>				

### **Annexure II**

## Assessment Criteria CRITERIA FOR ASSESSMENT OF TRAINEES

Assessment Criteria for Plumber (General)	
Job Role	Plumber (General)
Qualification Pack	PSC/Q0104
Sector Skill Council	Plumbing

Sr. No.	Guidelines for Assessment
1	For assessment for each Qualification Pack will be created by the Sector Skill Council. Each Performance Criteria (PC) will be assigned marks proportional to its importance in NOS. SSC will also lay down proportion of marks for Theory and Skills Practical for each PC
2	The assessment for the theory part will be based on knowledge bank of questions created by the SSC
3	Individual assessment agencies will create unique question papers for theory part for each candidate at each examination/training centre (as per assessment criteria below)
4	Individual assessment agencies will create unique question papers for theory part for each candidate at each examination/training centre (as per assessment criteria below)
5	To pass the Qualification Pack , every trainee should score a minimum of 50% in every NOS and overall 50% pass percentage in every QP
6	In case of successfully passing only certain number of NOS's, the trainee is eligible to take subsequent assessment on the balance NOS's to pass the Qualification Pack.

Assessable Outcomes	Assessment Criteria (PC)	Total Marks	Out of	Theory	Practical Skills
1. PSC/N0101	PC1. understand the task to be done		5	2	3
Installation of basic sanitary fixtures,	PC2. assemble pipe sections, tubing and fittings, using couplings, clamps, screws, bolts, caulking tools, or cutting, threading and joining equipment		10	3	7
fittings, related	PC3. establish the sequence of pipe installations		10	3	7
piping and accessories	PC4. Plan installation around obstructions such as electrical wiring, etc		10	3	7
	PC5. locate and mark the position of pipe installations, connections, passage holes, and fixtures in structures, using measuring instruments such as rulers and levels	100	10	3	7
	PC6. cut openings in structures to accommodate pipes and pipe fittings, using hand and power tools (if required)		10	3	7
	PC7. measure, cut, thread, and bend pipe to required angle, using hand and power tools or equipment such as cutting, threading and bending equipment		10	3	7
	PC8. hang steel supports from ceiling joists to hold pipes in place (if required)		10	3	7
	PC9. install pipe assemblies, fittings, valves, appliances such as dishwashers and water heaters, and fixtures such as sinks and toilets, using hand and power tools.		10	3	7

	PC10. test the joints and fixtures for proper functioning		10	2	8
	PC11. clear the work area and waste disposal		5	2	3
		Total	100	30	70
2. PSC/N0102	PC1.Understand the installed plumbing system		5	2	3
Repair of basic	PC2. Identify the problem/fault in the system and its cause		5	2	3
sanitary fixture,	PC3. Establish the sequence of repair		5	2	3
fittings, related	PC4. Assemble fittings fixtures and tools required for the task		5	1	4
piping and accessories	PC5. Locate and mark the position of the component to be replaced/repaired using measuring instruments such as rulers and levels		10	3	7
	PC6. Cut openings in structures to remove the defected pipes and pipe fittings, using hand and power tools		10	3	7
	PC7. Measures, cut, thread and bend pipes to required angle, using hand and power tools or equipment such as cutting, threading and bending equipment hand and power tools	100	10	3	7
	PC8. Replace with new pipe assemblies, fittings, valves, appliance such as dish washers and water heaters and fixtures such as sinks and toilets, using hand and power tools hand and power tools	_	10	3	7
	PC9. Test the joints and fixtures for proper functioning.		10	3	7
	PC10. Clear the work area and waste disposal.		5	2	3
	PC11. Deliver Task in Time		5	1	4
	PC12. Achieve quality finishing in repair of sanitary fixtures and fittings		5	2	3
	PC13.ensure minimal wastage of material		5	1	4
	PC14. Ensure minimal damage to other system.		5	1	4
		Total	100	30	70
3.PSC/N0108 Coordinating	PC1. receive work instructions and discuss the project / design with seniors required		5	2	3
with the senior and other working	PC2. communicate to reporting senior about task status, repairs and maintenance of tools and equipment as required		5	1	4
team	PC3. communicate any potential hazards and expected process disruptions	100	10	3	7
	PC4. Get the work reviewed and handover completed task to reporting seniors		10	3	7
	PC5. receive feedback from reporting senior		10	3	7

	PC6. report any anticipated reasons for delays		10	3	7
		1	10	3	7
	Pc7. work as a team with colleagues and share work as per the work load and skills				
			10	3	7
	PC8. work with colleagues of other teams		5	2	3
	PC9. communicate and discuss work flow related difficulties		10	3	7
	in order to find solution with mutual agreement		10	3	7
	Pc10. taking instructions from the reporting senior		5	2	3
	Pc11. report problem/incident etc		5	1	4
	PC12. put team over individual goals				
	PC13. resolve conflicts	-	5	1	4
		Total	100	30	70
4.PSC/N0109 Maintain a healthy, safe and secure working environment	PC1. to avoid accidents related to use of sharp tools and equipment	100 	15	5	10
	PC2. attend and actively participate in the health and safety campaigns organized by the company or any other authority		10	3	7
	PC3. use or wear safety gear (helmet, gloves, goggles, safety shoes, ear plugs, etc.) as per the rules of the company		10	3	7
	PC4. attend fire drills or any other safety drills organized by the company or any other authority		15	4	11
	PC5. learn first-aid procedure		15	5	10
	PC6. use insect repellents and safe drinking water		10	3	7
	PC7. use site toilets and follow other hygienic practices		15	4	11
	PC8. Understand the evacuation & emergency procedure		10	3	7
			100	30	70
Total			400	120	280
Percentage Weightage:			30%	70%	
Minimum Pass% to Qualify :		50% in aggregate and 40% in a NOS			

Do 🗸

- Explain each Guideline for Assessment in detail
- Explain the score that each trainee needs to obtain
- Recapitulate each NOS one-by-one and take participants through the allocation of marks for Theory and Skills Practical.
- Explain the Allocation of Marks. Explain that they will be assessed on Theory and Skills Practical.

