

सत्यमेव जयते GOVERNMENT OF INDIA MINISTRY OF SKILL DEVELOPMENT & ENTREPRENEURSHIP

RNITURE &



Participant Handbook

Sector Furniture and Fittings

Sub-Sector Wooden Furniture

Occupation Production -Fitting

Reference ID: FFS/Q6101, Version No. 1.0 NSQF Level 3

> Assembler-Doors/Windows (Glass) Option: Wooden/Aluminium

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This participant handbook is dedicated to the aspiring youth who desire to achieve special skills which will be a lifelong asset for their future endeavours.

About this book

This Participant Handbook is designed for providing skill training and /or upgrading the knowledge level of the Trainees to take up the job of an "Assembler-Doors/Windows (Glass) Option: Wooden/ Aluminium" in the Furniture & Fittings Sector.

This Participant Handbook is designed based on the Qualification Pack (QP) under the National Skill Qualification framework (NSQF) and it comprises of the following National Occupational Standards (NOS)/topics and additional topics.

- (FFS/N6101) Assist lead technician in work process glass doors and windows •
- (FFS/N8601) Ensure health and safety at workplace •
- (FFS/N8501) Maintain work area, tools and machines •
- (FFS/N8801) Work effectively with others •
- Option :(FFS/N6102) Assist lead technican in work process-wooden/aluminium doors and windows

Symbols Used





Activity

Key Learning Outcomes

Summary



Tips







Unit Objectives

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Transforming the skill landscape

1. Assist Lead Technician in Work Process – Glass Doors and Windows

Unit 1.1 Introduction

- Unit 1.2 Various Types of Glass Doors and Windows Fitting Products
- Unit 1.3 Marking, Cutting Glass, Polishing, Repairing Rough Edges etc.
- Unit 1.4 Assembling Door and Windows and Placement of Glass
- Unit 1.5 Assembling and Dismantling Procedure of Components
- Unit 1.6 Product and Workplace Safety Specifications
- Unit 1.7 Various Types of Defects and Troubleshooting Common Errors
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- Unit 1.10 Handling of Tools and Equipment with Care
- Unit 1.11 Common Faults Encountered and Rectification Methods
- Unit 1.12 Discussing Alignment, Strength of Material and Proper Setting of Frames, Doors
- Unit 1.13 Adhesives, Sealants and Other Filling Materials Used in Fittings
- Unit 1.14 Safety Standards and Precautions/Personal Protective Equipment
- Unit 1.15 Quality Standards to be Maintained
- Unit 1.16 Standard Operating Procedures
- Unit 1.17 Reporting and Documentation Skills



Key Learning Outcomes

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

- 1. Identify the various types of glass doors and windows fitting products manufactured by the company along with their functions, specifications and components
- 2. Discuss the know-how of marking, cutting glass, polishing, repairing rough edges etc.
- 3. Demonstrate the process of assembling door and windows and placement of glass
- 4. Demonstrate the process of assembling and dismantling procedure of components for different products List Product and Workplace Safety Specifications
- 5. Identify various types of defects and troubleshooting common errors
- 6. Compare relevant hand and power tools
- 7. Discuss units of measurement
- 8. Practise handling of tools and equipment with care on finished surface
- 9. Identify common faults encountered with equipment and the methods to rectify them
- 10. Discuss alignment, strength of material and proper setting of frames, doors and other fittings
- 11. Discuss Adhesives, Sealants and other Filling Materials used in fittings of glass and other structures
- 12. Different types of personal protective environment and their usage
- 13. Appraise the quality standards to be maintained
- 14. Explain standard operating procedures
- 15. State the importance of reporting and documentation skills

Unit 1.1 Introduction



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

- 1. Discuss about the Furniture & Fittings sector in India
- 2. Discuss about and introduce the job role of assembler- doors/windows (glass)
- 3. Describe the common types of glass and their properties

1.1.1 An Overview of the Furniture & Fittings sector in India

- Currently, India is the 14th largest market in the world for the Furniture and Fittings sector, as stated by HKTDC Research.
- The Indian middle-class population and business organizations are gradually recovering from the temporary market decline, which was driven by recent economic reforms and measures like Demonetization, introduction of the GST (Goods and Services Tax) and advent of the Long Term Capital Gains Tax.
- The GDP (Gross Domestic Product) of India, for the fiscal year 2018-19, has been forecasted to grow by 7-7.5% by the Economic Survey of India (2017-18).
- This can be attributed to the rise of per capita income level and the subsequent growth in consumption by the urban and semi-urban middle-class population.
- The choice and consumption of middle-class population in India are now driven by need, quality and convenience, rather than affordable prices.
- Middle-class households are now interested in enhancing their lifestyle standards by decorating their homes with modern and glass-fitted doors and windows.
- The Furniture & Fittings sector in India has been forecasted, by TechSci Research, to beat INR 3200 crores by 2019.

1.1.2 Introduction to the Job Role of Assembler-Doors/ Windows (Glass)

The Assembler- Doors/Windows (Glass) is responsible for assisting the technician and the rest of the team for installing glazed/ toughened/ plain glass windows, doors with fittings and fixtures.

She/he would be required to prepare for the installation by undertaking preparatory work and assisting in installation at the work site, in accordance to client requirements and quality standards.

- The job responsibilities of an Assembler- Doors/Windows (Glass) are given below:
 - Assembling structural components like doors, metal sashes, windows, window screens etc., using appropriate hand and power tools
 - Assembling frame components like tops, bottoms, sides, panels, moulds and fixtures
 - Smoothening the uneven edges of components for obtaining the specified and desired fit, using appropriate tools like Grinder or File
 - o Punching and drilling holes for fastening, using tools like Hole Punch or Power Drill

- o Aligning holes, connectors and components together, using Screwdriver or Wrenches
- o Taking appropriate measurements, as per desired specifications and work order
- o Marking and cutting glass to specified size
- o Arranging and organizing workpiece in measuring jig to verify dimensions
- \circ $\;$ Examining workpiece for detecting scratches, cracks and other defects $\;$
- o Using adhesive, putty, sealants etc. on frame and arranges pre-cut glass panes into the frame
- In order to be a successful Assembler- Doors/Windows (Glass), students need to have the following skills:
 - o Knowledge of basic carpentry skills
 - Knowledge on the usage of power tools
 - Knowledge on Computer basics, including MS Office, AutoCAD, Internet usage, etc.

1.1.3 Common types of glass and their properties

Type of Glass	Properties
Float glass	Also known as Soda Lime glass, this is fabricat- ed out of Sodium silicate and Calcium silicate. This glass is clear and flat, causing glare. Weight ranges between 6 to 36 kg/m2.Thickness ranges between 2 - 20 mm.
Shatterproof glass	This glass is used for building windows, skylights, floors, etc. This is primarily made of plastic poly- vinyl butyral and hence, cannot form sharp edges or jagged pieces on breaking.
Laminated glass	This is fabricated by combining multiple layers of common glass. It is, hence, heavier than common glass. Used in aquariums, green houses and bridg- es, it is very thick and is resistant to Ultraviolet radiations and sound waves.

Type of Glass	Properties
Extra clean glass	This type of glass is photocatalytic (easily reacts to and absorbs light) and hydrophilic (easily gets wet by water). This is resistant to stain and in- volves easy maintenance.
Chromatic glass	
	This type of glass is generally used in Meeting Rooms, Eyewear and Intensive Care Units in hospitals. This controls the transparent efficiency of glass and prevents daylight from entering the interiors.
Toughened / Tempered glass	Toughened or Tempered glass is a type of safety glass fabricated by controlled thermal or chemical treatments, to increase its strength, as compared with normal glass. Tempering subjects the outer surfaces to compression and the interior to ten- sion. Such stresses cause the glass, when broken, to crumble into small granular chunks instead of splintering into jagged shards as plate glass does. These granular chunks are less hazardous.These glasses are mainly used in fire resistant doors, mobile screen protectors, etc.
Insulated Glazed Units	
	This type comprises a glass sheet, separated into two to three layers by air or vacuum. This glass serves as a good insulator because of the air layers.

Unit 1.2 Various Types of Glass Doors and Windows Fitting Products

– Unit Objectives 💆



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

1. Describe the various types of fitting products for glass doors / windows

1.2.1 Various types of fitting products for glass doors / windows

Glass doors and windows come with various types of fitting products and accessories, based on the need and taste of the consumer. These are generally made of Aluminium, Zinc die-casting, forged Brass and 316 Stainless Steel.

Patch Fittings:

Functionality of Patch Fittings

- Patch Fitting is a modern, frameless glass concept, which incorporates the toughened glass (tempered and heated glass for strengthening) technology and is used in partitioned glasses.
- In Patch Fitting, silicon sealants are used as cushioning agents between the glass panels.
- Patch Fitting makes the glass door / window hardware architecture highly durable and strong. These are readily available in the market.
- Patch Fitting enables secure and reliable mounting of glass doors / windows.

Patch Fittings - Components and Specifications:

Name of Component	Description / Specifications (Sample)	Image
Bottom Patch	 Comes with an insert for Floor Closer Type is Pivot or Round Pivot (Diameter: 9/16") Pivot Location: 2-3/4" Weight in Kgs: Aluminium: 0.564 Brass: 0.680 Stainless Steel: 0.662 	









Single Door with Over- panel on top	Comes with: 1 Overpanel Patch with fixing plate 1 Top Patch 1 Bottom Patch 1 Corner Patch Lock 	
Double Door with Over- panel on top	 Comes with: 2 Overpanel Patches with fixing plates 2 Top Patches 2 Bottom Patches 2 Corner Patch Locks 	
Single Door with Over- panel & Sidelight	Comes with: 1 Overpanel Patch 1 Connector for Overpanel / Sidepanel 1 Bottom Patch 1 Top Patch 1 Corner Patch Lock 	
Single Door with Over- panel & Side- panels (each side)	Comes with: 1 Overpanel side patch 1 Connector for Overpanel / Sidepanel 1 Bottom Patch 1 Top Patch 1 Corner Patch Lock	

Double Door with Over- panel & Side- panels (each side)	Comes with: • 2 Overpanel side patches • 2 Bottom Patches • 2 Top Patches • 2 Corner Patch Locks			
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B. Glass Door / Window Connectors:

Functionality of Connectors

- Connectors, as the name suggests, help in attaching two objects.
- The common connectors used in Glasswork are various types of Handles, Hinges and Knobs.

Patch Fittings - Components and Specifications:

Name of Component	Description / Specifications (Sample)	Image
Glass Connectors (Type 1)	 One connecting panel between Wall to Glass Weight-carrying capacity: 20 Kgs/pair 	$ \begin{array}{c} $
Glass Connectors (Type 2)	 Two connecting panels between Wall to Glass Weight-carrying capacity: 20 Kgs/pair 	



	 Type 2: 3 Point Fixing Diameter: 35 mm, Material Thickness: 1.35 mm Centre to centre bottom: 925 mm, Centre to centre upper: 725 mm End to end: 1800 mm Material: Stainless steel Type 3: 3 Point Fixing Diameter: 35 mm, Material Thickness: 1.35 mm Centre to centre bottom: 925 mm, Centre to centre upper: 925 mm End to end: 2000 mm Material: Stainless steel 	
	 Type 4: 3 Point Fixing Diameter: 35 mm, Material Thickness: 1.35 mm Centre to centre bottom (C1): 1125 mm, Centre to centre upper (C2): 1125 mm End to end: 2400 mm Material: Stainless steel 	
Stainless Steel Pull Handles	 Installation height: 85 mm Opening diameter: 12 mm Fastening screws: included Material: Stainless steel Back to back handle diameter: 19-32 mm Centre to centre length: 150-1500 mm End to end length: 300-1800mm 	



	 Type 2: Material: Brass with Chrome plating For Glass thickness: 8-12 mm 	9°. 0° 1° 1° 1° 1° 1° 1° 1° 1° 1° 1° 1° 1° 1°
90° Glass to Glass Hinge	 Material: Brass with Chrome plating For Glass thickness: 8-12 mm 	
180° Glass to Glass	 Material: Brass with Chrome plating For Glass thickness: 8-12 mm 	50 50 0 51 0 51 0 0 0 0 0 0 0 0 0 0 0 0
90° Glass to wall Hinge (standard base plate)	 Self-closing from 30° Material: Brass with Chrome plating For Glass thickness: 8-12 mm 	
90° Glass to wall Hinge (forked base plate)	 Self-closing from 30° Material: Brass with Chrome plating For Glass thickness: 8-12 mm 	OG U U U U U U U U U U U U U U U U U U U



Unit 1.3 Marking, Cutting Glass, Polishing, Repairing Rough Edges etc.

- Unit Objectives 💆



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

- 1. Explain and demonstrate the process of marking
- 2. Explain and demonstrate the process of cutting glass
- 3. Demonstrate the processes of polishing and repairing rough edges

1.3.1 Marking

Marking is defined as the process of transferring specific dimensions from the blueprint / plan to the workpiece, in preparation for the next step.

	Tools Required
Marking Pencil - In India, Assemblers normally use 4H Pencils, which are very hard and can write or mark almost on any surface.	
Marking Knife - A good Marking Knife is another asset for the Assembler. There are many different kinds, but the kind that uses disposable blades is the most common. The blade retracts into the grip for safety.	



1.3.2 Steps in Marking Glass

Preparing for Measuring and Marking

Step 1: Select the appropriate tools for marking. For ex - select a Scriber with diamond tip for marking on the glass workpiece.

Step 2: Determine the physical quantity you need to measure on the workpiece. Say, you want to measure the length of a piece of glass and have to mark half the length.

Step 3: Clean the glass workpiece, on which you are required to make the mark, with soft fabric.

Measure materials using appropriate tools and equipment and mark outlines or pattern on glass for cutting

Step 4: Select appropriate measuring tools to measure accurately. Say, select a commercial measuring tape to measure length of the glass. Clasp the hook of the tape to the work piece and pull out the spool to the other end. Tip the measuring slide of the tape down against the work piece.



Fig. 1.3.2: A Commercial Measuring Tape can be used for measuring accurately before marking on the glass workpiece

Step 5: Make a mark, with the help of the Scriber, at the end tip of the Measuring tape. Hold the Scriber / Marking Pencil correctly for marking.



Fig. 1.3.3: Hold the Scriber / Marking Pencil correctly for marking on glass workpiece

Precaution while Marking:

The Assembler must be extremely careful while marking on glass, because any mistake committed while marking would lead to cutting wrong dimensions on the glass workpiece. Thus, the entire project would go wrong. Before marking, the Assembler is advised to verify the specification to be marked from the Blueprint or the Work Order.

Assist in cutting, grinding or polishing glass, smoothening surfaces with materials or tools as needed in accordance to design and client requirement

An Assembler assists the Technician or the Leadin the various processes in glass cutting, grinding or polishing. Depending on the level of precision, customer specifications and degree of finesse, the processes and their steps may be repeated by the Assembler. However, adequate safety precautionary measures, like using appropriate PPE and exercising safe handling techniques, must be implemented by the Assembler in carrying out his / her responsibilities.

1.3.3 Cutting _____

Cutting is the process of segregating the whole glass workpiece into smaller sizes, as specified. It is essential that the workpiece is cut by a professional and in appropriate sizes. Glass, with thickness exceeding 4 mm is considered most suitable for cutting.

Tools Required		
Handheld Glass Cutter with Diamond Blade - This comes with a diamond blade, which is strong enough to cut the glass workpiece, along the score etched by marking tools. Care should be taken that the cutter is held gently, to avoid breaking the glass.		



1.3.4 Steps in Cutting Glass

Step 1: The Assembler should put on the appropriate Personal Protective Equipment, say, Safety Glasses and Gloves.

Step 2: The glass workpiece / sheet should be placed on a cushioned surface, preferably one that is slightly soft and would not scratch the glass. Soft cardboard would be a good choice.

Step 3: The glass surface should be cleaned gently, with the help of soft fabric, along where the cut is required to be made. Any dirt or grime on the glass can ruin the etch / cut.

Step 4: The Assembler should measure and mark the glass at desired position, leaving about six inches of glass on each side to grip and break. A marker and a straight edge may be used to draw the cutting line. The desired mark can also be made on paper and then the glass workpiece can be placed on the top of the paper.

Step 5: Now, the cutter should be dipped in the cutting oil and grasped like a pencil.

Step 6: The straight edge should be used as a guide and the assembler should etch the glass, in one even, sweeping motion of hand.

Step 7: A soft sound, like that of ripping silk, would be heard if the glass workpiece is etched properly. In case a gritty sound is heard, or, little glass flakes are see flying into the air, the Assembler should be warned that he / she is either pushing too hard or the cutter has not been oiled properly.

Step 8: The cutter should be run smoothly, from one edge to the other. The Assembler should ensure that the etched line runs completely along the edge.

Step 9: Finally, the workpiece should be grasped gently from both sides of the etched line and snapped into the desired pieces, without applying excessive pressure.

Precautions while Cutting:

- Care should be taken that the cutter should strike on the marked line only once. For thick glasses, the cutter should be used on both the sides of the glass.
- Care should be taken that the work area is clean and free from dust, splinters and debris.
- A soft, cushioning fabric, like blanket or carpet, should be used mandatorily on the work surface, before the glass is placed on it for cutting.
- The Assembler must always wear appropriate PPE while cutting glass.
- Eyes must be washed immediately, in case of irritation or pain during glass cutting.
- A physician must be consulted if pain persists even after washing.
- Care should be taken that the glass edges do not get chipped while cutting.

1.3.5 Polishing and Repairing Rough Edges

After glass is cut, its edges are rough and uneven. Besides, they comprise scratches, digs, cracks and irregularities. They are, hence, subjected to grinding operations, followed by Polishing. Polishing is the process of imparting the appropriate and desired finish to glass, before installing in doors and windows, or delivering at the client's location.

Tools Required	
Diamond File - These tools are used to give shape to a piece of glass and level its rough edges	
Glass Grinders (powered) - This comes with an electrically powered motor, which turns a spindle. This spindle is fitted with a diamond-coated brass barrel, equipped with Allen Key or Grinder Bits. When the barrel rotates, glass is placed against the edge and grinding gets done.	

Emery Cloth - This is a type of coated abrasive that has emery glued to a cloth surface. Com mon sizes are, from coarse to fine: 40, 46, 54, 60, 70, 80, 90, 100, 120, 180, 220, 320, F, and FF. A 46 or 54 grade cloth is used on roughly filed work, while 220 to 320 grit cloth will give a good polish.

Sandpaper - This is a type of coated abrasive that consists of sheets of paper or cloth with abrasive material glued to one face. Sandpaper is available in a range of grit sizes and is used to remove material from surfaces, either to make them smoother or to remove a layer of material.





Powered Drill with Sand Bit- Handheld power drills are used for general purpose boring and the creation of straight, clean holes.

Powered Drill



Powered Drill



A. Repairing Rough Edges

This is a grinding process required to remove all foreign particles and deformed materials from the glass edges. Sometimes, the process must be repeated, depending on the roughness of the edges and the required degree of finesse and precision. The Assembler should note that the removal rate decreases with each subsequent step.

a) Using Emery Cloth

Step 1: An Emery Cloth is preferred to Sandpaper, because it is easier to run it around the edges.

Step 2: The glass should be wrapped around by the Emery cloth; during this process, the Assembler must wear safety gloves to minimize contact of the rough Emery cloth with his / her hands.

Step 3: The glass should be placed in the Assembler's non-dominant hand and held steadily.

Step 4: The Emery cloth should be rubbed and worked up around the sharp edge.

Step 5: The above steps should be repeated with medium and low grit Emery clothes, depending on the degree of finesse to be achieved.

b) Using Powered Drill with Sanding Bit

Step 1: The Assembler must wear PPE like protective gloves, safety glasses and ventilation mask.

Step 2: A medium-grit Sandpaper bit should be selected by the Assembler. The larger the Sanding bit, the more of the edge it will be able to smoothen at a time.

Step 3: Next, the glass should be held with the Assembler's non-dominant hand. Placing the glass sheet

inside a Clamp is not recommended, because this would, most likely, crack the glass.

Step 4: The Power Drill must be started by pressing the power button.

Step 5: The Drill should be worked in towards the center and out towards the outer edges, in order to obtain a round, even edge. The drill must be rotated slowly until it has travelled around the entire outer edge.

Step 6: The above process must be repeated with a fine-grit Sand bit.

B. Polishing

Glass Polishing can be accomplished using any one or a combination of the following methods:

Chemical-mechanical Polishing	This is a combination of abrasive polishing and chemical etching.
Flame Polishing	Method of polishing glass by subjecting it to flame or heat. The glass surface melts, and gets smoothened gradually by surface tension.

Unit 1.4 Assembling Door and Windows and Placement of Glass



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

- 1. Manage preparatory work and on site assessment before work initiation
- 2. Demonstrate how to assist in installing glass doors and windows

1.4.1 Manage Preparatory Work and on Site Assessment

Before starting with the installation and assembling processes, an Assembler must thoroughly prepare for the same by organizing ad cleaning the work area, tools and equipment, as well as by assessing the site, by appraising the risks involved and taking appropriate measurements. Any job requires good planning, and that of an Assembler is no exception.

A. Gather and organize required tools and equipment, hardware fittings for assembling and installation of fitting

- The general workflow for an Assembler during the preparatory phase is:
- Unpacking the requisite tools, equipment, components and hardware fittings to organize them in a proper sequence
- Verify and visually inspect the unpacked components and hardware fittings, as per industry standards and the work order
- Check the functioning of tools and equipment and assess if there is requirement for replacing or repairing them
- Plan and organize the activities/steps to be taken to execute the work in accordance with the timeline/schedule and the sequence



Fig. 1.4.1: An organized work area
The various steps involved in preparing, planning and organizing work are:

- 1. Developing objectives and goals
- 2. Designing methods (tasks) to meet these objectives and goals
- 3. Determining and allocating resources needed to accomplish tasks
- 4. Determining a time line, over which the entire project / assignment will be carried out
- 5. Evaluating each task, according to its outcomes
- 6. Monitoring and tracking the evaluation process of each task
- 7. Finalizing the plan
- 8. Distributing the plan among all concerned people in the team

B. Unpack the material /parts as per instructions of lead

Glass is extremely fragile and brittle in nature. Glass can not only break very easily, but also develops scratches, rubs, lines and digs. While unpacking hardware components and tools, the Assembler must handle them carefully, to avoid the glass pieces / sheets coming in contact with any hard surface.

- Select a spacious area for unpacking and clean it thoroughly, so that no hard or sharp thing (which can break or scratch glass) is in immediate vicinity. It is recommended that unpacking is done on the floor and not at a height (like tables).
- Read the labels on the packing boxes/packets carefully and look out for ones like "Fragile" or "Brittle". Unpack these first.
- Place a soft fabric, carpet, rug or cushioned mat on the work area and ensure it is clean.
- Open the tops / lids of the boxes, labelled "fragile", gently, with the help of a common utility knife. Deal with one box at a time.
- Take out the materials from the box, one by one, wrap them in soft cushioning fabric or paper, and place them carefully on the carpet / rug spread over the work area beforehand.
- As you unpack an item, tally its specifications and other aspects with that of the Cart Specification Details.
- Inspect all items visually and look out for defects and missing items. Escalate such cases to the lead.
- After completing the unpacking process, do not keep the work area cluttered. Dispose of all parts of the packing carton / box and the packing materials in appropriate manner and locations.

C. Assist in carrying out a risk assessment for the installation process and accordingly advise the client on the hazards associated with the work

Before initiating the assembly and installation process, the Assembler must evaluate the hazards associated with the processes and advise the client accordingly. This is accomplished with the help of the Risk Assessment Form. Once the Assembler identifies the hazards associated with the work, with the help of this form, he / she cautions the client about the consequences and accordingly advises the client on how to avoid the potential risks. The client needs to ensure that all remedial repair work is done by a licensed / authorised professional.

The various components of the Risk Assessment Form are:

- Identify the hazards
- Determine who could be harmed and how
- Assess the level of risk(s) associated with these hazards and analyze if the existing precautions are adequate to combat them
- Record the findings
- Review the Assessment Form and revise, if required

Risks can be assessed from the below parameters:

- Severity (S): Negligible, Marginal, Critical and Catastrophic
- Likeliness (L): Rare, Unlikely, Possible, Likely and Certain

	Negligible	Marginal	Critical	Catastrophic
Certain	High	High	Extreme	Extreme
Likely	Moderate	High	High	Extreme
Possible	Low	Moderate	High	Extreme
Unlikely	Low	Low	Moderate	Extreme
Rare	Low	Low	Moderate	Extreme

To understand better, see the table below:

Hazard	Potential Risk	Risk Ranking	Category	Advice to Clients
Cracked Walls (condition of wall)	Concrete Breakage	High	L - Likely, S - Critical	Immediate repair is needed. The crack needs to be opened up first and the loose concrete , debris, paint, etc. must be cleared. Then, the opening must be filled up properly using filling solution.

Hazard	Potential Risk	Risk Ranking	Category	Advice to Clients
Chipped-off Corners and Edges (condition of wall)	Concrete Breakage	Medium	L - Possible, S - Marginal	Urgent repair is needed, with the help of stiffening paste or paintable caulk, and a small putty knife. The paste / caulk must be left to dry off first before any other work begins. Other remedies include additional reinforc- ing bars and applica- tion of thick precast elements.
Dimensional Deviation (condition of wall)	Concrete Breakage	High	L - Likely, S - Critical	Immediate correc- tion is required. For minor deviations, Surface Grinding, Trimming, Hack- ing and Skim Coat Application can be useful. In case of major deviations, it is advisable to use an alternate route for installation / assembly.
Fractured / Chipped Glass	Glass Break- age	Medium to High	L - Possible, S - Marginal	Urgent replace- ment of the glass is required.

í	1	1	1
People	High to Ex-	L - Certain,	Immediate replace-
entering	treme	S - Critical	ment of the glass is
through			required.
these glass			
entrances			
and getting			
cut fatally			
Concrete	High to Ex-	L - Certain,	Immediate assis-
Breakage	treme	S - Critical	tance from a profes-
			sional Pest Control
			team is required.
			Then, the decayed
			area of the wall
			must be chiselled off
			using a chisel. The
			gaps must be rebuilt
			using fillers, plaster.
	People entering through these glass entrances and getting cut fatally Concrete Breakage	People entering through these glass entrances and getting cut fatallyHigh to Ex- tremeConcrete BreakageHigh to Ex- treme	People entering through these glass entrances and getting cut fatallyHigh to Ex- tremeL - Certain, S - CriticalConcrete BreakageHigh to Ex- tremeL - Certain, S - Critical

The common format of the Risk Assessment Form is given below:

A. Assessment Details			
Area / Task / Activity: Dealing with Broken Glazing and Fractured Glass			
Name of Client:		Name of Assembler / Person conducting the Risk Assessment:	
Address & Contact Information:		Date of Assessment:	
Mode of Communication to Assembler:		Date Communicated to team:	
Signature of Client:		Signature of Assessor:	

B. Hazard Identification & Control Measures				
Step 1: Identify hazards	Step 2: Identify v and how	Step 2: Identify who may be harmed Step 3: Identify existing precautionary measures		
List of Hazards	Vulnerable Persons	Type of Harm	Existing Controls	
1.	1.	1.	1.	
2.	2.	2.	2.	
3.	3.	3.	3.	

1.4.2 Assist in Installing Glass Doors and Windows

A. Put markings of placement positions and access the fastener system to fasten the hardware accessories or fittings as per worksite requirements

Fastening hardware accessories, fittings and connectors, is an extremely important aspect of assembling and installing doors and windows. An even more important aspect is to take accurate measurements, according to worksite requirements and specifications, and mark placement positions correctly. Proper and professional fastening, using appropriate fastening tools would ensure that the fittings are robust and durable.

Here, we shall discuss the **marking**, **placement and fastening processes** for the following hardware accessories:

- Hinges
- Floor Springs
- Overhead Closers
- Handles
- Latch / Bolts

Hinges

Hinges are types of connectors, which are installed between two objects. For example, a hinge is attached between a door and the door frame. Hinges allow doors to open at a definite angle. It clamps the furniture with the frame.





Flag Hinges

Butt Hinges

Back Flap Hinge





Tools Required in Marking, Placement and Fastening Hinges:







Phase	Objective	What to Do
Mariling and	Discing the binges at	The precise location for the hinges must be selected on the door / window frame.
		A minimum of two hinges would be required: one should be located 7 inches from the top of the frame, while the other one would be located 11 inches from the bottom of the frame.
Placement	correct position	This distance must be measured and the location marked on the frame.
		The above step must be repeated for the door / window under assembly / installation.
		In case a third hinge is used (for heavy doors / windows), the Assembler should place it directly in the middle of the other two hinges (this will put it slightly off-center).
		The hinge must be put in place on the door / window and the jamb (a side post or surface of a door/ window), and a Marking pencil should be used to trace around the hinge lightly, carefully yet visibly.
		The Assembler must ensure that the depth of the hinge on the jam must always be as thick as the hinge itself.
Tracin hinge	Tracing around the hinge lightly	The Assembler must recheck to ensure that the traced outlines match exactly the same location on the door / window and the jamb, before proceeding with the next step.
		The above step must be repeated for the door / window under assembly / installation.
		An Utility Knife is ideal to etch the traced outline, since this would make it easier for the Assembler to cut the mortise.

Tools Required in Marking, Placement and Fastening Hinges:

		Mortise is defined as a hole, designed to
		lock two parts together.
		Mortise and Tenon Joint
	Cutting the Mortise	In this step, the wood in the jamb is cut in the shape of the hinge, so that the hinge would ne robustly set in the jamb.
		The mortise must be cut by carefully angling the chisel and tapping gently into the jamb from the side, thus removing thin strips of wood.
		The mortise must not be cut too deep, since this would result in the hinge getting loose over time.
		Only the outlines area and the marked depth must be cut precisely.
		The hinge must be put back in the jamb, where the mortise has been cut.
	Marking the location of the Screws	With the help of the Marking Pencil, the location of the screws in the jamb must be marked.
		The above step must be repeated with the hinge's location on the door.
	The hinges may be removed after the Assembler is done away with marking.	

	Drilling the pilot bolos	Fasteners like Electric Drill or Screwdriver are ideal for this purpose. These fasteners help in drilling narrow and precise pilot holes (small holes drilled ahead of a full-sized hole and used as guides) in the location of the screws, marked on the jamb.
		On drilling the pilot holes, the screws must be placed in them and tapped in lightly, to ensure that they do not move off place accidentally.
		A Screw Guide may be sued to ensure that the screws are straight, while they enter the wood.
	Installing individual hinges	The hinges must now be put in their respective places and, with the help of a drill or screwdriver, secured individually into the jamb and the door.
Fastening		Finally, the door must be held in place, with the help of blocks under the bottom for the necessary support.
	Connecting the door /	Both hinge plates must be lined up, so that the ones on the door and the ones on the jamb, match.
	window to the jamb	The hinge pins must slide into appropriate place and the supporting blocks may now be removed from the door.
		Open and close the door to check if the hinges are working properly.

Tips to follow:

- Extreme diligence must be exercised by the Assembler during the Drilling process, since Drilling is irreversible and wrong drilling can ruin the entire workpiece.
- The Assembler must ensure that the chisel, used to cut the mortise, is sharp. This is because, cutting a mortise with a blunt chisel requires application of more pressure with the hammer, which is dangerous and may result in a slip.
- In case the mortise is cut too deep, a wooden filler may be placed in the mortise before installing the hinge.



Tools Required in Marking, Placement and Fastening Hinges:

- Circular Saw
- Marking Pencil
- Electric Drill
- Screws
- Automatic Screwdriver
- Try Square

Phase	Objective	What to Do
Preparation	Selecting an appropriate Floor Spring	 The Floor Spring unit must be selected on the basis of the below criteria: Door Dimensions (Door Width and Door Weight) Closing Speed Variation Safety and Durability requirements Control over the Closing Rate Performance during Fire Outbreak
	Deciding size and position	The position and size of the ground dig- ging hole and that of the pilot holes must be decided upon.
	Placing the unit appropriately	The Floor Spring unit must be placed appropriately over the ground digging hole.
Marking and Placement	Marking and tracing with pencil	With the help of the Marking Pencil, the outline of the unit, as well as the pilot holes, must be traced. The Floor Spring unit is now removed
		from position. The Ground Hole is now cut along the traced outline and dug according to the desired depth. Cutting is done by a Cir- cular Saw. An Electric Drill is used to drill the pilot holes in traced positions. The Cement Box must now be placed
	Cutting & Digging the Ground Hole and Placing the Cement Box	with the door spring.
		Floor Spring.

		The Floor Spring position must now be adjusted inside the cement box. An Auto- matic Screwdriver must be used to fasten the screws in pilot holes.
Fastening	Fastening Screws and Adjust-	The Closing and the Latching speeds must now be adjusted.
		The plate must now be covered and fixed.
		The Assembler must check if the Floor Spring unit is working fine.

Overhead Closers









Tools Required in Marking, Placement and Fastening Overhead Closers:

- Marking Pencil
- Washer / Arm Screw
- Screwdriver
- Electric Drill
- Try square

Marking, Placement & Fastening Process for Overhead Closers:

Phase	What to Do
Checking Functionality of other hardware	To begin with, the Assembler must ensure that all other parts of the door hardware are in good working condition.
Selecting an appropriate Overhead Door Closer	 Depending on need and specifications, the type of Overhead Door Closer must be selected. The basic criteria for selection are: Size and weight of the door Location of the door Opening and closing frequency Mounting location Affordability Backswing requirements

	Using the measurements from the sketch, the screw hole center locations must be marked, with the help of a Marking Pencil.
Marking and Placement	Four hole locations must be marked on the door itself for the door closer and two hole locations must be marked on the frame for the Arm Shoe.
	Pilot holes must be drilled in the door and the frame: 7/32 inches (5.5mm) diameter holes for wood screws or drill and tap 0.201 inches diameter) for 1/4 - 20 machine screws.
	The adjustable forearm / arm shoe must be installed to the frame, using screws, as recommended in the sketch and BOM.
Fastening	The door closer must now be mounted on the door, using appropriate screws, as recommended in sketch and BOM. The speed adjusting valves should be positioned towards the hinge side.
	The main arm must be installed perpendicular to the door and tightly secured with arm screw / washer screw.

Tools Required in Marking, Placement and Fastening Handles:

- Marking Pencil
- Measuring Tape
- Masking Tape
- Template from Handle Installation Kit
- Electric Drill
- Screws
- Chisel
- Hammer
- Wooden Wedge

Marking, Placement & Fastening Process for Handles:

Phase	Objective	What to Do
	Measuring 41	The most common placement for a common door handle is 41 inches (100 cm), if the specifications does not instruct otherwise.
Marking and	from the floor	The end of the Measuring Tape should be placed on the floor and the narrow part of the door must be marked with the help of a Marking Pencil.
Placement	Attaching the kit's template to the door	With the help of a Masking Tape, the template must be attached to the door.
	Making the nec- essary markings	With the help of the pencil, marks must be made on the template to indicate drilling positions.

		These marks must be made accurately on the mirror portion as well as both the outer sides of the door.
	Placing a wedge at the bottom of the door to keep it in position	The wooden wedge must be inserted into and fitted at the bottom of the door, as close to the wall as possi- ble.
		A 2 mm drill bit must be used to drill pilot holes in the door's front, back and narrow parts. The kit's template must be used to drill the pilot holes in the desired locations.
	Drilling pilot holes into the door	The Assembler must ensure that the drill level is kept at par with the floor, in order to avoid visible damages to the door.
		The kit instructions must be read properly to know and select the exact drill bit size, required to enlarge the pilot holes.
		The Assembler must ensure that he / she does not drill all the way through the door on either side.
		The template instructions must be diligently followed to select the desired drill bit size. The template must be placed and the required spindle holes are drilled in the right locations.
Fastening	Drilling Spindle Holes into the outsides of the	The two spindle holes are drilled on both front and back sides of the door. These are the holes, where the handle would actually be inserted and attached.
		Following the template instructions, an appropriate drill bit size is selected and holes are drilled into the narrow portion of the door. The wedge must be re- checked to avoid damages.
		The handle's faceplate must be traced with the help or a Marking Pencil.
		The faceplate outline must be chiselled out, at 45 degree angle, with a chisel and hammer.
	Setting, mounting and attaching the	The faceplate must be screwed into the narrow part o the door.
	door handle	The door handles must be placed into the spindle holes.
		The strike plate must be attached into the door jamb.
		The Assembler must finally check if the door unit is working properly after installing the handle.

Tips to follow:

- Extreme diligence must be exercised by the Assembler during the Drilling process, since Drilling is irreversible and wrong drilling can ruin the entire workpiece.
- The Spindle Holes must be drilled carefully and accurately, because these are the holes, where the door handle would finally be inserted.
- Extra caution must be exercised while drilling into the narrow part of the door, since this has a small surface area.
- In case the door knobs are dysfunctional, they must be unscrewed and rechecked that they have fitted into the spindle properly.

Latches

Tools Required in Marking, Placement and Fastening Latches:

- Marking Pencil
- Try Square
- Measuring Tape
- Screwdriver and screws
- Chisel
- Hammer
- Electric Drill

Marking, Placement & Fastening Process for Latches:

Phase	Objective	What to Do
	Placing the latch in place on the edge of the door	The latch must be placed in a way so that it is centred on the cross bore hole.
		The perimeter must be marked with the help of a Mark- ing Pencil. This helps the Assembler in knowing exactly where to chisel and scrape out the wood of the door.
Marking & Place- ment	Cleaning out the center with a chisel	To accomplish this, a sharp and well-honed chisel must be used. To start with, the perimeter of the place to be chiselled must be etched using the chisel. This etched outlines encloses the area to be scraped and chiselled out.
	Scraping off and cleaning out the interior of the perimeter with the chisel	The most common practice is to chisel and scrape out about 1/8 inches of door surface.
	Checking and en- suring the depth is correct	The dimensions of the mortise plate and the latch must be rechecked to ensure that the mortise plate and the latch, once combined, must be about 1/8 inches thick.
Fastening	Installing the latch	For perfect installation, the curvature of the latch end must be placed appropriately so that the curved part strikes the jamb.



Tools Required in Marking, Placement and Fastening Bolts:

- Door bolt kit
- Marking Pencil
- Try Square
- Measuring Tape
- Small spirit level

- Medium grade sandpaper
- Hammer
- Chisel
- Philips screwdriver
- Electric Drill
- Selection of small drill bits 2 4mm if possible or a bradawl

Marking, Placement & Fastening Process for Bolts:

Phase	Objective	What to Do
	Determining the Height of the	The first step is determining the height at which the bolt should reside. Once the position is decided upon, only the bolt must be held on the door, at decided position.
	Door Latch	The bolt must be positioned exactly on the edge of the door, in order to avail the maximum length available from the bolt.
		With the help of a Marking Pencil, a mark inside the screw hole on the bolt must be made farthest from the door's edge.
Marking & Placement		In order to ensure, that, the bolt is fitted level and straight, one screw must be inserted first and the level- ling must be done from there.
	Marking the First Screw Hole and Drill Pilot Hole	Once the screw hole is marked, the bolt must be re- moved from the door.
	Drint not flore	A pilot hole for the screw must be made next. A small drill bit (2-3 mm) must be selected (if the manufacturer has not instructed otherwise in the kit manual).Alter- nately, a Bradawl may be used, if such a fine drill bit is not available.
		A hole of 5 mm diameter must be drilled.
	Scrowing on Door	The bolt must now be positioned back on the door, so that the screw hole is over the pilot hole.
Fastening	Bolt in the First Screw Hole	The screw must be inserted into the hole, with the help of a screwdriver or drill. care should be taken that it does not get tightened thoroughly, leaving space for little movement.

		1
		The hanging bolt must be swung up, until it is visual level. With the help of the Spirit Level / Boat Float, th bolt must be positioned along the flat top edge of th bolt and adjusted till it is perfectly level.
	Levelling Door	The top left hand screw hole must be marked with th help of the Marking Pencil.
	Second Screw	The Spirit Level must now be removed and the bo swung back down.
	noie	Another pilot hole must be drilled for the second screw with the same drill and drill bit.
		The bolt must be swung back up. The screw must be in serted and tightened all the way up. The top right har screw must be tightened as well.
	Inserting Remain- ing Screws	There may be more screw holes, depending on the type and size of lock. The above steps must be repeated for drilling pilot holes, inserting screws and screwing them up.
		Now that the door bolt is fixed firmly onto the door, the final task is fixing the bolt keep onto the door's frame
	Marking Fixings for Door Keep	The bolt must be slightly extended outwards and the bolt keep must be pushed over it. The door must be closed up until the keep touches the door frame.
		This helps in marking the position on the frame, whe the keep needs to be fixed exactly. The position mu be marked with the help of a Marking Pencil.
Marking & Place- ment	Chicalling out	In order to make the door keep remain fixed at the bolt's level, it is essential to chisel out a small portion of the architrave (moulded frame around a doorway of window).
	the Architrave, if required	With the help of the Marking Pencil, the area arour the keep, that must be removed, must be marked ar the door must be opened up.
		The marked portion on the architrave must be chiselle and scraped out, until it reaches the door frame grad ually.
	Finishing the Recess	After chiselling is done and bulk is removed, the edge must be finished with the help of a medium grade Sar Paper.
Fastening		Finally, the bolt deep must be put back onto the bolt end and the door must be closed back up.
rasching	Fixing the Door Keep	The keep must be placed on the door frame and, with the help of a Marking Pencil, the position of scree holes must be marked on the frame. Space for mov ment must be allowed to prevent excessive stiffening effect while closing the holt

The keep must be removed and the door must be opened up again.
The pilot holes must be drilled in, using the same steps as above. The bolt keep is finally screwed firmly onto the door frame.

Knobs

Tools Required in Marking, Placement and Fastening Knobs:

- Latch Kit
- Knob Kit
- Marking Pencil
- Try Square
- Measuring Tape
- Screwdriver and screws
- Electric Drill and Drill Bits
- Wood Putty
- Wooden Block
- Hammer

Marking, Placement & Fastening Process for Knobs:

Phase	Objective	What to Do
Removing the	Removing the old	The top and bottom screws must be removed with the help of a screwdriver and lifted carefully out of the door.
old unit	and strike plate	Installing a new latch involves removing the old strike plate, because most latches come with their own strike plates.
Measuring & Marking	Installing a latch plate on top of	In case the Latch comes with a rectangular plate and a round one is required (or vice versa), measurements of the latch plate must be taken and get a latch plate of these measurements.
	the latch	After removing the old plate, the new latch must be placed on top of the latch.
	Sliding the latch inside the edge of the door	The latch must be inserted through the door hole so that the flat side of the latch faces the door jamb.
		With the help of a wooden block and hammer, the latch must be tapped gently into place.
Placement& Fastening	Placing the latch into place	In case the latch cannot be slid in, a thick rectangular wooden block must be placed over the latch's end.
		Then, the latch must be tapped into the hole with the hammer, until the latch's back reaches the holes' end.
	Securing the latch into the door with 2 screws	According to the template and design, the latch must be secured into the door with the help of the recom- mended number of screws at the top and the bottom.

Securing the first half of the door- knob in through the latch	One half of the door knob should have a square steel peg sticking out of its side. This half of the door knob must be inserted first, placing the peg through the latch mechanism.
Aligning the other half of the door	The other half of the door know must be lifted and placed on the other side of the hole.
knob with the first one	Both sides must be aligned with their respective screw holes, turning the sides around as required.
	In case both sides of the door knob are not aligned completely, they shall stay loose or wobbly after instal- lation.
Pushing the two sides of the door	Both sides of the knob must be pressed together, through the hole, with one hand on each side of the door knob.
knob together	In case one of the sides seems stuck up, both the sides must be pulled apart to ensure that the side without the square peg is completely aligned with the one with the peg.
Attaching both ends of the door	The door knob must be checked for screw holes for determining the exact number required. This number must match that of the screws the door knob comes with.
with screws	With the help of a Screwdriver, both the knob sides must be fastened securely with the door.
Using wooden putty for securing any loose screws	In case the new door knob is too small for the screw holes left behind by the old door knob, the holes may be filled up by wood putty and dried for few hours, de- pending on the putty instructions.
Screwing in the new strike plate	The strike plate must be aligned over the latch and the door frame.
Screwing in the new strike plate	The strike plate must be fastened to the door with the screws and screw holes provided.
Testing the door knob for proper functioning	Finally, open and close the door to check the func- tioning of the knob and latch unit. For looseness, the screws must be tightened or wood putty can be used to fill in the screw holes.

B. Place toughened/glazed/plain glass in windows, doors and entrances at the marked location or as per fittings placement

The steps involved in placing glass in doors, windows and entrances (at marked locations or as per fittings' placement) are:

No. of Step	Phase	What to Do
Step 1	Cleaning	The door / window member, like door / window frame, must be cleaned thoroughly, to do away with any dust, sediment, debris or foreign particles. This can be accomplished with the aid of a soft cloth, moistened with turpentine oil or spirit.
Step 2	Applying Putty	An uniform and continuous layer of putty, about 1/6th inch thick, must be applied next.
Step 3	Selecting Glass	Glass, of required size, type and specifications, must be selected by the Assembler.
Step 4	Setting the Glass	The glass must be placed and set with its concave side facing inwards. It must be ensured, that, wire glass, if used, must be placed and set with the twist erect.
Step 5	Pressing the Glass Firmly	Once the glass is placed and set properly, it must be pressed firmly in place, so that the putty layer fills in and covers all deformities and irregularities.
Step 6	Reapplying Putty	After the glass sets in firmly in desirable place and position, an uniform and continuous layer of putty must be laid, against and along the perimeter of the glass-face putty run, done in step 2.
Step 7	Inserting Glazier Points,	For Wood Frame: Two Glazier Points (used for supporting glass in frame) per side must be inserted for a small area. For larger area, these must be placed about 8 inches apart on all sides.
	Beads or Wire Clips	For Metal Frame (say, aluminium or stainless steel):Wire Clips or Metal Glazing Beads must be used for supporting the glass in the frame.

Step 8	Pressing the Putty	The putty must be pressed, with the help of a putty knife or glazing (action of installing doors / windows) tool, to ensure its complete adhesion to the glass and the frame.
Step 9	Finishing with Bevels and Miters	The work must be finished with complete, smooth, accurately formed bevels (a slope from the horizontal or vertical), with the help of clean-cut miters (joints made between two pieces of wood or other material at an angle of 90°, such that the line of junction bisects this angle).
Step 10	Cutting off Reverse Side Putty Bed	The bed putty, on the reverse side of the glass, must be cut off.
Step 11	Glazing and Re-glazing the inner side of the frame	While glazing or re-glazing the frame's inner side, wood or metal glazing beads must be used.

1.4.3 Assist in Conducting Quality Check and Handover to Client

Site Assessment, Risk Evaluation, Installation and Assembly are not the responsibilities of the Assembler. A vital aspect of his / her responsibilities is conducting quality check before handing over the project to the client.

A. Assist in checking quality of material arrived at work site as per specification agreed by the client and inform lead for any repair/replacement needed

The Assembler assists the lead in checking quality of the material arrived at the site. He / she should ensure that the materials are matching the specifications agreed by the client. The common discrepancies may appear in the materials and the consignment, like:

- Visual defects in the materials and their components
- Components of hardware missing
- Components of hardware not matching the ordered specifications

The Assembler must immediately escalate the exact issue / discrepancy with the lead and arrange for immediate repair or replacement of the materials. This should be done with the help of appropriate Requisition forms.

or Knob123321Missing pegrews987789Mismatched specificat
rews 987789 Mismatched specificat
ass Sheet for Window 656454 Damaged during transportation

B. Support in checking for any apparent defects and deficiencies around the structural opening

Structural Opening is the main aperture of the doorway or the window. Another essential responsibility of the Assembler is to support the lead and the rest of the team in checking for apparent and visible defects and deficiencies around structural openings. Once detected, such defects and deficiencies must be reported to the lead or directly to the client, depending on the urgency of the situation. Corresponding remedies and repair must be suggested to the client before carrying on with the work further.

Few of such defects and deficiencies, which may occur around the structural opening, are:

Defects and deficiencies around Structural Opening	How do they look
Cracks	

Assembler- Doors/Windows (Glass)

_		
	Chipped-off edges and cor- ners	
	Flaky Paint (Peeling Off)	
	Dimensional Deviation	
	Termites	



C. Assist lead in testing of repaired / serviced product / new installation w.r.t functioning, alignment, placement etc. against the specifications before handing over to client

Apart from checking for and detecting apparent and visible defects and deficiencies, an Assembler must assist the lead in conducting quality check by implementing appropriate testing methods and tools, wherever and whenever necessary.

During testing, the following are tested:

- Functioning of each hardware component
- Functioning of the complete unit
- Alignment
- Level
- Straightness
- Angle

The various testing tools and their functions are listed below:







D. Assist in checking for any path blockage or damage like pre-installed decorative materials, ducts or any other structure in building and suggest remedies if required

Often, a building is full of pre-installed decorative and utility structures, like:

- Light fixtures and lamps
- Grills for doors and windows
- Porticos
- Wall Art
- Brackets and shelves
- Wall Cabinets
- Air-conditioner ducts
- Wiring

The Assembler must check if such structures and materials are blocking the path and hampering the glass assembling and installation process. If yes, then they must be broken, uninstalled, opened or dismounted, with prior permission from the client. If the client wants to keep the structure, in spite of the blockage, then they must be modified or alternate routes must be devised for the work. For example, if a client wants to keep window grills, then the Assembler may suggest remedies like installing Wired Glass, where both features would be present.



Fig. 1.4.1 Wired Glass in windows serves the purpose of grills and glass pane together

Unit 1.5 Assembling and Dismantling Procedure of Components

- Unit Objectives

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

- 1. Demonstrate the assembling and dismantling procedure of Latch and Handle unit
- 2. Demonstrate the assembling and dismantling procedure of Door Knob Assembly / Unit
- 3. Demonstrate the assembling and dismantling procedure of Mortise Lock Assembly / Unit

1.5.1 Latch and Handle Assembly / Unit



Fig. 1.5.1.1: Common Latch & Handle Assembly

A. Highlighting the Steps in Assembling Procedure:



Fig. 1.5.1.2: The Steps in Assembling Procedure

Step 1: Use a sharp chisel along the marked lines to establish the edges of the cut-out.

Step 2: Use a sharp chisel to remove the waste wood from the edge of the door to the depth of the end plate thickness so that the front of the end plate will be flush with the wood down the door edge.

Step 3: Offer up the lock and locate the end plate into the cut-out - mark the position for the handle bar and the keyhole.

Step 4: Drill the holes for the handle bar and keyhole - make the bar hole at least as big as the spindle on the back of the lock - for the keyhole, drill the top hole and cut out the shape using a thin pad saw.

Step 5: Position the assembly on the door and secure using screws.

Step 6: Fit the door handles and key shield on the reverse side of the door. The door handles have to be bar type with a small screw in the 'skirt' of each handle - the square bar having holes into which the screws locate.

Step 7: Close the door and mark on the door frame the position of the top and bottom of the latch **assembly.**

Step 8: The 'staple' (which secures the lock catch and bolt when the door is closed) may have an end plate (like the lock), which will need to be recessed in to the door frame in a similar manner as the lock end plate.

Step 9: Position the staple on the door frame and mark around it. The architrave around the door will probably need to be cut away so that the staple will fit flatly, aligned with the lock and hold the door closed.

B. Highlighting the Steps in Dismantling Procedure:





Fig. 1.5.1.3: The Steps in Dismantling Procedure

Step 1: Unscrew the deadbolt mounting screws from the inside of the deadbolt with a Phillip screwdriver.

Step 2: Pull the thumb turn unit away from the inside of the door, followed by the outside cylinder unit from the outside of the door.

Step 3: Remove the adapter ring with the screwdriver if there is one present.

Step 4: Remove the screws from the deadbolt latch faceplate on the side of the door with the screwdriver.

Step 5: Pull the faceplate off of the door.

Step 6: Then use the screwdriver to pull the deadbolt latch assembly out of the door.

Step 7: Unscrew the strike plate from the door jamb.

Step 8: The strike plate may be stuck to the paint so use a screwdriver to help remove the strike plate, if needed.

Step 9: Wipe the grime from your hands with a cloth rag until you have the chance to wash them.

1.5.2. Door Knob Assembly / Unit Outside knob Spindle Doorstop Face bore Mounting screws Latch assembly Edge bore Inside knob Latch-plate mortise Latch Strike plate JAMB DOOR Latch plate

Fig. 1.5.2 Common Door Knob Assembly

A. Highlighting the Steps in Assembling Procedure:

Step 1: The bars on the external knob must be pushed through the holes in the latch.

Step 2: The faceplate must be attached to the other side of the door, if applicable.

Step 3: The interior doorknob must be fastened to the door if you do not have a faceplate.

Step 4: The knob must be screwed into the door, using appropriate screws and screwdriver. **Step 5:** The new knob must be slid onto the stem if you have a faceplate.

B. Highlighting the Steps in Dismantling Procedure:

Step 1: The screws must be removed in the faceplate of the doorknob if they are visible.

Step 2: A sharp object must be inserted into the latch hole if there are no visible screws.

Step 3: The interior knob must be pulled away from the door.

Step 4: If there is a faceplate, it must be pried off and unscrewed.

Step 5: The knob, on the outside of the door, must be removed.

Step 6: The latch must be unscrewed.

Step 7: The latch must be pulled out from the hole in the door.

1.5.3 Mortise Lock Assembly / Unit _____



Fig. 1.5.3.1: Common Mortise Lock



Mortise Lock - Latch Plate, Latch, Latch Screws, latch Plate Mortise

Fig. 1.5.3.2: Common Mortise Lock Assembly

A. Highlighting the Steps in Assembling Procedure:

Step 1: Fixing the lock assembly on the door



Fig. 1.5.3.3: Fixing the lock assembly on the door


Second sacrificial section will deploy if then attacked beyond the first shear line. Unlike all other locks, the ABS locking cam blocks access to totally stop entry. The ABS lock can still be locked/unlocked from the inside with the key. Step 4: Placing the Lock Retainer Plate on the other side of the door



Step 5: Securing the Lock Retainer on the other portion of the door, using lock fixing screws



Step 6: Placing the Latch Assembly on the door frame as per alignment of lock with the door





B. Highlighting the Steps in Dismantling Procedure:

Step 1: Unscrew the deadbolt mounting screws from the inside of the deadbolt with a Phillip screwdriver.

Step 2: Pull the thumb turn unit away from the inside of the door, followed by the outside cylinder unit from the outside of the door.

Step 3: Remove the adapter ring with the screwdriver if there is one present.

Step 4: Remove the screws from the deadbolt latch faceplate on the side of the door with the screwdriver.

Step 5: Pull the faceplate off of the door.

Step 6: Then use the screwdriver to pull the deadbolt latch assembly out of the door.

Step 7: Unscrew the strike plate from the door jamb.

Step 8: The strike plate may be stuck to the paint so use a screwdriver to help remove the strike plate, if needed.

Step 9: Wipe the grime from your hands with a cloth rag until you have the chance to wash them.

Unit 1.6 Product and Workplace Safety Specifications



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

- 1. Explain the term safety specifications
- 2. List the various product and workplace safety specifications

1.6.1 What are Safety Specifications?

Safety Specifications are the standards and practices followed in a given industry, across different countries. In Furniture & Fittings industry, the safety specifications, generally followed in India (Indian Standards - IS), are based on and adopted from the following:

- European Standard or European Norms (EN)
- Australian Standard (AS)
- British Standard (BS)

1.6.2 Various Product and Workplace Safety Specifications

Most of the products used in the global Furniture & Fittings industry are compliant with the below safety specifications and standards.

A. Product Safety Specifications:

Safety Specification Standard	Meaning	Highlights
CE	Conformité Européenne (European Conformity)	The manufacturer or importer claims compliance with the relevant EU legislation applicable to a product, regardless of the place of manufacture. For ex - electrical equipment must comply with the EMC (Electromagnetic Compatibility) Directive, i.e., the device will work as intended, without interfering with the function of any other device. Toys must comply with the Toy Safety Directive.
F	Fire Protection Certification	Components of furniture and fittings, as well as upholstery, are compliant with the specified ignition resistance levels and are labelled accordingly.

Safety Specification Standard	Meaning	Highlights
EN 179	European Norms for Emergency Exit Locks with Door Handles	 Uses in Emergency situation: Exit at all times One single operation of the lever handle Previous knowledge about operating the locking device is required A lever handle is used to open the door from the inside
EN 1125	European Norms for Panic Exit Devices	 Uses in panic situation: Exit at all times One single operation of the lever handle in exit direction to open the door No previous knowledge about operating the device is required Door is opened by pressure on the locking device to open the door from the inside Push bars are mandatory

B. Few Workplace Safety Specifications:

Safety Specification Standard	Highlights
EN 3	Portable fire extinguishers
EN 54	Fire detection and fire alarm systems
EN 81	Safety of lifts
EN 166	Personal eye protection specifications
EN 341	Personal protective equipment against falls from a height
EN 403	Respiratory protective devices for self-rescue
EN 420	Protective gloves - General requirements and test methods
EN 352-2	Revised 2002 standards on hearing protectors (Safety requirements and testing, generally about earplugs)
EN 980	Symbols for use in the labelling of medical devices

Unit 1.7 Various Types of Defects and Troubleshooting Common Errors

Unit Objectives

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

- 1. Explain troubleshooting
- 2. Identify various defects and errors

1.7.1 Explaining Troubleshooting for Assemblers

Troubleshooting is a systematic and sequential approach to solve problems, used to detect and resolve issues in a unit or a system. In short, Troubleshooting is the process of detecting a problem, finding its root cause and then rectifying it using suitable remedies.

• With the sole purpose of bringing back a system into operation, troubleshooting techniques also focus on preventive maintenance, so that a particular issue does not appear again and what needs to be done in case it recurs.



The main objectives of Troubleshooting are:

- Working Faster
- Working Economically
- Working Safely
- Working Efficiently

1.7.2 Identify Various Defects and Errors in Assembling Glass Doors and Windows

Name of the Defect / Error	Description	What to Do
Water Seepage Image: Additional system of the second system of the sec	 Poor detailing and finishing of top frame Improper sealing of gaps 	 Shield the door / win- dow from direct rainfall through better design Carry out waterproof- ing test on field, before installation Use mechanical tools to refabricate
Difficulty in Opening and Closing (for casement doors and windows)	 Misalignment of frames and glass panels Improper installation of pivot hinges 	 Verify the alignment and plumb of the outer frames and inner panels Lubricate the pivot hinges Clean properly to remove dust, rust and debris
Difficulty in Sliding of Inner Panel (for sliding doors and windows)	 Improper alignment of frames and inner panels 	 Verify the alignment of the outer frames and inner panels Clean thoroughly to remove dirt, rust and debris

Misalignment	 Improper setting out of wall openings Improper alignment and plumb of window frame during installation 	 Check that the setting ou of wall opening conform to specifications Verify the alignment and plumb of window frame during installation
Untidy Joints between frame and wall	Poor workmanship during installation	Protect the frame with suita ble tapes during application o sealant or during painting
Gaps at frame corner	 Poor workmanship during fabrication and installation Mishandling during delivery and storage 	 Carry out cutting and assembly of frames using selected tools in good working condition Protect the frames during delivery and storage
Stained Glazing	Inadequate protection during delivery, storage and instal-	Protect the glazing adequate ly, so that it remains intact

Scratches, mortar droppings and paint drips on frame	Inadequate protection during fabrication, delivery, storage and installation	• Examine the component before delivery and be- fore installation
		• Provide proper and ade- quate storage space
		• Minimize unnecessary handling during delivery, storage and installation
		 Provide adequate pro- tection to frames and glazing. Protection should stay intact until all tasks are completed
Loose Screws	Screws are visible not fitted properly and are coming out loose	 Check if the screws match the specification and the type of component
		• Minimize unnecessary handling during delivery, storage and installation
		Tighten the loose screws using appropriate screw- driver
Misaligned Latch	Latch and Strike Plate are not	Close the door to deter-
LATCH BOLT MISALIGNED STRIKE PLATE	aligned with each other.	mine where the plate comes in contact with the latch
		Tighten all hinges
		• Enlarge the strike plate hole if needed
		Move the strike plate and recheck alignment

Door Lock moves slowly	Locks moving slower than usual and seems stuck up inside	 Lubricate the keyhole by applying graphite-based lubricant
10 10 mg	The lock may be frozen or dirty; the small internal units may have worn out or are broken	 Operate the lock few times to make the lubri- cant work
		 Apply Lock "De-icers" for frozen locks, which also help in dissolving grime and dirt sediments
		 Dismantle the lock as a last resort, to find out if any internal unit is jammed or broken
		 Replace the said internal units, if required
Door Knob is loose	The knob has worn out over time	 Loosen the Set Screws or the knob's leg
		 Hold the knob on the other side of the door
		• Turn the knob clockwise, till it fits firmly
		 Tighten the set screws until you feel them lying on the flat side of the spindle; the knob should turn freely now
		 Remove the knob and checking the spindle, if the above does not work
		• Replace the lock, if the entire lock is worn out

Unit 1.8 Relevant Hand and Power Tools



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

- 1. Apply relevant Hand tools
- 2. Apply relevant Power tools
- 3. Apply fasteners and connectors whenever necessary
- 4. Demonstrate removal of old windows and door along with other removable architectural fittings
- 5. Assess trueness of structure using level and plumb bob tools

1.8.1 Hand Tools ____







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Follow Safety Measures while using Hand Tools:

1. Use tied-off containers to keep tools from falling off of scaffolds and other elevated work platforms.

- 2. Keep the blades of all cutting tools sharp.
- 3. Carry all sharp tools in Cover.
- 4. Tag worn, damaged or defective tools "Out of Service" and do not use them.

5. Do not use a tool if its handle has splinters, burrs, cracks, and splits or if the head of the tool is loose.

6. Do not use impact tools such as hammers, chisels, punches or steel stakes that have mushroomed heads.

7. When handing a tool to another person, direct sharp points and cutting edges away from yourself and the other person.

8. Do not carry sharp or pointed hand tools such as screwdrivers, scribes, aviation snips, scrapers, chisels or files in your pocket unless the tool or pocket is sheathed.

9. Do not perform "make-shift" repairs on tools.

10. Do not carry tools in your hand when climbing. Carry tools in tool belts or hoist the tools to the work area with a hand line.

11. Do not throw tools from one location to another, from one employee to another, from scaffolds or other elevated platforms.

1.8.2 Power Tools



5. Planer: Portable planners are not used for very precise work. However it is an excellent tool for quick plan- ning. It also makes joinery work easier.	Planer
6. Router: A portable router is used for moulding, grooving and rebat- ing work in metalwork and glass work. A router bit's shape deter- mines the type of cut it creates.	Fouter
7. Miter Saw: It is used to cut the wood at an angle	Miter Saw
8. Band Saw: It is used for cutting precise shapes and curves It is a powerful tool when cutting rabbets and tenons You can also rip small pieces of wood and even make your own laminate strips with a band saw	Pand Saw



Follow electrical safety measures while working with electrically powered tools & equipment:

1. Do not use power equipment or tools on which you have not been trained.

2. Keep power cords away from the path of drills, saws, vacuum cleaners, floor polishers, mowers, slicers, knives, grinders, irons and presses.

- **3.** Do not carry plugged-in equipment or tools with your finger on the switch.
- 4. Do not carry equipment or tools by the cord.
- 5. Disconnect the tool from the outlet by pulling on the plug, not the cord.
- 6. Turn the tool off before plugging or unplugging it.
- 7. Do not leave tools that are "ON" unattended.

8. Do not handle or operate electrical tools when your hands are wet or when you are standing on wet floors.

9. Do not operate spark-inducing tools such as grinders, drills or saws near containers labelled "Flammable" or in an explosive atmosphere such as a paint spray-booth.

10. Turn off electrical tools and disconnect the power source from the outlet before attempting repairs or service work. Tag the tool "Out of Service."

11. Do not connect multiple electrical tools into a single outlet.

12. Do not run extension cords through doorways, through holes in ceilings, walls or floors.

13. Do not drive over, drag, step on or place objects on a cord.

14. Do not operate a power hand tool or portable appliance with a two-pronged adapter or a two-conductor extension cord.

15. Do not use a power hand tool while wearing wet cotton gloves or wet leather gloves.

16. Never operate electrical equipment barefooted. Wear rubber-soled or insulated work boots.

17. Do not operate a power hand tool or portable appliance while holding a part of the metal casing or holding the extension cord in your hand. Hold all portable power tools by the plastic hand grips or other nonconductive areas designed for gripping purposes.

18. Do not operate a power hand tool or portable appliance that has a frayed, worn, cut, improperly spliced or damaged power cord.

19. Do not operate a power hand tool or portable appliance if the ground pin from the three pronged power plug is missing or has been removed.

20. Test run the Electric equipment, before actually running it on wood

21. Power source should be used as per equipment rating only.

1.8.3 Fasteners and Connectors

Tools	Image
1. Nuts: Nut is a fastening tool. It has coils around its body, giving it a shape of threaded pattern. The thread- ed pattern helps to join the two parts of metal or wooden furni- ture. The common types of nails are: Hexagonal Nut Square Nut Flanged Nut Cap Nut	Nuts and Bolts
	Fixing a Nut







1.8.4 Assist in Removal of Old Windows and Door Along with Other Removable Architectural Fittings

An Assembler plays a significant role in the removal of old windows and doors. In this process, he / she assists the lead in removing other removable architectural fittings with the help of appropriate hand and power tools.

While removing old windows and doors, the Assembler assists in the following:

A. Measuring the Dimensions of the old window / door

- Measuring the height of existing window / door
- Measuring the width of existing window / door
- Checking the squareness of the window / door by measuring diagonally across the window at both sides

Tools required:

- Measuring Tape / Steel Rule
- Try Square (for checking squareness)

B. Removing the old Window / Door

- Removing the internal stop pieces, from the right and the left sides of the Window / Door
- Taking out the internal sash from the frame
- Sliding the external sash down to the bottom part of the frame
- Cleaning the remaining parts of the frame
- Rechecking for apparent defects and rotting wood

Tools required:

- Safety Gloves
- Protective Glasses
- Electric Drill
- Sand Paper Bit
- Screwdriver
- Wrench
- Pliers
- Wooden filler
- Putty Knife
- Utility Knife

1.8.5 Check Trueness of Structure Using Level and Plumb Bob Tools

Spirit Level and Plumb Bob tools are important testing tools for an Assembler. These help in checking the trueness of structure, in terms of straightness of both vertical and horizontal surfaces.

A. Steps in checking straightness of structure using Spirit Level:

Step 1: The mid-line of the horizontal surface must be measured, oriented lengthwise.

Step 2: Mark, with the help of a Marking Pencil, at the mid-line.

Step 3: If the surface is straight and level, the bubbles in the Spirit Level will be visible between the two lines in the middle of the glass tubes. In case the bubble is not floating between the two vertical lines, the level must be adjusted until the bubble floats exactly between the vertical lines.

Step 4: The gap, between the desired and the actual levels, must be measured. If the gap is

B. Steps in checking straightness of structure using Plumb Bob:

Step 1: The Assembler must measure two to three inches away from the top of the wall and mark the place using a Marking Pencil.

Step 2: A nail must be set in the mark.

Step 3: The Plumb Bob must be hung on the nail, allowing gravity to draw a vertical reference line.

Step 4: When the Plumb Bob stops oscillating gradually, the distance from the wall must be measured. If this measured distance matches that at the top of the wall, the wall can be considered appropriately vertical.

Unit 1.9 Units of Measurement



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

- 1. Explain Measurement
- 2. Appraise measurement systems being used across the globe
- 3. Recall Measuring Tools
- 4. Demonstrate the process of measuring dimensions
- 5. Demonstrate the process of conversion of into FPS

1.9.1 Explaining Measurement

Measurement is the process of obtaining the magnitude of a quantity relative to an agreed standard. Measurement of any quantity involves comparison with some precisely defined unit value of the quantity. Standard units of measure need to be identified and defined as accurately as possible.

Accurate measurement is the basis of good engineering and crafting practice. The accuracy of any measuring device depends on the user as much as on the design of the tool. Measuring is not only checking the length, width or thickness of objects but also checking of the shape – things like the flatness, straightness, roundness or squareness. Measuring tools are also used for inspecting a finished or partly finished product.

Measurement is required for checking the accuracy of part made, as well as creating the sketch for making a part.

All measuring tools are precision tools. One must take care to keep them in good shape to maintain accuracy.

1.9.2 Measurement Systems Across the Globe

There are two systems of measurement. The first one is the traditional system (used in Carpentry, Glass work and metalwork), based on the English imperial system of measure; this is called FPS (also known as Foot - pound system). The second one is called the SI system (Also known as MKS System). The metric system is an international decimalized system of measurement, first adopted in France, in the year 1791, and is the most common system of measuring units, used by most countries in the world. All measuring tools have metric or imperial graduations, or a combination of both. One big advantage of the metric scale is that it eliminates the necessity for a range of fractional sizes. The markings on a metric rule are made in millimetre, with the figures marked at 10 millimeter intervals. Fractions are not used in the SI system.

FPS (British System)

In this system, the scale of measuring length is inch, foot and Gaz (Yard). In this scale, there is a unit in every inch and after every 12 inch there is a footmark. An inch is divided into 8 parts. This is called an eighth of an inch (1/8 inch)

1 Soot = 1/8 inch, 8 Soot = 1 inch, 12 inches = 1 foot, 3 feet = 1 Gaz (yard).

MKS (Metric System)

In this system, the units of measurements are millimeter (millimeter), centimetre (Centimeter), meter (m) etc. The smallest unit in this system is the millimetre.

10 millimeter = 1 centimeter, 100 centimeter = 1 meter

Relation between the British System and Metric System

1 inch = 2.54 Centimeter or 25.4 millimeter

1 foot = 30.48 Centimeter or 304.8 millimeter

1 meter = 3.280 Foot = 39.370 inch

3 Foot = 1 Gaz (Yard)

Conversion Table

1/16" = = 1.6 Millimeter	
2/16" = 1/8" = 3.2 Millimeter	
3/16" = = 4.8 Millimeter	
4/16" = 1/4" = 6.35 Millimeter	
5/16" = = 8.0 Millimeter	
6/16" = 3/8" =9.5 Millimeter	
7/16" = = 11.1 Millimeter	
8/16" = 1/2" = 12.7 Millimeter	
9/16" ≡ = 14.3 Millimeter	
10/16" = 5/8" = 15.9 Millimeter	
11/16" = = 17.5 Millimeter	
12/16" = 3/4" = 19.05 Millimeter	
13/16" = = 20.6 Millimeter	
14/16" = 7/8" =22.2 Millimeter	
15/16" = 23.8 Millimeter	
16/16" = 1" = 25.4 Millimeter	





Rule is the most common and the best-known piece of measuring equipment, for measuring linear distance. Least count for Rule is normally 1 millimeter and 1/8 inch (normally one side has Centimeters and other side has inch scale).

b) Protractor:





Fig. 9.1.3.2: Half Protractor



In geometry, a protractor is a circular or semi-circular tool for measuring an angle or a circle.

c) Measuring Tape



Fig. 9.1.3.4: Measuring Tape

The next important hand tool for the woodworker is an accurate Measuring Tape. We should have a retractable one that is at least 25 feet long. Any longer than that, and we will start having problems getting it to roll back up. Since measurements on large scale projects can be very susceptible to even the most minute measurement variations, we should make sure the "hook" or tab at the end of the is firmly attached, with no give. When they get loose, we shall have as much as 1/8" variation in your measurements. This can add up to some severe accuracy problems in the long run.

d) Wing Compass



Fig. 9.1.3.5: wing Compass

This is a two-legged tool and the ends of these legs are pointed. It is used to mark arcs and circles etc. It is made up of steel.

e) Calliper



Fig. 9.1.3.6: Calliper

This tool is required to take indirect measurements. Measurements taken by this tool is read on the steel rule or steel tape. They are of two types:

Outside Calliper: With this calliper, the external measurement of wood or any object, such as the diameter of the round object, as well as the length and the width of a flat object, is measured. It has rounded end points.

Inside Calliper: With the help of this calliper, the internal measurements, such as the diameter of the holes, slits etc. are taken. It has two legs, which are twisted outside.

f) Vernier Calliper



Fig. 9.1.3.7: Vernier Calliper

Vernier Calliper is a very handy measurement instrument for length measurement till 2 point of decimal. For example, we will learn how to read 2.13 on the Vernier. The main scale contributes the main number and one decimal place to the reading (2.1 Centimeter) The vernier scale contributes the second decimal place to the reading (0.03 Centimeter).

To obtain the main scale reading, please refer to the image provided below:



Fig. 9.1.3.8: Scale reading of vernier calliper

2.1 centimeter is to the immediate left of the zero on the vernier scale. Hence, the main scale reading is 2.1 centimeter.

g) Try Square



Fig. 9.1.3.9: Try Square

It is used to mark or check the right angle (90 degrees) of the workpiece. It is L-shaped. It is made of steel or wood and comprises only 2 main parts.

- 1. Blade
- 2. Stock

h) Miter Square

It looks like a Try Square. Apart from 90 degrees, the angles of 45 and 135 degrees can also be measured using this tool.



Since it looks like alphabet T, it is also called the "T- square". It is used to check or move not only the right angle but different angles.
1.9.4 The Process of Measuring Dimensions

There are three methods of measuring a workpiece.

1. Running Measurement: In this method, the breadth and the thickness of the workpiece are not measured. Only the length is measured. The length of the workpiece, measured in foot, is called the Running Foot, and, if measured in meter, is called the Running Meter. The unit of measurement in this method is Foot and Meter.

2. Square Measurement: In this method, the length and breadth of the workpiece are multiplied. The thickness is not measured. The units of measurement in this method are square foot and square meter.

3. Cubic measurement: In this method, the length, breadth and thickness are multiplied altogether. The units of this method are cubic meter and cubic foot.

A. Running Meter / Running Foot

Example: In a photo frame, there are two wooden strips; each has 50 centimeter length and 30 centimeter width. Calculate the length of the wooden strip used in the photo frame.

Calculation:

Length of a strip	= 50 centimeter
Length of two strips	= 50 x 2 = 100 centimeter
Width of a strip	= 30 centimeter
Width of two strips	= 30 x 2 = 60 centimeter
Total length of the strips	= 100 Centimeter + 60 Centimeter = 160 centimeter
Total length of the strips	= 160/100 = 1.6 meter

B. Square Meter/Square Foot

Example: If the length and width of the wood is 210 centimeter and 120centimeter respectively, then how much will be the sq. meter area of the door?

Calculation:

You know that in the area of sq. meter, the length and width of the wood is considered and the thickness of the wood is ignored.

Height of the door	= 210 centimeter
Width of the door	= 120 centimeter
Area	= Length × Width = Sq. area (Meter / foot)
Area in Centimeter	= 210 × 120 = 25200 centimeter
Area in Meter	= (210 x 210) / (100 x 100) = 2.52 square meters

C. Cubic Meter / Cubic Foot

Example: If a wooden board's length is 2.5 meter and width is 50 centimeter and thickness 3 centimeter, then calculate the total quantity of wood in Cubic meter.

Calculation:

Length of the frame	= 2.5 meter
Width of the frame	= 50 centimeter = 50 / 100 meter = 0.50 meter
Thickness of the frame	= 3 centimeter = 3 / 100 meter = 0.03 meter
Volume	= Length x Width x Thickness = 2.50 × 0.50 × 0.03 = 0.0375 cubic meter

1.9.5 Conversion into FPS

(Inch x Foot x Foot) / 12 = Square Foot (Inch x Inch x Foot) / 144 = Square Foot (Inch x Inch x Inch) /1728 = Square Foot

Unit 1.10 Handling of Tools and Equipment with Care

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- U	Init	Ob	ectives	6

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

- 1. Evaluate the importance of handling of tools and equipment with care
- 2. Describe the essentials of handling of tools and equipment with care

1.10.1 Importance of Handling of Tools and Equipment with Care on Finished Surface

Finished product is the condition in which the project is finally delivered to the client. The success of the project, i.e., if the client's requirements have been met successfully, depends on the accuracy of this condition. Often, an Assembler needs to lay his / her hands on finished surfaces for maintenance, repair, cleaning and replacement purposes. Utmost care should be taken to handle tools and equipment carefully on the finished surface, so that the surface and its surrounding areas do not get damaged.



Fig. 1.10.1 Finished Door in Wooden Frame



Fig. 1.10.3 Finished Window in Wooden Frame



Fig. 1.10.2 Finished Door in Aluminium Frame



Fig. 1.10.4 Finished Window in Aluminium Frame



Fig. 1.10.5 Finished Wall Surface with Glass Window

1.10.2 Essentials of Handling of Tools and Equipment

- with Care

Dos	Don'ts
While marking on finished surface, mark very gently and lightly to avoid scratches and cracks.	While using the Steel Rule, Try Square, Measuring Tape, and similar Measuring Tools with sharp edges, do not make deep scratches on the finished surface.
Clean the finished surface with recommended solutions ONLY.	Do not hit the finished surface hard with the help of Hammer, Mallet or Chisel. Hitting the surface hard may develop cracks and chipped edges.
Painting a finished surface must be done with the help of recommended paint and painting tools only.	While using a Putty Knife, Screwdriver, Chisel or File, do not use them roughly on the finished surface.
Cleaning should be done in gentle yet effective swiping and sweeping motions.	Do not scrub roughly while cleaning a finished surface.
While using a Nail Puller, yank the nail gently out of the finished surface, so that no cracks are developed.	Do not tap on or hit the glass pane in door or window with tools. This may break the glass.

Unit 1.11 Common Faults Encountered and Rectification Methods

- Unit Objectives



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

- 1. Identify the common faults with hand tools and methods to rectify them
- 2. Identify the common faults with power tools and methods to rectify them

1.11.1 Common faults with Hand Tools and methods to rectify them

Name of the Hand Tool	Description of Fault	How to Rectify
Hole Cutter	Binding - Hole Cutter teeth are bound with dust and debris.	Holding the drill firmly and preventing the teeth of the Hole Cutter from walking away while cutting
Chisels and Gouges	Blunt - The cutting or gouging edge is not sharp and is slipping off the workpiece	Honing the chisel / gouge with the help of an Oiling Stone
Saws	 Heavy wear on tips and teeth corners - The tips and teeth corners are worn off and not effective enough. The possible reasons are: Too fast blade speed, resulting in high amount of heat generation at the blade tips, leading to fast wear Too low feed rate, resulting in the teeth rubbing the material instead of cutting and creating friction Wrong type of coolant is being used, which is unable to cool the blade properly 	 Readjusting the blade speed Readjusting the feed rate Selecting the right type of coolant or using an appropriate coolant mix

	Chips welded to teeth tips - Due to extreme heat generation, chips get welded and attached to the teeth tips, rendering the saw blunt. The	Adjusting and controlling feed pressure
	 possible reasons are: Too high feed pressure, resulting in friction and heat Too high Band speed, resulting in friction and heat Wrong coolant or inadequate coolant 	Controlling Band speed
		Selecting the right type of coolant or using an appropriate coolant mix
Measuring Tape	Zero Error - Tape shows a measurement when the actual reading should be zero, i.e., at one of the ends.	Replace the faulty tape and buy a new one

1.11.2 Common Faults with Power Tools and Methods - to Rectify Them

Name of the Power Tool	Description of Fault	How to Rectify
	Slipping Drill Bits - The chuck is not holding the drill bit tightly enough.	Selecting and using a drill bit, which is appropriate for the job.
	 Drilled Hole is bigger than expected - The possible reasons are: Drill point is off the center Machine Spindle must be adjusted Workpiece is clamped loose and / or vibrating 	 Replacing the drill bit Adjusting the Machine Spindle Adjusting the clamp to secure the workpiece rigidly
Electric / Power Drill	Damaged cord - The power cord is damaged, cut or worn off	Replacing immediately by licensed professional
	Molten and discoloured wiring - Power cord is molten and discoloured due to generation of excessive friction and heat	Checking and adjusting the machine spindle or adjusting speed Checking if the power supply matches the drill's power specifications and making necessary changes Replacing the wiring by licensed professional

Name of the Power Tool	Description of Fault	How to Rectify
Edea Dand	Edge of the adhesive tape is not secure on the panel - the profile trimmer on the machine cuts into the face laminate during edge banding or end-capping processes	Stopping the machine and readjusting the panel settings
Edge Band	Poor Adhesion - bands and tapes are not getting attached securely	 Checking the workpiece for warping, swelling, breakages and other defects Replacing the adhesive band, if possible
Planer does not feed Bench Planer	 Honing and reversing the knives Checking and cleaning the rollers Checking and ensuring that the rollers do not have deep grooves Cleaning the pitch and resin with suitable mineral oil and elbow grease 	
	Planer works only on one end of the Infeed Roller	 Removing the cover plate Applying slight pressure by cranking the adjustment wheel Checking for dirt and debris and cleaning them; these may be preventing the feed roller from coming all the way down Replacing the wiring by licensed professional

Unit 1.12 Discussing Alignment, Strength of Material and **Proper Setting of Frames, Doors**

Unit Objectives

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

- 1. Discuss alignment and strength of material for glass doors and windows
- 2. Demonstrate the process of checking alignment etc.

1.12.1 Alignment and Strength of Material for Glass **Doors and Windows**

Alignment is defined as the arrangement of an object in a straight line or in correct relative positions. Ensuring the correct alignment of doors and windows, while assembly and installation, involves the following:

- Correctly reading and interpreting the Blueprint and Job Order, to identify the correct dimensions for the doors / windows, in terms of length, width, depth, thickness and height from the floor
- Selecting the appropriate marking and measuring tools; for ex A Vernier Calliper cannot be used to measure and mark 6 inches height from the floor
- Transferring these exact dimensions on the workpiece or work area, by accurately measuring and marking these dimensions on it, with the help of the selected measuring and marking tools
- Placing and setting the doors, windows and other fittings by abiding by these marked dimensions
- Drilling pilot holes at accurate positions, using carefully selected drill bits; wrong drilling leads to pilot holes of wrong dimensions, which would result in ruining the entire installation process





Fig. 1.12.1: Accurate marking and selecting the proper drill bit are essential for drilling accurate pilot holes

Strength of Material for the most common form of glass, used for building purposes, is defined by the below parameters:

Parameters	Value
Density	2500 Kg / m3
Specific Gravity	2.5 at 21° C
Coefficient of Thermal Expansion (Linear)	88 x 10 -7/°C
Tensile Strength / Modulus of Rupture	19.3 - 28.4 MPa (Mega Pascals)
Thermal Conductivity	1.05 W/m°C
Softening point	737° C
Annealing range	480 - 560 ° C
Mean Specific Heat	162 J/kg ° C
Strain Point	523 ° C
Moh's Scale (Hardness Scale)	5.5 - 6.5
Volume electrical resistivity	31 x 1011 Ωm

1.12.2 Check for Functioning, Alignment etc. and Rectify any Error Found

- In furniture industry, there is no alternative to checking, rechecking and constant monitoring.
- Only a vigilant Quality Assurance process can help in eliminating errors during each phase and deliver the perfect product to the client.
- An Assembler must look out for elements that may hamper the precision and accuracy of his / her work.
- He / she must not only keep a close check on the defects, errors and anomalies in the workpiece, its components and hardware fittings, but also on the functioning of the tools and accessories.
- Any error, rectified during checking, must be immediately escalated to the Lead and prioritized for corrective actions.
- Alignment and level are extremely important aspects in the following phases in door / window installation:
 - \circ Measuring
 - o Marking
 - $\circ \quad \text{Setting and Placement} \quad$
 - o Cutting, Drilling and Chiselling
 - Adding Fasteners

Unit 1.13 Adhesives, Sealants and Other Filling Materials Used in Fittings

- Unit Objectives



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

- 1. Discuss the adhesives, sealants and other filling materials used in glass fittings
- 2. Demonstrate how to apply adhesives for glass fittings
- 3. Demonstrate how to assist in identifying and applying materials and sealant to fill gaps

1.13.1 Adhesives, Sealants and Other Filling Materials Used in Fittings of Glass

An Adhesive is an object used to stick objects or surfaces together. The most common form of Adhesive is glue.

Adhesive	Why used on Glass
Polyurethane Adhesives	Provides high elasticity and elongation to glass
Modified Silanes adhesives	Resists Ultraviolet radiations and has low toxicity
Silicone Adhesives	Resists Ultraviolet radiations and provides high elongation to glass
Acrylate adhesives	Has high mechanical resistance and hence, is required in small amount
Epoxy Adhesives	Good cohesive properties and hence, used on small areas of glass
Cyanoacrylate Adhesives	These bond to a vast range of glasses and materials and have very short curing time

Sealants are used to seal the joints between materials like glass, aluminium, wood, concrete, masonry walls, etc. These are mainly used to prevent the damage caused by wear and stress. Sealants should:

- Bind well with building materials
- Be soft and strong
- Be flexible •
- Be resistant towards climatic changes

The most common Sealants used in the Furniture & Fittings industry are:

- Silicone based sealants
- Urethane based sealants
- Acrylic based sealants
- Polysulphide based sealants

Among these, Polysulphide based sealants are the most popular ones.



Fig. 1.13.1 Sealant is being applied near a glass door

Fillers are materials used to fill up gaps, cracks and holes in Furniture & Fittings, as well as construction. The most common fillers are:

- Ground Calcium Carbonate (GCC)
- Precipitated Calcium Carbonate (PCC)
- Wood Flour
- Putty
- Saw Dust

1.13.2 How to Apply Adhesives for Glass Fittings ____

Applying Adhesives:

Step 1: Clean the surfaces (glass and other materials) to be glued.

Step 2: Prepare the glue as directed by the glue manufacturers.

Step 3: Apply a generous amount of glue to one surface. Use a brush to spread the glue evenly.

Step 4: Place the second onto the glue-smeared surface.

Step 5: Clamp the surfaces together.

Step 6: Tighten the clamps making sure the excess glue oozes out all the way

Step 7: Clean up the excess glue with a damp cloth.

Step 8: Allow the glue to dry according to the manufacturer's instructions.

Step 9: Remove the clamps after the glue is dry.

1.13.3 Assist in Identifying and Applying Materials and Sealant to Fill Gaps

a) Applying Sealants:

Step 1: A window scraper must be used to remove unwanted residue, if anyStep 2: All dust and debris must be brushed away using a cleaning brush and paper towelsStep 3:On selecting the appropriate sealant, the sealant container must be opened and pressed lightly at the end of the container

Step 4: The sealant's tip must now be dragged along the surface of the seam

Step 5: The sealant must be allowed to dry for few hours, ideally, a day.

b) Applying Fillers:

Step 1: The appropriate filler must be selected

Step 2: Paint chips and splinters, if any, must be removed

Step 3: Rough edges must be smoothened using Sand bits or Emery paper

Step 4: Debris, if any, must be removed by wiping it down with a damp cloth

Step 5: The filler must be squeezed into the hole

Step 6: The hole / gap / crack must be overfilled with the filler

Step 7: The filler must be smoothened using a putty knife and excess filler must be trimmed off with the knife

Step 8: Check the hole / gap / crack for excessive or inadequate filler and add or trim accordingly

Step 9: The filler must be allowed to dry for few hours, ideally, a day

Unit 1.14 Safety Standards and Precautions/Personal Protective Equipment

- Unit Objectives 🔟

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

- 1. Discuss the various safety standards and precautions to be taken
- 2. Explain the meaning and objective of Personal Protective Equipment
- 3. Apply safety equipment and personal protection equipment as needed
- 4. Explain why the floor guard/other floor safety material must be spread on the floor

1.14.1 Various Safety Standards and Precautions to be **Taken**

Safety standards and precautions must be followed not only to protect oneself, but others and the entire workplace as well. An Assembler must remember that these must be learnt well and followed strictly, in order to implement in daily life and during emergencies.

A. Safe Handling of Power Tools

Before Using	While Using
Appropriate measures should be taken to inspect the tool and the power supply; if the tool or any part / accessory is found defective, it must be either replaced immediately or removed from service and tagged appropriately as "Out of Service for Repair".	Issues, like a tool getting heated too soon or appearance of sparks, must be inspected and rectified by a licensed electrician only.
Care should be taken that no defective tool must be used at any point of time.	All power cords must be kept clear of tools and the path along which the tool will operate.
All repair and maintenance work must be accomplished by licensed and experienced persons.	Approved extension cords, with proper specifications, power requirement (for the tool) and dimensions must be used, to prevent overheating and fraying of the cord.
Before operating Powered Tools, the Instruction Manual must be read thoroughly.	Outdoor work must be done with the help of outdoor extension cords labelled with "W-A" or "W".

The guidelines and recommendations (by manufacturer) must be stringently followed, as per the Instruction Manual or Directions of Use.	Cords must be suspended over the work area to mitigate trips and falls.
The tools must be grounded adequately with the help of a three-pronged plug (equipped with relevant 3-wired colour coded cord) and double insulation; this helps in preventing electric shocks.	Octopus connections must be avoided by deploying a power bar or power distribution, comprising multiple receptacle plugs.
All powered tools must be checked with a continuity tester or a Ground Fault Circuit Interrupter (GFCI), for effective grounding.	While unplugging the tool from the socket, the plug must be pulled gently and not the cord. Forcibly pulling the cord leads to fraying and subsequent risk of electric shocks.
Powered tools must be switched off before connecting them to a power supply.	The entire work area must be kept dry and away from heat, sharp edges and oil, to avoid damage of insulation.
Doubts about operating power tools must be raised with the Lead without delay.	Cords, instead of knots, may be looped, using a twist lock plug.

B. Safe Handling of Hand Tools

- The user must ensure that he / she is adequately trained in the secure usage of hand tools.
- Appropriate and accurate choice must be made on the right tool for the task.
- The user must deploy the correct techniques of handling and using the hand tools thus selected for the task.
- The user must operate hand tools by keeping the wrist straight.
- Hand tools must be thoroughly inspected before use and must be repaired immediately or replaced, whenever necessary.
- The user must ensure that handles of axes, hammers, saws and chisels must fit tightly into the head of the tool, to avoid accidental injuries.
- One must always pull on pliers or wrench.
- Worn jaws of pliers, pipe tools and wrenches must be replaced immediately.
- All hand tools must be kept in a robust toolbox, in a clean and dry place, away from the work area.
- While using hand tools, one must wear appropriate PPE, according to the types of hazards involved in the task. This includes protective gloves of appropriate material, heavy aprons, safety goggles and face shields.
- When not in use, sharp and cutting tools must be covered with appropriate sheaths to avoid injuries.

1.14.2 Meaning and objective of Personal Protective Equipment

Meaning:

Personal Protective Equipment, commonly known as PPE, denotes protective clothing and apparatus, designed to protect the user's body from hazards, injuries and infection. Such clothing are aimed at protecting different parts of the body, like hands, eyes, ears, face, feet, head etc. These are worn or used specifically for staying protected against occupational safety and health hazards.

Objective:

The objective behind using personal protective equipment is to reduce employee exposure to hazards when internal controls are not effective enough to reduce these risks to acceptable levels.

Limitation:

- PPE are unable to eliminate hazards at their roots.
- PPE may impose additional physical strain on the wearer / user, leading to impairment of efficiency at work.

1.14.3 Use Safety Equipment and Personal Protection Equipment as Needed

Purpose / Use	Name of PPE	Description
		Head injury can impair a worker for the lifetime. Wearing safety helmet is the easiest way to avoid such situations.
Head Protection	Con and a second	 Protect head from falling objects and knocks
		• Reduce risk of head bump- ing against fixed objects like exposed pipes and beams
	Safety Helmet	• Protect head from acciden- tal electrical hazards
Eye Protection		Eye is one of the most sensitive organs of the body. Assembling glass doors and windows is a job, which comes with various hazards related to eye damage. For example, saw dust, small pieces of sharp objects may cause damage to the eye. Some widely used eye protection are – • Safety Goggle
		Safety SpectacleFacemask



Hand Protection	Hand Gloves (Abrasion and Cut resistant)	the hands from harmful and corrosive chemicals, extreme temperatures, sharp and con- taminated objects. For exam- ple, Nitrile gloves are used for protecting the hands against solvents, oils, greases, tar, acids and alkalis. Gloves made of natural rubber or Latex are used for protection against contaminations and biohazard risks. Asbestos gloves are worn while dealing with extremely hor materials.
Feet Protection		Safety shoes are used to protect the feet from heavy objects, such as tools that might roll onto or fall on the Assembler's feet It is also used while working with sharp objects such as nails or spikes that could pierce the soles or upper parts of ordinary shoes It also protects feet from hot, wet or slippery objects
	Safety Shoes	
Respiratory Pro- tection	Respirator	These offer protection of a min- imum protection Class of FFP3. Here, FFP3 stands for Filtering Face Piece Grade-3, which offer maximum protection against environmental pollution. These masks allow a maximum leakage of 5% only and filter 99% of all particles measuring up to 0.6

1.14.4 Why the Floor Guard/ Other Floor Safety Material Must be Spread on the Floor _____

During assembly and installation operations, the floor of the work area poses the maximum hazard of all. Hence, floors are covered with appropriate and ergonomically designed floor guards and other safety material. An Assembler must ensure that the floor safety material is spread on the floor to prevent damage and provide safety.

Hazard associated with floor	Protective Action
Injury from Glass Sharps and Glass Splinters	Cut resistant Mat
Slips, Trips and Falls on greasy or wet floors	
	Anti-slip, Waterproof Rubber Mat
	Anti-slip Tape
Electrical Hazard from wet floors and open wiring	Electrical Rubber Mat (for insulation)

Unit 1.15 Quality Standards to be Maintained

- Unit Objectives

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

- 1. Discuss the importance of cleaning the work area to ensure hazard free work
- 2. Demonstrate how to conduct on site modifications and touch up
- 3. Explain the importance of gathering all the tools and equipment, and remove from the site
- 4. Explain the process of wiping and cleaning the work area
- 5. Practise how to remove debris and dispose waste appropriately after work completion

1.15.1 Clean the Work Area to Ensure Hazard Free Work

One of the most recommended ways to ensure hazard free work is to clean the work area and keep it free of all debris and clutter. The more cluttered the work area is, the greater are the chances of coming across potential safety issues. A work area cluttered with tools, workpieces and equipment, involves serious hazards of slips, trips, and falls.

Cleaning the work area also enhances the Assembler's productivity. A well-organized and cleaned area helps the Assembler in identifying all tools and equipment on time, thus easing the preparatory phase before installation and assembly operations. Thus, the Assembler is able to start the work with better planning, which, in turn, helps him / her in completing and delivering the project on or before time. A tidy, clean work area also helps the Assembler in focusing better on the work, thus eliminating chances of errors and meeting the client's requirements at every stage.



Fig. 1.15.1.1: Cleaning the work area ensures better productivity and hazard free work

1.15.2 Conduct any on Site Modifications that may be Required

While assessing and surveying the site, before starting the work, the Assembler must assist the Lead in carefully studying the site and appraising if modifications and touch up are required. While carrying out these operations, care should be taken that the repair, modifications and touch up processes should be at par with the client's requirements and the desired specifications of the project.

a) Repair: In case the Assembler detects apparent defects on the site, especially at and around the structural openings, they must be reported to the client immediately and appropriate remedial and repair work must be initiated.

b) Reconstruction and Modification: Pre-installed decorative fittings and pieces of furniture often act as barriers to door and window installation. These, with prior permission from the client, must either be removed, or modified through reconstruction, so that the decoration does not seem to be a mismatch with the door / window but enhances its look.

c) Finishing and Touch-up: Minor defects, which do not require elaborate repair work or modification, may be rectified via appropriate Finishing and Touch-up processes.

1.15.3 Remove all the Tools and Equipment from the Site -

After completing the work, the Assembler must always remember to gather all the tools and remove them from the site. This is to ensure that the site remains clean and uncluttered after the work is completed. Such an attitude reflects that the Assembler is not only a responsible person, but pays attention small details and this creates a good impression on the client.

In order to gather the tools quickly, it is advisable for the Assembler to use a Nail Pouch, where he can place the small hand tools and fasteners. For the larger hand tools and vital tools, like the Power Drill and Hole Cutter, a toolkit must be carried by the Assembler to the site and back.



Fig. 1.15.3.1: Gather all the tools and equipment



Fig. 1.15.3.2 : Tools should not be left behind at the site and should be gathered and placed in the

1.15.4 Wipe the Installation and Clean the Work Area

The responsibility of the Assembler does not end with project delivery. After completing work at the site, the Assembler must not only wipe and clean the tools but the work area as well. In order to wipe the area, a soft piece of fabric must be used. Appropriate cleaning solutions, which are not corrosive and would not harm the work area, may be used with the wiping fabric. If a large area has to be wiped, a moping rod may be used.

Cleaning must be done by wearing appropriate gloves and other PPE, as recommended by the Lead.





Fig. 1.15.4.1: The work area must be wiped and cleaned properly after completing work

1.15.5 Remove the Debris and Dispose the Waste Appropriately after Work

A. Essentials of Debris Removal:

- After installation is done, ensure that you clear all the debris or waste materials from the site
- Separate the recyclable wooden pieces from the waste particles
- Gather damaged nails or screws on the ground and remove from site
- Check for sharp wooden bits on the floor and remove from site
- Use a broom to clear the saw dust from the area
- Dump all the wooden pieces in a plastic bag and put it in the dustbin



B. Steps in debris removal and waste disposal:

Use a broom to sweep the saw dust and other waste generated during assembling and installation	
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Step 2:	Collect waste from different parts of the work station and sweep them to a particular direction	
Step 3:	Dump the collected waste in a par- ticular bin/ place to dispose	

C. Appropriate Waste Disposal:

- Solid waste, once accumulated, must be labelled appropriately.
- Solid waste on the site mainly comprises debris and sharps.
- Debris in a furniture workshop comprises wood and timber splinters, saw dust, metal and glass sharps.
- Wood, timber and saw dust can be either treated at Landfill or at the Incinerator.
- Metal and Glass sharps are collected in appropriate sharp containers.
- Metal sharps are melted for recycling.
- Glass sharps are pulverized for recycling.
- Sharps, if contaminated, must be autoclaved and deactivated before disposing of into containers.
- Ferro-magnetic debris are separated using magnetic filters and treated according to their nature.



Fig.1.15.5.1: Waste collection for sharp objects



Fig. 1.15.5.2: Saw dust collector

Unit 1.16 Standard Operating Procedures

Unit Objectives

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

- 1. Explain Standard Operating Procedures
- 2. List SOPs for Door / Window Installation

1.16.1 Defining Standard Operating Procedures

Commonly known as SOP, this is a set of stepwise instructions to help Assemblers in carrying out routine functions. Before one works on any routine task, it is recommended that he / she refers to the relevant SOP first.

1.16.2 Listing SOPs for Door / Window Installation

Although SOPs may vary between organizations and their products, here are few general ones: SOPs for Door / Window Installation:

Understanding the customer's requirements

- 1. The Assembler must confirm with the client if the door or the window would be inward or outward opening.
- The Assembler must inform the client of any enhancement that could be implemented due to obvious security problems.
- For example, on outward opening windows, a restriction fitting, like a Door Stop, should be installed to avoid damages by sudden gusts of wind.

2. Assessing and measuring the aperture for suitability

- The Assembler must inspect the structural opening for apparent visual defects and suggest remedies to the client.
- The presence of pre-installed decorations, electrical wiring, telephone cable, etc. in the aperture must be noted. These should be routed around and not through the outer frame of the window / door.
- If bricks must be removed for installation, subsequent procedures for closing the cavity should be suggested.
- Any sub-sill, if required, should be such that there exists an protrusion of minimum 25 mm from the face of the building.

3. Calculating the manufacturing sizes

- Tolerances must be allowed for thermal expansion and contraction of framing materials.
- Such allowances must also be provided for the door / window aperture and thickness of the subsill material.

4. Determining Performance and Special Requirements

Performance criteria and special requirements are involved with the following:

- Weather Resistance
- Drainage
- Thresholds
- Letter plates
- Hardware fittings
- Side Panels
- Decoration
- Planning Permission
- Risk Assessment
- Cleaning Requirements

5. Structural loading requirements

For structural load requirements, it is recommended that the system supplier's instructions must be followed. For example, if windows and doors are to be coupled, then the Assembler must follow the supplier's recommendations in selecting the methods, look and position of the coupling.

6. Installation techniques

- Corner jamb fixings should be between 100 150 mm from the external corner.
- No fixings should be less than 100 mm from the centre line of a mullion (vertical bar between the panes of glass in a window) or transom (strengthening crossbar above door or window).
- Intermediate fixings should be at centres not exceeding 600 mm.
- There should be at least two fixings on each jamb.
- On windows and doors exceeding a width of 1800 mm, central head and sub-sill fixings should be provided.

Unit 1.17 Reporting and Documentation Skills

- Unit Objectives 🙋

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

- 1. Apply requisite documentation as per organization protocol
- 2. Demonstrate how to take note inputs/ feedback and assist in completion of documents
- 3. Discuss how to advise customer on any relevant maintenance requirements

1.17.1 Assist in Requisite Documentation as per Organization Protocol

Every organization has a set of policies regarding documentation. It is the Assembler's responsibility to assist the lead in getting the following documentation completed on time:

Feedback received from client

- Annual Maintenance Card (if any) from client
- Complaint Form from client
- Daily Work Report
- Task Completion Report

Apart from these, there may be other documents depending on the organization and the kind of work.

1.17.2 Take Note of Inputs/ Feedback and Assist in Completion of Documents

In case of assembling glass doors and windows, feedback is very significant. Good feedback helps the organization improve the service provided. Moreover, implementation of good feedback earns the trust and respect of the customers.

Each organization has a set of parameters on which customers share their feedback. Usually, a feedback form is given to the customers, which they fill in to share their opinions.

ABC Furniture	Pvt. Ltd.			
Voucher No. 12			Date: 21	L/09/2018
Category: Wind	low in Wooden Frame	and with Tinted Glas	ss Pane	
Type: Bay Winc	low			
Delivery	Assembling	Finishing	Cleaning	Conduc

1.17.3 Assist in Advising Customer on any Relevant Maintenance Requirements

Maintenance is defined as the process of preserving tools and equipment in good working condition. It is not enough to get doors and windows installed and then forget about them. Proper and periodic maintenance is required to protect doors and windows against effects of weather, rust, pests (like termites) as well as normal wear and tear over time. Visual defects, like cracks, chipped off and flaky surfaces must also be taken care of. Maintenance includes cleaning with carefully selected solutions and painting periodically with weather-resistant paint.

Maintenance requirements may vary, according to geographic location (of client), type of door / window and other factors. Assemblers must assist the team in advising the customer of maintenance requirements and suggest schemes (like Annual Maintenance Scheme), which would be cost-effective for the customer.

– Summary 뾛

- Currently, India is the 14th largest market in the world for the Furniture and Fittings sector.
- Glass doors and windows come with various types of fitting products and accessories, based on the need and taste of the consumer.
- Know-how of marking, cutting glass, polishing, repairing rough edges etc. is essential for Assemblers.
- Before starting with the installation and assembling processes, an Assembler must thoroughly prepare for the same by organizing ad cleaning the work area, tools and equipment, as well as by assessing the site, by appraising the risks involved and taking appropriate measurements.
- An Assembler must be well aware of the assembling and dismantling procedure of components for different products.
- Most of the products used in the global Furniture & Fittings industry are compliant with the below safety specifications and standards.
- Troubleshooting is a systematic and sequential approach to solve problems, used to detect and resolve issues in a unit or a system.
- Utmost care should be taken to handle tools and equipment carefully on the finished surface.
- Alignment is defined as the arrangement of an object in a straight line or in correct relative positions.
- An Assembler must follow safety standards and precautions to protect himself and the workplace.

Activity

- 1. Prepare a list of Marking Tools
- 2. Prepare a list of tools required for measuring all dimensions for a simple four-legged table
- 3. Observe different Hand tools
- 4. Observe different Power tools
- 5. Observe different types of Fasteners and Connectors

Exercise

Choose the Correct Option:

- 1. What other angle can be measured by the Miter Square?
 - a) 90 degrees and 180 degrees
 - b) 45 degrees and 135 degrees
 - c) 90 degrees and 100 degrees
 - d) 60 degrees and 120 degrees

2. Which one of the following is NOT a cutting tool?

- a) Marking Knife
- b) Hole Cutter Saw
- c) Sandpaper
- d) Palm Sander

3. The ______ helps in protecting our hands from abrasions and cuts.

- a) Safety Masks
- b) Disposable Latex Apron
- c) Safety Helmets
- d) Protective Gloves

4. The diameter of a small hole can be measured using:

- a) Tap
- b) Inside Vernier Calliper
- c) Outside Vernier Calliper
- d) Screwdriver

5. Which of the following is used in boring and the creation of straight, clean holes?

b)













सत्यमेव जयते GOVERNMENT OF INDIA MINISTRY OF SKILL DEVELOPMENT & ENTREPRENEURSHIP



Transforming the skill landscape

FURNITURE & FITTINGS SKILL COUNCIL



2. Ensure Health and Safety at Workplace

- Unit 2.1 Common Health and Safety Hazards in a Work Environment
- Unit 2.2 Procedures for Safe Handling of Tools and Equipment Unit 2.3 How to Respond to an Emergency Situation
- Unit 2.4 Potential Risks and Threats
 - Init 2.4 Potential Risks and Threats
- Unit 2.5 Organizational Reporting Protocol Unit 2.6 Health and Safety Practices at Work Place
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- Unit 2.18 Various Types of Safety Signs
- Unit 2.19 Basic First Aid Treatment relevant to the Condition
- Unit 2.20 Importance of Safe Lifting Practices and Correct Body Postures
- Unit 2.21 List of Names, Contact Details of all the People Responsible for Health and Safety in a Workplace



Key Learning Outcomes

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

- 1. Recognise the common health and safety hazards in a work environment
- 2. Discuss organizational procedures for safe handling of tools and equipment
- 3. Demonstrate how to respond to an emergency situation
- 4. Identify and assess potential risks and threats
- 5. Apply health and safety practices at work place
- 6. Identify potential hazards and risks at furniture and fittings related workplace
- 7. Discuss the storage and handling of hazardous substances
- 8. Explain the importance of good housekeeping
- 9. Discuss the procedure to be followed for safe disposal of waste
- 10. Discuss how to deal with an accident that involves human life
- 11. Describe the different types of personal protective equipment and their use
- 12. Demonstrate how to follow safe working practices while at work
- 13. Identify the different risks associated with the use of electrical equipment
- 14. Discuss the preventative actions to be taken in the case of exposure to toxic materials
- 15. Identify the various causes of fire
- 16. Differentiate between the different types of fire extinguishers
- 17. Demonstrate the techniques of using the different fire extinguishers
- 18. Identify the various types of safety signs and recall their meaning
- 19. Discuss the appropriate basic first aid treatment relevant to the condition
- 20. Analyse the importance of safe lifting practices and correct body postures
- 21. List the names and the contact details of all the people responsible for health and safety

Unit 2.1 Common Health and Safety Hazards in a Work Environment

- Unit Objectives 🛽

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

- 1. Differentiate between risk, hazard and threat
- 2. Explain occupational hazards
- 3. Identify the common health and safety hazards

2.1.1 Difference between Risk, Hazard and Threat

- **Hazard** is defined as a factor, which may cause harm to people and properties alike, like electricity, inflammable products, explosive material, corrosive chemical, using heavy ladders at workplace etc.
- Simply put, a Hazard is simply a condition or a set of circumstances that present a potential for harm.
- **Risk** is defined as the likeliness or the chance that a hazard can actually cause harm to somebody. For example, smokers of cigarettes run the risk of developing Cancer.
- The potential or imminent danger, that Risks and Hazards expose the concerned premises to. is known as **Threat.** For example, a person, who has the potential of blowing up a building, is a threat to that building and its inhabitants.
- The steps involved in Risk Management are:
 - 1. Identifying Hazards
 - 2. Assessing the Hazards
 - 3. Controlling and mitigating Risks

- 2.1.2 Explaining Occupational Hazards -

- Any job role and any occupation in this world involve some hazards, in varying severity. These are called Occupational Hazards.
- Occupational Hazards are caused by the following:

A. Hazardous Working Ambience	B. Hazardous Behaviour and Acts
Unsafe and unguarded machinery and tools	Using unsafe and unguarded machinery and tools
Hazardous and unmonitored processes	Neglecting safety guidelines while working
Inappropriate and inadequate ventilation	Ignoring the Instruction Manual or Directions for Use

A. Hazardous Working Ambience	B. Hazardous Behaviour and Acts
Inappropriate and inadequate illumination	Unsafe lifting, loading, staging, assembling and installing
Inappropriate and unsafe dress	Not adopting the prescribed ergonomic postures
	Handling Personal Protective Equipment (PPE) and dysfunctional Safety Devices

- 2.1.3 Common Health and Safety Hazards

- On the basis of effects on individuals, Occupational Hazards can be broadly categorized into: Health and Safety Hazards.
- Examples of Health Hazards are:
 - Carcinogenic factors
 - \circ Corrosive
 - \circ Toxic
 - \circ Irritant
 - o Factors that may lead to chronic and adverse effects on one's health
- Examples of Safety Hazards are:
 - $\circ \quad \text{Spills on floors} \quad$
 - o Tripping hazards like loose cords and cluttered workplace
 - Working from high or raised areas like ladders, cranes, scaffolds, rooftops etc.
 - o Unsafe and unguarded machinery and their moving parts
 - Electrical hazards like live wires, lack of earthing, loose cables, frayed cords, wet and poorly insulated devices, etc.
 - Inadequate space

Health Hazard

- Results in illness physical harm
- Lead to measurable changes in the exposed individual, which are understood by signs and symptoms

Safety Hazard

- Results in physical harm or injuries
- Affect the safety of individuals, usually having an injury or immediate fatality as the result of an incident

Other Hazards

• Apart from the ones mentioned above, Hazards can also be categorized on the basis of the Source of Energy.

- The types of hazards, according to the Source of Energy, are:
 - Biological
 - Chemical
 - \circ Ergonomic
 - o Physical
 - o Psychosocial

Biological - These hazards are associated with working with animals, plants and their products, as well as contagious or infectious materials. Examples are:

- Body fluids like Blood, Saliva, Sweat and Semen
- Bacteria, Fungi and Viruses
- Insect bites
- Human and animal waste

Chemical - These hazards occur, if, the inherent properties of materials pose harm to animal life, property or the environment as a whole. Severity of chemical hazards depends on the dosage and amount of the harmful components in a given chemical. Typical examples are:

- Chemicals in unlabelled container
- Various types of cleaning products, chemical agents, solvents, solutions, paints, acids, etc.
- Vapours and fumes resulting from welding and gas cutting operations, as well as from strong solvents and solutions
- Harmful gases like CFCs, Acetylene, Carbon Monoxide, Sulphur Monoxide, Propane, Helium
- Insecticides and pesticides

Ergonomic - These hazards occur, when the nature of work, body postures and working conditions exert strain on one's body. Common examples are:

- Inappropriately set up workstations and seats
- Frequent lifting by inappropriate techniques
- Repetitive and exhaustive movement
- Exertion of excessive force
- Excessive mechanical vibration

Physical - These hazards result from natural disasters, like earthquakes, floods, storms, etc., which cause massive loss of life and property. The hazardous factors are generally:

- Radiation
- Noise
- Dust and Debris
- Extreme temperatures (extremely high or low)

Psychosocial - These hazards mainly result from stress in one's social and professional life. These include:

- Excessive workload
- Violence at workplace
- Sexual Harassment
- Lack of respect at workplace
- Lack of flexibility at workplace
- Poor work relations
- Grapevine gossips

Hazard Prevention and Control

Identification implies that the job is half done. In order to take adequate precautionary measures against hazards, one needs to identify the hazards commonly found in the workplace. The common methods of hazard identification are:

• Job Hazard Analysis (JHA)

- This is a popular technique to identify the perils associated with specific tasks ina job role, in order to lessen the risk of injuries to employees.
- The steps involved in successfully conducting JHA are:

A. Divide the entire job role into small tasks or steps

Let us understand the concept with the help of an example, where JHA is being conducted on Carpentry work.

Steps	Hazards Associated	Recommendations
 Loading job with tools and equipment 		
2. Framing and Sheathing		
3. Prepping up and Painting		

B. Spot out the hazards associated with each step by asking questions like:

- What can go wrong with this task?
- What would be the consequences if the task went wrong?
- How could the task go wrong?
- What are the other contributing factors?
- What are the chances that this hazard will take place?
| Steps | Hazards Associated | |
|--|---|--|
| Loading job with
tools and
equipment | Injury from lifting, carrying, possible trip and fall | |
| 2. Framing and
Sheathing | Injury from lifting, carrying, possible trip and fall Injury from power tools Injury from sharp objects, metal studs, wood splinters Lungs getting affected by dust and debris | |
| 3. Prepping up and
Painting | Eye and skin injury Accidentally touching the wet paint Paint fumes affecting the lungs | |

- C. Review and discuss the scope of the hazards with the employees, who would actually do the tasks on hand
- D. Find out strategies and ways to mitigate or avoid the hazards

Steps	Hazards Associated	
 Loading job with tools and equipment 	Injury from lifting, carrying, possible trip and fall	
2. Framing and Sheathing	 Injury from lifting, carrying, possible trip and fall Injury from power tools Injury from sharp objects, metal studs, wood splinters Lungs getting affected by dust and debris 	
 Prepping up and Painting 	 Eye and skin injury Accidentally touching the wet paint Paint fumes affecting the lungs 	

E. Review and revise the JHA periodically

Unit 2.2 Procedures for Safe Handling of Tools and Equipment

- Unit Objectives 💆



1. Identify ways to adhere to relevant occupational safety policies while handling sharp tools

2.2.1 Relevant Occupational Safety Policies while Handling Sharp Tools

Sharp tools must be specifically handled with care. Few occupational safety policies while handling sharp tools are:

a) Safety Policies while handling Chisels:

- 1. Keep the cutting edge of the chisel sharp to avoid slipping.
- 2. Do not use chisels with damaged ferrules.
- 3. Hold a chisel with a tool holder if possible.
- 4. Clamp a small work piece in a vise and chip towards the stationary jaw when working with a chisel.

b) Safety Policies while handling Files and Rasps:

- 1. Do not use a file as a pry bar, hammer, screwdriver or chisel.
- 2. When using a file or a rasp, grasp the handle in one hand and the toe of the file in the other.
- 3. Do not hammer on a file.

c) Safety Policies while handling Knives:

- 1. When handling knife blades and other cutting tools, direct sharp points and edges away from you.
- 2. Store knives in knife blocks or in cover after use.
- 3. Do not use knives with dull blades.
- 4. Do not use honing steels that do not have disc guards.
- 5. Do not use sharp tools as toys.
- 6. Use knives for the operation for which they are named.
- 7. Do not use knives with broken or loose handles.
- 8. Do not use knives as screwdrivers, pry bars, can openers or ice picks.
- 9. Do not pick up knives by their blades.
- 10. Carry knives with their tips pointed towards the floor.

d) Safety Policies while handling Saws:

- 1. Do not use an adjustable blade saw such as a hacksaw, coping saw, and keyhole saw or bow saw, if the blade is not taut.
- 2. Do not use a saw that has blunt saw blades.
- 3. Keep hands and fingers away from the saw blade while using the saw.
- 4. Do not carry a saw by the blade.
- 5. While using a handsaw, hold the work piece firmly against the worktable.
- 6. Do not use circular saws, radial saws or jointers if they do not have guards on the saw blade.
- 7. Keep control of saws by decreasing downward pressure at the end of the stroke.
- 8. While operating scroll saws, stop the machine before removing scrap pieces from the table.
- 9. Clamp the workpiece while using a hole saw.
- 10. Do not use saw without teeth setting.
- 11. Always use a saw with sharpened teeth.

e) Safety Policies while handling Snips:

- 1. Wear safety glasses / goggles and protective cut-resistant gloves while using snips to cut materials.
- 2. Do not use straight cut snips to cut curves.
- 3. Keep the blade aligned by tightening the nut and bolt on the snips.
- 4. Do not use snips as a hammer, screwdriver or pry bar.
- 5. Use the locking clip on the snips after use.

Unit 2.3 How to Respond to an Emergency Situation



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

- 1. Demonstrate how to evaluate the Emergency
- 2. Practise how to handle the Emergency
- 3. Apply first aid activities in case of any accident

2.3.1 Evaluating the Emergency

An Emergency can be defined as "a serious, unexpected, and often dangerous situation requiring immediate action." Responding to an Emergency situation, while working at the site, involves the following:

- One must remain calm and composed during an emergency situation because stress during an emergency complicates things and confuses a person.
- One must critically and rationally think and evaluate the severity of the emergency and determine, what requires to be done on immediate basis.
- One must look for additional help by calling up the emergency toll free number, which would help the caller reach an official or 'dispatcher'.
- The emergency dispatcher aims at providing immediate and appropriate help, depending on the nature and degree of emergency.
- One must help the dispatcher by answering his / her questions and providing the dispatcher with the accurate location and nature of emergency.
- It is recommended that one should call from a GPS equipped phone, so that the dispatcher is able to track the location, even if the caller is unable to speak.
- One must determine the nature of the emergency, i.e. if it is a medical, mental health or behavioural emergency.
- One must assess the immediate threats, for example, in case a person is severely injured from a running machine, the machine must be turned off immediately to prevent others from getting hurt as well.

2.3.2 Handling the Emergency _____

- Extremely high casualties must be reported to the Occupational Health and Safety Committee (OHSC).
- One must move farther from the emergency spot and help others do the same.
- Evacuation Plans must be adopted and Escape Routes must be taken.
- Secondary Hazards must be eliminated or mitigated, at least. For example, a car accident involves the risk of a violent explosion and fire outbreak resulting from spilled fuel.
- One must help the other victims and take appropriate measures to help the specially abled ones.
- One must never feel guilty if nothing can be done to help the others.

- Once the emergency team arrives, it must be provided with all required and relevant information.
- In case nothing can be done to mitigate the severity of the situation, one must provide support to the others by comforting them, inquiring about their medical history, noting events as they occur, etc. These information may prove crucial for the emergency response team.
- A First Aid kit must be used, wherever applicable.
- One must try reviving a seemingly unconscious victim by rubbing the chest, pinching the earlobes, providing Cardiopulmonary Resuscitation (combination of chest compression and artificial respiration)
- One must avoid moving a severely injured victim and provide only the basic first aids.
- Only the emergency services can properly handle and move such victims.

2.3.3 Undertake First Aid Activities in Case of any Accident

- First Aid is an emergency care or treatment given to an ill or injured person before regular medical aid can be obtained.
- Before administering First Aid to a victim, one must check the category and degree of emergency and then apply the techniques duly.
 - Stop and look at the scene and the person before responding.
 - Ask yourself the following questions:
 - o Is the scene safe for you to enter?
 - What happened exactly?
 - What is the casualty?
 - What is the category and nature of the emergency?
 - o Is the accident fatal for the victim?
 - Is anyone else available at the place to help?
- Do the following if the victim is conscious and injury is not fatal:
 - $\circ~$ Ask for the victim's consent to administer first aid.
 - Put on appropriate PPE, if possible.
 - Interview the victim to ask basic medical questions, so that accurate information may be provided to the Emergency Medical Team, once it arrives.
 - o Conduct a thorough check for undetected injuries.
 - Administer appropriate care and technique.
- If the victim is unconscious, try reviving the person by addressing him / her, rubbing shoulders, hands or the sole of feet.
- Fetch the AED (Automated External Defibrillator) and use it, along with Artificial Respiration.

Unit 2.4 Potential Risks and Threats



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

1. Identify and evaluate the potential risks and threats associated with the job role

2.4.1 Identify and Evaluate Potential Risks and Threats

a) The Risk Assessment Matrix

- It is a good industrial practice to assess the severity and likeliness of risks, before undertaking a particular project or assignment.
- This can be successfully understood from a Risk Assessment Matrix or Risk Matrix.
- Risks can be evaluated from the below parameters:
 - Severity: Negligible, Marginal, Critical and Catastrophic
 - Likeliness: Rare, Unlikely, Possible, Likely and Certain

	Negligible	Marginal	Critical	Catastrophic
Certain	High	High	Extreme	Extreme
Likely	Moderate	High	High	Extreme
Possible	Low	Moderate	High	Extreme
Unlikely	Low	Low	Moderate	Extreme
Rare	Low	Low	Moderate	High
	Negligible	Marginal	Critical	Catastrophic

	Negligible	Marginal	Critical	Catastrophic
Certain	Minor cut			
Likely		Slip, Trip and Fall at the site		
Possible			Accident due to short circuit	
Unlikely			Massive Fire Outbreak on the site	
Rare				Tsunami / Earthquake (Richter scale of 8 and above)

b) Controlling Potential Risks

Once the hazards are identified and the severity of the associated risks assessed, the risks must be controlled and mitigated using appropriate strategies and programs. The various popular Risk Control Strategies are:

- Risk Defence
- Risk Avoidance
- Risk Transfer
- Risk Mitigation
- Risk Retention
- Risk Elimination

- Risk Defence This involves implementing safeguards and protection methods to eradicate or lessen uncontrolled risk. Ex - Using Personal Protective Equipment (PPE) while encountering hazardous operations.
- **Risk Avoidance** This involves averting a particular risk by discontinuing a given operation or process and replacing it with a safer option. Ex A Power Drill with frayed cords may be replaced with a new or repaired one.
- **Risk Transfer** This strategy involves transferring risks to other related areas in order to distribute the chances of loss equally or proportionately, so that one particular area does not get affected. Ex In Financial Management for an organization, its funds are invested into multiple projects involving varying degrees of risks, so that the losses (if any) incurred with one investment option can be offset with the profits earned from the remaining. This is called "Risk Distribution or Transfer".
- **Risk Mitigation** This strategy calls for reducing the impact of risks in a given operation or process, in case the vulnerable areas of the process get affected.
- **Risk Retention** Under this strategy, the risk associated with a given process is accepted and retained in the organization. The organization takes appropriate measures, in advance, to compensate for and finance the loss associated with the risk. This strategy typically involves two aspects Risk Retention with prior knowledge and Risk Retention without prior knowledge.
- **Risk Elimination** This strategy can be implemented by adopting suitable measures to curb the severity of a given risk. This can be accomplished by fixing a vulnerability or weakness in the organization that exposes the organization and its operations to the risk. Compensatory control systems are set up to either mitigate the probability of the weakness, at its very root, or lessening the severity of its impact.

Unit 2.5 Organizational Reporting Protocol



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

1. Identify and report any hazards / potential risks / threats to supervisors

2.5.1 Identify and Report any Hazards and Potential Risks/ Threats to Supervisors

Hazards and potential risks / threats can be identified and then reported to supervisors or other authorized persons in the following ways:

- Verbally reporting to supervisor or authorized persons
- Filling up and presenting a Hazard Report form
- Discussing the issue at a team meeting

While identifying and reporting a hazard / potential threat / potential risk, one must describe the following:

- Nature and location of the hazard
- Who it was reported to
- What action was taken
- Whether it was fixed

Reporting an accident / incident to an authorized person can be best done with the help of the Hazard Reporting form. The common format of the Hazard Reporting form is given below:

Part A: To be completed by the Assembler

Details Required:

- Name of Assembler
- Date of filling up the form
- Time of incident / accident
- Supervisor / Lead Name
- Work Location / Address
- Description of the hazard / what happened (Includes area, task, equipment, tools and people involved)
- Possible solutions to prevent recurrence (Suggestions)

Part B: To be completed by the Supervisor / Lead

Details Required:

- Results of Investigation (Comment on if the hazard is severe enough to cause an injury and mention the causes of the incident / accident)
- Actions taken / measures adopted (Identify and devise actions to prevent further injury, illness and casualty)

ing Form
Date:

Unit 2.6 Health and Safety Practices at Work Place



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

- 1. Discuss how to work safely at all times, complying with health and safety legislation
- 2. Inspect and check the worksite for any possible health and safety hazards
- 3. Demonstrate how to handle all required tools, machines, materials
- 4. Identify and follow appropriate procedure in case a of fire emergency

2.6.1 Work Safely at all Times, Complying with Health and Safety Legislation

- Ensure that all emergency route maps are on display, in publicly accessible places, on all floors of the workplace
- Ensure that appropriate Fire Extinguishers are available on all the floors of the workplace
- Ask your lead how you may retrieve PPE and the guidelines on maintaining and storing the same
- Stay aware that confined spaces must bear appropriate signs, to restrict claustrophobic people from accessing them
- Follow company policy and procedures for dealing with security risks in your workplace
- Learn and abide by Company policies and procedures for making sure that security will be maintained when you go on your breaks and when you finish work

2.6.2 Check the Worksite for any Possible Health and Safety Hazards

- Appoint a Safety Supervisor in the workshop
- This Safety Supervisor will stay responsible for checking the worksite for potential health and safety hazards
- Develop a daily checklist for all areas, looking out for possible hazards

2.6.3 Handle all Required Tools, Machines and Materials

Below are the safe handling practices for few selected hand tools, power tools and other equipment:

- a) Hammer:
 - 1. Use a claw hammer for pulling nails and driving nails.
 - 2. Do not strike nails or other objects with the cheek of the hammer.
 - 3. Do not strike a hardened steel surface, such as a cold chisel, with a claw hammer.

- 4. Do not strike one hammer against another hammer.
- 5. Do not use a hammer if your hands are oily, greasy or wet.
- 6. Do not use a hammer as a wedge, a pry bar or for pulling large spikes.
- 7. Use only a sledge-type hammer on a striking face wrench.

b) Screwdriver:

- 1. Always match the size and type of screwdriver blade to fit the head of the screw.
- 2. Do not hold the work piece against your body while using a screwdriver.
- 3. Do not put your fingers near the blade of the screwdriver when tightening a screw.
- 4. Use an awl, drill or a nail to make a starting hole for screws.
- 5. Do not force a screwdriver by using a hammer or pliers on it.
- 6. Do not use a screwdriver as a punch, chisel, pry bar or nail puller.
- 7. Use a screwdriver that has an insulated handle for electrical work.
- 8. Do not use a screwdriver if your hands are wet, oily or greasy.
- 9. Do not use a screwdriver to test the charge of a battery.
- 10. When using a spiral ratchet screwdriver, push down firmly and slowly.

c) Vises:

- 1. While clamping a long workpiece in a vise, support the far end of the work piece by using an adjustable pipe stand, saw horse or box.
- 2. Position the work piece in the vise so that the entire face of the jaw supports the work piece.
- 3. Do not use a vise that has worn or broken jaw inserts, or has cracks or fractures in the body of the vise.
- 4. Do not slip a pipe over the handle of a vise to gain extra leverage.

d) Pneumatic Tools:

- 1. Do not point a compressed air hose at bystanders or use it to clean your clothing.
- 2. Do not use tools that have handles with burrs or cracks.
- 3. Do not use compressors if their belt guards are missing. Replace belt guards before use.
- 4. Turn the tool "off" and let it come to a complete stop before leaving it unattended.
- 5. Disconnect the tool from the airline before making any adjustments or repairs to the tool.
- 6. Engage positive locks on hoses and attachments before use.
- 7. Shut off pressure valve and disconnect airline when not in use.
- 8. Tag damaged or defective pneumatic tools "Out of Service" to prevent usage of the tool by other employees.

e) Scaffolding:

- 1. Follow the manufacturer's instructions when erecting the scaffold.
- 2. Do not work on scaffolds outside, during stormy or windy weather.
- 3. Do not climb on scaffolds that wobble or lean to one side.
- 4. Initially inspect scaffold prior to mounting. Do not use a scaffold if any pulley, block, hook or fitting is visibly worn, cracked, rusted or otherwise damaged. Do not use a scaffold if any rope is

frayed, torn or visibly damaged.

- 5. Do not use any scaffold tagged "Out of Service."
- 6. Do not use unstable objects such as barrels, boxes, loose brick or concrete blocks to support scaffolds or planks.
- 7. Do not use a scaffold unless guardrails and all flooring are in place.
- 8. Level the scaffold after each move. Do not extend adjusting leg screws more than 12 inches.
- 9. Do not walk or work beneath a scaffold unless a wire mesh has been installed between the midrail and the toe board or planking.
- 10. Use safety belts and lanyards when working from scaffolds that are higher than 10 feet and that do not have top and mid-guard rails.
- 11. Do not climb the cross braces for access to the scaffold. Use a ladder.
- 12. Do not jump from, to, or between scaffolding.
- 13. Do not slide down cables, ropes or guys used for bracing.
- 14. Keep both feet on the decking. Do not sit or climb on the guardrails.
- 15. Do not lean out from the scaffold. Do not rock the scaffold.
- 16. Keep the scaffold free of scraps, loose tools, tangled lines and other obstructions.
- 17. Do not throw anything "overboard" unless a spotter is available. Use debris chutes or lower things by hoist or by hand.
- 18. Do not move a mobile scaffold with anyone on the scaffold.
- 19. Lock and chock wheels on rolling scaffolds before using.

2.6.4 Follow Appropriate Procedure in Case a of

– Fire Emergency

Dos	Don'ts
Switch off the isolation switch to stop the electric supply. This will prevent the spreading of fire.	Do not place combustible items like cotton waste - oil soaked cotton or oil, near the brazing or electrical points. These are highly inflammable and even a small spark may start a fire.
Use a wooden stick to switch off the isolation switch to protect yourself from an electric shock.	Do not keep the LPG cylinder's regulator switched on.
Check electrical sockets and switches to ensure there are no loose wires.	Do not use water on electrical fires.
Use appropriate Fire Extinguishers to put out Fire.	Do not panic.

Unit 2.7 Potential Hazards and Risks Present at Furniture and Fittings Related Workplace

- Unit Objectives



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

1. Identify the potential hazards and risks associated with furniture and fittings workplace

2.7.1 Potential Hazards and Risks present at Furniture and Fittings Workplace

For Assemblers in glass door / window installation, hazards and risks are mainly associated with glass splinters, broken edges and sharps.

Potential Risk / Hazard	Caused When	Risk Level
Flying glass pieces and splinters	Cutting, grinding or polishing glass	High
Cuts with sharp tools	Cutting glass, cutting wooden / metal frames, etc.	Moderate to High
Chemical or other hazardous material exposure	Cleaning, polishing or finishing	Moderate to High, depending on toxicity
Electrocution	Using Power Tools	High
Falling from height	Working at a height during installation	Moderate to High
Bumps, slips and trips from wires, heavy machines and tools	General operations on site	Low to moderate

Unit 2.8 Storage and Handling of Hazardous Substances



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

1. Discuss and demonstrate the storage and handling processes of hazardous substances

2.8.1 Storage and Handling of Hazardous Substances

Special care must be taken while handling and storing hazardous substances. In case of doubts, the Assembler must refer to the relevant SOPs, organizational policies or ask the lead.

A. Biological

- Infectious and potentially infectious materials must be inactivated by bleaching or Autoclave Sterilization during storage and before disposal.
- Infectious waste must be inactivated within 24 hours and marked with "Biohazard" symbol.
- Appropriate PPE must be worn or used while procuring, handling and disposing of infectious materials.
- Non-infectious biological waste do not need inactivation but must be put away separately in biological waste box, lined with red garbage bag
- Non-infectious biological waste include used but uncontaminated laboratory utensils, disposable clothing and gloves
- Sharps waste (including metal lancets, hypodermic needles, scalpel blades, medical instruments for cutting and piercing), used and unused, must be placed in red sharp boxes.
- Sharps boxes must be closed, when they get 3/4 full.
- Closed Sharp boxes must not be stored for more than 30 days.
- Contaminated sharps must be autoclaved and inactivated before storing for disposal.
- Penetration-resistant gloves must be worn for handling and storing contaminated sharps.

B. Chemicals

- One must read all information stated in the Material Safety Data Sheet (MSDS), before handling chemically toxic materials, so that the user is aware of the hazards involved and the necessary precautions
- All storage containers must be appropriately and accurately labelled.
- Any incident of damaged container or illegible label must be reported to the concerned authority.
- One must ensure that incompatible materials (like Acetone and concentrated Nitric Acid, Molten Wax and Water) are stored and used separately.
- To avoid destruction of containers, corrosive chemicals must never be stored in containers made of inappropriate materials.
- Containers of corrosive and toxic materials must be closed tightly.

- Appropriate PPE must be worn while handling toxic and corrosive chemicals.
- One must never consume anything while handling toxic chemicals and can do so only after thoroughly cleansing oneself with appropriate soap and solutions.
- Chemicals that produce a lot of fumes must be used carefully, enclosed in a Fume Hood.
- Flammable chemicals like alcohol, benzene, gasoline, Carbon disulphide, etc. must be handled only after turning off all sources of flame (burners, ovens, heaters, etc.)
- Flammable liquids must be only heated in a flask fitted with a Reflux Condenser; they must never be heated in open containers over open flames.
- While working with acids, one must wear acid resistant chemical gloves and clothing.
- One must keep emergency eye wash solutions handy.
- Dilution of acids must be done very carefully, by gradually stirring the concentrated acid into the water.
- Ethers must not be kept open and exposed to open air, because, this would create peroxides, which are highly unstable and may lead to violent explosions.
- All chemicals must be treated as a potential toxin and hence, one must keep appropriate antidotes nearby.

C. Combustible and Explosive

- Appropriate PPE, like disposable gloves (generally lead-lined latex or nitrile gloves) and close-toed shoes must be worn while handling radioactive materials.
- Flammable materials must be contained, stored or transported in vapour-proof, metal or plastic containers and must be equipped with welded seams, spark / flame arrestors, pressure release valves, spring closing lids with spout covers, etc.
- Care must be taken that the flammable material does not react with the container material.
- Containers must be labelled with "Flammable" sign.
- The labelling comprises the following information:
 - Name of the flammable material
 - Disclaimer that the contents are flammable
 - Precautions to be taken, like the fact that the container should be kept away from open flames, spark and other sources of ignition
- Storage and transportation containers for flammable substances must remain closed, when not in use.
- Flammable gas cylinders must be stored in a separate room
- Cylinders must be fitted with appropriate valves so that they do not run the chances of leakage
- Parts of the cylinder, like valves, hoses and container, must be checked regularly for damages.
- Compressed gases must never be stored along with or near bulk storage containers for flammable materials.
- Pieces of wood, straw and hay, saw dust, paper, cardboard etc. must be cleared off as soon as they are procured during the Furniture & Fittings operations.
- Adequate care must be adopted to ensure that the entire work area is a non-smoking zone.

Unit 2.9 Importance of Good Housekeeping



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

- 1. Describe Housekeeping
- 2. Explain the Dos and Don'ts of Housekeeping
- 3. Discuss the importance of good housekeeping

2.9.1 What is Housekeeping?

Housekeeping, in a furniture & fittings workshop, is the process of cleaning and maintaining the workplace / site as well as the various tools and equipment. Good and safe housekeeping practices help in keeping the workplace organized, thus boosting productivity and also minimising hazards.

2.9.2 Dos and Don'ts of Housekeeping

Housekeeping, in a furniture & fittings workshop, is the process of cleaning and maintaining the workplace / site as well as the various tools and equipment. Good and safe housekeeping practices help in keeping the workplace organized, thus boosting productivity and also minimising hazards.

Dos:

- 1. Sweep up shavings from around equipment such as drill presses, lathes or planers by using a broom and a dustpan.
- 2. Keep walking surfaces of elevated working platforms, such as scaffolds, clear of tools and materials that are not being used.
- 3. Remove protruding nails or bend them down into the lumber by using a claw hammer.
- 4. Return tools to their storage places after use.

Don'ts:

- 1. Do not place material such as boxes or trash in walkways and passageways.
- 2. Do not block or obstruct stairwells, exits or accesses to safety and emergency equipment, such as fire extinguishers or fire alarms.
- 3. Do not use gasoline for cleaning purposes.

2.9.3 Importance of Good Housekeeping

Good housekeeping helps in avoiding accidents like:

- Tripping over and stumbling across loose objects on cluttered floors, stairs and platforms
- Fire outbreak
- Bumping against unattended objects on raised platforms
- Slipping on wet, dirty and greasy surfaces
- Getting burnt with corrosive chemicals
- Getting punctured, scratched or cut with sharps, jagged edges, unsheathed cutting tools, protruding nails, etc.

Unit 2.10 Procedure for Safe Disposal of Waste

– Unit Objectives 🛛

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

1. Demonstrate how to ensure safe handling and disposal of waste and debris

2.10.1 Ensure Safe Handling and Disposal of Waste and Debris

Housekeeping, in a furniture & fittings workshop, is the process of cleaning and maintaining the workplace / site as well as the various tools and equipment. Good and safe housekeeping practices help in keeping the workplace organized, thus boosting productivity and also minimising hazards.



Unit 2.11 Safe Working Practices in a Furniture and Fittings Workplace

- Unit Objectives

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

- 1. Ensure that health and safety instructions applicable to the work place are being followed
- 2. Assess and follow manufacturers' instructions and job specifications relating to safe use of materials
- 3. Analyse and follow agreed work location procedures during an emergency

2.11.1 Ensure that Health and Safety Instructions are Followed

- Lighting should be adequate in all areas and replacement bulbs should be kept handy
- Ensure that all manual cutting tools must be honed in advance, because blunt tools can slip and lead to deep cuts
- Ensure that, while using cutting tools, the direction of cutting is always away from your body
- Arrange for frequent Safety Drills and Trainings for employees to promote safety awareness
- Have clear idea of how much authority and responsibility you have to deal with security risks, including your legal rights and duties
- Learn and abide by company policies and procedures for maintaining security while you work

2.11.2 Follow Manufacturers' Instructions and Job Specifications Relating to Safe Use of Materials

- Ensure that all chemicals, placed on display shelves, must be used only after referring to the relevant MSDS (Material Safety Data Sheets) or Instruction Manuals
- Loosely fitted clothes must be completely avoided because the loose ends may get caught in powered machinery and tools and may be fatal
- Ensure that you read the Instruction Manual / Directions for Use thoroughly before handling powered tools and equipment.

2.11.3 Follow Agreed Work Location Procedures during

Emergency

- Emergency procedures and related protocols vary according to the work locations and the nature of work.
- An Assembler must abide by the agreed work location procedures, in case of emergencies and accidents.

- An Assembler, on joining, must be adequately briefed on the Occupational Health Hazards and the procedures to deal with the same.
- All agreed work location procedures must be standardized and laid down under Standard Operating procedures, commonly known as SOPs, for general access.
- Each case of emergency and accident must be reported appropriately, to concerned authority, by filling up relevant forms.
- Usage of First Aid kit and Fire Extinguishers must be reported to concerned authority after each use.
- Any incident of an unlabelled chemical bottle, or waste container, or illegible label, must be reported to the supervisor or concerned authority immediately.

Unit 2.12 Deal with an Accident which Involves Human Life



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

- 1. Discuss methods of accident prevention in the work environment
- 2. Discuss emergency and evacuation procedures in case of accidents, fires, natural calamities
- 3. Demonstrate correct rescue techniques applied during fire hazard
- 4. Demonstrate how to free a person from electrocution
- 5. Demonstrate how to respond promptly and appropriately to an accident situation
- 6. Discuss how to participate in emergency procedures

2.12.1 State Methods of Accident Prevention in the

Work Environment

One must stay aware on and updated about the various methods of accident prevention in the work environment. Few of these are:

- **Training in health and safety procedures** One must be trained in the industrial health and safety procedures through drills and training sessions. Apart from the procedures popular in the industry, every organization has its own set of procedures and protocols, laid down and standardized in the form of Standard Operating Procedures (SOPs).
- Using health and safety procedures Ergonomic practices, use of PPE, hygiene and importance of good housekeeping practices must be promoted among workers.
- Use of equipment and working practices- Proper use, storage and maintenance of PPE, as well as medically recommended lifting, carrying and transporting practices must be taught and promoted among workers.
- Safety notices, advice and instructions from colleagues and supervisors- Workers must always keep their eyes open, so that they do not miss out safety notices, advice and instructions being circulated around them. Such safety notices, plans and instructions are often displayed for general public access at prominent and common places at workplace.

2.12.2 Follow Emergency and Evacuation Procedures

a) For Fire Outbreak:

The emergency and evacuation procedures are:

- A clear passageway must be present to all escape routes.
- Signage like escape routes should be clearly marked.
- Enough exits and routes must be there for all people to escape
- Emergency doors, that open easily, must be present.

- Emergency lighting (Infrared lights for night and blurred vision) must be present.
- All people at the workplace must be given brief instructions about the positions of the escape routes.
- Brief instructions must also be given regarding the availability and use of fire extinguishers.
- The workplace must have a safe meeting point or assembly area for the staff.
- Nobody should use the Elevator during fire.

b) For Natural Calamities / Disasters:

Earthquake

- The emergency and evacuation procedures are:
- Quickly shutdown any hazardous operations or processes and render them safe.
- Notify others in the area by raising an alarm if they have not heard it while you are evacuating yourself.
- Exit the room.
- Take jackets or other clothing needed for protection from the weather.
- If possible, close windows and doors as you leave, but do not lock the doors and emergency exit routes.
- Exit the building, walk to the nearest safe exit route. Do not run. Do not use elevators.

Flood and Storms

- The emergency and evacuation procedures are:
- Stay alert, avoid panicking and monitor the surroundings with eyes and ears open.
- Move to the high grounds and help others move before the flood strikes.
- Accumulate disaster supplies like:
 - o Canned, dry, ready-to-eat and packaged food, which do not require refrigeration or cooking
 - Liquid cash
 - o Drinking water in clean containers
 - First Aid Kit
 - o Essential clothing
 - \circ Flashlights
 - $\circ \quad \text{Adequate batteries} \quad$
- Instruct people around you not to drive
- Do not walk or swim through flooded water
- Shut off the Mains Supply (electricity) at the circuit breakers
- Stay alert for evacuation calls and help people identify alternate routes of getting there

c) For Accidents:

The emergency and evacuation procedures are:

- Summon emergency medical help by calling up the Safety Committee officials or the toll-free number.
- Check and examine the site, to gather as much information (location, nature and severity of injuries, casualty if any, hazards present, etc.) as possible, so that the same can be provided to the emergency team, once it arrives.
- One must inform the immediate supervisor about an injury or illness.

- If possible, workers may treat themselves to first aid or ask colleagues to do so.
- One must extend help and assistance to others.

d) For the specially abled:

The Visually Impaired

- Announce the type of emergency
- Offer your arm for help

With Impaired Hearing

• Turn lights on/off to gain the person's attention, or indicate directions with gestures, or write a note with evacuation directions

People with Prosthetic Limbs, Crutches, Canes, Walkers, etc.

- Evacuate these individuals along a route specially designated as injured persons
- Assist and accompany to evacuation site, if possible
- Use a sturdy chair, or a wheeled one, to move the person to an enclosed stairwell.
- Notify emergency crew of their location

2.12.3 Demonstrate Rescue Techniques during Fire Hazard -

A. Responding to Fire

- The Fire Alarm System must be initiated and an alert must be raised.
- o A safe evacuation path must be identified before dealing with the fire.
- The appropriate class of Fire Extinguisher must be chosen.
- The P.A.S.S technique must be adopted for extinguishing the fire.
- o Immediate evacuation must be initiated if the extinguisher is exhausted and the fire still exists.
- o Call the workplace security or the local emergency services.
- Summon the fire fighting services at the earliest.
- Stay as far as possible from smoke, because smoke may comprise toxic gases.
- Cover your mouth and nose with a damp cloth to protect yourself. If possible, help your colleagues (those who are with you) to repeat the same.
- Look out for the nearest emergency exit routes and call out for people, who you can take along with you.
- While opening a door, first touch the door with the back side of your palm.
- Keep doors open, after you open them.
- Start moving out of the building and ask your colleagues to do so.
- o Always use a staircase and not the elevator.
- Do not rush.
- As you move out of the building, gather people, whoever you come across.
- Always move downstairs and avoid returning to the burning premises, till the fire-fighters arrive.

- B. Initiate Evacuation
 - Stop your work but safely and without spreading panic.
 - Gather and carry only the most important items like cell phone.
 - Leave the workplace through the nearest door bearing an "Exit" sign.
 - Report to the designated Assembly Area.
 - Await instructions from the Safety Committee.
 - o Incorporate first aid treatment to anyone in need.

2.12.4 Demonstrate how to Free a Person from

Electrocution

Electrocution, to put simply, is injury or death caused by electric shock. The following procedure must be adopted while freeing a victim from electrocution:

Phase	Action	
Annuach	The first step is to approach the spot to find out if you run the risk of electrocution as well.	
Approach	Summon help from a colleague, who is trained in treating electrocution victims.	
Inspect Examine the accident scene to ensure if the source of electrocution still active.		
Examine if the victim is still in contact with the source of shock.		
Disconnect	Disconnect the main power supply of the area.	
	Avoid any electrical conductors in the surroundings.	
	Touch the victim only if all power sources have been deactivated.	

	In case it is impossible to deactivate the power supply, the victim mus be removed from the vicinity of the live power source.	
Insulate		
	This should be done by wearing appropriate insulating PPE.	
	The victim must not be removed in case of neck or spine injury.	
Rescue	The area must not be crowded to allow sufficient breathing air.	
The victim's breathing rate and pulses must be checked.		
	Never touch the victim or the surroundings without disconnecting the	
Recollect Main power supply. Wear appropriate insulating gloves and shoes, to protect you electric shocks.		

2.12.5 Respond Promptly and Appropriately to an

Accident Situation

- One must respond to an accident or emergency situation with a calm and composed mind. Presence of mind is very crucial under such circumstances.
- Medical help must be sought by calling the in-house medical team (if any), the Safety Committee, or the Emergency toll-free number.
- Appropriate first aid treatment must be administered to anyone in need, by a trained person / colleague.
- In case a victim cannot be adequately treated by first aid, and the emergency team is yet to arrive on the spot, the victim must be taken to the emergency ward of the nearest hospital.
- Ambulance services may be summoned by calling up the toll-free number for the same.

- The Environmental Health and Safety (EHS) department must be notified about the accident within 48 hours of the Supervisor being informed.
- Care should be taken that a seriously injured victim must not be moved and one must wait for the emergency team to arrive.

2.12.6 Participate in Emergency Procedures

Emergency procedures: raising alarm, safe/efficient, evacuation, correct means of escape, correct assembly point, roll call and return to work

- **Raising Alarm:** Fire Alarms can either have a "Break Glass" or a "Pull / Push" mechanism. In the "Break Glass" system, the glass sheet must be forcefully hit with clenched fist. One must repeat the process till the glass breaks. In the "Pull / Push" systems, one must smash the glass first and then either pull down or push up the lever to raise the alarm.
- Safe and efficient evacuation: Appropriate evacuation procedures (already discussed in the previous chapter) must be adopted for general public and for specially abled persons. Specially abled persons must be helped to evacuate the place by providing them access to Wheelchairs and other aids.
- **Correct Means of Escape:** The Assembler must look out for the correct means of escape, appropriate for the situation. During a fire emergency, only the routes marked as "Fire Exit" must be taken. Staircases must be taken and elevators must be avoided.
- **Correct Assembly Point:** Proper instructions must be given to the workers about the location of and the directions to the correct assembly point in the workplace. Information about this must be provided during mock evacuation drills and training sessions as well.
- **Roll call:** Once everybody has evacuated the building / workshop and arrived at the Assembly Point, Roll call or Head Count must be done to ensure that nobody is left behind in the affected area. This must be done mandatorily to ensure that everybody within the premises is safe.
- Correct return to work: Evacuation must be conducted in a very organized, streamlined and noiseless
 manner. Likewise, everybody, who had evacuated the workplace, must return to his / her respective
 locations / positions / seats, following normal or emergency routes, depending on whether the
 situation has been restored to normal or not. Once everybody is back in place, another Roll call is
 conducted.

Unit 2.13 Types of Personal Protective Equipment and their Use

– Unit Objectives 🗌



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

1. Identify the different types of PPE used by assemblers

2.13.1 Different types of PPE and their use

We have already explained the different types of Personal Protective Equipment (PPE) and their uses in Chapter 1. Let us recapitulate the same for better learning.

Name of PPE	Use
	Protecting the head against injuries from falling objects, knocks, exposed pipes and beams, etc.
Safety Helmet	
	Protecting the eyes against injuries from flying
Safety Goggles	splinters, debris, sharps, etc.
$\overline{\mathbf{C}}$	
Safety Spectacles	

Assembler- Doors/Windows (Glass)





Unit 2.14 Follow Safe Working Practices at Work



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

- 1. Ensure general health and safety equipment are available at work site
- 2. Comply with restrictions imposed on harmful chemicals inside work area
- 3. Demonstrate good housekeeping in order to prevent fire hazards

2.14.1 Ensure General Health and Safety Equipment are Available at Work Site

Workers must ensure the availability of general and safety equipment like:

- Fire extinguishers
- First aid equipment (First Aid box and its contents)
- Safety instruments and clothing (Personal Protective Equipment)
- Safety installations like neon-enabled and glowing fire exits, exhaust fans, etc.

All such equipment must be in good operating condition and must be periodically maintained.

2.14.2 Comply with Restrictions Imposed on Harmful Chemicals

Few hazardous chemicals in the workplace are recommended for restricted and expert use only. These chemicals must be stored in cool, dry and clean storage locations, in containers made of compatible materials and labelled with relevant Directions of Use, Precautionary Measures, Ingredients and Hazard Warnings. Care should be taken that incompatible chemicals do not get mixed. Appropriate PPE should be worn and sued while handling and storing such chemicals.

2.14.3 Demonstrate Good Housekeeping to Prevent Fire Hazards

The following fall under good housekeeping practices for preventing fire hazards:

- The workplace must be freed from clutter and debris, since these can act as fuels and are fire hazards.
- The entire workplace must be a "No Smoking" zone, thus designated with the help of "No Smoking Signs".
- Only designated areas, outside and far from the main work area, must be allowed for smoking.
- Fire Extinguishers must be maintained properly and refilled after use.
- Electrical faults may lead to fire and hence, any electrical hazards must be reported and attended to, immediately.

- There must be easy access to the Main Power Supply Control Panel, so that electrical power can be switched off in case of electrical fires.
- All powered tools, machinery and equipment must be maintained and inspected regularly by trained professionals, to prevent fire outbreak from overheating and friction sparks.
- Fuel containers, like Gas Cylinders and flammable oils, must be enclosed and stored separately, away from the main work area.
- Emergency exits, sprinklers, fire fighting apparatus, emergency exits etc. must never be blocked.
- Materials must never be stacked in a manner, so that clearances and exit routes are blocked.
- All fire alarm systems and fire fighting equipment must be inspected regularly.

Unit 2.15 Different Risks Associated with Electrical Equipment



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

1. Identify the different risks associated with electrical equipment

2.15.1 Risks Associated with Electrical Equipment

The risks associated with the use of electrical equipment are extended to both the user and his / her surroundings in the workplace, to people and properties alike. Few of such risks are:

- Fatal Electrocution accidents
- Non-fatal electric shocks leading to burn injuries
- Non-fatal yet severe shocks leading to damages caused to the internal tissues and vital organs like the heart and the brain
- Falls from ladders, cranes and scaffolding and resulting mechanical injuries due to electric shocks
- Health issues like muscle spasms, nausea, unconsciousness and palpitations
- Non-fatal yet painful static electric shocks
- Fire outbreaks and explosions caused by the sudden ignition of flammable materials

Such risks can be minimised by minimising and controlling the below electrical hazards:

- Live wires
- Lack of earthing / grounding
- Loose cables
- Frayed cords
- Wet and poorly insulated devices
- Wet floors and surfaces

Unit 2.16 Preventative and Remedial Actions for Exposure to **Toxic Materials**

- Unit Objectives

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

- 1. Discuss the remedial actions for exposure to toxic solvents
- 2. Practise preventative actions for exposure to toxic solvents
- 3. Discuss remedial actions for exposure to toxic fluxes
- 4. Practise preventative actions for exposure to toxic fluxes

2.16.1 Remedial Actions for Exposure to Toxic Solvents

- In case of inhalation of toxic solvents or resulting fumes, moving the victim to fresh air immediately, thus exposing the person to adequate oxygen supply.
- In case of skin contact with toxic solvents, the affected area must be washed thoroughly with lukewarm water and soap.
- In case of ingestion, vomiting must be instigated and the stomach must be washed.
- Activated charcoal may be administered in case of ingestion and inhalation.
- In case the eye is affected, it must be splashed and rinsed off with cold water till the effect subsides.

2.16.2 Preventative Actions for Exposure to Toxic Solvents

- Appropriate PPE, like protective chemical-resistant gloves, respiratory masks (for protection against toxic fumes), aprons, etc. must be worn.
- Initiatives must be taken to provide adequate ventilation to the work area.
- Any spillage of toxic chemicals must be wiped off immediately with wet cloth.
- The containers must be closed tightly after every use, to prevent spillage or leakage of fumes.
- Solvents must be kept away from naked flames, in a cool and dark place.
- All solvents must be stored in neatly labelled containers and provided with MSDS (Material Safety Data Sheets).

Examples: Acetone, chloroform, gasoline, carbon tetrachloride, diethyl ether, ethyl alcohol and methyl (ethanol), toluene, benzene, ethers, trichlorethylene, dichloroethane, tricresyl phosphate, nitroparaffins, tetralin, decalin, etc.

2.16.3 Remedial Actions for Exposure to Toxic Fluxes

- The victim must be carefully removed from the exposure area, to a well-ventilated place.
- In case of skin contact or eye injury with toxic fluxes, the affected area must be washed thoroughly with generous amount of water for at least 15-20 minutes.
- In case of ingestion, vomiting must not be induced unless prescribed by a physician.
- Ingestion must be treated with a drink of cold water or milk.

- In case of inhalation, adequate breathing support must be provided to the victim.
- Washing of the skin and the eye must be followed by a suitable skin or eye ointment.
- In case of difficulty in swallowing and unconsciousness in the victim, no oral remedy must be administered to prevent choking.
- Medical help must be summoned in case of severity.

2.16.4 Preventative Actions for Exposure to Toxic Fluxes

- Appropriate PPE must be used while working with toxic fluxes.
- The Directions of Use provided by the supplier / manufacturer must be strictly abided by.

Examples: Beeswax, Lead, Paraffin Wax, Borax, resin, Palm Oil, Cryolite, Unslaked Lime, Common Salt, Solder, Acid fluxes (Hydrochloric acid, Ammonium chloride, Zinc chloride, etc.), Resin fluxes (may lead to Asthma), Molten Solder fluxes (can cause severe burns on the skin), Lead and Mercury fluxes (very easily absorbed by the body and cause countless health issues and even death).

Unit 2.17 Causes of Fire, Types of Fire Extinguishers and Techniques

Unit Objectives

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

- 1. Identify the various causes of fire
- 2. List the common types of Fire Extinguishers
- 3. Apply appropriate fire extinguishers on different types of fires
- 4. Demonstrate the correct use of a fire extinguisher
- 5. Discuss the instructions for using different extinguishers

2.17.1 Various Causes of Fire

The various causes of fire in the workplace are:

- a) Common Fire Hazards These include combustible and inflammable materials like waste paper, cardboards, wood, saw dust, hay, straw, liquid fuels, gas cylinders, etc.
- **b)** Faulty Electrical Wiring This is one of the most common causes of fire outbreaks in the workplace. Faulty Electrical Wiring includes:
 - o Outdated and frayed wires and cables
 - Misuse of portable heaters, which includes putting them extremely close to inflammable surfaces like upholstery, couches, chairs, desks, rugs and carpets
 - Misuse of Extension Cords by plugging in appliances into Extension Cords and not directly into outlets
 - Misuse of cords by letting them run under rugs (made of combustible fibre)
 - Removal of the Grounding Plug from a cord, in order to use it in a two-pronged electrical outlet
 - o Installation of lamps and light bulbs with a wattage specification, too high for the existing outlets
- c) Faulty Electrical Equipment Short Circuit faults occur, when the circuit in an electrical apparatus allows a current to travel along an accidental path with NIL or extremely low resistance.
 - Short Circuit is caused by internal breakdown of equipment, resulting in the deterioration of insulation.
 - Short Circuit is also caused by insulation failure due to lightning surges, overloading of equipment due to overheating, physical damage, etc.

Fire	Fires can be classified according to their sources:		
	Class of Fire	Source	
	Α	Ordinary combustible objects like Wood, Paper, Plastic, Cloth, Charcoal, etc.	
	R	Flammable liquids like Gasoline, Petrol, Diesel, Grease, Other Greasy Liquids Flammable gases like Propane, Butane, Methane, etc.	
	В		
	С	Electrical equipment	
	D	Combustible Metals like sodium, magnesium, potassium, lithium, titanium, aluminium, etc.	

2.17.2 Common types of Fire Extinguishers

Type of Fire Extinguisher	Description
<image/> <image/> <image/> <image/> <image/>	It is used to extinguish the fire on wood, paper, cloth, etc. It should not be used to extinguish the fire from electrical equipment.

Foam	It is used to extinguish the fire caused by kerosene, spirit, thinner etc. It should not be used to extin- guish the fire caused on electrical equipment.
Dry Powder	It is used to extinguish fire from flammable liquids, such as petrol, diesel etc.
Carbon-di-oxide	It is used to extinguish fire from electric equipment, liquid gases or fluids.
2.17.3 Appropriate Fire Extinguishers on Different Types of Fires

Class of Fire	Type of Fire Extinguisher to be Used
B or C	Regular Dry Chemical
A, B, C, or D	Multi-Purpose Dry Chemical
D	Purple K Dry Chemical
B or C	KCL Dry Chemical
D	Dry Powder Special Compound
D	Carbon Dioxide (Dry)
Borc	Halogenated Agent (Gas)
	Water
A	Water with Anti-freeze
A or B	Water in loaded steam style
В	Foam

Fire Extinguisher Chart						
Exting	uisher			Туре	of Fire	
Colour	Туре	Solids (wood, paper, cloth, etc)	Flammable Liquids	Flammable Gasses	Electrical Equipment	Cooking Oils & Fats
	Water	Yes) 110) No) No	X 110
	Foam	Yes	Yes) 110) No	Yes
	Dry Powder	Yes	Yes	Yes	Yes	X 110
	Carbon Dioxide (CO2)	X ⊪∘	Yes) Ho	Yes	Yes

Fig. 2.18.2.1: Each fire must be treated with the appropriate extinguisher

2.17.4 Demonstrate the Correct use of a Fire Extinguisher (multipurpose)

The method, in general, of using any fire extinguisher is defined by the P.A.S.S technique:

- 1. PULL
 - Pull the pin to break the seal
- 2. AIM
 - o Aim the nozzle low, at the fire base
- 3. SQUEEZE
 - o Squeeze handle to release extinguishing agent
- 4. SWEEP
 - o Sweep sideways at the base, till fire is put out



2.17.5 Instructions for Using Different Extinguishers

Type of Fire Extinguisher	Instructions for Use
	After ensuring that the extinguisher is full (by checking if the Pressure Gauge is pointing at the green area), the Safety Pin must be removed, which in turn would break the seal.
	For a fire spreading horizontally, the hose of the Water Extinguisher must be aimed at the base of the fire and the jet of water must be moved across the area of the fire.
Water	For a fire spreading vertically, the hose of the Water Extinguisher must be aimed at the base of the fire, thus moving the jet gradually upwards, following the direction of the fire.
	The lever must be gradually squeezed to discharge the extinguisher.
	The user must move closer to the diminishing fire, gradually, applying the extinguishing agent at the same time.
	The user must look out for any hot regions that may reignite.
	After ensuring that the extinguisher is full (by checking if the Pressure Gauge is pointing at the green area), the Safety Pin must be removed, which in turn would break the seal.
Dry Chemical Powder	For extinguishing fires from flammable solid materials, the hose of the Powder Extinguisher must be aimed at the base of the fire and moved gradually across the area of the fire.
	For extinguishing fire from spilled liquids, the hose of the extinguisher must be must be aimed at the near edge of the fire and moved with a brisk sweeping movement, thus driving the fire towards the far edge till all the flames have been put out.
	For extinguishing fire from flowing liquids, the hose of the Powder Extinguisher must be aimed at the base of the fire and be swept upwards, till all the flames have been put out.
	The lever must be gradually squeezed to discharge the extinguisher.
	The user must move closer to the diminishing fire, gradually, applying the extinguishing agent at the same time.
	The user must look out for any hot regions that may reignite.
	After ensuring that the extinguisher is full (by checking if the Pressure Gauge is pointing at the green area), the Safety Pin must be removed, which in turn would break the seal.
Foam	For extinguishing fire from flammable liquids, the hose of the Foam Extinguisher must be aimed at a vertical surface near the fire and must never be sprayed directly at the fire, to prevent the fire from being pushed and spread to the surrounding areas.

	For using Foam Extinguisher on live Electrical Fires, it must be tested to 35 kV, keeping a safe distance of 1 km.
	For putting out fire from combustible solid materials, the hose must be aimed at the base of the fire, moving across the entire area of the fire.
	Foam Extinguishers are suitable for both Class A and B fires. However, the technique of application differs for both the classes.
	Foam Extinguishers help in putting out fires by accumulating a thick foam blanket across the entire surface of the fire.
	This built-up foam blanket prevents re-ignition of fire.
	After ensuring that the extinguisher is full (by checking if the Pressure Gauge is pointing at the green area), the Safety Pin must be removed which in turn would break the seal.
	While putting out fire from flammable liquids, the hose of the CO2 extinguisher must be aimed at the base of the fire and briskly move across the area.
CO2	The user needs to ensure that the CO2 jet does not splash the burning liquid.
	For extinguishing live electrical fire, the power supply must be switched off, if it is safe to do the same, and then, the hose must be aimed directly at the fire.
	Adequate care must be taken to extinguish the fire completely, since reignition is possible while using CO2 extinguishers.
	After ensuring that the extinguisher is full (by checking if the Pressure Gauge is pointing at the green area), the Safety Pin must be removed which in turn would break the seal.
	The heat source must be turned off.
	The lance must be held at an arm's length from the body, thus maintaining a safe distance with the fire.
Wet Chemical	The nozzle, at this juncture, must be at least 1 m away from the source of fire.
	The lever must be squeezed slowly to discharge the extinguishing agent.
	The spray must be applied in gentle round movements, allowing the wet chemical to enter the fire gradually, thus preventing hot molter fats and oils from splashing on to the user.
	The user must ensure that the entire fire has been extinguished, since wet chemical may instigate re-ignition.

Safety Measures:

- Do not use water on Types B, C or D fires.
- Water, if used on Type B fires, would spread the flames.
- Water conducts electricity, and hence, would cause major shock if used on type C fires.
- Water, if used on type D fires, would react violently, causing an explosion.

Unit 2.18 Various Types of Safety Signs



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

1. Identify the various safety signs and analyse their meaning

2.18.1 Various Safety Signs and Their Meaning _

Safety Signs are aimed at alerting people on the existing hazards and imminent risks involved with them. The various safety signs are given below:

Safety Sign	Meaning
FIRE EXTINGUISHER	There is a Fire Extinguisher near the sign, which can be used in case of Fire outbreaks.
EMERGENCY EXIT	There is a door near the sign, which should be used in case of any Emergency.
NO SMOKING	Smoking is strictly prohibited in this place.

HIGH VOLTAGE	Equipment or place bearing this sign has high voltage in vicinity. So it is not safe to go near that sign.
A DANGER	There is a threat of any limb getting caught by machines. Do not use the machine without appropriate Safety Guards.
Do not enter	The indicated zone has machines or equipment, which are not safe to be operated by a non- trained person.



Unit 2.19 Basic First Aid Treatment relevant to the Condition



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

1. Apply first aid activities in case of any accident

Undertake first aid activities in case of any accident, if required and asked to do so

A. Objectives of First Aid

- Preservation of life by promptness of action
- Relief from pain
- Prevention of the worsening of illness or injury
- o Enhancement of chances of recovery
- o Protection of the unconscious or semi-conscious

B. First Aid Principles

- Act calmly and logically.
- \circ Be in control both of yourself and the problem.
- Be gentle but firm.
- Speak to the casualty kindly but purposefully.
- o Build up trust through talking to the casualty throughout the examination and treatment.
- Avoid giving any misleading information.
- Never leave the casualty alone and continue to talk to him / her until the ambulance or doctor arrives.
- Continuously reassure the casualty.
- Send the casualty to a hospital or doctor by the quickest means of transport.
- Always inform the police about serious accidents.
- o Inform relatives of the casualty.

C. First Aid Treatment

Injury / Condition	Relevant First Aid
Abrasion & Small Cuts	Clean wound with soap and water. Apply antibiot- ic cream or provide iodine solution. Bandage and check dressing daily. See your doctor if there are signs of infection: increased redness, pus or red lines running from wound.

Cut with Splinters	
	Remove with sharp, pointed tweezers. (They should be sharp enough to pick up a single hair.) If splinter is completely under the skin, expose splinter end with sewing needle doused in alcohol, and then remove with tweezers.
Laceration	
	Clean wound with soap and water. Assess damage: If laceration is gaping or more than 1/4 in deep seek emergency help. Otherwise, apply pressure to stop bleeding. Close wound with butterfly closures or adhesive strips. Check dressing daily.
Fracture	
A A A A A A A A A A A A A A A A A A A	Signs include extreme pain, swelling, bruising and an inability to move an adjacent joint. If you have any of these signs, you should be seen by a doctor to see whether you need an X-ray to evaluate for a fracture.
Amputation	
A Contraction	Apply pressure to wounded area with clean band- age. Do not panic. Call for help. Raise wounded area above heart. Wrap amputated appendage in plastic bag. Keep append- age cool, not directly on ice. Sit in a chair near door, and await help.

Minor Burns	
Sold and the second sec	Cool the burn under cold running water for at least ten minutes. Loosely cover the burn with cling film or a clean plastic bag. Call and summon the Emer- gency Services if needed.
Electric Shock	
	Switch Off the Main Power Supply immediately. Free the victim of his clothes. Give artificial respira- tion and oxygen if needed. In case of Burns, apply ice and burn cream and rush to the hospital de- pending on the severity of the burn. Call and summon the Emergency Services if needed.
Poisoning	
POISON	In case of inhalation, move the victim to fresh air immediately, thus exposing the person to adequate oxygen supply. In case of skin contact, the affected area must be washed thoroughly with lukewarm water and soap. In case of ingestion, vomiting must be instigated and the stomach must be washed. Activated charcoal may be administered in case of ingestion and inhalation.
Eye Injuries	
	Look into mirror to assess eye. If foreign matter is embedded in the eye, go to the emergency room. If foreign matter is on the surface, flush it with water, or use eye wash and cup. For chemical splashes, flush with running water for five to 10 minutes. If it hurts too much to open your eye, go to the emergency room.

Heart Attack / Stroke	
	Think FAST. Face: is there weakness on one side of the face? Arms: can they raise both arms? Speech: is their speech easily understood? Time: to call Emergency helpline. Provide CPR (Cardiopulmo- nary resuscitation) as applicable. Immediately call medical/ambulance helpline or get someone else to do it.
Resuscitation due to Fumes and Dust	
	If you feel dizzy or are having trouble breathing, leave the area, and go to fresh air. If normal breath- ing does not return in 15 minutes, go to the emer- gency room.

Unit 2.20 Importance of Safe Lifting Practices and Correct **Body Postures**

Unit Objectives



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

- 1. List the safe lifting practices for an Assembler
- 2. Demonstrate how to maintain and work in correct body posture
- 3. Demonstrate how to lift, carry or move heavy wooden furniture and accessories

2.20.1 Safe Lifting Practices (as recommended by **OSHA** - Occupational Safety and Health Administration)

DOs

- Check the exact weight of an object before moving it.
- Always size up the load. Get help from others for heavy objects.
- Chose the flattest, straightest, and clearest route before your lifting the object.
- If the load is wet or slippery, wipe it off before lifting.
- Make sure the weight of the object is stable and distributed evenly if possible.
- Stand close to the object with legs at shoulder-width stance.
- Check your footing before you pull the load close to your body. Lift with your legs, not your back.
- Use material handling equipment whenever possible.
- When unloading, do face the spot you have chosen and lower the load slowly by bending your knees. ٠

DON'Ts

- Never lift more than you can easily handle or without knowing the weight.
- Avoid twisting your body while lifting or carrying.
- Never lift with a rounded back and straight legs.
- Never lift from an unbalanced position.
- Never carry a load that blocks your view or is big enough for the path you are following.
- Never look down while lifting.
- Never reach over your shoulders to lift. Instead, use a step stool or platform if possible.
- Avoid heavy lifting if you have had previous joint injuries.
- Do not bend over to load or unload a heavy object; it may hurt your back.

2.20.2 Maintain Correct Body Posture while Standing and Working for Long Hours -

While prescribing the correct body postures for Assemblers, we must discuss the differences between Neutral and Awkward body postures.

- In **Neutral** body posture, a person's body is aligned and balanced, at sitting, working or standing positions, thus imposing minimal stress on the body and keeping the joints aligned.
- Neutral postures lessen the stress exerted on the musculoskeletal system, thus promoting maximum control over the task and efficiency.
- On the contrary, **Awkward** body postures move away from the neutral body postures, away from the comfort zone, towards the extremes in the range of motion.
- This exerts greater stress on the body's musculoskeletal system.

Working at heights/ with ladder:



Fig. 2.20.2.1: Correct method to work on a ladder



Fig. 2.20.2.2: One must never work on a broken ladder



Fig. 2.20.2.3: A ladder must be correctly placed at work

Working with Hand Tools:



Fig. 2.20.2.4: Proper technique of working with hand tools(use clamps)



Safe Practices:



Fig. 2.20.2.6: Wearing safety shoes instead of slippers would protect the person against slips and falls

2.20.3 Work in a Comfortable Position -

- Posture is the position in which one holds the body straight and upright against gravity while moving, standing and sitting during work.
 - Correct posture involves teaching the body to stand, sit and move in positions. Such comfortable positions are:
 - Keeping the bones and joints in the correct alignment, so that muscles are being used appropriately
 - Helping the body in decreasing the abnormal wearing of joint surfaces that could result in Arthritis
 - o Relieves the stress on the ligaments, holding the joints of the spine together
 - o Preventing the spine from becoming fixed in abnormal positions
 - Managing fatigue because muscles are being used more efficiently, allowing the body to ease backache and muscular pain

2.20.4 Lift, Carry or Move Heavy Wooden Furniture and Accessories from One Place to Another

The steps involved in correct lifting, loading, unloading and handling procedures are:

- **A. Preparation:** One must prepare for lifting and handling the load, keeping in mind the following points:
 - o The heaviness of the load
 - o If mechanical means like Hand Trucks are required to lift the load
 - o If the load can be broken into small parts
 - o The destination of the load and if the path is free of obstacles

- If there are closed doors on the way
- If PPE must be worn while handling the load
- o If another person is needed to help with the load
- B. Lifting: Lifting should be done by considering the following factors:
 - Staying as close to the load as possible for ensuring better grip
 - o Keeping elbows and arms close to the body
 - o Keeping the back straight by tightening the stomach muscles
 - \circ Avoiding twisting and jerking motions while lifting
 - o Asking for assistance if the load is too heavy for one person to lift
- C. Carrying: Carrying should be accomplished by considering the following factors:
 - o One should turn by moving the feet around but not by twisting or turning the body
 - o The carrier's hips, shoulders, toes and knees should face the same direction
 - o Rest and short breaks should be taken for some time if the carrier is too fatigued and stressed out
- D. Settling Down: Settling down needs considering these factors:
 - \circ The load must be put down in the same way it was picked up, but in the reverse order
 - o The carrier must bend at the knees but not at the hips
 - o The load must be kept close to the body to ensure a firm grip till it is completely set down
 - o Hold should be released only when the load is securely set down



Fig. 2.20.4.1: Steps of lifting weight (from the left)

Unit 2.21 List of Names, Contact Details of all the People Responsible for Health and Safety in a Workplace

- Unit Objectives 🛽



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

1. List the names and contact details of people responsible for health and safety

2.21.1 List of Names and Contact Details of People Responsible for Health & Safety

As an important part of the emergency management procedure, any workplace must elect a Safety Committee, which comprise responsible and senior people from all departments and teams. This committee would act as the legislative body, the authority and the first point of contact for reporting any hazard, potential risks / threats and emergency situations at the entire workplace. This committee would also be responsible for conducting training sessions, safety audits and drills, to help all employees prepare themselves for emergency and unprecedented situations.

- The list of the committee members, their designations and job titles, as well as contact numbers must be listed and circulated among all staff members.
- The Safety Committee must comprise important members from the following departments:
 - o Supervisor / Manager / Team Lead from each project
 - Security Services
 - Reception / Front Desk
 - $\circ \quad \text{Building Operations and Maintenance team}$
 - Emergency Medical Services
 - o Counselling and Psychological Services team
- This list must be put up for easy display at prominent parts of the workplace, in the form of an Emergency Escalation Matrix and must be updated regularly.
- Furthermore, this list must be mandatorily included in every First Aid kit available in the workplace premises, so that a person treating a victim with first aid techniques may summon additional help and report the accident.

Few Emergency Toll-free numbers are:

100	Police
101	Fire
102	Ambulance
108	Disaster Management
181	Women's Helpline
1097	AIDS Helpline
1098	Child Abuse Helpline
+91 9540161344	Air Ambulance

- Summary 🖉

- Any job role and any occupation in this world involve some hazards, in varying severity. These are called Occupational Hazards.
- An Assembler must always follow the organizational safety procedures while handling tools and equipment.
- One must evaluate an emergency before responding to it.
- It is a good industrial practice to assess the severity and likeliness of risks, before undertaking a particular project or assignment.
- For Assemblers in glass door / window installation, hazards and risks are mainly associated with glass splinters, broken edges and sharps.
- Good and safe housekeeping practices help in keeping the workplace organized, thus boosting productivity and also minimising hazards.
- One must always ensure that health and safety instructions applicable to the work place are being followed.
- An Assembler must learn how to deal with a critical or fatal accident.

- Activity 🖉

- 1. Observe all safety equipment and try wearing / using all of them.
- 2. Visit a workshop and list all safety hazards present there.

Exercise

Choose the Correct Option:

1. Read the below statements carefully and answer the question:

- a) An Utility Knife can be used for any cutting operation that involves knives.
- b) A File can be easily used as a Pry Bar, Hammer or Chisel.
- c) Blunt Saw blades must never be used for cutting.
- d) It is a recommended practice to connect multiple electrical tools into a single outlet.

2. Which of the below options is correct for the above statements?

- a) A, B and D are TRUE
- b) Only C is TRUE
- c) All four statements are FALSE
- d) All four statements are TRUE

3. Which of the following Fire Extinguishers can be used to put out electrical fires?

- a) Water
- b) Co₂
- c) Foam
- d) Wet Chemical

4. "P" in "PASS" technique stands for:

- a) Pull
- b) Press
- c) Point
- d) Pin

5. Fill up the missing cells in the below table:

Type of Fire Extinguisher to be Used
Regular Dry Chemical
Multi-Purpose Dry Chemical
Purple K Dry Chemical
KCL Dry Chemical
Dry Powder Special Compound
Halogenated Agent (Gas)
Water with Anti-freeze
Water in loaded steam style
Foam

5. Which of the below Safety Signs prohibits a non-trained person to approach an indicated zone? b)

d)











6. Which of the following is NOT a step in rescuing an electrocuted person?

- a) Discharge
- b) Disconnect
- c) Inspect
- d) Insulate
- 7. Saw dust is a potential Fire Hazard. The statement is:
 - a) Correct

8. _

b) Incorrect

_____ is a part of safe practice for Hand tool:

- a) Keep the blades of all cutting tools sharp
- b) Keep all sharp tools in sheaths or holsters
- c) Not to use a tool if its handle has splinters, burrs, cracks, splits or if the head of the tool is loose.
- d) All of above
- 9. "Returning tools to their storage places after use" is a part of safe practice related to:
 - a) Using Hand Tools
 - b) Using Saws
 - c) Housekeeping
 - d) None of above
- 10. Which of the following is an example of Safety Hazard for an Assembler?
 - a) Glass particle in Eye
 - b) Piercing by nail gun
 - c) Electrocution by electric powered tool
 - d) All of above





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Transforming the skill landscape

FURNITURE & FITTINGS SKILL COUNCIL

3. Maintain Work Area, Tools and Machines

- Unit 3.1 Work Instructions and Specifications and their Interpretation
- Unit 3.2 Make Use of the Information Detailed in Specifications and Instructions
- Unit 3.3 Different Ways of Minimizing Waste
- Unit 3.4 Effects of Contamination on Products
- Unit 3.5 Maintenance of Tools, Equipment and Consumables
- Unit 3.6 Hazards Encountered when Conducting Routine Maintenance
- Unit 3.7 Types of Cleaning Equipment and their Use
- Unit 3.8 Safe Working Practices for Cleaning



FFS/N8501

Key Learning Outcomes 🔯

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

- 1. Comply with and accurately interpret work instructions and specifications
- 2. Discuss the method to use information detailed in specifications and instructions
- 3. Discuss the different ways of minimizing waste
- 4. Identify the effects of contamination on products
- 5. Discuss the maintenance procedures of tools, equipment and consumables
- 6. Evaluate the hazards likely to be encountered when conducting routine maintenance
- 7. Compare the different types of cleaning equipment and substances
- 8. Recall safe working practices for cleaning and the method of carrying them out

Unit 3.1 Work Instructions and Specifications and their Interpretation

Unit Objectives 🛛

Ø

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

- 1. Discuss how to accurately interpret instructions and specifications
- 2. Discuss how to prepare for and organize work

3.1.1 Work Instructions and Specifications and Interpret them Accurately _____

- Instructions and specifications provided to the Assembler must not be read casually.
- Instead, all sections and preferably every word must be read and understood diligently.
- The instructions must be read along with the BOM (Bill of Materials), which is a list of the raw materials, sub-assemblies, intermediate assemblies, sub-components, parts, and the quantities of each needed to assemble and install the final door / window.
- This helps the Lead Assembler and the other team members to fully understand and interpret the client's requirements and the specifications of the work piece or job.
- This is an important step in the project / assignment since it eliminates chances of miscommunication.

\cdot 3.1.2 Prepare and Organize Work -

- Planning, preparing for and organizing work have the below benefits:
- Planning helps in making quick and correct decisions by providing a person with adequate guidelines
- Planning helps in preparing a person for the worst outcomes and unexpected situations, thus helping the person in exercising better control in that situation
- Preparing and planning helps in optimally allocating resources like raw materials, finances, time and manpower.
- Preparing and planning helps in identifying, quantifying and defining goals, so that appropriate methods can be adopted to complete the assignment on time and in an organized manner.

The various steps involved in preparing, planning and organizing work are:

Step 1: Developing objectives and goals

Step 2: Designing methods (tasks) to meet these objectives and goals

Step 3: Determining and allocating resources needed to accomplish tasks

Step 4: Determining a timeline, over which the entire project / assignment will be carried out

Step 5: Evaluating each task, according to its outcomes

Step 6: Monitoring and tracking the evaluation process of each task

Step 7: Finalizing the plan

Step 8: Distributing the plan among all concerned people in the team

Unit 3.2 Make Use of the Information Detailed in Specifications and Instructions

- Unit Objectives 🛛



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

1. Discuss how to use the information detailed in specifications and instructions

3.2.1 Use the Information Detailed in Specifications and Instructions

Below are the sections in Specifications / Instructions, used by the Assembler to retrieve important information on the project:

- The Table of Contents, as the name suggests, briefs the reader / user about what information do the specifications comprise
- The name, address and contact details of authorized experts, who are responsible for preparing the specifications, deviations and updates
- The significance, scope and purpose of the specification
- The intended use of the specification
- Glossary of important terms and abbreviations
- Test methods for measuring all specified characteristics
- Material requirements in terms of rate and quantity, targets and tolerances
- Drawings, sketches, photographs and illustrations
- Safety requirements and guidelines / instructions on the same
- Quality Control and Assurance standards, requirements and performance testing criteria
- Expected TAT / deadline for delivery of the project
- Rejection, inspection and correction provisions
- Relevant annexures and appendices

Unit 3.3 Different Ways of Minimizing Waste



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

- 1. Apply different materials to minimize waste
- 2. Dispose of waste to designated locations

3.3.1 Use Materials to Minimize Waste

Waste in furniture & fittings can be minimized by the 3 Rs of Waste Minimization:

- Recycle
- o Reduce
- \circ Reuse
- **Resource Optimization** Raw materials must be used to the fullest, so that minimal waste is procured while converting the raw materials into finished products.
- **Recycling of Scrap Material** Scraps, when created, must immediately be incorporated in the manufacturing process, so that they get reused completely as raw material.
- Enhanced Quality Control This can be implemented by minimizing the number of rejects per batch. This is easily achievable with a higher frequency of careful inspection, accompanied with constant monitoring.
- **Exchange of Waste** Some wastes cannot be completely eliminated from the manufacturing process. Such waste can be effectively managed via Waste Exchange techniques, where the waste procured in a certain process becomes the raw material of another, and vice versa.

3.3.2 Dispose of Waste Safely in the Designated Location _

Waste Type	Treatment / Disposal to designated location
Wood chips, wood splinters, sawdust, wood shavings, Wood pieces, Paper	 Recycling in furniture manufacture or using as fuel Landfill Incineration
Glass splinters, sharps, broken / chipped glass	 Recycling in glass factories Collecting in labelled Sharp containers Incineration
Chemical Waste (from Wood Finishing)	 Recycling in factories, where chemicals are used for various processes Exposing to non-toxic chemical treatment (with minimally toxic end products)
Polybags (from Consumables)	 Recycling in plastic factories Exposing to Corona Treatment to change the non- biodegradable properties of Plastic

Unit 3.4 Effects of Contamination on Products

- Unit Objectives 🛛

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

1. Identify the effects of the common contaminants on glass doors and windows

3.4.1 Effects of the Common Contaminants on Glass Doors and Windows

Glass doors and windows may get contaminated either during the glass pane / frame manufacturing process or during packing, unpacking, assembly, installation, repair and maintenance operations.

a) Effect of foreign materials - Foreign materials like carbon dust, lubricants, adhesives, dirt, debris, etc. may get embedded during the glass manufacture process. This results in brittleness, strength loss or product foaming in glass.

b) Effect of Moisture - Wood is hygroscopic in nature, i.e. it readily absorbs and accumulates moisture, leading to multiple defects, including unusual expansion of wood and open joints. This results in warping, variations in size and creation of excessive or inadequate spacing around pre-fitted joints. Metals like Iron may accumulate moisture and rust, thus leading to furniture defects like brittleness and flaking. Aluminium, when exposed to moisture, leads to corrosion. These allow for chipping of the door / window.



Fig. 3.4.1.1: A corroded Aluminium window

c) Effect of Microorganisms, Insects and Rodents - Infestation by Fungi (Molds) leads to discolouration and disfiguration of doors / windows. Insects like Termites, Carpenter Ants, Wood Borers and Powderpost Beetles cause serious damages to wood (natural wood and its products) frames by chewing and grinding through them or building nests in them, thus rendering them flimsy. Pests like rats not only gnaw through wood, but also contaminate them chemically with their urine, faeces and hair. Steel and metallic furniture are usually unaffected by insects and rodents, but rats can gnaw through aluminium as well. Both wood and aluminium are affected by Molds.



Fig. 3.4.1.2: Termites in the wooden frame of a door

c) Effect of Dust - Accumulation of excessive dust on furniture lead to discolouration. Excessive dust may catch moisture and grease, thus forming greasy grime, which is often difficult to remove.



Fig. 3.4.1.3: Grease and Dust deposits on window

d) Effect of Corrosive Chemicals - Corrosive chemicals, like acids and alkalis, can destroy, disfigure, flake off, discolour, tarnish and eat through glass, metals and wood alike. Certain chemical finishing and cleaning agents are suitable for certain types of wood and metals only. Chemicals must be implemented on glass doors and windows only after reading the MSDS sheets and Manufacturer's Instructions.



Fig. 3.4.1.4: Glass window corroded by excess acid



Fig. 3.4.1.5: Effect of incompatible chemical on Aluminium

Unit 3.5 Maintenance of Tools, Equipment and Consumables



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

- 1. Apply maintenance procedures of tools, equipment and consumables
- 2. Examine and ensure correct handling of materials, equipment and tools
- 3. Discuss how to deal with work interruptions
- 4. Maintain appropriate environment to protect stock from pilfering, theft, damage and deterioration

3.5.1 Maintenance Procedures of Tools, Equipment and Consumables

The condition of your tools is important to the quality of your pieces. Your tools working correctly and efficiently add to the satisfaction of your efforts, but also ensure your safety. It is very important to set up a routine maintenance program to assure everything is running correctly, tools are correctly sharpened, instrument calibration are true, and tools are clean.

Handle materials, machinery, equipment and tools safely and correctly

a) Metal Tools - Handling & Maintenance

You need to ensure to follow operating and care instructions of tools. Do not ignore the maintenance instructions since tools are always running in a harsh environment. Lubricant, that keeps a motor running smoothly, attracts dust, and usually in the most inconvenient places. Proper care will keep them running efficiently, help in maintaining their new tool look, and increase their lifespan. Metal tool parts need proper oiling, or lubrication, while some components of an electrically driven tool need to be kept free of dust and debris.

b) Power Tools - Handling & Maintenance

Power tools require little maintenance if stored in a clean, dry protected area, keeping dust and debris away from them, and protecting them from the elements. Make sure that the cord is free of cuts or abrasions. You can also check the switch to see that it is properly connected, to allow current to flow to the motor. Some power tools, including Routers, have a pair of brushes that might need to be repaired or replaced as they wear down over time. Doubly check that chucks and bits are proper tightened. Keep tools in their case when not in use and make sure there is a proper storage place for tools that do not have a protective case.

c) Cutting Tool - Handling & Maintenance

Saws and Sanders require high diligence level in their maintenance. The nature of the tool entails cutting or abrasive action. The cutting and abrasion surfaces wear out and must be changed or restored frequently. Flattening tool surfaces, keeping sawdust and resin accumulation away from integral components, checking electronic components for sustained damage, functioning and proper lubrication of wheels, motors and bearings, are important to proper operability and lifespan of the tools. Worn out drive belts can cause amplified vibration and slippage and tend to break.

d) Pneumatic Tool - Handling & Maintenance

Pneumatic or Air-powered tools are usually piston-driven and this necessitates lubrication. Add a few drops of pneumatic oil into the air intake coupling. Tools used daily should also be oiled daily. Use of tape on threaded surfaces will keep a tight seal, which avoids loss of pressure on components. Clean or replace filters, depending on the use of the tool and the overall environment, in which it is used. Always protect your tools from moisture and extreme temperatures, because exposure to moisture causes corrosion on unprotected metal surfaces. Use tools as they are intended to because tools are usually made for specific purposes. When tools are subjected to misuse and stresses they were not designed for, they will often break down and fail to work correctly.

3.5.2 Use Correct Handling Procedures

Lack of knowledge in correct handling procedure can lead to Musculoskeletal Disorders. Handling involves lifting, lowering, pushing, pulling and carrying. Correct handling techniques involve:

- Lifting, by taking into consideration:
 - $\circ \quad \text{Nature of load} \\$
 - o Individual capacity
 - Environmental condition
- Reducing the amount of twisting and stooping while handling things manually
- · Not lifting from floor level or above shoulder height, especially for heavy loads
- Adjusting storage areas for mitigating the need of executing such motions
- Considering how you can mitigate transporting load across distances
- Evaluating the weight to be carried and identifying if the worker can move the load safely or needs assistance
- Identifying if the load can be broken down into smaller, lighter components

3.5.3 Maintain Tools, Equipment and Consumables

- It is essential that in order to keep tools, equipment and consumables in good working condition, they must be subjected to periodic maintenance.
- The frequency of maintenance depends upon the following factors:
 - \circ The manufacturer's instructions and recommendations
 - o The intensity and degree of use
 - o The physical working conditions like temperature, humidity, weathering, etc.
 - o The severity of potential risks and threats arising from unprecedented but likely malfunction

3.5.4 Ensure Safe and Correct Handling of Materials, Equipment and Tools

- Supervisors must inspect the ongoing tasks in the work area to ensure safe and correct handling of materials, equipment and tools.
- Surprise Audits must be conducted from time to time to ensure that all safety measures, like ergonomic procedures and safe handling of powered tools, are being adhered to by the Assemblers.
- Checklists and inspection sheets must be maintained at the workplace to keep a track of the maintenance and audit schedules.
- Assemblers must refer to SOPs from time to time, to ensure that they do not deviate from the safety protocols in handling materials, equipment and tools.

3.5.6 Protect Stock from Pilfering, Theft, Damage and Deterioration

Any workshop is comprised of raw material, countless tools, equipment, heavy machinery, cleaning equipment, PPE, documents, cash and several other important properties. A workshop and its security is threatened by the following factors, which can be mitigated and even eliminated with the help of apt surveillance processes:

- **Theft** Apart from raw materials, deliverable Finished Products, tool, machinery and equipment, important documents like database, manuals and blueprints, which are considered the Intellectual properties of the workshop, are exposed to the risk of theft.
- **Pilfering** Pilfering involves the theft of items, which are of comparatively lesser importance, in terms of cost and utility. For example, theft of petty cash, stationery items, tiny machine parts, screws, nails, adhesives, etc. is considered Pilfering.

Damage and Deterioration - Properties in a workshop may be damage and get deteriorated due to multiple factors. These factors can be natural or man-made. For example, cases of Sabotage and Vandalism are brought about by human miscreants.

Damages and deterioration can occur naturally, over time, due to wear and tear of tools, equipment and products, as well as poor inventory management. Man-made factors can be unintentional and may occur due to human errors and fatigue.

Good practices in keeping material safe -

- 1. All the cut parts should be numbered and same number should be written on drawing or sketch. This will help in identifying the parts while assembling and any missing part can also be identified easily.
- 2. All small parts should be kept in transparent polybags. Polybags can be marked with number and that detail can be written on a piece of paper.
- 3. Similarly, all consumables, like nails, handles, etc. also should be kept in transparent bags or in their original bags, so that it is easier to locate the desired item.
- 4. All material should be kept at one place, so that it is easier to locate all material at one attempt.
- 5. The material should be away from working area and preferably in some rack. If not possible, the some corner area should be used for this purpose.

Unit 3.6 Hazards Encountered when Conducting Routine Maintenance

Unit Objectives



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

1. Identify hazards likely to be encountered during routine maintenance

3.6.1 Hazards Encountered While Conducting Routine Maintenance

Preventive or Proactive Maintenance, commonly identified as Routine Maintenance, are subjected to few hazards, like:

- Electrical hazards from powered tools, while one is operating on them for checking and inspection
- Splinters, Dust and Debris during drilling holes or replacement of parts and accessories
- Working at heights, including working from hoisted cranes, trolleys and ladders, which can subject one to the risk of trips, falls and injuries
- · Bumping with heavy items, like large loads and heavy machinery and tools
- Working with toxic fluxes and harmful chemicals during cleaning, repair and maintenance operations

Unit 3.7 Types of Cleaning Equipment and their Use



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

1. Identify the different types of cleaning equipment & substances and discuss their use

3.7.1 Different Types of Cleaning Equipment and Their Use –

The various materials to be used by the housekeeping staff for cleaning are:

Cleaning Agents

Manual equipment & tools

Power equipment & tools

A. Cleaning Agents

- Solvents
 - A solvent is a liquid that dissolves a solid or liquid solute, resulting in a solution.
 - The most common solvent used in everyday life is water.
 - Water can be used to dilute any cleaning solution for easy use.
 - Warm water dissolves soap more readily than cold water.

Detergents & Soaps

- Detergents and soaps are used for cleaning because pure water cannot remove oily, organic soiling.
- o Soap allows oil and water to mix so that oily grime can be removed during rinsing.
- Detergents are similar to soap, but they are less likely to form films (soap scum) and are not as affected by the presence of minerals in water (hard water).
- Detergents to be used depend on:
 - Material to be cleaned
 - Cleaning equipment to be used
 - Type of dirt

• Liquid Cleaning Agents

- Liquid cleaning agents can be either diluted in a little water or used directly with a dry cloth.
- Washing Soda
 - It is useful for emulsifying grease on drainpipes, gutters or stone surfaces.

- In strong concentration, it could be an irritant and injurious to skin, fabrics brushes, wood and paint.
- Washing soda is useful as a water softener.
- Soda bars, Powders and Flakes
 - Nowadays soaps have been replaced by excellent synthetic soap less detergents, which are unaffected by hard water.
 - They give instant lather.
 - When used, care should be taken that they are thoroughly dissolved.
 - Should know the right concentration for best results.
 - Should be stored on open shelves in a dry storage area.

• Acid

- Acids are used for the removal of metal stains.
- Vinegar and lemon are used for the removal of tarnish of copper and brass and of mild water stains on bathtubs, etc.
- $\circ~$ More resistant water stains may be removed with stronger acids such as oxalic acid or hydrochloric acid.
- This should be only used under strict and experienced supervision so that it is used carefully and not in excess.

• Alkali

- Caustic soda, sodium hydroxide and ammonia are alkalis and are used as grease emulsifiers and stain removal agents.
- Strong alkaline cleaning agents based on caustic soda in flakes or in liquid form are available for the cleaning, of blocked drains, and other large industrial equipment.
- Extreme care is to be taken in their use as they are very strong and are highly corrosive.

Absorbents

- These perform the cleaning action by absorbing the stain or grease; for example starch, French chalk powders, and besan or gram flour.
- Their constituents vary and many are of vegetable origin.
- Unlike abrasives, they are not manufactured.

• Manual and Powered Equipment

- Manual cleaning tools and equipment are operated by hands while Powered equipment are connected to a power supply or battery.
- o Funnel
- o Rubber Spatula
- Floor Mop
- o Bowl Swab

- Plastic Caddie
- Spray Bottle
- $\circ \quad \text{Cobweb Cleaner} \\$
- Dry Vacuum Cleaner (Commercial)
- o Suction Dryer
- Dust Pan and Brush
- o Bucket and Mug
- Squeegees
- \circ Scrubbing Brush
- o Sponge
- o Scraper
Unit 3.8 Safe Working Practices for Cleaning



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

- 1. Discuss how to maintain a clean and hazard free working area
- 2. Apply cleaning equipment and methods
- 3. Demonstrate how to store cleaning equipment safely after use

3.8.1 Maintain a Clean and Hazard Free Working Area-

Assemblers must maintain a clean and hazard free working area to enhance workplace safety and also to improve their own productivity, by minimising accidents and chances of interference and disruption of work.

Accomplishing this involves the following activities in the workplace:

- Sweeping, washing, cleaning of floors
- Allocating space to all tools and equipment
- Keeping all tools and equipment at their place
- Disposing of unwanted or unused components, consumables, tools and equipment
- Cleaning of equipment and other office areas

3.8.2 Use cleaning Equipment and Methods

- Cleaning tools and equipment must be selected according to the nature of task, surface and the required intensity of cleaning.
- Delicate surfaces must not be treated with strong and corrosive cleaning agents like acids and alkalis.
- On the contrary, surfaces that require intensive cleaning cannot be treated with mild cleaning agents.
- Cleaning equipment, especially the powered ones, come with Instruction Manuals, which not only explain the steps involved in using the, but also comprise Precautionary Measures, Dos and Don'ts of handling them.
- For example, Vacuum Cleaners must never be used on wet surfaces.

3.8.3 Store Cleaning Equipment Safely After Use

- Cleaning tool and agents, which fall under the same category, must be kept and stored together.
- Cleaning agents must be stored in a cool, dry place in containers of compatible materials.
- Flammable liquids and gases must be stored in pressure-safe containers with appropriate labels on.
- Such flammable substances must be stored in secluded and well-ventilated places, at least 50 feet away from sources of heat or flame.
- Places for storing chemicals must contain a book of all MSDS sheets.
- Chemical cleaning agents must be stored in secure shelve or in a locked cupboard.
- Sharp equipment must be stored in sheaths or designated racks.
- Powered equipment must be turned off, when not in use.

Summary

- Instructions and specifications provided to the Assembler must not be read casually. Instead, all sections and preferably every word must be read and understood diligently.
- An Assembler must make good use of the information detailed in specifications and instructions.
- Waste in furniture & fittings can be minimized by the 3 Rs of Waste Minimization: Recycle, Reuse and Reduce.
- Glass doors and windows may get contaminated either during the manufacturing process or during packing, unpacking, assembly, installation, repair and maintenance operations.
- Power tools require little maintenance if stored in a clean, dry protected area, keeping dust and debris away from them, and protecting them from the elements.
- An Assembler must be well aware of the different types of cleaning equipment & substances and their use.
- Assemblers must maintain a clean and hazard free working area to enhance workplace safety and also to improve their own productivity.

Activity

- 1. Observe Hand Tools and state few safety handling instructions.
- 2. Observe Power Tools and state few safety handling instructions.
- 3. Visit a workshop and prepare a list of all the cleaning tools and equipment used there.

Exercise

2. ___

Choose the Correct Option:

1. Identify the TRUE statement among the following:

- a) Broken glass and splinters cannot be recycled
- b) Wood is hygroscopic in nature
- c) Aluminium can easily rust like Iron
- d) Pneumatic Tools are powered by electricity

_____ are used for cleaning because pure water cannot remove oily, organic soiling.

- a) Washing and Baking Soda
- b) Detergents & Soaps
- c) Liquid Cleaning agents
- d) Caulking Agent

3. Which of the following can remove metal stains?

- a) Acids & Alkalis
- b) Liquid Cleaning Agents
- c) Aluminium Oxide
- d) Detergents

4. Flammable liquids and gases must be stored in:

- a) Moist containers
- b) Glass Containers
- c) Pressure-safe containers
- d) All of these

5. The Vacuum Cleaner is a:

- a) Manual cleaning equipment
- b) Grease Emulsifier
- c) Absorbent
- d) Power cleaning equipment



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4. Work Effectively With Others

Unit 4.1 Work Effectively with Others to Achieve Goals Unit 4.2 Effective Communication and Establishing Good Relationships

Unit 4.3 Own Role and Responsibilities

Unit 4.4 Principle of Furniture and Fittings Manufacturing and Installation

Unit 4.5 Display Correct Understanding of Work Task and Objective Unit 4.6 How to Keep Work Area Clean and Tidy and its Importance Unit 4.7 Quality Standards for Assigned Work Task and Objective Unit 4.8 Reporting Procedure in Case of Deviations

Unit 4.9 Importance and Need of Supporting Co-Workers Facing Problems

Unit 4.10 Types of People that One is Required to Communicate

- Unit 4.11 Various Components of Communication Cycle
- Unit 4.12 Importance of Active Listening
- Unit 4.13 Importance of Discipline and Ethics
- Unit 4.14 Disciplined Behaviour for a Working Professional
- Unit 4.15 Expressing and Addressing Grievances Appropriately
- Unit 4.16 Managing Interpersonal Conflict Effectively

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Key Learning Outcomes

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

- 1. Discuss the importance of working effectively with others
- 2. Discuss the importance of effective communication
- 3. Assess own role and responsibilities
- 4. Comply with the principle of furniture and fittings manufacturing and installation
- 5. Discuss the importance of having the correct understanding of work task
- 6. Demonstrate how to keep the work area clean and tidy
- 7. Apply quality standards for assigned work task and objective
- 8. Practise reporting procedure in case of deviations
- 9. Discuss the importance and need of supporting co-workers facing problems
- 10. Recognise the different types of people that one is required to communicate
- 11. Identify the various components of communication cycle
- 12. Discuss the importance of active listening
- 13. Relate the importance of discipline and ethics with professional success
- 14. Describe what constitutes disciplined behaviour for a working professional
- 15. Explain the method of expressing and addressing grievances
- 16. Recall the importance and ways of managing interpersonal conflict effectively

Unit 4.1 Work Effectively with Others to Achieve Goals



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

- 1. Discuss how to seek assistance from supervisor as and when required
- 2. Demonstrate how to follow organizational policies and procedures

4.1.1 Seek Assistance From Supervisor or any Such Appropriate Authority

- One's supervisor is supposed to be one's mentor and guide at work.
- Assistance and guidance must be sought from the supervisor whenever needed.
- Ask questions to clarify doubts.

4.1.2 Follow Organizational Policies and Procedures-

- A good employee is expected to respect and follow the organizational policies and procedures.
- Such policies involve adherence to Standard Operating procedures, safety guidelines, Instruction manuals, HR policies etc.
- Adherence to and respect for the organizational mission and vision are mandatory to align a person with the organizational goals and targets.
- Following organizational policies and procedures make a person an integrated part of the organization, thus making him / her a family member.

Unit 4.2 Effective Communication and Establishing Good Relationships

- Unit Objectives

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

- 1. Identify the components of effective communication
- 2. Demonstrate how to communicate effectively with clients
- 3. Explain the importance of establishing good working relationships

4.2.1 Components of Effective Communication

Effective Communication is a two way information sharing process, which involves one party sending a message that is easily understood by the receiving party. An Assembler, with effective communication skills, can work more efficiently and earn appreciation more commonly.



The various types of communication are:

Verbal or Oral Communication	Involves the use of language spoken verbally or or orally to convey messages
Written Communication	Involves the art of writing to convey messages. This includes letters, emails, reports, etc.
Non-verbal Communication	Involves the use of Body Language and gestures to convey messages

4.2.3 Importance of Establishing Good Working Relationships

- To succeed in one's career, it is not enough to effectively communicate with one's clients alone.
- No career is possible without team work and support from colleagues and guidance from supervisor(s).
- Best practices should be shared with colleagues and one must listen to the advice of experienced colleagues.
- Care should be taken that all colleagues must be treated with equal respect, irrespective of their religion, ethnicity, caste, creed, colour or special abilities.
- Women colleagues must be treated with utmost respect.
- One must use appropriate tone and pitch while effectively communicating with one's supervisor(s) and colleagues.
- Communication with everybody at workplace should be cordial, yet brief and formal.

Unit 4.3 Own Role and Responsibilities



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

1. List one's own role and responsibilities

4.3.1 Own role and Responsibilities

Apart from the responsibilities related to the job role, a person working or aspiring to work as an Assembler has to fulfil few roles and responsibilities on a personal front. These are:

- Working as a good Team Player, so that one's personal objectives and aspirations align perfectly with those of the team
- Working as a good Team Leader, so that one's leadership skills, instructions and timely reviews help in eliminating errors and delivering the tasks on time
- Working as a good Quality Inspector, so that one is able to identify defects in the products under process (Work-in-progress), to avoid recall of the final and finished products

Unit 4.4 Principle of Furniture and Fittings Manufacturing and Installation

Unit Objectives



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

1. Discuss the principle of Furniture and Fittings manufacturing and installation

4.4.1 Principle of Furniture and Fittings Manufacturing and Installation

Furniture and fittings manufacturing and installation are done, keeping in mind these three factors: Style, Comfort and Storage. Any product in this sector must be a perfect balance and outcome of these three factors. A customer would not accept a bed, if it suits his / her taste or style, is compact but is not comfortable enough. The major principles and requirements of this industry are given below:

Criteria	Elements	Principles
Knowledge	Industry	Knowing and understanding the Furniture & Fittings industry in general
	Organisation	Knowing and understanding the employer company, its policies and manufacturing & installation procedures
	Materials	Identifying target customers and understanding their expectations correctly
	Customers	Knowing and understanding the Furniture & Fittings industry in general
	Quality Standards	Identifying the applicable quality policies and checking if they have been met
		Carefully reading and interpreting specifications, drawings, sketches and other technical information provided
	Health, safety and Environment	Knowing and understanding all health, safety, sustainability and environmental requirements relevant to the industry

Criteria	Elements	Principles
Skills	Maintain Work Area, Tools and Equipment	Carrying out regular routine maintenance operations on machinery, tools and equipment
	Problem Solving	Identifying issues quickly, solving problems and applying appropriate solutions
	Achieve Quality and Productivity Targets	Follow all policies to meet the laid down quality standards
		Monitoring and inspecting if the work meets specifications and following methodology and processes
Behaviour	Collaboration and Adaptability	Communicating effectively and listening actively to receive and utilise accurate and undistorted information
		Coping up with challenges and changing environment
		Working as a good team player and maintaining good working relationships with others

Unit 4.5 Display Correct Understanding of Work Task and Objective

Unit Objectives



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

- 1. Demonstrate how to seek clarifications on work tasks whenever required
- 2. Evaluate and accurately receive information and instructions from the supervisor

4.5.1 Ask Questions and Seek Clarifications on Work Tasks

- Question must be asked to clarify doubts and to eliminate communication gaps with one's supervisor.
- This must be done to get a clear idea about the responsibilities expected by one's supervisor.
- Having a clear idea about one's tasks helps in fulfilling targets successfully.
- Seek and obtain clarifications on policies and procedures, from the supervisor or other authorized personnel.
- If the Lead Assembler has doubts about the organizational policies and SOPs, they can be clarified by the supervisors or other authorized personnel.
- Address the problems effectively and report if required to immediate supervisor appropriately.
- Identify and report any possible deviations to appropriate authority.
- Receive instructions clearly from superiors and respond effectively on the same.
- Accurately receive information and instructions from the supervisor related to one's work.

4.5.2 Accurately Receive Information and Instructions from the Supervisor

- Before starting a particular work, it is important to sit with one's supervisor and understand the task's objectives and requirements.
- The Assembler must obtain necessary resources, like BOM, Work Order, Specifications and Instructions from the supervisor.
- He / she must also discuss the SOPs involved in the operations, if any.
- Brief should be also taken on the tools and equipment required for accomplishing the work, and the precautionary measures in using the same.
- The Assembler must also receive brief regarding the potential risks and hazards involved in the work and how to assess them.

Unit 4.6 How to Keep Work Area Clean and Tidy and its Importance

- Unit Objectives 🛛



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

1. Demonstrate how to keep work area in a tidy and organized state

4.6.1 Keep Work Area in a Tidy and Organized State -

- Control Dust and Debris
- Clear Clutter and Spills to avoid Slips, Trips and Falls
- Follow a specific frequency of cleaning operations
- Maintain a written set of guidelines on cleaning and tidying the work area, in the form of SOPs (Standard Operating Procedures)
- Store tools and equipment appropriately, in their designated storage locations
- Store and maintain PPE appropriately
- Effectively move waste materials to designated locations and treat them duly

Unit 4.7 Quality Standards for Assigned Work Task and **Objective**

Unit Objectives

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

- 1. Discuss how to seek and obtain clarifications on policies and procedures
- 2. Explain how to adhere to time lines and quality standards
- 3. Identify methods to share information with team

4.8.1 Seek and Obtain Clarifications on Policies and **Procedures**

Every organisation has its own set of quality standards and related SOPs and policies. Before delivering the final finished product to the client, the respective quality criteria must be verified by the Assembler, with appropriate briefing and clarification from the supervisor and other authorized persons.

4.8.2 Adhere to Time lines and Quality Standards

- Deadline, TAT adherence and quality assurance are important aspects of project management.
- While working on a project, one must maintain a borderline between the delivery time and the quality standards required by the client as well as directed by the organization.
- It is important to deliver the project on or before the deadline, but care must be taken that one does not deviate from the client's specifications and quality standards.

4.8.3 Share Information with Team Wherever and **Whenever Required**

- A team must follow a very effective and strong communication cycle.
- Accurate and undistorted information must be shared with the team, so that all members in the team are perfectly aligned with the task requirements and expectations.
- Sharing accurate information eliminates communication gaps between the Lead Assembler and the other members in the team.
- This is also effective in managing emergency situations, since it is very crucial to impart accurate and appropriate instructions while handling such circumstances.

Unit 4.8 Reporting Procedure in Case of Deviations



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

- 1. Identify and report any possible deviations to appropriate authority
- 2. Illustrate how to address the problems effectively and report, if required

4.9.1 Identify and Report any Possible Deviations

During the entire course of work, any deviation, in terms of quality standards, requisite specifications and others, should be reported immediately to the supervisor or appropriate authority. For example, if the client has asked for an Overpanel Patch and the team has given a Corner Patch, it is a notable deviation from the specifications required.

4.9.2 Address the Problems Effectively and Report

Problems and issues must be reported to the immediate supervisor as soon as they are identified. There is no need to panic but timely escalation must be made to get them resolved. For example, if matching screws are missing from the Handle kit, then this issue must be escalated and replacement order must be placed with the vendor. Such escalations and reports must be made in proper format, as directed by the organization.

Unit 4.9 Importance and Need of Supporting Co-Workers Facing Problems

- Unit Objectives 🛽



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

1. Evaluate the importance and need of supporting co-workers

4.9.1 Importance and Need of Supporting Co-workers Facing Problems

Coordinate and cooperate with colleagues to achieve work objectives

Teamwork is extremely important in any job. An Assembler must coordinate and cooperate with colleagues to make the project a grand success. He / she should:

- Listen actively with minimal barriers
- Build trust, but do not get too casual
- Be aware of your tone
- Watch your body language
- Participate and coordinate
- Ask questions to clarify
- Discuss task lists, schedules and activities
- Share best practices with peers

Unit 4.10 Types of People that One is Required to Communicate

- Unit Objectives

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

- 1. Apply instructions clearly from superiors and respond effectively
- 2. Discuss how to work together with co-workers in a synchronized manner
- 3. Demonstrate how to communicate with others clearly

4.11.1 Receive Instructions Clearly from Superiors and Respond

Communication is incomplete and ineffective if there is a gap between the receiver and the sender. One should not only ensure to receive the accurate information from the supervisor(s), but also acknowledge that he / she has correctly understood the same. It is a recommended practice to note down important points while receiving instructions from one's supervisor.

4.11.2 Work Together with Co-workers

- An Assembler must be an excellent team player, because it is practically impossible to accomplish a project or task without proper synchronization.
- The various stages in a project must be treated discretely and yet, there must exist a seamless link or flow between them, in other words, synchronization.
- The deadline for delivery of the entire project can be met only if each component of the project is delivered on time.
- The outcomes of each stage of a project become the inputs to the next one and the process must continue in a synchronized manner until the final product is obtained.

4.11.3 Communicate with Others Clearly

One must ensure that important information must be communicated and conveyed in a pace that helps everybody understand easily. Too fast a pace would make the audience not only miss out the important chunks of information, but also in understanding the information wrongly. Too slow a pace would make the conversation boring and make the audience lose interest in listening.

Unit 4.11 Various Components of Communication Cycle



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

1. Identify and analyse the various components of the Communication Cycle

4.11.1 Various Components of the Communication Cycle

Communication Cycle is the sequence in which effective communication occurs between the giving and receiving ends. The various components of the communication cycle are:

- 1. Aim
- 2. Formulate / Encode message
- 3. Transmit / Deliver message to Receiver
- 4. Receive Feedback from receiver
- 5. Decode, Analyse and Act
- 6. Ask questions to sender to clarify doubts if message is still not clear

Unit 4.12 Importance of Active Listening



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

1. Demonstrate how to display active listening skills at work

4.12.1 Display Active Listening Skills while Interaction

Active Listening, as the name suggests, is how one utilises one's listening skills to effectively receive accurate information. Without Active Listening, communication in a workplace stands incomplete and would invite several errors and gaps in communication.

The steps involved in Effective and Active Listening are:

- Facing the speaker and maintaining an eye contact
- Attentively listen and comprehend the information given by the speaker
- Staying attentive yet relaxed
- Keeping an open, receiving mind
- Listening to the words and trying to visualize what the speaker is saying
- Never interrupting or imposing your "solutions"
- Waiting for the speaker to pause to ask clarifying questions
- Asking questions only to ensure understanding
- Communicate clearly on the issues being faced and clarify queries
- Trying to empathize with the speaker
- Providing the speaker with constructive feedback

The barriers in Active Listening are:

- Distractions
- Noise
- Interruptions
- Prejudice and Preconceived Ideas
- Lack of Interest in the conversation

Unit 4.13 Importance of Discipline and Ethics

- Unit Objectives

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

1. Appraise the importance of discipline and ethics in professional success

4.13.1 Importance of Discipline and Ethics

The importance of Discipline and Ethics, to achieve professional success can be elaborated with the help of the following elements. These are known as the pillars of workplace discipline and ethics:

Element of Discipline & Ethics	Meaning & Importance
Professionalism	 Defined as the competence or skill expected of a professional Emphasizes on the importance of Grooming, which adds to one's confidence level and enhances personality Emphasizes on the importance of Effective Communication Skills and strong Interpersonal Skills, which help the person in carrying out activities in a team
Respecting others	 Emphasizes on appreciating and admiring other colleagues for their contribution towards a task Emphasizes on the need of complimenting This helps in boosting team spirit and improves work culture
Reliability and Accountability	 Measure of how responsible a worker is towards his / her job role and assigned tasks Dedication and Determination Measure of how focused , committed and sincere a worker is towards the job role and responsibilities
Integrity	 Having honesty and strong moral principles are very crucial for a worker
Humility	• One must be formal, firm, yet cordial, polite and humble while dealing with peers and colleagues

Unit 4.14 Disciplined Behaviour for a Working Professional



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

- 1. Display courteous behaviour, respect and politeness at work
- 2. Practise how to respond politely to customer and team queries
- 3. Recognize the dress code at work place

4.15.1 Display Courteous Behaviour at all Times

At workplace, one may encounter varied situations, few of which may be unpleasant. One must stay firm yet courteous while dealing with difficult work situations, like conflicts, grievances, appraisal discussion, etc. However unpleasant the situation may be, one must not lose control over oneself and behave courteously.

4.15.2 Demonstrate Responsible and Disciplined Behaviour

Learning about discipline alone does not make one disciplined at the workplace. One must implement what has been learned, by demonstrating responsible and disciplined behaviour at the workplace.

Few such elements of disciplined behaviour are:

- Punctuality This encourages a person to be always "On Time". Punctuality inculcates the habit of deadline adherence and effective time management, thus completing tasks as per given time and standards. Practising punctuality can be an efficient tool in delighting customers and earning their retention and loyalty.
- Eliminating Wastage An Assembler must stick to the policy of "Zero Wastage". Resources must be properly planned, allocated and utilized to the fullest. Such resources include people, time, raw materials and money. Wastage of time, by loitering unnecessarily, idling and gossiping, etc. must be condemned and prevented.
- Integrity and Honesty An employee with high standards of ethics, honesty and moral values is considered a valuable asset to the organization. One must respect work hours and should not render oneself unproductive or underproductive by gossiping and idling.

4.15.3 Show Respect to Others and Their Work-

- Appreciation for other team members works as "Positive Reinforcement", i.e. it encourages and rewards them for their performance and contribution towards the project.
- Appreciation for others in the team promotes mutual respect, which is one of the most important aspects in good team work.
- Showing respect to others would imply that one shall earn respect and appreciation in return.
- Thus habit promotes collaboration in a team to boost productivity and improve quality of work.

4.15.4 Respond Politely to Customer Queries

- Customer Centricity is one of the most vital personal attributes that an Assembler must have, since an Assembler must interact with innumerable clients in daily life.
- A client may have several doubts and queries, which the Lead Assembler must listen proactively and clarify politely.
- This behavioural trait must not only be practiced with one's clients, but also with the other team members as well.
- By responding politely to all queries of clients, an Assembler fulfils the following:
 - **Understand customer requirements and time lines and respond as per their needs -** Answering customer's queries helps in understanding the task requirements very clearly. This, in turn, helps in working with less confusion and interruptions and in delivering the task perfectly on time.
 - Being courteous with customers and ability to handle different types of customers Different customers have different types of nature. The nature of customers can range between being very polite to extremely demanding and critical of whatever you do.
 - Being aware of different customer cultures / faiths and responding appropriately Irrespective of the culture, colour, nationality, creed and economic status, a customer is always the King for a Lead Assembler. Respecting diversity implies that Customer Centricity should be practised, irrespective of the customer's background. A Lead Assembler must always remain neutral and truly professional while dealing with customers from diverse backgrounds.
 - Work and deliver output as per client requirement and satisfaction The end result of any project is ultimate client delight. Meeting client's requirements about a project and exceeding the client's value expectations help in retaining a client and earning his / her loyalty.

4.15.5 Follow Dress Code at Work Place

- Dress Code helps a person in identifying himself or herself as an inseparable component of the organization.
- Maintaining the dress code helps in strengthening the security of the organization.
- Dress code mandates that only authorized persons are allowed to access and control the premises.
- Adhering to the organization's dress code is an important part of Work Ethics in the work area.

Unit 4.15 Expressing and Addressing Grievances Appropriately



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

- 1. Explain the meaning of grievance
- 2. Explain the importance of following the escalation matrix in case of any grievance

4.15.1 What is Grievance?

Grievance is defines as "an official statement of a complaint over something believed to be wrong or unfair". Grievance is very common in any workplace and it is important to address and resolve it on time, to avoid non-performance, unproductivity and failure in delivering the tasks on time.

4.15.2 Follow Escalation Matrix for any Grievance

- Before complaining and expressing grievance, be very clear of the objectives, i.e. why do you require to complain and what do you want to achieve in the long run.
- Follow the Escalation Matrix for Internal Grievance Resolution.
- At each level of the matrix, write an email to the designated official, according to the guidelines and formats provided.
- Follow up with the concerned official, if the complaint or grievance is not addressed within the standard TAT at that escalation level.
- Document all records of emails and phone calls, till the issue is duly addressed and closed.
- If the concerned official, at a certain level, does not address the grievance within the TAT, "escalate" and carry forward the issue to the next level.
- Repeat the process from 2-6.
- On resolution of the grievance, thank the concerned authority over phone or email, whichever is applicable.



- Racial Discrimination
- Sexual Harassment
- Breaches in organizational safety protocol

Unit 4.16 Managing Interpersonal Conflict Effectively



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

1. Discuss how to manage interpersonal conflict

4.16.1 How to Manage Interpersonal Conflict

Interpersonal Conflict can be defined as a serious quarrel or disagreement between two or more persons. Conflict Management is extremely crucial in maintaining a good work environment and the standard productivity of the organization.

The method of effectively managing a conflict are:

- Identifying a safe place and time to talk
- Clarifying individual perceptions involved in the conflict
- Arranging for a discussion with witnesses, if required
- Adopting an active and empathetic listening approach
- Searching for options with the aim of a win-win outcome
- Arriving at a conclusion agreed upon by all parties in the conflict

– Summary 🏼

- A good employee is expected to respect and follow the organizational policies and procedures.
- An Assembler, with effective communication skills, can work more efficiently and earn appreciation more commonly.
- Furniture and fittings manufacturing and installation are done, keeping in mind these three factors: Style, Comfort and Storage.
- Question must be asked to clarify doubt and to narrow down communication gaps with one's supervisor.
- The workplace must be maintained in a tidy and organized state.
- It is important to deliver the project on or before the deadline, but care must be taken that one does not deviate from the client's specifications and quality standards.
- Problems and issues must be reported to the immediate supervisor as soon as they are identified.
- One must support colleagues if they are in problem.
- Communication Cycle is the sequence in which effective communication occurs between the giving and receiving ends.
- Without Active Listening, communication in a workplace stands incomplete and would invite several errors and gaps in communication.

Activity

- 1. Visit a workshop and observe the different methods of communication used by the workers.
- 2. Distribute a plan of replacing an old window and installing a new glass door, among 5 of your batch mates. Ensure an equal workload for all of them.
- 3. With the help of two batch mates, perform a Role Play, where both of you are in a conflict and your Lead / Supervisor resolves the same.

Exercise

Choose the Correct Option:

1. Why should an Assembler plan his / her work?

- a) To able to convey the right delivery time to customer
- b) To reduce interruption in work due to non-availability of tools
- c) To get support in advance, if needed in his project
- d) All of the above

2. If the Assembler has completed his work on time, then he has -

- a) Saved Time
- b) Saved Money
- c) Earned Customer Satisfaction
- d) All of the above

3. "Participating and coordinating" is an important element of:

- a) Communicating with colleagues
- b) Communicating with the supervisor
- c) Communicating with clients
- d) None of the above

4. Which of the following is NOT an element of disciplined behaviour?

- a) Punctuality
- b) Appraisal
- c) Waste Minimisation
- d) Honesty
- 5. A client must be treated like a:
 - a) Friend
 - b) Family member
 - c) Colleague
 - d) Partner

Glossary

A

Absorption: The portion of total incident radiation that is absorbed by the glass and subsequently reradiated either outside or inside.

Acid Etching: A process of decorating glass, which involves the application of hydrofluoric acid to the glass surface.

Acoustic Laminate: Laminated glass with a special acoustic interlayer for good sound control.

Acuity: Sharpness of image

Airspace: The gap between two pieces of glass in an insulated glass unit.

Ambient Temperature: The surrounding temperature existing at any given time.

Annealing: Process designed to eliminate or limit stresses in glass by submitting the glass to strictly controlled cooling in a special oven known as a Lehr.

Antelio: Pyrolitic coated reflective glass.

Anti-Bandit: A type of security glazing, typically laminated glass, designed to resist manual attack and to delay access to the protected space for a short period of time.

Antifade: Laminated glass with an additive to block UV radioations.

Antique glass: Glass with an uneven surface texture and bubbles inside, produced by using antique methods in order to obtain the appearance of glass made before the development of industrial processes.

Antisun: Standard Grey bronze and Green tinted float range.

Application life: Period of time during which a sealant can be effectively applied to a joint. The timing is from completion of mixing and could be affected by temperature, humidity or a combination of both. Also known as Working life.

Arctic: An obscure glass with a non-directional pattern. Also known as Kosciusko. Cannot be toughened.

Arctic Blue: A blue tinted float engineered for high light transmittance, low solar heat gain combined with cool blue colour.

Argon Gas: An inert, nontoxic gas used to fill insulating units, thus improving thermal performance.

Armourclad: Ceramic painted tempered safety glass.

Arris: A small bevel at an angle of approximately 45 degrees to the surface of the glass applied usually with a wet or dry belt, stone or machine.

Aspect Ratio: The ratio of the longer side of a panel to its shorter side.

Atlantica: Emerald Green tinted high performance glass. Formally known as Solar Green.

Attenuation: The reduction of sound intensity (or signal strength) with distance. Attenuation is the opposite of amplification, and is measured in decibels.

Autoclave: A pressure tank vessel that applies high pressure and heat to obtain bonding between glass and PVB or other plastic sheet, creating a laminated glass product.

Azuria: Aqua Blue tinted high performance glass. Formally known as Azurlite.

В

Back Clearance: Space between the back of the glass and back of the rebate.

Back Putty: Portion of the compound remaining between the back of the rebate and glass after the glass has been pressed into position in the bedding putty.

Backing Rod: A polyethylene or polyurethane foam material installed in the joint to control sealant joint depth, provide a surface for sealant tooling, and to prevent three-sided adhesion.

Balustrade: A framed or unframed enclosure between handrail and floor level (see also handrail). Required to protect a difference in level of 1m or more.

Bead: A strip of timber, aluminium or other suitable material secured to the rebate to retain the glass in place (sometimes referred to as a glazing bead).

Bevelling: The process of grinding and polishing a sloped angle on the face of the edge of flat glass which results in a decorative edge appearance to the glass.

Bite: The amount of overlap between the frame or fin support. Also referred to as structural bite, this is the width of silicone sealant that is applied to the panel of glass to adhere it to the frame.

Blemish: A noticeable imperfection in or on the surface of the glass.

Blinds Inside: Window blinds which are installed inside an insulated glass unit.

Blisters: A profusion of bubbles or gaseous inclusions in glass. Small bubbles less than 2mm diameter are referred to as seeds.

Block: A small piece of lead, wood, rubber or any other suitable material used to position glass in a frame. **Blow-in:** A separation of glass and interlayer at or close to the edge of laminated glass caused by penetration of the autoclaving medium into the edge during laminating.

Borosilicate: Low expansion heat resistant glass.

Brewster's Fringe: A rainbow effect sometimes seen in double glazing caused by the light refraction from identical thicknesses of glass.

Bull Nose: The rounding, in the form of a quarter circle, of half of the cut edge of the glass. The remaining surface edge is slightly rounded. Also known as Half Round.

Bullet Resistant Glass: A multiple lamination of glass and plastic that is designed to resist penetration from medium-to-super-power small arms and high-power rifles.

Bullion: A glass panel having a formed antique style circle in its centre for decorative effect. Originally the cut out bottom of a mouth blown glass cylinder.

Bushes: Nylon or hard plastic or fibre used around fixings in holes to prevent glass to metal contact.

Butt Glazing: The installation of glass products where the vertical glass edges are glazed with silicone and without structural supporting mullions. Similar to Butt Joint.

С

Casement window: Window, pivoted or opening on side hinges.

Cast glass: Glass produced by 'casting', in other words by pouring molten glass into a mould or by heating glass in a mould until it assumes the shape of the mould.

Cathedral: An obscure glass with a non-directional pattern.

Centre tension: Residual tension stresses within the centre zone between the surface compression layers of thermally toughened and heat-strengthened glass.

Chair Rail: A fixed glazing bar or rigid push bar that provides protection from human impact. Also known as a Crash Rail.

Channel Opening: The internal dimension between the up-stands of the channel.

Channel Width: The distance between the fixed and removable beads at the widest point.

Checking: Fine hairline cracks in a dried coating or film.

Chip: A small shallow piece of glass which has become detached from the original glass edge or the void it has left.

CIP (Cast in place): Lamination process where the interlayer is a liquid poured between two plies of glass and then chemically or UV cured to produce the final laminated safety glass product.

Cladding Glass: Toughened or Heat strengthened glass usually painted or silkscreened using ceramic ink as a colouring agent foruse in curtain walls or as a cover to columns and walls.

CNC: Computer Numeric Control. This type of machinery enables the processing of sophisticated shapes and hole contours in glass.

Cohesive Failure: Internal splitting of a sealant resulting from over stressing and insufficient elasticity and elongation to absorb the strain.

Colonial Bars: Internal splitting of a sealant resulting from over stressing and insufficient elasticity and elongation to absorb the strain.

Compression: Pressure exerted on the glazing compound, sealant, tape, gasket or wedge by the glazing method.

Containment: The ability of the glass or glazing to prevent people from falling through.

Corflute: A thin plastic board used for templates.

Countersunk hole: A hole which has been ground out at the surface to receive a mechanical fixing and bush, allowing the bolting or fixing of the glass panel.

Curing agent: One part of a two-part sealant, which, when added to the base, will cause the base to change its physical state by chemical reaction between the two parts.

D

Dantalux: Copper and Lead free mirror.

Datastop: Electromagnetic data shielding glass.

Daylight Size: The clear height and width between frame members that admits light.

Decorated glass: Glass or patterned glass processed by craftsmen for decorative effect. Stained glass, headlights, sand blasted, acid etched, embossed, slumped and printed glass fall into this category.

Deep Bite: An extra deep sandblast used to create depth in an image on glass.

Deflection: The amount of bending or flexing of the centre of a glass panel perpendicular to the plane of the glass surface under load.

Delamination: A condition in which one or more of the glass plies of laminated glass loses the bond with the interlayer.

Desiccant (silica gel): Molecular sieve or extremely porous crystalline substance used to absorb moisture inside the air space of secondary glazing.

De-vetrification: Crystallization of glass.

Dice: The cubicle pattern of fractured toughened glass.

Dichroic coating: Multi layered coatings that exhibit different colours by reflection and transmission as a function of viewing angle.

Diffusing: Scattering, dispersing, as the tendency to eliminate a direct beam of light.

Diminishing stop bevel: A bevel in which only a portion of the surface edges is bevelled. The bevel running out on a small radius.

Distance pieces: Small blocks of resilient, non-absorbent material (such as extruded rubber) used to prevent the displacement of glazing compound or sealant by external loading. They are positioned opposite each other between the glass and rebate, and glass and bead.

Double Bevel: A glass edge that has two bevels at different angles.

Double Glazing: Two or more panes of glass separated by air spaces within openings to improve insulation against heat transfer and/or sound transmittance.

Drained Glazing: A glazing system in which any water that enters the sytem is drained out.

Drop Height: The vertical height an impact ball is raised for testing safety glass.

Dry seal: A weather seal between the glass and frame using foam tapes or gasket materials. This may not be completely watertight.

Dual seal: Insulating Glass units manufactured with a primary seal and a secondary seal for maximum protection against moisture vapour transmission.

Durometer: An instrument for measuring Shore Hardness and the relative hardness of materials like rubber.

Ε

Edge Clearance: The space between the edge of the glass and sight line.

Edge Cover: The distance between the edge of the glass and the edge of the rebate forming the sight opening of the window frame.

Edge Defects: Glass defects at the edge that include vents, shells, flakes, wave, sharks teeth, nips and corners on/off.

Edge Deletion: The removal of the edge of CIP (Cast in place) laminate so the edge tape cannot be seen.

Edgebanding: The painting or cladding of the perimeter edge of glass panels prior to toughening which results in a fused colour to the edge for protection of sealants and adhesives against UV degrading or for visual effect.

Edgework: Grinding, smoothing, bevelling, mitre or polishing edges of glass panes.

Elastomer: An elastic rubber like substance or synthetic rubber.

End Caps: A set number of stock sheets of glass packed with wooden caps on each end of the glass which is then strapped together to hold them inplace. This form of packaging makes unpacking easy.

Engraving: Abrading the surface of the glass to produce decorative designs.

EPDM: A synthetic rubber used to produce gaskets and setting blocks.

Etch: To alter the surface of the glass with acids or special tools.

Etchlite: A float glass, one side of which has been treated with a high quality acid to produce a fine grain satiny finish. Also known as AcidEtchGlass.

F

Faceted glazing: Glazing with vertical strips of glass (facets) joined at the vertical edges with silicone joints to typically form a radius window.

Fenestration: Any glass panel, window, door, curtain wall or skylight unit on the exterior walls providing windows to the building.

Fiery: Poorly annealed glass that results in poor cutting from residual tension or bowing.

Finger slots: The slot produced by processing the surface of the glass by grinding in a slot for use as a finger grip in sliding the glass panels.

Fins: Supporting glass panels, usually vertical, located at a 90° to the glazed surface, usually behind a butt joint.

Fire cracks: Small cracks penetrating the surface of the glass usually in the shape of short hooked crescents.

Fire Resistant Glass: Glass that resists the penetration of flames and/or smoke for a period of time, in accordance with appropriate Standards.

Fire-rated glass: Glass that resists the penetration of flames and/or smoke for a period of time, in accordance with appropriate standards.

Flare: A protrusion on the edge of a panel of a glass.

Flashing: An impervious membrane or material which must be compatible with the framing materials, installed to waterproof the installation in the building.

Flemish: An obscure glass with a semi-transparent directional pattern.

Float Glass: A transparent glass, the two surfaces of which are flat, parallel and fire polished so that they give a clear undistorted vision and reflection. Float glass is manufactured by floating a ribbon of molten glass over a bath of liquid tin which has a greater density than that of glass.

Flush Glazing: Glass glazed to an aluminium frame without any external mullion or transom projections. **Formed glass:** Glass which has been heated and formed by moulds.

Fracture pattern: The pattern formed by the cracks in an individual pane of glass when broken.

Frit: Raw materials mixed together and melted to form glass.

Front putty: A triangular fillet of putty formed between the surface of the glass and rebate platform.

Frosted Film: A decorative film applied to glass after glazing.

FRR: Fire Resistant Rating. The classification given to a glass type or glazing system to resist fire relative to certain measurements.

G

Gaskets: The filling of the cavity of a sealed IGU with a special gas to enhance the thermal insulation. A good example of this is Argon gas.

Georgian wired glass: Glass with an incorporated wire mesh square pattern. The glass may be cast or clear polished.

Gilding: A process employed largely for lettering and decorative work, whereby leaf metal such as gold leaf is applied to the surface of glass and coated with a protective medium.

Glare: The discomfort, or impairment of vision, or both, caused by extreme contrasts in the field of vision, where parts such as lamps, luminaries, sky, or reflecting surfaces are excessively bright in relation to the surrounding brightness.

Glass clad polycarbonate: Two or more panels of flat glass bonded with a urethane interlayer to one or more sheets of extruded polycarbonate in a pressure/temperature/vacuum laminating process.

Glass Fibre: A fibre made from molten glass, generally produced in strand form.

Glazing bar: An aluminium extrusion typically used for glazing systems in roofs.

Glazing quality: The standard float glass quality supplied to buildings when quality is not otherwise definitely specified.

Glazing shoe: A mechanical fixing at the end of a sloped glazing bar to stop the glass panel sliding or protruding past the bar at the gutter or exposed end.

Glazing System: Any combination of glass and other materials that fills a window opening.

Gloss: The degree of shine or lustre on the surface of a paint or ceramic ink.

Glue Chip: Decorative glass produced by sticking material onto the glass with a glue. As the glue cures the material is stripped off the glass, the surface of which is plucked. This gives a random pattern.

н

Half Round : Rounding of a cut edge to a quarter circle.

Handrail: A horizontal or sloped rails for support on a stair landing or Balustrade.

Hard coat: Coating applied to glass during its manufacture, whereby it is fused to the glass in the form of a pyrolytic coating. It is very durable and can be cut and toughened from stock.

Heat soaking: Heat soaking is the process whereby toughened glass is reheated for a period of time at high temperatures to induce breakages that may be caused by inclusions or contaminants in the glass.

Heat treated glass: Annealed glass heated to a temperature near its softening point and forced to cool rapidly under carefully controlled conditions. Heat-treated glass may be either heat strengthened or fully toughened (tempered).

Heat-reflecting glass: Surface-treated glass that reduces solar heat gain through reflection.

Heel Bead: Sealant applied at the base of a window channel, after setting the glass panel and before the bead is installed. One of its purposes is to prevent air and water penetration.

Hermetically Sealed: Made airtight by fusion or sealing. Insulated Glass Units are hermetically sealed.

Hickey: An imperfection in a screen printed coating caused by contamination.

Horticultural glass: A low grade glass used for glass houses and other horticultural applications, normally sheet glass.

Hydrophilic: Term used for self-cleaning glass in which the coating attracts water so that it spreads to form a thin film to wash away dirt and dries without spotting.

I

IGUMA: Abbreviation for Insulating Glass Units Manufacturers Association.

Inclusion: A crystalline or non-crystalline particle entrapped in glass.

Insulating Glass Unit (IGU):Two or more panes of glass spaced apart and factory sealed with dry air or special gases in the unit cavity.

Integrity : The number of times a FRR material resists the passage of flame and hot gas.

Interlayer: Plastic material used between two or more glass panes in the manufacture of laminated safety glass to bond the glass together.

Intumescent interlayer: A type of interlayer in fire-resistant laminated glass, which becomes opaque when exposed to fire.

Iridescence: A surface rainbow effect similar to an oil-on-water appearance. Normally caused by atmospheric moisture or alkali attack.

J

Jamb: Vertical frame member at the perimeter of the opening of a window or door.

Κ

Knot: An imperfection in glass, an inhomogeneity in the form of a vitreous lump.

L

Lamguard: 6.52mm Residential Laminated Security Glass.

Laminated Safety Glass: A product consisting of two or more sheets of glass permanently bonded together by a plastic or resin interlayer material and usually meeting the test requirements for a Grade A Safety Glass.

Lead glass: A type of glass produced with lead oxide in the mix for X ray shielding applications.

Leadlight: Glazing made in the traditional manner with lead cames and small pieces of glass.

Lehr: A special type of oven or kiln used for annealing glass

LHR: Abbreviation for Light and Heat Reflecting glass.

Linear Expansion: The expansion of a material over it length per degree C change in temperature.

Liquid laminated safety glass: Two or more sheets of glass permanently bonded together by a liquid resin that cures to form a plastic-type interlayer.

Lite: A panel or sheet of glass.

Location Blocks: Blocks positioned between the frame and edge of the glass to maintain its position.

Louvre: A window unit comprising a series of blades of glass or other material lapping over each other when in the close position.

Low Iron glass: Glass which is very low in iron content and consequently is extremely white and clear and transmits an exceptionally high percentage of visible light.

Luminous Efficacy: (Light-to-Shading Coefficient Ratio) The visible transmittance of a glazing system divided by the shading coefficient. This ratio is helpful in selecting glazing products for different climates in terms of those that transmit more heat than light and those that transmit more light than heat.

Μ

Manifestation: The act of making glass visible. The marking of glass so as to minimise the potential for human impact and injury.

Mastic: Heavy consistency compound which may retain adhesion and pliability with age.

MDF: Medium Density Fibreboard used for templates.

Mirrocol: An elastic adhesive specially designed for bonding mirrors.

Mirror: Glass silvered on one side.

Mirrorpane TM: A one way vision reflective glass which in conjunction with correct lighting levels gives visual security to the viewer.

Mitre bevel: The bevelling of the cut edge of the glass to an angle of approximately 45° (unless otherwise specified); the extreme point is slightly arrissed. Similar to bevelto butt.

Modesty panels: A panel of toughened shower screen glass silkscreened with a decorative pattern to give a discreet curtain effect.

Modulus: Stress at a given strain. Modulus of elasticity is the tensile strength at a given elongation.

Monolithic Glass: A single light or piece of glass as opposed to laminated glass or an insulated glass unit.

Mottle: A blotch appearance in a coating.

Mullion: A vertical intermediate framing member. When used in curtain walls it represents all vertical members.

Multi-laminates: Laminated glass comprising three or more lites of glass.

Muntin bars: Bars used in insulated glass units to simulate colonial style windows.

Ν

Neoceram: Ceramic heat resistant glass with a special coating.
Neoprene: A synthetic rubber with similar properties to natural rubber, but manufactured without sulphur for vulcanisation.

Newton's rings: Coloured rings which appear when two pieces of glass or clear plastic are pressed together.

Nib: A small protrusion of glass away from the corners.

Nickel Sulphide Inclusions: Minute particles of nickel and sulphur present in the raw material of glass which under heat form into crystals and in rare cases can cause spontaneous breakage in toughened glass.

Nominal thickness: The commonly used dimension by which the thickness of a panel of glass is sold or marketed.

0

Off-line coatings: Coatings applied to individual panes of glass once the glass has been manufactured and taken off line and cutin preparation for the further treatment.

One-way Vision: The term for a reflective glass, which if glazed with appropriate lighting ratios, allows visual security to be maintained from the viewing side.

On-line coatings: On-line coatings are made while the glass is hot and still in the annealing lehr. They may still be considered as basic products, and the size and tolerance constraints are similar to those for clear float glass.

Opacifier: Applied polyester film or coating to the surface of tinted or reflective glass rendering it opaque.

Opacity: The relative capacity of a coating material to obstruct the transmission of light.

Opal interlayer: A range of translucent white shades of CIP resin.

Opalite: Laminated safety glass with a white translucent interlayer.

Opaque: Denoting a solid colour with little if any light transmission.

Optifloat: Clear float glass.

Orange peel effect: A rough surface texture on paint or ceramic ink coating having the appearance of orange peel and regarded as undesirable when viewed against light.

Overhead glass: Generally regarded as glass or glazing installed at above 2 metres and sloped more than 15° from the vertical. It relates to glass over populated areas. Vertical glazing to upper levels is not generally regarded as overhead glass.

Ρ

Parsol: European range of grey, bronze, green and pink colours.

Pascal (Pa): The unit of pressure or stress that arises when a force of one Newton is applied uniformly over an area of one square metre.

Patch Fitting: A frameless glass fitting, typically for hinged frameless doors.

Patterned Glass: Glass having a pattern impressed on one or both sides. Used extensively for diffusing light, privacy, bathroomsand decorative glazing. Sometimes called rolled, figured or obscure glass.

Photocatalytic: Process used for self-cleaning glass to loosen and break down organic dirt particles on the glass surface.

Photovoltaic Glass: Glass with integrated solar cells, to convert solar energy into electricity. This means that the power for an entire building can be produced within the roof and façade areas.

Pinholes: Tiny, transparent openings in a coating film which can be attributed to surface contamination, cracks, dirt, coating contamination, surface tension, static electricity, screen clogging, abrasion of the film, agglomerates in the coating, rapid solvent loss, and the like. Any small hole that permits the passage of light.

Planar: Frame less glass system using countersunk fittings.

Ply: One sheet or panel of glass in a laminate.

PMMA resin: Poly Methyl Meth Acrylate. A temperature curing elastic resin used as an interlayer in some cast in place laminates.

Pocket glazing: A two or three sided framed opening in a sash or frame to accommodate a glass panel. Beads maybe fixed or removable on one or two sides.

Points: Thin flat triangular or diamond shaped pieces of metal used to hold glass in place for putty glazing.

Polarex: One way observation mirror.

Polariscope: A device for examining the degree of strain in a sample of glass.

Polarised Light: Light waves which are vibrating in a special orientation either after passing through a polarised filter or after being reflected a surface or from the sky.

Polished Plate: Glass manufactured prior to the invention of the Float process. The glass was ground and polished on both sides to produce a parallel optically high quality surface.

Polishing: A process whereby the surface or edge of glass is polished with felt and a polishing agent, as in polished edges.

Poly Vinyl Butyral (PVB): An extremely tough resilient plastic film used to bond glass together in the laminating process.

Polyisobutylene: A butyl compound, typically the primary seal in a dual seal Insulating Glass Unit and the key component in restricting moisture vapour transmission.

Polysulphide: A sealant used around the perimeter of insulated glass units.

Polyvinyl Chloride (PVC): Polymer formed by polymerisation of vinyl chloride monomer. Sometimes called vinyl.

Pre-shimmed Tape: A sealant having a pre-formed shape containing solids or discrete particles that limit its deformation under compression.

Primary Seal: A butyl-based sealant applied to the edges of the space bar during assembly into doubleglazed units, to ensure a watertight and airtight seal around the perimeter of the unit.

Primer: A coating specifically designed to enhance the adhesion of paints or sealant systems to certain surfaces.

Putty: A compound used to glaze and seal glass into joinery.

Pyrolytic: The coating on a glass substrate which is deposited on-line during the glass manufacturing process. The coating is fired into the glass surface at 700 °C and is therefore extremely hard and durable.

Q

Qualage: An annealed glass permanently bonded to both sides of the glass to give the impression of traditional lead lighting.

Quatrix: An obscure glass with a directional pattern.

Quench: The cooling area of a toughening furnace.

R

Rake: A shape where one edge is longer than its parallel with 2 square corners.

Rebate: The part of a frame in joinery which is designed to receive glass which can be face putty glazed or receive a removable glazing bead to hold the panel of glass in place.

Rebate size: The actual size of the glazing rebate opening.

Reflective glass: Glass with a reflective coating to reduce heat and light transmission.

Refractive Index: The ratio of the speed of light in air to the speed of light in glass.

Reglazing: The repair or replacement of glazing because of breakage, renovation or for any other reason.

Reveal lining: The trim member that lines the perimeter of a window between the frame and the internal wall lining. Also known as a reveal.

Rolled Glass: Glass formed by rolling, including patterned glass and wired glass.

Roller Hearth Toughening: A process that supports the glass horizontally on rollers, passing it first into a heating chamber and then into a cooling area.

Round and Polish (RP): The grinding in the form of a semicircle and polishing, of the cut edge of the glass.

Rub: An abrasion or series of small scratches, which produce a frosted appearance, in glass generally caused during transport by a chip lodged between two panels.

R-Value: The thermal resistance of a glazing system. The higher the R-Value the less heat is transmitted throughout the glazing material.

S

Safety Glass: Glass which is treated or manufactured into a form that reduces the likelihood of cutting and piercing injury to persons by the glass should it be broken by human contact.

Safety wired glass: A single sheet of glass with wire completely embedded in the glass.

Salt Spray Test: Accelerated corrosion test in which samples are exposed to a fine mist of salt water. Primarily used to test silvered glass mirrors.

Sandblasting: A surface treatment for glass obtained by blasting the glass with hard particles to obscure one or both surfaces of the glass. The effect is to increase obscurity and diffusion. but it can make the glass weaker and harder to clean.

Sash: The separate frame to a window or door which carries the glass. It may be fixed (inoperable) or movable (operable).

Scar: Scratch on the surface of the glass.

Screen printing: The application of ink to the surface of glass through a screen or mesh. The ink may be applied uniformly to the entire surface or in a design determined by the mesh stencil.

Scuff: An abrasion or dull area on the glass surface usually caused by furnace rollers or contact with other furnace parts.

Sealant: Compound used to seal or fill joints or openings. When cured it has flexible adhesive properties.

Seam: To grind, usually with an abrasive belt, wet or dry, to remove the sharp edges of the glass.

Secondary Seal: A sealant applied to the edges of double-glazed units after the primary seal, to provide effective and durable adhesion between the glass components and spacer bar.

Seeds: Small gaseous bubbles in glass, normally less than 2mm in size.

Self-cleaning glass: Its dual action uses the forces of nature – natural ultraviolet light and rain – to help keep the glass free from organic dirt.

Selvedge: The extreme lateral edges of the Lehr or glass ribbon which are stripped off and recycled as cullet.

Shading coefficient (SC): The ratio of the total solar heat gain through a specific glass product or glazing system to the total solar heat gain through 3mm clear glass under the same set of conditions.

Shark's teeth: Serrated features in the cut edges of glass, extending from the score mark through part or all of the thickness. Shark's teeth seriously weaken the edge and create thermal shock risk.

Sheet Glass: A transparent glass obtained by drawing glass from a furnace. Sheet glass has natural fire finished surfaces, but because the two surfaces are never perfectly flat and parallel there is always distortion of vision and reflection.

Shell: Similar to a chip, but often larger and occurring on the face opposite to the score mark.

Sight Line: The line along the perimeter of the glazed panel corresponding to the edge of stationary or removable bead.

Silica: Silicon dioxide, a mixture that is the main ingredient of glass. The most common form of silica used in glass making is sand.

Sill: The bottom horizontal member of the window/door frame.

Silvering: The application by chemical or other methods of a film of silver to a glass surface to create mirrors.

Sloped Glazing: Any installation of glass that is sloped more than 15° from the vertical.

Slump glass: Glass that has been heat treated to mould patterns or designs into the surface of the glass.

Spacer: The component of an insulating glass unit which separates the glass and includes a desiccant.

Spandrels: The panels of a wall located between vision areas of windows which conceal structural columns, floors and shear walls.

Spider Fitting: A fitting with two – four legs which holds frame less glass in place.

Stain: Discolouration of either a glass or finished aluminium surface caused by alkalis that come from surrounding materials like pre-cast or cast-in-place (CIP) concrete or from sealants, pollutants or other contaminants.

Stock sheet: A whole sheet of glass in various imported stock sizes depending on product and thickness.

Stones: Any crystalline inclusion embedded in the glass.

Structural glazing: Glazing system used in place of a conventional joinery or curtain wall to install glass products on to structurally supporting sub-frame or glass fin with the retention of the glass maintained by the insertion of mechanical fixings or fittings.

Substrate: A base material to which other materials are applied.

Т

Temper (Toughen): Introduction of predictable residual stresses in glass by controlled chilling from near the softening point to below the strain point. These residual stresses are in compressive form on the surface of the glass and tensile in the interior. The compressive stress on the surface strengthens the glass.

Template: A pattern used as a guide to produce the desired definition of the overall size and shape of a piece of glass.

Thermal break: An insulating material of low thermal conductivity placed between materials of high thermal conductivity within a system or extrusion to inhibit the flow of cold or heat.

Tight size: The actual size of the rebate opening from one side to the other without any clearance.

Tinted Float: Glass with colouring agents added to the basic glass batch that give the glass colour, as well as light and heat reducing capabilities. The colour extends throughout the thickness of the glass. Typical tints include bronze, grey, dark grey, aquamarine, green, deep green and blue.

Tong Marks: Small surface indentations near and parallel to one edge of vertically toughened or vertically heat strengthened glass resulting from the tongs used to suspend the glass during this method of heat treatment.

Toughened Glass: Flat or curved glass that has been heat treated to induce a high surface and /or edge compression. Fully toughened glass, if broken. will fracture into many small pieces (dice) which are more or less cubical.

Translucent Glass: Glass that transmits light with varying degrees of diffusion so that vision is semi transparent.

Transparent glass: Glass that transmits light and permits clear vision through it.

U

U Value: A measure of air-to-air heat transmittance (loss or gain) due to thermal conductance and the difference in indoor and outdoor temperatures. As the U-Value decreases, so does the amount of heat that is transferred through the glazing material. The lower the U-Value, the better the insulation.

Ultimate Limit State (ULS): The wind pressure or load at which failure of the integrity of the glazing can be expected.

V

Vacuum coated: The process in which, by passing an electric current through an ionized gas and thus bombarding the surface of a metal cathode with ions, atoms of the desired metal are vaporized and then deposited in a thin film on the surface of glass. Also known as soft coats and sputter coated glass.

Venetian Mirror: A mirror which has strips of clear glass between which allows better viewing from one side.

Ventilated Airspace: The space between blind/drapes and the window or between spandrel glass and the structure of the building. The thermal safety of the glazing will be dependent upon the extent of ventilation.

Vents: Small cracks at the edges of glass that can lead to breakage.

W

Warp: The easily seen deviation, undulation or twist from the pure plane of the surface of a sheet of glass.

Weather seal: A material included in window and door construction to reduce the air infiltration or improve water penetration resistance of the unit. Also known as a sealant joint between panes of glass.

Weep holes: Small holes or slots in the sash or framing system which allow water to drain to the building exterior.

Wet Glaze: A glazing process which uses putties or silicones.

Wet seal: Application of an elastomeric sealant between the glass and frame or glass to form a weather-tight seal.

Window Rating: The level of performance for strength, weather-proofing, or insulation of windows and doors as determined by test.

Wired Glass: Glass having a layer of meshed or stranded wire embedded near to the centre of thickness of the panel. This glass is available as polished glass (one or both surfaces polished to make it clear) and patterned glass.

Working Life: The time during which a curing sealant (usually of two compounds) remains suitable for use after being mixed with a catalyst.

Х

X-Ray Shielding glass: Glass that contains a high percentage of lead and sometimes also barium and which has a high degree of opacity to X-rays.

Y

Young's Modulus: The ratio of stress to strain.



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5. Assist Lead Technician in Work Process Wooden/Aluminium – Doors and Windows

Unit 5.1 Types of Windows/Doors and Installation Techniques

Unit 5.2 Assembling and Dismantling Procedure

Unit 5.3 Types of Defects and Troubleshooting Common Errors

Unit 5.4 Standard Operating Procedures (for Wooden / Aluminium Doors / Windows)



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Key Learning Outcomes 🔯

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

- 1. Explain the various types of doors/windows installation techniques
- 2. Demonstrate the assembling and dismantling of components
- 3. Identify defects and troubleshooting errors
- 4. Employ alignment, strength of material and proper setting of doors/windows
- 5. Discuss the standard operating procedures for wooden / aluminium doors and windows

Unit 5.1 Types of Windows/Doors and Installation Techniques

- Unit Objectives 💆

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

- 1. Categorize and describe the various types of doors and windows
- 2. Demonstrate installation techniques for doors and windows

5.1.1 Types of Doors and Windows and Installation Techniques

A. Doors

A Door is defined as a "a hinged, sliding, or revolving barrier at the entrance to a building, room, or vehicle, or in the framework of pieces of furniture, like the cupboard". Door is a key feature of any building, whether it is a home or commercial building. It is provided for controlling access to that building/room, for air circulation and light.

Type of DoorDescriptionInward OpeningIf you are standing inside of the room and the
door panel gets open inside the room, then it is
called Inward Opening Door.Outward OpeningIf you are standing inside of the room and door
panel gets open outside the room, then it is
called Outward Opening Door.

The most common types of doors, usually made of wood and aluminium are:

Type of Door	Description
Sliding	These types of doors slide in horizontal direction. These are very good in saving space. This are normally mounted in channel, or suspended in rack.
Rotating	These typically consist of three or four doors that hang on a central shaft and rotate around a vertical axis within a cylindrical enclosure. These doors allow large number of people to pass in and out.
Left Hand Side Opening Door	If you are standing outside the room and door is installed with hinges on your left side, then it is called Left Hand Side Opening Door.
Right Hand Side Opening	If you are standing outside the room and door is installed with hinges on your Right side, then it is called Right Hand Side Opening Door.

Installing a basic Door Tools Required:

- Power Drill
- Marking Pencil
- Measuring Tape
- Level (4 6 feet)
- Door Installation Brackets
- Blocks (Wooden)
- Screws
- Screwdriver

Step 1: Select the door

The door should be selected so that it fits the structural opening of the wall. Care should be taken that the opening must be at least 2 inches wider than the door purchased (excluding the door jamb). This allows for adjustments, while level is tested during installation.

Step 2: Measure and Mark

- A plumb line should be drawn on the wall. 1/2 inch must be measured from the structural opening on the door's hinge side.
- The level line must be drawn along the drywall, downwards, using a 4 6 feet level.
- Marking for pilot holes and others should be done very carefully and accurately with the help of a Marking Pencil.



Fig. 5.1.1.1: Marking and drilling of pilot holes must be done very carefully and accurately

Step 3: Attach the door installation brackets

- Six door installation brackets must be attached on the outside of the door jamb. The wood or aluminium frame of the door comes pre-attached.
- A bracket must be placed behind each of the three hinges and the remaining three brackets must be

attached on the other side of the jamb.

• The first bracket must be 8 inches from the top, the next one just above the latch stop, while the final bracket must be 8 inches from the door's bottom.

Step 4: Placement of door

- The door must be placed into the opening on the top of blocks or shims.
- 1/2 inch blocks must be placed under the door, to allow space for carpet or hardwood to be installed, or 1/4 inch, if laminate needs to be installed.
- The door must never be placed directly on an unfinished floor.

Step 5: Attach remaining brackets

- With the help of the plumb line drawn on the wall, the top bracket must be screwed on the hinge side of the door.
- Next, the next 2 brackets must be screwed in, using the same reference line.
- After attaching these three brackets, using the same reference line, the door is now level.
- The reveal (gap between door and door jamb) must be checked while screwing in each of the three final brackets.
- While screwing in the top bracket, the reveal must be checked, starting at the door's top.
- The blocks can be removed now.
- The door is perfectly hung now.

Step 6: Complete casing

The Casing or the Trim is comprised of strips of wood that conceal the joints and some portions of the hinge. This perfectly conceals the door installation brackets too.

Step 7: Complete Finishing

Finishing must be done with suitable paint and sandpaper.



Fig. 5.1.1.2: Finishing must be done with the help of sandpaper and appropriate paint

B. Windows

The most common types of windows, usually made of wood and aluminium are:

Type of Window	Description
Casement Window	Most basic form of window used in building and construction. The construction of this window is similar to the door construction.
Pivoted window	Similar to the casement window, except that it has no rebates provided in the construction. The shutters of this type are allowed to swing round the pivots. The shutters can swing either horizontally or vertically round the pivots. These windows are easy to clean.
Sliding windows	These resemble sliding doors. The shutters slide on either horizontally or vertically on the roller bearings.



Installing a basic Window Tools Required:

- Power Drill
- Marking Pencil
- Measuring Tape
- Door Installation Brackets
- Blocks (Wooden)
- Screws
- Screwdriver
- Putty
- Sealants and Glue

Step 1: Preparing, inspecting or repairing new window opening

- The condition of the window jamb must be inspected carefully to ensure the absence of any structural and apparent damage.
- In case there is a damage, the damaged areas of the jamb must be immediately treated and repaired before proceeding with the other steps.
- The rough opening /aperture must be measured to ensure the new window can easily fit into it.
- The opening must be at least 1/4 3/8 inch larger than the external dimensions of the new window.

Step 2: Inspecting or replacing the Window Stop

The window stop must be checked thoroughly to ensure it is not damaged and in good working condition.

Step 3: Dry Fitting the Window

The window must be dry fitted to the aperture / opening to ensure there are no fitting issues. In case there are fitting issues, they must be resolved immediately and the window must be placed and dry fitted again. The window now snugly fits into the opening.

Step 4: Placing and installing the window

Apply adhesives/screws/nails as per requirement for fastening the furniture parts to ensure quality and correct fitting

- A bead of silicone must be applied along the inner edge of the window stop.
- The window must now be slid into place.
- A level must be placed across the window top.
- Wooden / Aluminium (depending on need) Shims must be pressed between the bottom of the window frame and the jamb to get the window's sitting level.
- Among the four screws (hardware kit components), which should be put through the sides of the window unit and anchored to the jamb, two screws must be put into each side of the window; one near the top and the other near the bottom.
- The screws are driven into the pilot holes using a Screwdriver.

Step 5: Adding Insulation

- Gaps around the window must be insulated with the help of roll insulation.
- For difficult spots, expanding spray insulation foam may be used.

Step 6: Adding Extension Jambs and Trim Molding

- A suitable type of molding must be selected and a frame must be created around the window.
- The length of each piece must be measured with the help of a Measuring Tape or similar tools.
- The trim must be cut with a Miter Saw, in order to obtain the desired length.
- The cuts must be made at 45 degrees, so that the Trim fits together snugly.
- The trim must be attached to the wall using finish nails.
- Thin strips of wood or aluminium trim (as required) must be added inside the window frame, as a jamb extension, to fill up the gap between the window and the drywall.

Step 7: Finishing the installed Window

- Finishing of the window frame includes filling the nail holes (if any) with paintable wood putty.
- The trim molding around the window must be painted or stained for proper finishing.

Unit 5.2 Assembling and Dismantling Procedure



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

1. Demonstrate the assembling and dismantling procedures of components for different products

5.2.1 Assembling and Dismantling Procedure of Components

Tools Required:

- Utility knife
- J-roller
- Hammer
- Marking Pencil
- Measuring Tape
- Caulking gun
- Construction stapler with 3/8" staples
- Power Drill
- Automatic Screwdriver
- Level (4' minimum recommended)
- Drill with bits
- a) Check the measurement of doors/windows aperture considering the size and material of doors/windows to be installed, if necessary provide suggestions for modification considering expansion/contraction in material under temperature fluctuations
 - The structural opening must be checked in terms of aperture size, squareness and level, visible defects and allowance for warping, and thermal expansion / contraction of the material (Aluminium or Wood).
 - While inspecting the door / window and the aperture, it must be ensured that the diagonal measurements should not deviate by more than 1/8 inch.
 - Defects around the aperture / structural opening like splits, cracks, holes, missing sections, etc. should be repaired immediately, if they are longer than 6 inches and / or are within 1/2 inch of the door / window frame.
 - The Assembler must ensure that the width and the height of the window / door must be 1/2 inch smaller than the aperture / structural opening width and height.
 - Mulled units should be narrower by at least 3/4 inch.
 - In terms of squareness, maximum deviation allowed is 1/8 inch for those windows, which are of area 20 square feet and smaller, and 1/4 inch for windows larger than 20 square feet.

- b) Check the requirement of sill height and masonry opening for doors/windows and if any legal approval is required and inform seniors/client for necessary action
 - For masonry wall openings, buck must be prepared.
 - Any joint, larger than 1/16 inch, must be sealed in the buck and the masonry, with the help of appropriate sealant.
 - The sill, if being installed into a four-sided buck, must be sealed into the buck using appropriate sealant.



Fig. 5.2.1.1: Installing buck is mandatory for masonry or concrete wall openings



Fig. 5.2.1.2: Window Sill Height is an essential factor for window installation

- Shims must be at least 1/4 inch shorter than the window sill depth and should not exceed 1/4 inch of thickness.
- According to the IRC (International Residential Code), when the space between the window or door frame and the wall's rough opening is 1.5 inches or less, shims or bucks can be installed and fasteners can extend from the door or window frame to the wall.
- When the space is greater than 1.5 inches, the bucks need to be securely fastened to the wall and the door, or window frames need to be securely fastened to the bucks. This requirement limits the shear length of fasteners to 1.5 inches.



Fig. 5.2.1.3: Shims help in levelling windows

- c) Take measurements and create markings to assemble different parts of door / window structure before installation
 - Side fixings should lie between 150 mm and 250 mm, from the top and from the bottom of the frame, respectively.
 - Fixings must not exceed 600 mm between centres.
 - Fixings must be provided both at the head and sill, when a window's width exceeds 1800 mm.
 - Marking should be done carefully, with the help of a Marking Pencil.
 - Measuring is usually done with the help of a commercial Measuring Tape or a Steel Rule.



Fig. 5.2.1.4: Marking and Measuring before installation

- d) Undertake markings of placement positions and access the fastener system to fasten the hardware accessories or fittings as per work site requirements
 - Placement positions (for different fittings) and pilot hole positions (for screws) must be marked very accurately and precisely, because if this goes wrong, wrong dimensions would be bored or cut and the entire project would go erroneous.
 - The window sill must be tilted into the rough structural opening.
 - The window must be fastened with the help of a galvanized roofing nail, through the nail fin between 3 7 inches from one lower corner.
- e) Identify slots for placing/installing and assist in installation of door/windows frame by fastening to surface via appropriate usage of nails/screws
 - Side Jambs must be shimmed 4 6 inches from each corner, at the centre point, 8 inches apart.
 - With the help of Flush Fastener heads, windows must be fastened through pilot holes, 3 7 inches from the corners, and 8 inches apart all the way around.
- f) Install the door/window into the frame by using appropriate door/window hinges and screws to fasten them
 - o Hinges and screws come in kits, along with templates and instructions for fastening.
 - Hinges and other fittings in doors / windows must be fastened with the help of screws, nuts and bolts, which are suitable for them.
 - Size, Head and material are few important factors that help in determining the set of fasteners to be used for fitting and installing doors and windows.
 - Wrong and mismatched fasteners result in defects like misalignment, loose screws, etc.





Fig. 5.2.1.5: Appropriate fasteners must be used for fitting Fixtures and installing doors and windows

g) Check for spacing, alignment between the door /window and frame

- Post installation, the Assembler must ensure that there is a minimum gap of 1/4 3/8 inches, between the window / door frame and the external wall surface.
- This allows for sufficient space for thermal expansion and warping.
- To ensure appropriate alignment, checking tools like Plumb Bob, Spirit Level and wooden blocks must be used.
- h) Check for presence of any electrical or specialist items such as television aerials and telephone wires in the aperture

The presence of pre-installed decorations, electrical wiring, telephone cable, etc. in the aperture must be noted. These should be routed around and not through the outer frame of the window / door.

Unit 5.3 Types of Defects and Troubleshooting Common Errors

- Unit Objectives 🛽



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

1. Identify the various types of defects and errors in assembling wooden / aluminium doors and windows

5.3.1 Types of Defects and Troubleshooting Common Errors

Few common defects and errors, which occur generally in all doors and windows, irrespective of the material, have already been discussed before under 1.7.2. We shall now discuss two defects / errors that typically occur in wood and aluminium doors / windows.

Name of the Defect / Error	Description	What to Do
Warping in Wooden Doors / Windows	 Warping is a condition when the wooden door / window becomes twisted or distorted and becomes hard to open or close. Warping takes place due to the following reasons: Exposure of the door to moisture (especially during the monsoons) or excess heat Finishing on only one side of the door or different finishing on both sides of the door 	 Reheating the door to dry off the accumulated moisture; this is called Curing Applying pressure on the door to remove distortion and to realign the door to its original shape and dimensions Applying at least two coats of Finish on both the sides of the door
Thermal Expansion in Aluminium Doors / Windows	This is a natural phenomenon under which Aluminium doors and windows expand under high temperatures and are difficult to operate smoothly	 Applying pressure on the door to remove distortion and to realign the door to its original shape and dimensions

Name of the Defect / Error	Description	What to Do
Corrosion in Aluminium Doors / Windows	Exposure of the door / window to low too acidic or too alkaline atmosphere (surrounding bricks, masonry wall, concrete and mortar)	 Applying protective coats and paints Scraping off gently and refinishing

Unit 5.4 Standard Operating Procedures (for Wooden / Aluminium Doors / Windows)

- Unit Objectives 🖉

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

1. Discuss the Standard Operating Procedures for installation cycle

a) Pre-installation Care

- Doors / windows must be stored in dry location and under cover (if possible), to protect against cement, lime, paint, acid and loose debris.
- Doors and windows must always be carried in vertical position, with the sashes locked.
- Frames must never be racked out of square.
- Exposure to moisture, like ponding and pooling, must be strictly avoided.
- Fitted bands must not be removed from double hung windows, until after installation.
- Fitted corner bracing must not be removed, until after installation.
- Frames must be stacked carefully on site and must be standing upright on their sills, raised off the ground level on wooden blocks or bricks.
- Frames must be erected against flat, vertical surfaces (like a shed) and tied firmly in place.

b) Installation

- The frame opening must be measured carefully to allow room for packing. For sufficient clearance, the manufacturer's instructions must be referred to.
- The frame must be pack level, square and never twisted between the openings.
- Sills must be straight, level, packed ad secured to prevent sill roll on Sliding Windows.
- Aluminium windows must be secured by nailing through the reveal in brick veneer applications.
- Wooden windows must be secured by back nailing through the stud and not through the face of the stud.
- While nailing, wedges must be installed between the window and the frame to prevent the frame joints from opening.
- Sashes must be closed while installing frames.
- Standing on doors and windows, using them for scaffolding or sliding any material through the frames, etc. are strictly prohibited to avoid damage.
- The weight of eaves or arch bars must never bear on door / window frame.
- Cement, mortar, paint and plaster droppings must be removed immediately from the door / window, to avoid scratching of the frame or pane and other permanent damages. The droppings must be washed off before the material sets.

c) Post-installation care & maintenance

- Door tracks and window sills must be safeguarded against planks, scaffolding and barrows.
- Acid must be prevented from coming in direct contact with aluminium doors and windows. In case contact happens, the affected areas must be washed immediately with clean water.
- For cleaning doors and windows, the hose nozzle must be set to a fine spray. A door or window must never be hit with full force of hose nozzle setting.
- Glass pane must be cleaned by wiping over the surface with a damp cloth doused with few drops of methyl alcohol.
- Polishing of glass pane must be done with a lint free cloth.
- All cleaning cloths must be free of abrasive materials and debris to avoid damages and scratches.
- Abrasive materials must never be removed by scraping and scrubbing.

Summary .

- Door is a key feature of any building, whether it is a home or commercial building.
- A door is provided for controlling access to that building/room, for air circulation and light.
- The door should be selected so that it fits the structural opening of the wall.
- Marking for pilot holes and others should be done very carefully and accurately with the help of a Marking Pencil.
- Defects around the aperture / structural opening like splits, cracks, holes, missing sections, etc. should be repaired immediately.
- Thermal Expansion is a natural phenomenon under which Aluminium doors and windows expand under high temperatures and are difficult to operate smoothly.
- Doors and windows must always be carried in vertical position, with the sashes locked.

Activity

- 1. Prepare a list of the tools used in the installation of Aluminium doors and windows.
- 2. Observe the different styles of doors and windows in your centre and list their features.
- 3. Make a list of the dimensions you are required to measure while installing an Aluminium window.

– Notes 🖉

Exercise

Choose the Correct Option:

- 1. The _____ windows allow free circulation of air when chased and they help in maintaining sufficient privacy.
 - a) Sliding
 - b) Casement
 - c) Louvered
 - d) None of these
- 2. The structural opening must be at least _____ inch larger than the external dimensions of the new window.
 - a) 1/2-3/4
 - b) 1/4 3/8
 - c) 1/4 1/2
 - d) None of these

3. A door is said to be Right Hand Side Opening if:

- a) You are standing outside the room and door is installed with hinges on your left side
- b) You are standing outside the room and door is installed with hinges on your Right side
- c) It is mounted in channel, or suspended in rack
- d) None of these

4. Buck must be prepared for:

- a) Stone walls
- b) Wooden walls
- c) Masonry walls
- d) Painted walls

5. Fixings in windows must not exceed:

- a) 1800 mm between the frame and the sill
- b) 150 mm and 250 mm, from the top and from the bottom of the frame, respectively
- c) 600 mm between centres
- d) 3 7 inches from one lower corner

5. Fixings in windows must not exceed:

- a) 1800 mm between the frame and the sill
- b) 150 mm and 250 mm, from the top and from the bottom of the frame, respectively
- c) 600 mm between centres
- d) 3 7 inches from one lower corner

6. Warping occurs due to:

- a) Exposure of the door / window to pests and termites
- b) Thermal Expansion
- c) Rusting
- d) Exposure of the door / window to excess moisture





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6. Employability and Entrepreneurship Skills

- Unit 6.1 Personal Strength & Value System Unit 6.2 Digital Literacy: A Recap Unit 6.3 Money Matters Unit 6.4 Preparing for Employment & Self Employment Unit 6.5 Understanding Entrepreneurship
- Unit 6.6 Preparing to be an Entrepreneur

Key Learning Outcomes

At the end of this unit, you 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
- 32. Identify the basic parts of a computer
- 33. Identify the basic parts of a keyboard
- 34. Recall basic computer terminology
- 35. Recall basic computer terminology

- 36. Recall the functions of basic computer keys
- 37. Discuss the main applications of MS Office
- 38. Discuss the benefits of Microsoft Outlook
- 39. Discuss the different types of e-commerce
- 40. List the benefits of e-commerce for retailers and customers
- 41. Discuss how the Digital India campaign will help boost e-commerce in India
- 42. Describe how you will sell a product or service on an e-commerce platform
- 43. Discuss the importance of saving money
- 44. Discuss the benefits of saving money
- 45. Discuss the main types of bank accounts
- 46. Describe the process of opening a bank account
- 47. Differentiate between fixed and variable costs
- 48. Describe the main types of investment options
- 49. Describe the different types of insurance products
- 50. Describe the different types of taxes
- 51. Discuss the uses of online banking
- 52. Discuss the main types of electronic funds transfers
- 53. Discuss the steps to prepare for an interview
- 54. Discuss the steps to create an effective Resume
- 55. Discuss the most frequently asked interview questions
- 56. Discuss how to answer the most frequently asked interview questions
- 57. Discuss basic workplace terminology
- 58. Discuss the concept of entrepreneurship
- 59. Discuss the importance of entrepreneurship
- 60. Describe the characteristics of an entrepreneur
- 61. Describe the different types of enterprises
- 62. List the qualities of an effective leader
- 63. Discuss the benefits of effective leadership
- 64. List the traits of an effective team
- 65. Discuss the importance of listening effectively
- 66. Discuss how to listen effectively
- 67. Discuss the importance of speaking effectively
- 68. Discuss how to speak effectively
- 69. Discuss how to solve problems
- 70. List important problem solving traits
- 71. Discuss ways to assess problem solving skills
- 72. Discuss the importance of negotiation

- 73. Discuss how to negotiate
- 74. Discuss how to identify new business opportunities
- 75. Discuss how to identify business opportunities within your business
- 76. Explain the meaning of entrepreneur
- 77. Describe the different types of entrepreneurs
- 78. List the characteristics of entrepreneurs
- 79. Recall entrepreneur success stories
- 80. Discuss the entrepreneurial process
- 81. Describe the entrepreneurship ecosystem
- 82. Discuss the purpose of the Make in India campaign
- 83. Discuss key schemes to promote entrepreneurs
- 84. Discuss the relationship between entrepreneurship and risk appetite
- 85. Discuss the relationship between entrepreneurship and resilience
- 86. Describe the characteristics of a resilient entrepreneur
- 87. Discuss how to deal with failure
- 88. Discuss how market research is carried out
- 89. Describe the 4 Ps of marketing
- 90. Discuss the importance of idea generation
- 91. Recall basic business terminology
- 92. Discuss the need for CRM
- 93. Discuss the benefits of CRM
- 94. Discuss the need for networking
- 95. Discuss the benefits of networking
- 96. Discuss the importance of setting goals
- 97. Differentiate between short-term, medium-term and long-term goals
- 98. Discuss how to write a business plan
- 99. Explain the financial planning process
- 100. Discuss ways to manage your risk
- 101. Describe the procedure and formalities for applying for bank finance
- 102. Discuss how to manage your own enterprise
- 103. List important questions that every entrepreneur should ask before starting an enterprise

Unit 6.1 Personal Strength & Value System

- Unit Objectives 🏼 🤇

At the end of this unit, you 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

- 6.1.1 Health, habits, hygiene: What is Health

As per the World Health Organization (WHO), health is a "State of complete physical, mental, and social well-being, and not merely the absence of disease or infirmity." This means being healthy does not simply mean not being unhealthy – it also means you need to be at peace emotionally, and feel fit physically. For example, you cannot say you are healthy simply because you do not have any physical ailments like a cold or cough. You also need to think about whether you are feeling calm, relaxed and happy.

Common Health Issues

Some common health issues are:

- Allergies
- Asthma
- Skin Disorders
- Depression and Anxiety
- Diabetes
- Cough, Cold, Sore Throat
- Difficulty Sleeping
- Obesity

Tips to Prevent Health Issues

Taking measures to prevent ill health is always better than curing a disease or sickness. You can stay healthy by:

- Eating healthy foods like fruits, vegetables and nuts
- Cutting back on unhealthy and sugary foods
- Drinking enough water everyday
- Not smoking or drinking alcohol
- Exercising for at least 30 minutes a day, 4-5 times a week
- Taking vaccinations when required
- Practicing yoga exercises and meditatio

How many of these health standards do you follow? Tick the ones that apply to you.

- 1. Get minimum 7-8 hours of sleep every night.
- 2. Avoid checking email first thing in the morning and right before you go to bed at night.
- 3. Don't skip meals eat regular meals at correct meal times.
- 4. Read a little bit every single day.
- 5. Eat more home cooked food than junk food.

6.	Stand more than you sit.	
7.	Drink a glass of water first thing in the morning and have at least 8 glasses of water through the day.	
8.	Go to the doctor and dentist for regular checkups.	
9.	Exercise for 30 minutes at least 5 days a week.	
10.	Avoid consuming lots of aerated beverages.	

- What is Hygiene

As per the World Health Organization (WHO), "Hygiene refers to conditions and practices that help to maintain health and prevent the spread of diseases." In other words, hygiene means ensuring that you do whatever is required to keep your surroundings clean, so that you reduce the chances of spreading germs and diseases.

For instance, think about the kitchen in your home. Good hygiene means ensuring that the kitchen is always spick and span, the food is put away, dishes are washed and dustbins are not overflowing with garbage. Doing all this will reduce the chances of attracting pests like rats or cockroaches, and prevent the growth of fungus and other bacteria, which could spread disease.

How many of these health standards do you follow? Tick the ones that apply to you.

1.	Have a bath or shower every day with soap – and wash your hair with shampoo 2-3 times a week.	
2.	Wear a fresh pair of clean undergarments every day.	
3.	Brush your teeth in the morning and before going to bed.	
4.	Cut your fingernails and toenails regularly.	
5.	Wash your hands with soap after going to the toilet.	
6.	Use an anti-perspirant deodorant on your underarms if you sweat a lot.	
7.	Wash your hands with soap before cooking or eating.	
8.	Stay home when you are sick, so other people don't catch what you have.	
9.	Wash dirty clothes with laundry soap before wearing them again.	
10.	Cover your nose with a tissue/your hand when coughing or sneezing.	
See The	how healthy and hygienic you are, by giving yourself 1 point for every ticked staten In take a look at what your score means.	ient!
You	r Score	
0-7/20: You need to work a lot harder to stay fit and fine! Make it a point to practice good habits daily and see how much better you feel!		

7-14/20: Not bad, but there is scope for improvement! Try and add a few more good habits to your daily routine.

14-20/20: Great job! Keep up the good work! Your body and mind thank you!

- Swachh Bharat Abhiyan

We have already discussed the importance of following good hygiene and health practices for ourselves. But, it is not enough for us to be healthy and hygienic. We must also extend this standard to our homes, our immediate surroundings and to our country as a whole.

The 'Swachh Bharat Abhiyan' (Clean India Mission) launched by Prime Minister Shri Narendra Modi on 2nd October 2014, believes in doing exactly this. The aim of this mission is to clean the streets and roads of India and raise the overall level of cleanliness. Currently this mission covers 4,041 cities and towns across the country. Millions of our people have taken the pledge for a clean India. You should take the pledge too, and do everything possible to keep our country clean!

What are Habits

A habit is a behaviour that is repeated frequently. All of us have good habits and bad habits. Keep in mind the phrase by John Dryden: "We first make our habits, and then our habits make us." This is why it is so important that you make good habits a way of life, and consciously avoid practicing bad habits.

Some good habits that you should make part of your daily routine are:

- Always having a positive attitude
- Making exercise a part of your daily routine
- Reading motivational and inspirational stories
- Smiling! Make it a habit to smile as often as possible
- Making time for family and friends
- Going to bed early and waking up early

Some bad habits that you should quit immediately are:

- Skipping breakfast
- Snacking frequently even when you are not hungry
- Eating too much fattening and sugary food
- Smoking, drinking alcohol and doing drugs
- Spending more money than you can afford
- Worrying about unimportant issues
- Staying up late and waking up late

Tips 🍳

- Following healthy and hygienic practices every day will make you feel good mentally and physically.
- Hygiene is two-thirds of health so good hygiene will help you stay strong and healthy!

- 6.1.2 Safety: Tips to Design a Safe Workplace

Every employer is obligated to ensure that his workplace follows the highest possible safety protocol. When setting up a business, owners must make it a point to:

- Use ergonomically designed furniture and equipment to avoid stooping and twisting
- Provide mechanical aids to avoid lifting or carrying heavy objects
- Have protective equipment on hand for hazardous jobs
- Designate emergency exits and ensure they are easily accessible
- Set down health codes and ensure they are implemented
- Follow the practice of regular safety inspections in and around the workplace
- Ensure regular building inspections are conducted
- Get expert advice on workplace safety and follow it

Non-Negotiable Employee Safety Habits

Every employee is obligated to follow all safety protocols put in place by the employer. All employees must make it a habit to:

- Immediately report unsafe conditions to a supervisor
- Recognize and report safety hazards that could lead to slips, trips and falls
- Report all injuries and accidents to a supervisor
- Wear the correct protective equipment when required
- Learn how to correctly use equipment provided for safety purposes
- Be aware of and avoid actions that could endanger other people
- Take rest breaks during the day and some time off from work during the week

Tips

 (\mathbf{I})

- Be aware of what emergency number to call at the time of a workplace emergency
- Practice evacuation drills regularly to avoid chaotic evacuations

6.1.3 Self Analysis - Attitude, Achievement Motivation: What is Self-Analysis

To truly achieve your full potential, you need to take a deep look inside yourself and find out what kind of person you really are. This attempt to understand your personality is known as self-analysis. Assessing yourself in this manner will help you grow, and will also help you to identify areas within yourself that need to be further developed, changed or eliminated. You can better understand yourself by taking a deep look at what motivates you, what your attitude is like, and what your strengths and weaknesses are.

What is Motivation

Very simply put, motivation is your reason for acting or behaving in a certain manner. It is important to understand that not everyone is motivated by the same desires – people are motivated by many, many different things. We can understand this better by looking at Maslow's Hierarchy of Needs.

Maslow's Hierarchy of Needs

Famous American psychologist Abraham Maslow wanted to understand what motivates people. He believed that people have five types of needs, ranging from very basic needs (called physiological needs) to more important needs that are required for self-growth (called self-actualization needs). Between the physiological and self-actualization needs are three other needs – safety needs, belongingness and love needs, and esteem needs. These needs are usually shown as a pyramid with five levels and are known as Maslow's Hierarchy of Needs.


As you can see from the pyramid, the lowest level depicts the most basic needs. Maslow believed that our behaviour is motivated by our basic needs, until those needs are met. Once they are fulfilled, we move to the next level and are motived by the next level of needs. Let's understand this better with an example.

Rupa comes from a very poor family. She never has enough food, water, warmth or rest. According to Maslow, until Rupa is sure that she will get these basic needs, she will not even think about the next level of needs – her safety needs. But, once Rupa is confident that her basic needs will be met, she will move to the next level, and her behaviour will then be motivated by her need for security and safety. Once these new needs are met, Rupa will once again move to the next level, and be motivated by her need for relationships and friends. Once this need is satisfied, Rupa will then focus on the fourth level of needs – her esteem needs, after which she will move up to the fifth and last level of needs – the desire to achieve her full potential.

Understanding Achievement Motivation

We now know that people are motivated by basic, psychological and self-fulfillment needs. However, certain people are also motivated by the achievement of highly challenging accomplishments. This is known as Achievement Motivation, or 'need for achievement'.

The level of motivation achievement in a person differs from individual to individual. It is important that entrepreneurs have a high level of achievement motivation – a deep desire to accomplish something important and unique. It is equally important that they hire people who are also highly motivated by challenges and success.

What Motivates You -

What are the things that really motivate you? List down five things that really motivate you. Remember to answer honestly!

I am motivated by:

Characteristics of Entrepreneurs with Achievement Motivation

Entrepreneurs with achievement motivation can be described as follows:

- Unafraid to take risks for personal accomplishment
- Love being challenged
- Future-oriented
- Flexible and adaptive
- Value negative feedback more than positive feedback
- Very persistent when it comes to achieving goals
- Extremely courageous
- Highly creative and innovative
- Restless constantly looking to achieve more
- Feel personally responsible for solving problems

Think about it:

- How many of these traits do you have?
- Can you think of entrepreneurs who display these traits?

What is Attitude

Now that we understand why motivation is so important for self-analysis, let's look at the role our attitude plays in better understanding ourselves. Attitude can be described as your tendency (positive or negative), to think and feel about someone or something. Attitude is the foundation for success in every aspect of life. Our attitude can be our best friend or our worst enemy. In other words:

"The only disability in life is a bad attitude."

When you start a business, you are sure to encounter a wide variety of emotions, from difficult times and failures to good times and successes. Your attitude is what will see you through the tough times and guide you towards success. Attitude is also infectious. It affects everyone around you, from your customers to your employees to your investors. A positive attitude helps build confidence in the workplace while a negative attitude is likely to result in the demotivation of your people.

How to Cultivate a Positive Attitude

The good news is attitude is a choice. So it is possible to improve, control and change our attitude, if we decide we want to! The following tips help foster a positive mindset:

- Remember that you control your attitude, not the other way around
- Devote at least 15 minutes a day towards reading, watching or listening to something positive
- Avoid negative people who only complain and stop complaining yourself
- Expand your vocabulary with positive words and delete negative phrases from your mind
- Be appreciative and focus on what's good in yourself, in your life, and in others
- Stop thinking of yourself as a victim and start being proactive
- Imagine yourself succeeding and achieving your goals

What Are Your Strengths and Weaknesses

Another way to analyze yourself is by honestly identifying your strengths and weaknesses. This will help you use your strengths to your best advantage and reduce your weaknesses.

Note down all your strengths and weaknesses in the two columns below. Remember to be honest with yourself!

Strengths	Weaknesses

Tips 🚇

- Achievement motivation can be learned.
- Don't be afraid to make mistakes.
- Train yourself to finish what you start.
- Dream big.

- 6.1.4 Honesty & Work Ethics: What is Honesty

Honesty is the quality of being fair and truthful. It means speaking and acting in a manner that inspires trust. A person who is described as honest is seen as truthful and sincere, and as someone who isn't deceitful or devious and doesn't steal or cheat. There are two dimensions of honesty – one is honesty in communication and the other is honesty in conduct.

Honesty is an extremely important trait because it results in peace of mind and builds relationships that are based on trust. Being dishonest, on the other hand, results in anxiety and leads to relationships full of distrust and conflict.

Qualities of Honest People -

Honest individuals have certain distinct characteristics. Some common qualities among honest people are:

- 1. They don't worry about what others think of them. They believe in being themselves they don't bother about whether they are liked or disliked for their personalities.
- 2. They stand up for their beliefs. They won't think twice about giving their honest opinion, even if they are aware that their point of view lies with the minority.
- 3. They are think skinned. This means they are not affected by others judging them harshly for their honest opinions.
- 4. They forge trusting, meaningful and healthy friendships. Honest people usually surround themselves with honest friends. They have faith that their friends will be truthful and upfront with them at all times.
- 5. They are trusted by their peers. They are seen as people who can be counted on for truthful and objective feedback and advice.

Importance of Honesty in Entrepreneurs

One of the most important characteristics of entrepreneurs is honesty. When entrepreneurs are honest with their customers, employees and investors, it shows that they respect those that they work with. It is also important that entrepreneurs remain honest with themselves. Let's look at how being honest would lead to great benefits for entrepreneurs.

- Honesty and customers: When entrepreneurs are honest with their customers it leads to stronger relationships, which in turn results in business growth and a stronger customer network.
- Honesty and employees: When entrepreneurs build honest relationships with their employees, it leads to more transparency in the workplace, which results in higher work performance and better results.
- Honesty and investors: For entrepreneurs, being honest with investors means not only sharing strengths but also candidly disclosing current and potential weaknesses, problem areas and solution strategies. Keep in mind that investors have a lot of experience with startups and are aware that all new companies have problems. Claiming that everything is perfectly fine and running smoothly is a red flag for most investors.
- Honesty with oneself: The consequences of being dishonest with oneself can lead to dire results, especially in the case of entrepreneurs. For entrepreneurs to succeed, it is critical that they remain realistic about their situation at all times, and accurately judge every aspect of their enterprise for what it truly is.

What are Work Ethics

Being ethical in the workplace means displaying values like honesty, integrity and respect in all your decisions and communications. It means not displaying negative qualities like lying, cheating and stealing.

Workplace ethics play a big role in the profitability of a company. It is as crucial to an enterprise as high morale and teamwork. This is why most companies lay down specific workplace ethic guidelines that must compulsorily be followed by their employees. These guidelines are typically outlined in a company's employee handbook.

Elements of a Strong Work Ethic

An entrepreneur must display strong work ethics, as well as hire only those individuals who believe in and display the same level of ethical behavior in the workplace. Some elements of a strong work ethic are:

- **Professionalism**: This involves everything from how you present yourself in a corporate setting to the manner in which you treat others in the workplace.
- **Respectfulness**: This means remaining poised and diplomatic regardless of how stressful or volatile a situation is.
- **Dependability**: This means always keeping your word, whether it's arriving on time for a meeting or delivering work on time.
- **Dedication**: This means refusing to quit until the designated work is done, and completing the work at the highest possible level of excellence.
- **Determination**: This means embracing obstacles as challenges rather than letting them stop you, and pushing ahead with purpose and resilience to get the desired results.
- Accountability: This means taking responsibility for your actions and the consequences of your actions, and not making excuses for your mistakes.
- **Humility**: This means acknowledging everyone's efforts and had work, and sharing the credit for accomplishments.

How to Foster a Good Work Ethic

As an entrepreneur, it is important that you clearly define the kind of behaviour that you expect from each and every team member in the workplace. You should make it clear that you expect employees to display positive work ethics like:

- **Honesty**: All work assigned to a person should be done with complete honesty, without any deceit or lies.
- **Good attitude**: All team members should be optimistic, energetic, and positive.
- **Reliability**: Employees should show up where they are supposed to be, when they are supposed to be there.
- **Good work habits**: Employees should always be well groomed, never use inappropriate language, conduct themselves professionally at all times, etc.
- **Initiative**: Doing the bare minimum is not enough. Every team member needs to be proactive and show initiative.
- **Trustworthiness**: Trust is non-negotiable. If an employee cannot be trusted, it's time to let that employee go.

- **Respect**: Employees need to respect the company, the law, their work, their colleagues and themselves.
- **Integrity**: Each and every team member should be completely ethical and must display above board behaviour at all times.
- **Efficiency**: Efficient employees help a company grow while inefficient employees result in a waste of time and resources.

- Tips 🚇

- Don't get angry when someone tells you the truth and you don't like what you hear.
- Always be willing to accept responsibility for your mistakes.

– 6.1.5 Creativity & Innovation: What is Creativity

Creativity means thinking outside the box. It means viewing things in new ways or from different perspectives, and then converting these ideas into reality. Creativity involves two parts: thinking and producing. Simply having an idea makes you imaginative, not creative. However, having an idea and acting on it makes you creative.

Characteristics of Highly Creative People

Some characteristics of creative people are:

- They are imaginative and playful
- They see issues from different angles
- They notice small details
- They have very little tolerance for boredom

What is Innovation

There are many different definitions of innovation. In simple terms, innovation means turning an idea into a solution that adds value. It can also mean adding value by implementing a new product, service or process, or significantly improving on an existing product, service or process.

Characteristics of Highly Innovative People

Some characteristics of highly innovative people are:

- They embrace doing things differently
- They don't believe in taking shortcuts
- They are not afraid to be unconventional
- They are highly proactive and persistent
- They are organized, cautious and risk-averse

Tips 🔮

- Take regular breaks from your creative work to recharge yourself and gain fresh perspective.
- Build prototypes frequently, test them out, get feedback, and make the required changes.

- They detest rules and routine
- They love to daydream
 - They are very curious

6.1.6 Time Management: What is Time Management

Time management is the process organizing your time, and deciding how to allocate your time between different activities. Good time management is the difference between working smart (getting more done in less time) and working hard (working for more time to get more done).

Effective time management leads to an efficient work output, even when you are faced with tight deadlines and high pressure situations. On the other hand, not managing your time effectively results in inefficient output and increases stress and anxiety.

Benefits of Time Management

Time management can lead to huge benefits like:

- Greater productivity
- Better professional reputation
- Higher chances for career advancement

Not managing time effectively can result in undesirable consequences like:

- **Missing deadlines**
- Substandard work quality
- Stalled career

Reduced stress

Higher efficiency

- Greater opportunities to achieve goals
- Inefficient work output
- Poor professional reputation
- Increase in stress and anxiety

Traits of Effective Time Managers

Some traits of effective time managers are:

- They begin projects early
- They set daily objectives
- They modify plans if required, to achieve better results
- They are flexible and open-minded
- They inform people in advance if their help will be required
- They break tasks into steps with specific deadlines
- They continually review long term goals
- They think of alternate solutions if and when required
- They ask for help when required
- They create backup plans
- They know how to say no

Effective Time Management Techniques

You can manage your time better by putting into practice certain time management techniques. Some helpful tips are:

- Plan out your day as well as plan for interruptions. Give yourself at least 30 minutes to figure out your time plan. In your plan, schedule some time for interruptions.
- Put up a "Do Not Disturb" sign when you absolutely have to complete a certain amount of work.
- Close your mind to all distractions. Train yourself to ignore ringing phones, don't reply to chat messages and disconnect from social media sites.

- Delegate your work. This will not only help your work get done faster, but will also show you the unique skills and abilities of those around you.
- Stop procrastinating. Remind yourself that procrastination typically arises due to the fear of failure or the belief that you cannot do things as perfectly as you wish to do them.
- Prioritize. List each task to be completed in order of its urgency or importance level. Then focus on completing each task, one by one.
- Maintain a log of your work activities. Analyze the log to help you understand how efficient you are, and how much time is wasted every day.
- Create time management goals to reduce time wastage.

Tips 🚇

- Always complete the most important tasks first.
- Get at least 7 8 hours of sleep every day.
- Start your day early.
- Don't waste too much time on small, unimportant details.
- Set a time limit for every task that you will undertake.
- Give yourself some time to unwind between tasks.

-6.1.7 Anger Management: What is Anger Management

Anger management is the process of:

- 1. Learning to recognize the signs that you, or someone else, is becoming angry
- 2. Taking the best course of action to calm down the situation in a positive way

Anger management does not mean suppressing anger.

Importance of Anger Management

Anger is a perfectly normal human emotion. In fact, when managed the right way, anger can be considered a healthy emotion. However, if it is not kept in check, anger can make us act inappropriately and can lead to us saying or doing things that we will likely later regret.

Extreme anger can:

- **Hurt you physically**: It leads to heart disease, diabetes, a weakened immune system, insomnia, and high blood pressure.
- **Hurt you mentally**: It can cloud your thinking and lead to stress, depression and mental health issues.
- **Hurt your career**: It can result in alienating your colleagues, bosses, clients and lead to the loss of respect.
- **Hurt your relationships**: It makes it hard for your family and friends to trust you, be honest with you and feel comfortable around you.

This is why anger management, or managing anger appropriately, is so important.

Anger Management Strategies

Here are some strategies that can help you control your anger:

Strategy 1: Relaxation

Something as simple as breathing deeply and looking at relaxing images works wonders in calming down angry feelings. Try this simple breathing exercise:

- 1. Take a deep breath from your diaphragm (don't breathe from your chest)
- 2. Visualize your breath coming up from your stomach
- 3. Keep repeating a calming word like 'relax' or 'take it easy' (remember to keep breathing deeply while repeating the word)
- 4. Picture a relaxing moment (this can be from your memory or your imagination)

Follow this relaxation technique daily, especially when you realize that you're starting to feel angry.

Strategy 2: Cognitive Restructuring

Cognitive restructuring means changing the manner in which you think. Anger can make you curse, swear, exaggerate and act very dramatically. When this happens, force yourself to replace your angry thoughts with more logical ones. For instance, instead of thinking 'Everything is ruined' change your mindset and tell yourself 'It's not the end of the world and getting angry won't solve this'.

Strategy 3: Problem Solving

Getting angry about a problem that you cannot control is a perfectly natural response. Sometimes, try as you may, there may not be a solution to the difficulty you are faced with. In such cases, stop focusing on solving the problem, and instead focus on handling and facing the problem. Remind yourself that you will do your best to deal with the situation, but that you will not blame yourself if you don't get the solution you desire.

Strategy 4: Better Communication

When you're angry, it is very easy to jump to inaccurate conclusions. In this case, you need to force yourself to stop reacting, and think carefully about what you want to say, before saying it. Avoid saying the first thing that enters your head. Force yourself to listen carefully to what the other person is saying. Then think about the conversation before responding.

Strategy 5: Changing Your Environment

If you find that your environment is the cause of your anger, try and give yourself a break from your surroundings. Make an active decision to schedule some personal time for yourself, especially on days that are very hectic and stressful. Having even a brief amount of quiet or alone time is sure to help calm you down.

Tips for Anger Management

The following tips will help you keep your anger in check:

- Take some time to collect your thoughts before you speak out in anger.
- Express the reason for your anger in an assertive, but non-confrontational manner once you have calmed down.
- Do some form of physical exercise like running or walking briskly when you feel yourself getting angry.
- Make short breaks part of your daily routine, especially during days that are stressful.
- Focus on how to solve a problem that's making you angry, rather than focusing on the fact that the problem is making you angry.

Tips 🔮

- Try to forgive those who anger you, rather than hold a grudge against them.
- Avoid using sarcasm and hurling insults. Instead, try and explain the reason for your frustration in a polite and mature manner.

- 6.1.8 Stress Management: What is Stress

We say we are 'stressed' when we feel overloaded and unsure of our ability to deal with the pressures placed on us. Anything that challenges or threatens our well-being can be defined as a stress. It is important to note that stress can be good and bad. While good stress keeps us going, negative stress undermines our mental and physical health. This is why it is so important to manage negative stress effectively.

Causes of Stress

Stress can be caused by internal and external factors.

Internal causes of stress

- Constant worry
- Rigid thinking
- Unrealistic expectations

External causes of stress

- Major life changes
- Difficulties with relationships
- Having too much to do

- Pessimism
- Negative self-talk
- All in or all out attitude
- Difficulties at work or in school
- Financial difficulties
- Worrying about one's children and/or family

Symptoms of Stress

Stress can manifest itself in numerous ways. Take a look at the cognitive, emotional, physical and behavioral symptoms of stress.

Cognitive Symptoms		Emotional Symptoms	
•	Memory problems	Depression	
•	Concentration issues	Agitation	
•	Lack of judgement	Irritability	
•	Pessimism	• Loneliness	
•	Anxiety	• Anxiety	
•	Constant worrying	• Anger	

	Physical Symptoms		Behavioral Symptoms
•	Aches and pain	•	Increase or decrease in appetite
•	Diarrhea or constipation	•	Over sleeping or not sleeping enough
•	Nausea	•	Withdrawing socially
•	Dizziness	•	Ignoring responsibilities
•	Chest pain and/or rapid heartbeat	•	Consumption of alcohol or cigarettes
•	Frequent cold or flu like feelings	•	Nervous habits like nail biting, pacing etc.

- Tips to Manage Stress

The following tips can help you manage your stress better:

- Note down the different ways in which you can handle the various sources of your stress.
- Remember that you cannot control everything, but you can control how you respond.
- Discuss your feelings, opinions and beliefs rather than reacting angrily, defensively or passively.
- Practice relaxation techniques like meditation, yoga or tai chi when you start feeling stressed.
- Devote a part of your day towards exercise.
- Eat healthy foods like fruits and vegetables. Avoid unhealthy foods especially those containing large amounts of sugar.
- Plan your day so that you can manage your time better, with less stress.
- Say no to people and things when required.
- Schedule time to pursue your hobbies and interests.
- Ensure you get at least 7-8 hours of sleep.
- Reduce your caffeine intake.
- Increase the time spent with family and friends.

Tips 🦉

- Force yourself to smile even if you feel stressed. Smiling makes us feel relaxed and happy.
- Stop yourself from feeling and thinking like a victim. Change your attitude and focus on being proactive.

Unit 6.2 Digital Literacy: A Recap

Unit Objectives

At the end of this unit, you 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 basic computer terminology
- 5. Recall the functions of basic computer keys
- 6. Discuss the main applications of MS Office
- 7. Discuss the benefits of Microsoft Outlook
- 8. Discuss the different types of e-commerce
- 9. List the benefits of e-commerce for retailers and customers
- 10. Discuss how the Digital India campaign will help boost e-commerce in India
- 11. Describe how you will sell a product or service on an e-commerce platform

6.2.1 Computer and Internet basics: Basic Parts of a Computer



- **Central Processing Unit (CPU)**: The brain of the computer. It interprets and carries out program instructions.
- Hard Drive: A device that stores large amounts of data.
- **Monitor**: The device that contains the computer screen where the information is visually displayed.
- **Mouse**: A hand-held device used to point to items on the monitor.
- Speakers: Devices that enable you to hear sound from the computer.
- **Printer**: A device that converts output from a computer into printed paper documents.

- Basic Parts of a Keyboard



- Arrow Keys: Press these keys to move your cursor.
- **Space bar**: Adds a space.
- Enter/Return: Moves your cursor to a new line.
- Shift: Press this key if you want to type a capital letter or the upper symbol of a key.
- **Caps Lock**: Press this key if you want all the letters you type to be capital letters. Press it again to revert back to typing lowercase letters.
- Backspace: Deletes everything to the left of your cursor.

Basic Internet Terms

- **The Internet**: A vast, international collection of computer networks that transfers information.
- The World Wide Web: A system that lets you access information on the Internet.
- **Website**: A location on the World Wide Web (and Internet) that contains information about a specific topic.
- **Homepage**: Provides information about a website and directs you to other pages on that website.
- Link/Hyperlink: A highlighted or underlined icon, graphic, or text that takes you to another file or object.
- Web Address/URL: The address for a website.
- Address Box: A box in the browser window where you can type in a web address.

Tips

- When visiting a .com address, there no need to type http:// or even www. Just type the name of the website and then press Ctrl + Enter. (Example: Type 'apple' and press Ctrl + Enter to go to www.apple.com)
- Press the Ctrl key and press the + or to increase and decrease the size of text.
- Press F5 or Ctrl + R to refresh or reload a web page.

- 6.2.2 MS Office and Email: About MS Office

MS Office or Microsoft Office is a suite of computer programs developed by Microsoft. Although meant for all users, it offers different versions that cater specifically to students, home users and business users. All the programs are compatible with both, Windows and Macintosh.

- Most Popular Office Products

Some of the most popular and universally used MS Office applications are:

- Microsoft Word: Allows users to type text and add images to a document.
- Microsoft Excel: Allows users to enter data into a spreadsheet and create calculations and graphs.
- Microsoft PowerPoint: Allows users to add text, pictures and media and create slideshows and presentations.
- Microsoft Outlook: Allows users to send and receive email.
- Microsoft OneNote: Allows users to make drawings and notes with the feel of a pen on paper.
- **Microsoft Access**: Allows users to store data over many tables.

Why Choose Microsoft Outlook

A popular email management choice especially in the workplace, Microsoft Outlook also includes an address book, notebook, web browser and calendar. Some major benefits of this program are:

- Integrated search function: You can use keywords to search for data across all Outlook programs.
- Enhanced security: Your email is safe from hackers, junk mail and phishing website email.
- **Email syncing**: Sync your mail with your calendar, contact list, notes in OneNote and...your phone!
- **Offline access to email**: No Internet? No problem! Write emails offline and send them when you're connected again.

– Tips 🛛

- Press Ctrl+R as a shortcut method to reply to email.
- Set your desktop notifications only for very important emails.
- Flag messages quickly by selecting messages and hitting the Insert key.
- Save frequently sent emails as a template to reuse again and again.
- Conveniently save important emails as files.

- 6.2.3 E-Commerce: What is E-Commerce

E-commerce is the buying or selling of goods and services, or the transmitting of money or data, electronically on the internet. E-Commerce is the short form for "electronic commerce."

- Examples of E-Commerce

Some examples of e-commerce are:

• Online shopping

Online auctions

- Electronic payments
- Internet banking
- Online ticketing

Types of E-Commerce

E-commerce can be classified based on the types of participants in the transaction. The main types of e-commerce are:

- Business to Business (B2B): Both the transacting parties are businesses.
- Business to Consumer (B2C): Businesses sell electronically to end-consumers.
- **Consumer to Consumer (C2C)**: Consumers come together to buy, sell or trade items to other consumers.
- **Consumer-to-Business (C2B)**: Consumers make products or services available for purchase to companies looking for exactly those services or products.
- **Business-to-Administration (B2A)**: Online transactions conducted between companies and public administration.
- **Consumer-to-Administration (C2A)**: Online transactions conducted between individuals and public administration.

Benefits of E-Commerce

The e-commerce business provides some benefits for retailers and customers.

Benefits for retailers:

- Establishes an online presence
- Reduces operational costs by removing overhead costs
- Increases brand awareness through the use of good keywords
- Increases sales by removing geographical and time constraints

Benefits for customers:

- Offers a wider range of choice than any physical store
- Enables goods and services to be purchased from remote locations
- Enables consumers to perform price comparisons

- Digital India Campaign

Prime Minister Narendra Modi launched the Digital India campaign in 2015, with the objective of offering every citizen of India access to digital services, knowledge and information. The campaign aims to improve the country's online infrastructure and increase internet connectivity, thus boosting the e-commerce industry.

Currently, the majority of online transactions come from tier 2 and tier 3 cities. Once the Digital India campaign is in place, the government will deliver services through mobile connectivity, which will help deliver internet to remote corners of the country. This will help the e-commerce market to enter India's tier 4 towns and rural areas.

E-Commerce Activity

Choose a product or service that you want to sell online. Write a brief note explaining how you will use existing e-commerce platforms, or create a new e-commerce platform, to sell your product or service.



- Before launching your e-commerce platform, test everything.
- Pay close and personal attention to your social media.

Unit 6.3 Money Matters

Unit Objectives

At the end of this unit, you 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 transfers

6.3.1 Personal Finance - Why to Save Importance of Saving

We all know that the future is unpredictable. You never know what will happen tomorrow, next week or next year. That's why saving money steadily through the years is so important. Saving money will help improve your financial situation over time. But more importantly, knowing that you have money stashed away for an emergency will give you peace of mind. Saving money also opens the door to many more options and possibilities.

Benefits of Saving

Inculcating the habit of saving leads to a vast number of benefits. Saving helps you:

- **Become financially independent**: When you have enough money saved up to feel secure you can start making your choices, from taking a vacation whenever you want, to switching careers or starting your own business.
- Invest in yourself through education: Through saving, you can earn enough to pay up for courses that will add to your professional experience and ultimately result in higher paying jobs.
- **Get out of debt**: Once you have saved enough as a reserve fund, you can use your savings to pay off debts like loans or bills that have accumulated over time.
- **Be prepared for surprise expenses**: Having money saved enables you to pay for unforeseen expenses like sudden car or house repairs, without feeling financially stressed.
- **Pay for emergencies**: Saving helps you deal with emergencies like sudden health issues or emergency trips without feeling financially burdened.

- Afford large purchases and achieve major goals: Saving diligently makes it possible to place down payments towards major purchases and goals, like buying a home or a car.
- **Retire**: The money you have saved over the years will keep you comfortable when you no longer have the income you would get from your job.



- Break your spending habit. Try not spending on one expensive item per week, and put the money that you would have spent into your savings.
- Decide that you will not buy anything on certain days or weeks and stick to your word.

6.3.2 Types of Bank Accounts, Opening a Bank Account: Types of Bank Accounts

In India, banks offer four main types of bank accounts. These are:

- Current Accounts
- Savings Accounts
- Recurring Deposit Accounts
- Fixed Deposit Accounts

Current Accounts

Current accounts offer the most liquid deposits and thus, are best suited for businessmen and companies. As these accounts are not meant for investments and savings, there is no imposed limit on the number or amount of transactions that can be made on any given day. Current account holders are not paid any interest on the amounts held in their accounts. They are charged for certain services offered on such accounts.

Savings Accounts

Savings accounts are meant to promote savings, and are therefore the number one choice for salaried individuals, pensioners and students. While there is no restriction on the number and amount of deposits made, there are usually restrictions on the number and amount of withdrawals. Savings account holders are paid interest on their savings.

Recurring Deposit Accounts

Recurring Deposit accounts, also called RD accounts, are the accounts of choice for those who want to save an amount every month, but are unable to invest a large sum at one time. Such account holders deposit a small, fixed amount every month for a pre-determined period (minimum 6 months). Defaulting on a monthly payment results in the account holder being charged a penalty amount. The total amount is repaid with interest at the end of the specified period.

Fixed Deposit Accounts

Fixed Deposit accounts, also called FD accounts, are ideal for those who wish to deposit their savings for a long term in return for a high rate of interest. The rate of interest offered depends on the amount deposited and the time period, and also differs from bank to bank. In the case of an FD, a certain amount of money is deposited by the account holder for a fixed period of time. The money can be withdrawn when the period expires. If necessary, the depositor can break the fixed deposit prematurely. However, this usually attracts a penalty amount which also differs from bank to bank.

Opening a Bank Account

Opening a bank account is quite a simple process. Take a look at the steps to open an account of your own:

Step 1: Fill in the Account Opening Form

This form requires you to provide the following information:

- Personal details (name, address, phone number, date of birth, gender, occupation, address)
- Method of receiving your account statement (hard copy/email)
- Details of your initial deposit (cash/cheque)
- Manner of operating your account (online/mobile banking/traditional via cheque, slip books) Ensure that you sign wherever required on the form.

Step 2: Affix your Photograph

Stick a recent photograph of yourself in the allotted space on the form.

Step 3: Provide your Know Your Customer (KYC) Details

KYC is a process that helps banks verify the identity and address of their customers. To open an account, every individual needs to submit certain approved documents with respect to photo identity (ID) and address proof. Some Officially Valid Documents (OVDs) are:

- Passport
- Driving License
- Voters' Identity Card
- PAN Card
- UIDAI (Aadhaar) Card

Step 4: Submit All your Documents

Submit the completed Account Opening Form and KYC documents. Then wait until the forms are processed and your account has been opened!

Tips 🔮

- Select the right type of account.
- Fill in complete nomination details.
- Ask about fees.
- Understand the rules.
- Check for online banking it's convenient!
- Keep an eye on your bank balance.

6.3.3 Costs: Fixed vs Variable: What are Fixed and Variable Costs

Fixed costs and variable costs together make up a company's total cost. These are the two types of costs that companies have to bear when producing goods and services.

A fixed cost does not change with the volume of goods or services a company produces. It always remains the same.

A variable cost, on the other hand, increases and decreases depending on the volume of goods and services produced. In other words, it varies with the amount produced.

Differences Between Fixed and Variable Costs

Let's take a look at some of the main differences between fixed and variable costs:

Criteria	Fixed Costs	Variable Costs
Meaning	A cost that stays the same, regardless of the output produced.	A cost that changes when the output changes.
Nature	Time related.	Volume related.
Incurred	Incurred irrespective of units being produced.	Incurred only when units are produced.
Unit cost	Inversely proportional to the number of units produced.	Remains the same, per unit.
Examples	Depreciation, rent, salary, insurance, tax etc.	Material consumed, wages, commission on sales, packing expenses, etc.

– Tips 🚇

• When trying to determine whether a cost is fixed or variable, simply ask the following question: Will the particular cost change if the company stopped its production activities? If the answer is no, then it is a fixed cost. If the answer is yes, then it is probably a variable cost.

- 6.3.4 Investment, Insurance and Taxes: Investment

Investment means that money is spent today with the aim of reaping financial gains at a future time. The main types of investment options are as follows:

- Bonds: Bonds are instruments used by public and private companies to raise large sums of money – too large to be borrowed from a bank. These bonds are then issued in the public market and are bought by lenders.
- **Stocks:** Stocks or equity are shares that are issued by companies and are bought by the general public.
- Small Savings Schemes: Small Savings Schemes are tools meant to save money in small amounts. Some popular schemes are the Employees Provident Fund, Sukanya Samriddhi Scheme and National Pension Scheme.
- **Mutual Funds:** Mutual Funds are professionally managed financial instruments that invest money in different securities on behalf of investors.
- **Fixed Deposits:** A fixed amount of money is kept aside with a financial institution for a fixed amount of time in return for interest on the money.
- **Real Estate:** Loans are taken from banks to purchase real estate, which is then leased or sold with the aim of making a profit on the appreciated property price.
- **Hedge Funds:** Hedge funds invest in both financial derivatives and/or publicly traded securities.
- **Private Equity:** Private Equity is trading in the shares of an operating company that is not publicly listed and whose shares are not available on the stock market.
- **Venture Capital:** Venture Capital involves investing substantial capital in a budding company in return for stocks in that company.

Insurance

There are two types of insurance – Life Insurance and Non-Life or General Insurance.

Life Insurance

Life Insurance deals with all insurance covering human life.

Life Insurance Products

The main life insurance products are:

- **Term Insurance:** This is the simplest and cheapest form of insurance. It offers financial protection for a specified tenure, say 15 to 20 years. In the case of your death, your family is paid the sum assured. In the case of your surviving the term, the insurer pays nothing.
- Endowment Policy: This offers the dual benefit of insurance and investment. Part of the premium is allocated towards the sum assured, while the remaining premium gets invested in equity and debt. It pays a lump sum amount after the specified duration or on the death of the policyholder, whichever is earlier.
- Unit-Linked Insurance Plan (ULIP): Here part of the premium is spent on the life cover, while the remaining amount is invested in equity and debt. It helps develop a regular saving habit.

- **Money Back Life Insurance:** While the policyholder is alive, periodic payments of the partial survival benefits are made during the policy tenure. On the death of the insured, the insurance company pays the full sum assured along with survival benefits.
- Whole Life Insurance: It offers the dual benefit of insurance and investment. It offers insurance cover for the whole life of the person or up to 100 years whichever is earlier.

General Insurance

General Insurance deals with all insurance covering assets like animals, agricultural crops, goods, factories, cars and so on.

General Insurance Products

The main general insurance products are:

- **Motor Insurance:** This can be divided into Four Wheeler Insurance and Two Wheeler Insurance.
- **Health Insurance:** The main types of health insurance are individual health insurance, family floater health insurance, comprehensive health insurance and critical illness insurance.
- **Travel Insurance:** This can be categorised into Individual Travel Policy, Family Travel Policy, Student Travel Insurance and Senior Citizen Health Insurance.
- Home Insurance: This protects the house and its contents from risk.
- **Marine Insurance:** This insurance covers goods, freight, cargo etc. against loss or damage during transit by rail, road, sea and/or air.

Taxes -

There are two types of taxes – Direct Taxes and Indirect Taxes.

Direct Tax

Direct taxes are levied directly on an entity or a person and are non-transferrable.

Some examples of Direct Taxes are:

- **Income Tax:** This tax is levied on your earning in a financial year. It is applicable to both, individuals and companies.
- **Capital Gains Tax:** This tax is payable whenever you receive a sizable amount of money. It is usually of two types – short term capital gains from investments held for less than 36 months and long term capital gains from investments held for longer than 36 months.
- Securities Transaction Tax: This tax is added to the price of a share. It is levied every time you buy or sell shares.
- **Perquisite Tax:** This tax is levied is on perks that have been acquired by a company or used by an employee.
- **Corporate Tax:** Corporate tax is paid by companies from the revenue they earn.

Indirect Tax

Indirect taxes are levied on goods or services.

Some examples of Indirect Taxes are:

- **Sales Tax:** Sales Tax is levied on the sale of a product.
- Service Tax: Service Tax is added to services provided in India.
- Value Added Tax: Value Added Tax is levied at the discretion of the state government. The tax is levied on goods sold in the state. The tax amount is decided by the state.
- **Customs Duty & Octroi:** Customs Duty is a charge that is applied on purchases that are imported from another country. Octroi is levied on goods that cross state borders within India.
- **Excise Duty:** Excise Duty is levied on all goods manufactured or produced in India.



- Think about how quickly you need your money back and pick an investment option accordingly.
- Ensure that you are buying the right type of insurance policy for yourself.
- Remember, not paying taxes can result in penalties ranging from fines to imprisonment.

6.3.5 Online Banking, NEFT, RTGS etc: What is Online Banking

Internet or online banking allows account holders to access their account from a laptop at any location. In this way, instructions can be issued. To access an account, account holders simply need to use their unique customer ID number and password.

Internet banking can be used to:

- Find out an account balance
- Transfer amounts from one account to another
- Arrange for the issuance of cheques
- Instruct payments to be made
- Request for a cheque book
- Request for a statement of accounts
- Make a fixed deposit

Electronic Funds Transfers

Electronic funds transfer is a convenient way of transferring money from the comfort of one's own home, using integrated banking tools like internet and mobile banking.

Transferring funds via an electronic gateway is extremely convenient. With the help of online banking, you can choose to:

- Transfer funds into your own accounts of the same bank.
- Transfer funds into different accounts of the same bank.
- Transfer funds into accounts in different banks, using NEFT.
- Transfer funds into other bank accounts using RTGS.
- Transfer funds into various accounts using IMPS.

NEFT -

NEFT stands for National Electronic Funds Transfer. This money transfer system allows you to electronically transfer funds from your respective bank accounts to any other account, either in the same bank or belonging to any other bank. NEFT can be used by individuals, firms and corporate organizations to transfer funds between accounts.

In order to transfer funds via NEFT, two things are required:

- A transferring bank
- A destination bank

Before you can transfer funds through NEFT, you will need to register the beneficiary who will be receiving the funds. In order to complete this registration, you will require the following information:

Recipient's name

- Recipient's bank's name
- Recipient's account number
- Recipient's bank's IFSC code

- RTGS

RTGS stands for Real Time Gross Settlement. This is a real time funds transfer system which enables you to transfer funds from one bank to another, in real time or on a gross basis. The transferred amount is immediately deducted from the account of one bank, and instantly credited to the other bank's account. The RTGS payment gateway is maintained by the Reserve Bank of India. The transactions between banks are made electronically.

RTGS can be used by individuals, companies and firms to transfer large sums of money. Before remitting funds through RTGS, you will need to add the beneficiary and his bank account details via your online banking account. In order to complete this registration, you will require the following information:

- Name of the beneficiary
- Beneficiary's account number
- Beneficiary's bank address
- Beneficiary's bank's IFSC code

- IMPS -

IMPS stands for Immediate Payment Service. This is a real-time, inter-bank, electronic funds transfer system used to transfer money instantly within banks across India. IMPS enables users to make instant electronic transfer payments using mobile phones through both, Mobile Banking and SMS. It can also be used through ATMs and online banking. IMPS is available 24 hours a day and 7 days a week. The system features a secure transfer gateway and immediately confirms orders that have been fulfilled.

To transfer money through IMPS, the you need to:

- Register for IMPS with your bank
- Receive a Mobile Money Identifier (MMID) from the bank
- Receive a MPIN from the bank

Once you have both these, you can login or make a request through SMS to transfer a particular amount to a beneficiary.

For the beneficiary to receive the transferred money, he must:

- 1. Link his mobile number with his respective account
- 2. Receive the MMID from the bank

In order to initiate a money transfer through IMPS, you will need to enter the following information:

- 1. The beneficiary's mobile number
- 2. The beneficiary's MMID
- 3. The transfer amount
- 4. Your MPIN

As soon as money has been deducted from your account and credited into the beneficiary's account, you will be sent a confirmation SMS with a transaction reference number, for future reference.

Criteria	NEFT	RTGS	IMPS
Settlement	Done in batches	Real-time	Real-time
Full form	National Electronic Fund Transfer	Real Time Gross Settlement	Immediate Payment Service
Timings on Monday – Friday	8:00 am – 6:30 pm	9:00 am – 4:30 pm	24x7
Timings on Saturday	8:00 am – 1:00 pm	9:00 am – 1:30 pm	24x7
Minimum amount of money transfer limit	₹1	₹2 lacs	₹1
Maximum amount of money transfer limit	₹10 lacs	₹10 lacs per day	₹2 lacs
Maximum charges as per RBI	Upto 10,000 – ₹2.5 above 10,000 – 1 lac – ₹5 above 1 – 2 lacs – ₹15 above 2 – 5 lacs – ₹25 above 5 – 10 lacs – ₹25	above 2 – 5 lacs – ₹25 above 5 – 10 lacs –₹50	Upto 10,000 – ₹5 above 10,000 – 1 lac – ₹5 above 1 – 2 lacs – ₹15

- Differences Between NEFT, RTGS & IMPS -

– Tips 🔍

- Never click on any links in any e-mail message to access your online banking website.
- You will never be asked for your credit or debit card details while using online banking.
- Change your online banking password regularly.

Unit 6.4 Preparing for Employment & Self Employment

– Unit Objectives 📗

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

- Discuss the steps to prepare for an interview
- Discuss the steps to create an effective Resume
- Discuss the most frequently asked interview questions
- Discuss how to answer the most frequently asked interview questions
- Discuss basic workplace terminology

6.4.1 Interview Preparation: How to Prepare for an Interview

The success of your getting the job that you want depends largely on how well your interview for that job goes. Therefore, before you go in for your interview, it is important that you prepare for it with a fair amount of research and planning. Take a look at the steps to follow in order to be well prepared for an interview:

1. Research the organization that you are having the interview with.

- Studying the company beforehand will help you be more prepared at the time of the interview. Your knowledge of the organization will help you answer questions at the time of the interview, and will leave you looking and feeling more confident. This is sure to make you stand out from other, not as well informed, candidates.
- Look for background information on the company. Ty and find an overview of the company and its industry profile.
- Visit the company website to get a good idea of what the company does. A company
 website offers a wealth of important information. Read and understand the company's
 mission statement. Pay attention to the company's products/services and client list. Read
 through any press releases to get an idea of the company's projected growth and stability.
- Note down any questions that you have after your research has been completed.
- 2. Think about whether your skills and qualifications match the job requirements.
 - Carefully read through and analyze the job description.
 - Make a note of the knowledge, skills and abilities required to fulfill the job requirements.
 - Take a look at the organization hierarchy. Figure out where the position you are applying for fits into this hierarchy.
- 3. Go through the most typical interview questions asked, and prepare your responses.
 - Remember, in most interviews a mix of resume-based, behavioral and case study questions are asked.
 - Think about the kind of answers you would like to provide to typical questions asked in these three areas.
 - Practice these answers until you can express them confidently and clearly.

4. Plan your attire for the interview.

- It is always safest to opt for formal business attire, unless expressly informed to dress in business casual (in which case you should use your best judgement).
- Ensure that your clothes are clean and well-ironed. Pick neutral colours nothing too bright or flashy.
- The shoes you wear should match your clothes, and should be clean and suitable for an interview.
- Remember, your aim is to leave everyone you meet with the impression that you are a professional and highly efficient person.

5. Ensure that you have packed everything that you may require during the interview.

- Carry a few copies of your resume. Use a good quality paper for your resume print outs.
- Always take along a notepad and a pen.
- Take along any information you may need to refer to, in order to fill out an application form.
- Carry a few samples of your work, if relevant.

6. Remember the importance of non-verbal communication.

- Practice projecting confidence. Remind yourself to smile and make eye contact. Practice giving a firm handshake.
- Keep in mind the importance of posture. Practice sitting up straight. Train yourself to stop nervous gestures like fidgeting and foot-tapping.
- Practice keeping your reactions in check. Remember, your facial expressions provide a good insight into your true feelings. Practice projecting a positive image.

7. Make a list of questions to end the interview with.

- Most interviews will end with the interviewer(s) asking if you have any questions. This
 is your chance to show that you have done your research and are interested in learning
 more about the company.
- If the interviewer does not ask you this question, you can inform him/her that you have some queries that you would like to discuss. This is the time for you to refer to the notes you made while studying the company.
- Some good questions to ask at this point are:
 - What do you consider the most important criteria for success in this job?
 - How will my performance be evaluated?
 - What are the opportunities for advancement?
 - What are the next steps in the hiring process?
- Remember, never ask for information that is easily available on the company website.

Tips 🔮

- Ask insightful and probing questions.
- When communicating, use effective forms of body language like smiling, making eye contact, and actively listening and nodding. Don't slouch, play with nearby items, fidget, chew gum, or mumble.

6.4.2 Preparing an Effective Resume: How to Create an Effective Resume

A resume is a formal document that lists a candidate's work experience, education and skills. A good resume gives a potential employer enough information to believe the applicant is worth interviewing. That's why it is so important to create a resume that is effective. Take a look at the steps to create an effective resume:

Step 1: Write the Address Section

The Address section occupies the top of your resume. It includes information like your name, address, phone number and e-mail address. Insert a bold line under the section to separate it from rest of your resume.

Example:

Khyati Mehta Breach Candy, Mumbai – India Contact No: +91 2223678270 Email: khyati.mehta@gmail.com

Step 2: Add the Profile Summary Section

This part of your resume should list your overall experiences, achievements, awards, certifications and strengths. You can make your summary as short as 2-3 bullet points or as long as 8-10 bullet points.

Example:

Profile Summary

- A Floor Supervisor graduated from University of Delhi having 6 years of experience in managing a retail outlet.
- Core expertise lies in managing retail staff, including cashiers and people working on the floor.

Step 3: Include Your Educational Qualifications

When listing your academic records, first list your highest degree. Then add the second highest qualification under the highest one and so on. To provide a clear and accurate picture of your educational background, it is critical that include information on your position, rank, percentage or CPI for every degree or certification that you have listed.

If you have done any certifications and trainings, you can add a Trainings & Certifications section under your Educational Qualifications section.

Example:

Educational Qualifications

 <Enter qualification> <enter date of qualification> from <enter name of institute> with <enter percentage or any other relevant scoring system>.

Step 4: List Your Technical Skills

When listing your technical skills, start with the skills that you are most confident about. Then add the skills that you do not have as good a command over. It is perfectly acceptable to include just one skill, if you feel that particular skill adds tremendous value to your résumé. If you do not have any technical skills, you can omit this step.

Example:

Technical Skills

• <Enter your technical skill here, if applicable>

Step 5: Insert Your Academic Project Experience

List down all the important projects that you have worked on. Include the following information in this section:

- Project title
 C
 - Organization
- Platform used

- Contribution
- Description
- Flation in used

Example:

Academic Projects

Project Title: </nsert project title>

Organization: <*Insert the name of the organization for whom you did the project*>

Platform used: *<Insert the platform used, if any>*

Contribution: </nsert your contribution towards this project>

Description: </nsert a description of the project in one line>

Step 6: List Your Strengths

This is where you list all your major strengths. This section should be in the form of a bulleted list.

Example:

Strengths

- Excellent oral, written and presentation skills
- Action-oriented and result-focused
- Great time management skills

Step 7: List Your Extracurricular Activities

It is very important to show that you have diverse interests and that your life consists of more than academics. Including your extracurricular activities can give you an added edge over other candidates who have similar academic scores and project experiences. This section should be in the form of a bulleted list.

Example:

Extracurricular Activities

< Insert your extracurricular activity here. E.g.: Member of ______, played (name of sport) at ______ level, won (name of prize/award) for ______ >

Step 8: Write Your Personal Details The last section of your résumé must include the following personal information: Date of birth • Gender & marital status • Nationality Languages known • • Example: Personal Details Date of birth: 25th May, 1981 • Gender & marital status: Female, Single • Indian •

- Nationality: IndianLanguages known: English, Hindi, Tamil, French
- Tips 🗓
 - Keep your resume file name short, simple and informational.
 - Make sure the resume is neat and free from typing errors.
 - Always create your resume on plain white paper.

- 6.4.3 Interview FAQs

Take a look at some of the most frequently asked interview questions, and some helpful tips on how to answer them.

Q1. Can you tell me a little about yourself?

Tips to answer:

- Don't provide your full employment or personal history.
- Offer 2-3 specific experiences that you feel are most valuable and relevant.
- Conclude with how those experiences have made you perfect for this specific role.

Q2. How did you hear about the position?

Tips to answer:

- Tell the interviewer how you heard about the job whether it was through a friend (name the friend), event or article (name them) or a job portal (say which one).
- Explain what excites you about the position and what in particular caught your eye about this role.

Q3. What do you know about the company?

Tips to answer:

- Don't recite the company's About Us page.
- Show that you understand and care about the company's goals.
- Explain why you believe in the company's mission and values.

Q4. Why do you want this job?

Tips to answer:

- Show that you are passionate about the job.
- Identify why the role is a great fit for you.
- Explain why you love the company.

Q5. Why should we hire you?

Tips to answer:

- Prove through your words that you can not only do the work, but can definitely deliver excellent results.
- Explain why you would be a great fit with the team and work culture.
- Explain why you should be chosen over any other candidate.

Q6. What are your greatest professional strengths?

Tips to answer:

- Be honest share some of your real strengths, rather than give answers that you think sound good.
- Offer examples of specific strengths that are relevant to the position you are applying for.
- Provide examples of how you've demonstrated these strengths.

Q7. What do you consider to be your weaknesses?

Tips to answer:

- The purpose of this question is to gauge your self-awareness and honesty.
- Give an example of a trait that you struggle with, but that you're working on to improve.

Q8. What are your salary requirements?

Tips to answer:

- Do your research beforehand and find out the typical salary range for the job you are applying for.
- Figure out where you lie on the pay scale based on your experience, education, and skills.
- Be flexible. Tell the interviewer that you know your skills are valuable, but that you want the job and are willing to negotiate.

Q9. What do you like to do outside of work?

Tips to answer:

- The purpose of this question is to see if you will fit in with the company culture.
- Be honest open up and share activities and hobbies that interest and excite you.

Q10. If you were an animal, which one would you want to be?

Tips to answer:

- The purpose of this question is to see if you are able to think on your feet.
- There's no wrong answer but to make a great impression try to bring out your strengths or personality traits through your answer.

Q11: What do you think we could do better or differently?

Tips to answer:

- The purpose of this question is to see if you have done your research on the company, and to test whether you can think critically and come up with new ideas.
- Suggest new ideas. Show how your interests and expertise would help you execute these ideas.

Q12: Do you have any questions for us?

Tips to answer:

- Do not ask questions to which the answers can be easily found on the company website or through a quick online search.
- Ask intelligent questions that show your ability to think critically.

– Tips 🏼

- Be honest and confident while answering.
- Use examples of your past experiences wherever possible to make your answers more impactful.
6.4.4 Work Readiness - Terms & Terminologies: Basic Workplace Terminology

Every employee should be well versed in the following terms:

- Annual leave: Paid vacation leave given by employers to employees.
- **Background Check:** A method used by employers to verify the accuracy of the information provided by potential candidates.
- Benefits: A part of an employee's compensation package.
- Breaks: Short periods of rest taken by employees during working hours.
- **Compensation Package:** The combination of salary and benefits that an employer provides to his/her employees.
- Compensatory Time (Comp Time): Time off in lieu of pay.
- **Contract Employee:** An employee who works for one organization that sells said employee's services to another company, either on a project or time basis.
- **Contract of Employment:** When an employee is offered work in exchange for wages or salary, and accepts the offer made by the employer, a contract of employment exists.
- **Corporate Culture:** The beliefs and values shared by all the members of a company, and imparted from one generation of employees to another.
- **Counter Offer/Counter Proposal:** A negotiation technique used by potential candidates to increase the amount of salary offered by a company.
- **Cover Letter:** A letter that accompanies a candidate's resume. It emphasizes the important points in the candidate's resume and provides real examples that prove the candidate's ability to perform the expected job role.
- **Curriculum Vitae (CV)/Resume:** A summary of a candidate's achievements, educational background, work experience, skills and strengths.
- **Declining Letter:** A letter sent by an employee to an employer, turning down the job offer made by the employer to the employee.
- **Deductions:** Amounts subtracted from an employee's pay and listed on the employee's pay slip.
- **Discrimination:** The act of treating one person not as favourably as another person.
- **Employee:** A person who works for another person in exchange for payment.
- **Employee Training:** A workshop or in-house training that an employee is asked to attend by his or her superior, for the benefit of the employer.
- Employment Gaps: Periods of unemployed time between jobs.
- **Fixed-Term Contract:** A contract of employment which gets terminated on an agreed-upon date.
- **Follow-Up:** The act of contacting a potential employer after a candidate has submitted his or her resume.
- Freelancer/Consultant/Independent Contractor: A person who works for him or herself and pitches for temporary jobs and projects with different employers.
- Holiday: Paid time-off from work.
- Hourly Rate: The amount of salary or wages paid for 60 minutes of work.

- **Internship**: A job opportunity offered by an employer to a potential employee, called an intern, to work at the employer's company for a fixed, limited time period.
- **Interview**: A conversation between a potential employee and a representative of an employer, in order to determine if the potential employee should be hired.
- Job Application: A form which asks for a candidate's information like the candidate's name, address, contact details and work experience. The purpose of a candidate submitting a job application, is to show that candidate's interest in working for a particular company.
- **Job Offer**: An offer of employment made by an employer to a potential employee.
- Job Search Agent: A program that enables candidates to search for employment opportunities by selecting criteria listed in the program, for job vacancies.
- Lay Off: A lay off occurs when an employee is temporarily let go from his or her job, due to the employer not having any work for that employee.
- Leave: Formal permission given to an employee, by his or her employer, to take a leave of absence from work.
- Letter of Acceptance: A letter given by an employer to an employee, confirming the offer of employment made by the employer, as well as the conditions of the offer.
- Letter of Agreement: A letter that outlines the terms of employment.
- Letter of Recommendation: A letter written for the purpose of validating the work skills of a person.
- **Maternity Leave**: Leave taken from work by women who are pregnant, or who have just given birth.
- **Mentor**: A person who is employed at a higher level than you, who offers you advice and guides you in your career.
- Minimum wage: The minimum wage amount paid on an hourly basis.
- **Notice**: An announcement made by an employee or an employer, stating that the employment contract will end on a particular date.
- Offer of Employment: An offer made by an employer to a prospective employee that contains important information pertaining to the job being offered, like the starting date, salary, working conditions etc.
- **Open-Ended Contract**: A contract of employment that continues till the employer or employee terminates it.
- **Overqualified**: A person who is not suited for a particular job because he or she has too many years of work experience, or a level of education that is much higher than required for the job, or is currently or was previously too highly paid.
- **Part-Time Worker**: An employee who works for fewer hours than the standard number of hours normally worked.
- **Paternity Leave**: Leave granted to a man who has recently become a father.
- **Recruiters/Headhunters/Executive Search Firms**: Professionals who are paid by employers to search for people to fill particular positions.
- **Resigning/Resignations**: When an employee formally informs his or her employer that he or she is quitting his or her job.
- **Self-Employed**: A person who has his or her own business and does not work in the capacity of an employee.
- **Time Sheet**: A form that is submitted to an employer, by an employee, that contains the number of hours worked every day by the employee.

Unit 6.5 Understanding Entrepreneurship

- Unit Objectives 🛛 🎯

- 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

6.5.1 Concept Introduction, (Characteristic of an Entrepreneur, types of firms/Types of enterprises): Entrepreneurs and Entrepreneurship

Anyone who is determined to start a business, no matter what the risk, is an entrepreneur. Entrepreneurs run their own start-up, take responsibility for the financial risks and use creativity, innovation and vast reserves of self-motivation to achieve success. They dream big and are determined to do whatever it takes to turn their idea into a viable offering. The aim of an entrepreneur is to create an enterprise. The process of creating this enterprise is known as entrepreneurship.

Importance of Entrepreneurship

Entrepreneurship is very important for the following reasons:

- 1. It results in the creation of new organizations
- 2. It brings creativity into the marketplace
- 3. It leads to improved standards of living
- 4. It helps develop the economy of a country

Characteristics of Entrepreneurs

All successful entrepreneurs have certain characteristics in common.

They are all:

- Extremely passionate about their work
- Confident in themselves
- Disciplined and dedicated
- Motivated and driven
- Highly creative
- Visionaries
- Open-minded
- Decisive

Entrepreneurs also have a tendency to:

- Have a high risk tolerance
- Thoroughly plan everything
- Manage their money wisely
- Make their customers their priority
- Understand their offering and their market in detail
- Ask for advice from experts when required
- Know when to cut their losses

It often means discarding the material and starting again. To select right bit size, hold the screw under a bit. If only the screw threads are visible, it means bit size is perfect.

How to use a drill machine



STEP 1: Insert the chuck key into the small hole on the side of the chuck and turn it counterclockwise until the chuck can accommodate the drill bit. Slide a bit into the chuck.

STEP 2: Turn the key in a clockwise direction to tighten the chuck. Make sure the bit is secured tightly.

STEP 3: Mark the position where you intend to drill. Use a hammer and nail punch to produce a small indentation at that point. This will prevent the drill from slipping.



STEP 4: Turn on the power to the drill. Position the tip of the drill bit in the indentation, and start drilling at a low speed. Increase the speed of the drill gradually. Keep both hands on the drill as you apply pressure to the trigger. Keep the drill perpendicular to the object you are drilling to.

STEP 5: Stop the drill when you have drilled to your desired depth. Remove the drill bit from the hole with the bit rotating at a slow speed.

- 6.5.2 Leadership & Teamwork: Leadership and Leaders

Leadership means setting an example for others to follow. Setting a good example means not asking someone to do something that you wouldn't willingly want to do yourself. Leadership is about figuring out what to do in order to win as a team, and as a company.

Leaders believe in doing the right things. They also believe in helping others to do the right things. An effective leader is someone who:

- Creates an inspiring vision of the future.
- Motivates and inspires his team to pursue that vision.

Leadership Qualities That All Entrepreneurs Need -

Building a successful enterprise is only possible if the entrepreneur in charge possesses excellent leadership qualities. Some critical leadership skills that every entrepreneur must have are:

- 1. **Pragmatism**: This means having the ability to highlight all obstacles and challenges, in order to resolve issues and reduce risks.
- 2. **Humility**: This means admitting to mistakes often and early, and being quick to take responsibility for your actions. Mistakes should be viewed as challenges to overcome, not opportunities to point blame.
- 3. **Flexibility**: It is critical for a good leader to be very flexible and quickly adapt to change. It is equally critical to know when to adapt and when not to.
- 4. **Authenticity**: This means showing both, your strengths and your weaknesses. It means being human and showing others that you are human.
- 5. **Reinvention**: This means refreshing or changing your leadership style when necessary. To do this, it's important to learn where your leadership gaps lie and find out what resources are required to close them.
- 6. **Awareness**: This means taking the time to recognize how others view you. It means understanding how your presence affects those around you.

Benefits of Effective Leadership

Effective leadership results in numerous benefits. Great leadership leads to the leader successfully:

- Gaining the loyalty and commitment of the team members
- Motivating the team to work towards achieving the company's goals and objectives
- Building morale and instilling confidence in the team members
- Fostering mutual understanding and team-spirit among team members
- Convincing team members about the need to change when a situation requires adaptability

Teamwork and Teams

Teamwork occurs when the people in a workplace combine their individual skills to pursue a common goal. Effective teams are made up of individuals who work together to achieve this common goal. A great team is one who holds themselves accountable for the end result.

Importance of Teamwork in Entrepreneurial Success

For an entrepreneurial leader, building an effective team is critical to the success of a venture. An entrepreneur must ensure that the team he builds possesses certain crucial qualities, traits and characteristics. An effective team is one which has:

- 1. **Unity of purpose:** All the team members should clearly understand and be equally committed to the purpose, vision and goals of the team.
- 2. **Great communication skills:** Team members should have the ability to express their concerns, ask questions and use diagrams, and charts to convey complex information.
- 3. **The ability to collaborate:** Every member should feel entitled to provide regular feedback on new ideas.
- 4. **Initiative:** The team should consist of proactive individuals. The members should have the enthusiasm to come up with new ideas, improve existing ideas, and conduct their own research.
- 5. **Visionary members:** The team should have the ability to anticipate problems and act on these potential problem before they turn into real problems.
- 6. **Great adaptability skills:** The team must believe that change is a positive force. Change should be seen as the chance to improve and try new things.
- 7. **Excellent organizational skills:** The team should have the ability to develop standard work processes, balance responsibilities, properly plan projects, and set in place methods to measure progress and ROI.

– Tips 🤇

- Don't get too attached to your original idea. Allow it to evolve and change.
- Be aware of your weaknesses and build a team that will complement your shortfalls.
- Hiring the right people is not enough. You need to promote or incentivize your most talented people to keep them motivated.
- Earn your team's respect.

6.5.3 Communication Skills: Listening & Speaking: The Importance of Listening Effectively

Listening is the ability to correctly receive and understand messages during the process of communication. Listening is critical for effective communication. Without effective listening skills, messages can easily be misunderstood. This results in a communication breakdown and can lead to the sender and the receiver of the message becoming frustrated or irritated.

It's very important to note that listening is not the same as hearing. Hearing just refers to sounds that you hear. Listening is a whole lot more than that. To listen, one requires focus. It means not only paying attention to the story, but also focusing on how the story is relayed, the way language and voice is used, and even how the speaker uses their body language. The ability to listen depends on how effectively one can perceive and understand both, verbal and non-verbal cues.

How to Listen Effectively

To listen effectively you should:

- Stop talking
- Stop interrupting
- Focus completely on what is being said
- Nod and use encouraging words and gestures
- Be open-minded
- Think about the speaker's perspective
- Be very, very patient
- Pay attention to the tone that is being used
- Pay attention to the speaker's gestures, facial expressions and eye movements
- Not try and rush the person
- Not let the speaker's mannerisms or habits irritate or distract you

How to Listen Effectively -

How successfully a message gets conveyed depends entirely on how effectively you are able to get it through. An effective speaker is one who enunciates properly, pronounces words correctly, chooses the right words and speaks at a pace that is easily understandable. Besides this, the words spoken out loud need to match the gestures, tone and body language used.

What you say, and the tone in which you say it, results in numerous perceptions being formed. A person who speaks hesitantly may be perceived as having low self-esteem or lacking in knowledge of the discussed topic. Those with a quiet voice may very well be labelled as shy. And those who speak in commanding tones with high levels of clarity, are usually considered to be extremely confident. This makes speaking a very critical communication skill.

- How to Speak Effectively

To speak effectively you should:

- Incorporate body language in your speech like eye contact, smiling, nodding, gesturing etc.
- Build a draft of your speech before actually making your speech.
- Ensure that all your emotions and feelings are under control.
- Pronounce your words distinctly with the correct pitch and intensity. Your speech should be crystal clear at all times.
- Use a pleasant and natural tone when speaking. Your audience should not feel like you are putting on an accent or being unnatural in any way.
- Use precise and specific words to drive your message home. Ambiguity should be avoided at all costs.
- Ensure that your speech has a logical flow.
- Be brief. Don't add any unnecessary information.
- Make a conscious effort to avoid irritating mannerisms like fidgeting, twitching etc.
- Choose your words carefully and use simple words that the majority of the audience will have no difficulty understanding.
- Use visual aids like slides or a whiteboard.
- Speak slowly so that your audience can easily understand what you're saying. However, be careful not to speak too slowly because this can come across as stiff, unprepared or even condescending.
- Remember to pause at the right moments.

– Tips 🏼

- If you're finding it difficult to focus on what someone is saying, try repeating their words in your head.
- Always maintain eye contact with the person that you are communicating with, when speaking as well as listening. This conveys and also encourages interest in the conversation.

6.5.4 Problem Solving & Negotiation skills: What is a Problem

As per The Concise Oxford Dictionary (1995), a problem is, "A doubtful or difficult matter requiring a solution"

All problems contain two elements:

1. Goals 2. Obstacles

The aim of problem solving is to recognize the obstacles and remove them in order to achieve the goals.

How to Solve Problems

Solving a problem requires a level of rational thinking. Here are some logical steps to follow when faced with an issue:

Step 1: Identify the problemStep 2: Study the problem in detailStep 3: List all possible solutionsStep 4: Select the best solution

Step 5: Implement the chosen solution Step 6: Check that the problem has really been solved

Important Traits for Problem Solving

Highly developed problem solving skills are critical for both, business owners and their employees. The following personality traits play a big role in how effectively problems are solved:

- Being open minded
- Being proactive
- Having a positive attitude
- Asking the right questions
- Not panicking
- Focusing on the right problem

How to Assess for Problem Solving Skills

As an entrepreneur, it would be a good idea to assess the level of problem solving skills of potential candidates before hiring them. Some ways to assess this skill are through:

- 1. **Application forms**: Ask for proof of the candidate's problem solving skills in the application form.
- 2. **Psychometric tests**: Give potential candidates logical reasoning and critical thinking tests and see how they fare.
- 3. **Interviews**: Create hypothetical problematic situations or raise ethical questions and see how the candidates respond.
- 4. **Technical questions**: Give candidates examples of real life problems and evaluate their thought process.

- What is Negotiation

Negotiation is a method used to settle differences. The aim of negotiation is to resolve differences through a compromise or agreement while avoiding disputes. Without negotiation, conflicts are likely to lead to resentment between people. Good negotiation skills help satisfy both parties and go a long way towards developing strong relationships.

- Why Negotiate

Starting a business requires many, many negotiations. Some negotiations are small while others are critical enough to make or break a startup. Negotiation also plays a big role inside the workplace. As an entrepreneur, you need to know not only know how to negotiate yourself, but also how to train employees in the art of negotiation.

How to Negotiate

Take a look at some steps to help you negotiate:

Step 1: Pre-Negotiation Preparation	Agree on where to meet to discuss the problem, decide who all will be present and set a time limit for the discussion.
Step 2: Discuss the Problem	This involves asking questions, listening to the other side, putting your views forward and clarifying doubts.
Step 3: Clarify the Objective	Ensure that both parties want to solve the same problem and reach the same goal.
Step 4: Aim for a Win-Win Outcome	Try your best to be open minded when negotiating. Compromise and offer alternate solutions to reach an outcome where both parties win.
Step 5: Clearly Define the Agreement	When an agreement has been reached, the details of the agreement should be crystal clear to both sides, with no scope for misunderstandings.
Step 6: Implement the Agreed Upon Solution	Agree on a course of action to set the solution in motion

Tips 🔍

- Know exactly what you want before you work towards getting it
- Give more importance to listening and thinking, than speaking
- Focus on building a relationship rather than winning
- Remember that your people skills will affect the outcome
- Know when to walk away sometimes reaching an agreement may not be possible

6.5.5 Business Opportunities Identification: Entrepreneurs and Opportunities

"The entrepreneur always searches for change, responds to it and exploits it as an opportunity." Peter Drucker

The ability to identify business opportunities is an essential characteristic of an entrepreneur.

What is an Opportunity

The word opportunity suggests a good chance or a favourable situation to do something offered by circumstances.

A business opportunity means a good or favourable change available to run a specific business in a given environment, at a given point of time.

Common Questions Faced by Entrepreneurs

A critical question that all entrepreneurs face is how to go about finding the business opportunity that is right for them.

Some common questions that entrepreneurs constantly think about are:

- Should the new enterprise introduce a new product or service based on an unmet need?
- Should the new enterprise select an existing product or service from one market and offer it in another where it may not be available?
- Should the enterprise be based on a tried and tested formula that has worked elsewhere?

It is therefore extremely important that entrepreneurs must learn how to identify new and existing business opportunities and evaluate their chances of success.

When is an Idea an Opportunity

An idea is an opportunity when:

- It creates or adds value to a customer
- It solves a significant problem, removes a pain point or meets a demand
- Has a robust market and profit margin
- Is a good fit with the founder and management team at the right time and place

- Factors to Consider When Looking for Opportunities

Consider the following when looking for business opportunities:

- Economic trends
- Changes in funding
 - Changing relationships between vendors,
 - Changing relationships between vendo partners and suppliers
- Market trends
- Changes in political support
- Shift in target audience

- Ways to Identify New Business Opportunities

1. Identify Market Inefficiencies

When looking at a market, consider what inefficiencies are present in the market. Think about ways to correct these inefficiencies.

2. Remove Key Hassles

Rather than create a new product or service, you can innovatively improve a product, service or process.

3. Create Something New

Think about how you can create a new experience for customers, based on existing business models.

4. Pick a Growing Sector/Industry

Research and find out which sectors or industries are growing and think about what opportunities you can tap in the same.

5. Think About Product Differentiation

If you already have a product in mind, think about ways to set it apart from the existing ones.

Ways to Identify Business Opportunities Within Your Business

1. SWOT Analysis

An excellent way to identify opportunities inside your business is by creating a SWOT analysis. The acronym SWOT stands for strengths, weaknesses, opportunities, and threats.

SWOT analysis framework:



Consider the following when looking for business opportunities:

By looking at yourself and your competitors using the SWOT framework, you can uncover opportunities that you can exploit, as well as manage and eliminate threats that could derail your success.

2. Establishing Your USP

Establish your USP and position yourself as different from your competitors. Identify why customers should buy from you and promote that reason.

Opportunity Analysis

Once you have identified an opportunity, you need to analyze it. To analyze an opportunity, you must:

- Focus on the idea
- Focus on the market of the idea
- Talk to industry leaders in the same space as the idea
- Talk to players in the same space as the idea

- Tips 🖳

- Remember, opportunities are situational.
- Look for a proven track record.
- Avoid the latest craze.
- Love your idea.

6.5.6 Entrepreneurship Support Eco-Syetem: What is an Entrepreneur

An entrepreneur is a person who:

- Does not work for an employee
- Runs a small enterprise
- Assumes all the risks and rewards of the enterprise, idea, good or service

Types of Entrepreneurs

There are four main types of entrepreneurs:

- 1. **The Traditional Entrepreneur**: This type of entrepreneur usually has some kind of skill they can be a carpenter, mechanic, cook etc. They have businesses that have been around for numerous years like restaurants, shops and carpenters. Typically, they gain plenty of experience in a particular industry before they begin their own business in a similar field.
- 2. **The Growth Potential Entrepreneur**: The desire of this type of entrepreneur is to start an enterprise that will grow, win many customers and make lots of money. Their ultimate aim is to eventually sell their enterprise for a nice profit. Such entrepreneurs usually have a science or technical background.
- 3. **The Project-Oriented Entrepreneur**: This type of entrepreneur generally has a background in the Arts or psychology. Their enterprises tend to be focus on something that they are very passionate about.
- 4. **The Lifestyle Entrepreneur**: This type of entrepreneur has usually worked as a teacher or a secretary. They are more interested in selling something that people will enjoy, rather than making lots of money.

Characteristics of an Entrepreneur

Successful entrepreneurs have the following characteristics:

- They are highly motivated
- They are creative and persuasive
- They are mentally prepared to handle each and every task
- They have excellent business skills they know how to evaluate their cash flow, sales and revenue
- They are willing to take great risks
- They are very proactive this means they are willing to do the work themselves, rather than wait for someone else to do it
- They have a vision they are able to see the big picture
- They are flexible and open-minded
- They are good at making decisions

- Entrepreneur Success Stories

Dhiru Bhai Ambani

Dhirubhai Ambani began his entrepreneurial career by selling "bhajias" to pilgrims in Mount Girnar on weekends. At 16, he moved to Yemen where he worked as a gas-station attendant, and as a clerk in an oil company. He returned to India with Rs. 50,000 and started a textile trading company. Reliance went on to become the first Indian company to raise money in global markets and the first Indian company to feature in Forbes 500 list.

Dr. Karsanbhai Patel

Karsanbhai Patel made detergent powder in the backyard of his house. He sold his product door-to-door and offered a money back guarantee with every pack that was sold. He charged Rs. 3 per kg when the cheapest detergent at that time was Rs.13 per kg. Dr. Patel eventually started Nirma which became a whole new segment in the Indian domestic detergent market.

The Entrepreneurial Process

Let's take a look at the stages of the entrepreneurial process.

Stage 1: Idea Generation. The entrepreneurial process begins with an idea that has been thought of by the entrepreneur. The idea is a problem that has the potential to be solved.

Stage 2: Germination or Recognition. In this stage a possible solution to the identified problem is thought of.

Stage 3: Preparation or Rationalization. The problem is studied further and research is done to find out how others have tried to solve the same problem.

Stage 4: Incubation or Fantasizing. This stage involves creative thinking for the purpose of coming up with more ideas. Less thought is given to the problem areas.

Stage 5: Feasibility Study: The next step is the creation of a feasibility study to determine if the idea will make a profit and if it should be seen through.

Stage 6: Illumination or Realization. This is when all uncertain areas suddenly become clear. The entrepreneur feels confident that his idea has merit.

Stage 7: Verification or Validation. In this final stage, the idea is verified to see if it works and if it is useful.

Take a look at the diagram below to get a better idea of this process.



- Introduction to the Entrepreneurship Ecosystem

The entrepreneurship support ecosystem signifies the collective and complete nature of entrepreneurship. New companies emerge and flourish not only because of the courageous, visionary entrepreneurs who launch them, but they thrive as they are set in an environment or 'ecosystem' made of private and public participants. These players nurture and sustain the new ventures, facilitating the entrepreneurs' efforts.

An entrepreneurship ecosystem comprises of the following six domains:

- 1. **Favourable Culture:** This includes elements such as tolerance of risk and errors, valuable networking and positive social standing of the entrepreneur.
- 2. **Facilitating Policies & Leadership:** This includes regulatory framework incentives and existence of public research institutes.
- 3. **Financing Options:** Angel financing, venture capitalists and micro loans would be good examples of this.
- 4. **Human Capital:** This refers to trained and untrained labour, entrepreneurs and entrepreneurship training programmes, etc.
- 5. **Conducive Markets for Products & Services:** This refers to an existence or scope of existence of a market for the product/service.
- 6. **Institutional & Infrastructural Support:** This includes legal and financing advisers, telecommunications, digital and transportation infrastructure, and entrepreneurship networking programmes.

These domains indicate whether there is a strong entrepreneurship support ecosystem and what actions should the government put in place to further encourage this ecosystem. The six domains and their various elements have been graphically depicted.

	Research institutes	Venture-friendly legislation	 e.g. Bankruptcy, contract enforcement, 	property rights, and labour	Venture capital funds Drivote contitute	family • Public capital markets	enture • Debt	ries	esses	eration for founders al reputation	ns	risk, mistakes, failure creativity, experimentation of entrepreneur	uon ive, hunger	0		
Government	al support	tor advocate • Financial support eurship strategy e.g. for R&D, jump start funds	isis and chantenge Regulatory framework incentives	Policy e.g. lax benints	Micro-loans Angel invost	Finance Finance friends and 1	Cero-stage v capital capital	Success Stor	Culture • Visible succ	Wealth gen Wealth gen Internation	Societal norr	 Tolerance of Innovation, Social status 	Government Institution • Ambition. di	repreneurship • Conferences omotion in	1-profits	itests friendly association
tomers	Our proof-of-concept Our Social legit Our social legit Our social legit Our social legit	Entreprene Entreprene	channels uigenicy, u Networks	 Entrepreneure's networks Discora networks 	Multinational corporations Market	Labour	 Skilled and unskilled Serial entrepreneures 	 Later generation family 	utions	professional and academic)	afea chuirchirea	 Telecommunications Transportation & logistics Energy 	• Zones, incubation centers, clusters Non -	Ent Support Professions pro	• Legal nor	Investment bankers con

Every entrepreneurship support ecosystem is unique and all the elements of the ecosystem are interdependent. Although every region's entrepreneurship ecosystem can be broadly described by the above features, each ecosystem is the result of the hundred elements interacting in highly complex and particular ways.

Entrepreneurship ecosystems eventually become (largely) self-sustaining. When the six domains are resilient enough, they are mutually beneficial. At this point, government involvement can and should be significantly minimized. Public leaders do not need to invest a lot to sustain the ecosystem. It is imperative that the entrepreneurship ecosystem incentives are formulated to be self-liquidating, hence focusing on sustainability of the environment.

Make in India Campaign

Every entrepreneur has certain needs. Some of their important needs are:

- To easily get loans
- To easily find investors
- To get tax exemptions
- To easily access resources and good infrastructure
- To enjoy a procedure that is free of hassles and is quick
- To be able to easily partner with other firms

The Make in India campaign, launched by Prime Minister Modi aims to satisfy all these needs of young, aspiring entrepreneurs. Its objective is to:

- Make investment easy
- Support new ideas
- Enhance skill development
- Safeguard the ideas of entrepreneurs
- Create state-of-the-art facilities for manufacturing goods

Key Schemes to Promote Entrepreneurs

The government offers many schemes to support entrepreneurs. These schemes are run by various Ministries/Departments of Government of India to support First Generation Entrepreneurs.Take a look at a few key schemes to promote entrepreneurship:

SI. Name of the Scheme

- 1. Pradhan Mantri MUDRA Yojana Micro Units Development and Refinance Agency (MUDRA),
- 2. STAND UP INDIA
- 3. Prime Minister Employment Generation Programme (PMEGP)
- 4. International Cooperation
- 5. Performance and Credit Rating
- 6. Marketing Assistance Scheme
- 7. Reimbursement of Registration Fee for Bar Coding
- 8. Enable Participation of MSMEs in State/District level Trade Fairs and Provide Funding Support

- 9. Capital Subsidy Support on Credit for Technology up gradation
- 10. Credit Guarantee Fund for Micro and Small Enterprise (CGFMSE)
- 11. Reimbursement of Certification Fees for Acquiring ISO Standards
- 12. Agricultural Marketing
- 13. Small Agricultural Marketing
- 14. Mega Food Park
- 15. Adivasi Mahila Sashaktikaran Yojana
- 1. Pradhan Mantri MUDRA Yojana, Micro Units Development and Refinance Agency (MUDRA),

Description

Under the aegis support of Pradhan Mantri MUDRA Yojana, MUDRA has already created its initial products/schemes. The interventions have been named 'Shishu', 'Kishor' and 'Tarun' to signify the stage of growth/development and funding needs of the beneficiary micro unit/entrepreneur and also provide a reference point for the next phase of graduation/ growth to look forward to:

- a. Shishu: Covering loans upto Rs.50,000/-
- b. Kishor: Covering loans above Rs. 50,000/- and upto Rs.5 lakh
- c. Tarun: Covering loans above Rs. 5 lakh to Rs.10 lakh

Who can apply?

Any Indian citizen who has a business plan for a non-farm sector income generating activity such as manufacturing, processing, trading or service sector and whose credit need is less than Rs.10 lakh can approach either a Bank, MFI, or NBFC for availing of MUDRA loans under Pradhan Mantri Mudra Yojana (PMMY).

2. Stand Up India

Description

The objective of the Standup India scheme is to facilitate bank loans between Rs.10 lakh and Rs.1 crore to at least one Schedule Caste (SC) or Scheduled Tribe (ST) borrower and at least one woman borrower per bank branch for setting up a Greenfield enterprise. This enterprise may be in manufacturing, services or the trading sector. In case of non-Individual enterprises at least 51% of the shareholding and controlling stake should be held be either an SC/ST or Woman Entrepreneur.

Who can apply?

ST, SC & Women

3. Prime Minister Employment Generation Programme (PMEGP)

Description

The Scheme is implemented by Khadi and Village Industries Commission (KVIC), as the nodal agency at the National level. At the State level, the Scheme is implemented through State KVIC Directorates, State Khadi and Village Industries Boards (KVIBs) and District Industries Centres (DICs) and banks. The Government subsidy under the Scheme is routed by KVIC through identified banks for eventual distribution to the beneficiaries/entrepreneurs in their bank accounts.

Nature of assistance

The maximum cost of the project/unit admissible under manufacturing sector is Rs.25 lakh and under business/service sector is Rs.10 lakh. Levels of funding under PMEGP

Categories of beneficiaries under PMEGP	Beneficiary's contribution (of project cost)	Rate of Subsidy (of project cost)
Area (location of project/unit)		Urban Rural
General Category	10%	15% 25%
Special (including SC / ST / OBC / Minorities / Women, Ex-servicemen, Physically handicapped, NER, Hill and Border areas, etc.	05%	25% 35%

The balance amount of the total project cost will be provided by Banks as term loan as well as working capital.

Who can apply?

Any individual, above 18 years of age. At least VIII standard pass for projects costing above Rs.10 lakh in the manufacturing sector and above Rs.5 lakh in the business/ service sector. Only new projects are considered for sanction under PMEGP. Self Help Groups (including those belonging to BPL provided that they have not availed benefits under any other Scheme), Institutions registered under Societies Registration Act,1860; Production Co-operative Societies, and Charitable Trusts are also eligible. Existing Units (under PMRY, REGP or any other scheme of Government of India or State Government) and the units that have already availed Government Subsidy under any other scheme of Government of India or State Government are NOT eligible.

4. International Cooperation

Description

The Scheme would cover the following activities:

- a. Deputation of MSME business delegations to other countries for exploring new areas of technology infusion/upgradation, facilitating joint ventures, improving market of MSMEs products, foreign collaborations, etc.
- b. Participation by Indian MSMEs in international exhibitions, trade fairs and buyerseller meets in foreign countries as well as in India, in which there is international participation.
- c. Holding international conferences and seminars on topics and themes of interest to the MSME.

Nature of assistance

IC Scheme provides financial assistance towards the airfare and space rent of entrepreneurs. Assistance is provided on the basis of size and the type of the enterprise.

Who can apply?

- a. State/Central Government Organisations;
- b. Industry/Enterprise Associations; and
- c. Registered Societies/Trusts and Organisations associated with the promotion and development of MSMEs

5. Performance and Credit Rating for Micro and Small Enterprises

Description

The objective of the Scheme is to create awareness amongst micro & small enterprises about the strengths and weaknesses of their operations and also their credit worthiness.

Nature of assistance

Turn Over	Fee to be reimbursed by Ministry of MSME					
Up to Rs.50 lacs	75% of the fee charged by the rating agency subject to a ceiling Rs.15,000/-					
Above Rs.50 lacs to Rs.200 lacs	75% of the fee charged by the rating agency subject to a ceiling of Rs.30,0001-					
Above Rs.200 lacs	75% of the fee charged by the rating agency subject to a ceiling of Rs.40,000/-					

Who can apply?

Any enterprise registered in India as a micro or small enterprise is eligible to apply.

6. Marketing Assistance Scheme

Description

The assistance is provided for the following activities:

- a. Organizing exhibitions abroad and participation in international exhibitions/trade fairs
- b. Co-sponsoring of exhibitions organized by other organisations/industry associations/ agencies
- c. Organizing buyer-seller meets, intensive campaigns and marketing promotion events

Nature of assistance

Financial assistance of up to 95% of the airfare and space rent of entrepreneurs. Assistance is provided on the basis of size and the type of the enterprise. Financial assistance for cosponsoring would be limited to 40% of the net expenditure, subject to maximum amount of Rs.5 lakh.

Who can apply?

MSMEs, Industry Associations and other organizations related to MSME sector.

7. Reimbursement of Registration Fee for Bar Coding

Description

The financial assistance is provided towards 75% reimbursement of only one-time registration fee and 75% of annual recurring fee for first three years paid by MSEs to GS1 India for using bar coding.

Nature of assistance

Funding support for reimbursement of 75% of one time and recurring bar code registration fees. **Who can apply?**

All MSMEs with EM registration.

8. Enabling Participation of MSMEs in State/District Level Trade Fairs and Provide Funding Support

Description

Provide marketing platform to manufacturing MSMEs by enabling their participation in state/district level exhibitions being organized by state/district authorities/associations.

Nature of assistance

1. Free registration for participating in trade fairs

Note: The selection of participants would be done by the MSME-DIs post the submission of application.

- 2. Reimbursement of 50% of to and fro actual fare by shortest distance/direct train (limited to AC II tier class) from the nearest railway station/bus fare to the place of exhibition and 50% space rental charges for MSMEs (General category entrepreneurs).
- 3. For Women/SC/ST entrepreneurs & entrepreneurs from North Eastern Region Govt. of India will reimburse 80% of items listed above in Point (2).

Note: The total reimbursement will be max. Rs.30,000/- per unit for the SC/ST/Women/ Physically Handicapped entrepreneurs, while for the other units the max. limit will be Rs.20,000/- per person per MSME unit.

Note: The participant is required to submit follow-up proofs post attending the event to claim reimbursement. The proofs can be submitted after logging in online under the section "My Applications" or directly contacting a DI office.

Who can apply?

All MSMEs with EM registration.

9. Capital Subsidy Support on Credit for Technology Upgradation

Description

MSMEs can get a capital subsidy (~15%) on credit availed for technology upgradation.

Nature of assistance

Financial assistance for availing credit and loan.

Who can apply?

- 1. Banks and financial institutions can apply to DC-MSME for availing support.
- 2. MSMEs need to directly contact the respective banks for getting credit and capital subsidy.

How to apply?

If you are a financial institution, click on the "Apply Now" button or else you can also directly contact the Office of DC-MSME. You can view the contact details of Office of DC-MSME. If you are an MSME, directly contact the respective banks/financial institutions as listed in the scheme guidelines.

10. Provision of Collateral Free Credit for MSMEs

Description

Banks and financial institutions are provided funding assistance under this scheme so that they can in turn lend collateral free credit to MSMEs.

Nature of assistance

Funding support to banks and financial institutions for lending collateral-free credit to MSMEs.

Who can apply?

Banks and financial institutions can apply to office of DC-MSME/MSME-DIs for availing support. MSMEs need to directly contact the respective banks for getting credit.

11. Reimbursement of certification fees for acquiring ISO standards

ISO 9000/ISO 14001 Certification Reimbursement.

Description

The GoI assistance will be provided for one-time reimbursement of expenditure to such MSME manufacturing units which acquire ISO 18000/ISO 22000/ISO 27000 certification.

Nature of assistance

Reimbursement of expenditure incurred on acquiring ISO standards.

Who can apply?

MSMEs with EM registration.

12. Agricultural Marketing

Description

A capital investment subsidy for construction/renovation of rural godowns.

Creation of scientific storage capacity and prevention of distress sale.

Nature of assistance

Subsidy @ 25% to farmers, 15% of project cost to companies.

Who can apply

NGOs, SHGs, companies, co-operatives.

13. Small Agricultural Marketing

Description

Business development description provides venture capital assistance in the form of equity, and arranges training and visits of agri-preneurs

Farmers' Agriculture Business Consortium

Business development description provides venture capital assistance in the form of equity, and arranges training and visits of agri-preneurs.

Nature of assistance

Financial assistance with a ceiling of Rs.5 lakh.

Who can apply

Individuals, farmers, producer groups, partnership/propriety firms, SGHs, agri-preneurs, etc.

14. Mega Food Park

Description

Mechanism to link agricultural production and market to maximize value addition, enhance farmers income, create rural employment.

Nature of assistance

One-time capital grant of 50% of project cost with a limit of Rs.50 crore.

Who can apply

Farmers, farmer groups, SHGs.

15. Adivasi Mahila Sashaktikaran Yojana

Description

Concessional scheme for the economic development of ST women.

Nature of assistance

Term loan at concessional rates upto 90% of cost of scheme.

Who can apply

Scheduled Tribes Women.



- Research the existing market, network with other entrepreneurs, venture capitalists, angel investors, and thoroughly review the policies in place to enable your entrepreneurship.
- Failure is a stepping stone and not the end of the road. Review yours and your peers' errors and correct them in your future venture.
- Be proactive in your ecosystem. Identify the key features of your ecosystem and enrich them to ensure self-sustainability of your entrepreneurship support ecosystem.

6.5.7 Risk Appetite & Resilience: Entrepreneurship and Risk

Entrepreneurs are inherently risk takers. They are path-makers not path-takers. Unlike a normal, cautious person, an entrepreneur would not think twice about quitting his job (his sole income) and taking a risk on himself and his idea.

An entrepreneur is aware that while pursuing his dreams, assumptions can be proven wrong and unforeseen events may arise. He knows that after dealing with numerous problems, success is still not guaranteed. Entrepreneurship is synonymous with the ability to take risks. This ability, called risk-appetite, is an entrepreneurial trait that is partly genetic and partly acquired.

- What is Risk Appetite

Risk appetite is defined as the extent to which a company is equipped to take risk, in order to achieve its objectives. Essentially, it refers to the balance, struck by the company, between possible profits and the hazards caused by changes in the environment (economic ecosystem, policies, etc.). Taking on more risk may lead to higher rewards but have a high probability of losses as well. However, being too conservative may go against the company as it can miss out on good opportunities to grow and reach their objectives.

The levels of risk appetite can be broadly categorized as "low", "medium" and "high." The company's entrepreneur(s) have to evaluate all potential alternatives and select the option most likely to succeed. Companies have varying levels of risk appetites for different objectives. The levels depend on:

- The type of industry
- Market pressures
- Company objectives

For example, a startup with a revolutionary concept will have a very high risk appetite. The startup can afford short term failures before it achieves longer term success. This type of appetite will not remain constant and will be adjusted to account for the present circumstances of the company.

Risk Appetite Statement

Companies have to define and articulate their risk appetite in sync with decisions made about their objectives and opportunities. The point of having a risk appetite statement is to have a framework that clearly states the acceptance and management of risk in business. It sets risk taking limits within the company. The risk appetite statement should convey the following:

- The nature of risks the business faces.
- Which risks the company is comfortable taking on and which risks are unacceptable.
- How much risk to accept in all the risk categories.
- The desired tradeoff between risk and reward.
- Measures of risk and methods of examining and regulating risk exposures.

- Entrepreneurship and Resilience

Entrepreneurs are characterized by a set of qualities known as resilience. These qualities play an especially large role in the early stages of developing an enterprise. Risk resilience is an extremely valuable characteristic as it is believed to protect entrepreneurs against the threat of challenges and changes in the business environment.

- What is Entrepreneurial Resilience

Resilience is used to describe individuals who have the ability to overcome setbacks related to their life and career aspirations. A resilient person is someone who is capable of easily and quickly recovering from setbacks. For the entrepreneur, resilience is a critical trait. Entrepreneurial resilience can be enhanced in the following ways:

- By developing a professional network of coaches and mentors
- By accepting that change is a part of life
- By viewing obstacles as something that can be overcome

Characteristics of a Resilient Entrepreneur

The characteristics required to make an entrepreneur resilient enough to go the whole way in their business enterprise are:

- A strong internal sense of control
- Strong social connections
- Skill to learn from setbacks
- Ability to look at the bigger picture
- Ability to diversify and expand
- Survivor attitude
- Cash-flow conscious habits
- Attention to detail

Tips 🚇

- Cultivate a great network of clients, suppliers, peers, friends and family. This will not only help you promote your business, but will also help you learn, identify new opportunities and stay tuned to changes in the market.
- Don't dwell on setbacks. Focus on what the you need to do next to get moving again.
- While you should try and curtail expenses, ensure that it is not at the cost of your growth.

6.5.8 Success & Failure: Understanding Successes and Failures in Entrepreneurship

Shyam is a famous entrepreneur, known for his success story. But what most people don't know, is that Shyam failed numerous times before his enterprise became a success. Read his interview to get an idea of what entrepreneurship is really about, straight from an entrepreneur who has both, failed and succeeded.

Interviewer: Shyam, I have heard that entrepreneurs are great risk-takers who are never afraid of failing. Is this true?

Shyam: Ha ha, no of course it's not true! Most people believe that entrepreneurs need to be fearlessly enthusiastic. But the truth is, fear is a very normal and valid human reaction, especially when you are planning to start your own business! In fact, my biggest fear was the fear of failing. The reality is, entrepreneurs fail as much as they succeed. The trick is to not allow the fear of failing to stop you from going ahead with your plans. Remember, failures are lessons for future success!

Interviewer: What, according to you, is the reason that entrepreneurs fail?

Shyam: Well, there is no one single reason why entrepreneurs fail. An entrepreneur can fail due to numerous reasons. You could fail because you have allowed your fear of failure to defeat you. You could fail because you are unwilling to delegate (distribute) work. As the saying goes, "You can do anything, but not everything!" You could fail because you gave up too easily – maybe you were not persistent enough. You could fail because you were focusing your energy on small, insignificant tasks and ignoring the tasks that were most important. Other reasons for failing are partnering with the wrong people, not being able to sell your product to the right customers at the right time at the right price... and many more reasons!

Interviewer: As an entrepreneur, how do you feel failure should be looked at?

Shyam: I believe we should all look at failure as an asset, rather than as something negative. The way I see it, if you have an idea, you should try to make it work, even if there is a chance that you will fail. That's because not trying is failure right there, anyway! And failure is not the worst thing that can happen. I think having regrets because of not trying, and wondering 'what if' is far worse than trying and actually failing.

Interviewer: How did you feel when you failed for the first time?

Shyam: I was completely heartbroken! It was a very painful experience. But the good news is, you do recover from the failure. And with every subsequent failure, the recovery process gets a lot easier. That's because you start to see each failure more as a lesson that will eventually help you succeed, rather than as an obstacle that you cannot overcome. You will start to realize that failure has many benefits.

Interviewer: Can you tell us about some of the benefits of failing?

Shyam: One of the benefits that I have experienced personally from failing is that the failure made me see things in a new light. It gave me answers that I didn't have before. Failure can make you a lot stronger. It also helps keep your ego in control.

Interviewer: What advice would you give entrepreneurs who are about to start their own enterprises?

Shyam: I would tell them to do their research and ensure that their product is something that is actually wanted by customers. I'd tell them to pick their partners and employees very wisely and cautiously. I'd tell them that it's very important to be aggressive – push and market your product as aggressively as possible. I would warn them that starting an enterprise is very

expensive and that they should be prepared for a situation where they run out of money.

I would tell them to create long term goals and put a plan in action to achieve that goal. I would tell them to build a product that is truly unique. Be very careful and ensure that you are not copying another startup. Lastly, I'd tell them that it's very important that they find the right investors.

Interviewer: That's some really helpful advice, Shyam! I'm sure this will help all entrepreneurs to be more prepared before they begin their journey! Thank you for all your insight!



- Remember that nothing is impossible.
- Identify your mission and your purpose before you start.
- Plan your next steps don't make decisions hastily.

Unit 6.6 Preparing to be an Entrepreneur

- Unit Objectives

At the end of this unit, you 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 your own enterprise
- 16. List important questions that every entrepreneur should ask before starting an enterprise

6.6.1 Market Study/The 4 Ps of Marketing/ Importance of an IDEA: Understanding Market Research

Market research is the process of gathering, analyzing and interpreting market information on a product or service that is being sold in that market. It also includes information on:

- Past, present and prospective customers
- Customer characteristics and spending habits
- The location and needs of the target market
- The overall industry
- Relevant competitors

Market research involves two types of data:

- Primary information. This is research collected by yourself or by someone hired by you.
- Secondary information. This is research that already exists and is out there for you to find and use.

Primary research

Primary research can be of two types:

- Exploratory: This is open-ended and usually involves detailed, unstructured interviews.
- Specific: This is precise and involves structured, formal interviews. Conducting specific research is the more expensive than conducting exploratory research.

Secondary research

Secondary research uses outside information. Some common secondary sources are:

- Public sources: These are usually free and have a lot of good information. Examples are government departments, business departments of public libraries etc.
- Commercial sources: These offer valuable information but usually require a fee to be paid. Examples are research and trade associations, banks and other financial institutions etc.
- Educational institutions: These offer a wealth of information. Examples are colleges, universities, technical institutes etc.

The 4 Ps of Marketing

The 4 Ps of marketing are Product, Price, Promotion and Place. Let's look at each of these 4 Ps in detail.

Product

A product can be:

• A tangible good • An intangible service

Whatever your product is, it is critical that you have a clear understanding of what you are offering, and what its unique characteristics are, before you begin with the marketing process.

Some questions to ask yourself are:

- What does the customer want from the product/service?
- What needs does it satisfy?
- Are there any more features that can be added?
- Does it have any expensive and unnecessary features?
- How will customers use it?
- What should it be called?
- How is it different from similar products?
- How much will it cost to produce?
- Can it be sold at a profit?

- Price

Once all the elements of Product have been established, the Price factor needs to be considered. The Price of a Product will depend on several factors such as profit margins, supply, demand and the marketing strategy.

Some questions to ask yourself are:

- What is the value of the product/service to customers?
- Do local products/services have established price points?
- Is the customer price sensitive?
- Should discounts be offered?
- How is your price compared to that of your competitors?

- Promotion

Once you are certain about your Product and your Price, the next step is to look at ways to promote it. Some key elements of promotion are advertising, public relations, social media marketing, email marketing, search engine marketing, video marketing and more.

Some questions to ask yourself are:

- Where should you promote your product or service?
- What is the best medium to use to reach your target audience?
- When would be the best time to promote your product?
- How are your competitors promoting their products?

Place

According to most marketers, the basis of marketing is about offering the right product, at the right price, at the right place, at the right time. For this reason, selecting the best possible location is critical for converting prospective clients into actual clients.

Some questions to ask yourself are:

- Will your product or service be looked for in a physical store, online or both?
- What should you do to access the most appropriate distribution channels?
- Will you require a sales force?
- Where are your competitors offering their products or services?
- Should you follow in your competitors' footsteps?
- Should you do something different from your competitors?

Importance of an IDEA -

Ideas are the foundation of progress. An idea can be small or ground-breaking, easy to accomplish or extremely complicated to implement. Whatever the case, the fact that it is an idea gives it merit. Without ideas, nothing is possible. Most people are afraid to speak out their ideas, out for fear of being ridiculed. However, if are an entrepreneur and want to remain competitive and innovative, you need to bring your ideas out into the light.

Some ways to do this are by:

- Establishing a culture of brainstorming where you invite all interested parties to contribute
- Discussing ideas out loud so that people can add their ideas, views, opinions to them
- Being open minded and not limiting your ideas, even if the idea who have seems ridiculous
- Not discarding ideas that you don't work on immediately, but instead making a note of them and shelving them so they can be revisited at a later date

— Tips 🚇

- Keep in mind that good ideas do not always have to be unique.
- Remember that timing plays a huge role in determining the success of your idea.
- Situations and circumstances will always change, so be flexible and adapt your idea accordingly.

6.6.2 Business Entity Concepts: Basic Business Terminology

If your aim is to start and run a business, it is crucial that you have a good understanding of basic business terms. Every entrepreneur should be well versed in the following terms:

- Accounting: A systematic method of recording and reporting financial transactions.
- Accounts payable: Money owed by a company to its creditors.
- Accounts Receivable: The amount a company is owed by its clients.
- Assets: The value of everything a company owns and uses to conduct its business.
- Balance Sheet: A snapshot of a company's assets, liabilities and owner's equity at a given moment.
- Bottom Line: The total amount a business has earned or lost at the end of a month.
- Business: An organization that operates with the aim of making a profit.
- Business to Business (B2B): A business that sells goods or services to another business.
- Business to Consumer (B2C): A business that sells goods or services directly to the end user.
- Capital: The money a business has in its accounts, assets and investments. The two main types of capital are debt and equity.
- Cash Flow: The overall movement of funds through a business each month, including income and expenses.
- Cash Flow Statement: A statement showing the money that entered and exited a business during a specific period of time.
- Contract: A formal agreement to do work for pay.
- Depreciation: The degrading value of an asset over time.
- Expense: The costs that a business incurs through its operations.
- Finance: The management and allocation of money and other assets.
- Financial Report: A comprehensive account of a business' transactions and expenses.
- Fixed Cost: A one-time expense.
- Income Statement (Profit and Loss Statement): Shows the profitability of a business during a period of time.
- Liabilities: The value of what a business owes to someone else.
- Marketing: The process of promoting, selling and distributing a product or service.
- Net Income/Profit: Revenues minus expenses.
- Net Worth: The total value of a business.
- Payback Period: The amount of time it takes to recover the initial investment of a business.
- Profit Margin: The ratio of profit, divided by revenue, displayed as a percentage.
- Return on Investment (ROI): The amount of money a business gets as return from an investment.

- Revenue: The total amount of income before expenses are subtracted.
- Sales Prospect: A potential customer.
- Supplier: A provider of supplies to a business.
- Target Market: A specific group of customers at which a company's products and services are aimed.
- Valuation: An estimate of the overall worth of the business.
- Variable Cost: Expenses that change in proportion to the activity of a business.
- Working Capital: Calculated as current assets minus current liabilities.
- Business Transactions: There are three types of business transactions. These are:
 - O Simple Transactions Usually a single transaction between a vendor and a customer. For example: Buying a cup of coffee.
 - O Complex Transactions These transactions go through a number of events before they can be completed. For example: Buying a house.
 - O Ongoing transactions These transactions usually require a contract. For example: Contract with a vendor.

Basic Accounting Formulas

Take a look some important accounting formulas that every entrepreneur needs to know.

1. The Accounting Equation: This is value of everything a company owns and uses to conduct its business.

Formula:

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Assets = Liability + Owner's Equity
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2. Net Income: This is the profit of the company.

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Formula:
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Net Income = Revenues – Expenses

- 3. 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.
 - Formula:

Break-Even = Fixed Costs/Sales Price – Variable Cost per Unit

- 4. Cash Ratio: This tells us about the liquidity of a company.
 - Formula:

Cash Ratio = Cash/Current Liabilities

5. Profit Margin: This is shown as a percentage. It shows what percentage of sales are left over after all the expenses are paid by the business.

Formula:

Profit Margin = Net Income/Sales

6. Debt-to-Equity Ratio: This ratio shows how much equity and debt a company is using to finance its assets, and whether the shareholder equity can fulfill obligations to creditors if the business starts making a loss.

Formula: Debt-to-Equity Ratio = Total Liabilities/Total Equity 1. Cost of Goods Sold: This is the total of all costs used to create a product or service, which has been sold.

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Formula:
Cost of Goods Sold = Cost of Materials/Inventory – Cost of Outputs
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8. Return on Investment (ROI): This is usually shown as a percentage. It calculates the profits of an investment as a percentage of the original cost.

Formula:

ROI = Net Profit/Total Investment * 100

9. Simple Interest: This is money you can earn by initially investing some money (the principal).

Formula:

A = P(1 + rt); R = r * 100

Where:

A = Total Accrued Amount (principal + interest)

P = Principal Amount

I = Interest Amount

r = Rate of Interest per year in decimal; r = R/100

- t = Time Period involved in months or years
- 10. Annual Compound Interest: The calculates the addition of interest to the principal sum of a loan or deposit.

Formula:

 $A = P (1 + r/n)^{n}$ nt:

Where:

- A = the future value of the investment/loan, including interest
- P = the principal investment amount (the initial deposit or loan amount)
- r = the annual interest rate (decimal)
- n = the number of times that interest is compounded per year
- t = the number of years the money is invested or borrowed for
- 6.6.3 CRM & Networking: What is CRM

CRM stands for Customer Relationship Management. Originally the expression Customer Relationship Management meant managing one's relationship with customers. However, today it refers to IT systems and software designed to help companies manage their relationships.

The Need for CRM -

The better a company can manage its relationships with its customers, the higher the chances of the company's success. For any entrepreneur, the ability to successfully retain existing customers and expand the enterprise is paramount. This is why IT systems that focus on addressing the problems of dealing with customers on a daily basis are becoming more and more in demand.

Customer needs change over time, and technology can make it easier to understand what customers really want. This insight helps companies to be more responsive to the needs of their customers. It enables them to modify their business operations when required, so that their customers are always served in the best manner possible. Simply put, CRM helps companies recognize the value of their clients and enables them to capitalize on improved customer relations.

Benefits of CRM

CRM has a number of important benefits:

- It helps improve relations with existing customers which can lead to:
 - Increased sales
 - Identification of customer needs
 - Cross-selling of products
- It results in better marketing of one's products or services
- It enhances customer satisfaction and retention
- It improves profitability by identifying and focusing on the most profitable customers

-6.6.4 What is Networking

In business, networking means leveraging your business and personal connections in order to bring in a regular supply of new business. This marketing method is effective as well as low cost. It is a great way to develop sales opportunities and contacts. Networking can be based on referrals and introductions, or can take place via phone, email, and social and business networking websites.

- 6.6.5 The Need for Networking

Networking is an essential personal skill for business people, but it is even more important for entrepreneurs. The process of networking has its roots in relationship building. Networking results in greater communication and a stronger presence in the entrepreneurial ecosystem. This helps build strong relationships with other entrepreneurs.

Business networking events held across the globe play a huge role in connecting like-minded entrepreneurs who share the same fundamental beliefs in communication, exchanging ideas and converting ideas into realities. Such networking events also play a crucial role in connecting entrepreneurs with potential investors. Entrepreneurs may have vastly different experiences and backgrounds but they all have a common goal in mind – they all seek connection, inspiration, advice, opportunities and mentors. Networking offers them a platform to do just that.

Benefits of Networking

Networking offers numerous benefits for entrepreneurs. Some of the major benefits are:

- Getting high quality leads
- Increased business opportunities
- Good source of relevant connections
- Advice from like-minded entrepreneurs
- Gaining visibility and raising your profile
- Meeting positive and enthusiastic people
- Increased self-confidence
- Satisfaction from helping others
- Building strong and lasting friendships

Tips

- Use social media interactions to identify needs and gather feedback.
- When networking, ask open-ended questions rather than yes/no type questions.

– 6.6.6 Business Plan: Why Set Goals

Setting goals is important because it gives you long-term vision and short-term motivation. Goals can be short term, medium term and long term.

Short-Term Goals

• These are specific goals for the immediate future.

Example: Repairing a machine that has failed.

Medium-Term Goals

- These goals are built on your short term goals.
- They do not need to be as specific as your short term goals.

Example: Arranging for a service contract to ensure that your machines don't fail again.

Long-Term Goals

These goals require time and planning.

They usually take a year or more to achieve.

Example: Planning your expenses so you can buy new machinery

- Why Create a Business Plan

A business plan is a tool for understanding how your business is put together. It can be used to monitor progress, foster accountable and control the fate of the business. It usually offers a 3-5 year projection and outlines the plan that the company intends to follow to grow its revenues. A business plan is also a very important tool for getting the interest of key employees or future investors.

A business plan typically comprises of eight elements.

Elements of a Business Plan

Executive Summary

The executive summary follows the title page. The summary should clearly state your desires as the business owner in a short and businesslike way. It is an overview of your business and your plans. Ideally this should not be more than 1-2 pages.

Your Executive Summary should include:

• The Mission Statement: Explain what your business is all about.

Example: Nike's Mission Statement

Nike's mission statement is "To bring inspiration and innovation to every athlete in the world."

- Company Information: Provide information like when your business was formed, the names and roles of the founders, the number of employees, your business location(s) etc.
- Growth Highlights: Mention examples of company growth. Use graphs and charts where possible.
- Your Products/Services: Describe the products or services provided.
- Financial Information: Provide details on current bank and investors.
- Summarize future plans: Describe where you see your business in the future.

Business Description

The second section of your business plan needs to provide a detailed review of the different elements of your business. This will help potential investors to correctly understand your business goal and the uniqueness of your offering.

Your Business Description should include:

- A description of the nature of your business
- The market needs that you are aiming to satisfy
- The ways in which your products and services meet these needs
- The specific consumers and organizations that you intend to serve
- Your specific competitive advantages

Market Analysis

The market analysis section usually follows the business description. The aim of this section is to showcase your industry and market knowledge. This is also the section where you should lay down your research findings and conclusions.

Your Market Analysis should include:

- Your industry description and outlook
- Information on your target market
- The needs and demographics of your target audience
- The size of your target market
- The amount of market share you want to capture
- Your pricing structure
- Your competitive analysis
- Any regulatory requirements

Organization & Management

This section should come immediately after the Market Analysis.

Your Organization & Management section should include:

- Your company's organizational structure
- Details of your company's ownership
- Details of your management team
- Qualifications of your board of directors
- Detailed descriptions of each division/department and its function
- The salary and benefits package that you offer your people
- The incentives that you offer

Service or Product Line

The next section is the service or product line section. This is where you describe your service or product, and stress on their benefits to potential and current customers. Explain in detail why your product of choice will fulfill the needs of your target audience.

Your Service or Product Line section should include:

- A description of your product/service
- A description of your product or service's life cycle
- A list of any copyright or patent filings
- A description of any R&D activities that you are involved in or planning

Marketing & Sales

Once the Service or Product Line section of your plan has been completed, you should start on the description of the marketing and sales management strategy for your business.

Your Marketing section should include the following strategies:

- **Market penetration strategy**: This strategy focuses on selling your existing products or services in existing markets, in order to increase your market share.
- **Growth strategy**: This strategy focuses on increasing the amount of market share, even if it reduces earnings in the short-term.
- **Channels of distribution strategy**: These can be wholesalers, retailers, distributers and even the internet.
- **Communication strategy**: These can be written strategies (e-mail, text, chat), oral strategies (phone calls, video chats, face-to-face conversations), non-verbal strategies (body language, facial expressions, tone of voice) and visual strategies (signs, webpages, illustrations).

Your Sales section should include the following information:

- A salesforce strategy: This strategy focuses on increasing the revenue of the enterprise.
- A breakdown of your sales activities: This means detailing out how you intend to sell your products or services will you sell it offline or online, how many units do you intend to sell, what price do you plan to sell each unit at, etc.

Funding Request

This section is specifically for those who require funding for their venture.

The Funding Request section should include the following information:

- How much funding you currently require.
- How much funding you will require over the next five years. This will depend on your long-term goals.
- The type of funding you want and how you plan to use it. Do you want funding that can be used only for a specific purpose, or funding that can be used for any kind of requirement?
- Strategic plans for the future. This will involve detailing out your long-term plans what these plans are and how much money you will require to put these plans in motions.
- Historical and prospective financial information. This can be done by creating and maintaining all your financial records, right from the moment your enterprise started, to the present day. Documents required for this are your balance sheet which contains details of your company's assets and liabilities, your income statement which lists your company's revenues, expenses and net income for the year, your tax returns (usually for the last three years) and your cash flow budget which lists the cash that came in, the cash that went out and states whether you had a cash deficit (negative balance) or surplus (positive balance) at the end of each month.

Financial Planning

Before you begin building your enterprise, you need to plan your finances. Take a look at the steps for financial planning:

Step 1: Create a financial plan. This should include your goals, strategies and timelines for accomplishing these goals.

Step 2: Organize all your important financial documents. Maintain a file to hold your investment details, bank statements, tax papers, credit card bills, insurance papers and any other financial records.

Step 3: Calculate your net worth. This means figure out what you own (assets like your house, bank accounts, investments etc.), and then subtract what you owe (liabilities like loans, pending credit card amounts etc.) the amount you are left with is your net worth.

Step 4: Make a spending plan. This means write down in detail where your money will come from, and where it will go.

Step 5: Build an emergency fund. A good emergency fund contains enough money to cover at least 6 months' worth of expenses.

Step 6: Set up your insurance. Insurance provides long term financial security and protects you against risk.

Risk Management

As an entrepreneur, it is critical that you evaluate the risks involved with the type of enterprise that you want to start, before you begin setting up your company. Once you have identified potential risks, you can take steps to reduce them. Some ways to manage risks are:

- Research similar business and find out about their risks and how they were minimized.
- Evaluate current market trends and find out if similar products or services that launched a while ago are still being well received by the public.
- Think about whether you really have the required expertise to launch your product or service.
- Examine your finances and see if you have enough income to start your enterprise.
- Be aware of the current state of the economy, consider how the economy may change over time, and think about how your enterprise will be affected by any of those changes.
- Create a detailed business plan.

Tips 🔮

- Ensure all the important elements are covered in your plan.
- Scrutinize the numbers thoroughly.
- Be concise and realistic.
- Be conservative in your approach and your projections.
- Use visuals like charts, graphs and images wherever possible.

6.6.7 Procedure and Formalities for Bank Finance: The Need for Bank Finance

For entrepreneurs, one of the most difficult challenges faced involves securing funds for startups. With numerous funding options available, entrepreneurs need to take a close look at which funding methodology works best for them. In India, banks are one of the largest funders of startups, offering funding to thousands of startups every year.

What Information Should Entrepreneurs Offer Banks for Funding

When approaching a bank, entrepreneurs must have a clear idea of the different criteria that banks use to screen, rate and process loan applications. Entrepreneurs must also be aware of the importance of providing banks with accurate and correct information. It is now easier than ever for financial institutions to track any default behaviour of loan applicants. Entrepreneurs looking for funding from banks must provide banks with information relating to their general credentials, financial situation and guarantees or collaterals that can be offered.

General Credentials

This is where you, as an entrepreneur, provide the bank with background information on yourself. Such information includes:

- Letter(s) of Introduction: This letter should be written by a respected business person who knows you well enough to introduce you. The aim of this letter is set across your achievements and vouch for your character and integrity.
- Your Profile: This is basically your resume. You need to give the bank a good idea of your educational achievements, professional training, qualifications, employment record and achievements.
- Business Brochure: A business brochure typically provides information on company products, clients, how long the business has been running for etc.
- Bank and Other References: If you have an account with another bank, providing those bank references is a good idea.
- Proof of Company Ownership or Registration: In some cases, you may need to provide the bank with proof of company ownership and registration. A list of assets and liabilities may also be required.

Financial Situation

Banks will expect current financial information on your enterprise. The standard financial reports you should be prepared with are:

- Balance Sheet
- Cash-Flow Statement

- Profit-and-Loss Account
- Projected Sales and Revenues

Business Plan

• Feasibility Study

Guarantees or Collaterals

Usually banks will refuse to grant you a loan without security. You can offer assets which the bank can seize and sell off if you do not repay the loan. Fixed assets like machinery, equipment, vehicles etc. are also considered to be security for loans.

The Lending Criteria of Banks

Your request for funding will have a higher chance of success if you can satisfy the following lending criteria:

- Good cash flow
- Adequate shareholders' funds
- Adequate security
- Experience in business
- Good reputation

The Procedure

To apply for funding the following procedure will need to be followed.

- 1. Submit your application form and all other required documents to the bank.
- 2. The bank will carefully assess your credit worthiness and assign ratings by analyzing your business information with respect to parameters like management, financial, operational and industry information as well as past loan performance.
- 3. The bank will make a decision as to whether or not you should be given funding.

Tips 🚇

- Get advice on funding options from experienced bankers.
- Be cautious and avoid borrowing more than you need, for longer than you need, at an interest rate that is higher than you are comfortable with.

6.6.8 Enterprise Management - An Overview: How to Manage Your Enterprise

To manage your enterprise effectively you need to look at many different aspects, right from managing the day-to-day activities to figuring out how to handle a large scale event. Let's take a look at some simple steps to manage your company effectively.

Step 1: Use your leadership skills and ask for advice when required.

Let's take the example of Ramu, an entrepreneur who has recently started his own enterprise. Ramu has good leadership skills – he is honest, communicates well, knows how to delegate work etc. These leadership skills definitely help Ramu in the management of his enterprise. However, sometimes Ramu comes across situations that he is unsure how to handle. What should Ramu do in this case? One solution is for him to find a more experienced manager who is willing to mentor him. Another solution is for Ramu to use his networking skills so that he can connect with managers from other organizations, who can give him advice on how to handle such situations.

Step 2: Divide your work amongst others - realize that you cannot handle everything yourself.

Even the most skilled manager in the world will not be able to manage every single task that an enterprise will demand of him. A smart manager needs to realize that the key to managing his enterprise lies in his dividing all his work between those around him. This is known as delegation. However, delegating is not enough. A manager must delegate effectively if he wants to see results. This is important because delegating, when done incorrectly, can result in you creating even more work for yourself. To delegate effectively, you can start by making two lists. One list should contain the things that you know you need to handle yourself. The second list should contain the things that you are confident can be given to others to manage and handle. Besides incorrect delegation, another issue that may arise is over-delegation. This means giving away too many of your tasks to others. The problem with this is, the more tasks you delegate, the more time you will spend tracking and monitoring the work progress of those you have handed the tasks to. This will leave you with very little time to finish your own work.

Step 3: Hire the right people for the job.

Hiring the right people goes a long way towards effectively managing your enterprise. To hire the best people suited for the job, you need to be very careful with your interview process. You should ask potential candidates the right questions and evaluate their answers carefully. Carrying out background checks is always a good practice. Running a credit check is also a good idea, especially if the people you are planning to hire will be handling your money. Create a detailed job description for each role that you want filled and ensure that all candidates have a clear and correct understanding of the job description. You should also have an employee manual in place, where you

put down every expectation that you have from your employees. All these actions will help ensure that the right people are approached for running your enterprise.

Step 4: Motivate your employees and train them well.

Your enterprise can only be managed effectively if your employees are motivated to work hard for your enterprise. Part of being motivated involves your employees believing in the vision and mission of your enterprise and genuinely wanting to make efforts towards pursuing the same. You can motivate your employees with recognition, bonuses and rewards for achievements. You can also motivate them by telling them about how their efforts have led to the company's success. This will help them feel pride and give them a sense of responsibility that will increase their motivation. Besides motivating your people, your employees should be constantly trained in new practices and technologies. Remember, training is not a one-time effort. It is a consistent effort that needs to be carried out regularly.

Step 5: Train your people to handle your customers well.

Your employees need to be well-versed in the art of customer management. This means they should be able to understand what their customers want, and also know how to satisfy their needs. For them to truly understand this, they need to see how you deal effectively with customers. This is called leading by example. Show them how you sincerely listen to your clients and the efforts that you put into understand their requirements. Let them listen to the type of questions that you ask your clients so they understand which questions are appropriate.

Step 6: Market your enterprise effectively.

Use all your skills and the skills of your employees to market your enterprise in an effective manner. You can also hire a marketing agency if you feel you need help in this area.

Now that you know what is required to run your enterprise effectively, put these steps into play, and see how much easier managing your enterprise becomes!

– Tips	Q
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- Get advice on funding options from experienced bankers.
- Be cautious and avoid borrowing more than you need, for longer than you need, at an interest rate that is higher than you are comfortable with.

6.6.9 20 Questions to Ask Yourself Before Considering Entrepreneurship

- 1. Why am I starting a business?
- 2. What problem am I solving?
- 3. Have others attempted to solve this problem before? Did they succeed or fail?
- 4. Do I have a mentor or industry expert that I can call on?
- 5. Who is my ideal customer?
- 6. Who are my competitors?
- 7. What makes my business idea different from other business ideas?
- 8. What are the key features of my product or service?
- 9. Have I done a SWOT analysis?
- 10. What is the size of the market that will buy my product or service?
- 11. What would it take to build a minimum viable product to test the market?
- 12. How much money do I need to get started?
- 13. Will I need to get a loan?
- 14. How soon will my products or services be available?
- 15. When will I break even or make a profit?
- 16. How will those who invest in my idea make a profit?
- 17. How should I set up the legal structure of my business?
- 18. What taxes will I need to pay?
- 19. What kind of insurance will I need?
- 20. Have I reached out to potential customers for feedback?

Tips 🤇

- It is very important to validate your business ideas before you invest significant time, money and resources into it.
- The more questions you ask yourself, the more prepared you will be to handle to highs and lows of starting an enterprise.

Footnotes:

- 1. A mentor is a trusted and experienced person who is willing to coach and guide you.
- 2. A customer is someone who buys goods and/or services.
- 3. A competitor is a person or company that sells products and/or services similar to your products and/or services.
- 4. SWOT stands for Strengths, Weaknesses, Opportunities and Threats. To conduct a SWOT analysis of your company, you need to list down all the strengths and weaknesses of your company, the opportunities that are present for your company and the threats faced by your company.

- 5. A minimum viable product is a product that has the fewest possible features, that can be sold to customers, for the purpose of getting feedback from customers on the product.
- 6. A company is said to break even when the profits of the company are equal to the costs.
- 7. The legal structure could be a sole proprietorship, partnership or limited liability partnership.
- 8. There are two types of taxes direct taxes payable by a person or a company, or indirect taxes charged on goods and/or services.
- 9. There are two types of insurance life insurance and general insurance. Life insurance covers human life while general insurance covers assets like animals, goods, cars etc.





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