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Gem & Jewellery Skill Council of India

Participant Handbook

Sector
Gems and Jewellery

Sub-Sector
Imitation Jewellery

Occupation
Stone Fixing

Reference ID: **G&J/Q1504, Version 3.0**
NSQF Level 2

Stone Fixer - Imitation Jewellery

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> Skilling is building a better India. If we have to move India towards development then Skill Development should be our mission.

Shri Narendra Modi
The Prime Minister of India

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Certificate

COMPLIANCE TO
QUALIFICATION PACK – NATIONAL OCCUPATIONAL STANDARDS

is hereby issued by the

GEM AND JEWELLERY SKILL COUNCIL OF INDIA
for

SKILLING CONTENT : PARTICIPANT HANDBOOK

Complying to National Occupational Standards of

Job Role/ Qualification Pack: **'Stone Fixer - Imitation Jewellery'** QP No. **G&J/Q1504, NSQF Level 2'**

Date of Issuance: November 17th,2022
Valid up to*: November 17th,2025
*Valid up to the next review date of the Qualification Pack or the 'Valid up to' date mentioned above (whichever is earlier)

Authorised Signatory
(Gem and Jewellery Skill Council of India)

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About this book

This Participant Handbook is designed to enable training for the specific Qualification Pack (QP). Each National Occupational Standards (NOS) is covered across Unit/s. Key learning objectives for the specific NOS mark the beginning of the Unit for that NOS. This book is about Stone Fixing as per the design requirement of the jewellery, accessories etc.

The participant will learn to fix stones in the finished and embellished jewellery/ accessories frame with minimum damage to stone, jewellery / accessories frame.

Symbols Used


Key Learning Outcomes


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Table of Content

It is recommended that all the trainings include the appropriate Employability Skills Module.

Content for the same is available here:
https://www.skillindiadigital.gov.in/content/list

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1. Introduction

Key Learning Outcomes

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

1. Analyze the gem and jewellery sector in India, and its sub-sectors.
2. Record the role and responsibilities of Stone Fixer – Imitation Jewellery.

Unit 1.1: Gem and Jewellery Sector in India

Unit Objectives

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

1. Analyze the significance of the gem and jewellery sector in India.

1.1.1 Significance of Gem and Jewellery Sector in India

The Gems and Jewellery sector plays a significant role in the Indian economy, contributing to around 6-7 % of the country's GDP. One of the fastest growing sectors, it is extremely export oriented and labour intensive.

Based on its potential for growth and value addition, the Government of India has declared the Gems and Jewellery sector as a focus area for export promotion. The Government has recently undertaken various measures to promote investments and to upgrade technology and skills to promote 'Brand India' in the international market.

India's Gems and Jewellery sector has been contributing in a big way to the country's foreign exchange earnings (FEEs). The Government of India has viewed the sector as a powerful area for export promotion.

- With a market size of almost INR 4,54,100 crore, the sector has a large share of the GDP at ~5.9 %, apart from large-scale employment generation and foreign exchange earnings.
- Market research reveals that jewellery accounts for more than a fourth of the optional spending by consumers in India. This combined with rising income levels in India is a major growth driver.
- India has an estimated 229 crore women aged 20-49. The number of women, the key customer category for jewellery, who are employed in professional sectors is rising very fast.
- With more than 300 million people in the 25-29 age group in the period 2011-21, 150 crore weddings are expected to take place in this period.
- In Tier-3 zones, where landlords and money lenders are the primary source of financial credit, jewellers have emerged as an alternative, providing investment options through gold jewellery.

Gem and Jewellery industry classification

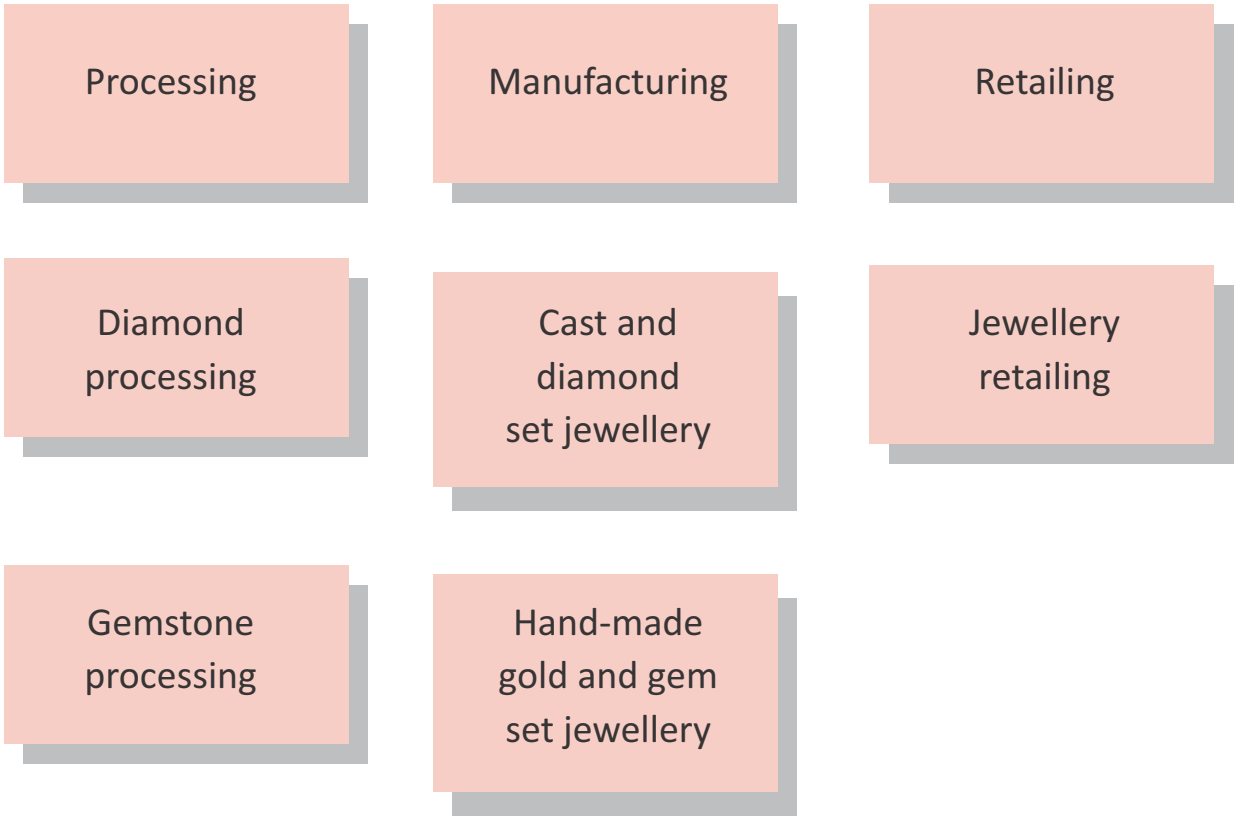

Fig 1.1.1.Sub-sectors of Gem and Jewellery sector

Based on economic activities from NIC-2008, major sub-sectors of sector are: processing (diamond and gemstone), manufacturing (cast and diamond set, and handmade and gem set) and retailing.

Scan the QR Code to watch the related video or click on link

Click Here
Gem & Jewellery industry Orientation

Click Here
IJMA Documentary

- With a market size of almost INR 4,54,100 crore, the sector has a sizeable share of the GDP at ~5.9%, apart from large-scale employment generation and foreign exchange earnings.
- The highly labour-intensive nature of the sector with large number of employees in the unorganised space, has led to job creation, employing more than 0.464 million people in the country in 2013.
- This is more than the population of Kolkata, the seventh most populous city in India with a population of 4.5 million; this indicates the high employment generation capacity of this sector.
- Indian markets for diamond processing — Surat, Ahmedabad; for gemstone processing — Bhavnagar and Jaipur; and for handmade gold jewellery — Kolkata, Thrissur and Coimbatore — are among other areas that are known world over for their products.
- Every region of the country has a different unique style of jewellery. Some examples of these traditional jewellery forms include Bikaneri, Dhokra, Minakari and Filigree.
- India is a source for manufacturing all varieties of products; and its presence in the global gems and jewellery sector is of much importance.

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Click Here
Fashion Jewellery Manpower Report

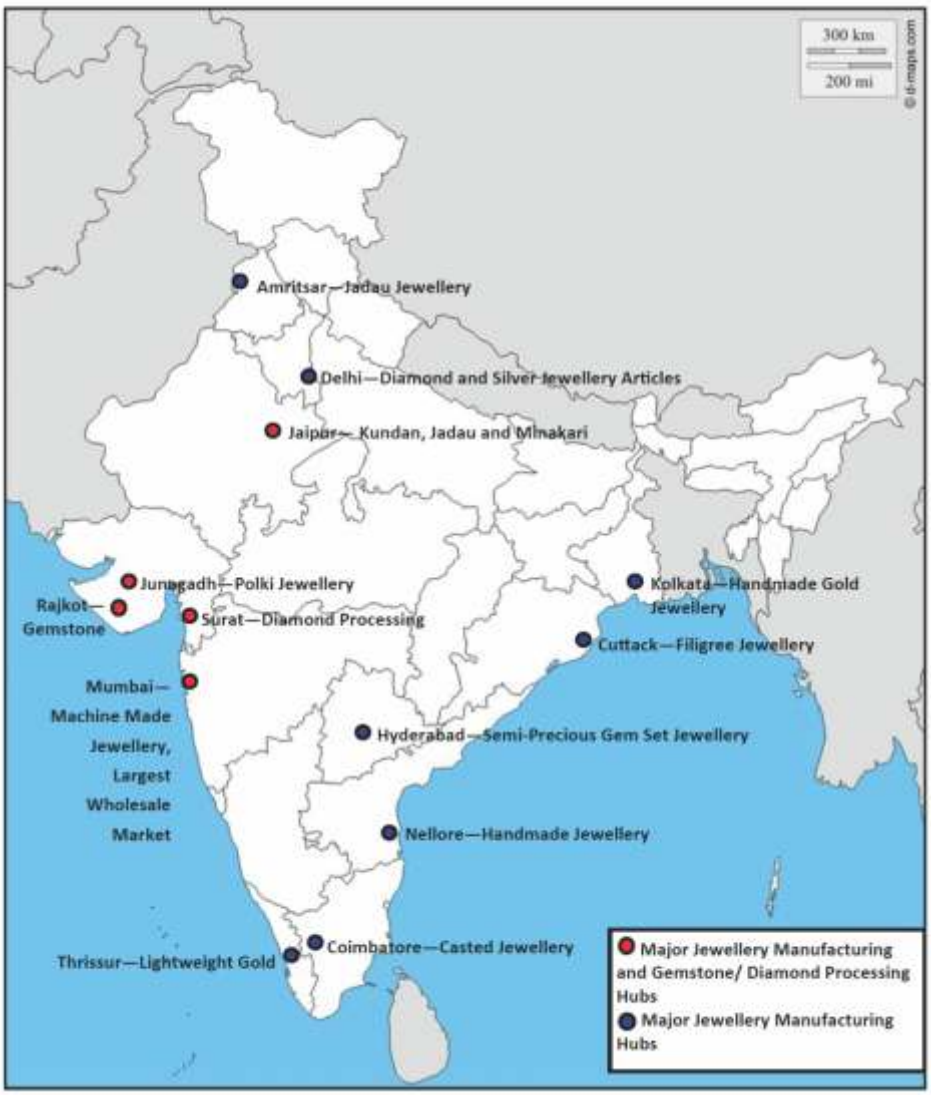

Fig 1.1.2 Geographical Markets: Employment Zones in India

- More than two-thirds of the sector work force in India are employed in the processing and manufacturing areas of the value chain.
- These workers are employed in certain zones, as indicated in the map above.
- The retailing work force is spread across the country from metros and Tier – 1 cities to villages in rural areas.

Processing and Manufacturing Markets:

- Employment is concentrated in the states of Rajasthan, Gujarat, Maharashtra, West Bengal and the Southern states of Kerala and Tamil Nadu.
- Jaipur and Amritsar are known for Kundan – Jadau jewellery with Minakari work, while Delhi – NCR is known for silver jewellery. Further, Jaipur is also one of the largest coloured gemstone cutting and polishing centre in the world.
- Surat is the world's largest diamond processing centre and processes about 85 percent of the rough diamond imports of India. Surat has a large group of workforce and is also home to the world's leading diamond institute, the Indian Diamond Institute (IDI).
- Mumbai, besides being the largest trading hub and wholesale market in the country, is also a key centre for cast and diamond set jewellery.
- SEEPZ in Mumbai alone accounts for almost a quarter of the jewellery exports to USA, the world's largest jewellery consuming country.
- Thrissur is a hub for lightweight plain gold jewellery, a style traditional to Kerala, while Coimbatore is known for electroformed jewellery.
- Kolkata is known for handmade gold jewellery.
- Its importance also stems from the fact that a large share of the skilled artisans in the country are from this region. However, recent times have seen a decline of this supply due to a reduction in inherited skills.

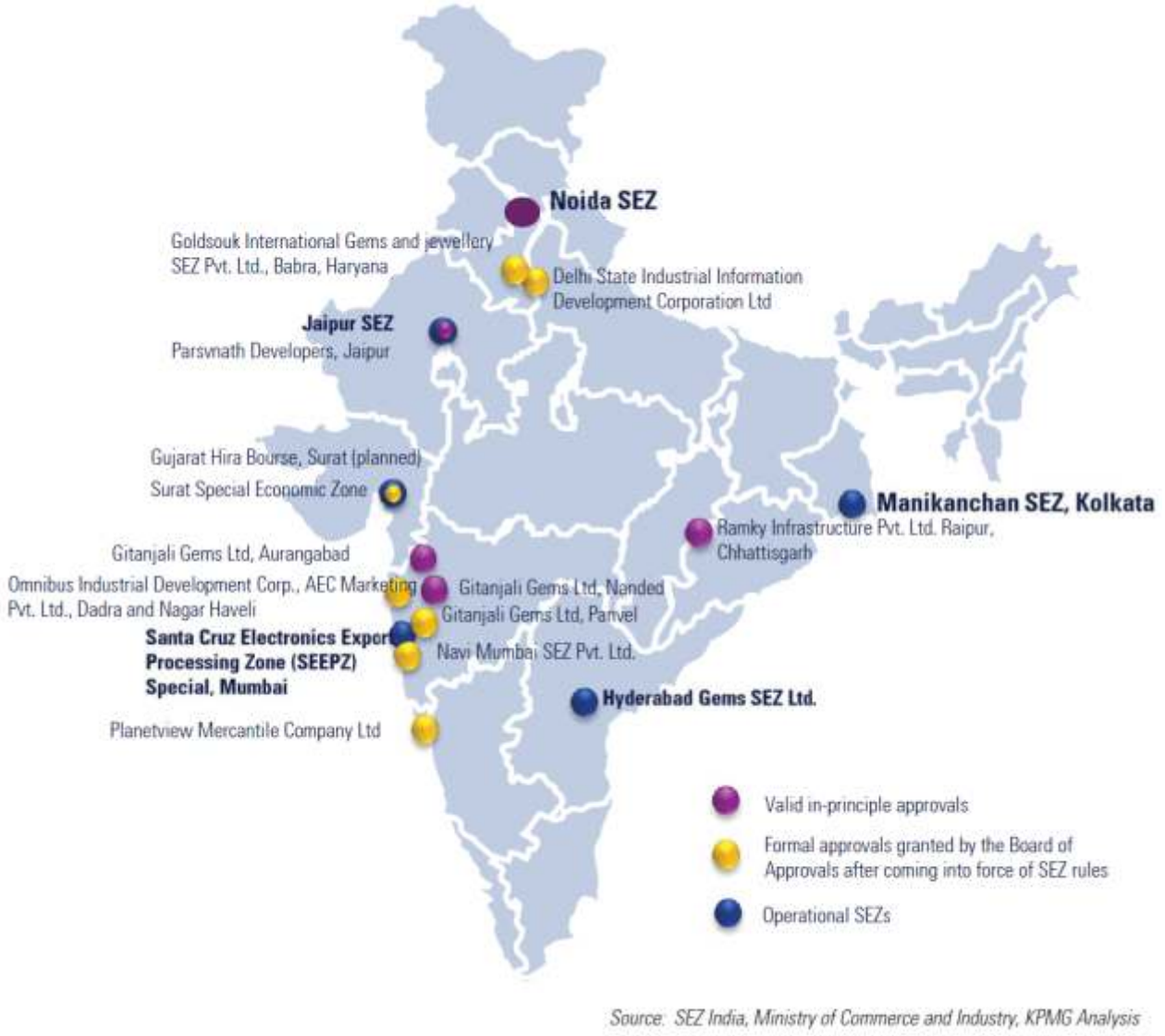

Fig 1.1.3 Geographical Markets

- India has multiple operational SEZs focused in the sector and many others expected to operationalise in the coming years.
- Currently, there are about 22 G&J SEZ's approved under the SEZ Act, 2005, throughout India.
- Out of these, 5 are operational, 4 have valid-in principle approvals and 12 are at the formal approval stage.
- The focus of investment is currently concentrated in Maharashtra, followed by Gujarat and Rajasthan.
- These areas will require skilled manpower and in line with current employment areas indicating that these areas will continue to be employment destinations for manpower supply.

- **Incremental human resource requirement (2013-17, 2017-22) and skill gaps.**
- **Current workforce of 4.64 crore in 2013 is expected to increase to 8.22 crore by 2022.**

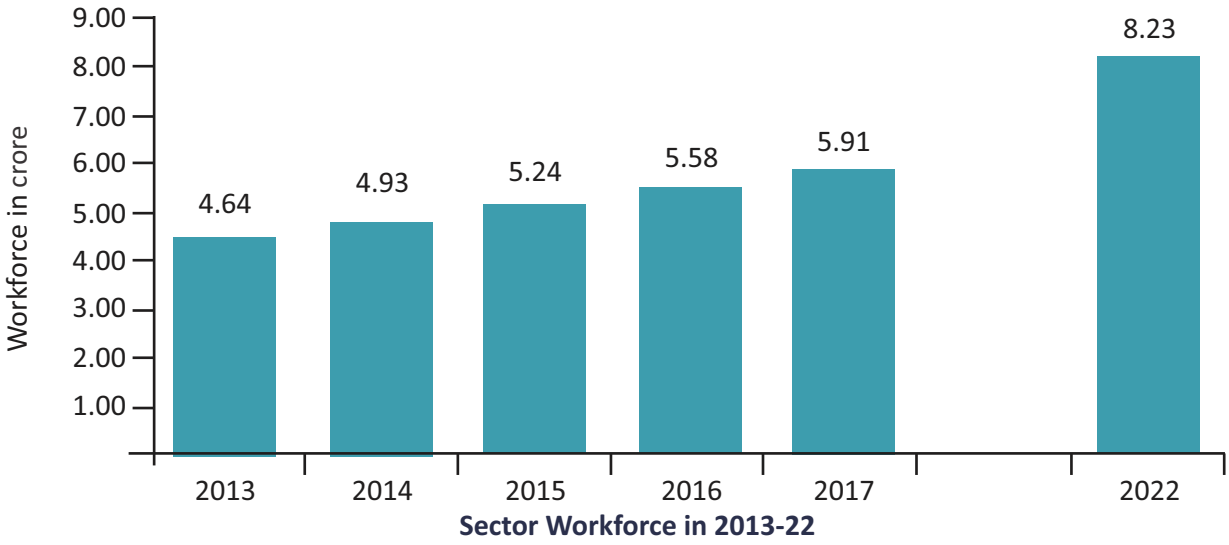

Fig 1.1.4

- The sector currently employs more than 4.64 crore employees and is planning to employ more than 8.23 crore employees by 2022.
- This implies additional creation of ~3.59 crore jobs in the nine-year period.
- The period 2013 – 18 will see a slower rate of growth in employment vis-à-vis 2017 – 22 due to the repercussions of the global recessions of 2008 – 09.
- The sector will bounce back and will require more work-force in the latter period viz. 2017 – 22.

Unit 1.2: Objectives of the Program

Unit Objectives

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

1. Analyze the importance of a stone fixer in the jewellery manufacturing process.

1.2.1 Need for Stone Fixer

The jewellery making process is a very fine work and it takes great effort to make fine jewellery. All the levels of making jewellery are very important.

The work a Stone Fixer does have value and need as it enhances the quality of jewellery and makes it more presentable and appealing. It's needed to understand the design specification and also to correct any defects. A Stone Fixer increases the durability of the product as he helps in correcting all the small or big faults that the jewellery would have.

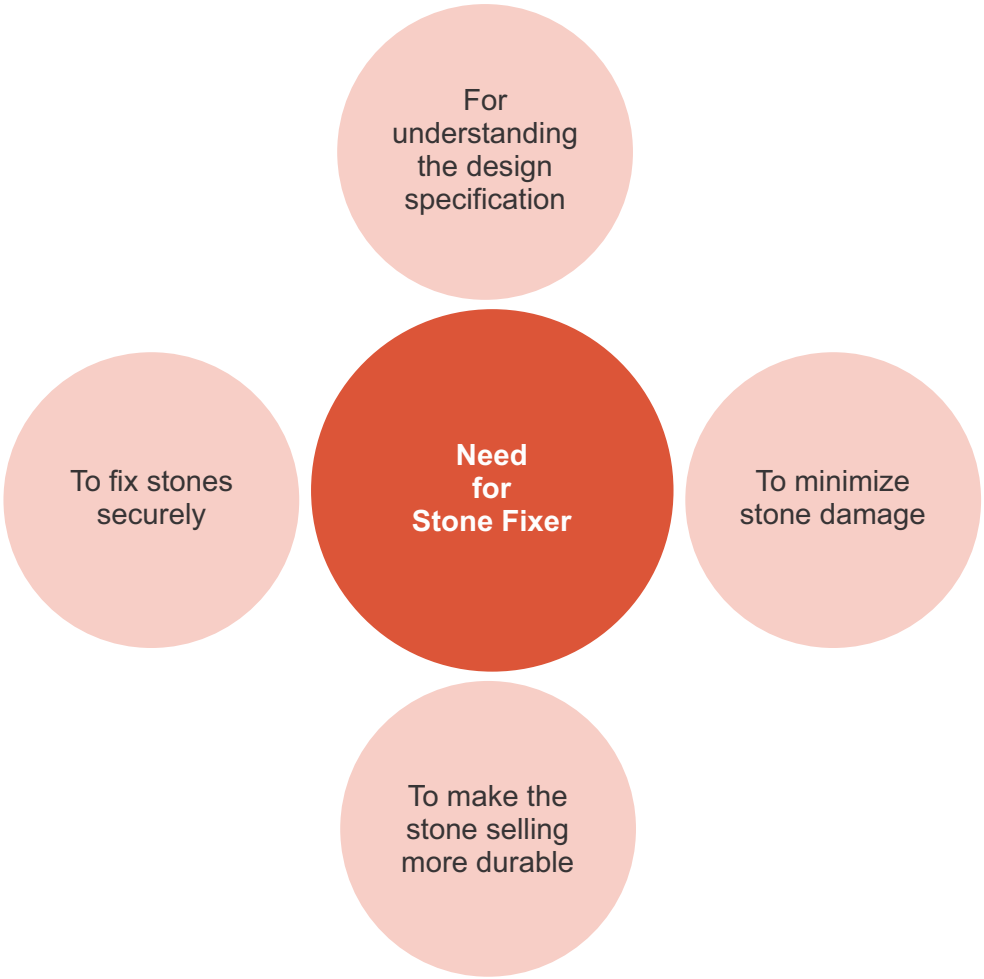

Fig 1.2.1 Need for stone fixer

Unit 1.3: Job Role of Stone Fixer – Imitation Jewellery

Unit Objectives

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

1. Analyze the job role of stone fixer in the Imitation jewellery manufacturing process.

1.3.1 Job Role of Stone Fixer – Imitation Jewellery

A Stone Fixer at work in imitation jewellery manufacturing solders the spots according to the design required to manufacture the jewellery or accessories. A stone Fixer solders metal parts of the jewellery like on pendant loop etc. with great care and accuracy using spot welding machine. As a Stone Fixer he is also required to spot any defects and deliver defect free products.

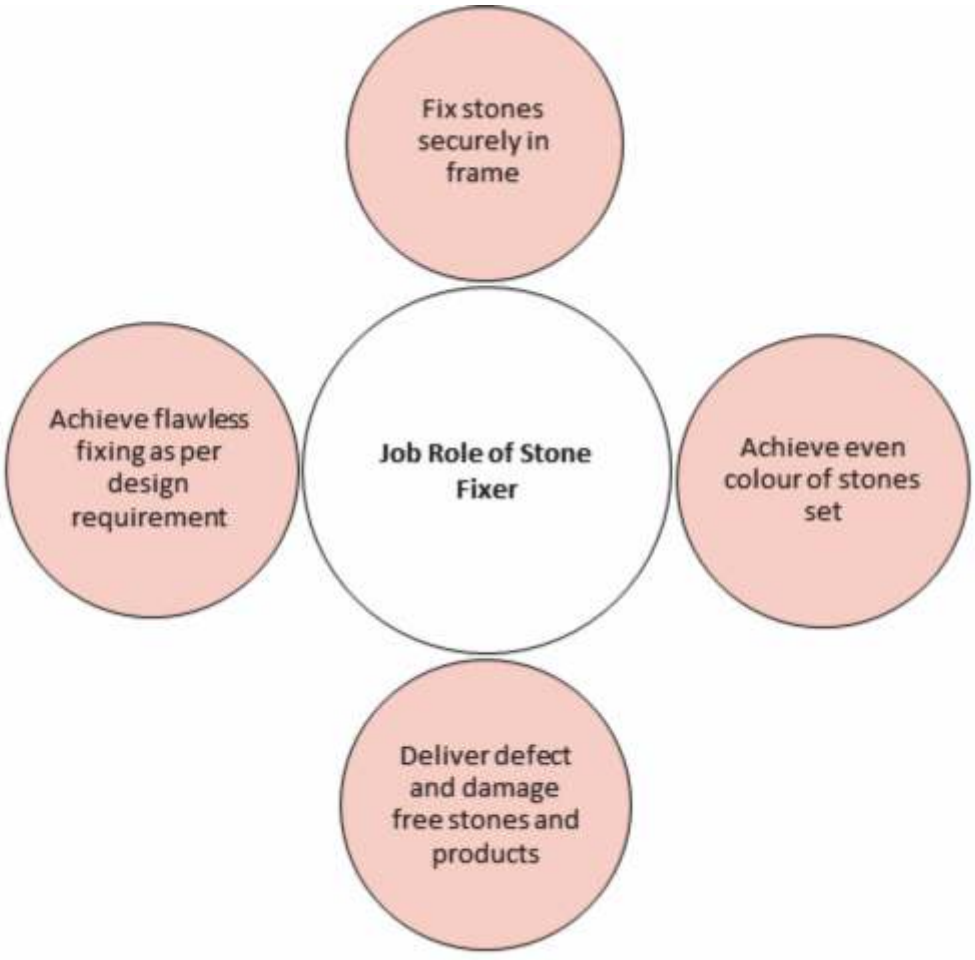

Fig 1.3.1 Job role of stone fixer

Unit 1.4: Job Opportunities for Stone Fixer – Imitation Jewellery

Unit Objectives

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

1. Analyze the job opportunities for Stone Fixer in the Imitation jewellery industry.

1.4.1 Job Opportunities for Stone Fixer

- Stone fixer is also known as 'Artisan' or 'Bench-Worker' in the industry.
- Work as Freelancer
  - A freelance stone fixer works as self-employed on a contract basis in a single company, two or more companies.
  - They have the freedom to pick and choose their project according to company rules and regulations.
- Stone Fixer in small or large company/ firm/ shop
  - The stone fixer can work in smaller companies/ firms/ shops which have a small unit and few employees.
  - The stone fixer can work in larger companies/ firms/ shops which have a large unit and more employees.

Fig 1.4.1 Job Opportunities for Stone Fixer

1.4.2 Personal Qualities Required in a Stone Fixer

The Stone Fixer is required to have a lot of patience while working to repair or weld jewellery as it's a work of great precision. One is also required to have coordination between hands and eye movement along with having focus in the work. A Stone Fixer is also required to work in small groups in an enclosed area and also work well with sharp tools with minimum hazards. The job also requires him to sit for long hours thus integrity and patience are a necessity for the work.

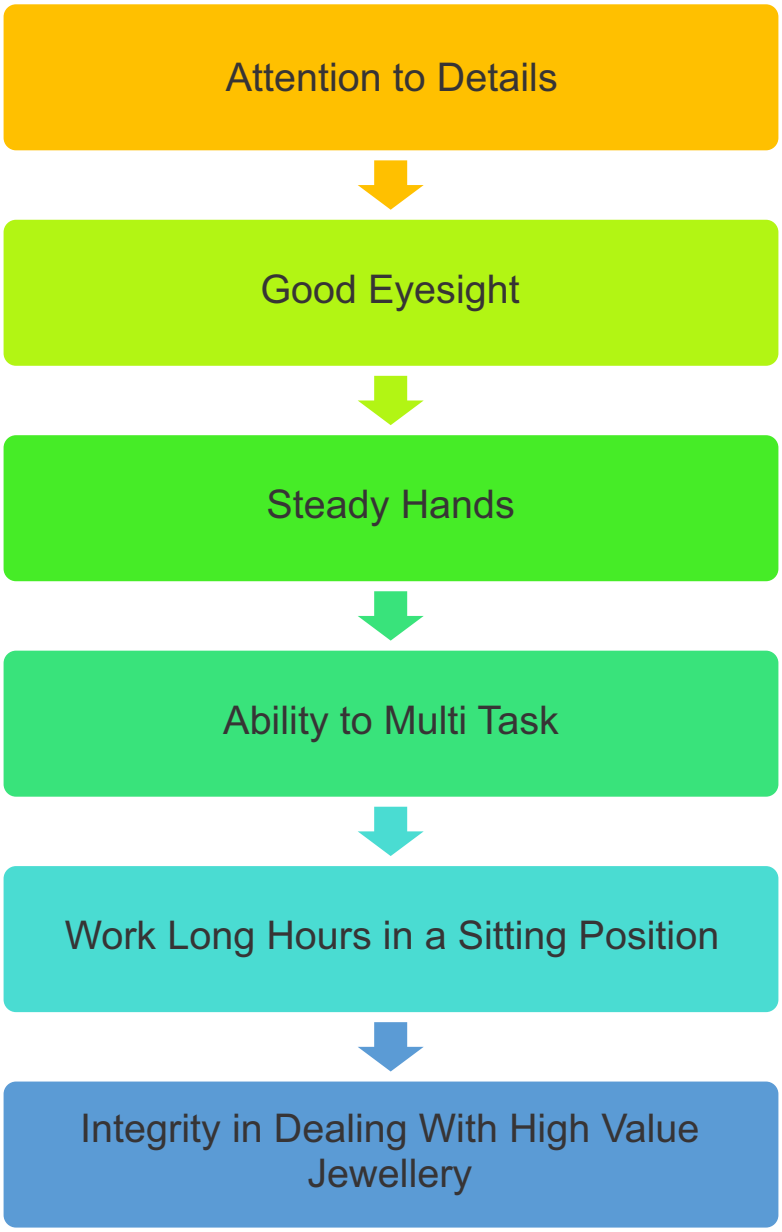

Fig 1.4.2 Personal qualities

Exercise

1. Write three job responsibilities of a stone fixer.
   a. _____
   b. _____
   c. _____

2. List three personal qualities required for a stone fixer.
   a. _____
   b. _____
   c. _____

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2. Fix Stones On Jewellery Frame - I

Unit 2.1 – Introduction to Imitation Jewellery Making Process
Unit 2.2 – Job Work of Stone Fixer
Unit 2.3 – Introduction to Metals
Unit 2.4 – Reading Job Sheet
Unit 2.5 – Types of Jewellery
Unit 2.6 – Introduction to Stones
Unit 2.7 – Types of Settings

G&J/N1504

Key Learning Outcomes

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

1. Analyze the Imitation jewellery making process.
2. Inspect the job work of stone fixer.
3. Analyze the importance of Imitation jewellery in the Indian market.
4. Analyze and inspect the metals and their properties.
5. Read the job sheet and understand the job requirements.
6. Analyze the various types of jewellery including the Indian jewellery categories.
7. Analyze and inspect the different types of stones used in Imitation jewellery and their characteristics.

Unit 2.1: Introduction to Imitation Jewellery Making Process

Unit Objectives

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

1. Analyze the Imitation jewellery making process.

2.1.1 Imitation Jewellery Making Process – Part 1

The first step towards jewellery manufacturing is 'Designing'. Thus in order to produce a piece which is unique we need to first prepare its design. This works like magic as it is just an idea which will be made into reality. Design is either created through CAD or Manually. The second step takes us towards melting lead with the alloy at 327 degree Celsius without reaching the boiling point. The molten metal is then poured into casts and metal rods are made as a next step. Finally the rods are used to make chains, handmade jewellery and casted jewellery.

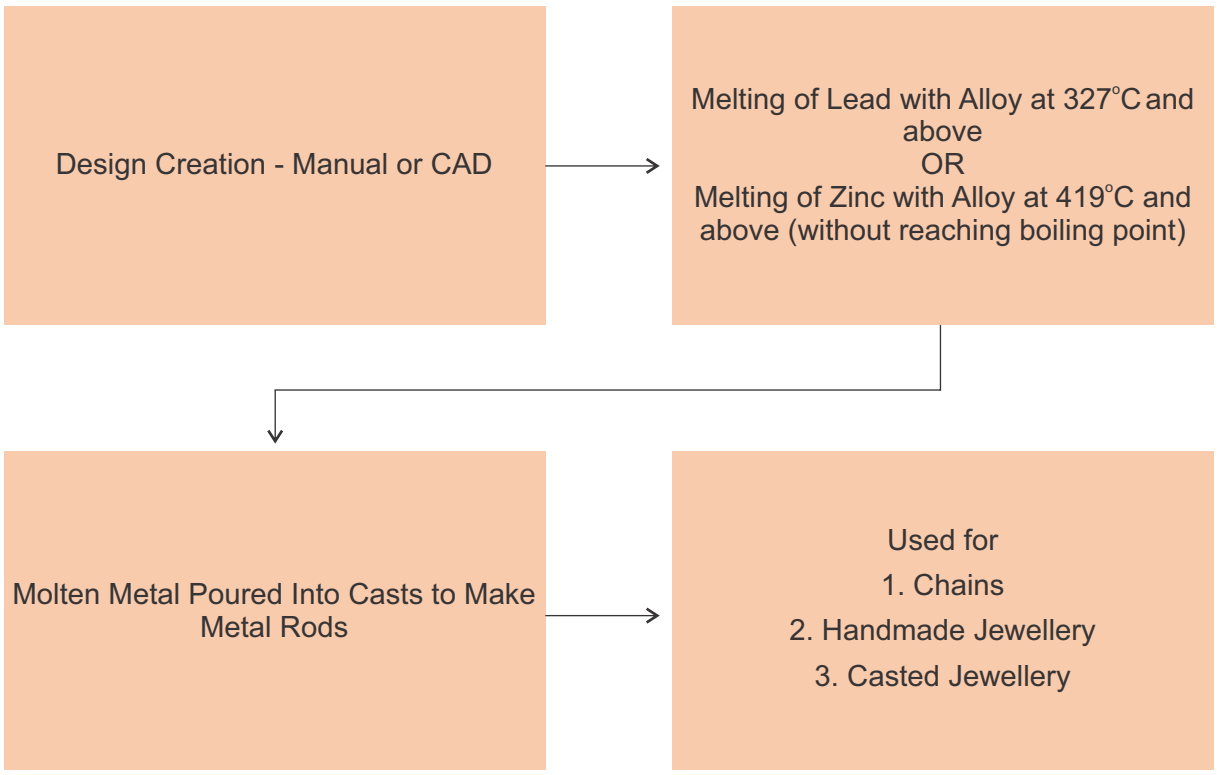

Fig 2.1.1 Jewellery manufacturing process

2.1.2 Imitation Jewellery Making Process – Part 2 – Handmade Jewellery

Handmade jewellery is jewellery made and assembled by hand and not through machines. The imitation jewellery made with hands includes wire drawing and stamping, die cutting, design fabrication, design pieces and loose ends, soldering and polishing, finishing and quality check and delivery. Handmade jewellery is made with utmost care and the work is done by experts who enjoy doing it and are also employed into it. Handmade jewellery has its own importance in the market.

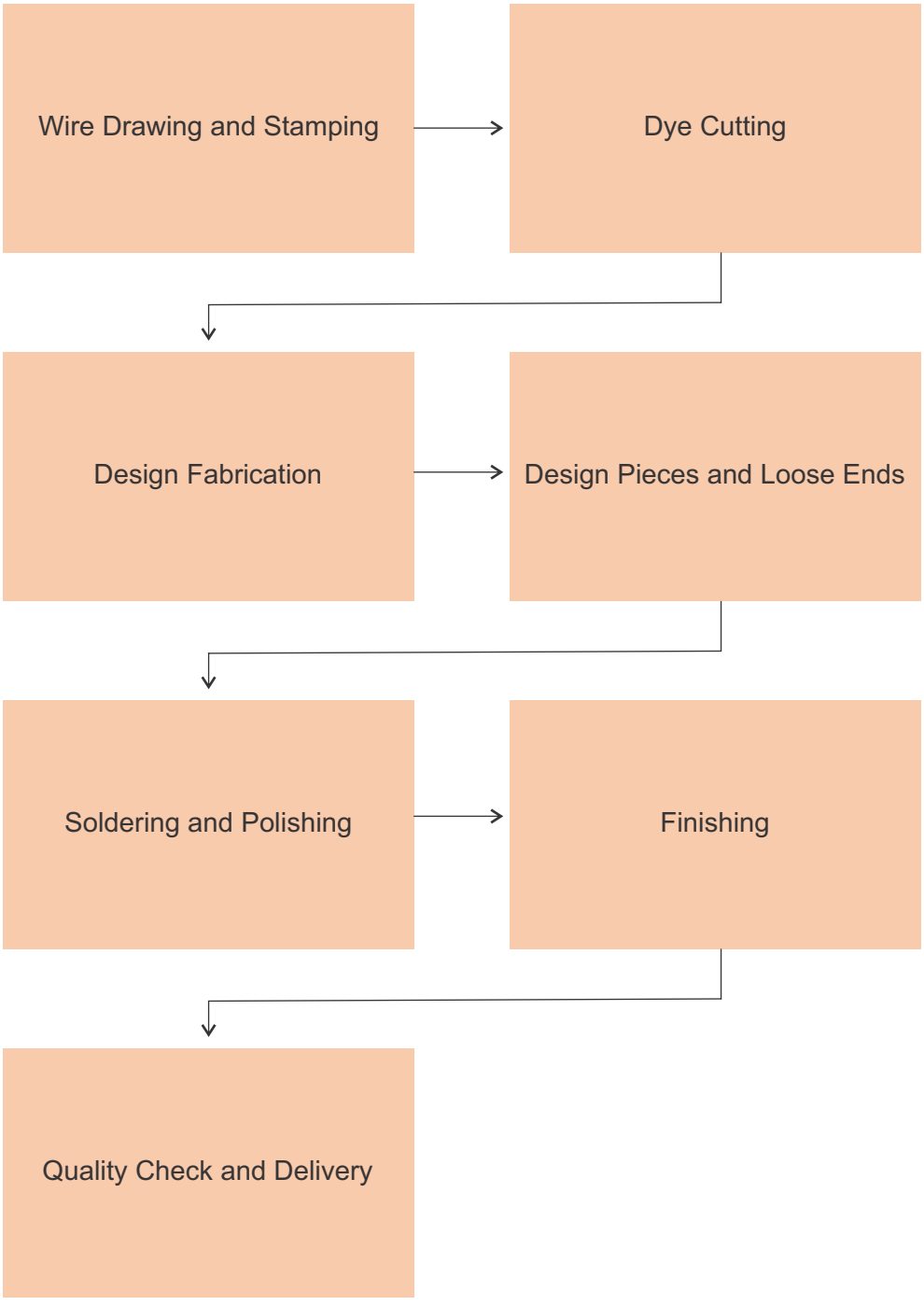

Fig 2.1.2 Handmade jewellery

2.1.3 Imitation Jewellery Making Process – Part 3 – Casted Jewellery

Jewellery casting is the process by which a wax pattern is made into a jewellery mold and then filled with molten metal or silver to create a custom piece of jewellery. It is also called lost wax casting as wax is always lost in the process of jewellery making.

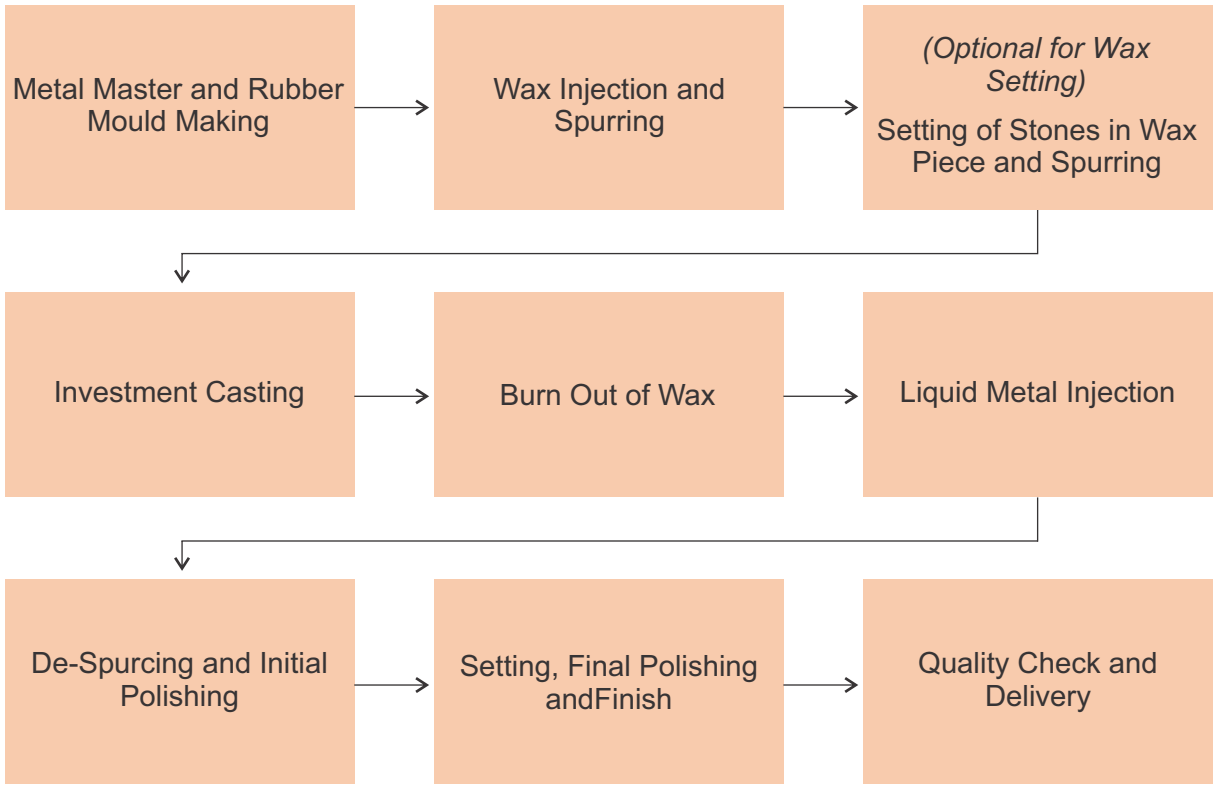

Fig 2.1.3 Casted jewellery

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Click Here
Brand Segmentation for Fashion or Imitation Jewellery

Click Here
Comparision between Fashion vs Real Jewellery

2.1.4 Imitation Jewellery Making Process – Part 4 – Machine Made Chains

The machine made chains are formed with a link which interconnects with the previously formed link. This creates a chain from wire formed links. The chain is passed on to the welder where every link is welded with machine electrically, without filler by heating the edges of the end of the wire and forging them together.

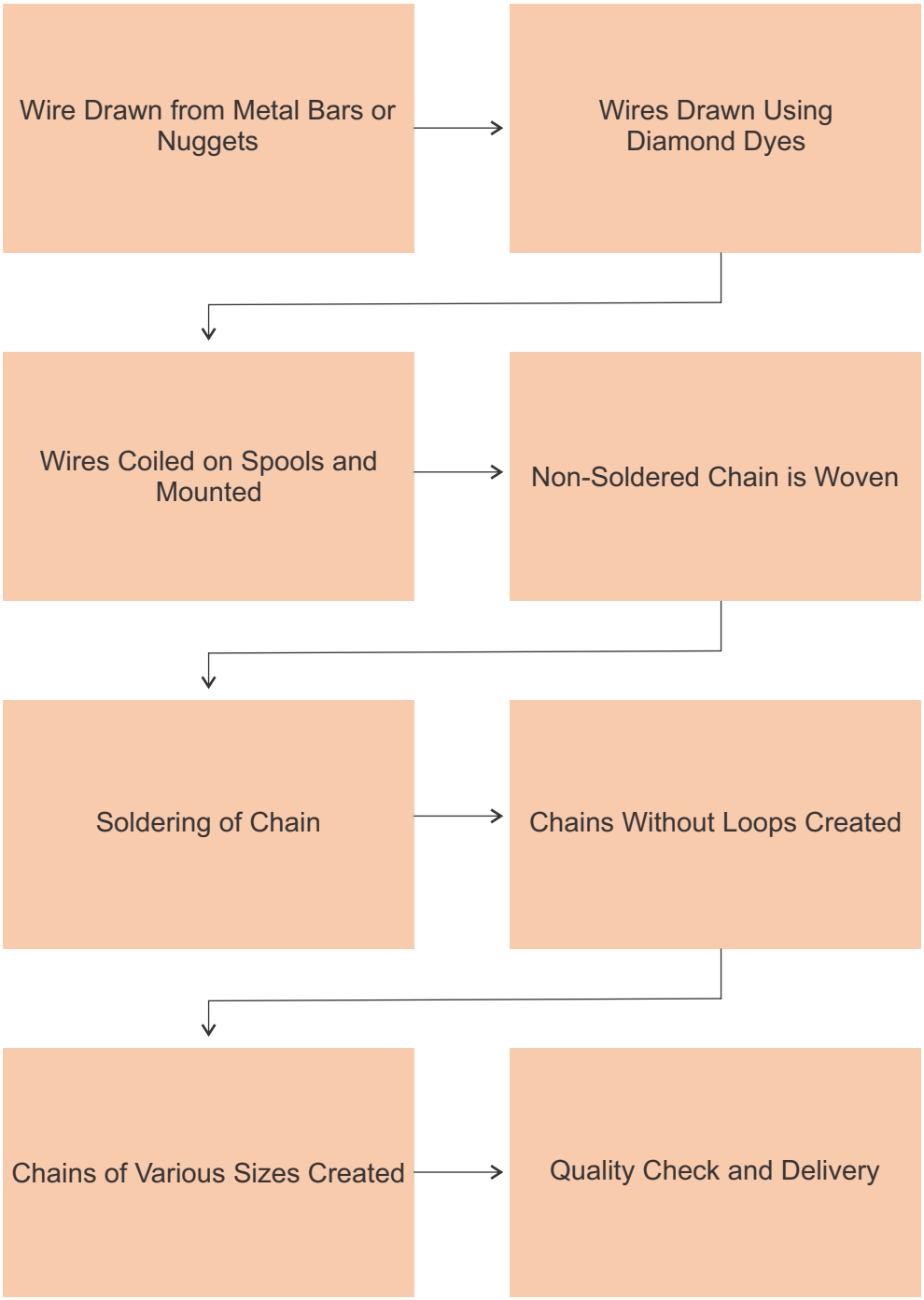

Fig 2.1.4 Machine made chains

Tips

1. In the Imitation jewellery making process, there are 3 outcomes: machine made chains, handmade jewellery and casted jewellery.
2. The stone fixer has a role to play in handmade and casted processes.

Notes

Unit 2.2: Job Work of Stone Fixer

Unit Objectives

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

1. Record the job work of stone fixer.

2.2.1 Introduction of Stone Fixer

- The stone fixer is also known as 'Artisan' or 'Bench Worker' in India.
- The stone fixer works with stones and tools to securely fix the stones in the metal frame.
- The stone fixer is also responsible for delivering quality metal frame and jewellery with minimum stone damage and metal defects.
- The stone fixing technique increases the setting quality of the product.
- In the International market, Imitation jewellery is also termed as “Costume Jewellery”.

Fig 2.2.1 Stone fixing

2.2.2 Job Work of Stone Fixer

- The job of stone fixer includes:
  - Achieving flawless fixing as per design requirement.
  - Achieving even colour of stones set, i.e., no discolouration or breakage during setting.
  - Using appropriate tools and equipment during the stone fixing process.
  - Ensuring stone is properly secured.
  - Ensuring smooth job finish.
  - Avoiding damage to stones and jewellery piece.
  - Reporting any defects to immediate supervisor.
  - Re-fixing defective pieces.

- The job also requires the individual to:
  - Pay attention to details
  - Have good eyesight
  - Have steady hands
  - Have ability to work in a team
  - Be able to stand for long hours
  - Maintain personal hygiene
  - Maintain good health
  - Take responsibility for any mistakes made by oneself

Fig 2.2.2 Stone Fixing

Tips

1. The stone fixer is a person who sets or fixes stones in a frame and jewellery or accessory product securely.
2. The stone fixer works with tools and equipment to ensure the secure and flawless stone fixing is carried out on the jewellery without any damage to the stones and products.

Notes

Unit 2.3: Introduction to Metals

Unit Objectives

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

1. Inspect the types of metals.
2. Analyze more about the metals used in Imitation jewellery.
3. Record the metal properties of the common metals used in manufacturing Imitation jewellery.

2.3.1 Introduction to Metals

A metal is a material an element, compound, alloy that is typically hard, opaque, shiny, and good conductor of heat and electricity.

TYPES OF METALS

1. Ferrous

- A Ferrous metal contains Iron, while a non-ferrous metal does not contain iron.
- Since these forms of metals tend to rust, most jewellery is created with non-ferrous metals.
- Normally, most jewellery is made from non-ferrous metals with the exception of steel jewellery.

2. Non-Ferrous Metals

- Base Metals:
  - Base metals are relatively abundant and tend to oxidise or corrode easily.
  - The 7 non-ferrous base metals include copper, aluminium, zinc, tin, lead, cobalt and nickel.
  - Imitation jewellery is typically manufactured using base metals.

- Noble Metals (Precious vs Non-Precious Metal):
  - Precious metals are rarer and valuable.
  - Precious metals are particularly desirable for jewellery because they are less reactive than most elements, possess a higher lustre and are easier to work with.
  - For example - Gold, Silver and Platinum.
  - Noble metals are rare, possess high surface lustre and are resistant to corrosion such as gold, silver, platinum, ruthenium, rhodium and palladium.
  - Non-Precious metals include all other metals such as ruthenium, rhodium, palladium.

2.3.2 Metals Used in Imitation Jewellery

Fig 2.3.1 Metals used in manufacturing Imitation jewellery

- The most commonly used metals for manufacturing Imitation jewellery across the world includes copper, lead, tin, nickel, steel and zinc.
- In India, the commonly used metals for Imitation jewellery include brass, copper, lead, nickel and zinc.
- These jewellery pieces are often mixed with alloys to make them more durable and withstand damage.
- The jewellery pieces can be coated with other metal coatings which made include gold plating, silver or rhodium plating.

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Click Here
Indian Heritage & Crafts in Global Market 1

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Indian Heritage & Crafts in Global Market 2

2.3.3 Metal Properties

- **PHYSICAL PROPERTIES OF METALS**
  - All metals show certain characteristic properties such as ductility, lustre, and malleability.
  - Metals differ in terms of ductility and malleability with gold being the most ductile while lead and tin being least ductile and malleable.

- **Metals differ widely in:**
  - Hardness
    - Ability of a material to resist plastic deformation, usually by dent on metal, permanent change in shape, meaning that a metal that does not lose its shape or get scratched when worked on.
  - Ductility
    - Ability of being drawn into wire, meaning the metal can be made into wires without breaking.
  - Malleability
    - A substance which can be beaten to make sheets, meaning the metal can be beaten to a thin sheet without it breaking or tearing.
  - Tensile Strength
    - Ability of a material to resist tearing, meaning the metal can be beaten or drawn into a wire or sheet without tearing.
  - Density
    - Density is the mass of an object per unit of volume, for example iron is a heavier metal than copper, hence it has a higher density.
  - Melting Point
    - The temperature at which it changes state from solid to liquid at atmospheric pressure.

Fig 2.3.2 Metal properties

2.3.3 Metal Properties

Base metal properties differ from the properties of noble or precious metals. It is important to know the properties and characteristics of base metals used in Imitation jewellery during the melting, annealing and cooling process. This will help in the stone fixing process and to obtain quality production.

Metal Name	Melting Point	Properties and Characteristics
Copper	1080°C	Red, tough, malleable and ductile, good conductor of heat and electricity, resistant to corrosion, can be worked on when hard or cold, needs frequent annealing.
Zinc	419.5°C	A layer of oxide protects it from corrosion, bluish-white, can be easily worked on, neither ductile nor malleable at room temperature
Lead	327.4°C	Soft, malleable, heavy, bright and shiny when new but quickly oxidizes to a dull grey, resistant to corrosion.
Cobalt	1495°C	Grey, lustrous, resistant to corrosion, ductile, but only moderately malleable, strongly magnetic.
Nickel	1555°C	Silvery – white, ductile and malleable, magnetic
Brass	900°C - 1000°C	Yellow, fairly hard, good conductor of heat and electricity, very corrosive, tarnishes very easily, harder than copper. Comprises of 65% copper and 35% zinc.

Table 2.3.2 Metal properties for metals used in Imitation

Tips

1. Every metal has a different physical and chemical property.
2. Before working with non-ferrous metals, make sure that you know the metals in which you will setting or fixing the stones.

Notes

Unit 2.4: Reading Job Sheet

Unit Objectives

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

1. Analyze how to read a job sheet and how a sample job sheet looks like.

2.4.1 Reading Job Sheet

DESIGN SPECIFICATION SHEET				
Product Code				**Date of Creation:**
Product Name:				**Design Description:**
Design with Technical Information				-Measurements of Product: -Metal Used: -Stones: -Instruments to be Used: -Setting Style(s): -Finish: -Other Instructions:
Stone Details:				**Name and Signature:**
Stone	*Size*	*No. of Pieces*	*Setting Style(s)*	

Table 2.4.1 Job sheet

2.4.2 Sample Job Sheet

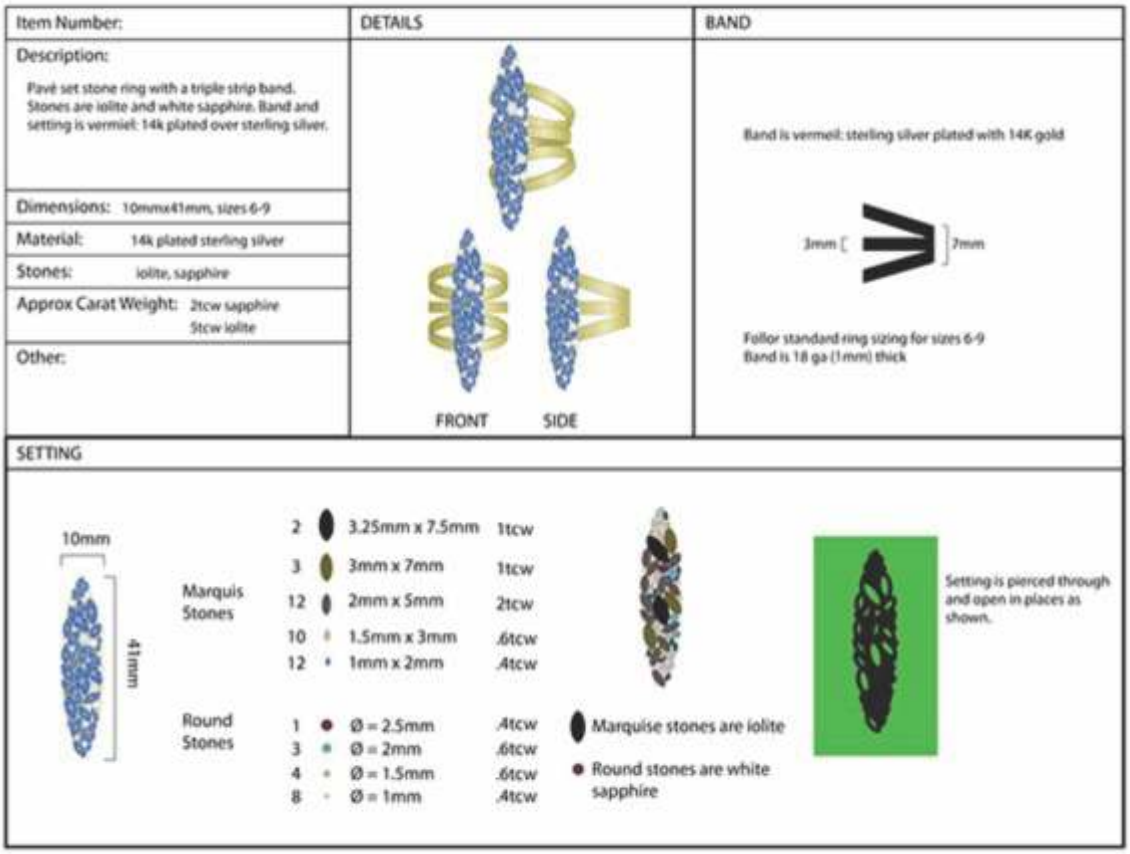

Fig 2.4.2 Sample job sheet

Tips

1. Always refer to the job sheet details before fixing or setting stones to understand the design requirement, metal used and the stones used.
2. If you are unsure of any detail mentioned on the job sheet, seek your supervisor's advice and assistance.

Notes

Unit 2.5: Types of Jewellery

Unit Objectives

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

1. Analyze the different types of Indian jewellery.

2.5.1 Types of Indian Jewellery

Antique Jewellery

Antique Jewellery is loved by most and look elegant and beautiful. This kind of jewellery has a dull and rough look. Antique jewellery comes in numerous forms, like meenakari, kundan work, jadau etc.

Fig 2.5.1 Antique jewellery

Scan the QR Code to watch the related video or click on link

Click Here
Diversity in Indian Jewellery

2.5.1 Types of Indian Jewellery

Bead Jewellery

During ancient times, people used to make beads out of gold, silver, copper, clay, ivory and even wood. Beads made out of copper, silver, other base metals, glass and plastic are very popular in India and are worn by all age group people.
Beads of various sizes are used in Imitation jewellery. The metal beads are normally plated with gold and silver.

Fig 2.5.2 Bead jewellery

2.5.1 Types of Indian Jewellery

Wedding Jewellery

These days' gold plated and silver plated Imitation jewellery are gaining popularity amongst Indians. Bracelets, anklets, wedding necklaces, pendants, earrings, bangles, amulets, toe rings, finger rings, nose rings, hairpins, forehead tikka, waistband and other ornaments are part of the bridal jewellery.

Fig 2.5.3 Bridal jewellery

2.5.1 Types of Indian Jewellery

Custom or Customized Jewellery

Custom or customized jewellery gives total freedom to the customer to make the jewellery according to what they want. Like readymade jewellery, in customized jewellery too there are a number of options, like gold plated jewellery, silver plated jewellery, diamond look alike jewellery, kundan jewellery, gemstone jewellery, minakari jewellery, bead jewellery, imitation pearl jewellery, etc.

In readymade jewellery, the jeweller helps the customer to choose according to what the latter wants but the jewellery is not changed or altered and the customer chooses it from a catalogue. The jeweller also gives his or her personal suggestions, to help the customer choose from a wide variety.

In custom made jewellery the customer and craftsman together decide what design has to be made. Often, the customer knows what he or she desires and takes this idea to the jeweller, in the form of a sketch or picture or sample.

Fig 2.5.4 Custom or customized jewellery

2.5.1 Types of Indian Jewellery

Filigree Jewellery

Filigree also known as Filagree and earlier was also written as filigrene or filigrann is a form of intricate metalwork used in jewellery making and also other forms of metalwork.
Filigree Jewellery is a unique piece that includes handcrafted and twisted threads of precious metal into a design. This metal is then soldered with gold or silver jewellery taking the shape of a symmetrical art work.
What does Filigree involve?
Filigree work involves lots of precision and details, and requires great amount of patience and an eye for minute details. Base metals are made into very thin wires, by passing it through a wire drawing machine or by hammering. After this, the two thinnest wires are heated and twisted around a rotating wheel machine, known as "Charkha". They are then flattened again, to make it as a single wire. This wire is bent in different ways, to give it many different forms and shapes. The jewellery is plated with gold or silver to resemble the precious metals.

Fig 2.5.5 Filigree jewellery

2.5.1 Types of Indian Jewellery

Plain Gold Plated Jewellery

The Plain Gold Plated Jewellery is a type that Some major gold plated jewellery of India includes necklaces, nose rings, earrings, hair clips, waistbands or toe rings etc., all popular among Indian women. The 1-gram gold jewellery is actually gold plated jewellery with another base metal.

Fig 2.5.6 Plain gold plated jewellery

2.5.1 Types of Indian Jewellery

Imitation Jadau Jewellery

Iin Imitation Jadau jewellery, stones resembling precious and semi-precious gemstones, crystals and beads are used which are embedded in metal, which is first melted a bit. When the metal becomes flexible, the stones are set on it with great precision and artistry. After that, it is allowed to cool down and the stones get fixed on it without any glue or carvings. The chiterias make the basic design, ghaarias are responsible for engraving and making holes, Minakari or enamelling is done by the enameller and the goldsmith takes care of the kundan or the gold. Uncut glass resembling uncut diamonds (polki or vilandi) are used as the central stone. Minakari or art work done at the back of the jewel is purely for beautifying purposes. The stone setters first set the stone in silver foil then combine with a finishing of gold plating.

Fig 2.5.7 Imitation jadau jewellery

2.5.1 Types of Indian Jewellery

Imitation Kundan Jewellery

Imitation kundan jewellery has glass studded on one side and colourful minakari on the back side. The entire technique of Kundankari lies in the skilful setting of stones in metal, which is rarely solid. Holes are cut for the stones, engraving is carried out and the pieces are enamelled. The main part of the ornament is made out of lac, a natural resin. Later, lac is inserted into the hollow parts and is then visible from the front, through the holes left for the stones. Refined metal is used to cover the lac and stones are then pushed into the metal. To increase the strength of the joints and to give it a smooth finish, more metal is applied.

Fig 2.5.8 Imitation kundan jewellery

2.5.1 Types of Indian Jewellery

Lac or Lacquer Jewellery

Another type of Indian Jewellery is Lac or Lacquer Jewellery. The process of making lac or lacquer jewellery is complex. Glass beads, flower shaped mirrors and decorative wire are also used for the enhancement of beauty of the jewellery.

The bangles of lac consist of an inner area that has a covering of thin layer of superior quality lac. Main lac, when mixed with a material similar to white clay, strengthens the bangle. The heating, mixing, pressing, and hammering of the dried ingredients takes place repeatedly and soft dry paste is formed. Once this paste is heated, it is shaped further and the expansion of the lac makes up for the required thickness, resulting in thickening of bangle. Next, a flat-shaped tool is used to roll the bangle across the flat surface, which gives it a proper thickness. The shaping is done by controlling the lac into grooves (coloured) on every side of the mould. The lac takes the shape of the groove into which it is forced. This process requires great precision.is forced. This process, which requires great precision.

Fig 2.5.9 Lac or lacquer jewellery

2.5.1 Types of Indian Jewellery

Minakari or Meenakari Jewellery

In Meenakari jewellery, stones are set and then enamelled with metal. As it is generally done on the reverse side of kundan jewellery, meenakar has to work with craftsman, engraver or ghaaria, designer or chiterias as well as jadiya. The art requires high skill and its difficulty for application requires a technical mind set. Ÿ In Meenakari, the piece of metal on which the work is to be done, is fixed on a lac stick. Ÿ Designs of flowers, birds, fish etc. are engraved on it. This creates walls or grooves, to hold colour. Enamel dust, of required colour, is then poured into the grooves and each colour is put under fire individually. The heat of the furnace melts the colour and the coloured liquid spreads equally into the groove. This process is repeated with each colour. Colours which are most heat resistant are applied first, as they are re-heated with each additional colour. Once the last colour has been heated, the material is cooled and polished with agate. The depth of the grooves, filled with different colours, determines the play of light.
Metal is used for the base of Meenakari. Choice of colours, in case of silver colour metal, has to be green, yellow or blue, as these are the colours which stick with it. As for gold colour metal, all the colours can be applied to it and this is also the reason why the metal is preferred for Meenakari jewellery.

Fig 2.5.10 Minakari or meenakari jewellery

2.5.1 Types of Indian Jewellery

Dokra or Dhokra Jewellery

Dokra is the art of metal crafts amongst some native tribes of eastern India. Basically, bronze melted with lac and resin is solidified into alloyed wires and rods, sometimes plates. Then the models are made with them and the designs created. They are handcrafted, therefore, the shapes are not perfect, and the symmetries are not mirror image produced like in computer graphics.

The themes and subjects of Dokra or Dhokra jewellery are usually nature and animals.
Dokra jewellery sets are heavy in weight especially if made with heavy metals such as copper or bronze. To create Dokra jewellery, the craftsman starts preparing the casting furnace and the wax image. The wax and the resin (dhuna) should be correctly mixed with oil to make the necessary lump. The image to be made must be clearly visualized by the craftsman, until it is ready to be modelled in the prepared lump of wax. When the wax-image is done it has to be purified with pancha - varna or the five powdered pigments. The joints of the component parts of the wax model should be strengthened with copper rods or nails before being covered by the clay mould. These supports may be removed after the wax model melts due to the heat of furnace. The craftsman then pours molten metal into a hole in the mould, breaks away the clay, brings out the object and finally smoothens and polishes it. The most important rule, in this metal craft is created by non-metals like wax, resin and clay and the artistic work is done with them.

Fig 2.5.11 Dokra or dhokra jewellery

2.5.1 Types of Indian Jewellery

Fusion Jewellery

Fusion jewellery is a combination of traditional and modern designs. They are designed keeping in mind the current Imitation trends of the industry. They are very bold, bright and colourful but also rooted to the origins.

Fig 2.5.12 Fusion jewellery

2.5.1 Types of Indian Jewellery

Imitation Thewa Jewellery

Yet another type of Indian Jewellery is the Imitation Thewa Jewellery. Thewa is a special art of jewellery making which involves embossing of intricately designed sheet of metal on molten glass. It literally means "setting". Thewa is the art of combining soft metal with multi-coloured glass. Each unit consists of a flat piece of transparent glass of different colours suggesting ruby (red), emerald (green) and sapphire (blue). The piece of glass is wrapped in a frame of gold plated silver wire. A paper-thin sheet of metal, of the same size as the glass, is cut and a free hand sketch of floral or historical motifs is made on it, by special tools. It is then dipped in acid for a while and washed thoroughly with water. A mixture of cinnamon oil (dalchini tel) and another material known as 'Ratti' is brushed at the back, to prevent the metal from melting. The glass is then semi melted and the gold pattern is carefully slipped over the edge and pressed onto the surface of the glass. The piece is reheated, till the gold and glass join firmly together. A thin silver foil is fixed on the other side, in order to give it a uniform lustre.

Fig 2.5.13 Imitation thewa jewellery

2.5.2 Categories of Jewellery

- There are various categories of jewellery such as head ornaments, neck ornaments, hand ornaments, body ornaments, leg and feet ornaments.
- Each of these are further divided as below:
  - Head Ornaments:
    - Maang Tikka
    - Sarpech (worn on turban by bridegroom)
  - Neck Ornaments:
    - Necklace
    - Choker
    - Chains
  - Hand and Arm Ornaments:
    - Bracelets
    - Bangles
    - Arm Band
    - Ring
    - Cufflinks
  - Body Ornaments:
    - Tie Pins
    - Brooch
    - Waistband (Kamarpatta)
  - Leg and Feet Ornaments:
    - Anklets (payal, jhanjhaar, paijab)
    - Toe Rings

Fig 2.5.14 Categories of jewellery

Tips

1. A stone fixer needs to know the different categories of jewellery while working, it is important that one remembers to follow the job sheet description for the right information.
2. It is very important that a stone fixer knows the type of jewellery they are working on as each type of Indian jewellery requires a different look hence the stone fixing needs to be done accordingly.
3. Other than the above mentioned jewellery types from India, there are some more types which are Navratna jewellery, Temple jewellery, Bikaneri jewellery (also called kundan), Pachchikam jewellery and German silver iodized jewellery which are manufactured using base metals and come under Imitation jewellery.

Notes

Scan the QR Code to watch the related video or click on link

Click Here
Categaries of Indian Jewellery

Unit 2.6: Introduction to Stones

Unit Objectives

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

1. Analyze the type of stones used in Imitation jewellery.
2. Inspect about imitation stones used in Imitation jewellery.

2.6.1 Type of Stones

There are 3 types of stones: natural, synthetic and imitation.

There are 2 main categories of natural gemstones: inorganic and organic. Inorganic gemstones are those which are minerals and have a definite structure. Organic gemstones are those which are produced by a living organism.

Synthetic gemstones including diamonds are grown in a laboratory and have the same physical, chemical and optical properties of a natural gemstone. For example, a synthetic ruby will have the same properties of a natural ruby except for the internal inclusions.

Imitation gemstones are those stones that have the same colour of another gemstone. These can be either natural or synthetic. Glass and plastic which imitate the colour of a natural gemstone also come in this category.

The synthetic gemstones grow within a controlled environment, as compared to the natural stones that get a chaotic environment for them where they grow. Because of their environment the natural stones have inclusions or impurities in them that are not present in the synthetic ones that have fewer inclusions or impurities and are therefore often vivid in colours.

Fig 2.6.1 Natural vs synthetic gemstone

2.6.2 Imitation Stones Used in Imitation Jewellery

Imitation stones are those stones which imitate the appearance or look like another stone. These stones can either be naturally occurring or can be created in a laboratory. Since the cost of high quality natural gemstones including diamonds are high, in Imitation jewellery less expensive stones are used.

Imitation stones include glass as well as plastic in all colours. For example, if the jewellery design requires green stones in them and using emeralds can increase the cost, green glass or plastic stones are used instead. Similarly, not all synthetic or lab grown gemstones are cheap, many of them are expensive depending on their manufacturing process.

Studded Imitation jewellery has different type of stones set in them compared to diamond and gemstones which are set in precious metal jewellery. Most of the stones used in Imitation jewellery include:

- Glass
- Plastic
- Synthetic gemstones
- Low quality semi-precious gemstones
- CZ
- High quality crystal also known as Swarovski crystals

Many of the glass and plastic stones have market names such as Rhinestone, Saphiret or Sappharine, Rivoli, Bakelite, Goldstone, Margarita etc. Low quality semi-precious gemstones include the low priced gemstones which are available in abundance in the market. Another popular material used in Imitation jewellery worldwide these days is resin along with wood. CZ (Cubic Zirconia) or popularly known as American Diamond in India, has been used intensively in expensive Imitation jewellery. Not all the colourless stones set in Imitation jewellery are CZ. Another popular stone used in India is plastic pearls or imitation pearls.

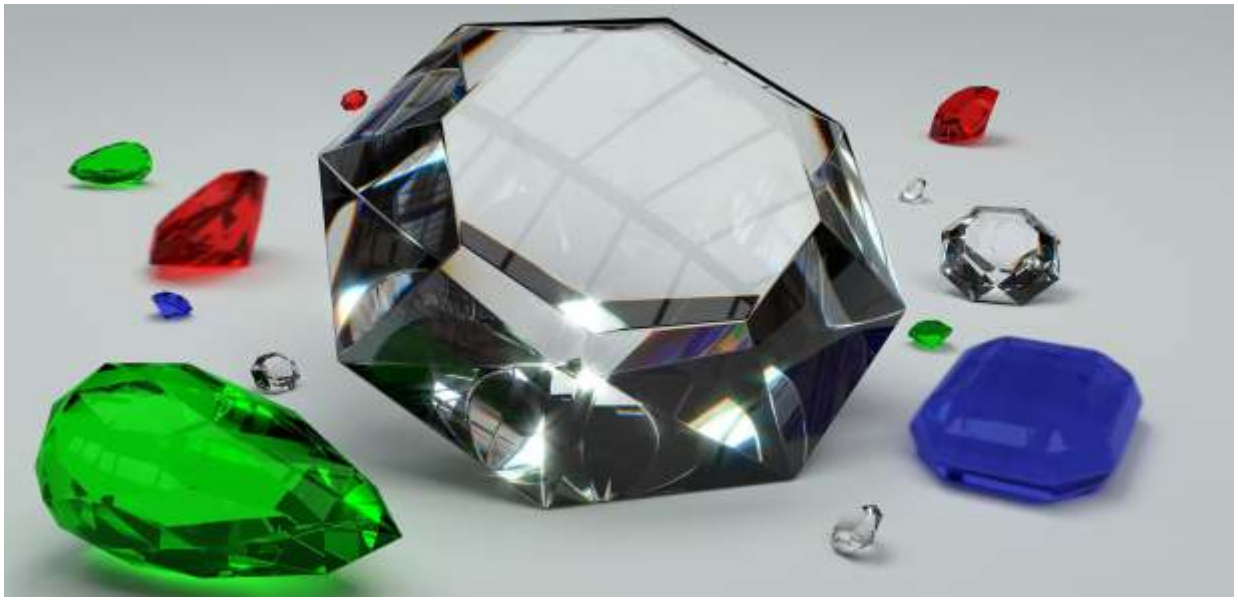

Fig 2.6.2 Imitation stones

2.6.3 Cuts and Shapes of Stones

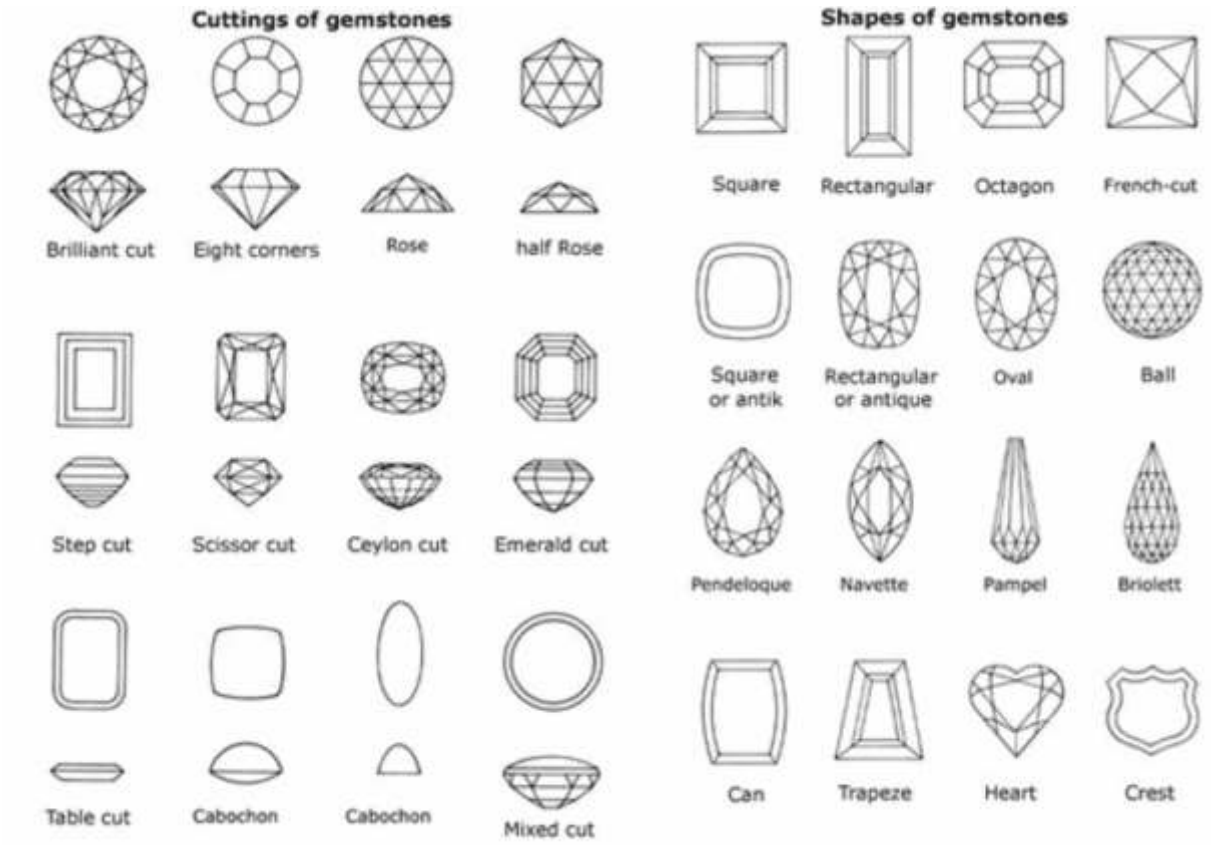

Fig 2.6.3 Cut and shapes of stones

Tips

1. A stone fixer needs to about the stones that are used in the jewellery designs so that stones do not get damaged during the setting process.
2. A stone fixer should know the properties such as softness of the stone to avoid any damage to the stone during the fixing or setting process.
3. Properties also include change of colour in the stone due to heat when applied directly on the stone during the repairing process.

Note

Unit 2.7: Types of Settings

Unit Objectives

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

1. Analyze which are the different types of basic and advanced settings for stones.

2.7.1 Types of Settings

Prong setting uses a stone between two or more claws and is commonly used with gemstones or diamonds. This is the setting that allows maximum light inside the stone among all the types of jewellery settings. They are used in single stones or clusters. Single, double, triple, V-Prong/Chevron and decorative double are the prong settings.

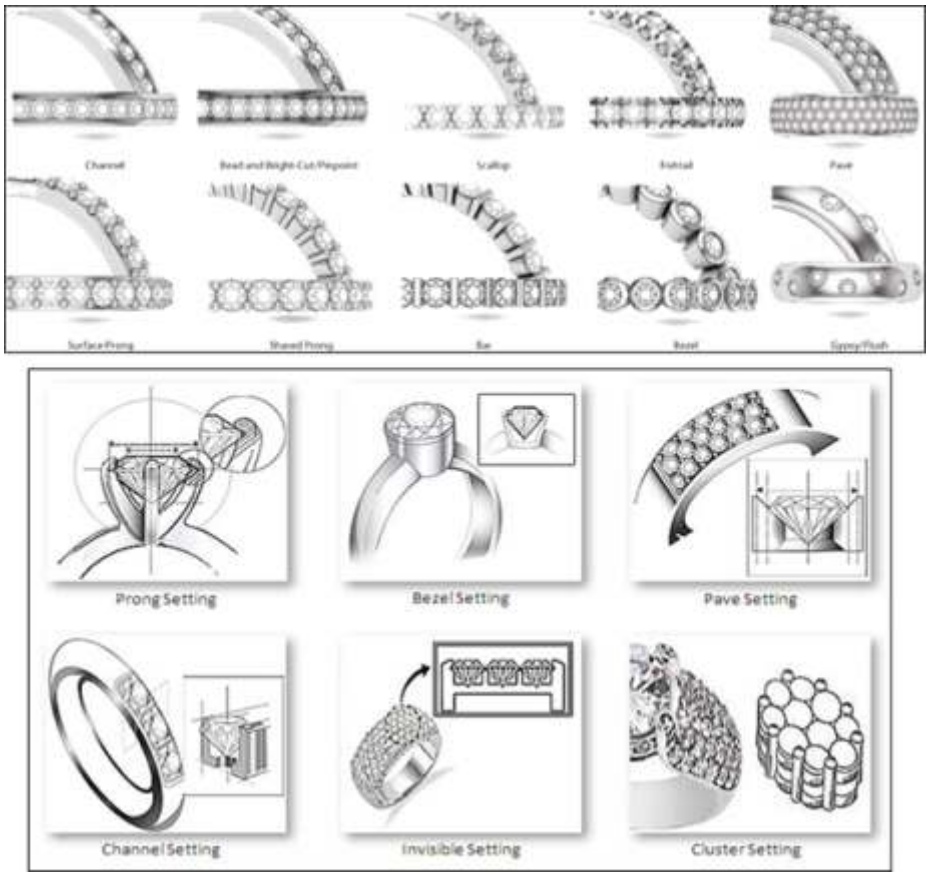

Fig 2.7.1 Different setting styles

2.7.1 Types of Settings

Prong Setting

- Prong or Claw setting is the most common setting.
- It is also known in India as “Nakun Setting”, “Sutti Setting”.
- There are some advance prong settings like Triple and Decorative Double.

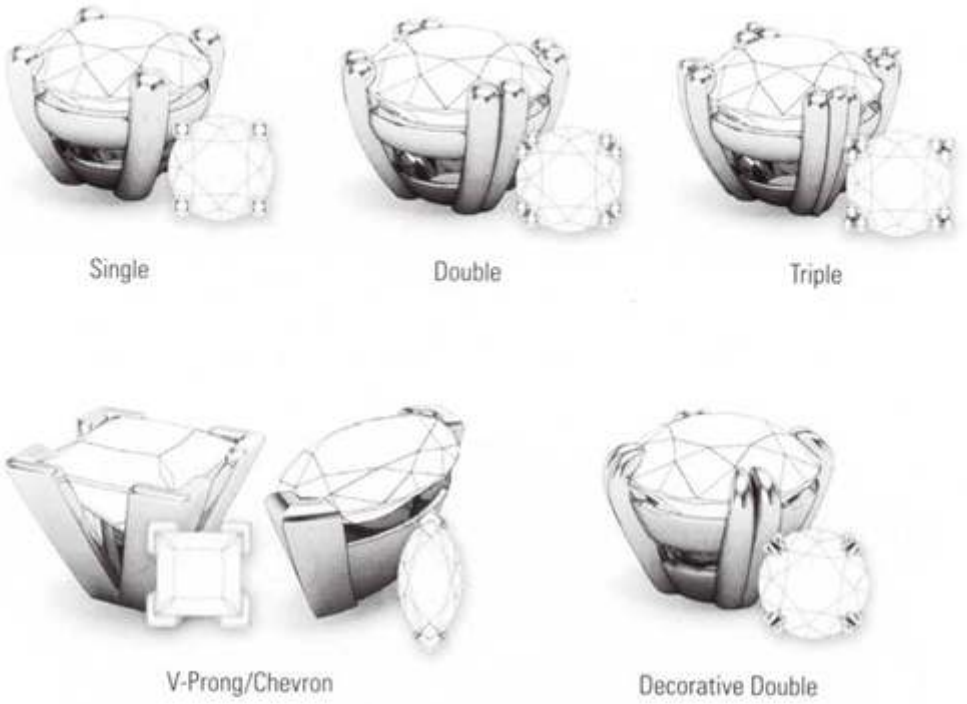

Fig 2.7.2 Prong setting

2.7.1 Types of Settings

Other Settings

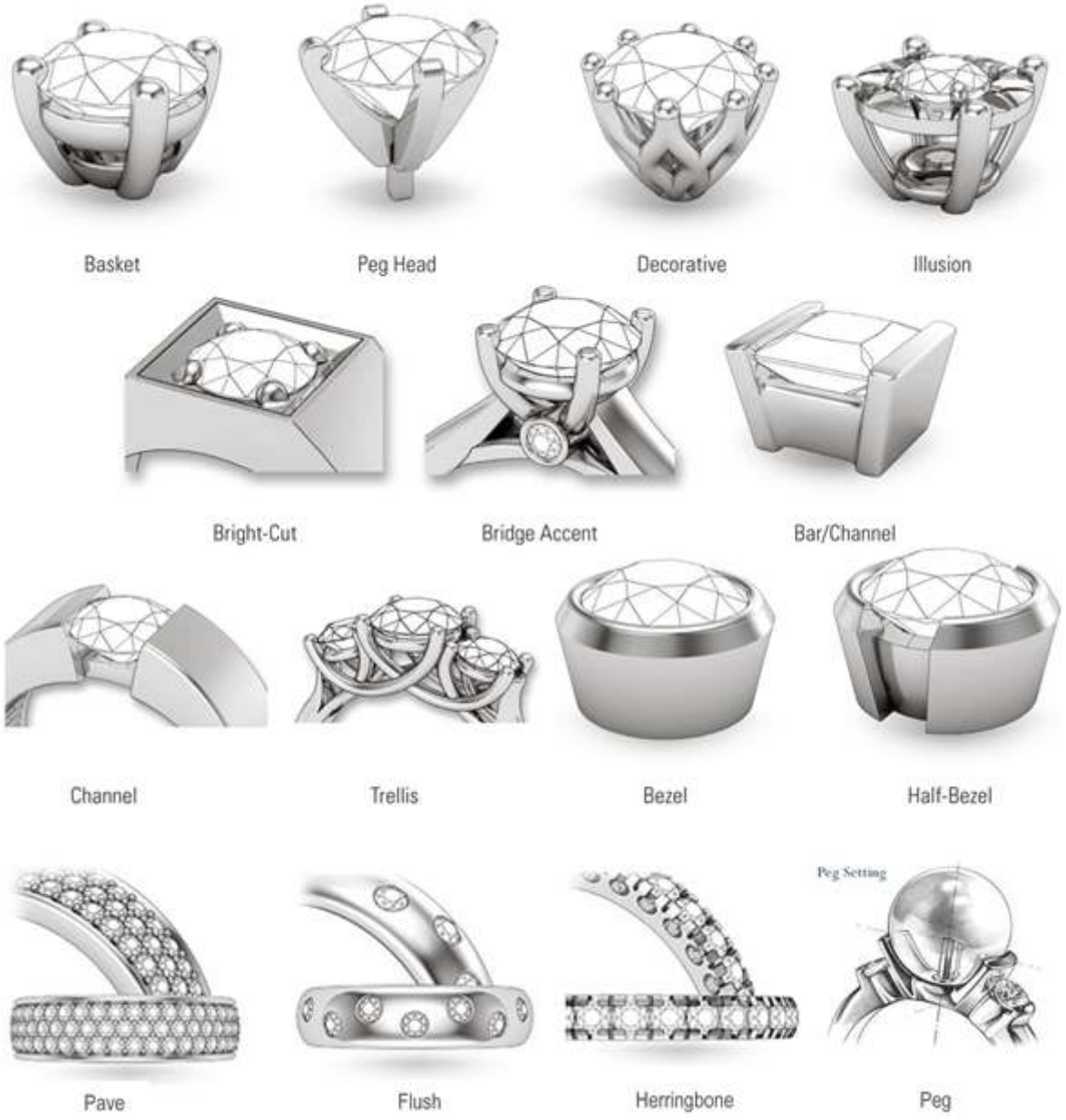

Fig 2.7.3 Other settings including prong setting

Tips

1. Check for any missing prongs, check if they can be repaired, if it is not possible inform your supervisor.
2. Check for damaged setting heads which need repairing.

Notes

Exercise

1. Identify bead jewellery.




2. Write the names of two head and two neck ornaments.

3. Name the setting shown in the image given below.
   a) Pave
   b) Bezel
   c) Channel
   d) Prong

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3. Fix Stones On Jewellery Frame - II

Unit 3.1 – Tools and Equipment Required for Stone Setting
Unit 3.2 – Setting or Fixing Stones
Unit 3.3 – Check for Defects
Unit 3.4 – Achieving Quality Standards
Unit 3.5 – Maintaining Quality of Production
Unit 3.6 – Know Your Organization and Its Standards
Unit 3.7 – Work Hazards

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Key Learning Outcomes

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

1. Analyze the various types of basic and advanced settings used for jewellery.
2. Analyze the various tools and equipment required for the job work.
3. Follow and practice the appropriate techniques for securely fixing stones in the frame.
4. Inspect product defects and repair them.
5. Analyze the daily production target with minimum errors and damage in the jewellery.
6. Maintain the quality of production of the company.
7. Analyze your organization and its working.
8. Record the work hazards and how to prevent them.

Unit 3.1: Tools and Equipment Required for Stone Setting

Unit Objectives

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

1. Analyze the various tools and equipment required for stone setting or fixing.

3.1.1 Tools and Equipment Required for Stone Setting

- The stone setting or fixing process involves the requirement of different types of tools and equipment.
- These include flex shaft, beading tools, burnisher, lac stick, ring clamp etc.

Fig 3.1.1 Stone setting or fixing tools and equipment

3.1.1 Tools and Equipment Required for Stone Setting

Saw Frame and Blades

- Saw frames and blades are used for cutting the metal frame or settings when required.
- Be careful when using the blades as they can cut into your fingers.
- Use gloves whenever possible while using saw blades.

Fig 3.1.2 Saw Frame and Blades

3.1.1 Tools and Equipment Required for Stone Setting

Needle Files

- Needle files are used to file the metal and help to make create better fitting stone settings.
- They can be used to file down the height of a bezel to make it fit the stone neatly.
- They can also be used to make the file the inside of the bezel setting to make it easier to push the stone.
- They can be used to file rough edges on metal beads and findings.
- Their small size also makes them ideal for getting into small spaces.

Fig 3.1.3 Needle files

3.1.1 Tools and Equipment Required for Stone Setting

Burnisher

- This is a tool that gives a high shine and professional finish to your stone setting.
- When rubbed onto softer metals such as copper, a burnisher smoothens and shines the metal.
- It can be used to remove tool marks during the stone setting process.

Fig 3.1.4 Burnisher

3.1.1 Tools and Equipment Required for Stone Setting

Bezel, Prong Pusher and Roller

- Used for pushing bezels, prongs or crown points around stones when mounting and setting stones or in jewellery.
- The polished "V" groove in the tip sets and pushes the bezel against the stone for a secure mount.
- The bezel roller is used for rolling the bezel setting over the stones especially cabochon cuts in pre-setting heads such as bezel cups.
- The bezel roller prevents creases or unsightly marks on the metal.
- To use the bezel roller, push the bezel around the gemstone, working from all sides and gently rocking back and forth with downward pressure until the stone is secure.
- The prong pusher is a tool used when setting faceted gemstones.
- It is particularly useful when working with setting heads as you can use the pusher to push the claws over the top of the stone.
- The square metal rod is slightly rounded on the corners and polished at the end to minimise setting marks and scratches.

Fig 3.1.5 Bezel, Prong Pusher and Roller

3.1.1 Tools and Equipment Required for Stone Setting

Prong Lifter

- This highly tempered opener allows the setter to easily open small prong set rings.
- Helps eliminate damage to prongs or stones.

Fig 3.1.6 Prong lifter

3.1.1 Tools and Equipment Required for Stone Setting

Millgrain Set

- The millgrain set is used for forming decorative edges on settings and bezels.

Fig 3.1.7 Millgrain Set

3.1.1 Tools and Equipment Required for Stone Setting

Stone Setting Pliers

- The stone setting pliers is used to set or tighten side stones in a basket setting as well as on other type of mountings.
- One side of the pliers has a slot for the wire under the stone and the other side has a beading tool cup on it.
- To use it, simply slip the post through the slotted side and bring the beading tool down on the prong.
- This is extremely useful for setting the tightening side stones surrounding the centre stones.

Fig 3.1.8 Stone setting plier

3.1.1 Tools and Equipment Required for Stone Setting

Beading Toolset

- The beading toolset is used for pave and bead setting.
- Each cone has a different measurement which is used for rounding the metal for the various bead setting styles.

Fig 3.1.9 Beading toolset

3.1.1 Tools and Equipment Required for Stone Setting

Lac or Shellac with Wooden Stick

- Lac or Shellac has amazing holding and sticking properties.
- To create the lac or shellac stick, you need
  - A piece of round or flat wood depending on the size of the object you would like to hold.
  - Place some shellac pieces onto the wood and start melting with a small soldering torch.
  - Cover the wood with approximately 10 to 20mm of shellac (depending on the depth of your piece) ensuring the edges are overlapping.
  - Use a pair of tweezers to secure the item in place and apply heat pushing the piece into the shellac.
  - Once the piece is fixed into the shellac to allow it to cool for between five and ten minutes, the piece is now ready to work on.
  - To release the piece from the shellac heat the item on the shellac (to melt) and remove with a pair of tweezers.

Fig 3.1.10 Lac or Shellac with wooden stick

3.1.1 Tools and Equipment Required for Stone Setting

Ring Clamp

- The ring clamp is used for holding rings by the shank while setting the stones in them.
- The ring is held securely by the jaws which have leather attached to them to avoid scratches on the metal.

Fig 3.1.11 Ring clamp

3.1.1 Tools and Equipment Required for Stone Setting

Setting Burs

- Setting burs are useful tools for creating a setting seat for the stones.
- Setting seats help in keeping the stone secure in the setting.
  - Use with a pin vice to drill in dry metal clay for clean, precise seats for setting stones in place.
  - Use these burs to cut a seat for faceted stones in bone dry clay or lac.
  - Cuts very easily by hand with a few turns, or put in a pin vise for a better grip.
  - First drill a pilot hole for a light hole and then cut the seat with the bur.
  - Stone table should sit below the surface by a small amount so the clay shrinks around the girdle.
  - Choose the bur that matches the stone size you wish to set.
  - To set stones in metal, install bur in a flex shaft and lubricate with Cut Lube and use a slow speed.
  - Top quality burs should be treated with care.
  - Do not overheat with high speed or the bur will lose its ability to cut.

Fig 3.1.12 Setting Burs

3.1.1 Tools and Equipment Required for Stone Setting

Loupes and Magnifying Lens

- Loupes and magnifying lens are very important tools for a stone fixer.
- These are available as head gears or as hand tools.
- The loupe is available in 10 times magnification (10x), 20x and 30x.
- Loupes are held with one hand and can be easy if you know how to use it.
- Loupes are held in front of one eye while checking the setting.
- Magnifying lens such as the head lens or the Optivisor are attached with the head band to your forehead.
- They come with additional lens for higher magnification.
- The head magnifying lens can help you work with both your hands while magnifying the jewellery piece or frame.
- Many would also use a microscope for setting styles such as micro pave setting.

Fig 3.1.13 Loupes and Magnifying Lens

3.1.1 Tools and Equipment Required for Stone Setting

Wax Jewel-Setting Stick

- Wax jewel setting sticks are used for placing the stone in the setting head.
- One can use the traditional clay setting stick or then the new paraffin wax stick.
- Both are easy to use.
- When picking up the stones, be sure you pick it from the table (largest facet of a stone), so that you can place the stone correctly.
- These wax jewel setting sticks will not damage a stone, but if you do not pick up the stone correctly, you may drop the stone and it will get damaged.

Fig 3.1.14 Wax jewel-setting stick

3.1.1 Tools and Equipment Required for Stone Setting

Flex Shaft and Tools

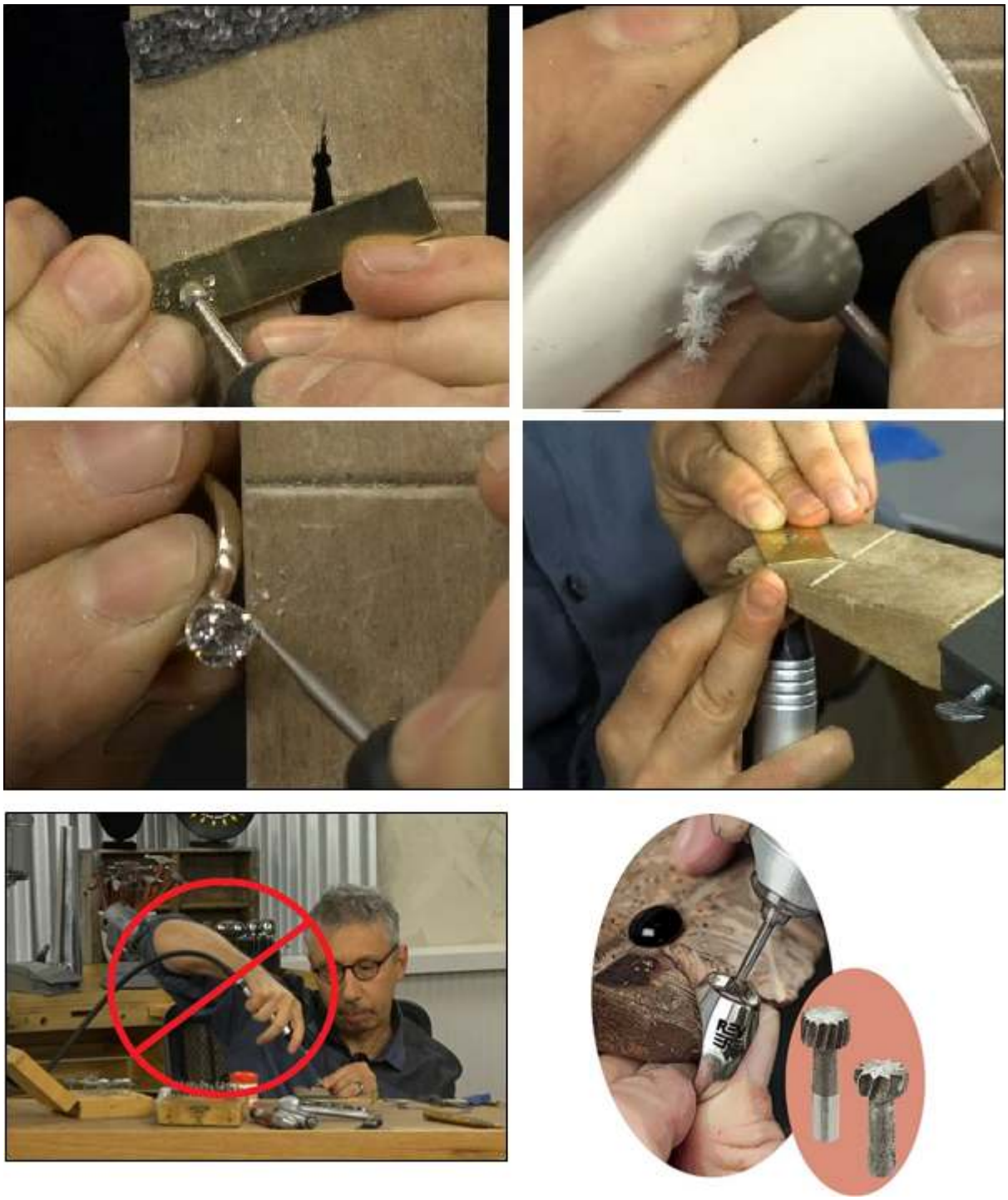


Fig 3.1.16 Using the flex shaft and tools

3.1.1 Tools and Equipment Required for Stone Setting

Bench Pin

- A bench pin is a removable tool which is attached to the edge of the bench.
- Depending on the type of work, the bench pin can be changed.
- Bench pins are used for pre-polishing, setting, cutting and holding the ring clamp.

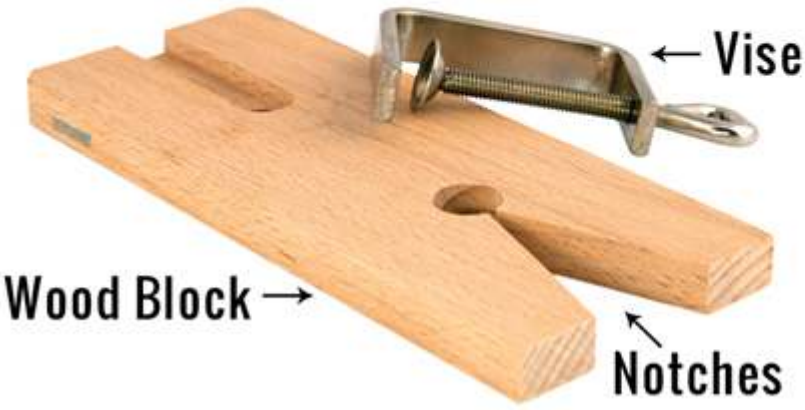


Fig 3.1.17 Bench pin

3.1.1 Tools and Equipment Required for Stone Setting

Callipers or Measuring Gauges

- Callipers or measuring gauges are used for measuring the length, width and thickness of metal.
- It is also used for measuring setting components and stones.
- There are different types of callipers and measuring gauges available in the market, use the ones that you are comfortable with and which give you the accurate reading.

Fig 3.1.18 Callipers or Measuring Gauges

3.1.1 Tools and Equipment Required for Stone Setting

Hand Drills and Small Drill Bits

- Hand drills and small drill bits are used for drilling holes in the metal manually.
- In India, we use the bow drill for the same purpose.
- However, the advanced flex shafts available today, can also drill holes.

Fig 3.1.19 Hand Drills and Small Drill Bits

3.1.1 Tools and Equipment Required for Stone Setting

Tweezers

- Tweezers are tools that make a jeweller's work easy and are a constant in the bench.
- There are different types of tweezers used in jewellery making and it is not limited to any one department.
- These tools keep you safe from chemicals that are used in jewellery making.
- Tweezers are also used to pick up the stones and place them in the setting heads.

Fig 3.1.20 Tweezers

Tips

1. Always read the instruction manual and the set up instructions before using the electrical machines.
2. Wear safety gears while working with the machines that emit heat.
3. Keep the work bench as well as tools area neat and clean.
4. If there is any equipment or tool that is damaged, inform the supervisor.

Notes

Unit 3.2: Setting or Fixing Stones

Unit Objectives

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

1. Analyze the parts of a jewellery piece.
2. Record how to fix or set a stone using the right tool.
3. Record the appropriate steps to fix a stone correctly.

3.2.1 Parts of A Jewellery Piece

- Before setting stones in the frame or jewellery, you must know the parts of the jewellery.
- For learning the parts, we will use the ring as an example.
- Arrange the stones as per size required for the different parts of the design.
- Remember, every design will have different setting requirements, always read your job sheet before starting.

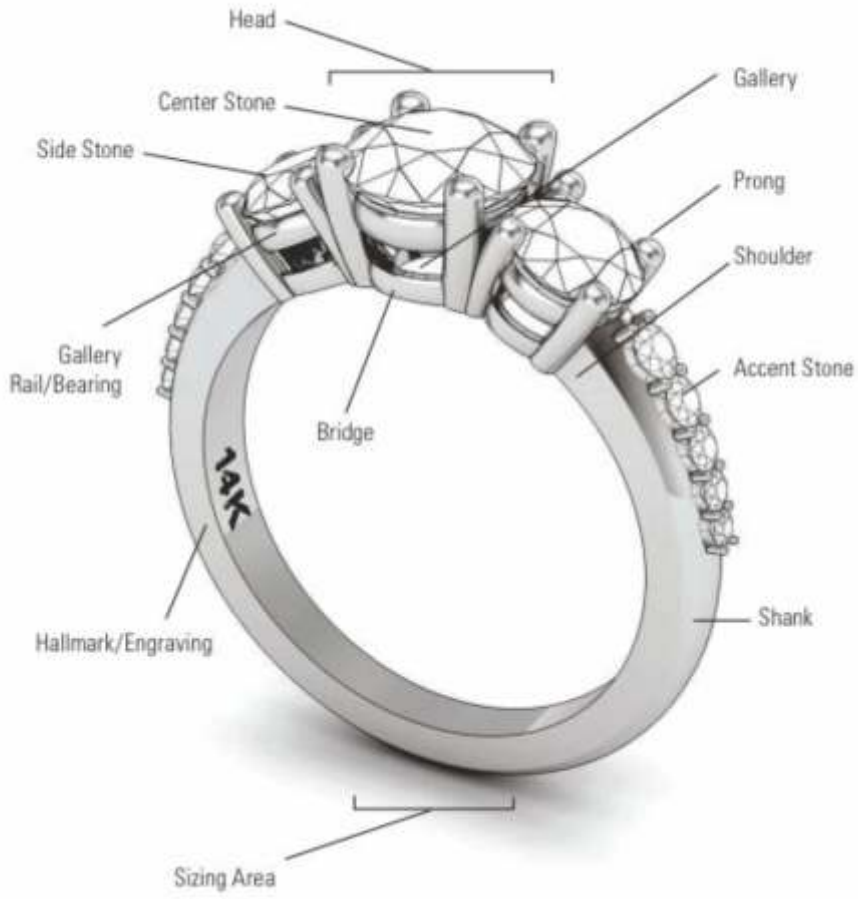


Fig 3.2.1 Parts of a Jewellery Piece

3.2.2 Types of Settings

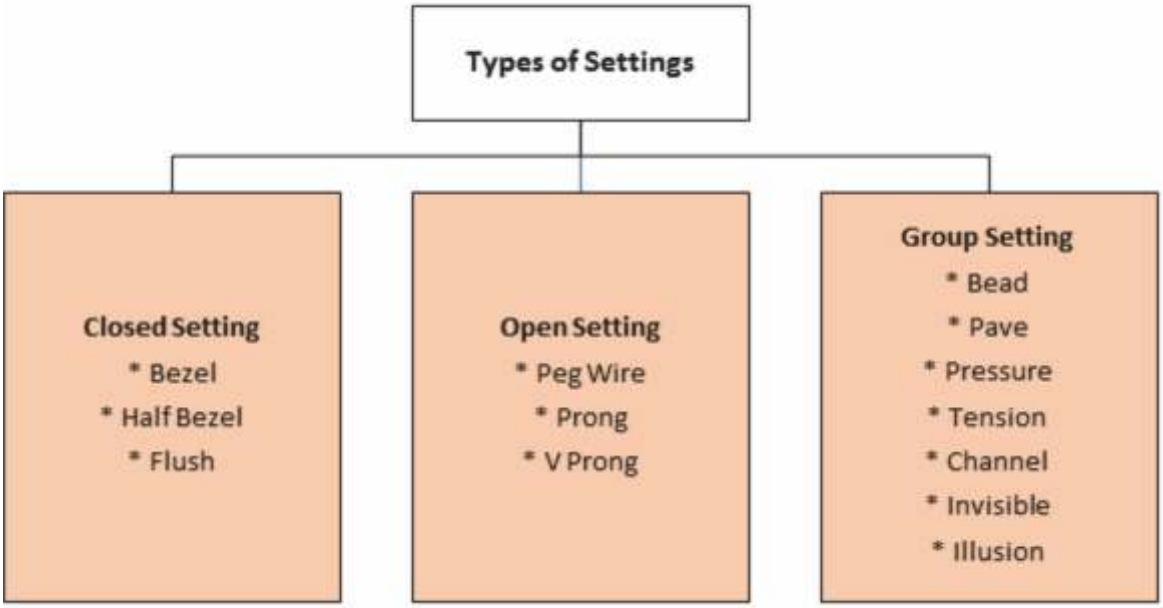


Fig 3.2.2 Types of settings

- Before starting the process of the stone fixing or setting, it is important to know the types of settings.
- In the Closed Setting category:
  - A metal sheet surrounds the stone either completely, half or then the stone is set on the level of the metal such as Flush setting.
- In the Open Setting category:
  - Metal wires are used to securely hold the stone in place.
  - The number of metal wires can increase depending on the design and the size of the stone.
- In the Group Setting category:
  - Bead and pave have shared metal beads which secure the stone.
  - In pressure and illusion setting, the central stone is surrounded by other smaller stones.
  - In tension setting, the stone is placed between two metal groove which are the only support that holds the stone in place.
  - In channel setting, the stones do not have metal between them, the stones are placed in a grooved channel next to each other, where the metal is on the opposite side.
  - In invisible setting, the side stones have metal holding them from the side whereas the stones in the central area are held in place by metal wires from the bottom side.

Scan the QR Code to watch the related video or click on link

Click Here
Types of Gemstone Setting

3.2.3 Setting or Fixing Stones in Jewellery

- If the setting is pave, bead or flush, make sure that when drilling the hole for the stone seat, you start with the smallest bur and then move to a bigger bur.
- Keep checking if the seat made will hold the stone in place, if the seat has been made bigger, the stone will get damaged and the entire jewellery piece would be required to be made again.
- For open settings, make sure you use the bur to make the stone seat at an angle so that it holds the stone securely.
- Pick up single stones with the setting stick by touching the table facet.
- Place the stone in the setting area and apply little pressure.
- You can use tweezers for bigger stones.
- While setting, hold the jewellery piece with the ring clamp or mounted on the lac.
- Use the appropriate tool and angle for setting the stone.
- You can use this method for all settings.
- When working with channel setting make sure that grooves are smooth.
- After completing the setting, turn the piece and check if the stone is secure and won't fall down.
- Every setting style is different from each other and a stone fixer needs to practice each setting style.
- After completing the setting, file out excess metal and give remove tool marks using the appropriate tools.

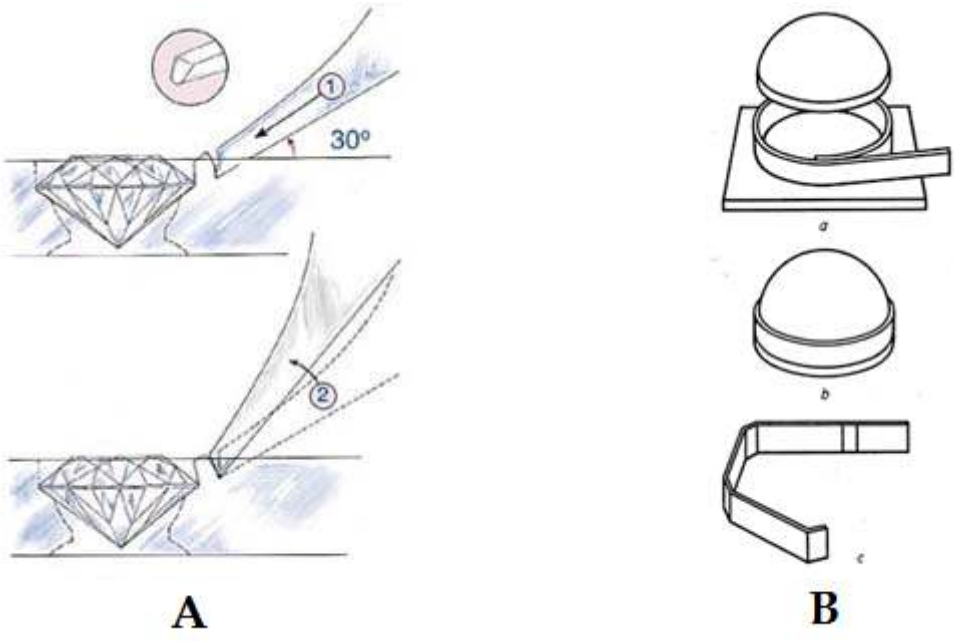


Fig 3.2.3 Setting the stone – Prong and Bezel

A. For Open Settings, Pave, Bead, Pressure and Illusion setting, the angle of pushing the metal to secure the stone should be accurate.
B. For Closed Settings, the metal sheet is used to wrap the stone around and with the bezel pusher, the metal is pushed onto the stone to hold it securely.

Tips

1. Pick up single stones with the setting stick or vacuum tweezers by touching the table facet.
2. While setting the stone, apply very little pressure.
3. When turning the jewellery piece around to check if the setting is secure, do not shake the jewellery piece roughly.

Notes

Unit 3.3: Check for Defects

Unit Objectives

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

1. Inspect the common setting defects.
2. Analyze the impact of defect.
3. Analyze defects in the products.
4. Record and avoid damage to the stones.

3.3.1 Check and Identify Defects

- Checking for defects is done after the setting process is completed. Once the defects are identified, the same should be repaired. If there are defects which cannot be repaired, then the same should be informed to the supervisor so that the entire piece can be remade.

- **Common defects include:**
  - Broken prongs
  - Broken heads
  - Missing prongs
  - Stone missing
  - Damaged stones
  - Gaps between stones in channel setting and invisible setting
  - Stone is loose in the setting
  - Too metal has been removed in bead and pave setting
  - Incomplete setting

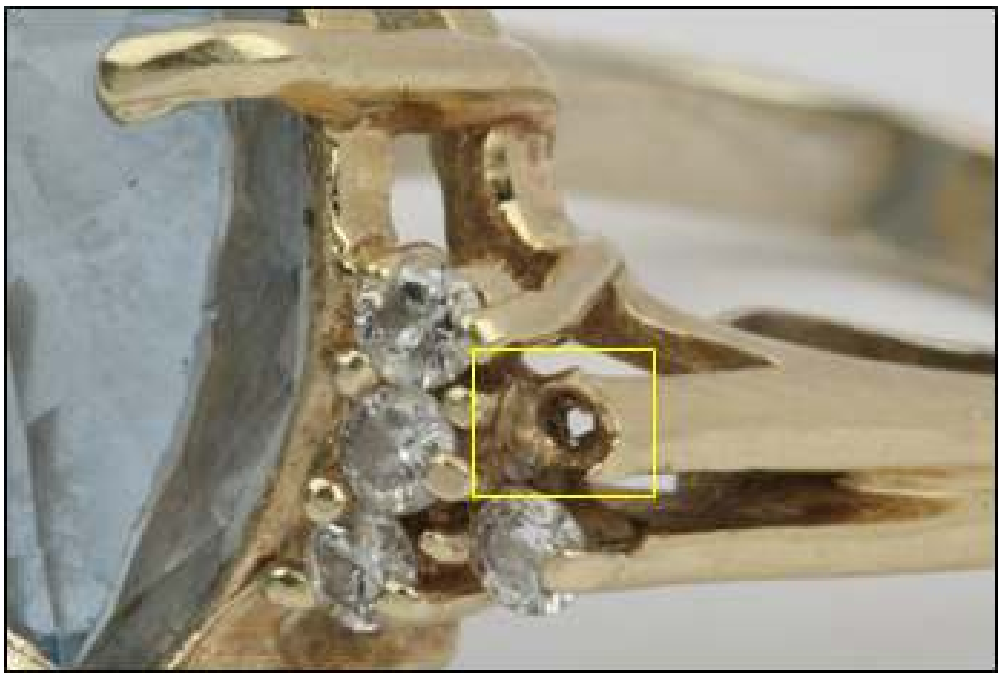


Fig 3.3.1 Broken prongs

3.3.1 Check and Identify Defects

Fig 3.3.2 Prongs without seats

Fig 3.3.3 Uneven prongs

3.3.1 Check and Identify Defects

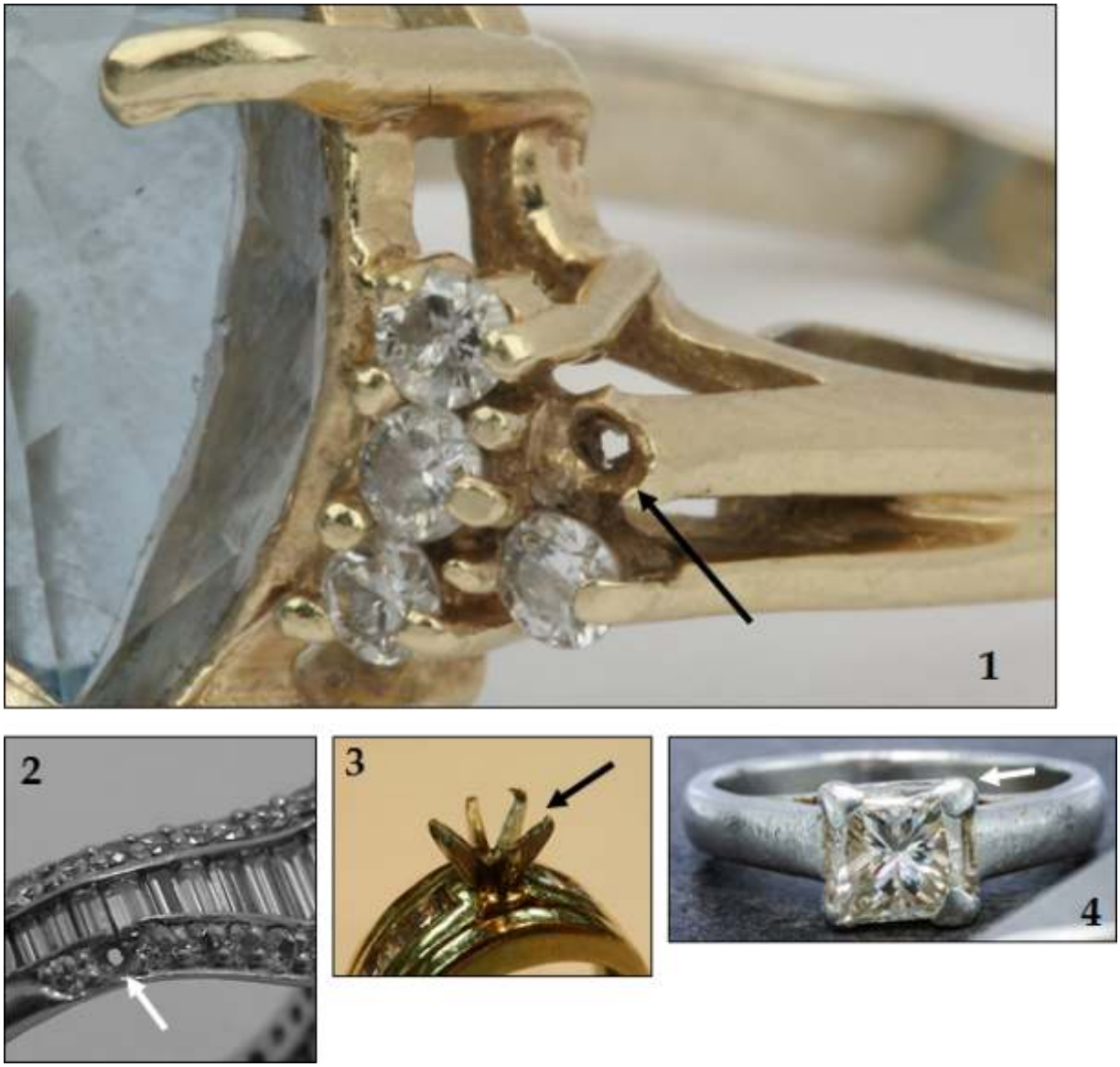


Fig 3.3.4 Various defects

- If there are pieces which cannot be repaired, report to your supervisor.
- 1st picture – Stone missing
- 2nd picture – Stone missing
- 3rd picture – Broken prongs, hence stone missing
- 4th picture – Setter put too metal around the stone, hence stone points will get damaged

3.3.1 Check and Identify Defects

Fig 3.3.5 Incomplete setting

- Setter has not closed the channel setting wall.
- This could damage the stones or they may fall down and go missing.

Fig 3.3.6 Stone not secure

- The stone is not set properly on the groove hence it is not secure.
- Due to this defect, the stone will get damaged or might fall off.

3.3.1 Check and Identify Defects

Fig 3.3.7 Stone has got damaged due to rough use of setting tools

Fig 3.3.8 Soft stone has got cracked and damaged due to rough use of setting tools

3.3.1 Check and Identify Defects

Fig 3.3.9 Soft stone has got completely damaged due to rough use of setting tools

Tips

1. Check if the stone is sitting properly or not in the setting seat.
2. Check for missing stones, which happens if the setting set is small for the stone.
3. Check for missing prongs.
4. Check for damaged stones.

Notes

Unit 3.4: Achieving Quality Standards

Unit Objectives

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

1. Analyze the quality standards of your company.

3.4.1 Achieving Quality Standards as Per Company

Quality Control	Achieving a minimum standard for a product, service or production process which meets customer needs
Quality Assurance	Ensuring quality is delivered & maintained at each stage of the production process. This creates a *'culture of quality'.*
Quality Standards	Most products will have to meet strict standards laid down by independent organisations.

To understand the nature of quality control & quality assurance

Fig 3.4.1 Achieve and maintain quality standards as per the company

- Check for the following quality control points to maintain the quality standard of your company
  - Ensure damage free stones
  - Ensure stones are secure in the setting
  - Defects caused due to incomplete setting
  - Ensure stones are not missing
  - Change in design

Tips

1. Quality of production will affect the reputation of the company.
2. If there are new ideas that you have to improve the quality of production, share the same with your supervisor.

Notes

Unit 3.5: Maintaining Quality of Production

Unit Objectives

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

1. Develop the quality of production for the company.

3.5.1 Maintaining Quality of Production

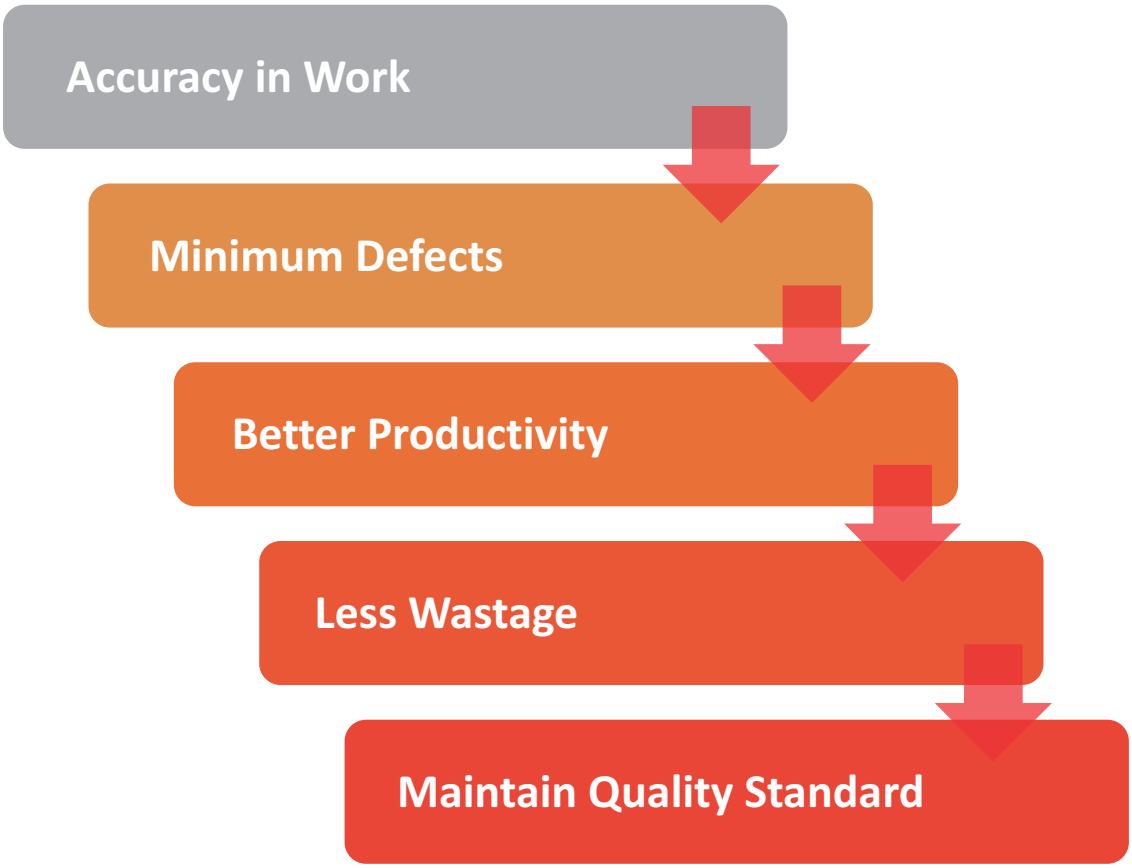


Fig 3.5.1

Tips

1. The lesser the defects during stone fixing, lesser the defects in the finished product, hence faster the production.
2. If there is any particular design or component that you have seen with many defectives over a period of time, inform your supervisor about it.

Notes

Unit 3.6: Know Your Organization and Its Standards

Unit Objectives

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

1. Analyze your company better.

3.6.1 Know your Organization and its Standards

Fig 3.6.1 Analyze your organization

In general when any employee joins an organisation, he takes time to know and understand its rules and regulations. In the similar manner the organisation also takes time to adjust with a new employee and both take time to understand and adjust with each other.

As a Stone Fixer one needs to observe and understand the working and the products of the organisation. How would the products be made and what are the tools used.

A Stone Fixer should also observe and see where his own skills would fit and how can he use his potential to the fullest.

Tips

1. Identify your skills and match them with the company's requirements.
2. If you know the product well, use your skills to make it productive for the company.

Notes

Unit 3.7: Work Hazards

Unit Objectives

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

1. Inspect and record the work hazards in your workplace.

3.7.1 Work Hazards

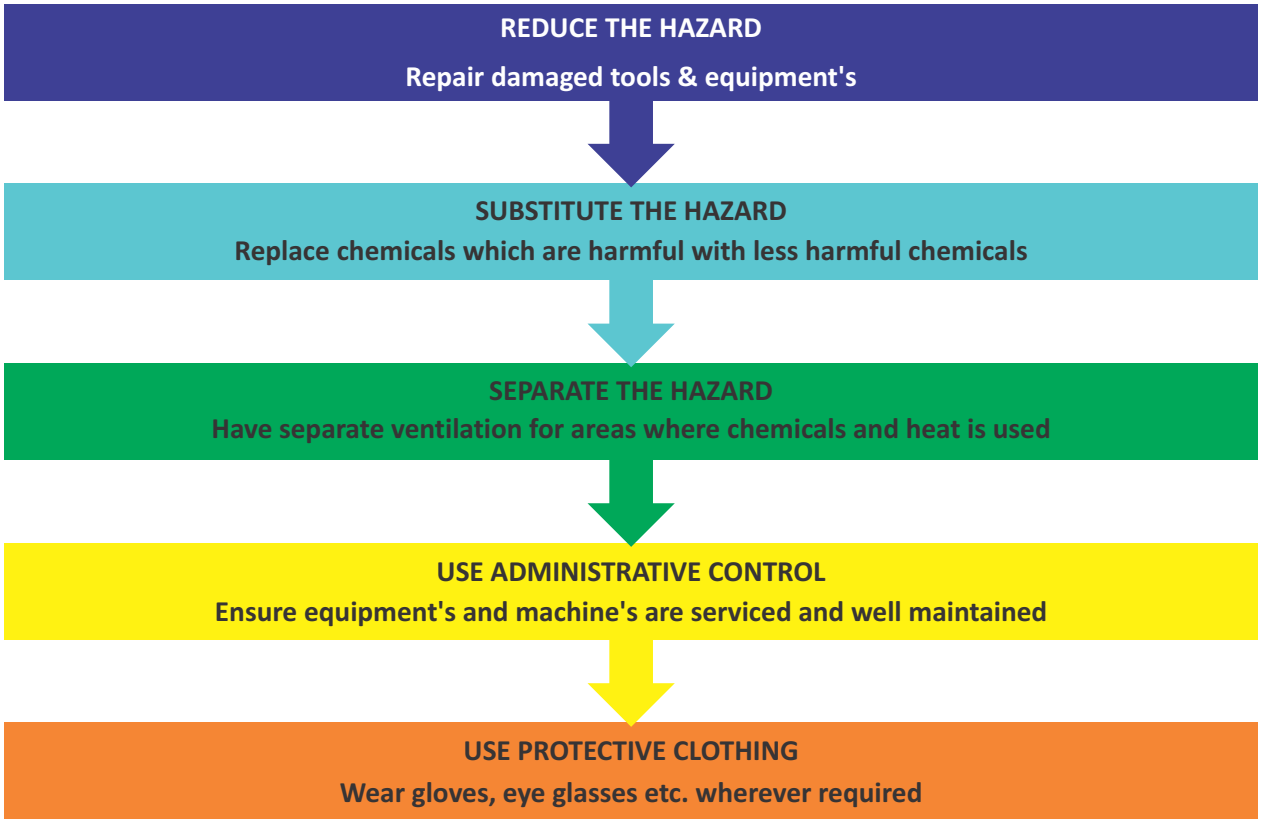


Fig 3.7.1 Work Hazards

Where one works we have to take care of what are the dangers that we might have to face. In jewellery industry, the employees who use machinery that may harm them should take great precautions and should have complete knowledge of the tools he is using.

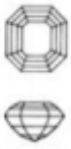
If there is any damaged tool he should repair it to reduce the hazard. If there are certain chemicals that cause more harm, those should be replaced with less harmful ones. There should be proper ventilation in areas where heat or chemicals are used for working. Maintenance of tools and equipment and servicing them is utmost important. Also clothes that are worn during work should be protective, for example, gloves, eye glasses etc

Tips

1. Understand and read your company's work hazard manual.
2. If you feel there is a work hazard which has not been accounted for, speak with your supervisor about it.

Exercise

1. Identify the cut of the stones.

Cut	Name
	
	
	

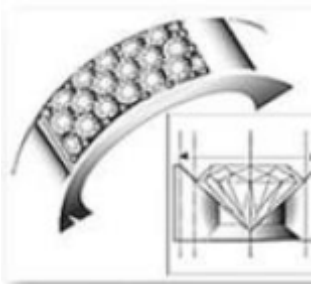
2. Match the image with the correct type of setting.

Image	Name of setting
	
	
	
	
	

3. Write the names and functions of the following tools.

Tool	Function
	
	
	

4. Name the tool and the setting style.



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Notes

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4. Coordinate with Co-workers

Unit 4.1 - Importance of Interaction and Coordination
Unit 4.2 - Interacting with Supervisor
Unit 4.3 - Interacting with Colleagues and Other Department

G&J/N9904

Key Learning Outcomes

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

1. Analyze how to coordinate with supervisor, colleagues and others.
2. Analyze the importance of interaction and coordination for personal growth.

Unit 4.1: Importance of Interaction and Coordination

Unit Objective

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

1. Analyze the importance of interaction and coordination.

4.1.1 Importance of Interaction and Coordination

1. A good interaction and communication motivates others as one gets clear information about a task one has to perform, how it would be done and how to improve the task if not done up to the mark.
2. It is also a source of information for decision making in an organisation and it helps in knowing any alternative actions that can be taken.
3. An individual who interacts well with others using good communication skills will have a better attitude and will be well informed than a less informed individual. This leads to altering attitudes in individuals.
4. It is said that man is a social animal. Thus interaction helps to socialising with others as this is the only way one's presence can be felt. Without communication and interaction one cannot survive.
5. Interaction helps in controlling the various functions of the management. A good interaction can help in a good performance of an employee and perform a task effectively.

4.1.2 Answer these Questions

Sr. No.	Question	Tick the Answer as per your opinion
1	How **Often** do people in your team or department speak with you about the job work or process?	○ Never ○ Sometimes ○ Always
2	How **Much Time** do people in your team or department take to solve an issue or get new information to you about the job work or process?	○ Never on time ○ Sometimes on time ○ Always on time
3	How **Precise** is their communication with you about the issue or the new information given to you?	○ Never Precise ○ Sometimes Precise ○ Always Precise
4	When there is a **Problem** do people in your department or team blame each other	○ Never ○ Sometimes ○ Always
5	How many of the people in your team or department **Share the Same Goals** as you regarding the progress of the company?	○ None ○ Some ○ All
6	How many of the people in your team or department know what your **Job Work Actually** is?	○ None ○ Some ○ All
7	Do these people **Respect** you for the work you are doing?	○ Never ○ Sometimes ○ Always

4.1.3 Solving the Gap Areas

1. If you have ticked"Never", "None", "Sometimes" or "Some" in most of the questions then we need to solve the gap areas.
2. To solve the gap areas, we need to:
   - Provide honest opinions
   - Report problems early
   - Focus on defect prevention than detection
   - Give appropriate feedback
   - Respect for ourselves, others and their time
   - Be friendly and a team player
   - Be problem solving
   - Have determination
   - Have willingness to learn and volunteer
   - Be accountable and take responsibility for our mistakes
   - Deliver work on time
   - Work well under pressure
   - Meet deadlines
   - Be open to ideas and suggestions
   - Keep personal information personal
   - Restrict ourselves from giving out company information to others
   - Focus on quality and quantity of work
   - Create a clear cut division between personal and work life
   - Communicate differences respectfully and in an appropriate manner

4.1.4 Importance of Interaction and Coordination

Fig. 4.1.1

Tips

1. It's always important to be honest about your thoughts, suggestions, opinions when it is concerning the company.
2. Do not involve personal opinions with professional opinions.

Notes

Unit 4.2: Interacting with Supervisor

Unit Objective

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

1. Analyze the importance of interacting with your supervisor.

4.2.1 Interaction with Supervisor

It is very important that when you are working in a company and under the supervision of your senior, you are required to act in a manner which is appropriate and ethical. Every organization has their own set of rules for their employees. Thus it is important to follow the rules and obey the orders of your supervisors. Interaction with the supervisor is about communicating with supervisor in order to achieve a smooth and hazard – free work flow.

Interaction includes:

- Raw material and work instructions by supervisor.
- Communication regarding improvements required in working process or defects received from previous process.
- Communication with supervisor on maintenance of tools and machinery, if required. To resolve conflicts.
- Informing about potential hazards in work place. Reporting about operation details.
- To know company's policies on language of communication, reporting and escalation policies, quality delivery standards and personnel management.

Facial expressions and body language are non-verbal and indicate if information received by worker is understood or not. Thus, you should always have a positive attitude towards work because your energy can give a lot of messages to your senior.

If you do not understand a part of the work instruction, always ask your supervisor for more information. Asking the supervision will not lessen your value but it will make you learn more.

4.2.2 Try the PDCA Cycle Method with your Supervisor's Help

The PDCA method is one that will help you in your work and to make improvements in the process and you will be able to take proper help from your supervisor.

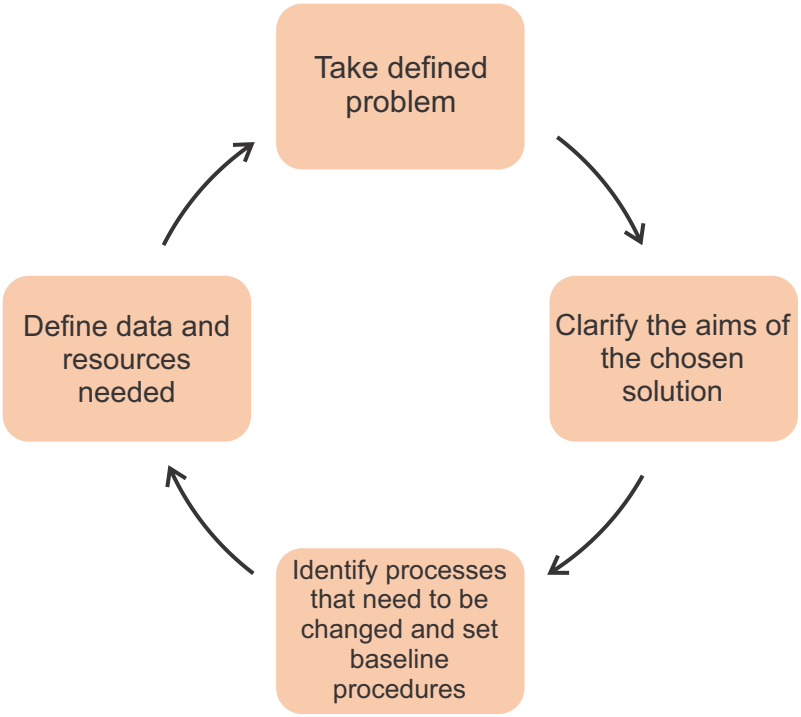

Fig 4.2.1 PDCA cycle method

This can help you with improvements in the process flow, reporting product defects, informing about repairs and maintenance of equipment and tools.

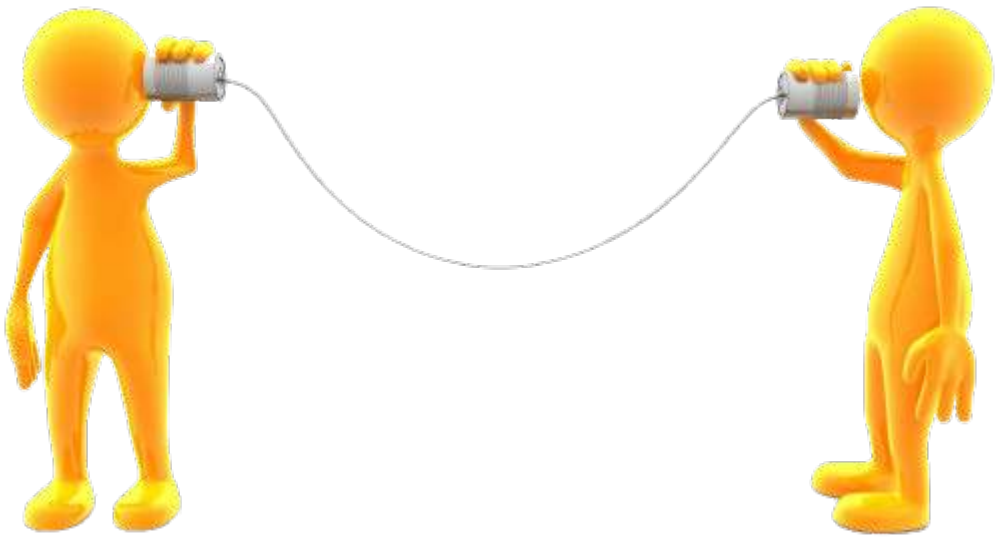

Fig 4.2.2 Listen, understand and ask questions if not understanding the job work

Tips

1. Respect your supervisor and learn to trust him/her.
2. If there is any conflict of thoughts, discuss the same with the supervisor in a humble manner and do not spread bad rumours about your supervisor because of this conflict.

Notes

Unit 4.3: Interacting with Colleagues and Other Departments

Unit Objective

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

1. Analyze the importance of interaction with colleagues of your department and other departments.

4.3.1 Interact with Colleagues Within and Outside the Department

1. Interaction with colleagues and other departments is about working as a team with colleagues and sharing work and work load.
2. It also means:
   - Sharing team and individual goals.
   - Sharing proper communication regarding work flow and finding out solutions for problems occurring in working together.
   - Communication with each other, receiving feedback from Quality checker in order to achieve best work in time.
   - Team coordination.
   - Proper work process by interacting with others and adopting best practices.

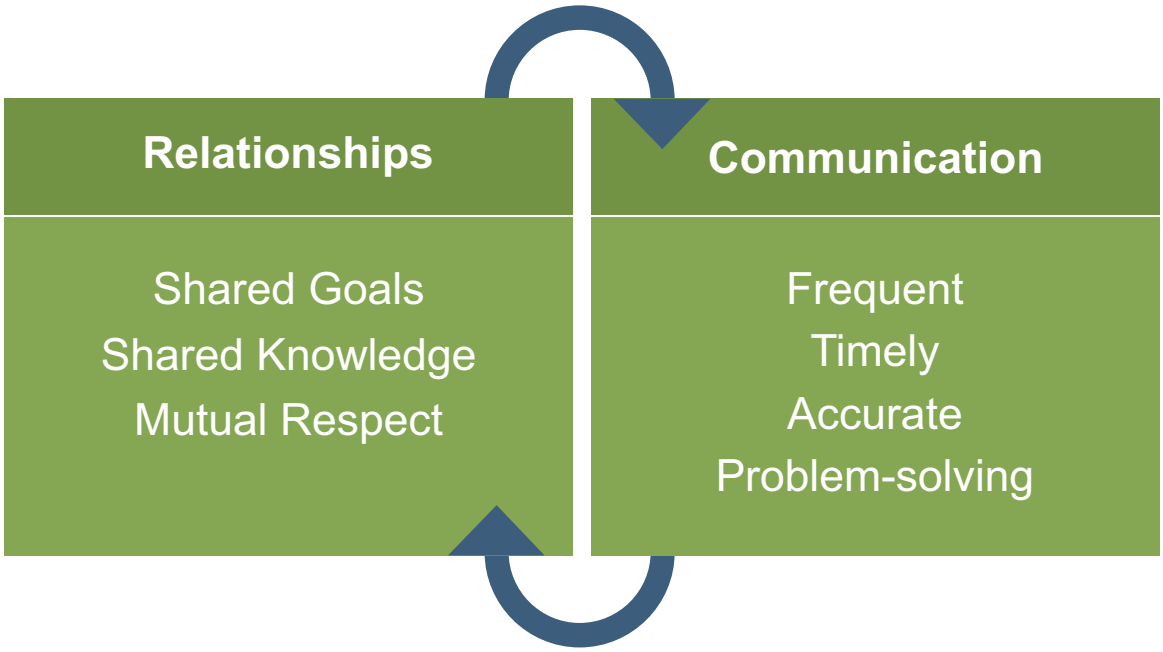

Fig 4.3.1 Interaction with colleagues and other departments

4.3.2 Non-Verbal Communication

1. When interacting with colleagues and other department personnel, we should also remember the non-verbal communication or body language that we are portraying to them.
2. Sometimes, a wrong body language sign might create conflicts or create opinions about you and others.
3. Always remember, what you do not speak may show in your actions, so be careful about what body language sign you are communicating to others.

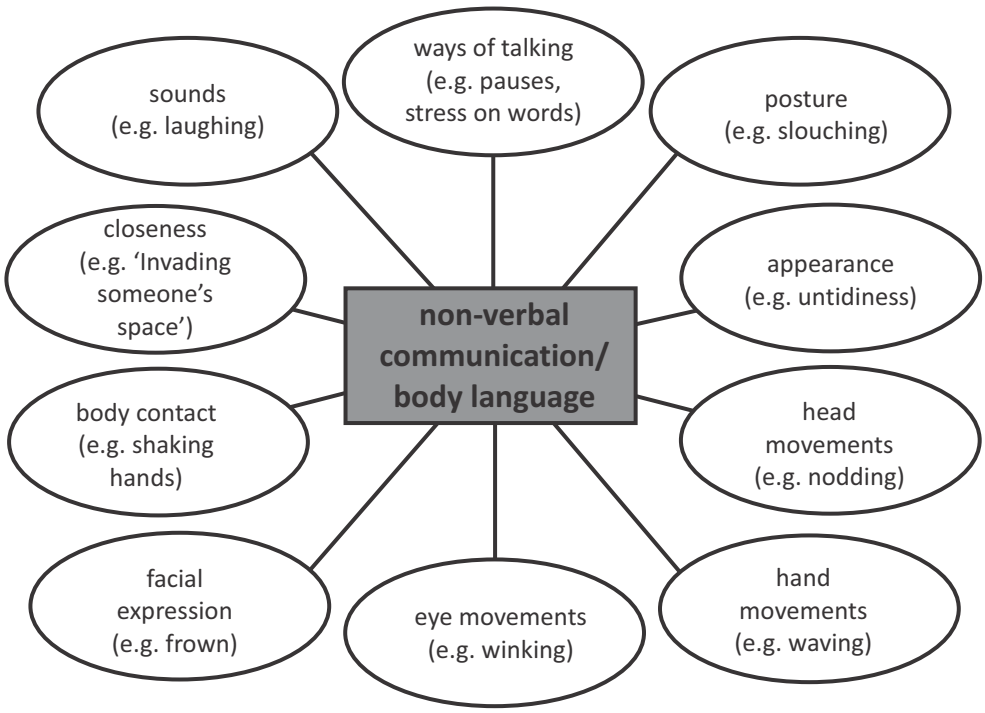

Fig 4.3.2 Non-verbal communication or body language

Tips

1. The inappropriate body language can create a different impression on your colleagues and other departments.
2. If there is something that you would like to share with them but cannot due to certain reasons, inform your supervisor to communicate the same.

Exercise

1. Write the full form of PDCA.

2. Write three examples of non-verbal communication.

a. _____
b. _____
c. _____

3. Describe briefly the importance of interaction and coordination.

.

4. Fill in the appropriate word:

Sometimes, a …….. body language sign might create conflicts.

a) Right
b) Positive
c) Wrong
d) Confident

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5. Maintain safe work environment

Unit 5.1 - Potential Sources of Accidents
Unit 5.2 - Safety Signs and Appropriate Requirements to be Safe
Unit 5.3 - Ergonomics or Bad Posture of Body
Unit 5.4 - Fire Safety Rules
Unit 5.5 - How to Deal with Emergency Situations

G&J/N9905

Key Learning Outcomes

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

1. Inspect safety procedures.
2. Inspect potential hazards.
3. Analyze what to do in an emergency situation.
4. Analyze how to use the fire extinguisher by identifying the appropriate fire.
5. Analyze how complying with company safety rules and regulations can be safe for you.

Unit 5.1: Potential Sources of Accidents

Unit Objective

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

1. Analyze the potential sources of accidents in a workplace.

5.1.1 Potential Sources of Accidents

Accidents are unpleasant events that happen unexpectedly, causing damage, injury or sometimes even death. Working people spend most of the time in work, thus accidents at work can happen unexpectedly.

Accidents or hazards mean an incident involving loss of life inside or outside the workplace, suffering injuries internally and/or externally, or release of toxic chemical or explosion or fire, or spilling of hazardous chemical resulting in 'on-site' or 'off-site' emergencies or damage to equipment leading to stoppage of process or adverse effects to the environment.

- Accidents or hazards usually occur due to: Faulty equipment
- Improper working conditions
- Faulty inspection or repairing equipment or tool without the proper instructions
- Irregular maintenance of equipment and tools
- Repairing of faulty equipment by someone who is not qualified to repair
- Lack of concentration or bringing personal tensions to work
- Unsafe practices such as plugging wires directly into sockets without a plug
- Not reading voltage instructions for imported equipment
- Improper or insufficient safety training
- Smoking in non-smoking zones
- Storage of chemicals near heat emitting machines
- Improper storage of chemicals
- Improper work clothing or lack of protective gears
- Exposed wire or wires bitten by rats or other animals
- Wires with bad insulation
- Improper electric connections
- Using wrong tools and equipment in wrong place or plugging into wrong socket
- Using too many wires in one spike guard or electric socket
- Bad housekeeping which includes wet floors, sweeping not done, papers thrown on floor, dustbins not covered or emptied
- Tools and equipment not stored properly after work
- Not unplugging tools and equipment after work or during breaks
- Leaving main switch ON of tools and equipment after work
- Non reporting of hazards to supervisor or ignoring potential dangers

5.1.1 Potential Sources of Accidents

The below figure clearly shows an exposed wire that can be hazardous to anyone who accidently touches or comes in contact with it.

Fig 5.1.1 Exposed Wire

5.1.1 Potential Sources of Accidents

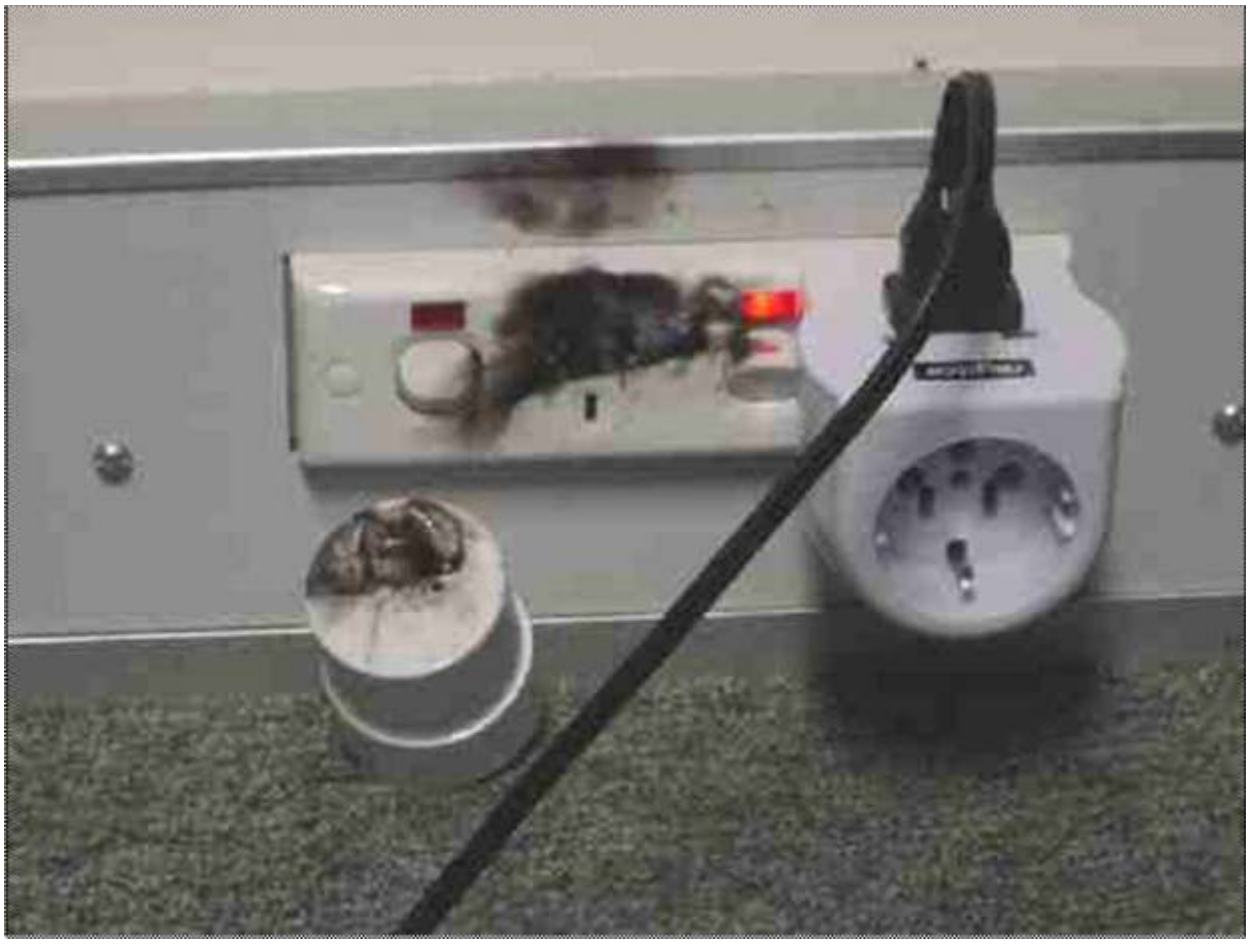

Fig 5.1.2 Burned Socket – Not advised to use the working plug

5.1.1 Potential Sources of Accidents

In the picture it is clear that the floor is wet with equipment lying on it. This can lead to serious accident and the workers should be very careful.

Fig 5.1.3 Liquid spilled on carpet floor with tools and equipment around

5.1.2 Potential Sources of Accidents

Fig 5.1.4 Causes of Accidents

Tips

1. Check your surrounding areas for any live wires, cables that are exposed or any chemical spill which may cause a fire.
2. Always check that equipment and tools are switched off before you leave for a break and after your work has ended.
3. It is better to be safe than sorry as it could cost you your life or put others in danger.
4. If there is a potential hazard waiting to happen inform your supervisor to have the same checked as soon as possible.
5. Do not delay in informing your senior about any hazardous thing you see around.

Notes

Unit 5.2: Safety Signs and Appropriate Requirements to be Safe

Unit Objective

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

1. Analyze the safety signs and appropriate requirements to be safe and to make the workplace safe for yourself and others.

5.2.1 Safety Signs

Safety Signs are some very important tips that you see around when you need some help in any situation where safety is required. You are just required to keep your mind alert during work and to look for any safety sign for your use. These are signs that cannot be avoided and are especially useful when nobody else is around to help.

Fig 5.2.1 Safety Sign - 1

5.2.1 Safety Signs

Fig 5.2.2 Safety Sign - 2

5.2.1 Safety Signs

Fig 5.2.3 Safety Sign - 3

Fig 5.2.4 Safety Sign - 4

5.2.1 Safety Signs

Fig 5.2.5 Safety Sign - 5

Fig 5.2.6 Safety Sign – 6

5.2.1 Safety Signs

In the figure you can see various signs explaining physical hazards and health hazards that you need to check around yourself. These are majorly warning signs that alert you beforehand.

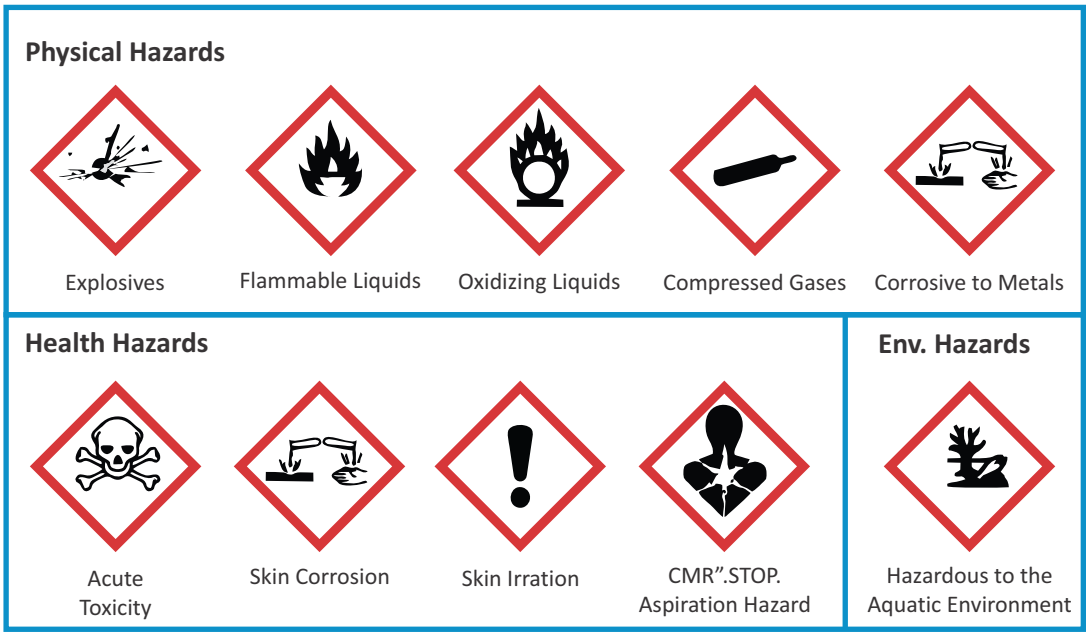

Fig 5.2.7 Safety Sign – 7

5.2.2 Safety First

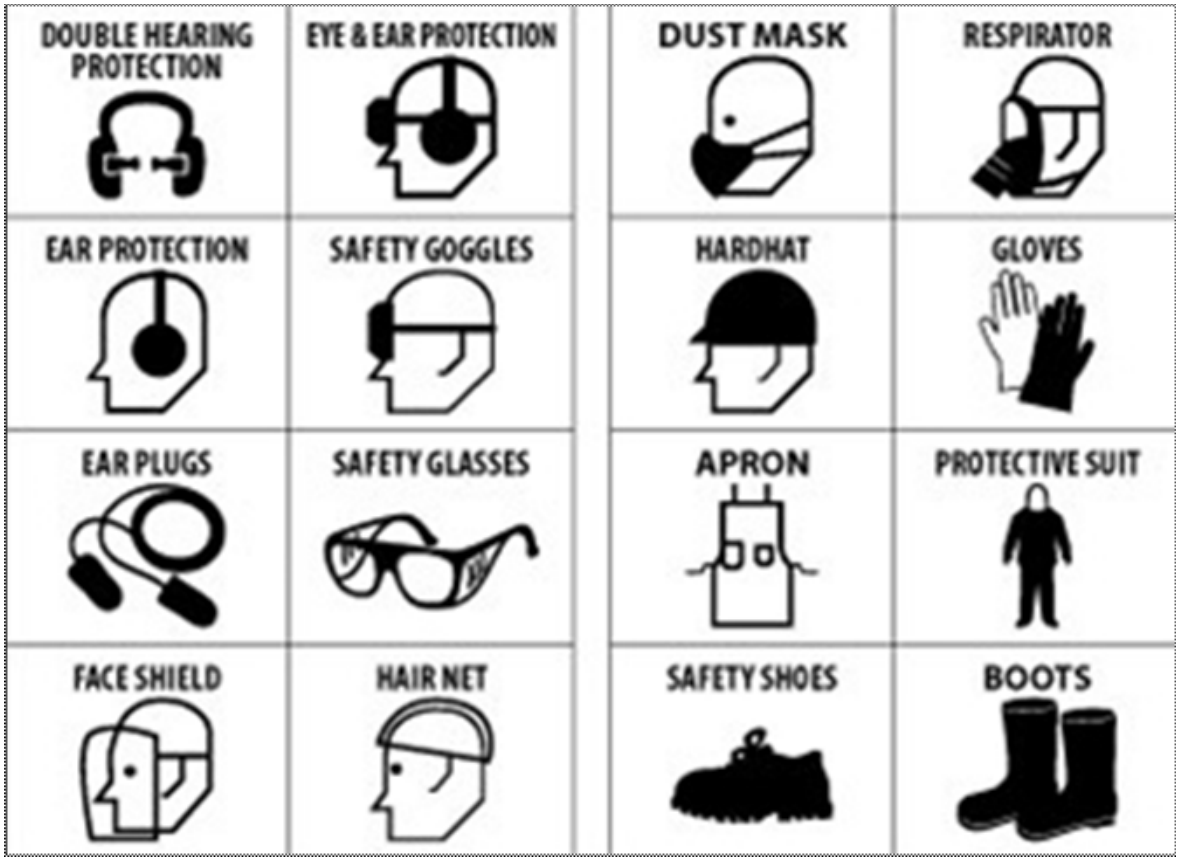

Fig 5.2.8 Safety gears to be worn while working with tools and equipment

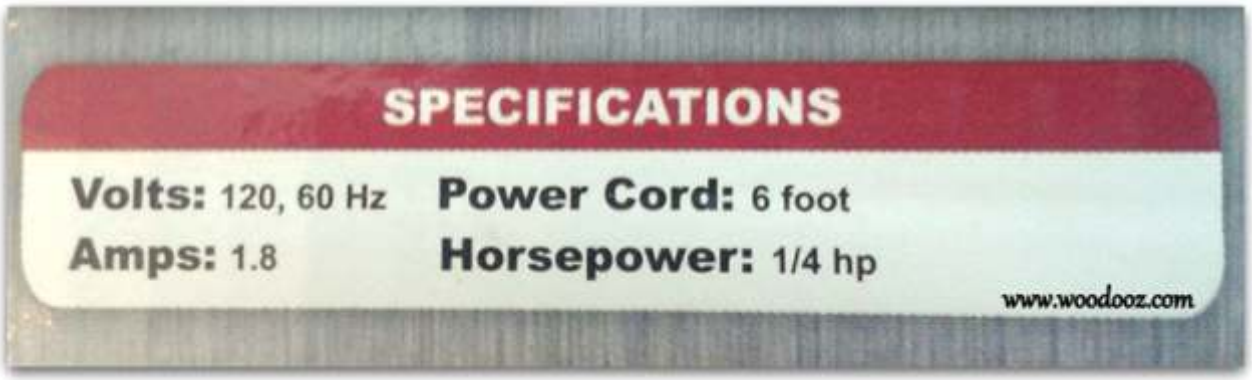

Fig. 5.2.9 Refer to voltage mentioned on equipment and machines before plugging in socket to avoid short circuit

5.2.2 Safety First

Fig 5.2.10 Housekeeping rules for every employee

5.2.2 Safety First

Just say no to electrical hazards.
Before you turn it on, make sure that you say no the following:

- Are outlets, motors, or circuits overloaded?
- Are the electric wires passing near water or heat sources?
- Are cords twisted or tangled?
- Do I see sparks or smoke?
- Are my hands wet?
- Am I wearing any metal jewellery?

Tips

1. If you follow proper housekeeping rules and the other mentioned rules, you can avoid accidents or hazards in your workplace.
2. Always work as a team when it comes to the workplace.

Notes

Unit 5.3: Ergonomics or Bad Posture of Body

Unit Objective

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

1. Develop the right body posture required while carrying out any kind of work.
2. Analyze how to relax your body more and put less strain on your body.

5.3.1 Ergonomics or Bad Posture of Body

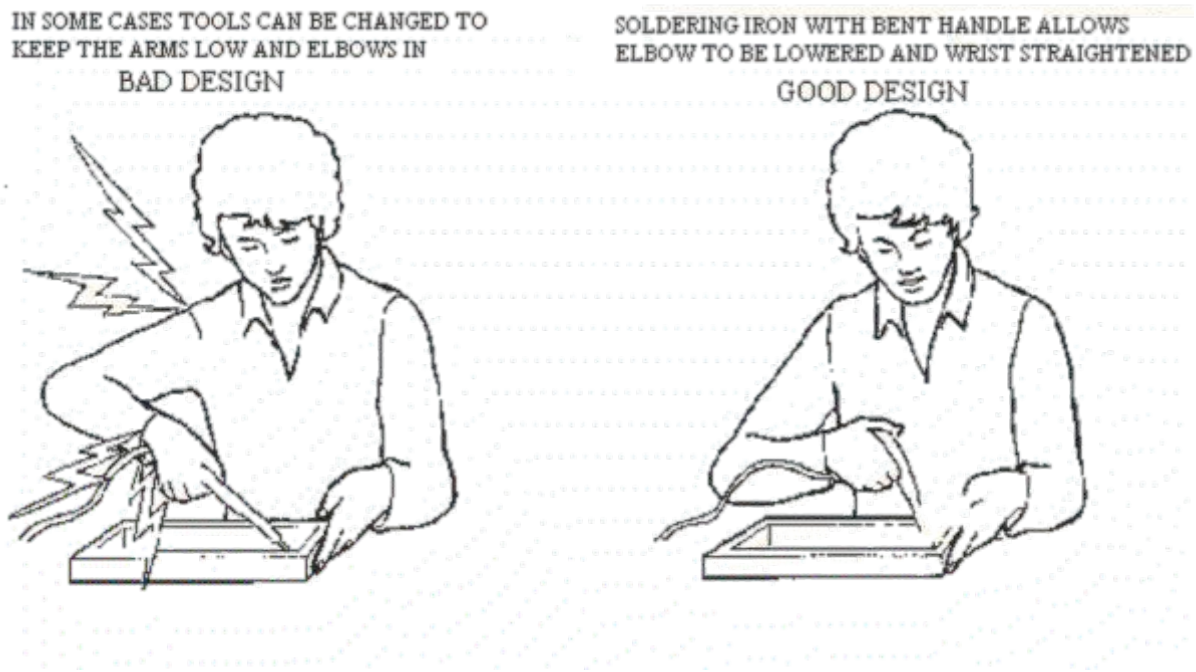

Fig 5.3.1 Straining elbows can strain the shoulder leading to body pain

5.3.1 Ergonomics or Bad Posture of Body

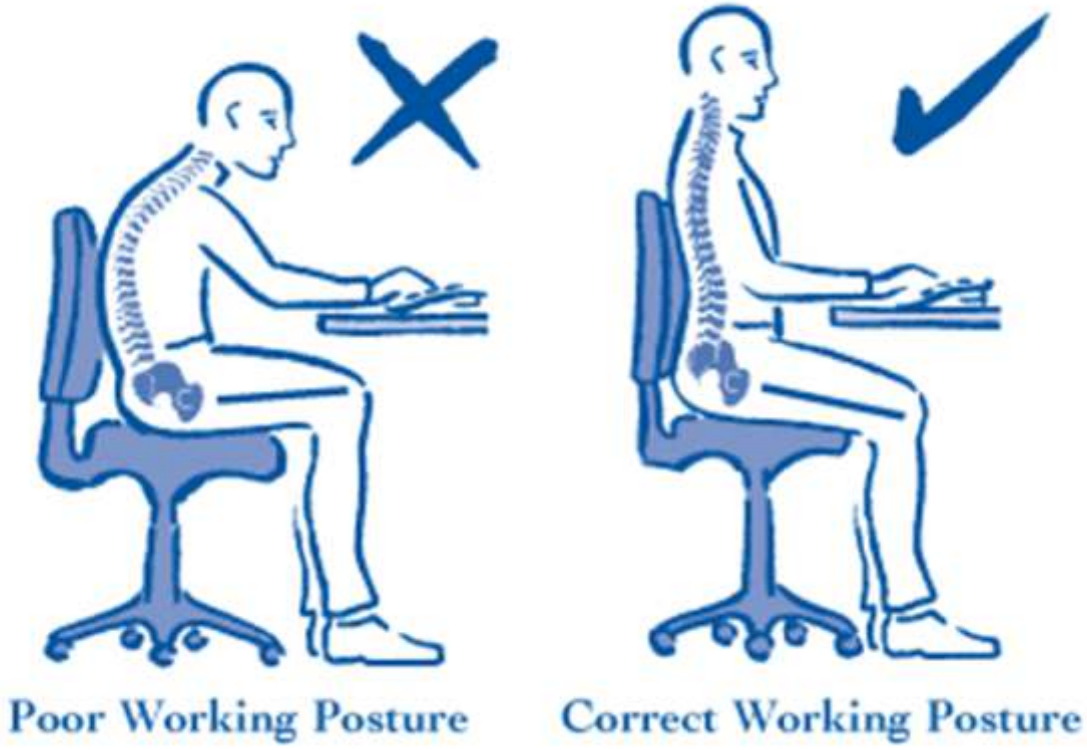

Fig 5.3.2 Wrong and right way to sit

Fig 5.3.3 Right way to work on computer

5.3.1 Ergonomics or Bad Posture of Body

Fig 5.3.4 Problems to avoid

Tips

1. The right body posture will benefit you in keeping many health problems away.
2. The wrong body posture can create health problems such as stiff neck, pain in the entire body, stiff shoulders, cervical spondylitis and many other problems.
3. Also drink a lot of water to keep yourself hydrated.

Notes

Unit 5.4: Fire Safety Rules

Unit Objectives

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

1. Inspect the fire safety rules.
2. Develop the skills on how to use a fire extinguisher.

5.4.1 Fire Safety Rules

CLASSES OF FIRES	TYPES OF FIRES	PICTURE SYMBOL
A	Wood, paper, cloth, trash & other ordinary materials.	
B	Gasoline, oil, paint and other flammable liquids.	
C	May be used on fires involving live electrical equipment without danger to the operator.	
D	Combustible metals and combustible metal alloys.	
K	Cooking media (Vegetable or Animal Oils and Fats)	

Fig 5.4.1 Know the different types of fire with classification codes and symbols

5.4.1 Fire Safety Rules

Fig 5.4.2 Know your fire extinguisher code

Fig 5.4.3 Know the refill date on the fire extinguisher

5.4.1 Fire Safety Rules

Fig 5.4.4 Basic fire fighting steps

Fig 5.4.5 Do not use elevator or lift when there is a fire

5.4.2 Using the Fire Extinguisher

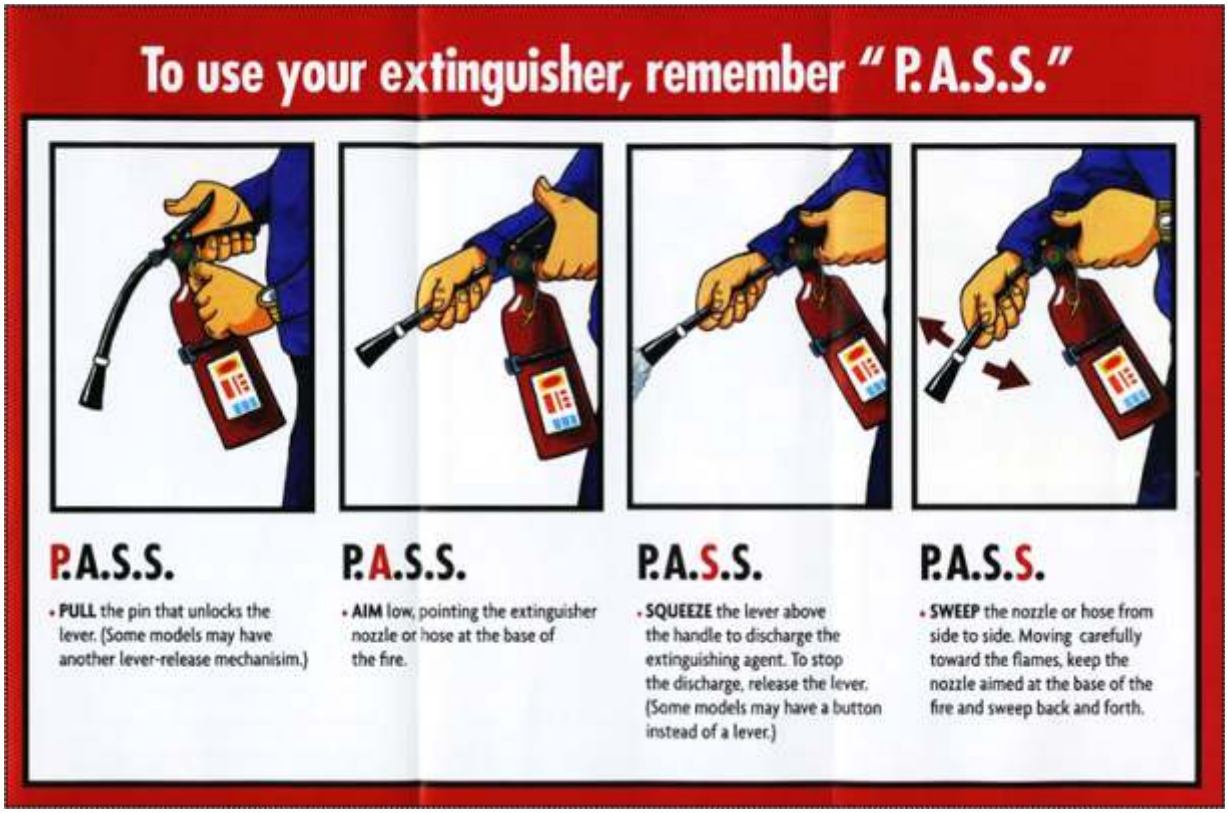

Fig 5.4.6 Steps to use the fire extinguisher – use the right extinguisher for the fire

Tips

1. Always recognize the type of fire before using the fire extinguisher.
2. The fire extinguisher has a code on it and that code will tell you for which fire that extinguisher can be used.
3. Do not use the lift or elevator when there is a fire.
4. Use wet blankets or napkins to cover your mouth so that you do not inhale the smoke.
5. Call the fire brigade and pull the fire alarm.

Notes

Unit 5.5: How to Deal with Emergency Situations

Unit Objective

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

1. Analyze an emergency situation and how to deal with it.

5.5.1 Emergency Situations

Fig 5.5.1 Emergency situations

5.5.2 Dealing with Emergency Situations

Evaluate Situation

- Check the surroundings.
- Evaluate the situation.
- Are there things that may place you in danger or harm?
- Are you or the victim endangered by fire, harmful smoke or gasses, an unstable construction, live electrical wires or alternative dangerous scenario?
- Don't rush into a situation wherever you may find yourself as a victim?
- If approaching the victim will endanger your life, seek professional help immediately; they have higher levels of training and know how to handle these situations.
- First aid becomes useless if you can't safely perform it without hurting yourself.

Fig 5.5.2 Evaluate situation

5.5.2 Dealing with Emergency Situations

Call for Help

- Call for help.
- Call the appropriate authorities or emergency services immediately if you feel someone is seriously injured.
- If you are the only person on the scene, try to check if the person is breathing before calling for help.
- Do not leave the victim alone for an extensive amount of time.

Take Care of the Person

- Take care of the person.
- A person who has just gone through a serious trauma requires to be taken care of including providing emotional support and physical treatment such as first aid.
- Always remember to remain calm and try to be reassure the person about help arriving.

Check for Response

- Determine responsiveness.
- If a person is unconscious, try to wake them by gently tickling their bare hands and feet or by speaking to them.
- If they do not respond to activity, sound, touch or other stimulation, check if they are breathing.

5.5.2 Dealing with Emergency Situations

Conducting CPR OR First Aid

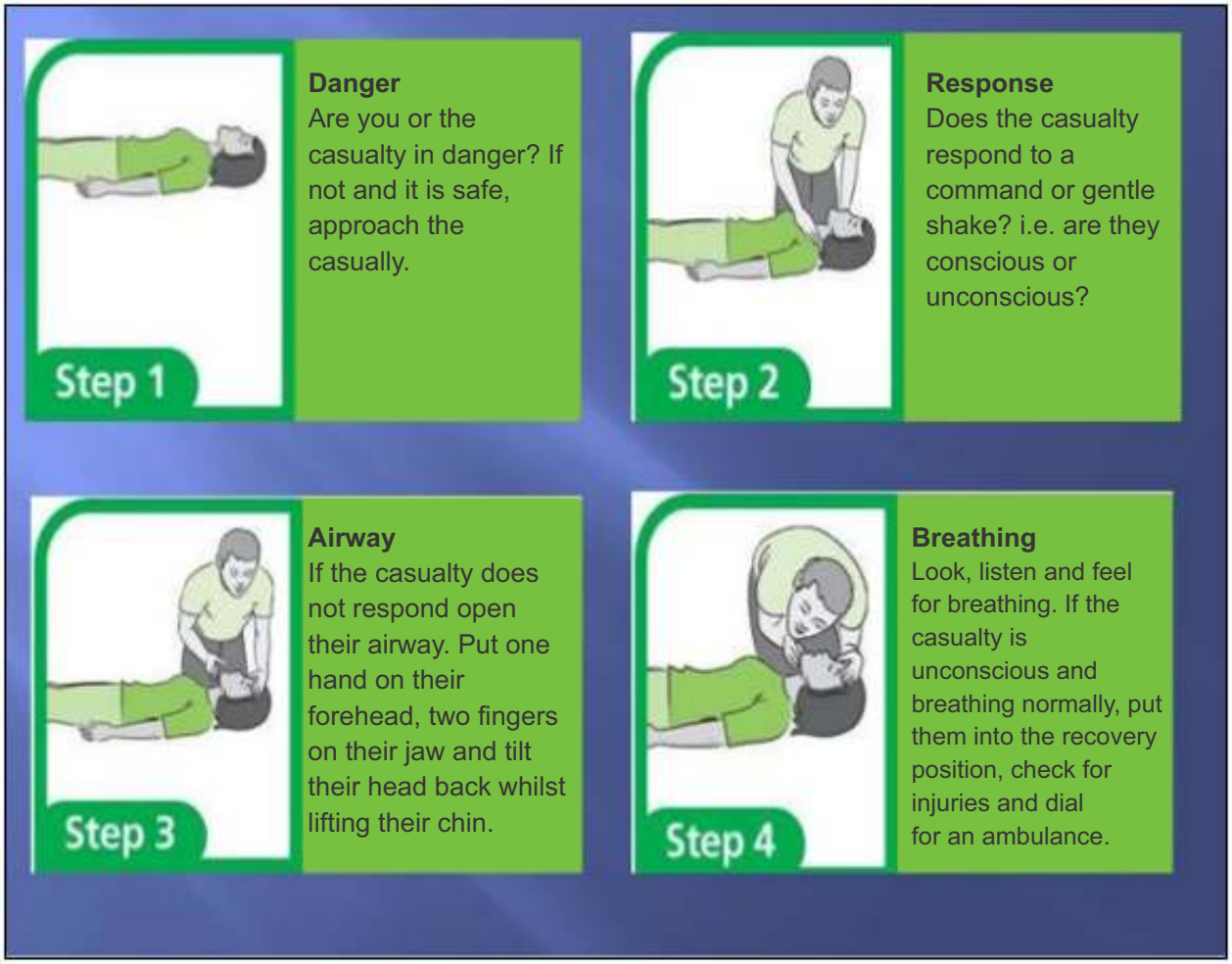

Fig 5.5.3 Conducting CPR or first aid

EMERGENCY NUMBERS IN INDIA

- 100 for Police
- 102 for Ambulance
- 101 for Fire
- 108 for Disaster management
- 181 for Women's helpline

5.5.3 Solving the Issue

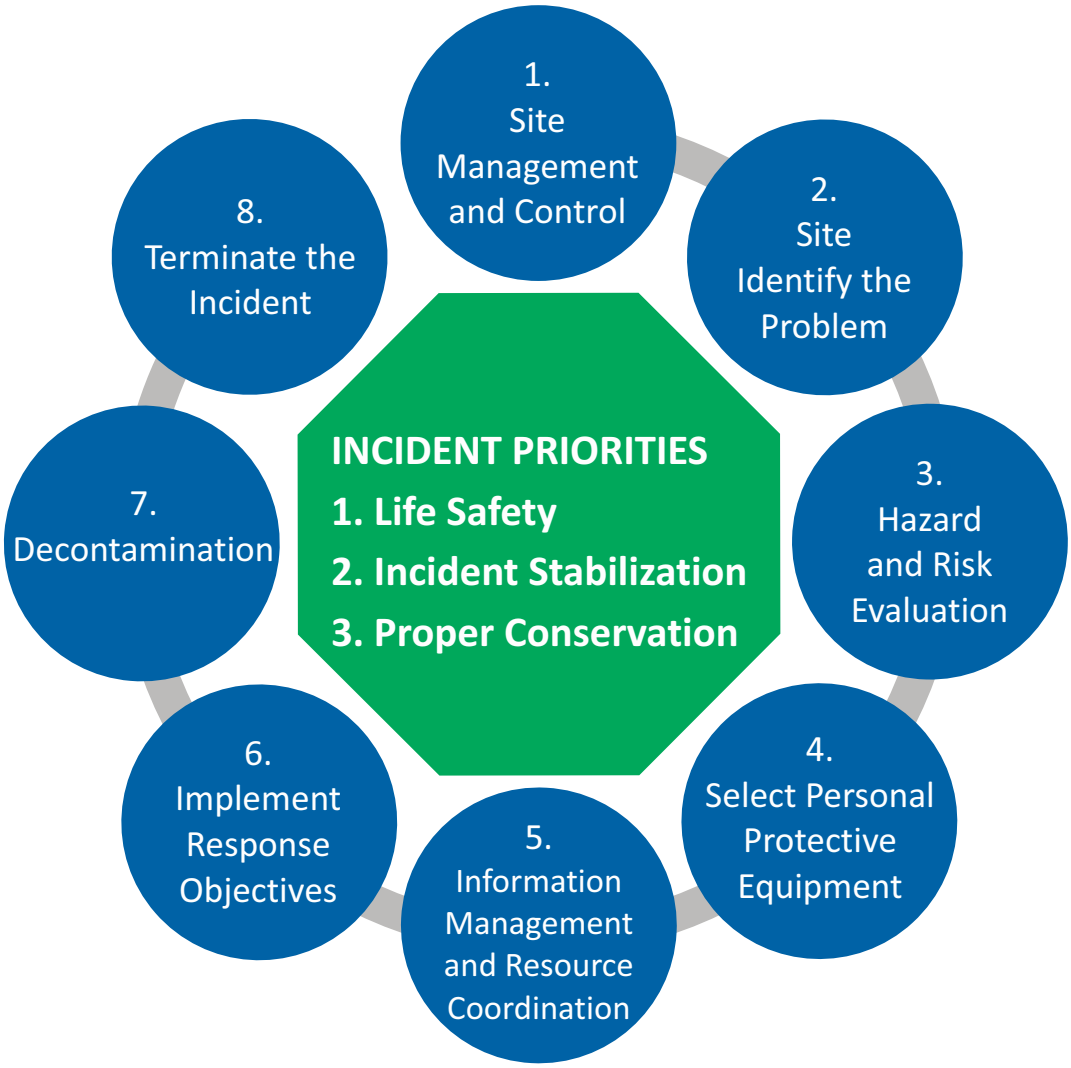

Fig. 5.5.4

Tips

1. Always participate in emergency drills organized by your company, you may never know when the knowledge will come in use.
2. Ask your company for a live demonstration of first aid administration.
3. Check with your company the contents of the first aid box and where it is kept.
4. Always report an incident to your supervisor or others, rather than hiding it.
5. Always care for others in an emergency situation.

Exercise

1. Write the full form of RACE.

2. Identify the meaning of the safety signs.

Safety Sign	Meaning of Safety Sign
	
	
	

3. Identify the following emergency numbers.

a. 100: _____

b. 101: _____

c. 102: _____

4. Accidents or hazards usually occur due to-

a) Faulty equipment

b) Smoking in non-smoking zones

c) Improper electric connections

d) All of these

5. If you find that someone is stuck in an emergency situation, how will you deal with it? Write in short.

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6. Annexure

Annexures 1 - QR codes - Video Link

Annexure: Chapter wise QR codes

Chapter No.	Unit No.	Topic Name	Page No.	Url	QR code (s)
1. Introduction	Unit 1.1: Gem and Jewellery Sector in India	1.1.1 Significance of Gem and Jewellery Sector in India	4	https://www.youtube.com/watch?v=nKY1AbPz668&t=1s	Gem & Jewellery industry Orientation
1. Introduction	Unit 1.1: Gem and Jewellery Sector in India	1.1.1 Significance of Gem and Jewellery Sector in India	4	https://youtu.be/oLhWHwacnOs	IJMA Documentary
1. Introduction	Unit 1.1: Gem and Jewellery Sector in India	1.1.1 Significance of Gem and Jewellery Sector in India	5	https://drive.google.com/file/d/1GKCzDvC-RP6SSccmhMCwN-gVR8CX-TSh/view?usp=share_link	Fashion Jewellery Manpower Report
2. Fix Stones On Jewellery Frame - I	Unit 2.1: Introduction to Imitation Jewellery Making Process	2.1.3 Imitation Jewellery Making Process – Part 3 – Casted Jewellery	19	https://drive.google.com/file/d/1psr6sWyV9rJrZ_oIP3UEYzu1V2YV_8Rn/view?usp=share_link	Brand Segmentation for Fashion or Imitation Jewellery
2. Fix Stones On Jewellery Frame - I	Unit 2.1: Introduction to Imitation Jewellery Making Process	2.1.3 Imitation Jewellery Making Process – Part 3 – Casted Jewellery	19	https://drive.google.com/file/d/1FPO9ENHVW_7E93qtbyf9XFxSZag37zJ2/view?usp=share_link	Comparision between Fashion vs Real Jewellery

Chapter No.	Unit No.	Topic Name	Page No.	Url	QR code (s)
2. Fix Stones On Jewellery Frame - I	Unit 2.3: Introduction to Metals	2.3.2 Metals Used in Imitation Jewellery	26	https://youtu.be/XEn-Cq2pDLc	Indian Heritage & Crafts in Global Market 1
2. Fix Stones On Jewellery Frame - I	Unit 2.3: Introduction to Metals	2.3.2 Metals Used in Imitation Jewellery	26	https://youtu.be/1NZ-1Gxpos4	Indian Heritage & Crafts in Global Market 2
2. Fix Stones On Jewellery Frame - I	Unit 2.5: Types of Jewellery	2.5.1 Types of Indian Jewellery	33	https://drive.google.com/file/d/1Reg-5FCnxLzJkTj9NFecrL8EYnNNv6nA/view?usp=sharing	Diversity in Indian Jewellery
2. Fix Stones On Jewellery Frame - I	Unit 2.5: Types of Jewellery	2.5.2 Categories of Jewellery	47	https://drive.google.com/file/d/1szE3LWEmzgSt1xGopymE3shRhDCwpLqf/view?usp=sharing	Categaries of Indian Jewellery
3. Fix Stones On Jewellery Frame - II	Unit 3.2: Setting or Fixing Stones	3.2.2 Types of Settings	80	https://drive.google.com/file/d/1_2XPTcEapET9ICY4n0IJ_BaRTmWX1c3q/view?usp=sharing	Types of Gemstone Setting
Employability Skills				https://www.skillindiadigital.gov.in/content/list	Employability Skills

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