



Skill India
कौशल भारत - कुशल भारत



सत्यमेव जयते
GOVERNMENT OF INDIA
MINISTRY OF SKILL DEVELOPMENT
& ENTREPRENEURSHIP



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National
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Transforming the skill landscape



Facilitator Guide



Sector
Rubber Industry

Sub-Sector
Tyre and Non Tyre

Occupation
Mixing

Reference ID: RSC/Q0112, Version 1.0
NSQF Level: 4

Rubber Internal Mixer Operator

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Shri Narendra Modi
Prime Minister of India

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

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About this Guide

Internal Mixing is a very important and first activity in Rubber Parts Production. Quality of Rubber Mixing operation is very critical for getting desired characteristics of final part. In this way, Rubber Internal Mixer Operator is very important and critical job role in Rubber Industry. In depth training of the job role is required in order to ensure quality of final rubber part to be produced.

This guide is designed for trainers to support them to train and upgrading the knowledge and basic skills of candidates for 'Rubber Internal Mixer Operator' in 'Rubber Industry' sector. All the training to be given by trainer are covered in this guide.

This guide is designed to provide the necessary knowledge and skill inputs for a trainer to train candidates in an organized and disciplined manner by following safe working practices.

This guide shall give in-depth practical information to trainer, which will be very useful in training the candidates for 'Rubber Internal Mixer Operator'.

This Facilitator Guide is designed to enable training for the specific Qualification Pack (QP). Each National Occupational (NOS) is covered across Unit/s.

Key Learning Objectives for the specific NOS mark the beginning of the Unit/s for that NOS. The symbols used in this book are described below.

Symbols Used



Steps



Activity



Tips



Notes



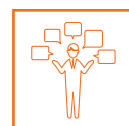
Objectives



Do



Ask



Explain



Elaborate



Facilitation Notes



Learning Outcomes



Say



Role Play



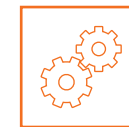
Demonstrate



Exercise



Team Activity



Resources



Summary

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1. Introduction to Rubber

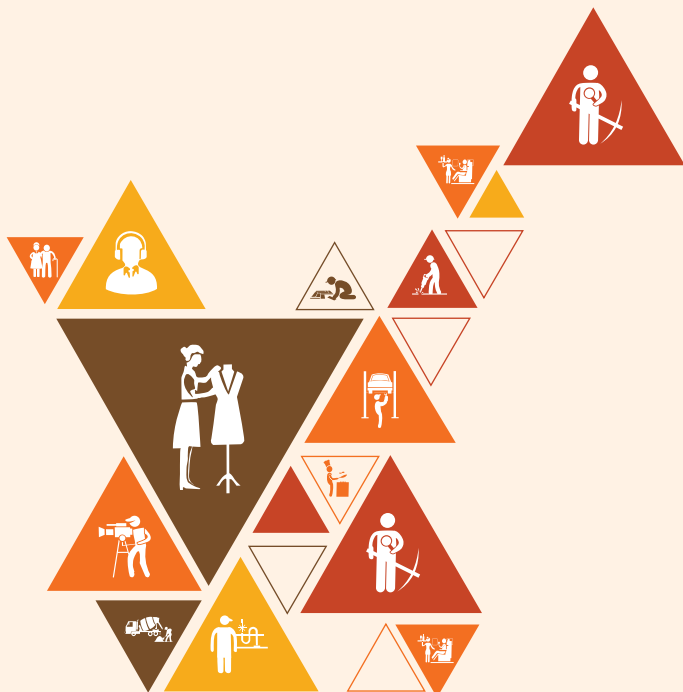
Unit 1.1 – Introduction to rubber industry

Unit 1.2 – Types of rubber internal mixing

Unit 1.3 – Rubber internal mixing basics

Unit 1.4 – Equipment used in rubber internal mixing

Unit 1.5 – Job role of a rubber internal mixer operator



RSC / N0133

Key learning outcomes



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

1. Discuss about rubber industry
2. Explain different sources of rubber
3. Discuss about major Indian rubber associations
4. Explain the rubber internal mixing terminology
5. Explain the basics of rubber internal mixing process
6. Identify material used in rubber internal mixing
7. Identify equipment used for rubber internal mixing
8. Define roles and responsibilities for rubber internal mixer operator

Unit 1.1: Introduction to Rubber Industry

Unit Objectives

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

1. Discuss about rubber and rubber industry.
2. Identify types of rubber.
3. Explain about rubber manufacturing processes.
4. Explain different uses of rubber.
5. Discuss functions of various rubber bodies and associations in India.

Resources to be Used

- Laptop
- Projector
- White Board
- Marker
- Duster
- Sample of different RSS sheets
- Sample of Crepe Rubber
- Sample of TSR Rubber
- Sample of Synthetic Rubber
- Sample of Reclaimed Rubber
- Sample of Products made of Rubber
- Field visit to rubber internal mixer factory
- Different machines used in rubber internal mixing

Notes for Facilitation

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

- Start class on time and close the session on time, so that you can give clear message of valuing your and participants time.
- Introduce yourself with your name, qualification and work experience.
- Give details of objectives of this course.
- Give details of today's session and what they are going to learn.
- Give Safety Instructions to be followed during class.
- Brief them about the rules of class and Do's and Don'ts.
- Encourage them to share their thoughts and doubts now and during the process of this course.

Do



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

Ask



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

Notes for Facilitation



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

Say



- Thank the participants for their participation.
- Inform them rules of the class.
- Inform them about course curriculum.
- Inform them about assessment and assessment procedure.
- Inform them about your Role and responsibility.

Notes for Facilitation



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

Team Activity-1



Objective: To get introduction of all the participants of the course.

Procedure:

- Ask the participants to make a circle.
- Give a ball to any participant to start the activity.
- The participant needs to pass the ball to the person whose name starts with letter 'A'.
- After getting the ball the participant will tell her name, native place and hobby.
- Now the participant needs to pass the ball to another participant whose name starts with letter 'A', if no other person available of the name with letter 'A', then ball should be passed to the person having name with the next letter.
- Get introduction from all the participant by end of the activity.

Activity Outcome:

- While having the fun, all the participant will know about each other.
- Facilitator will be able to break the ice with the participants

Activity	Time	Resources
Ball passing introduction activity	1 Hours	Rubber ball

Table 1.1.1

1.1.1: Rubber

Ask



- Ask the participants what they know about rubber.
- Ask the participants about products made of Rubber.

Explain



- Explain to participants about properties of rubber material, why it is used so widely in so many products. Explain about rubber's elastic properties. Explain with the help of following information:
- Rubber which is also called as 'Caoutchouc'. It normally has long chain molecules known as "polymers" and the combination of elastic and polymers, which give it another name called "elastomers". Forms of poly-isoprene that are used as natural rubbers are terms as 'Elastomers'.
- Products made from rubber have a flexible and stable – three-dimensional chemical structure and are able to withstand under and force large deformations.
- The material can be stretched repeatedly to at least twice of its original length and upon immediate release of the stress, will return with force to approximately its original length. Under load the product should not show creep or relaxation.
- Based on the source of raw material, there are two kinds of rubber, natural rubber (NR) and synthetic rubber (SR). However, Reclaimed rubber is produced from treating the scrap rubber.

Notes for Facilitation



- You could ask the participants how rubber is different than steel.
- Give participants some time to think about how the rubber industry has grown in the last five years.
- Set the context and describe the industry trends in rubber sector.

1.1.1.1: Natural Rubber

Ask



- Ask the participants whether they have seen the rubber plant.
- Ask the participants about the places where rubber plants grow.

Say



- Natural Rubber is mainly harvested from rubber plants.
- There are many plant species that generate natural rubber and there are many other plants that contain rubber latex.
- For quality and economic considerations, Rubber Plant is a major source of natural rubber. 'Latex' is a sticky, milky white, liquid material.
- The process used for extracting latex is called 'Tapping'.



Fig. 1.2.2. Rubber Plant



Fig. 1.2.3. Collection of rubber by tapping process

Explain



- Explain about rubber tree plantation.
- Explain requirement of climate for growing rubber trees.
- Explain areas favorable for growing rubber tree in India.
- Explain process of tapping.

Demonstrate



- Show photographs of rubber tree plantation.
- Show photographs / video of tapping process.

Say



- Latex is further processed for making rubber, which can be used for making some useable products.
- Latex is processed in following ways – Sheets, Creps, Block Rubber, Preserved latex concentrates
- Most of natural rubber is sold in the form of Sheets, Creps and Block Rubber.
- Sheets are the easiest form to produce; hence it is the most saleable form of natural rubber.
- There are 2 types of sheets – Ribbed Smoked Sheets (RSS), Air Dried Sheets (ADS)
- Out of above types, Ribbed Smoked Sheets are more common in sale.
- There are five grades of Ribbed Smoked Sheets based on quality. These grades are established by International Rubber Quality and Packing conference.
- Only completely dried sheets are allowed to be sold in this category. Based on different conditions, these ratings are called as RSS1, RSS2, RSS3, RSS4 and RSS5.

1.1.1.1.1: Sheets

Ask



- Ask the participants how natural rubber sheets are produced.
- Ask the participants about purpose of making Sheets.

Explain



- Explain process of latex processing for making rubber.
- Explain types of dried natural rubber form
- Show samples of RSS and ADS
- Explain difference in five grade of RSS
- Explain purpose of creating Sheets



Fig. 1.2.4. Rubber sheets

Demonstrate



- Show sample of natural rubber sheet to the participants.

1.1.1.1.2: Crepes

Ask



- Ask the participants how Crepes are produced.
- Ask the participants about purpose of making Crepes.

Say



- Crepes is derived from coagulated latex / field Coagulum, when it is rolled many times between rollers and then dried in Air.

Example



There are many types of crepes,

- Pale latex crepes,
- Estae brown crepes,
- Thin brown crepes,
- Thick blanket crepes,
- Flat blanket crepes,
- Standard flat bark crepes,
- Pure smoked blanket crepes.

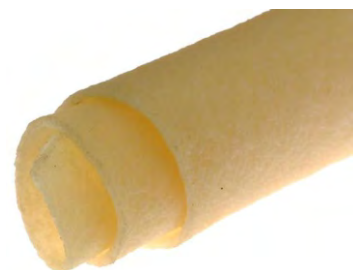


Fig. 1.2.5. Rubber crepes

Demonstrate



- Show samples of crepes to the participants.

1.1.1.1.3: Technically Specified Natural Rubber

Ask



- Ask the participants the meaning of TSR.
- Ask the participants about the purpose of creating TSR.

Say



- Technically specialized natural rubber (TSR) is natural Dried Rubber which is graded based on technical specification.
- It was initially proposed by ISO (International Standard Organisation) and then Malaysia adopted it in 1965. Later on all natural rubber producing countries adopted the system.
- In this system, first letter of country name is used for making code. For ex - Indian natural rubber is coded as ISNR (Indian Standard Natural Rubber).



Fig. 1.2.6. TSR rubber

Explain



- Explain specifications included in TSR Rubber.
- Explain different countries specification of TSR Rubber.

Demonstrate



- Show sample of TSR to the participants.
- Show specifications of TSR to the participants.

1.1.1.2: Synthetic Rubber

Ask



- Ask the participants what is Synthetic Rubber.
- Ask the participants about purpose of making Synthetic Rubber.

Say



- Synthetic Rubber, as the name suggests, it is manmade Rubber, which is derived from petroleum, coal, oil, natural gas and acetylene.
- It has more than 10 major classes, many of these are copolymers i.e. polymers consisting of more than one monomer.
- Initially, Styrene-butadiene copolymers (SBR) synthetic rubbers were invented. Which is one of the widely used elastomer.
- Synthetic Rubber is used as a replacement for natural rubber in many cases, especially when improved material properties are needed.

Example



1. Emulsion Styrene Butadiene (ESBR)
2. Butadiene Rubber (BR)
3. Solution Styrene Butadiene (SSBR)
4. Isobutylene Isoprene Butyl (IIR)
5. Acrylonitrile Butadiene (NBR)
6. Ethylene Propylene diene monomer (EPDM)



Fig. 1.2.7. Synthetic rubber

Demonstrate



- Show sample of Synthetic Rubber to the participants.

Say



- Used or Reclaimed rubber is the product, which is recovered from the processing of vulcanized scrap rubber tyres, tubes and miscellaneous waste rubber goods.
- The Process includes use of heat and chemical agents.
- The process also includes heavy mechanical working. This reclaimed rubber has plasticity, which is near to the original plasticity.
- This Rubber can be compounded, processed and re-vulcanized as fresh Rubber.
- During process of reclamation, the molecular weight of the elastomeric component is substantially reduced. But the chemical un-saturation of finished reclaim is essentially unchanged from that of the original vulcanized scrap.



Fig. 1.2.8. Reclaimed rubber

Explain



- Explain briefly the process of producing reclaimed Rubber.
- Explain different products used to produce reclaimed Rubber.

Demonstrate



- Show samples of Reclaimed Rubber to the participants.

1.1.2: Uses of Rubber

Ask



- Ask the participants the uses of Rubber.

Say



- Rubber is a widely used product now a days. It is used in automobiles, household and industrial applications.

Example



- Tyres and Tubes - Automobile and agriculture Tyres and tubes are the largest consumers of rubber. This category consume around three fourth of total rubber consumption.
- 'Under the bonnet' products for automobile - It includes, Door and window profiles, noses, bells, matting, flooring and dampeners (anti-vibration mounts).
- Conveyor Belt – for various industrial use.
- Hoses and pipes – for air and water circulation.
- Medical equipment - Gloves (medical household and industrial), toy balloons, rubber bands
- Adhesives – Many manufacturing industries and products also use Rubber product as adhesives. It is mostly used in paper and the carpet industry
- Textile industry – Rubber is also widely used in Textile industry.
- Shock absorbers – Impact absorbing property of rubber is very useful in shock absorber application.
- Machine mounting pads – it is widely used as machine mounting mount, which helps in reducing vibration transfer from machine to floor.



Fig. 1.2.9. Rubber products

Demonstrate



- Show different products made of rubber to the participants.

1.1.3: Overview of Rubber Industry

Ask



- Ask the participants position of India in world for producing natural rubber.
- Ask the participants name of world's top rubber producer country.

Elaborate



- Initially rubber industry started in south America during 19th Century. Where it was restricted for a long time from export.
- In 1876, English brought it to India, Sri Lanka and other parts of asian countries. Initially rubber trees were planted in Kolkata and then later it was grown in coastal areas of Kerala, Tamil Nadu and Karnataka.
- Rubber product manufacturing started in India, in the year 1920. Now, Rubber industry is one of the key industries of the Indian economy.
- India is the 4th largest producer of natural rubber in the world.
- India is the second largest consumer of natural rubber.
- India is the fifth largest consumer of natural rubber and synthetic rubber together in the world.
- India is the world's largest manufacturer of reclaimed rubber.
- India and China are consuming 48% of total world's Rubber production.

1.1.3.1: Overview of Indian Rubber Industry

Ask



- Ask the participants to name some of the prominent rubber parts producing companies.
- Ask the participants about highest rubber producing states of India.

Say

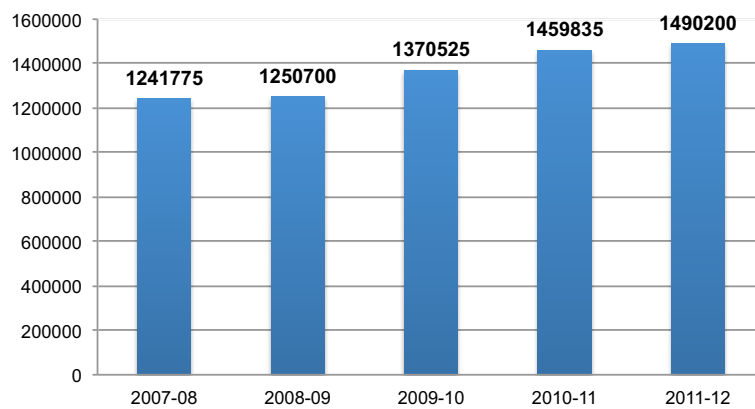


- India produces approx. 7 Lakh tons of rubber. In India there are approximately 6000 Rubber product companies.
- Out of these some 35 are large scale companies, 320 medium scale and more than 5000 are small scale industries.
- These companies do total turnover of around Rs. 12,000 Crore. These units are manufacturing more than 35000 rubber products, employing four Crore people, which also includes 22000 technically qualified support personnel.

- India's rubber industry has growth rate of 8-9% per annum.
- India consumes nearly 17 lakh tones of rubber (including natural, synthetic and reclaim) annually for producing a wide range of rubber products.
- Tamil Nadu (3.57 lakh tones), Kerala (2.10 lakh tones) and Maharashtra (1.98 lakh tones) are top three rubber consuming states in the country.

1.1.3.2: Trend of Rubber Consumption

Elaborate



Consumption is in Crore tons

Fig. 1.2.10. Trend of rubber consumption

1.1.4: Rubber Consumption in India

Ask

- Ask the participants the sector name, which consumes biggest part of rubber.

Explain

The major sectors consuming rubber in India are as follows:

1. Automotive tyre sector.
2. Bicycles tyres and tubes.
3. Footwear.
4. Camelback and latex products.
5. Belts and hoses.
6. Rest of the products.

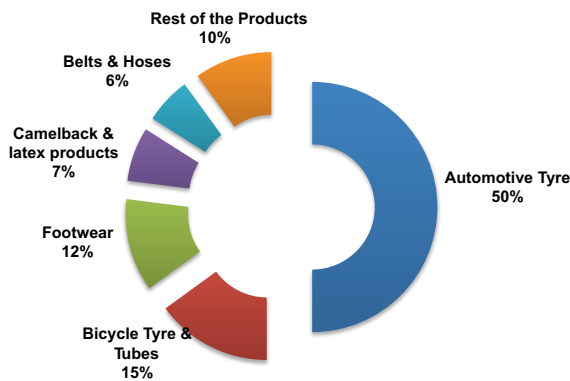


Fig. 1.2.11. Rubber consumption details

1.1.5: Rubber Act, Rubber Promotion and Development Bodies

Ask



- Ask the participants the names of prominent Rubber Bodies.
- Ask the participants about purpose of having various Rubber Associations for Rubber.

Say



- Indian Rubber industry is regulated by some acts. Also there are some bodies that are helping rubber industries in development.

1.1.5.1: Rubber Board

Elaborate



This act was made in 1947. With some changes it was named as 'Rubber Board' in 1955. The act was amended in 1960 for making changes in rates and procedures of cess on Rubber. Again the act was amended in 1982 for making provisions for appointing chairman and Executive Director. All departments of board come under control of Chairman.



Fig. 1.2.12. Rubber board

1.1.5.1.1: Functions of Rubber Board

Explain



Activities of Rubber Board -

- Promotion of activities for development of rubber in India.
- Without prejudice to the generality of the foregoing provision the measures referred to therein may provide for:

Explain



- Undertaking, assisting or encouraging scientific, technological or economic research.
- Training participants in improved methods of planting, cultivation, manuring and spraying.
- Providing technical advice to rubber growers.
- Improving marketing of rubber.
- The collection of statistics from owners of estates, dealers and manufacturers.
- Securing better working conditions for workers, provision and improvement of amenities and incentives to workers.
- Carrying out any other duties, which may be vested with the Board as per rules made under this act.
- It shall also be the duty of the Board:
 - To advise the central government on all matters relating to the development of the rubber industry, including the import and export of rubber.
 - To advise the central government with regard to participation in any international conference or scheme relating to rubber.
 - To submit to the Central Government and such other authorities as may be prescribed, half yearly reports on its activities and on the working of this act.
- To prepare and furnish such other reports relating to the rubber industry as may be required by the Central Government from time to time.

1.1.5.2: Chemicals & Allied Products Export Promotion Council (Capexil)

Elaborate



This organisation was made for promotion of Rubber and Chemical based and related products. Capexil is engaged in making export promotion strategies. Capexil do in depth research of overseas markets and promote exports through participation in various trade fairs and bilateral meets.



Fig. 1.2.13. CAPEXIL

1.1.5.3: All India Rubber Industries Association (AIRIA)

Elaborate



AIRIA is one of premier industrial associations. It was established in 1945 and since then working for promoting rubber and tyre industry. It has Pan India presence and more than 1200 members. AIRIA organizes 'The India Rubber Expo'. This event is biannual event, which provides a platform for suppliers, machine manufacturers, raw material suppliers, rubber testing equipment suppliers, consultant and exporters.



Fig. 1.2.14. AIRIA

1.1.5.4: Automotive Tyre Manufacturer Association (ATMA)

Elaborate



As the name suggest, this is an association of automotive tyre manufacturers. Having headquarter at New Delhi, it is not-for-profit organisation, which works for safeguarding the interests of tyre industry. It works as a liaising agency between tyre industry and Government. Also it actively works for promoting and raising tyre industry voice in media. It represents the companies producing 90% of tyre production of India.



Fig. 1.2.15. ATMA

Explain



Main objectives of ATMA are –

- To promote and protect the interest, growth and development of the rubber industry.
- To foster Co-operation among individuals and units engaged in the manufacturing of rubber goods with a view of advancing and safeguarding the interest of the industry.
- To provide common forum for exchange of views amongst the members.
- To arrange conferences, exhibitions, trade delegations, factory visits, techno-commercial talks and allied activities.
- To investigate, collect and circulate information and statistics relating to the industry.
- To represent officially to Government the views of the industry on all matters affecting or likely to affect the industry.
- To help the members in solving the difficulties faced in procuring raw materials.
- To support or oppose legislative or other measures likely to affect the industry.
- To disseminate information through the official organ, periodicals, circulars, etc.

1.1.5.5: Rubber Skill Development Council (RSDC)

Elaborate



RSDC has been constituted under the aegis of National Skill Development Corporation (NSDC), in collaboration with All India Rubber Industries Association (AIRIA) and Automotive Tyre Manufacturers Association (ATMA). Main motto of RSDC is to identify and fulfill skill development needs in the Rubber sector. The RSDC encourages the industry to employ skilled and certified manpower. It is identifying labour market skill gaps, frame Occupational Standards, facilitate development of practical and high quality training content, ensure adequate availability of faculty through Train The Trainer initiatives, build accreditation and certification mechanisms and encourage capacity building through private sector participation. In the process, RSDC is preparing catalogue of skill sets, range and depth of skills to facilitate individuals to choose from.



Fig. 1.2.16. RSDC

Explain



- The purpose of RSDC is to ensure the generation of skilled manpower in both the tyre and the non-tyre sectors
- Provide employment opportunities to youth across the nation
- Create career paths in roles existing within the unorganized and organized segments of the rubber industry
- Ensure active participation of the industry in absorption of skilled manpower generated through RSDC.

Team Activity-2



Objective: Identify rubber raw material type and rubber product.

Procedure:

- Ask the participants to make a pair of 2 participants.
- Arrange a display of rubber raw material and product made of rubber, plastic and metal.
- The pair of participant needs to identify and write their answer in their note pad.
- They can discuss the answer between them before writing and submitting to facilitator.
- Declare the real identity of rubber raw material and products, once each pair completes the identification.

Activity Outcome:

- You will be able to test the knowledge of participants.
- Participant will be keen to know more about the rubber.

Activity	Time	Resources
Identify rubber raw material type and rubber product	2 Hours	Rubber raw material from different sources, product made of different type of rubber, plastic and metal.

Table 1.1.2

Unit 1.2: Types of Rubber Internal Mixing

Unit Objectives

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

1. Explain what is Rubber Compound
2. Describe history of Rubber Mixing
3. Explain concept of Rubber Internal Mixing
4. Describe the construction of Banbury Mixer
5. Describe the construction of Intermix Mixer
6. Describe the construction of Variable Internal Clearance Mixer

Resources to be Used

- White Board + Marker /Black Board + Chalk
- Duster
- Laptop + Projector / Computer + Projector / Flipcharts
- Participant Handbook / Copies of Handout
- Detailed diagram of Internal Mixer, Banbury mixer, VIC mixer
- Samples of different rubber compounds

Do

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

Ask

- Ask the participants the use of rubber seen by them in different places
- Ask the participants different rubber parts brands known to them

Field Visit

- Take the participants for a field visit to the rubber company which has rubber internal mixing process.

Notes for facilitation

Check List to for Field visit

Activities to be done, one day before the field visit

1. Get confirmation from the management of the organisation to which team is going to visit.
2. Take contact details of the person to be met of the organisation to be visited.
3. Create check list for the participants for the things to be observed during visit.
4. Arrange transport for traveling to the place to be visited.
5. Instructions for all participant about field visit, such as:
 - Organisation to be visited during the field visit.
 - Objectives of the field visit.
 - Do's and don'ts during the field visit.
 - Time to report at the meeting place.
 - Things to carry for the field visit.
 - Duration of the field visit.
- 6- Any other specific arrangement to be made for the field visit.

Activities to be done on the day of the field visit

1. Ensure all participants are gathered before moving for the field visit.
2. Repeat information given to all the participants the previous day, for clarity.
3. Inform your expected time of arrival to the organisation to be visited.
4. Ensure to arrive on time to the place to be visited.
5. Ensure all the objectives planned out for the field visit, are met.
6. Encourage the participants to ask questions during the field visit for their better understanding.
7. Answer satisfactorily for all the queries raised by the participants during the field visit.

Activities to be done on the next day of the field visit

1. Ask the participants for their experience of field visit and their learnings.
2. Answer satisfactorily for any queries raised by the participants during the discussion.

1.2.1: What is Rubber Compound?

Explain

A Rubber Compound is a mixture of various ingredients in which rubber polymer is the most prominent part. There are various types of Rubber compound, which are made by changing the ingredients to suit different requirements as per application. We can produce different rubber compounds by varying rubber polymer/s and ingredients and utilize the rubber compounds thus produced for producing cost effective rubber products with required performance requirements.

Demonstrate

- Show sample of different compounds to the participants.

1.2.2: History of Rubber Mixing

Explain



Rubber mixing is a very old process which was first done in USA on Hancock's Pickle machine, also called two roll machine. The machine was patented in 1837. In 1865, first model of double rotor of internal mixer was designed by the Quartz mill of Nathaniel Goodwin. But this machine was not having good strength for Rubber mixing. Then in 1878, Paul Pfleiderer designed and patented a new twin rotor design machine. This machine was robust and suitable for Rubber mixing. Now a days, all rubber mixing is done in Internal mixers.

In Internal Mixers, mixing is done in closed chambers by two rotors, rotating in opposite direction. Since, compound ingredient is contained in chamber, hence we get more homogenize compound is prepared.

1.2.3: Mixing Mill

Ask



- Ask the participants to name some of the rubber parts companies in India.

Explain



Mixing mill was invented in 1835. It was primarily used of mixing vulcanizing agent in rubber compound. It has 2 roller in its construction in open. Roller rotates in opposite direction at different speed. It is also used for sheeting purpose. During rotation, compound generates lot of heat due to friction. For maintaining the temperature of compound during mixing, it has got provision of water circulation inside the rollers. It is very important to keep compound at lower temperature in order to avoid vulcanization before moulding or other operation.

1.2.4: Rubber Internal Mixer

Ask



- Ask the participants what they know about rubber mixing.

Explain



Rubber Internal mixer has 2 types -

1. Tangential Rotor Type (Banbury Mixer)
2. Intermeshing Rotor Type (Intermix Mixer)

1.2.4.1: Banbury Mixer

Ask



- Ask the participants to the difference in banbury mixer and intermix mixer.

Explain



There were many issues being faced in earlier designed Rubber mixers. So, Fernley H. Banbury in USA designed Banbury Mixer in 1916. Since it was designed by Fernley H. Banbury, hence it was named as Banbury mixer. It solved lot of issues of Rubber mixing and it became very popular very soon.

It works on concept of rotating material between rotor wings and wall of chamber. In this design rotor never mesh each other. It allows the rotors to rotate at different speed, which provide maximum friction to material between rotor to rotor and rotor to wall. There are many design available for rotors, which depends on the type of mixing process.

For higher productivity, four rotor banbury mixers are used now a days.

Demonstrate



- Show photos of banbury mixer to the participants.
- Show banbury mixer to the participants during field visit.

1.2.5: Intermix Mixer

Ask



- Ask the participants what they know about intermix mixer.

Explain



This Mixer was designed and patented by Francis Shaw and Company of Manchester in 1930. It works on intermeshing mechanism of both rotors, which gives more friction and rotation to material. In this mixer, rotors rotates at same speed and intermesh with each other. It has got various benefits over Tangential systems, such as - effective temperature control which result in lower power consumption, fill levels are 5% lower due to narrow intermeshing zone. This design is getting popularity now a days.

Demonstrate



- Show photos of internal mixer to the participants.
- Show internal mixer to the participants during field visit.

1.2.6: Variable Internal Clearance (VIC) mixer

Ask



- Ask the participants what they understand by the name of variable internal clearance mixer.

Explain



This Mixer was designed and patented Italy in 1987. It was developed to solve issue faced in intermeshing mixer. In this mixers you can move rotors on its axis to adjust the clearance between them. This feature is very useful and permit more clearance which is required during initial phase of mixing. later on when rubber lumps are broken in small pieces, you can reduce the clearance between rotors to achieve more homogenize compound. This is relatively new design but getting popularity day by day.

Demonstrate



- Show photos of VIC mixer to the participants.
- Show VIC mixer to the participants during field visit.

Team Activity



- Conduct a 'rubber internal mixer demonstration activity'.
- Demonstrate different 'rubber internal mixer' being used in the rubber industry and their video to the participants.

Activity	Time	Resources
<ul style="list-style-type: none"> • Demonstration of different rubber internal mixers. 	4 Hours	White board & markers, facilitator notes, laptop/ slides + projector, videos and images of rubber internal mixers.

Table 1.2.1

Unit 1.3: Internal Mixing Basics

Unit Objectives

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

1. Describe the common terminology used in rubber industry.
2. Describe the ingredient materials of the rubber compound.
3. Explain the application of internal mixing process.
4. Define type of rubber compounds.

Resources to be Used

- Laptop
- Projector
- White Board
- Marker
- Duster
- different samples of rubber parts

Do

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

1.3.1: Basic Terminology

Say

Before studying internal mixing, we will learn basic rubber terminology which is commonly used in rubber industry. These are as follows -

1.3.1.1: Accelerator

Explain

Chemicals which are used for expediting vulcanization or Curing process, called Accelerator. Example - Aldehyde Amine or thiophosphate .

1.3.1.2: Autoclave

Explain



An equipment used for vulcanization of Rubber with Heat and Pressure.

1.3.1.3: Batch Size

Explain



Batch size is number of parts in production lot. It is decided by the many factors, like – customer shipment size, machine production capacity for a shift or a day, Raw material batch size, finished goods storage capacity, etc.

1.3.1.4: Compression Moulding

Explain



It is a process of rubber moulding by heat & Pressure. Due to heat rubber softens (plasticizes) and flows into the mould cavity.

1.3.1.5: Compound

Explain



A homogenion mixture of many polymers and other chemicals like - Zinc oxide, carbon black and oil etc.

1.3.1.6: Co-Polymer

Explain



This is polymer which is made by mixing two different monomers. Some of the examples are EPDM, NBR and SBR etc.

1.3.1.7: Cure

Explain

A chemical process in Rubber under heat and pressure which changes its chemical structure. This process makes Rubber more useful by increasing its resistance for aging, swelling and gives desired elasticity.

1.3.1.8: Drag Flow

Explain

The resistance to the forward movement induced by dragging against the walls. This is the basic phenomenon by which the material gets conveyed to the other end of the screw.

1.3.1.9: Elasticity

Explain

It is a property of Rubber, due to which it comes back to its original shape after leaving from a pulled or pressed condition.

1.3.1.10: Elongation

Explain

This is a ratio of original length of rubber and maximum elongated length.

1.3.1.11: FIFO

Explain

Full form of word 'FIFO' is First in, First out, which means the material received first should be used first. This is a widely used term in industry and has very significant meaning especially in Rubber industry.

1.3.1.11.1: Why FIFO is Important

Elaborate



Since all the material is prone to some level of degradation over period of time due to – its shelf life, environmental effects on it, such as – humidity, temperature, light. Hence it is advisable to use it in a certain period of time. But if the material come first is not used and next arrived material is used there are high chances that the material came first might get rejected. This rule is made so that all material will be used timely by default.

1.3.1.12: Flashes

Explain



This is extra rubber which comes out from various exit points and joints of mould, like - air vent or mould closing surfaces.

1.3.1.13: Fillers

Explain



Fillers are some chemicals which are used to give some special properties to Rubber like - high/low elasticity, durability etc.

1.3.1.14: Hardness

Elaborate



This is a way of measuring Rubber's relative resistance towards pre-defined indentation.

1.3.1.15: Injection Moulding

Explain



A type of moulding in which molten rubber under heat and pressure fed to mould.

1.3.1.16: Machine Capacity

Explain

Machine capacity is the maximum output of the machine. This information is very important for following factors –

- production planning
- raw material planning
- customer shipment planning

1.3.1.16.1: How to Calculate Machine Capacity

Elaborate

In Internal Mixing capacity is also called batch weight, the weight of single batch which can be produced in the machine at a time. Here one thing is very important to understand that capacity of any machine is different for different polymer because of its Specific Gravity (SG). Formula for calculating machine capacity is -

$$W = NV \times SG \times FF$$

where **W** is Batch Weight in kilograms, **NV** is Net Mixer Volume in m³, **SG** is Specific Gravity of the batch to be mixed in kg/m³ and **FF**= Fill Factor.

1.3.1.16.2: Net Mixer Volume

Elaborate

This is the volume of mixer chamber, which is declared by Mixer manufacturer. This depends on Chamber and rotor size. This is available in user manual accompanied with mixer.

TIP

After using mixer regularly the effective volume of mixer gets increased due to wear of rotors and mixing chamber. You need to take care of this increase in NV in your calculation, else batch volume will be less which will cause insufficient ram pressure on the mixture, poor dispersion and longer mixing times. It is recommended to do regular measurements of mixing chamber for correct Net Volume (NV). If wearing is too much then mixers should be rebuilt or reconditioned.

1.3.1.16.3: Fill Factor (FF)

Elaborate



Fill factor is also an very important aspect of a mixer because an under-filled mixing chamber results in the ram bottoming out too soon. This reduces the pressure on the rubber stock and increases the mixing time. An over-filled chamber leads to unmixed ingredients staying in the mixer throat. This creates a mess under the mixer when the batch is dumped.

A typical Banbury Mixer has FF between 0.70 and 0.85, whereas an Intermix Mixer has FF range of 0.62 to 0.70.

For example, compound having high content of Natural Rubber in an **Intermix Mixer** will have a fill factor of around 0.65 while for the same compound in a *two-wing Bunbury Mixer*, will be 0.75. This compound will have an increased FF of about 0.78 for a **Bunbury Mixer** with *four-wing* rotors. Each polymer also has its ideal fill factor and that varies again with Mooney viscosity and filler system.

Fill factor of a mixer depends on the age of the machine, wear and tear of the rotors and chamber, the rotor type, rotor speed, rotor friction ratio, nature of elastomer, ratio of elastomers/ fillers, mixing sequence, kind of polymers, fillers and individual Specific Gravity of the ingredients in compound recipe, viscosity of ingredients, etc. Generally, the lower the compound viscosity, the fill factor is higher.

Hence, people initially guesstimate the FF before stabilizing on the figure later on through actual trials.

1.3.1.17: Estimate of Specific Gravity of Compound

Elaborate



You can estimate the density of your compound by multiplying the quantity of each ingredient with its individual density. Specific gravity of individual ingredient can be obtained from its supplier. Add individual results and then divide this number by the total sum, it is called phr. The result will give you the estimated density of the compound. We can understand it by example given below:

Recipe Ingredients	Volume (L)	Density kg/L	Volume x Density (kg or PHR)
SMR 10	106.4	0.94	100.0
Zinc Oxide	1.8	5.55	10.0
Stearic Acid	2.2	0.92	2.0
N550 Carbon Black	27.8	1.80	50.0
Oil	10.9	0.92	10.0
Antioxidant TMQ	1.9	1.08	2.1
Antiozonant DPPD	1.6	1.22	2.0

Table 1.3.1

<i>Sulphur</i>	<i>0.1</i>	<i>2.07</i>	<i>0.2</i>
<i>TBBS</i>	<i>1.6</i>	<i>1.29</i>	<i>2.1</i>
<i>TMTD</i>	<i>0.7</i>	<i>1.35</i>	<i>0.9</i>
Total	155		179.3
Compound SG	(179.3/155)	1.16	

Table 1.3.2

Calculating, the **SG of this Compound** mix is arrived at 1.16 (=179.3/155).

1.3.1.18: Master Batch

Explain

It is basic Rubber mixture made for making various type of compounds.

1.3.1.19: Moulding

Explain

It is a process of making usable Rubber parts by using moulds.

1.3.1.20: Polymer

Explain

A material which has a molecular structure built up chiefly or completely from a large number of similar units bonded together, e.g. many synthetic organic materials used as Rubber, plastics and resins.

1.3.1.21: PLC

Explain

Full form of PLC is 'Programmable Logic control'. It is a computer which is used to run a machine. This is used for automation of the machine. Through PLC we can program the machine, so that it can perform without any manual intervention.



Fig. 1.3.1. PLC

1.3.1.22: PQCDs

Explain



PQCDs are the most important factor for running a factory operation. Where P stands for Productivity, Q stands for Quality, C stands for Cost, D stands for Delivery and S stands for Safety. If PQCDs is under control for any company then following will be the benefits –

- Profitability will be high
- Customer will be happy
- Employees will be happy

1.3.1.23: Shelf life

Explain



Shelf life is the period by which a product maintains all of its properties and it can safely be used without any ill effects. All manufacturers declare shelf life for their product based on the ingredient and its specification. Since Rubber compound is prone to vulcanize with temperature and time, hence it is kept in temperature controlled environment. It has different storage limit based on its specification.

1.3.1.24: Shrinkage

Explain



Decrease in Rubber volume during moulding and due to prevailing environment.

1.3.1.25: Swell

Explain

Increase in Rubber volume due to oil, liquids and other things.

1.3.1.26: Unit of Measurement

Elaborate

Unit of measurement is the standard for defining the physical quantity of characteristics of any object. For example – Gram is unit of measurement for weight of any object. There are two systems of measurement.

1. SI or FPS System
2. MKS System

The metric system is an international decimalized system of measurement, first adopted by France in 1791, that is the common system of measuring units used by most countries in the world. All measuring tools have metric or imperial graduations or a combination of both. One big advantage of the metric scale is that it eliminates the necessity for a range of fractional sizes. The markings on a metric rule are every millimeter with the figures marked at 10 millimeter intervals. Unit of weight in FPS system is pound, while in MKS system it is gram. Fractions are not used in the MKS system. In India, Metric or MKS system is more popular. Hence weight measurement is done in grams or Kilograms.

1.3.1.27: Vulcanization

Explain

This is another term used for Cure.

1.3.2: Compounding

Explain

Compounding is to decide that what ingredients to mix in which proportions. The ingredients and their proportions are decided based on the desired properties for final product and their application. Its importance is very high since compound constitute the largest part of any rubber part. Following are some of the examples as per usage of compound -

1. Tubes - 98%
2. Moulded Parts - 20-100% (depending on the insert)
3. Tyres - 75-80%
4. Conveyor belts - 40-50%

1.3.3: Rubber Mixing

Explain



Rubber mixing is specified and proven method of combining different ingredients together and creating a new homogenous material. The new material has property which is different from basic ingredient's properties.

1.3.3.1: Steps of Rubber Mixing

Elaborate



Principally following are the four steps in Rubber Mixing process -

1.3.3.1.1: Incorporation

Elaborate



This is first phase of Rubber mixing. In this phase, all different ingredients are mixed with each other.

1.3.3.1.2: Dispersion

Elaborate



This is second phase of mixing. In this phase Carbon black, which acts as a filler, breaks in to very small pieces for getting mixed homogeneously with other ingredients.

1.3.3.1.3: Distribution

Elaborate



This is third phase of mixing. This is the phase of homogenization. In this phase all ingredients get homogeneously mixed with other ingredients.

1.3.3.1.4: Plasticization

Explain



This is the last phase of mixing. In this phase all plasticizers effectively lubricate the mixture and desired viscosity of mixture is achieved.

1.3.4: Ingredients of Compound

Explain



Any Rubber compound is primarily made of below ingredients -

1. Polymer - 50% of compound
2. Filler - 15 - 30% of compound
3. Antioxidant - 0.5 - 1.5% of compound
4. Antiozonants - 0.5 - 1.5% of compound
5. Oil - 2.5 - 15% of compound
6. Cure - 2.5 - 5% of compound

1.3.4.1: Polymer

Explain



This is the first and foremost ingredient of any rubber compound. This acts as a base for rubber compound and primarily responsible for chemical, physical and molding properties of a compound. The polymers are rated for their chemical properties and viscosity rating. Example of polymers are - Natural rubber, Nitrile rubber etc.

1.3.4.2: Filler

Explain



The filler used for giving strength and color to compound. Carbon black is the most used filler in rubber industry. It comes in various particle size. By changing the particle size one can change the physical properties and compression set too. There are some other filler also, like white clay. It helps in keeping compound color white wherever necessary.

1.3.4.3: Antioxidants

Explain

As the name suggest, it helps in keeping away the oxidants by absorbing the free radicals. It ensures that bonds between polymers remains strong and compound lasts its intended work life.

1.3.4.4: Antiozonants

Explain

Similarly as antioxidants, it helps in keeping away the ozone, which affects the work life of rubber compound. Example of antiozonants is wax.

1.3.4.5: Oil

Explain

Oil is used as binding agent for keeping together all the ingredients of compound. Since many ingredients like filler poses non-binding properties. For keeping the final compound together for making parts, it needs binding agent. With different percentage of oil content in compound you can increase or decrease viscosity of rubber compound. You can also adjust the hardness level of compound by varying oil content.

1.3.4.6: Curing Agent

Explain

It is also known as accelerator. It helps in expediting the vulcanizing process. Hence, it is mixed just before the part making process, whether it is moulding or extruding. Sulphur is the most common curing agent. Peroxide is also an accelerator, which gives higher bonding strength to rubber compound.

1.3.4.7: Types of Rubber Compound

Explain

Following are some of the commonly used rubber compounds -

1. NR (Natural Rubber)
2. NBR (Nitrile Butadiene Rubber)
3. SBR (Styrene Butadiene Rubber)
4. EPDM (Ethylene Propylene Diene Rubber)
5. FPM (Fluorocarbon Rubber)
6. CR (Chloroprene Rubber)

1.3.4.8: Natural Rubber

Explain



The main ingredient of this compound is natural rubber, which is derived from Rubber plants. It has properties, such as:

- low compression set, high tensile strength,
- resilience, abrasion and tear resistance,
- good friction characteristics, excellent bonding capabilities to metal substrate,
- good vibration dampening characteristics.

1.3.4.8.1: NBR

Explain



Due to petroleum resistance property of NBR, it is used extensively in making oil seals. Additionally it can withstand temperature range of -30°C to 100°F . It is a copolymer of butadiene and acrylonitrile. We can make various type of compound by varying their proportions. By increasing acrylonitrile content we can increase resistance to temperature and petroleum products and fuels. At the same time it decreases flexibility in low temperatures. NBR also provides good compression set, tear, and abrasion resistance. The major shortcoming of NBR are its poor ozone and weather resistance properties and moderate heat resistance.

1.3.4.8.2: SBR

Explain



Styrene-Butadiene (SBR) is a copolymer of styrene and butadiene. SBR compounds have properties similar to those of natural rubber. SBRs primary custom molded application is the use in hydraulic brakes system seals and diaphragms, with the major of the industry usage coming from the Tyre Industry.

SBR features excellent resistance to brake fluids, and good water resistance.

1.3.4.8.3: EPDM

Explain



Ethylene-propylene compounds are prepared from ethylene and propylene (EPM) and usually a third monomer (EPDM). These compounds are used frequently to seal in brake systems, and for sealing hot water and steam. Ethylene propylene compounds have good resistance to mild acids, detergents, alkalis, silicone oils and greases, ketones, and alcohols. They are not recommended for applications with petroleum oils, mineral oil, di-ester lubricants, or fuel exposure.

Ethylene Propylene has gained wide seal industry acceptance for its excellent ozone and chemical resistance properties and is compatible with many polar fluids that adversely affect other elastomers.

EPDM compounds are typically developed with a sulfur or peroxide cure system. Peroxide-cured compounds are suitable for higher temperature exposure and typically have improved compression set performance.

1.3.4.8.4: FPM

Explain



Fluorocarbon exhibits resistance to a broader range of chemicals combined with very good high temperature properties more so than any of the other elastomers. It is the closest available approach to a universal elastomer for sealing in the use of o-rings and other custom seals over other types of elastomers.

Fluorocarbons are highly resistant to swelling when exposed to gasoline as well as resistant to degradation due to exposure to UV light and ozone.

When exposed to low temperatures, fluorocarbon elastomers can become quite hard (-4 °F) but can be serviceable at low temperatures, although FPM compounds are not recommended for applications requiring good low temperature flexibility.

In addition to standard FPM materials, a number of special materials are available with differing monomer compositions and fluorine content (65% to 71%) for improved low temperature, high temperature, or chemical resistance performance.

1.3.4.8.5: CR

Explain



Neoprene homopolymer of chlorobutadiene and is it is moderately resistant to both petroleum oils and weather (ozone, UV, oxygen). This qualifies neoprene uniquely for certain sealing applications where many other materials would not be satisfactory. Neoprene is classified as a general purpose elastomer which has relatively low compression set, good resilience and abrasion, and is flex cracking resistant. Neoprene has excellent adhesion qualities to metals for rubber to metal bonding applications. It is used extensively for sealing refrigeration fluids due to its excellence resistance to Freon and ammonia. It is also used in flame resistance applications.

Notes for Facilitation

- Describe uses of different types of compounds.
- Tell the participants ways of identification of compounds.
- Show the participants samples of rubber compound and their properties.

Activity-1

Objective: Internal mixer machine capacity calculation.

Procedure:

- Explain the participants the method of calculating internal mixer capacity.
- Provide them the set of machine data for capacity calculation.
- They can discuss the answer between them before writing and submitting to facilitator.
- Declare the correct machine capacity and show the practical by loading the raw material in to the machine as per calculation.

Activity Outcome:

- You will be able to test the knowledge of participants.
- Participant will be keen to take formulas in to practical use.

Activity	Time	Resources
Internal mixer machine capacity calculation	4 Hours	White board & markers, facilitator notes, laptop/ slides + projector, set of data for calculating machine capacity, internal mixer, raw material for making rubber compound

Table 1.3.3

Activity-2

Objective: Rubber compound specific gravity calculation.

Procedure:

- Explain the participants the method of calculating specific gravity of a rubber compound through its ingredient specific gravity.
- Provide them the set of raw material specific gravity data for calculation.
- Ask them to calculate the specific gravity of the given set of data.
- Declare the correct specific gravity and demonstrate them the specific gravity of final compound by checking it through specific gravity measurement device.

Activity Outcome:

- You will be able to test the knowledge of participants of specific gravity calculation.
- Participants will be keen to take formulas in to practical use.

Activity	Time	Resources
Rubber compound specific gravity calculation	4 Hours	White board & markers, facilitator notes, laptop/ slides + projector, set of data for calculating rubber compound specific gravity, raw material for making rubber compound with known specific gravity, specific gravity measuring instruments

Table 1.3.4

Activity-3

Objective: Rubber compound ingredient identification.

Procedure:

- Demonstrate the participants the various ways to identify rubber compound ingredients: Smell, colour and texture etc.
- Ask the participants to make a pair of 2 participants.
- Arrange the set of raw material for rubber compound for display.
- They can discuss the answer between them before writing and submitting to facilitator.
- Declare the correct ingredient name and show them the correct way of identifying them.

Activity Outcome:

- You will be able to test the knowledge of participants about rubber compound ingredients.
- Participants will be keen to know more about the ingredients.

Activity	Time	Resources
Rubber compound ingredient identification	2 Hours	White board & markers, facilitator notes, laptop/ slides + projector, set of ingredients for making rubber compound

Table 1.3.5

Unit 1.4: Equipment Used in Rubber Internal Mixing

Unit Objectives

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

1. Explain the Equipment used in Internal Mixing process
2. Describe working of various equipment used in Internal Mixing Process.

Resources to be Used

- Laptop
- Projector
- White Board
- Marker + Duster
- Weighing scales & material handling equipment

Do

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

Field Visit

- Take the participants for a field visit to the rubber mixing plant.

Notes for facilitation

Check List to for Field visit

Activities to be done, one day before the field visit

1. Get confirmation from the management of the organisation to which team is going to visit.
2. Take contact details of the person to be met of the organisation to be visited.
3. Create check list for participants for the things to be observed during visit.
4. Arrange transport for traveling to the place to be visited.
5. Instructions for all participant about field visit, such as:
 - Organisation to be visited during the field visit.
 - Objectives of the field visit.
 - Do's and don'ts during the field visit.
 - Time to report at the meeting place.
 - Things to carry for the field visit.
 - Duration of the field visit.
6. Any other specific arrangement to be made for the field visit.

Activities to be done on the day of the field visit

1. Ensure all participants are gathered before moving for the field visit.
2. Repeat information given to all the participants the previous day, for clarity.
3. Inform your expected time of arrival to the organisation to be visited.
4. Ensure to arrive on time to the place to be visited.
5. Ensure all the objectives planned out for the field visit, are met.
6. Encourage participants to ask questions during the field visit for their better understanding.
7. Answer satisfactorily for all the queries raised by the participants during the field visit.

Activities to be done on the next day of the field visit

1. Ask participants for their experience of field visit and their learnings.
2. Answer satisfactorily for any queries raised by the participants during the discussion.

1.4.1: Equipment Used in Rubber Internal Mixing

Ask

- Ask the participants about equipment used in rubber internal mixing.

Say

Following are the equipment used in Rubber Internal mixing -

1. Internal Mixer Machine

Supporting Equipment -

1. Weighing Scale
2. TCU - Temperature control unit
3. Dust Collector
4. Material handling equipment

1.4.2: Internal Mixer Machine

Ask

- Ask the participants about ingredients for making rubber compound.

Explain

This is the machine where all ingredients of Rubber Compound are mixed and compound is made. Following are the common ingredients used for making Rubber Compound -

1. Rubber - Natural / Synthetic
2. Carbon black
3. Zinc Oxide
4. Stearic Acid
5. Accelerator
6. Oil

All contents are mixed in different proportions based on the specification of the compound.



Fig. 1.5.1. Internal mixer



Fig. 1.5.2. Internal mixing shop floor

1.4.3: Weighing Scale

Ask

- Ask the participants about types of weighing scale used in industry.

Explain

Measurement of portions of different ingredients is very crucial in compound making. Weighing scale is the equipment which helps us in doing this activity. It has 2 types –

1. Analog
2. Digital

It comes in different capacities. You can buy suitable weighing scale based on your requirement.

There are 2 types of weighing scales used in compound making.

1. Small Weighing scale - For weighing less than one Kg.
2. Big Weighing scale - For weighing more than one Kg.



Fig. 1.5.3. Small Weighing scale



Fig. 1.5.4. Big Weighing Scale

1.4.3.1: Importance of Correct Weighing

Ask



- Ask the participants about importance of weightment in rubber internal mixing.

Elaborate



For achieving right properties of compound it is very important to mix all ingredients in correct proportions. In order to mix all ingredients in correct proportions it is important to weigh ingredients exactly as per specification. Even the slightest of difference in specification and actual would result in big difference in compound properties and which can make the entire lot rejected.

1.4.4: TCU

Ask



- Ask the participants about importance of temperature control for rubber internal mixing.

Explain



TCU or Temperature Control Unit is the equipment which keeps compound temperature under control during mixing process, so that it does not get vulcanized.



Fig. 1.5.5. Temperature Control Unit

1.4.5: Dust Collector

Ask



- Ask the participants about role of dust collector in rubber internal mixing.

Explain



Dust collector is the equipment which keeps control on dust in shop floor. Dust collector sucks and collects dust from the area where it is installed. It is similar to exhaust fans, which also removes dust from work area. But it collects dust in it, in place of throwing it out in atmosphere. This collected dust is disposed later on appropriately as per environmental policy.

It is a very crucial equipment from health point of view. Also it makes working in shop floor easier. If an effective dust collector is in place, people can work calmly and give better output.

Capacity of Dust collector depends on the size of Shop floor. Capacity of a Dust collector is measured in CFM (cubic foot per minute).

1.4.5.1: Implication of Dust Collector not Working

Ask



- Ask the participants about bad effects of dusty environment on health.

Elaborate



Due to nature of work environment of a Rubber industry, there might be heavy dust in work area. This dusty environment makes working difficult and also very hazardous for health if exposed for a long time. Although, it is recommended to use proper mask during working in these area, but still dust collector is a must for such place.

1.4.6: Material Handling Equipment

Ask



- Ask the participants about types of equipment available for material handling in rubber internal

Explain



Material handling equipment are required to feed the compound ingredient to Internal Mixer and to move the prepared compound to store or next working station. You can use pallet mover or trolley for this purpose.



Fig. 1.5.6. Trolley with compound ingredients

Activity-1



Objective: Rubber internal mixer support equipment demonstration.

Procedure:

- Explain the participants the support equipment required to run internal mixer.
- Demonstrate working of each support equipment.
- Describe main parameters for each equipment.

Activity Outcome:

- Participant will be able to closely learn the functioning of support equipment required for internal mixer.
- Participant will be able ensure their availability before operating an internal mixer.

Activity	Time	Resources
Rubber internal mixer support equipment demonstration	8 Hours	White board & markers, facilitator notes, laptop/ slides + projector, cooling tower, air compressor, generator, power house

Table 1.4.1

Unit 1.5: Job Role of a Rubber Internal Mixer Operator

Unit Objectives

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

1. Explain the job role of a rubber internal mixer operator.

Resources to be Used

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

Elaborate

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

1.5.1: Job Role of a Rubber Internal Mixer Operator

Ask

- Ask the participants, as per them what are the roles of a rubber internal mixer operator.
- Ask the participants, as per them what is the minimum requirement for becoming a internal mixing operator.

Elaborate



Fig. 1.6.1. Internal Mixer Operator

Elaborate the details of his/ her duties. Explain why the job role or responsibilities of a Internal Mixer Operator is very important in Rubber manufacturing industry. Also explain in brief the activities involved in each of their duties, such as:

- Preparation of the rubber compound.
- Verification of ingredients which are getting fed in Internal Mixer.
- Cleaning of the machine by using proper aids.
- Setting the machine parameters before starting the operations.
- Picking the correct ingredient as per specification.
- Checking the compound for any quality issues.
- Housekeeping of machine and nearby areas.
- Use of PPEs, while working in company.
- Follow all the procedures related to health and safety.
- Safe handling of compound after preparation.
- Suggest / advise any improvement in process based on experience and knowledge gained while working on machine.
- Analysis of the quality issues and resolution of the problems.
- Escalation of the issues which are beyond his/ her control.



Fig. 1.6.2. Internal Mixer Operator

1.5.2: General Work Requirement

Ask



- Ask the participants about general work requirement of rubber internal mixing operation.

Explain

Explain to participants the general work requirement to work as a rubber internal mixer operator:

- Honesty for company property and time.
- Responsibility for completing one's own work assignment.
- Initiatives to enhance/ learn skills in one's area of work.
- The capacity to learn from experience in a range of settings.
- To remain open to new ways of doing things.
- Avoid absenteeism.
- Act objectively, rather than impulsively or emotionally when faced with difficult/ stressful or emotional situations.
- Work in disciplined factory environment.
- Be punctual.
- Apply problem-solving approaches in different situations.
- Suggest improvements in process/ product/ materials based on results and experience.
- Diagnose common problems in the machine based on visual inspection, sound , temperature etc.
- Seek clarification on problems from others.



Fig. 1.6.3. Internal Mixer Operator

Excercise



- Q1. Process of getting latex from rubber Plant is called :**
 a. Patting
 b. Tapping
 c. Receiving
 d. Latting
- Q2. Following is a type of rubber :**
 a. Natural Rubber
 b. Synthetic Rubber
 c. TSR Rubber
 d. All of above
- Q3. India is largest producer of**
 a. Natural Rubber
 b. Synthetic Rubber
 c. Reclaimed Rubber
 d. None of above
- Q4. Following is a type of natural rubber**
 a. Sheets
 b. Creps
 c. TSR
 d. All of above
- Q5. 'RSS' is a type of**
 a. Natural Rubber
 b. Synthetic Rubber
 c. A & B both
 d. None of above
- Q6. Following is not made of rubber**
 a. Machine Mount
 b. Car Body
 c. Belt
 d. Tyre
- Q7. In 2019, India is at ----- in rubber producing countries**
 a. 1st
 b. 2nd
 c. 3rd
 d. 4th
- Q8. Which of these is next operation after rubber internal mixing?**
 a. Compound making
 b. Vulcanizing agent mixing
 c. Curing
 d. None of the above
- Q9. Which of these is not used in making rubber compound?**
 a. SB Rubber
 b. Carbon black
 c. Zinc Oxide
 d. Copper
- Q10. Which of these machines is used in internal mixer :**
 a. Internal Mixer
 b. Hydraulic Press
 c. Lathe
 d. Milling machine

Answers

1. b 2. d 3. c 4. d 5. a 6. b 7.d 8. b 9. d 10. a

Key Learning Outcomes

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

1. Explain the construction of Internal Mixer
2. Describe the details of Internal Mixer parts
3. Prepare the machine for Internal Mixing
4. Demonstrate the cleaning process of Internal Mixer
5. Describe the method to check ingredients of rubber compound
6. Describe the process of arranging material for Internal Mixing

Unit 2.1: Rubber Internal Mixer Machine and its Parts

Unit Objectives

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

1. Explain construction of a Internal Mixer.
2. Describe the details of parts of a Internal Mixer.

Resources to be Used

- White Board + Marker /Black Board + Chalk
- Duster
- Laptop + Projector / Computer + Projector / Flip charts
- Participant Handbook + photos / diagram of the machine parts

Do

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

Field Visit

- Take the participants for a field visit to the rubber company which has rubber internal mixing

Notes for facilitation

Check List to for Field visit

Activities to be done, one day before the field visit

1. Get confirmation from the management of the organisation to which team is going to visit.
2. Take contact details of the person to be met of the organisation to be visited.
3. Create check list for participants for the things to be observed during visit.
4. Arrange transport for traveling to the place to be visited.
5. Instructions for all participant about field visit, such as:
 - Organisation to be visited during the field visit.
 - Objectives of the field visit.
 - Do's and don'ts during the field visit.
 - Time to report at the meeting place.
 - Things to carry for the field visit.
 - Duration of the field visit.
6. Any other specific arrangement to be made for the field visit.

Activities to be done on the day of the field visit

1. Ensure all participants are gathered before moving for the field visit.
2. Repeat information given to all the participants the previous day, for clarity.
3. Inform your expected time of arrival to the organisation to be visited.
4. Ensure to arrive on time to the place to be visited.
5. Ensure all the objectives planned out for the field visit, are met.
6. Encourage participants to ask questions during the field visit for their better understanding.
7. Answer satisfactorily for all the queries raised by the participants during the field visit.

Activities to be done on the next day of the field visit

- 1- Ask participants for their experience of field visit and their learnings.
- 2- Answer satisfactorily for any queries raised by the participants during the discussion.

2.1.1: Internal Mixer

Explain



As explained earlier, there are 2 types of Internal Mixers -

1. Intermesh Rotor type
2. Tangential Rotor type

Rotors are the main parts of any internal mixer. Following are the other important parts of Internal Mixers -

1. Rotors
2. Feed Hopper
3. End Frame
4. Discharge door
5. Dust Seal
6. Bed Plate
7. Oil Injectors
8. Ram Group
9. Gear Reducer



Fig. 2.1.1. Internal Mixer - Kneader

2.1.1.1: Rotors

Ask



- Ask the participants about the purpose of rotor in a rubber internal mixer.

Explain

These are the main mixing elements of the mixer. Between the rotors, the raw material gets mixed. The rotors are shaped in the form of wings (two – wing, four – wing and six – wing); sometimes the wings are also called helical blades.

The shape of these wings is important to get a smooth and predictable flow of mix in the mixing chamber. The way the material gets mixed also determines the temperature rise in the mixing chamber. Optimal rotor length – to – diameter ratio aids mixing. Another factor which influences the mixing is the rotor speed. Sometimes for certain mixing stages, even the alignment of the rotors can be adjusted.

The rotors are provided with extensive cooling systems (in the form of complicated geometric pathways inside the rotor) as the temperature during the time of mixing may well reach about 150 – 170 degrees centigrade. The cooling at the tips of the wing is especially important, as here the temperature rise is more than the other regions.

2.1.1.2: Feed Hopper

Ask

- Ask the participants about the purpose of feed hopper in a rubber internal mixer.

Explain

Large steep charging area for rapid feeding. Radius bottom floating weight to present maximum cooling and mixing surfaces to the compounds. Variable position, variable pressure, auto deceleration and air saving circuits available. Dust extraction hood fitted as standard. Charging door pneumatically operated.



Fig. 2.1.1.2. Feeder Hopper

2.1.1.3: End Frame

Ask

- Ask the participants about the purpose of end frame in a rubber internal mixer.

Explain

This is the basic frame on which all parts are mounted. This is manufactured of CAST STEEL, for strength which can support high rotor speed also.

2.1.1.4: Discharge Door

Ask

- Ask the participants about the purpose of discharge door in a rubber internal mixer.

Explain

Through this door, prepared compound is taken out, once mixing cycle is complete.

2.1.1.5: Dust Seal

Ask

- Ask the participants about the purpose of dust seal in a rubber internal mixer.

Explain

Dust seals prevent the fillers from leaking from rotor ends and also helps the grease from the rotor ends to enter from rotor to the main mixer and prevent contamination.

2.1.1.6: Bed Plate

Ask

- Ask the participants about the purpose of bed plate in a rubber internal mixer.

Explain

Complete Internal Mixer is mounted on this plate. Its design is based on Mixer position.

2.1.1.7: Oil Injectors

Ask



- Ask the participants about the purpose of oil injector in a rubber internal mixer.

Explain



These are used for injecting Oil in to compound being prepared. Various oil/liquid injection ports available in either the end frames, jackets (sides), or drop door top.

2.1.1.8: Ram Group

Ask



- Ask the participants about the purpose of ram group in a rubber internal mixer.

Explain



The ram is usually hydraulically or pneumatically operated. The ram is cooled and sensors indicate the position of the ram. The ram can generate pressures in excess of 100 bar.

A hydraulic ram offers some advantages over the pneumatic top cylinder. In a hydraulic ram, the pressure rise to the desired pressure level is more or less instantaneous, and more importantly the hydraulic's working pressure is unaffected by variable load as in the case of air – compression systems.

2.1.1.9: Gear Reducer

Ask



- Ask the participants about the purpose of gear reducer in a rubber internal mixer.

Explain



The rotor speed varies normally from 50 – 70 rpm. The gear reducer reduces the motor speed to this speed. They are usually provided with forced feed lubrication system.



Fig. 2.1.3. Gear Reducer

2.1.2: Difference in Tangential and Intermeshing Rotor Mixers

Ask



- Ask the participants about the difference in tangential and intermeshing rotor mixers.

Elaborate



Criteria	Tangential Rotor Mixer	Intermeshing Rotor Mixer
Form of Dump	Large Lump	Rough Sheet
Mix Temperature Control	Comparatively Poor - Lower Surface / volume ratio in chamber	Comparatively better - Higher Surface / volume ratio in chamber
Oil Incorporation	Slower	Faster
Material Movement around the chamber	Towards Center with higher distributional flow	Each Rotor carries material towards opposite chamber end Center with higher distributional flow
Mix Development	Disperse / Distribute	Distribute / Disperse
Power peak point	Beginning of cycle	End of cycle
Time for RAM to Bottom	30-50% in to cycle	50-100% in to cycle
Speed of RAM descent after feed	Comparatively faster	Comparatively Slower
Average Fill Factor	Up to 78%	Up to 75%

Table 2.1.1

Team Activity-1



Objective: Internal mixer machine parts identification.

Procedure:

- Demonstrate the participants different parts of a rubber internal mixer.
- Ask the participants to make a pair of 2 participants.
- Provide them the image of an internal mixer parts.
- Ask them to identify the parts of an internal mixer based on the knowledge acquired in this unit.
- Also ask them to write function of that part.
- Inform the correct part name and explain the function of that part.

Activity Outcome:

- You will be able to test the knowledge of participants about internal mixer.
- Participants will be learn about functioning of main parts of an internal mixer.

Activity	Time	Resources
Internal mixer machine parts identification	4 Hours	White board & markers, facilitator notes, laptop/ slides + projector, model, videos and images of rubber internal mixer.

Table 2.1.1

Unit 2.2: Machine Preparation for Internal Mixing

Unit Objectives

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

1. Prepare the machine for internal mixing.
2. Demonstrate the cleaning process of a internal mixer.
3. Describe the method to check ingredients of rubber compound.
4. Describe the process of arranging material for internal mixing.

Resources to be Used

- White Board + Marker /Black Board + Chalk
- Duster
- Laptop + Projector / Computer + Projector / Flip charts
- Participant Handbook / Copies of Handout
- Rubber internal mixer
- Cleaning equipments + clothes for cleaning
- Ingredients for rubber compound
- Material handling equipment

Do

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

2.2.1: Steps for Internal Mixer Preparation

Ask

- Ask the participants about importance of cleaning a rubber internal mixer.
- Ask the participants about equipment required for cleaning a rubber internal mixer.

Elaborate

Internal mixing is first and very critical step in rubber parts production. Due care should be taken in machine preparation before starting the internal mixing. Please follow below steps for preparing the internal mixer -

2.2.1.1: Internal Mixer Cleaning

Explain



Before beginning the operation for the day, operator should do the cleaning of the machine and his / her workplace. He should ensure that his / her workplace is thoroughly cleaned. There should not be any unwanted mould / material / tools / equipment in the workplace.

If anything, material / tools / equipment is available, which is not needed for current process, then it should be kept at its place properly, before starting the operation.



Fig. 2.2.1. Machine should be cleaned before start of the operation

2.2.1.2: Confirmation of Ingredients as per Specification

Ask



- Ask the participants that what is specification & where to get it.
- Ask the participants that why it is important to check the ingredients against specification of

Notes for Facilitation



- Explain the participants what is specification.
- Explain the participants who makes compound specification.
- Show the participants how a specification sheet for compound look like.

Elaborate



Next step is to check ingredient of compound. Before loading the material in mixer, following points should be taken care –

1. Ensure that job sheet is taken from a correct source.
2. Ensure the job sheet is latest and valid.
3. Ensure that correct material is identified as per job sheet requirement.

4. Ensure that material weightment is done properly.
5. Check physical condition of material for any obvious contamination.
6. Ensure that appropriate PPEs are worn before touching the ingredients, to ensure no allergy while checking the ingredients.
7. Ensure that appropriate material handling equipment are used, which can safely lift the material, in case it is heavy to lift manually.



Fig. 2.2.2. Checking Ingredients from the list

2.2.1.3: Arranging Batch of Ingredient for Mixing

Ask



- Ask the participants about steps of arranging ingredients.
- Ask the participants about source of getting ingredients.
- Ask the participants about material handling equipment to be used for moving ingredients.

Explain



Before starting the machine, it should be ensured that desired quantity of ingredients is available. By doing this, you will save precious time which you might waste in searching for ingredients after everything is ready and process is about to start.

It should be ensured that the available batch of ingredients matching with specification as mention in job sheet.

It should also be ensured that the lot available for mixing is approved from quality department.



Fig. 2.2.3. Batch of Ingredients

2.2.1.4: Setup of Program in Control Panel

Ask



- Ask the participants about their understanding about control panel of a rubber internal mixer.
- Ask the participants about what is a control panel program.
- Ask the participants who is authorized to make changes in control panel program.

Notes for Facilitation

- Explain the participants about control panel construction.
- Explain the participants what is the purpose of control panel in a rubber internal mixer.
- Show the participants how control panel works.

Explain

This step is very important. As per given job sheet the program should be chosen in control panel. It should be ensured that chosen program has all the critical parameters such as Speed of rotors, Temperature is set as per specification sheet. If anything is suspected to be wrong, it should be immediately discussed with supervisor and suggested countermeasures should be taken.



Fig. 2.2.4. Parameter setting

Team Activity-1

Objective: Internal mixer machine preparation.

Procedure:

- Demonstrate the participants the activities involved in internal mixer machine preparation.
- Ask the participants to make a pair of 2 participants.
- Provide them an internal mixer for demonstrating the preparation.
- Ask them to prepare the internal mixer for production activity.
- They should carry out function like: Cleaning, machine functioning checking, reviewing job sheet, parameter setting as per job sheet, verification of material as per job sheet.

Activity Outcome:

- You will be able to test the knowledge of participants for internal mixer preparation.
- Participants will get opportunity to work on an internal mixer.

Activity	Time	Resources
Internal mixer machine preparation	8 Hours	White board & markers, facilitator notes, laptop/ slides + projector, videos of rubber internal mixer preparation, internal mixer, ingredient for rubber compound.

Table 2.2.1

Team Activity-2

Objective: Rubber compound ingredient weighing.

Procedure:

- Demonstrate the participants the ideal way of rubber compound ingredient weighing.
- Ask the participants to make a pair of 2 participants.
- Provide them a rubber compound recipe, a weighing machine and rubber compound ingredients for demonstrating the weighing activity.
- Ask them to weigh the raw material for compound as per the recipe.
- They should showcase the function like: Calibration status checking of weighing machine, ensuring zero before starting the weighing, using TARE function if using any additional container during weighing.

Activity Outcome:

- You will be able to test the knowledge of participants for ingredient weighing.
- Participants will get opportunity to weigh the actual raw material.

Activity	Time	Resources
Rubber compound ingredient weighing	8 Hours	White board & markers, facilitator notes, laptop/ slides + projector, weighing scale, compound recipe, ingredients as per recipe, material handling equipment.

Table 2.2.2

Unit 2.3: Types of Compound and their Properties

Unit Objectives

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

1. Explain main types of compound being used in industries.
2. Describe the properties of compounds.
3. Describe the usage of various compounds.
4. Describe the application advantages of various compounds.

Resources to be Used

- White Board + Marker /Black Board + Chalk
- Duster
- Laptop + Projector / Computer + Projector / Flip charts
- Participant Handbook / Copies of Handout
- Samples of rubber compound

Do

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

2.3.1: Types of Regular Compound Used in Industries

Ask

- Ask the participants about name of rubber compounds they are aware of.
- Ask the participants why there are so many types of rubber compound.
- Ask the participants how it is possible to make so many types of rubber compound.

Notes for Facilitation

- Explain the participants about the purpose of having different types of rubber compound.
- Tell the participants uses of few of the rubber compounds.
- Show the participants samples of rubber compound and their properties.

Explain



There are numerous types of compound can be made with various combinations, but some compounds are very commonly used in industries due their specific properties. There are various aspect for choosing any particular compound, such as - : chemical compatibility for application, type of application - dynamic or static , pressure, temperature condition, friction requirement, cost, design requirement, installation requirement, intended life of product and desired maintenance frequency. Details of those compound are as below -

2.3.1.1: Chemical Name and Abbreviation of Compounds

Ask



- Ask the participants about abbreviation of some of the famous rubber compound.

Explain



Chemical Name	Common Name	Abbreviation	Trade name
Acrylonitrile-butadiene rubber	Nitrile	NBR	Buna-N
Hydrogenated Acrylonitrile-butadiene rubber	Hydrogenated Nitrile	HNBR	HNBR
Ethylene propylene diene rubber	Ethylene - Propylene	EPDM	EP
Fluorocarbon rubber	Flouro Carbon	FKM	Viton
Chloroprene rubber	Chloroprene	CR	Neoprene
Silicon rubber	Silicone	VMQ	PVMQ
Flourosilicon rubber	Flourosilicone	FVMQ	FVMQ
Styrene butadiene rubber	Styrene - Butadiene	SBR	SBR
Natural rubber	Natural rubber	NR	NR

Table 2.3.1

2.3.2: Properties of Different Rubber Compounds

Ask



- Ask the participants how different properties of rubber compounds help in different application of rubber.

Explain



All rubber compounds have different properties. Based on their exclusive properties they are used in different applications. Properties of some of widely used compounds are given below-

2.3.2.1: Properties of Nitrile (NBR)

Elaborate



Nitrile is the most widely used elastomer in the seal industry. The popularity of nitrile is due to its excellent resistance to petroleum products and its ability to be compounded for service over a temperature range of -22°F to 212°F.

Temperature Range

- -30 to 100 degree centigrade

Application advantages

- excellent compression set
- superior tear resistance
- abrasion resistance

Application Disadvantages

- poor weather resistance
- moderate heat resistance

Uses

O-rings, rubber seals and custom molded rubber components for:

- Oil resistant applications
- Low temperature applications
- Fuel systems, automotive, marine, and aircraft
- General Industrial Use

2.3.2.2: Properties of Hydrogenated Nitrile(HNBR)

Elaborate



HNBR is created by partially or fully hydrogenating NBR. The hydrogenating process saturates the polymeric chain with accompanying improvements to the ozone, heat and aging resistance of the elastomer and improves overall mechanical properties. HNBR, like Nitrile, increasing the acrylonitrile content increase resistance to heat and petroleum based oils and fuels, but decreases the low temperature performance.

Temperature Range

- -30 to 149 degree centigrade.

Application advantages

- excellent heat and oil resistance
- improved fuel and ozone resistance (approximately 5X) over Nitrile
- abrasion resistance

Application Disadvantages

- increased cold flow with hydrogenation
- decreased elasticity at low temperatures with hydrogenation over standard nitrile

Uses

O-rings, rubber seals and custom molded rubber components for:

- Oil resistant applications
- Low temperature applications
- Fuel systems, automotive, marine, and aircraft
- General Industrial Use

2.3.2.3: Properties of EPDM

Elaborate

Ethylene-propylene compounds are prepared from ethylene and propylene (EPM) and usually a third monomer (EPDM). These compounds are used frequently to seal in brake systems, and for sealing hot water and steam. Ethylene propylene compounds have good resistance to mild acids, detergents, alkalis, silicone oils and greases, ketones, and alcohols. They are not recommended for applications with petroleum oils, mineral oil, di-ester lubricants, or fuel exposure.

Temperature Range

- -51 to 149 degree centigrade

Application advantages

- excellent weather resistance
- good low temperature flexibility
- excellent chemical resistance
- good heat resistance
- poor petroleum oil and solvent resistance

Application Disadvantages

- sulfur-cured and peroxide-cured compounds
- third co-monomer EPDM, copolymer ethylene and propylene EPM

Uses

O-rings, rubber seals and custom molded rubber components for:

- Water system seals, faucets, etc.
- Brake systems
- Ozone exposure applications
- Automotive coolinga systems
- General Industrial Use

2.3.2.4: Properties of Fluorocarbon(FKM)

Elaborate



Fluorocarbon exhibits resistance to a broader range of chemicals combined with very good high temperature properties more so than any of the other elastomers. It is the closest available approach to a universal elastomer for sealing in the use of o-rings and other custom seals over other types of elastomers. Fluorocarbons are highly resistant to swelling when exposed to gasoline as well as resistant to degradation due to exposure to UV light and ozone.

Temperature Range

- -15 to 199 degree centigrade

Application advantages

- excellent chemical resistance
- excellent heat resistance
- good mechanical properties
- good compression set resistance

• Application Disadvantages

- poor low temperature flexibility
- poor resistance to hot water and steam

Uses

O-rings, rubber seals and custom molded rubber components for:

- Automotive fuel handling
- Aircraft engine seals
- High temperature applications requiring good compression set
- General industrial seals and gaskets

2.3.2.5: Properties of Neoprene/Chloroprene

Elaborate



Neoprene homopolymer of chlorobutadiene and is unusual in that it is moderately resistant to both petroleum oils and weather (ozone, UV, oxygen). This qualifies neoprene uniquely for certain sealing applications where many other materials would not be satisfactory. Neoprene is classified as a general purpose elastomer which has relatively low compression set, good resilience and abrasion, and is flex cracking resistant.

Temperature Range

- -40 to 199 degree centigrade

Application advantages

- moderate resistance to petroleum oils
- good resistance to ozone, UV, oxygen
- excellent resistance to Freon® and ammonia

Application Disadvantages

- moderate water resistance
- not effective in solvents environments

Uses

O-rings, rubber seals and custom molded rubber components for:

- refrigeration industry applications
- general purpose seals, hose and wire

2.3.2.6: Properties of Polyacrylate(ACM)

Elaborate

Polyacrylates are copolymers of ethyl and acrylates which exhibit excellent resistance to petroleum fuels and oils and can retain their properties when sealing petroleum oils at continuous high temperatures up to 300 °F. These properties make polyacrylates suitable for use in automotive automatic transmissions, steering systems, and other applications where petroleum and high temperature resistance are required.

Temperature Range

- -51 to 149 degree centigrade

Elaborate

Application advantages

- petroleum fuel and oil resistance
- resists flex cracking
- good ozone resistance
- good heat resistance

Application Disadvantages

- poor compression set performance relative to NBR
- lesser water resistance and low temperature performance than some other elastomers

Uses

O-rings, rubber seals and custom molded rubber components for:

- Automotive transmissions.
- Automotive steering systems

2.3.2.7: Properties of Styrene Butadiene (SBR)

Elaborate

Styrene-Butadiene (SBR) is a copolymer of styrene and butadiene. SBR compounds have properties similar to those of natural rubber. SBRs primary custom molded application is the use in hydraulic brakes system seals and diaphragms, with the major of the industry usage coming from the Tire Industry. SBR features excellent resistance to brake fluids, and good water resistance.

Temperature Range

- -46 to 100 degree centigrade

Application advantages

- good resistance to brake fluids
- good resistance to water

Application Disadvantages

- poor weather resistance
- poor petroleum oil and solvent resistance

Uses

O-rings, rubber seals and custom molded rubber components for:

- hydraulic brake systems seals and diaphragms
- plumbing applications

2.3.2.8: Properties of Silicone(VMQ)

Elaborate

Silicone is a semi-organic elastomer with outstanding resistance to extremes of temperature with corresponding resistance to compression set and retention of flexibility. Silicone elastomers provide excellent resistance to ozone, oxygen, and moisture. Low physical strength and abrasion resistance combined with high friction properties limit silicone to static seal applications.

Temperature Range

- -59 to 232 degree centigrade

Application advantages

- excellent extreme temperature properties
- excellent compression set resistance
- very clean, low odor and taste

Application Disadvantages

- typically not good for dynamic seals due to friction properties and poor abrasion resistance

Uses

O-rings, rubber seals and custom molded rubber components for:

- seals (static) for extreme temperature applications
- food applications
- medical devices
- FDA applications

2.3.2.9: Properties of Natural Rubber (NR)

Elaborate

Natural rubber is a product coagulated from the latex of the rubber tree, *hevea brasiliensis*. Natural rubber features low compression set, high tensile strength, resilience, abrasion and tear resistance, good friction characteristics, excellent bonding capabilities to metal substrate, and good vibration dampening characteristics.

Temperature Range

- -51 to 104 degree centigrade

Application advantages

- excellence compression set
- good resilience and abrasion
- good surface friction properties

Application Disadvantages

- poor resistance to attack by petroleum oils
- poor ozone, UV resistance

Uses

O-rings, rubber seals and custom molded rubber components for:

- rubber to metal bonded vibration isolators and mounts
- automotive diaphragms
- FDA applications for food and beverage seals

Team Activity-1

Objective: Identify rubber compound and their properties.

Procedure:

- Demonstrate the participants the ways to identify different rubber compound.
- Ask the participants to make a pair of 2 participants.
- Provide them set of rubber compound mentioned in the unit with codes.
- Ask them to identify the rubber compound based their: colour smell and texture.
- They should write the detail of rubber compound against the compound code and submit the same to the facilitator.

Activity Outcome:

- You will be able to test the knowledge of participants acquired by studying this unit.
- Participants will get opportunity to see the actual rubber compound of different variety.

Activity	Time	Resources
Identify rubber compound and their properties	4 Hours	White board & markers, facilitator notes, laptop/ slides + projector, different compound samples, flip charts.

Table 2.3.2

Excercise



- Q1. Which of these machine is used for rubber internal mixing:**
 a. Moulding oven
 b. Banbury Mixer
 c. Mixing Mill
 d. Extruder
- Q2. Compound making is ----- operation for making any rubber part:**
 a. 1st
 b. 2nd
 c. Last
 d. None of above
- Q3. Bunbury Mixer is preferred for compound making for its:**
 a. Low capacity
 b. High capacity and speed
 c. Slow speed
 d. None of the above
- Q4. Which of these part in an internal mixer rotates the compound for mixing?**
 a. Hopper
 b. Gear Reducer
 c. Rotors
 d. None of Above
- Q5. In which of these part of an internal mixer, rubber compound ingredients are loaded?**
 a. Hopper
 b. Gear Reducer
 c. Rotors
 d. None of Above
- Q6. Which of these is used in an internal mixer for reducing motor speed?**
 a. Hopper
 b. Gear Reducer
 c. Rotors
 d. None of the above
- Q7. Which of these is the right method to check correct ingredients specification for current production?**
 a. Ask Colleague
 b. All are same, you can use any ingredients
 c. Check from Job sheet
 d. None of above
- Q8. Which of these should be cleaned during Start / End of shift cleaning?**
 a. Machine outer surface
 b. Hopper and Rotors
 c. Area around machine
 d. All of the above
- Q9. Which of these is the correct source of machine parameters?**
 a. Authorised machine parameter sheet
 b. Ask Colleague
 c. HR Department
 d. None of Above
- Q10. Which of these is a function of TCU in an internal mixer?**
 a. Maintain temperature during extrusion
 b. Low electricity consumption
 c. Ease in Extrusion
 d. None of Above

Answers

1. b 2. a 3. b 4. c 5. a 6. b 7. c 8. d 9. a 10. a



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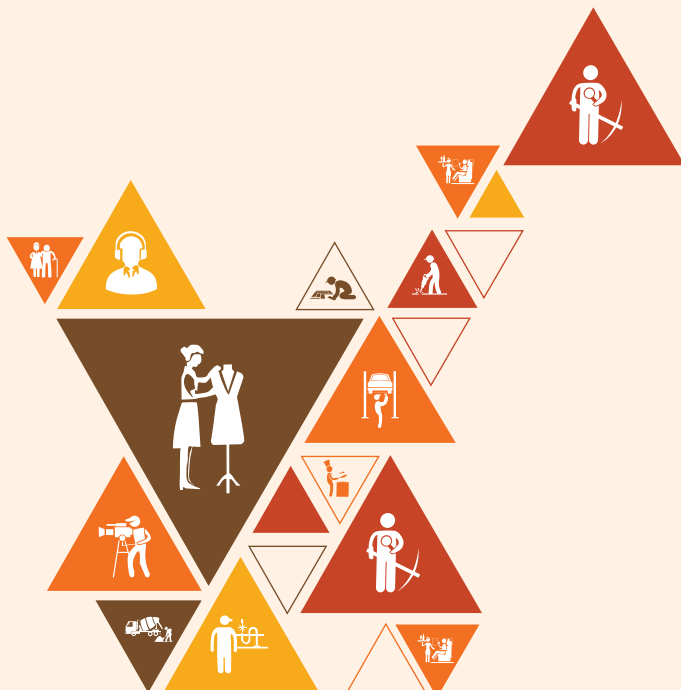
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3. Performing Internal Mixing Operation

Unit 3.1 – Initial checks for an internal mixer

Unit 3.2 – Operating an internal mixer



RSC / N0134

Key Learning Outcomes

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

1. Demonstrate internal mixer checkup points before starting operation
2. Demonstrate control panel checkup points before starting operation
3. Describe general operating instruction before starting operation
4. Describe internal mixer preparation points before starting operation
5. Demonstrate the steps for performing internal mixer operation
6. Describe the safety precautions to be taken during internal mixer operation
7. Discuss Do's and Don'ts for internal mixer operations
8. Define the responsibilities of an internal mixer operator

Unit 3.1: Initial Checks for an Internal Mixer

Unit Objectives

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

1. Demonstrate machine checkup points before internal mixing operation
2. Demonstrate control panel checkup points before internal mixing operation
3. Describe general operating instruction before internal mixing operation
4. Describe preparation points before internal mixing operation

Resources to be Used

- White Board + Marker /Black Board + Chalk
- Duster
- Laptop + Projector / Computer + Projector / Flip charts
- Participant Handbook / Copies of Handout
- Rubber internal mixer
- Ingredients for rubber compound
- Material handling equipment

Do

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

3.1.1: Startup Checks Before Internal Mixing Operation

Ask

- Ask the participants, what points should be checked before starting the internal mixing operation.
- Ask the participants, why start up checks are important in rubber internal mixing operation.

Notes for Facilitation

- Explain the participants about the purpose of doing start up checks.
- Elaborate the importance of start up checks.
- Describe the implication of not doing startup check in rubber internal mixing operation.

Explain



Explain the activities before starting the operation of Internal Mixing. Explain why they should check all the aspects for trouble free internal mixing process -

1. Ensure internal mixer is ready for operation by all aspects.
2. Ensure functioning of safety features of Internal Mixer and other accessories required for operation.
3. Ensure proper functioning of different upstream and downstream equipment attached with the Mixer like hydraulic/pneumatic system, temperature control unit (TCU), lubrication system, energy control system (power integrator).
4. Ensure dust extractor is working at its full capacity.
5. Ensure material handling equipment are available and are in working condition.
6. Ensure availability of pre-weighed, approved rubber and other ingredients to be fed as per batch requirement.
7. Ensure that weighing scale used for weighting is calibrated.
8. Ensure that all raw material to be fed for mixing is approved by laboratory.
9. Ensure Housekeeping and Safety in mixing area.
10. Ensure that handover/ takeover of the equipment/ work area is as per company's SOP.



Fig. 3.1.1 Checking Oil Level



Fig. 3.1.2 Checking Air Pressure

3.1.2: Machine Checkup

Explain



Apart from above, also explain following check points for other equipment of Internal mixer:

1. Before starting the Internal Mixing, the Internal Mixer operator should him/ herself check the operation of Internal Mixer parts. He / she should ensure that all parts, like - Feeder Hopper, Rotors, RAM and water connections, all are in physically ok condition.
2. Ensure machine is cleaned before running production cycle. If not, then it should be cleaned with clean cloth and compressed air. Ensure that there is no dirt and dust on machine.
3. Check if lights on both control and the main machine are ON to confirm power supply.
4. Check temperature display is in accordance to specification.
5. Check water pressure against specification.
6. Check all meters and equipment on machine are calibrated and nothing is overdue.

3.1.3: Control Panel Checkup

Elaborate

1. Ensure that you have full knowledge of control panel.
2. Ensure that correct program for mixing, is selected from machine memory (if machine is automatic), or all parameters are set as per machine parameter sheet.
3. Ensure that all functions in control panel are running.



Fig. 3.1.3 Checking Control Panel settings

3.1.4: General Instruction for Internal Mixing

Elaborate

1. Ensure that cleaning and housekeeping of work is proper. There is no material lying in the work area which is not needed the Rubber extrusion process.
2. Ensure that floor is also cleaned for any chemical or oil spillage. So that there is no threat of slip / fall hazard.
3. Ensure that you have all the required tool for Internal Mixing.
4. Ensure that you have worn proper Personal protective equipment, like – Gloves, Safety Goggle, Safety shoes, mask and Earmuff.
5. Ensure that at no time your hand is inside the feeder unit, while machine is in operation.
6. Read and understand all safety related instruction before operating the machine.

3.1.5: Compound Ingredients Inspection

Ask

- Ask the participants about their understanding of importance of inspecting compound ingredients.

Explain

Although compound Ingredients comes to this stage after proper inspection, still before feeding the compound Ingredients to machine, it should be checked for following points -

1. Compound ingredients should be checked visually for contamination during storage.
2. Batch code of the compound ingredients should be checked against job sheet.



Fig. 3.1.4 Checking Ingredients as per specification

3.1.6: Manpower Arrangement

Ask



- Ask the participants why arrangement of manpower in advance is important.

Explain



1. Ensure that required manpower is available for Internal Mixing & Related Operation.
2. Ensure that the given manpower is trained for required operation.

3.1.7: Preparation Before Starting Internal Mixing operation

Ask



- Ask the participants what is the role of preparation in carrying out a function successful.

Elaborate



There are some preparation which should be done before starting Internal Mixing –

1. Before starting the machine, the operator should be in full readiness and should not have mental tensions of any kind.
2. Operator must have full knowledge of all the tools that are needed for operating the machine, and same should be kept accessible in a toolbox.

3.1.8: Implication of Delay in Preparation Process

Ask



- Ask the participants why it is bad to have delay in preparation process.

Elaborate



There are many implication of delay in preparation process. Some of the main implications are listed below –

1. Downstream machines and manpower deployed on them will be idle.

2. If company is not working 24 hrs. Then you have to run the operation in overtime.
3. Additional cost of power for working overtime.
4. Delay in parts supply to customer.
5. Customer dissatisfaction.

3.1.9: Additional Check Points Before Operation

Ask



- Ask the participants do they some additional check points before starting the operation.

Elaborate



1. Handle the rubber compound to avoid contamination
2. Ensure that batch size of rubber mix is as per company's SOP
3. Ensure that identified & approved materials are used.
4. Ensure that the sequence in shift is based on raw material availability to maximize output

3.1.10: Effect of Equipment Non-Maintenance

Ask



- Ask the participants why it is important to upkeep the machine.

Elaborate



There are two types of equipment maintenance –

1. Break down maintenance
2. Preventive maintenance

As it is evident from the name, breakdown maintenance is carried out while machine is under breakdown. On the other hand, preventive maintenance is carried out while machine is still in working condition. Preventive maintenance is planned in non-working hours of machine.

With effective preventive maintenance, we can reduce machine break down to even 'zero'. Effectiveness of preventive maintenance is tracked by 'Mean time before failure' or 'MTBF' as it is popularly called. In this parameter, duration between 2 consecutive breakdowns is tracked. The higher the 'MTBF' the better it is.

Team Activity-1

Objective: Rubber internal mixer safety precaution demonstration.

Procedure:

- Demonstrate the participants the safety precautions to take during rubber mixing.
- Ask the participants to make a pair of 2 participants.
- Provide them the set of PPEs (Personal Protection Equipment).
- Ask them to demonstrate the safety precautions to be taken during production, such as: wearing appropriate PPE, checking all the safety aids available in the machine, checking functioning of stop button, etc.

Activity Outcome:

- You will be able to test the knowledge of participants for safety precautions.
- Participants will get opportunity to work on real safety equipment and PPEs.

Activity	Time	Resources
Rubber internal mixer safety precaution demonstration	4 Hours	White board & markers, facilitator notes, laptop/ slides + projector, safety videos, rubber internal mixer, rubber compound ingredient, safety shoes, safety goggle, mask, safety gloves.

Table 3.1.1

Team Activity-2

Objective: Rubber internal mixer parameter setting and rubber compound ingredient loading demonstration.

Procedure:

- Demonstrate the participants the internal mixer parameter setting as per given job sheet and rubber compound ingredient loading process.
- Ask the participants to make a pair of 2 participants.
- Provide them an internal mixer, job sheet and ingredient of rubber compound.
- Ask them to demonstrate the parameter setting of the machine as per job sheet and loading of rubber ingredient as per correct sequence.

Activity Outcome:

- You will be able to test the knowledge of participants for internal mixer parameter setting and rubber compound ingredient loading.

Activity	Time	Resources
Rubber internal mixer parameter setting and rubber compound ingredient loading demonstration	8 Hours	White board & markers, facilitator notes, laptop/ slides + projector, activity videos, rubber internal mixer, job sheet, rubber compound ingredient, safety shoes, safety goggle, mask, safety gloves.

Table 3.1.2

Unit 3.2: Operating Internal Mixer

Unit Objectives

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

1. Demonstrate the steps for performing Internal Mixing Operation
2. Describe the Safety Precautions to be taken during Internal Mixing Operation
3. Discuss Do's and Don'ts for Internal Mixing Operation
4. Define the responsibilities of an Internal Mixing Operator

Resources to be Used

- White Board + Marker /Black Board + Chalk
- Duster
- Laptop + Projector / Computer + Projector / Flip charts
- Participant Handbook / Copies of Handout
- Rubber internal mixer
- Ingredients for rubber compound

Do

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

Notes for Facilitation

- Explain the participants about do's and don'ts of rubber internal mixing.
- Describe the safety aspect during operating a rubber internal mixing machine.
- Describe the implication of ignoring safety rules during rubber internal mixing operation.

3.2.1: Do's and Don'ts for Internal Mixing

Ask

- Ask the participants about some of the do's & don'ts of rubber internal mixing operation .

Explain



Do's	Outcome
Wear proper fitting clothing	No threat of sticking loose cloth in moving machine parts, which could have caused accident
Wear Safety Mask	No threat of entering any foreign partide in eye
Wear Safety shoes	No threat of any injury to foot due any heavy object falling off over foot
Wear Safety Gloves	No threat of any cut due to handling of sharp object or burn due to handling hot objects
Be alert during Internal Mixing operation	No accident probability due to carelessness
Get trained in all safety / fire fighting equipment	Can use them as and when needed
Get information about location of fire fighting / safety equipment	Can retrieve them instantly in case of any need
Be informed about emergency stop of machine	Can stop machine immediately, in case of emergency

Table 3.2.1

Don'ts	Outcome
Do not talk to anybody while operating machine	Accident can be avoided due to carelessness
Do not let any unauthorised person come in workplace	Unauthorised person may become reason for accident due his/her unawareness
Do not run the machine if there is any leakage of steam or air	May cause accident
Do not run the machine without doing startup checks	Any unchecked issue in machine may become reason of accident
Do not run machine when intoxicated	You can loose control over machine and accident may happen

Table 3.2.1

3.2.2: Instruction for Mixing Operation

Elaborate



1. Add the ingredients in sequence as per SOP (Standard Operating Procedure)
2. Control mixing process and completion as per SOP by controlling temperature and time
3. Take out the batch from machine after completion of mixing cycle as per SOP
4. Inform the batch off mill man about the release of batch as per SOP.
5. Prepare the Internal Mixer for next batch as per Planning.

3.2.3: Steps for Operating Rubber Kneader

Demonstrate

Now, when all things are set, you are ready for Internal Mixing. Follow below steps for doing the process -



Receiving ingredients from weightment section



Empty all compound from Internal mixer of previous compound mixing



Pick ingredients from trolley for feeding in internal mixer



Put all ingredients in internal mixer



Once all the ingredients are fed, start the cycle



Empty all compound after completing the mixing cycle



Move compound to next operation or storage area after quality inspection

Demonstrate



- Demonstrate working of rubber kneader to the participants.

3.2.4: Steps for Operating Banbury Mixer

Ask



- Ask the participants how operation of banbury mixer is different from rubber kneader.

Demonstrate



Demonstrate the steps for operating Banbury mixer, which are following -

1. Check ingredients as per recipe sheet.
2. Put each ingredients on weighing conveyor for weighing.
3. Check all ingredients are weighed as per recipe sheet.
4. Operate conveyor for feeding ingredients to banbury mixer.
5. Lower ram down and start timer (180 sec approx.).
6. Raise Ram up and feed oil.
7. Close the door and lower Ram down.
8. Repeat the process of Ram lowering and raising.
9. Open door once cycle is completed.
10. Discharge the compound.
11. Let it cool to approx. 50o C.
12. Feed the compound to mixing mill for curing agent mixing.
13. Make sheets of compound for storage.
14. Consume prepared compound at the earliest. If the compound needs to be stored for longer period then it should be stored at temperature less than 25oC for preventing the curing.

3.2.5: Safety Precautions During Internal Mixing

Explain



There are many hazards in Internal Mixing process; hence it is necessary to take all safety precautions. Following are some of safety precaution, which you must take while doing Internal Mixing:

1. Ensure safety requirements on machine are ok.
2. Always wear safety shoes.
3. Always wear Gloves. Since temperature during Internal Mixing is high, hence you should use gloves with heat resistance property.

4. In Banbury mixers the temperature can go as high as 200 C and are capable of causing damage due to fire .Though the mixing temperatures are kept below 200 it can overshoot and cause fire.
5. Do not put hand in Feeder Hopper while machine is in working condition.
6. Do not come in contact with hot surfaces and chemicals with bare hands or skin.
7. Take appropriate safety measures while feeding Ingredients in Internal Mixer. Use suitable lifting devices for moving material.
8. Do not inhale chemical while feeding it to Internal Mixer. Use mask, while working on machine.



Fig. 3.2.1 Wear proper PPE before starting the work for Internal Mixing

Team Activity-1

Objective: Rubber internal mixer machine operation demonstration.

Procedure:

- Demonstrate the participants the ideal way of carrying out rubber mixing in an internal mixer with all the safety precautions.
- Ask the participants to make a pair of 2 participants.
- Provide them an internal mixer, job sheet and ingredient of rubber compound.
- Ask them to demonstrate the complete set of activities for mixing a rubber compound as per job sheet with all the necessary safety procedures.

Activity Outcome:

- You will be able to test the knowledge of participants for carrying out the rubber mixing.
- Participants will get opportunity to work on actual machine for hands on experience.

Activity	Time	Resources
Rubber internal mixer machine operation demonstration	8 Hours	White board & markers, facilitator notes, laptop/ slides + projector, safety videos, rubber internal mixer, rubber compound ingredient, safety shoes, safety goggle, mask, safety gloves.

Table 3.2.2

Team Activity-2

Objective: Banbury mixer operation demonstration.

Procedure:

- Demonstrate the participants the ideal way of carrying out rubber mixing in a banbury mixer with all the safety precautions.
- Ask the participants to make a pair of 2 participants.
- Provide them an banbury mixer, job sheet and ingredient of rubber compound.
- Ask them to demonstrate the complete set of activities for mixing a rubber compound as per job sheet with all the necessary safety procedures.

Activity Outcome:

- You will be able to test the knowledge of participants for carrying out the rubber mixing.
- Participants will get opportunity to work on actual banbury mixer for hands on experience.

Activity	Time	Resources
Banbury mixer operation demonstration	8 Hours	White board & markers, facilitator notes, laptop/ slides + projector, safety videos, banbury mixer, rubber compound ingredient, safety shoes, safety goggle, mask, safety gloves.

Table 3.2.3

Excercise



- Q1. Which of these is not a rubber internal mixer check points?:**
 a. Machine is cleaned
 b. Parameters are set as per job sheet
 c. Next operation is ready
 d. Die is cleaned
- Q2. Which of these is the right statement about control panel?**
 a. You should not use control panel without having full training for control panel setup
 b. Control panel setup is easy to use, no training is needed for using it
 c. Control panel has no role in rubber mixing, so we can leave it off while doing rubber mixing
 d. None of the above
- Q3. Loading correct ingredient is important, because:**
 a. Wrong ingredients will produce wrong compound
 b. Machine will not work with wrong ingredients
 c. Machine will consume more power with wrong ingredients
 d. All of the above.
- Q4. A clean maintained rubber mixing machine will produce:**
 a. Compound as per specification
 b. Compound without any quality issue
 c. Compound without any contamination
 d. All of the above
- Q5. Which of these is a correct instruction for inspecting ingredients before putting it in a rubber mixer?**
 a. Ingredients should be checked for color
 b. Batch code should be as per job sheet
 c. It should be warm
 d. None of the above
- Q6. Which of the process is not a step for rubber internal mixing?**
 a. Keep ingredients ready for mixing
 b. Machine switch 'On'
 c. Discuss mixing process with Colleague
 d. Ensure machine parameter are as per specification
- Q7. What are the safety precautions while doing rubber internal mixing?**
 a. Wearing mask
 b. Wearing safety gloves
 c. A & B both
 d. None of the above
- Q8. Which of these is a correct method of storing compound?**
 a. It is non-sticky you can store it with out any issue
 b. Before curing it is sticky, hence Poly sheet should be used for storing
 c. Let your colleague handle it is not related with you
 d. None of the above
- Q9. What is the benefit of knowing emergency stop switch ?**
 a. During operation you can stop the machine
 b. At the end of the cycle you can stop the machine
 c. In case of any emergency you can stop the machine
 d. None of the above
- Q10. Who should not be allowed to run the machine?**
 a. Supervisor
 b. Colleague
 c. Unauthorized person
 d. All of the above

Answers

1. d 2. a 3. a 4. c 5. b 6. c 7.c 8. b 9. c 10. c



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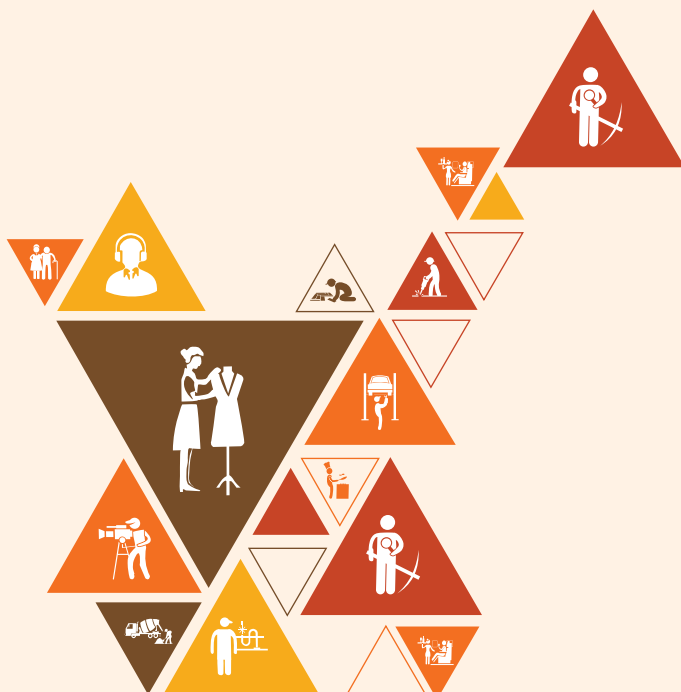
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4. Performing post-internal mixing activities

Unit 4.1 – Post internal mixing activities

Unit 4.2 – Disposal of rubber waste



RSC / N0135

Key Learning Outcomes

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

1. Explain post-internal mixing activities.
2. Describe the requirements of the rubber compound storing.
3. Define the importance of quality test of the rubber compound.
4. Explain challenges in the rubber waste disposal.
5. Describe the rubber waste recycling.
6. Describe the uses of the recycled rubber.

Unit 4.1: Post Internal Mixing Activities

Unit Objectives

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

1. Explain post-internal mixing activities.
2. Describe the requirements of the rubber compound storing.
3. Define the importance of quality test of the rubber compound.

Resources to be Used

- White Board + Marker /Black Board + Chalk
- Duster
- Laptop + Projector / Computer + Projector / Flip charts
- Participant Handbook / Copies of Handout
- Rubber internal mixer
- Rubber compound
- Material handling equipment

Do

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

Notes for Facilitation

- Explain the participants about next steps of rubber internal mixing after internal mixing.
- Describe how to take material out of machine.
- Explain how to move material to stores.

4.1.1: Post-Internal Mixing Activities

Explain

Following activities to be conducted after Internal Mixing is completed –

1. After Internal Mixing is completed the compound will come out of the mixer.
2. Since it is unvulcanized rubber, hence it should be immediately be moved to storage area or to next operation.

4. Mark the traceability marking on the compound before moving it for next process.
5. Put compound in the material movement trolley for moving it.
6. Send the compound sample to the testing room for checking it as per inspection standard.
7. Ensure if any waste is generated during this activity, that is properly disposed in place designated for that waste.
8. Send the compound for storage.
9. The non-conforming or quality suspected compound must be stored in a separate place designated for them. Put tag on them for rejection reasons.
10. Document production details and other information as per procedure on prescribed formats.

4.1.1.1: Important factors in Post Mixing Activities

Ask



- Ask the participants about their understanding what are the important factors in post mixing

Elaborate



1. Ensure shifting of the batch from dump mill to the batch off unit for cooling & stacking on the skids as per SOP
2. Handover the equipment to the next operator in clean and good condition
3. Dispose waste material in safe manner as per company's SOP
4. Ensure identification and traceability by batch marking/ coding for the right product as per instructions laid down by the company (in terms of batch number, colour, date stamp etc.)
5. Send sample of specified compound/ batch in specified form to lab for testing
6. Send the remaining material to the designated storage area
7. Ensure housekeeping and safety in mixing area

4.1.2: Taking out Compound from Internal Mixer

Demonstrate



As soon as mixing cycle is completed it should be taken out from Internal Mixer. Since it is in uncured stage, it should be moved to storage area in controlled condition.



Empty all compound after completing the mixing cycle



Move compound to next operation or storage area after quality inspection

Demonstrate



- Demonstrate the process of taking compound from machine.

4.1.3: What is Identification?

Ask



- Ask the participants about importance of identification in rubber internal mixing.

Explain



Identification is to give some reference to an object. This reference can be a serial number or some code. A very simple example for this is vehicle number. With vehicle number you can know the state in which the vehicle is registered, transport authority and with records available with authority you can know the owner of vehicle also. Similarly, in production product batch or lots are given identification, which may contain, date and shift of production, person details of quality, etc. This information helps in maintain the FIFO and trace related records, if any issues occur later on.

4.1.3.1: Identification of Rubber Compound

Elaborate



The rubber dough discharged from internal mixer is termed as batch. Each slab drawn out of a batch must be identified with compound code, batch number (sequence number in the order of production), date, shift.

4.1.3.2: Benefits of Identification

Elaborate



1. Ease in handling different batches
2. Avoid mix-up
3. Responsibility

4.1.3.3: Importance of Identifying Non-Conforming material and their Control

Elaborate



In order to supply only quality control parts to Customer, it is very important to identify the non-confirming or rejected parts as soon as they get generated. The rejected parts should be properly tagged or identified by any other appropriate method. All rejected parts should be kept at a location which is properly identified for them. The rejected parts should be appropriately disposed off as per company policy.

4.1.4: Compound Cooling-Off

Explain



During mixing compound becomes hot. The temperature goes more than 200oC. Before carrying out next operation which is mixing curing agent in mixing mill, the compound is cooled off to room temperature.

Demonstrate



- Demonstrate the process of compound cooling off.

4.1.5: Curing Agent Mixing

Ask



- Ask the participants about need of curing agent for making rubber compound.

Explain



In compound making process Sulphur is used as a curing agent. It helps compound in getting cured after moulding or extruding process. For mixing it thoroughly mixing mill is used. After mixing the curing agent the compound has to be kept in controlled temperature conditions. Hence the storage room for rubber compound has to be air conditioned. If controlled temperature environment is not possible, then compound should be stored at place having temperature comparatively lower than other places.



Fig. 4.1.1 Curing agent mixing in mixing mill

Demonstrate



- Demonstrate the process of curing agent mixing in the compound.

4.1.6: Applying Anti Sticking Chemical

Ask



- Ask the participants about use of anti sticking chemical for rubber compound.

Explain

For storing the compound the compound is converted in sheets by mixing mill. Anti sticking chemical is applied to these sheets to avoid sticking of sheets together during storage. Generally Zinc Stearate Powder is used for this purpose.

Demonstrate

- Demonstrate the process of applying anti sticking chemical.

4.1.7: Compound Testing

Ask

- Ask the participants the types of testing needed of a rubber compound .

Explain

Compound testing is a very important step after Internal mixing. After proper test only we can use the compound to any of the processes. We will discuss the tests to be conducted in Quality section.

4.1.8: Storage

Ask

- Ask the participants about the required conditions of compound storage area.

Explain

Compound storage in right conditions are very critical. If temperature and humidity is not maintained compound may get vulcanized and may become a waste, since it can not be used for any rubber manufacturing process.



Fig. 4.1.2 Compound storage



Fig. 4.1.3 Temperature & humidity control

Demonstrate



- Demonstrate the required conditions of the storage area for the rubber compound to the participants.

4.1.9: Effect of Ambient Temperature on Compound

Ask



- Ask the participants, why compound is not stored in ambient temperature.

Explain



Due to its basic property, rubber compound tends to vulcanize in hot condition. Hence, with increase in ambient temperature compound starts getting vulcanize. This is not good from manufacturing point of view. The compound should be allowed to vulcanize only after moulding process. If compound is vulcanize before that than part will not get moulded properly and parts will get rejected for quality defects.

4.1.10: Preventive Maintenance of Internal mixer

Ask



- Ask the participants about their understanding of preventive maintenance and its benefits.

Explain



Preventive Maintenance of any machine is very important activity to keep it ready for use any time. Down time of machine due to any maintenance machine result in various losses to company, such as - Manpower loss, customer supply delay etc. Preventive maintenance takes care for normal issues of machine and avoid any work disruptions due to machine break down. Normally, there is a check list of maintenance for machine with defined frequency for checking and replacing machine parts.

Team Activity-1

Objective: Finished rubber compound safe unloading from the machine, cooling off and safe storage activities demonstration.

Procedure:

- Demonstrate the participants the correct way of unloading a finished rubber compound from an internal mixer with all the necessary safety procedures, cooling it off and storage in stores.
- Ask the participants to make a pair of 2 participants.
- Provide them an internal mixer with mixed rubber compound in it.
- Ask them to demonstrate the complete set of activities for unloading a finished rubber compound from the internal mixer with all the necessary safety procedures, cooling it off and storage in stores.

Activity Outcome:

- You will be able to test the knowledge of participants for carrying out the post rubber mixing activities.
- Participants will get opportunity to work on actual machine for hands on experience.

Activity	Time	Resources
Finished rubber compound safe unloading from the machine, cooling off and safe storage activities demonstration	8 Hours	White board & markers, facilitator notes, laptop/ slides + projector, videos of safe material handling, internal mixing machine, material handling equipment, cooling off aids, storage aids, safety shoes, safety goggle, mask, safety gloves.

Table 4.1.1

Team Activity-2

Objective: Rubber internal mixer preventive maintenance demonstration.

Procedure:

- Demonstrate the participants the preventive maintenance activities as per the preventive maintenance check sheet.
- Ask the participants to make a pair of 2 participants.
- Provide them an internal mixer and its preventive maintenance check sheet.
- Ask them to demonstrate the preventive maintenance activities on the internal mixer with all the necessary safety procedures.

Activity Outcome:

- You will be able to test the knowledge of participants for carrying out the preventive maintenance activities on an internal mixer.
- Participants will get opportunity to work on actual machine for hands on experience.

Activity	Time	Resources
Rubber internal mixer preventive maintenance demonstration	8 Hours	White board & markers, facilitator notes, laptop/ slides + projector, videos of preventive maintenance, internal mixer, preventive maintenance check sheet and tools, safety shoes, safety goggle, safety gloves.

Table 4.1.2

Unit 4.2: Disposal of Rubber Waste

Unit Objectives

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

1. Explain challenges in the rubber waste disposal.
2. Describe the rubber waste recycling.
3. Describe the uses of the recycled rubber.

Resources to be Used

- White Board + Marker /Black Board + Chalk
- Duster
- Laptop + Projector / Computer + Projector / Flipcharts
- Participant Handbook / Copies of Handout
- Rubber scrap samples
- Field visit to scrap rubber dumping yard
- Field visit to rubber recycling plant

Do

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

Field Visit

- Take the participants for a field visit to the scrap rubber dumping yard.

Notes for facilitation

Check List to for Field visit

Activities to be done, one day before the field visit

1. Get confirmation from the management of the organisation to which team is going to visit.
2. Take contact details of the person to be met of the organisation to be visited.
3. Create check list for participants for the things to be observed during visit.
4. Arrange transport for traveling to the place to be visited.
5. Instructions for all participant about field visit, such as:

- Organisation to be visited during the field visit.
 - Objectives of the field visit.
 - Do's and don'ts during the field visit.
 - Time to report at the meeting place.
 - Things to carry for the field visit.
 - Duration of the field visit.
6. Any other specific arrangement to be made for the field visit.

Activities to be done on the day of the field visit

1. Ensure all participant are gathered before moving for the field visit.
2. Repeat information given to all the participants the previous day, for clarity.
3. Inform your expected time of arrival to the organisation to be visited.
4. Ensure to arrive on time to the place to be visited.
5. Ensure all the objectives planned out for the field visit, are met.
6. Encourage participants to ask questions during the field visit for their better understanding.
7. Answer satisfactorily for all the queries raised by the participants during the field visit.

Activities to be done on the next day of the field visit

1. Ask participants for their experience of field visit and their learnings.
2. Answer satisfactorily for any queries raised by the participants during the discussion.

4.2.1: What is Rubber Waste Disposal?

Ask



- Ask the participants what could be the disposal methods for scrapped or rejected rubber.
- Ask the participants why scrap rubber is important.

Say



No matter how much process control you keep, there would some rejection which will occur during production. Since processed rubber is almost non-biodegradable, hence proper disposal is very essential. If not disposed properly, we may face following issues -

1. Land Pollution
2. Occupation of usable land
3. Breeding ground for mosquitoes
4. Air pollution due to fire in rubber dumping grounds



Fig. 4.2.1. Rubber waste

4.2.2.1: Source of land Pollution

Explain



Tires can trap methane gases, causing them to become buoyant, or bubble to the surface. This 'bubbling' effect can damage landfill liners that have been installed to help prevent landfill contaminants from polluting local surface and ground water.



Fig. 4.2.4. Land contamination caused by rubber waste

4.2.2.2: Space Occupying

Explain



Due to its volumetric construction and more than 75% void space, Tyres are not very easy to dump in landfills also. It consumes more space as compared to other scraps.



Fig. 4.2.3. Big space consumed by scrap tyres

4.2.2.3: Breeding Ground for Mosquitos

Explain



Stockpiling of Rubber waste is also a big health and safety risk. An additional health risk, Rubber waste piles provide harborage for vermin and a breeding ground for mosquitoes that may carry diseases. Illegal dumping of Rubber waste, pollute ravines, woods, deserts, and empty lots.



Fig. 4.2.5. Mosquito breeding in water trapped in rubber waste

4.2.2.4: Fire Hazard

Explain



As we know rubber is easily combustible. Once it catches fire, it may burn for a long time till it gets burnt fully. Gases generated during its burning process are highly poisonous in nature. Due to this hazard, it is not advisable to dump it in any open space.



Fig. 4.2.2. Fire in Rubber waste stockpile

4.2.2: Recycling of Rubber

Explain



Recycling helps to reduce the rubber waste in storage. Shredded rubber are now being used in landfills, replacing other construction materials, for a lightweight back-fill in gas venting systems, leachate collection systems, and operational liners. Shredded rubber material may also be used to cap, close, or daily cover landfill sites. Use of scrap rubber as a back-fill and cover material is also more cost-effective, since rubber can be shredded on-site instead of hauling in other fill materials. Big companies have their own in-house plants for rubber recycling and small organisations out source this activity.



Fig. 4.2.6. Shredded rubber for recycling

Field Visit



- Take the participants for a field visit to the rubber recycling unit.

4.2.2.1: Use of Rubber Crusher for Recycling

Explain



A very common machine for making rubber granules for reusing is, Rubber Crusher. With the help of this machine you can create rubber granules of 5 to 60 mesh size. In this machine there are 2 rollers which rotates at different speed. By adjusting the gap between both rollers, you can change the size of rubber granules.



Fig. 4.2.7. Rubber Crusher



Fig. 4.2.8. Rubber granules of different sizes

Team Activity-1

Objective: Rejected compound handling demonstration.

Procedure:

- Demonstrate the participants the correct way of handling a rejection.
- Ask the participants to make a pair of 2 participants.
- Provide them a rejected lot of a rubber compound.
- Ask them to demonstrate the complete set of activities for handling a rejection, such as: material identification, tagging the material, and movement to rejection stores.

Activity Outcome:

- You will be able to test the knowledge of participants for handling a rejection.
- Participants will get opportunity to work in a real shop floor scenario.

Activity	Time	Resources
Rejected compound handling demonstration	4 Hours	White board & markers, facilitator notes, laptop/ slides + projector, videos of rejection handling, rejected material, material handling equipment, rejection storage area, safety shoes, safety goggle, mask, safety gloves.

Table 4.2.1

Exercise

- Q1. After completing rubber mixing process :**
- compound should be shifted to store
 - compound should be cooled off
 - compound should immediately be fed to moulding machine
 - All of the above
- Q2. Which of these is the first step after completing mixing process:**
- Send it to the customer
 - Send it to the Stores
 - Send it to for packing
 - Apply talc and arrange on rack
- Q3. Which of these is an important activity in post mixing activities?**
- Tagging of produced lot
 - Cleaning of mixing machine
 - Disposing waste as per company's SOP
 - All of above
- Q4. Which of these is a correct method of handling defective compound lot?**
- Keeping them separate with defective lot tags
 - We can mix them with ok lots for increasing production
 - There no need of identification, since Quality person will check lot before feeding to line.
 - All of the above
- Q5. Production quantity is reported to supervisor through?**
- Production report
 - Inspection report
 - Maintenance report
 - Machine set up report
- Q6. Which of these statement is correct for defective rubber disposal?**
- All type of rubber parts are not bio-degradable item
 - It can be disposed in any landfill
 - There is no fire hazard in rubber disposal
 - It occupy very less space
- Q7. What are the common hazards associated with rubber disposal?**
- It is a fire hazard
 - It causes ground pollution
 - Some rubber type takes very long time to get decomposed
 - All of the above

Answers

1. b 2. d 3. d 4. a 5. a 6. a 7.d



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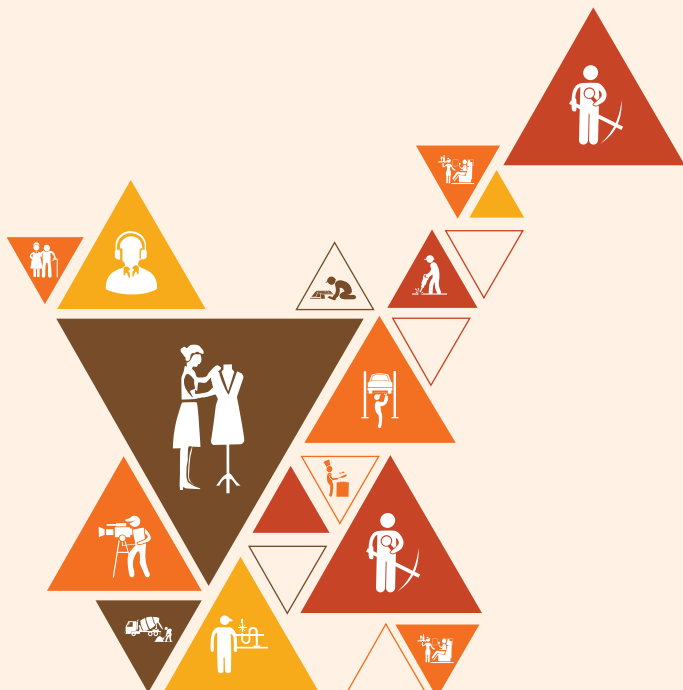
Transforming the skill landscape



5. Housekeeping

Unit 5.1 – Need and benefits of Housekeeping

Unit 5.2 – '5S' Methodology of Housekeeping



RSC / N5001

Key Learning Outcomes

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

1. Explain what is housekeeping
2. Define importance of Housekeeping
3. Describe purpose of Housekeeping
4. Explain benefits of Housekeeping
5. Explain what is '5S'
6. Define each 'S' and its meaning

Unit 5.1: Need and Benefits of Housekeeping

Unit Objectives

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

1. Explain what is housekeeping.
2. Define importance of Housekeeping.
3. Describe purpose of Housekeeping.
4. Explain benefits of Housekeeping.

Resources to be Used

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

Do

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

5.1.1: What is Housekeeping?

Ask

- Ask the participants what is Housekeeping.

Say

Housekeeping is to keep all things in place at work place and keep the area clean and tidy.



Fig. 5.1.1. Housekeeping at workplace

5.1.2: Importance of Housekeeping

Ask



- Ask the participants what is the importance of Housekeeping.
- Ask the participants what are the benefits of Housekeeping.

Elaborate



Effective housekeeping can eliminate some workplace hazards and help get a job done safely and properly. Poor housekeeping can frequently contribute to accidents by hiding hazards that cause injuries. If the sight of paper, debris, clutter and spills is accepted as normal, then other more serious health and safety hazards may be taken for granted.

Housekeeping is not just cleanliness. It includes keeping work areas neat and orderly; maintaining halls and floors free of slip and trip hazards; and removing of waste materials (e.g., paper, cardboard) and other fire hazards from work areas. It also requires paying attention to important details such as the layout of the whole workplace, aisle marking, the adequacy of storage facilities, and maintenance. Good housekeeping is also a basic part of accident and fire prevention.

TIP



Effective housekeeping is an ongoing operation: it is not a hit-and-miss cleanup done occasionally. Periodic "panic" cleanups are costly and ineffective in reducing accidents.

5.1.3: Purpose of Housekeeping

Explain



Poor housekeeping can be a cause of accidents, such as:

1. Tripping over loose objects on floors, stairs and platforms
2. Being hit by falling objects
3. Slipping on greasy, wet or dirty surfaces
4. Striking against projecting, poorly stacked items or misplaced material
5. Cutting, puncturing, or tearing the skin of hands or other parts of the body by projecting nails, wire or steel strapping

To avoid these hazards, a workplace must "maintain" order throughout a workday. Although this effort requires a great deal of management and planning, the benefits are many.

5.1.4: Benefits of Housekeeping

Elaborate

Effective housekeeping results in:

1. Reduced handling to ease the flow of materials
2. Fewer tripping and slipping accidents in clutter-free and spill-free work areas
3. Decreased fire hazards
4. Lower worker exposures to hazardous substances (e.g. dusts, vapours)
5. Better control of tools and materials, including inventory and supplies
6. More efficient equipment cleanup and maintenance
7. Better hygienic conditions leading to improved health
8. More effective use of space
9. Reduced property damage by improving preventive maintenance
10. Less janitorial work
11. Improved morale
12. Improved productivity (tools and materials will be easy to find)



Fig. 5.1.2. Shop floor with good housekeeping

Demonstrate

- Demonstrate process of doing housekeeping.
- Demonstrate different housekeeping tools.
- Demonstrate difference between good and bad housekeeping and benefits of good.

Elaborate

Do's

- Minimize fire hazards by keeping workplace free of accumulated combustible materials and waste.
- Ensure that exits and aisles are clear of obstructions, to allow easy evacuation of the building.
- Place all trash and scrap in proper containers.
- Keep oily rags in covered metal containers.
- Dispose of hazardous materials in approved marked containers.
- Store equipment and materials in their assigned location.
- Clean air vents and filters to maintain ventilation efficiency.
- Ensure that boxes, drums, and piles are located on a firm foundation and properly stacked.
- Clean up tools and unused materials after finishing a job or before leaving the job site.
- Clean up spills promptly according to the procedures, using personal protective equipment (PPE) wherever necessary.

- Report hazards such as uneven boards, cracks, burnt-out lights. Fix immediately.
- Bundle hoses and cables when not in use.
- Place empty containers and pallets in designated locations.
- Dump small containers into larger ones.

Elaborate

Don'ts

- Do not pile material around fire extinguishers, sprinklers, or emergency exits.
- Do not leave clean-up to last few minutes of shift or day.
- Do not clean equipment without "locking out."
- Do not reach into waste containers. Dump contents or remove bag.
- Do not blow off dust with compressed air. Use a vacuum or brush.
- Do not collect broken glass and metal straps in plastic bags.
- Do not use bare hands when collecting waste. Wear gloves to avoid cuts and splinters.
- Do not place materials on stairs.
- Do not use boxes as chairs or ladders.

Team Activity-1

Objective: Workplace cleaning: Internal mixer, support equipment, tools, surrounding area.

Procedure:

- Demonstrate the participants the cleaning process of machine, support equipment and surrounding area of the internal mixer.
- Ask the participants to make a pair of 2 participants.
- Provide them a machine and cleaning aids.
- Ask them to demonstrate the complete set of cleaning activities, such as: cleaning machine surface, rotors, support equipment, surrounding area.

Activity Outcome:

- You will be able to test the skill of participants for cleaning.
- Participants will get opportunity to work in a real shop floor scenario.

Activity	Time	Resources
Workplace cleaning: Internal mixer, support equipment, tools, surrounding area	4 Hours	White board & markers, facilitator notes, laptop/ slides + projector, workplace cleaning videos, internal mixing machine and support equipment, cleaning aids, cleaning chemical and solutions

Table 5.1.1

Unit 5.2: '5S' Methodology of Housekeeping

Unit Objectives

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

1. Explain what is '5S'
2. Define each 'S' and its meaning

Resources to be Used

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

Do

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

5.2.1: What is '5S'?

Ask

- Ask the participants what are the 5S for Housekeeping.
- Ask the participants, in which country 5S methodology originated.

Explain

'5S' is a system of steps and procedures that can be used by individuals and teams to arrange work areas in the best manner to optimize performance, comfort, safety, and cleanliness. The 5S method is the beginning of each program for improvement. It's a tool for helping the analysis of processes running on the workplace. The 5S is the methodology of creating and maintaining well organized, clean, highly effective and high quality workplace. It results in an effective organization of the workplace, reduction of work, elimination of losses connected with failures and breaks, improvement of the quality and safety of work. The philosophy of the 5S has its roots in Japan. The name 5S is the acronym of five Japanese words of the following meanings:



Fig. 5.2.1. 5S cycle

5.2.1.1: 1-S - Seiri – Sorting

Explain

Through the suitable sorting it is possible to identify the materials, tools, equipment and necessary information for realization of the tasks. Sorting eliminates the waste material (raw materials and the other materials), non-conforming products, and damaged tools. It helps to maintain the clean workplace and improves the efficiency of searching and receiving things, shortens the time of running the operation.



Fig. 5.2.2. 1S - Seiri

5.2.1.2: 2 S – Seiton – Set In Order

Explain

Especially important is visualization of the workplace (e.g. painting the floor helps to identify the places of storage of each material or transport ways, drawing out the shapes of tools makes possible the quickly putting them aside on the constant places, coloured labels permit to identify the material, spare parts or documents etc.).

Estimating the workplace in terms of 2S rule that is setting things in order, serve the following Control Questions: -

- Is position (location) of the main passages and places of storing, clearly marked? Are tools segregated according to their regular or special use? Are all transport palettes stored till the proper height?
- Is anything kept in front of fire devices?
- Has the floor any irregularity, cracks or causes other difficulties for the operator's movement?



Fig. 5.2.3. 2S - Seiton

5.2.1.3: 3 S – Seiso – Shine

Explain



Regular cleaning permits identification and elimination of sources of disorder and maintain a clean workplace. During cleaning, the cleanliness of machine, workplace and floor, tightness of equipment, cleanliness of lines, pipes, sources of light, current data, legibility and comprehensibility of delivered information etc, are checked.

Implementing the 3S rule:

The first step of realization of the 3S rule is renovation of the workplace. It is assumed that “the first cleaning” forces the implementation of the two previous rules. The usage of the 3S rule relies on everyday’s regular cleaning of the workplace. It is executed by the operator of the given workplace.



Fig. 5.2.4. 3S - Seiso

5.2.1.4: 4S – Seiketsu - Standardize

Explain



Worked out and implemented standards in the form of procedures and instructions permit to keep the order at the workplaces. Standards should be very communicative, clear and easy to understand. Regarding this, during preparation and improving, we should involve all participants of the process on the given workplace, it means direct workers. The group knows the best of its own activities, and process of elaboration and after that, usage gives them possibility of understanding the essence and each aspect of the operation. In the aim of assuring all the easy access, obligatory standards should be found in constant and visible places.



Fig. 5.2.5. 4S - Seiketsu

5.2.1.5: 5S – Shitsuke - Sustain

Explain



Implementation of 5S idea will demand from workers, compact self-discipline connected with the rules of regularity in cleaning and sorting. It leads to an increase in the consciousness of staff, and decrease in the number of non-conforming products and processes, improvements in the internal communication, and through this an improvement in the human relations.

It is also important to understand the need of executing the routine inspections of the 5S rule. This inspection is executed with the help of so-called Check Lists and on its basis the radar graph of the 5S is created, which serves to estimate the workplace. The inspection of realization of the 5S rule is executed once a month by a chosen team implementing the 5S rule – which is also called the control team.



Fig. 5.2.6. 5S - Shitsuke

Demonstrate



- Demonstrate process of doing 5S.
- Demonstrate importance of each 'S' in housekeeping.
- Demonstrate benefits of good housekeeping.

Team Activity-1



Objective: 1S and 2S (from 5S philosophy) activities in an internal mixing area demonstration.

Procedure:

- Demonstrate the participants the 1S and 2S activities in a work place.
- Ask the participants to make a pair of 2 participants.
- Provide them a work place with material, tools and equipment.
- Ask them to demonstrate the 1S and 2S, such as: sorting of material available in the work place and keeping the material at their place.

Activity Outcome:

- You will be able to test the skill of participants for 1S and 2S.
- Participants will get opportunity to work in a real shop floor scenario.

Activity	Time	Resources
1S and 2S (from 5S philosophy) activities in an internal mixing area demonstration	4 Hours	White board & markers, facilitator notes, laptop/ slides + projector, workplace 5S videos, identification tags, stickers, workplace with material, tools and equipment

Table 5.2.1



Excercise

- Q1. Meaning of housekeeping is :**
 a. Owning house
 b. Keeping house in good condition
 c. Keeping any place (work place or House) clean and tidy
 d. All of the above
- Q2. Which is these is result of poor housekeeping?**
 a. Accident
 b. Happy customer
 c. Satisfied employees
 d. All of the above
- Q3. Housekeeping is ---**
 a. an ongoing process
 b. an annual process
 c. a monthly process
 d. a weekly process
- Q4. Which of these is benefit of good housekeeping?**
 a. Reduced handling to ease the flow of materials
 b. Fewer tripping and slipping accidents in clutter-free and spill-free work areas
 c. Lower worker exposures to hazardous substances
 d. All of the above
- Q5. Which of these point is part of check list of housekeeping ?**
 a. Are floors in good condition?
 b. Are aisles unobstructed and clearly marked?
 c. Are all spills wiped up quickly?
 d. All of above
- Q6. which of these is a activity of housekeeping:**
 a. Place all trash and scrap in proper containers
 b. Keep oily rags in covered metal containers.
 c. Bundle hoses and cables when not in use.
 d. All of the above
- Q7. Which of these is correct meaning of 1S in 5S methodology?**
 a. Seiton
 b. Seiri
 c. Seiso
 d. Seiketsu
- Q8. Which of these is correct meaning of 2S in 5S methodology?**
 a. Seiton
 b. Seiri
 c. Seiso
 d. Seiketsu
- Q9. Which of these is correct meaning of 3S in 5S methodology?**
 a. Seiton
 b. Seiri
 c. Seiso
 d. Seiketsu
- Q10. Which of these is correct meaning of 4S in 5S methodology?**
 a. Seiton
 b. Seiri
 c. Seiso
 d. Seiketsu

Answers

1. c 2. a 3. a 4. d 5. d 6. d 7. b 8. a 9. c 10. d





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Transforming the skill landscape

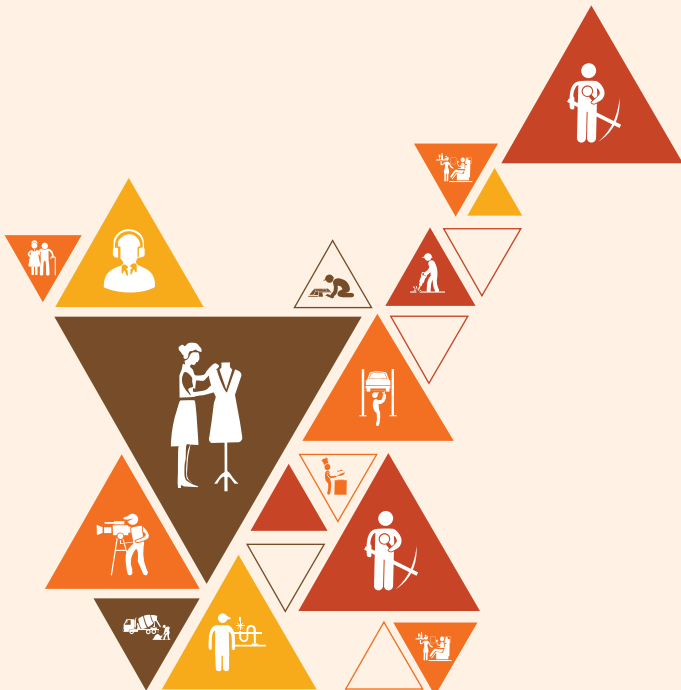


6. Reporting and Documentation

Unit 6.1 – Day to day activities documentation

Unit 6.2 – Organization procedure for documentation and reporting

Unit 6.3 – Communication in Organization



RSC / N5002

Key Learning Outcomes

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

1. Explain what is documentation
2. Describe the importance of documentation.
3. Define Purpose of documentation
4. Explain types of documentation
5. Describe common documentation used in rubber industry
6. Explain what is reporting
7. Describe importance of reporting
8. Explain about government act and bylaws
9. Describe about rules.
10. Define meaning of Policies and Guidelines
11. Describe meaning of Procedure
12. Explain what is work instruction
13. Define what is communication
14. Describe communication process
15. Explain problems in communication
16. Describe various communication barriers
17. Explain traits of active listening
18. Discuss points of good writing skill
19. Explain how to resolve conflict with team member
20. Discuss organisational procedures for reporting and documentation
21. Decide priority of work required to be done
22. Describe how to select work to do from pending work

Unit 6.1: Day to Day Activities Documentation

Unit Objectives

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

1. Explain what is documentation
2. Describe the importance of documentation.
3. Define purpose of documentation
4. Explain types of documentation
5. Describe common documentation used in rubber industry
6. Explain what is reporting
7. Describe importance of reporting

Resources to be Used

- White Board + Marker /Black Board + Chalk
- Duster
- Laptop + Projector / Computer + Projector / Flip charts
- Participant Handbook / Copies of Handout
- Samples of Documentations
- Samples of Reports
- Samples of Procedure
- Samples of Work Instructions

Do

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

6.1.1: What is Documentation?

Ask

- Ask the participants what is documentation.
- Ask the participants, as per them what activities in rubber industry should be documented.

Explain



Primarily creating records for any process or activity is called documentation. For example – creating inspection report for any product shall be called documenting the actual dimensions for the product. Also if we are creating minutes for any meeting, that will also be called as documenting the outcome of meeting. In any organisation there are many activities for which we need to document. For example – Production record, Part inspection report etc. This is required for reviewing the outcome later on. Unless these are documented, it is not possible to retrieve again upon requirement. In other words, recording any useful or required data is called, documentation.



Fig. 6.1.1. Documentation

6.1.2: Importance of Documentation

Say



As mentioned earlier, documentation helps in reviewing the activities later on. There are lot of purpose and use of documentation, such as –

1. Production recording
 - to review production performance
 - To find out consumption of material
 - To report production quantity to Finance Department
 - To take order against produced quantity
2. Inspection Report
 - to verify that all dimension are ok or not ok
 - To report quality data to supervisor
 - To keep record, in case later on any issue is reported in part
 - To get deviation from supervisor, dimensional variation is minor

6.1.3: Purpose of Documentation

Say



It is very important to make document in any industry. Some of key purposes for documentation are –

1. For creating record for any process outcome, which can be retrieved in case of any requirement, such as part failure. Ex- Process parameter report.
2. For creating record for any process outcome, which need to be shown to supervisor. Ex- Part Inspection report.
3. For creating record for any meeting outcome, which can be retrieved in case of any dispute later on.
4. For reporting to any external agencies. For example – Filing records to pollution control deptt.
5. For follow up and analysis as may be required from time to time.
6. For procurement of quality materials by avoiding the sources which supplied the ingredients.

7. For rectification of the machines and accessories - when were they in operation when the defects had occurred.
8. For retraining the operators who were operating the machine when the defects occurred.
9. To change the SOP to avoid re occurrence of the same defects.
10. To plan for adaptation of new processes and new equipment. Lack of record keeping will result in breakdown of monitoring system.

6.1.4: Types of Documentation

Explain

Normally there are two types of documentation –

1. Standard Documentation
2. Non-Standard Documentation

Standard Documentation –

All predefined report format are called Standard Documentation. It could be for inspection for product, attendance log etc. These are used for repeated nature of work.

Date		Shift		Machine Name					Total Available Time		Off					
Speed	Work Order No.	Size	Total Qty	Set-up & Change over	Material Not Available	Loss	Manpower	Others	Mechanical Problem	Electrical Problem	Manual Shifting	Sample Check	Total stoppage Minutes	Working Time Minutes	Target Production	Qty. Nos.

Fig. 6.1.2. Standard documentation

FIXTURE INSPECTION REPORT						Format No. : _____
Document No. & Date	Drawing No / Date	Drawing Rev. No. / Date - Details				Rev. No. : _____
Fixture Code	Description of Fixture					Rev. Date : _____
Supplier Name	Inspection Date	Certificate No. / Date				
Dimensional Inspection						
#	Specification	Located at	Tolerances	Checking Method	Measured	Deviation
01						
02						
03						
04						
05						
06						
07						
08						
Inspection results (Results are resubmitted)						
<input type="checkbox"/>						
<input type="checkbox"/>						
<input type="checkbox"/>						
<input type="checkbox"/>						
<input type="checkbox"/>						
<input type="checkbox"/>						
<input type="checkbox"/>						
<input type="checkbox"/>						
Conclusion						
Inspector Reporting:						Inspected by:

Non-Standard Documentation –

All the Documentation, which is done without any format is called Non-Standard Documentation. Writing mail or memo for any incident comes in this category.

6.1.5: Documentation in Rubber Industry

Say

As required in any other manufacturing industry, rubber industry also has some common documentation. Some of them are following–

1. Production Plan
2. Production Report
3. Product Inspection Report

The above documentation is important from the point view of traceability, follow up action, statistical analysis and preventive and corrective actions.

6.1.6: What is Reporting?

Ask

- Ask the participants what is reporting.
- Ask the participants, as per them what activities should be reported to supervisor and when.

Explain

To present data or information to supervisor is called 'Reporting'. Reporting can be 'Scheduled Reporting' or 'Unscheduled Reporting' also. Scheduled reporting is done on regular basis, such as Production reports or Machine breakdown reports. Normally, 'Scheduled Reports' have set format and time of reporting. On the other hand 'Unscheduled Reporting' is need based – based on supervisor requirement or while junior feel need of sending some important information to superiors.

6.1.7: Importance of Reporting

Elaborate

In any organisation reporting is very important. Based on reporting only senior management remains aware of day-to-day activities. Reporting is necessary to run operation as well as it is very essential for making improvements in operations. For Example – through reporting only management shall come to know any downfall in production. Based on that report only management can take some action to improve productivity.

Similarly, without reporting, supervisor will not be aware whether production is completed against plan or not. He or she can take decision only when he / she gets production report.

6.1.8: Example of Some Reports in Rubber Industry

Explain



EPDM RUBBER		
GRADE	PURE	
FINISH	SMOOTH BOTH SIDES	
COLOR	BLACK	
TECHNICAL SPECIFICATIONS		
Test Standard	GB/T5574-94	REMARK
Test Temperature	24°C	
Item	Test	
Colour	Transparent	
Tensile Strength at Break	3MPa	
Hardness	65±5 Shore A	
Elongation at Break	150-200%	
Density	1.5g/cm ³	
TEMPERATURE RANGE	-20°C TO 100°C	
Test Conclusion	Across the above tests, the result is up to the Chinese standard of GB/T5574-94. It is the eligible product.	
Remark	Seal for inspection report CUT EDGE ROLLS	

Fig. 6.1.3. Rubber test report

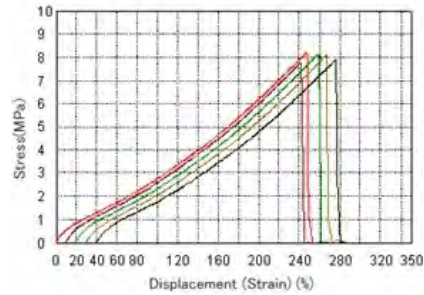


Fig. 6.1.4. Rubber stress / strain report

Demonstrate



- Demonstrate different types of documents being used in rubber Industry.
- Demonstrate filling up of documents under responsibility of rubber internal mixing operator.

Activity-1



Objective: Internal mixing production report making.

Procedure:

- Demonstrate the participants how to fill a production report for internal mixing production.
- Provide them a production report blank format and production data on a white board.
- Ask them to demonstrate the filling of production report with data, such as: target, OK material produced, rejection quantity, down time, etc.

Activity Outcome:

- Participant will be able to closely learn the production report filling, which is an important activity in any manufacturing industry.
- Participants will get opportunity to work in a real shop floor scenario.

Activity	Time	Resources
Internal mixing production report making	8 Hours	White board & markers, facilitator notes, laptop/ slides + projector, videos, production report format, production data

Table 6.1.1

Unit 6.2: Organisation Procedure for Reporting and Documentation

Unit Objectives

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

1. Explain about government act and bylaws
2. Describe about rules
3. Define meaning of policies and guidelines
4. Describe meaning of procedure
5. Explain what is work instruction
6. Discuss organisational procedures for reporting and documentation

Resources to be Used

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

Do

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

6.2.1: Government Acts and Bylaws

Explain

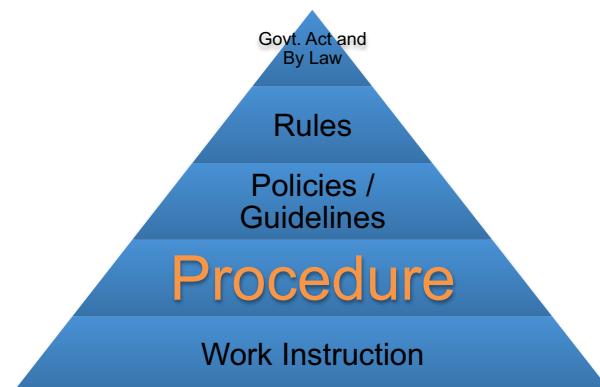


Fig. 6.2.1. Rules pyramid

Ask

- Ask the participants their understanding of Law, Rule, Policy, Procedure and Work instruction.
- Ask the participants, why it is important to have procedure and work instructions in an

Explain

Government Acts are those Acts and laws, which are made by Government and following these Acts are compulsory. There is a penalty for not following Government Acts. Examples of this is Income Tax Act, Sales Tax Law, etc.

6.2.2: Rules**Explain**

Authoritative statement for what to do and what not is called Rule. It is given by an appropriate person of body. The Rule is applicable in that forum or body which is controlled by rule making person. This can be any organisation, society or community of persons.

6.2.3: Policies and Guidelines**Explain**

A policy is a definitive principle or rule that an organisation must follow to reach its long-term goal. Typically, a policy marks out an organisation's views with respect to a particular matter.

Company guidelines establish the rules of conduct within an organisation. Guidelines define the responsibilities of both the employees and employer. Company policies and procedures are made in place to protect the rights of employees as well as the business interest of employers.

Employees, including managers and supervisors, are expected to uphold company policy and work according to it. The employees should complete tasks accurately by being flexible and adapting to work plans and procedures as per the company policies.

Most organisations have a handbook of policies and guidelines to be referred to by employees, as shown in following figure:

Make sure you take a look at the handbook thoroughly before within the first few days of joining the job. You can request for the handbook to your supervisor

Some typical company guidelines include:

- Employee code of conduct (for example, dress code and behavioral approach)
- Attendance policy (for example, time of entry into and exit from the workplace)
- Leave policy (for example, different types of leaves)
- Workplace safety (for example, understanding and following fire safety guidelines)

- Harassment policy (for example, engaging in a course of unwelcoming comment or conduct against a worker in a workplace)
- Substance abuse policy (for example, ban of smoking, alcohol, and drugs)
- Property abuse policy (for example, damaging company assets)

6.2.4: Procedure

Explain



Procedure is a broad guideline for carrying out any activity. In order to eliminate ambiguity in carrying out regular activities all organisation make procedures for all day-to-day activities. All employees should read these procedures carefully before carrying out those activities.

Procedures help an organisation to:

- Provide a framework for actions that help employees quickly understand what is expected of them
- Stop employees from discussing and re-discussing the same issues every time they arise
- Help in legal matters
- Act as a tool to improve the quality
- Create goodwill and trust among employers, customers and clients
- Help employees behave in a professional and responsible manner

6.2.5: Work Instruction

Explain



Work Instruction is detailed form of procedure. It has step-by-step details of method for carrying out that activity.

6.2.6: Organisational Procedure for Reporting and Documentation

Explain



It is important to keep your supervisor and co-workers informed about any issues related to malfunctioning of equipment, task completion difficulties and timelines, progress and any other work related issues. Such issues may include:

1. Volume of work
2. Quality of work
3. Time within which work needs to be completed

Since reporting and documentation is very important, hence it can not be left on people to decide that in which format and structure they would document and report.

An organisational procedure has details of all requirements of Documentation and reporting. Such as –

1. Format of report
2. Who to create
3. To whom it should be submitted
4. Frequency of reporting
5. Place of filing documentation
6. Retention duration of document to keep

Demonstrate



- Demonstrate hierarchy of rubber Industry and position of rubber internal mixing operator.
- Demonstrate reporting process in different situations of rubber internal mixing operator.

Team Activity-1



Objective: Interpretation and use of work instructions for operating internal mixer machine.

Procedure:

- Demonstrate the participants how to read and infer the instructions from a work instruction.
- Ask the participants to make a pair of 2 participants.
- Provide them an internal mixer and other support equipment, raw material and work instruction.
- Ask them to demonstrate the use of given work instruction for different activity, such as: Raw material weighment, machine cleaning, parameter setting, compound cooling off, etc.

Activity Outcome:

- You will be able to test the skill of participants for work instruction interpretation.
- Participants will get opportunity to read and follow work instruction in a real scenario.

Activity	Time	Resources
Interpretation and use of work instructions for operating internal mixer machine	8 Hours	White board & markers, facilitator notes, laptop/ slides + projector, videos, sample of work instructions for internal mixer, internal mixer and support equipment, weighing scale, PPEs, raw material for mixing

Table 6.2.1

Unit 6.3: Communication in Organization

Unit Objectives

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

1. Define what is communication
2. Describe communication process
3. Explain problems in communication
4. Describe various communication barriers
5. Explain traits of Active Listening
6. Discuss points of good writing skill
7. Explain how to resolve conflict with team member

Resources to be Used

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

Do

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

6.3.1: What is Communication?

Explain

Communication is exchange of information between people. It can be in the form of oral words, written words, drawings or physical actions. Communication is essential to express ideas and thoughts to friends, family, co-workers, and customers. Communication also plays a major role in information exchange and decision-making.

6.3.2: Types of Communication

Explain



There are two types of Communication -

1. Verbal
2. Non- Verbal

Verbal Communication - When information is exchanged between the parties through words, it is called verbal communication. It is a word-based communication. Verbal Communication has two types –

1. Written Communication, and
2. Oral Communication.

6.3.3: Problems in Communication

Explain



In the process of communication, care has to be taken so as to avoid communication barriers that can come up either consciously or unconsciously. Communication barrier can cause losses to a company in terms of money and productivity. Without good communication, a company is unable to exchange information essential to daily operations. But at times, people fail to understand communication. Following are some of the symptoms of communication problems in an organization:

- Lack of teamwork
- Poor planning or workload
- Insufficient resources and support
- Lateness
- Poor work quality
- Difficult people

6.3.4: Common Carriers of Communication

Explain



Explain the barrier of communication, such as:

- Assumption
- Use of Jargons
- Incomplete Sentences
- Psychological Barrier
- Language Difference
- Prejudice
- Physical Barrier

6.3.5: Active listening

Explain



Listening is an underestimated skill, which is rarely taught and mostly neglected by all. Active listening means listening to understand the communication. Active listening is an art that comes by practice. It takes more effort than plain “hearing” but the benefits make it worthwhile. Listening goes beyond hearing.

Below are some tips to improve active listening:

Keys to effective listening	The bad listener	The good listener
Find areas of interest	Switches off during boring or dull subjects	Asks if there might be something of relevance to him
Judge content not delivery	If delivery is poor, switches off	Considers content, skips over errors of delivery
Hold your fire	Jumps in before hearing the full argument	Waits until he understands fully before exercising his opinion
Listen for ideas	Listens for facts	looks for a theme or thread in what is being said
Be flexible	Takes copious notes using only one system	Takes fewer notes. Uses several systems according to the speaker
Work at listening	Makes no real effort to listen – fakes his attention	Works hard to concentrate
Resist distractions	Is easily distracted	Fights or avoids distractions, tolerates bad habits, knows how to concentrate
Exercise your mind	Avoids difficult material, looks for light relief	Seeks complex material to exercise his mind
Keep your mind open	Reacts to emotional words	Hold his emotions in check

Table 6.3.1

Table. 6.3.1

6.3.6: Writing Skills

Explain



Explain some of the key instruction for good writing skill, which are:

Clarity in Content

Remain Brief

Be Complete

Accuracy in Spelling and Facts

Be Convincing

Show Courtesy in Words

6.3.7: How to Resolve Conflict

Explain



Explain the guidelines for handling conflict in the workplace:

- Talk with Other Person
- Focus on Behavior and Event not on Personalities
- Listen Carefully
- Identify Points of agreement and disagreement
- Prioritize Areas of Conflict
- Develop a Plan to Work Upon each Conflict
- Follow through on Your Plan
- Build on your Success

6.3.8: Plan and Manage Work

Ask



- Ask the participants what is the importance of Planning.
- Ask the participants, why it is important to do work management.

Explain



In any working day we have to do lot of activity. It is important to complete all activity, but there are some which are absolute necessary to complete on time. This is only possible when we do work based on priority. Here we will learn how to prioritize our work.

First we have to divide our work in 4 categories –

1. Important and necessary
2. Not important but necessary
3. Important but not necessary
4. Not important and not necessary.

Once we have divided the all work available, we need to do following –

1. Discard all activities, which are in category 4 'Not important and not necessary'.
2. Review first category work, which is 'Important and necessary'. Do big duration work, out of this category initially and small duration later on.
3. Then do work from category 2, which is 'Not important but necessary'. Such as – arranging material for mixing, arranging equipment for next operation etc.
4. At last, do work from category 3, 'Important but not necessary'. Such as – Informing Supervisor for work progress.

Above way of prioritizing will help in completing all work in time.

Demonstrate



- Demonstrate how to prioritize activities related to rubber manufacturing.
- Demonstrate implications of not planning your activities.

Role play -1



Objective: Communication skill role play demonstration.

Procedure:

- Demonstrate the participants various traits of correct communication.
- Ask the participants to make a pair of 2 participants.
- Provide them a scenario for communicating with each other.
- Ask them to demonstrate the use of various communication skill taught in the class, such as: listening other person without interruption, maintaining a positive body language, keeping an positive eye contact while communicating, etc.

Activity Outcome:

- You will be able to test the skill of participants for communication.
- Participants will get opportunity to practice the communication skill learned in the class.

Activity	Time	Resources
Interpretation and use of work instructions for operating internal mixer machine	8 Hours	White board & markers, facilitator notes, laptop/ slides + projector, videos related to communication skill, various communication scenario

Table 6.3.1

Activity-1



Objective: Work prioritization activity demonstration.

Procedure:

- Demonstrate the participants how to prioritize the work from the pending tasks.
- Provide them a list of various tasks.
- Ask them to demonstrate the prioritization of tasks, such as: machine cleaning, production reporting to supervisor, machine preventive maintenance, etc.

Activity Outcome:

- Participant will be able to learn prioritization of activities through practical application of rules taught in the class.
- Participants will get opportunity to understand real work pressure during job.

Activity	Time	Resources
Work prioritization activity demonstration	4 Hours	White board & markers, facilitator notes, laptop/ slides + projector.

Table 6.3.2

Excercise



- Q1. Documentation is required for --- :**
 a. for future reference
 b. for reporting
 c. for fulfilling legal purpose
 d. All of the above
- Q2. Which of these is not a report :**
 a. Production report
 b. Inspection report
 c. Weekly magazine
 d. Maintenance report
- Q3. Which of these is not part of a company policy?**
 a. Leave policy
 b. attendance policy
 c. National security policy
 d. Safety policy
- Q4. Work in this category should be discarded?**
 a. Important and necessary
 b. Not important but necessary
 c. Important but not necessary
 d. Not important and not necessary
- Q5. Which of these should be part of organisational procedure for reporting?**
 a. Format of report
 b. Who to create
 c. To whom it should be submitted
 d. all of the above
- Q6. Which of these is not a type of communication?**
 a. Verbal communication
 b. Simple communication
 c. Written communication
 d. Non-verbal communication
- Q7. Which of these is not a symptom of poor communication?**
 a. Poor planning or workload
 b. Lateness
 c. Good team work
 d. Poor work quality
- Q8. Which of these is part of good writing skill?**
 a. Be convincing
 b. Be complete
 c. Be brief
 d. All of the above
- Q9. Which of these is a communication barrier?**
 a. No assumption
 b. Use of jargon
 c. Clear pronunciation
 d. No language difference
- Q10. Which of these is part of active listening?**
 a. Listen for ideas
 b. No clarity in content
 c. Accuracy in spelling
 d. All of the above

Answers

1. a 2. c 3. c 4. d 5. d 6. b 7.c 8. d 9. b 10. a



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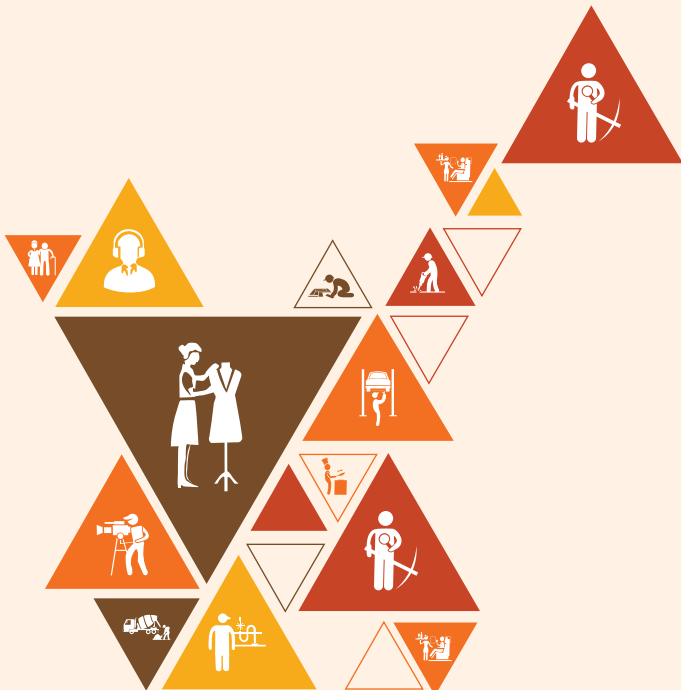
Transforming the skill landscape



7. Carrying Out Quality Checks

Unit 7.1 – Quality in Internal Mixing

Unit 7.2 – Defects in compound and solving quality problems



RSC / N5003

Key Learning Outcomes

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

1. Define need of Quality Control in Internal Mixing
2. Identify and discuss Measuring equipment for Rubber Compound
3. Discuss methodology of Problem solving
4. Describe implication of Rubber compound Defects
5. Describe the uses of recycled Rubber.

Unit 7.1: Quality in Internal Mixing

Unit Objectives

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

1. Define need of Quality Control in Internal Mixing
2. Identify and discuss inspection technique for Rubber compound
3. Describe testing equipment for Rubber compound

Resources to be Used

- Laptop
- Projector
- White Board
- Marker
- Duster
- Inspection Tools – Vernier Caliper, Micrometer, Rubber Hardness Tester, Measuring Tape, Tensile testing machine, Mooney viscometer, Weighing scale, Oscillating disc rheometer, Heating oven

Do

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

Ask

- Ask the participants what is their understanding about quality in rubber products.
- Ask the participants as per them, what are the quality tests to be conducted on rubber products.
- Ask the participants purpose of doing different quality tests.

Notes for Facilitation

- Explain the participants about importance of quality testing for rubber products.
- Describe some of critical quality parameter of rubber.
- Explain implication of not checking quality parameter of rubber products.

7.1.1: Quality Control in Internal Mixing

Ask



- Ask the participants about their understanding about quality control procedures.

Explain



The quality control procedures are necessary from the point of view of meeting the customer specifications. Routine quality control checks on sample also indicate the trend of quality (upward or downward) and help in taking appropriate corrective action in advance. The quality check procedure are designed to give advance intimation about improving or deteriorating trend of quality and help in taking preemptive actions to reverse any deteriorating trend and then bring the quality parameters in line with the quality objective.

Normally the procedure for testing the compound is by random sampling from the production lot kept after production in the shop floor. The quality plan in the SOP (standard operating procedure) clearly defines the frequency and size of the samples to be checked, while many of the visual checks are done by the production operator, any inspection involving instruments is done by either quality inspector or in the laboratory by lab technician. Appropriate work instructions should be available for doing the above activities.

7.1.2: In Process Quality Control

Explain



All steps involved in making rubber compound needs to be controlled and must be carried out as per company's SOP, in order to get compound as per specification. Following could be some of reasons for compound rejection:

1. Wrong recipe used for ingredients collection.
2. Wrong weightment done against specified recipe.
3. Some ingredient missed out of recipe during weightment.
4. Wrong ingredient used in mixing.
5. Wrong process parameter set for rubber mixing.
6. Mixing done for shorter duration against specification.
7. Mixing done for longer duration against specification.
8. Compound kept in hot environment after mixing curing agent.

7.1.2.1: Verification of Ingredients Before Weighment

Ask



- Ask the participants why it is important to verify ingredient before weighment.

Explain

This is a common mistake which takes place in rubber compounding section. Wrong recipe for compound making is taken by mixing operator. If this happens we would be producing the compound which is not required for production. Implication of this mistake would be:

1. Producing extra compound against previous production plan, which is not required now. It will result in excess inventory.
2. Excess produced compound would require extra space to keep material.
3. Producing obsolete compound, which is no longer required now. In this case, it will be a direct loss to company.

To avoid above implications, following instructions need to be adhered:

1. We need to take recipe from authorised sources only.
2. No verbal instruction to be followed for making compound batch.
3. All used recipe sheet need to be stored in a file as per company SOP.
4. In case of any doubt, take help of supervisor, without any delay.

7.1.2.2: Correct Weighment of Compound Ingredients

Explain

This is a very important step for compound mixing. Common quality issues during this process are:

1. Weighing machine calibration is overdue.
2. Zero is not set before weighing ingredient
3. Weighment not done accurately as per recipe

Following instructions need to be followed for during weighment:

1. Check calibration status of the weighing scale. The date of calibration should not be overdue.
2. Set and check zero before weighment.
3. Ensure all ingredients mentioned in recipe are taken for mixing.
4. Do accurate weighment as per company's SOP

7.1.2.3: Taking Correct Ingredients as Per Recipe

Explain

If any wrong ingredient is taken from stores, it would lead to production of rejected compound. To ensure production of ok compound, it is necessary to follow below instructions:

1. Identify all ingredients properly in stores.
2. Keep all ingredients separately with easy access.
3. Match ingredient name with recipe check list.
4. Put tick mark on recipe list against all taken ingredients.
5. Cross check all ingredients against recipe one more time, before taking the ingredient to the mixer.

7.1.2.4: Verification of Process Parameters

Explain



To produce defect free compound it is very important to use process parameter as per company's SOP. During the mixing process also rubber mixing operator needs to check them for any variation against the SOP. Any variation should be brought to the notice of the supervisor. Ram pressure, rotor speed, discharge temperature and mixing time for each batch are important parameter for verification.

7.1.2.4: Inspection Techniques of Rubber

Explain



Inspection is the last step in any manufacturing process—an important step in ensuring quality in both performance and safety. Inspection of Rubber compound includes the following:

- Visual inspection for appearance and to spot obvious defects
- Property parameter, such as - hardness, density, ash content etc.
- Performance parameter, such as - curing time, heat aging etc.

7.1.3: Measurement Techniques

Elaborate



Measurement systems

The modern measurement system is based on the work that was started in 1790 by a commission in France, whose task it was to develop a standardised measurement system. Their starting point was the circumference of the earth. One ten millionth part of the distance between the equator and the North Pole was said to be a meter. A standard meter rod was produced in platinum. In the year 1875, 40 prototype meters were made of platinum-iridium, in the form of a beam with a profiled cross section, one for each country which had signed the Meter Convention.

The system with meter prototypes is today not sufficiently accurate, since the rods age. Since 1960, a meter is defined on the basis of the wavelength of light. It was also decided that the mass 1-kg was one thousandth of the weight of one cubic meter of water at +4° C. Also kilo prototypes were produced.

The meter system was developed further into the MKS system of units (Meter, Kilogram, Second) and to the MKSA system, in which the unit Ampere was added for electrical current. These measurement systems were developed further into today's SI system of units.

7.1.3.1: Length

Elaborate

Measuring tapes and steel rulers are used in the measurement of longer lengths, where the accuracy is approximately 1 mm. Callipers are used for lengths of up to approximately 0.5 m and the accuracy can vary from 0.02 to 0.1 mm. Higher accuracy can be achieved with modern digital callipers. Dial gauges and micrometers are used when the accuracy is required to be 0.001 to 0.01 mm.

The thickness of rubber sheets and compression set buttons, etc. are measured using a dial gauge with a resolution of at least 0.01 mm, mounted in a stand and with a measuring pressure of 22 kPa on the plane measuring foot. The low measuring pressure is required in order not to deform the rubber during the measurements.

7.1.3.2: Volume

Elaborate

The volume of a solid body is easily measured by immersing it into water, e.g. in a measuring cylinder and measuring the rise of the surface of the water. The subsequent volume of a liquid is simply measured with graded measuring containers of various kinds.

7.1.3.3: Mass

Elaborate

The mass or weight of a body is measured using a balance. Several different types of balances are used. The balancing scale is an old construction, where two scale pans are balance against each other. The sample is placed in one pan and weights with known mass are added into the other pan until the two pans have reached balance.

7.1.4: Preparation of Test Pieces

Ask

- Ask the participants about need of preparation of rubber test pieces.

Explain



The testing of rubber is either starting from uncured rubber or from cured rubber products. Testing can also apply to the uncured or cured state. The preparation of the test pieces is an extremely important part of the testing itself and it must not be the case that the test results reflect the effects of the preparation rather than the properties of the materials being tested.

Temperature conditioning of the test material is also an important part of the preparation.

7.1.5: Testing Cured Properties

Ask



- Ask the participants about required tests for cured properties of rubber.

Explain



In order to test cured properties, specimen test sheet and other test pieces need to be produced. Nearly all rubber testing is carried out on 2 mm \pm 0,2 mm thick test sheets, which are vulcanised in a mould, often with four cavities, each 150 x 150 mm.

Cylindrical test pieces are used for compression set, relaxation, abrasion and compression testing and are also produced in a mould. There are two common sizes, the so called small test piece with a diameter of 13 mm and a height of 6,3 mm, and a large test piece 29 mm in diameter and 12,5 mm high.

Test pieces are punched out of the test sheets in order to perform tests for tensile strength, tear strength and tension set etc. It is important that sharp punching cutters or dies are used against a soft surface when punching out the test specimens. Punching cutters with poor cutting edges or nicks may cause rupture notches in the test piece and thus produce incorrect results.

7.1.6: Testing Uncured Properties

Ask



- Ask the participants about their understanding of required tests for uncured properties of rubber.

Explain



- When testing uncured rubber, it is often sufficient to cut off a piece of rubber of the appropriate size using a pair of scissors. In certain tests, as for example, the determination of cure curves, the test must have a specific volume in order to be able to provide reproducible test results. In these cases, a volume press is used to provide test pieces with a constant volume.

7.1.7: Testing Material Properties of Rubber Products

Ask



- Ask the participants about their understanding of properties of rubber products.

Explain



In certain cases, one is interested in testing the material properties of a rubber product. 2 mm thick sheets or cylindrical pieces are cut from the product for testing. A slicing machine or a cutting machine is very useful for this purpose and consists of a band knife or a rotating blade, which can cut off thin strips from a product.

The cylindrical pieces are cut from thicker parts of a product with a rotating knife.

7.1.8: Conditioning

Ask



- Ask the participants what is conditioning.

Explain



Prior to testing, the test material must often be conditioned. After test sheets are cured, there is a specified waiting time of at least 16 hours before testing, in order to allow the material to stabilise. Test pieces must also be given time to assume the testing temperature, which may take a few hours. Certain materials such as cellular materials must also be conditioned to achieve the correct balance of moisture, which may take a considerably long time. The standardised climatic conditions in a laboratory are $23\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$ and $50\% \text{ RF} \pm 5\% \text{ RF}$.

7.1.8.1: Conditioning Time for Rubber

Ask



- Ask the participants about importance of time for conditioning of rubber.

Elaborate

- Time in minutes to obtain evenness of temperature.

Thickness (mm)	Temp(Celsius)	Time(min)
25	-50	135
	0	95
	100	140
10	-50	45
	0	30
	100	45
5	-50	20
	0	15
	100	20

Table 7.1.1

7.1.9: Batch Control

Ask

- Ask the participants about significance of batch control in rubber manufacturing.

Explain

Batch control is the name given to the tests, which entails that each batch of mixed rubber is checked before it is used in any further processing. The testing can include the determination of viscosity, cure curve, density and hardness

7.1.10: Viscosity – Plasticity

Ask

- Ask the participants about signification of viscosity property in rubber.

Explain

In the processing of rubber, it is important that the material has a suitable viscosity for the purpose. If the viscosity is too low the material will become difficult to process, e.g. due to increased stickiness, cold flow and low strength. If the viscosity is too high, processing requires great amounts of power and energy. The mechanical energy used in the processing is transformed into heat, which increases the risk of scorching. Measuring the viscosity of rubber polymers and compounds is therefore one of the more usual controls when producing rubber.

The term "plasticity" is often used simultaneously with "viscosity". High plasticity is the same as low viscosity. Rubber polymers and rubber compounds have very complicated flow properties or rheological properties as they are also called. For normal liquids of low viscosity (Newtonian fluids) such as water, one single material constant – viscosity – is sufficient to be able to characterise their flow properties.

Finally, rubber is more or less thixotropic, which is why the flow properties depend on the degree of processing that has been used in previous processes. All this entails different measuring methods for the determination of the rheological properties can rank materials differently depending on the test conditions used. This also means that laboratory results could differ greatly from what they are in practice, e.g. if the shear rate differ in both cases

7.1.10.1: Rotation Viscometers

Explain

The most common instrument used in determining the viscosity of rubber polymers and compounds is the Mooney viscometer. The Mooney viscometer can be described as a rotation viscometer, in which the rubber is sheared between an inner rotor and an outer die. The die has a diameter of 50 mm and a height of 10 mm. The normal rotor has a diameter of 38 mm. For the measurement of high viscous materials, there is a smaller rotor with a diameter of 30 mm. The temperature of the die can be adjusted and normally 100 °C is used. The rotor is rotated with a speed of 2 rpm. This corresponds to an average shear rate of 1 s^{-1} . The torque required for driving the rotor, which is a measurement of the viscosity, is measured and presented in Mooney units.

7.1.11: Extrusion Plastometers

Explain

In an extrusion plastometer and a capillary rheometer, rubber is forced through an extruder nozzle, capillary, at a known pressure or with a constant speed for a specified time and the volume that is extruded is measured.

The method is somewhat similar to extrusion and injection moulding in the rubber manufacturing industry and is often used as a test of extrudability. A capillary rheometer is different from an extrusion plastometer because in a capillary rheometer the pressure is measured in the cylinder just before the die, the die often is longer and that it is easy to change the pressure on the rubber.

Demonstrate

- Demonstrate working procedure of the machine.

7.1.12: Compression Plastometers

Explain



The principle used in a compression plastometer is very simple – the testing piece is pressed together between two parallel plates using a constant load and the compressed thickness is measured. This simplicity explains the previous widespread use of the method within the rubber industry.

Apart from the simplicity, the method has few advantages. It does however have a whole series of disadvantages:

- a) The shear rate is low, between 0.1 to 1 s^{-1} .
- b) The rubber is not sufficiently deformed in order to break down the thixotropic structure this applies especially to materials filled with carbon black
- c) The shear rate is not uniform in the test piece and in addition it also changes during the testing.

The disadvantage of the low shear rate may also be regarded as an advantage, since in recent years it has been found that the difference in viscosity between various materials is greatest at low shear rates.

7.1.13: Scorch – Cure

Ask



- Ask the participants about their understanding of scorch.

Say



During the curing of rubber, crosslinks are formed via chemical reactions between the molecules in the compound, which is then transformed from a plastic formable compound to an elastic material. With the increase in the number of crosslinks, the tendency of the material to flow and creep decreases. The hardness and tensile strength of the material increases, swelling in liquids decreases and the elasticity increases etc.

The curing process can thus be followed by studying how one of these properties changes by testing a number of test pieces cured at different curing times. Today, however, there are methods with which you can continuously follow the curing process using both considerably faster and simpler means.

7.1.14: Density

Say



The most common method of determining the density of a rubber material is to weigh a test piece in air and water. Weighing in air provides the actual weight and weighing in water provides the volume. The density is then calculated by dividing the weight by the volume.

Demonstrate



- Demonstrate how to calculate density of rubber products.

7.1.15: Dimensions

Explain



When measuring the dimensions of rubber test samples and products, most normal measuring tools can be used, e.g. measuring tapes and rulers, vernier callipers, thickness gauges and profile projectors. Since rubber is a soft material, it is important not to deform the rubber when measuring it. In order to accurately measure the thickness, a thickness gauge having a specified measuring load of 22 kPa should be used. The diameter of the measuring foot can be from 2 mm up to 10 mm and the load can be adjusted to reach the specified pressure.

Another good way of measuring the cross section of rubber profiles is to use a profile projector, which allows remote, measuring without having to touch the profile itself.

7.1.16: Hardness

Elaborate



The rubber's hardness or stiffness (modulus) is determined by measuring how far a blunt measuring probe can be pressed into the rubber.

Originally there were several methods for hardness measuring, today however there are mainly two methods used, and a third for measuring hardness on big rubber covered rolls.

7.1.17: Shore

Elaborate



The oldest method for measuring hardness is the Shore method from 1915, where a truncated cone is pressed into the rubber with a spring force and the reading is carried out after 3 seconds. Earlier the reading time was expressed "within 1 second", but changed in ISO 7619 to 3 s for better accuracy. The Shore method has a number of scales (A, B,C, D, AO, DO, O, OO and AM). Among these the most common are specified in the ISO standard. Shore A is used for normal rubber hardness, Shore D for hard rubber and Shore AO for soft rubber. Shore AM is a Shore A micro method for thin test pieces.

The measuring accuracy is noticeably improved when the meter is stand mounted, as the meter is parallel with the test piece and the correct load is used. If a timer is used, the precision is further improved.

Demonstrate

- Demonstrate procedure of hardness testing of a rubber product.

7.1.18: Tensile Test**Explain**

Tensile testing is normally used to determine the following properties of rubber materials:

- Stress at a particular elongation, e.g. 100 % or 300 %, expressed in MPa, is sometimes called the “rubber modulus”.
- Tensile strength in MPa, which is the strength at break.
- Elongation at break in %.

The testing is normally conducted on dumbbell test pieces, which are punched out of 2 mm test sheets. The test is done in a tensile testing machine using a speed of 500 mm/min. To be able to determine the elongation and the stress at different elongation, an extensometer is also needed. The extensometer can be mechanical with balanced clamps that measure the elongation or optical e.g. a laser that measures two reflecting benchmarks on the test piece.

Demonstrate

- Demonstrate procedure of tensile testing of a rubber product.

7.1.19: Compression Tests**Explain**

Compression tests to measure the rubber's stiffness, spring constant or modulus, can be done in modern tensile testers, which can be used in both tension and compression. The normal method is to deform the rubber by 25 % and measure the force. It is common to do a mechanical condition by compressing the rubber three times and carrying out the measurement on the fourth compression. The result can be displayed as a load/deformation curve, from which you can read off the force at e.g. 10 and 20 % deformation

Demonstrate

- Demonstrate procedure of compression testing of a rubber product.

7.1.20: Analysis of Free Sulphur

Explain



The ash residue of a polymer or an elastomeric material is determined by heating a sample in a crucible, at first on a Bunsen to drive off the volatile substances, and later on in an oven at 550 °C. The ash residue is calculated as percentage of the sample weight. The ash residue in a polymer is a measure of the inorganic impurities, while ash of a rubber material is a measure of inorganic constituents such as zinc oxide, whiting, silica, clay etc.

Demonstrate



- Demonstrate procedure of analysis of free sulphur in a rubber product.

7.1.21: Ash Content

Explain



Compression tests to measure the rubber's stiffness, spring constant or modulus, can be done in modern tensile testers, which can be used in both tension and compression. The normal method is to deform the rubber by 25 % and measure the force. It is common to do a mechanical condition by compressing the rubber three times and carrying out the measurement on the fourth compression. The result can be displayed as a load/deformation curve, from which you can read off the force at e.g. 10 and 20 % deformation

Demonstrate



- Demonstrate procedure of analysis of ash content in a rubber product.

7.1.22: Carbon Black Content

Explain



When analysing the carbon black content an earlier extracted sample is used. To drive out the polymer from the sample it is pyrolyzed in nitrogen at 850 °C. The sample is then placed in a muffle furnace and the carbon black is burned off at 850 °C. The amount of carbon black is calculated from the weight loss in the different steps of the procedure

Demonstrate



- Demonstrate procedure of analysis of carbon black content in a rubber product.

7.1.23: Inspection and Testing Instruments

Ask



- Ask the participants the name of testing instruments used in rubber testing.

Explain



Following instruments are used for inspection and testing of Rubber –

- Vernier caliper,
- Micrometer
- Hardness tester
- Tensile testing machine
- Mooney Viscometer
- Weighing scale
- Oscillating Disc Rheometer
- Heating Oven

7.1.23.1: Vernier Caliper

Explain



Vernier caliper is a very useful measurement instrument for measurement of length, till 2 point of decimal. It has two scales, one main scale and one vernier scale. It has two sets of jaws (Internal and External) for measurement. It also has locking screw to hold the jaws on measured dimension for checking.

As an example, we will learn how to read 2.13 on vernier. The main scale used for reading the main number and one decimal place after the reading (2.1 cm)The vernier scale contributes the second decimal place to the reading (0.03 cm)

To obtain the main scale reading: Look at the image above. 2.1 cm is to the immediate left of the zero on the vernier scale. Hence, the main scale reading is 2.1 cm

To obtain the vernier scale reading: Look at the image above and look closely for an alignment of the scale lines of the main scale and vernier scale. In the image above, the aligned line correspond to 3. Hence, the vernier scale reading is 0.03 cm.

In order to obtain the final measurement, we will add the main scale reading and vernier scale reading together. This will give 2.13 cm.

Now we have digital vernier also, which give direct reading, hence eliminate any reading error.

Explain

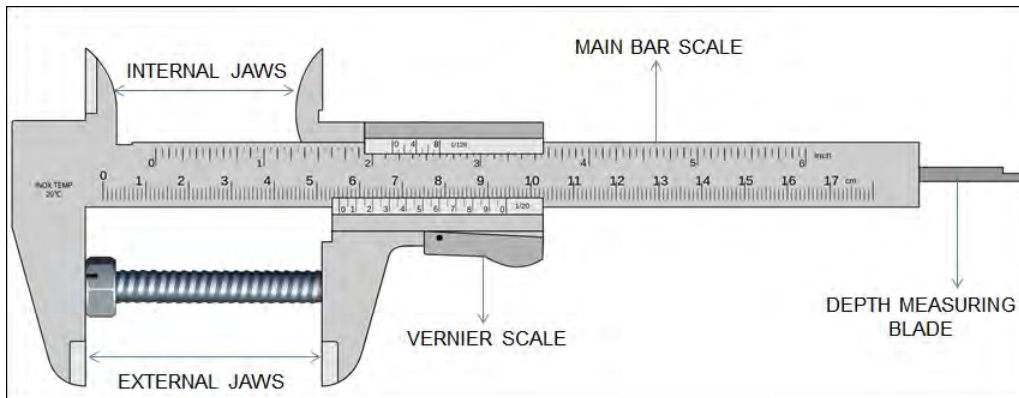


Fig. 7.1.2. Vernier caliper

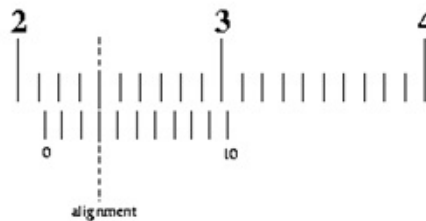


Fig. 7.1.3. Taking reading from vernier caliper

Demonstrate



- Demonstrate procedure of using a vernier caliper.

7.1.23.2: Micrometer

Explain



Micrometer is another instrument for doing accurate dimensional measurement. It works on screw gauge principle. It has least count of 0.001 Cm.



Fig. 7.1.4. Micrometer

Demonstrate



- Demonstrate procedure of using a micrometer.

7.1.23.3: Hardness Tester

Explain

Since it check hardness on Shore Scale, hence it is also called 'Shore Hardness Tester'. It is used to check the hardness of the compound.

The basic test requires applying of the force on a compound sample in a consistent manner, without shock, and measuring the hardness (depth of the indentation).

If a timed hardness is desired, force is applied for the required time and then reading is taken.



Fig. 7.1.5. Rubber hardness tester

Demonstrate

- Demonstrate procedure of using a hardness tester.

7.1.23.4: Ruler

Explain

Ruler is the most common measuring tool used for measuring linear distance. One side of a ruler has millimeters and other side has inches engraved on it. Least count for a common ruler is 1 millimeter or 0.25 inch.



Fig. 7.1.6. Ruler

7.1.23.5: Measuring Tape

Explain

It is a simple measuring instrument consisting of a long, thin metal strip with a marked scale of unit divisions.

This is used for measuring straight dimensions.



Fig. 7.1.7. Measuring tape

7.1.23.6: Tensile Testing Machine

Ask



- Ask the participants which property rubber can be tested on tensile testing machine.

Explain



The machine has 2 jaws for holding the rubber specimen and a dial to show the tensile strength. Once rubber specimen is put on machine for testing both jaws pull it in different direction till the time it breaks. Same machine is used for checking Elongation also.



Fig. 7.1.8. Tensile testing machine

Demonstrate



- Demonstrate procedure of using mooney viscometer.

7.1.23.7: Mooney Viscometer

Explain



This instrument is used for mooney viscosity of rubber polymer. This is a very important instrument for Rubber industry. Each batch of incoming polymer is checked for its correctness before using for production.

Demonstrate



- Demonstrate procedure of mooney viscometer.

7.1.23.8: Weighing Scale

Explain



This is high resolution scale for checking weight of polymer or compound for various tests, like - density or Ash / sulphur content checking. It is covered with glass to mitigate the disturbance of air.



Fig. 7.1.10. Lab weighing scale

Demonstrate

- Demonstrate procedure of using lab weighing scale.

7.1.23.9: Oscillating Disc Rheometer

Ask

- Ask the participants which property of rubber can be tested on oscillating disc rheometer.

Explain

This instrument is used to check curing properties of compound.



Fig. 7.1.11. Oscillating Disc Rheometer

Demonstrate

- Demonstrate procedure of using oscillating disc rheometer.

7.1.23.10: Heating Oven

Explain

Heating oven is used for various tests, like - Ash content, Sulphur content checking.



Fig. 7.1.12. Heating oven

Demonstrate

- Demonstrate procedure of using lab weighing scale.

Activity-1

Objective: Vernier caliper working procedure demonstration.

Procedure:

- Demonstrate the participants how to measure a dimension with the help of a vernier caliper.
- Provide them a vernier caliper and a product with various dimensions to measure.
- Ask them to demonstrate the measurement of dimensions with the help of vernier, such as: length, width, depth, etc.

Activity Outcome:

- Participant will be able to learn how to measure a dimension with a vernier caliper.
- Participants will get opportunity to measure hands on with a vernier caliper.

Activity	Time	Resources
Vernier caliper working procedure demonstration	4 Hours	Vernier caliper, test piece for inspection

Table 7.1.1

Activity-2

Objective: Hardness tester working procedure demonstration.

Procedure:

- Demonstrate the participants how to measure hardness with the help of a shore A hardness tester.
- Provide them a Shore A hardness tester and a rubber product.
- Ask them to demonstrate the measurement of hardness with the help of a hardness tester.

Activity Outcome:

- Participant will be able to learn how to measure rubber hardness with a hardness tester.
- Participants will get opportunity to carry out measurement hands on with a hardness tester.

Activity	Time	Resources
Hardness tester working procedure demonstration	4 Hours	Hardness tester, test piece for hardness testing

Table 7.1.2

Activity-3

Objective: Tensile testing machine working procedure demonstration.

Procedure:

- Demonstrate the participants how to measure tensile strength with the help of a Tensile testing machine.
- Provide them a Tensile testing machine and a rubber sample for testing.
- Ask them to demonstrate the Tensile test of the rubber sample.

Activity Outcome:

- Participant will be able to learn how to test rubber compound tensile strength with the help of a Tensile testing machine.
- By carrying out testing with their own hand, will give them confidence.

Activity	Time	Resources
Tensile testing machine working procedure demonstration	4 Hours	Tensile testing machine, test piece for inspection

Table 7.1.3

Activity-4

Objective: Mooney viscometer working procedure demonstration.

Procedure:

- Demonstrate the participants how to measure rubber mastication status with the help of a Mooney viscometer.
- Provide them a Mooney viscometer and a rubber sample for testing.
- Ask them to demonstrate the Mooney viscometer test of the rubber sample.

Activity Outcome:

- Participant will be able to learn how to test rubber compound with the help of a Mooney viscometer.
- By carrying out testing with their own hand, will give them confidence.

Activity	Time	Resources
Mooney viscometer working procedure demonstration	4 Hours	Mooney viscometer, test piece for inspection

Table 7.1.4

UNIT 7.2: Defects in Compound and Solving Quality Problems

Unit Objectives

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

1. Define various Quality defects of compound.
2. Demonstrate problem solving techniques.
3. Discuss Implication of Quality defects

Resources to be Used

- Laptop
- Projector
- White Board
- Marker
- Duster
- Defective rubber compound samples
- Samples of rubber parts produced with defective compound

Do

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

Notes for Facilitation

- Explain the participants about importance of producing ok parts.
- Describe cost implication of rejection.
- Explain implication of defective compound on final rubber parts.

7.2.1: Quality Defects in Compound

Ask

- Ask the participants about their understanding of implication of quality defects in compound.

Elaborate

Same as in other manufacturing processes, Internal Mixing also depends on various machine / man performance. Any variation in parameters or settings can generate a defect. Internal Mixing has evolved very much and machines and processes are very robust, still some defects get generated.

Since quality issue in any product may cause customer's dissatisfaction, hence it is very important that all the defects are minimized and contained in factory. Not even a single defective part should go to customer.

All companies follow multi-layer quality control system to ensure defect free part to customer. All parts are checked after every process and in the end they are checked for many parameters, such as - Dimensional, fitment and performance.



Fig. 7.2.1. Rubber Shore Hardness Tester

7.2.2: Internal Mixing Defects

Ask

- Ask the participants about their understanding of reasons of producing defective compounds.

Explain

If we follow process instruction, then there is scope of rejection. When any of parameter deviate from standard following defects gets generated -

1. Black Incorporation Times (BIT)
2. Lumps in dumped batches
3. Bagging on the mill
4. Back Rolling on the mill
5. Rheo Graph out of specification
6. Hardness low or high

7. Specific gravity high or low
8. Ash content high
9. Heat aging high

7.2.2.1: BIT

Ask



- Ask the participants about their understanding of BIT.

Elaborate



The black incorporation time in a mixing operation is a very important factor for determining how fast a given mixing procedure can be completed. However, fast incorporation time does not necessarily guarantee good filler or carbon black dispersion.

By using lower surface area Carbon black, we can achieve faster BIT. Sometimes selecting a highly aromatic oil as the process oil in a given rubber compound may result in faster oil take-up times during mixing for SBR- and BR-based compounds. Using cold emulsion NBRs with greater linearity enables compounds to have faster filler incorporation. Certain Metallocene-Catalyzed EPDM Grades Single-site constrained-geometry metallocene catalyst technology for commercial polymerization makes it possible to produce commercial grades of EPDM with high ethylene content. Through this technology, it is possible to manipulate the ethylene distribution in such a way as to affect the distribution of the melting endotherm. Thus this technology can provide commercial EPDM grades with improved black incorporation time.

7.2.2.2: Lumps in Dumped Batches

Ask



- Ask the participants about their understanding of lumps in dumped batches.

Elaborate



Lumps contained in dumped batches can be a major quality problem. The following experimental ideas might help eliminate this problem.

By using star-branched halobutyl rubber in place of regular halobutyl rubber in mixing a rubber compound, lumps are reportedly reduced.

7.2.2.3: Bagging on Mill

Ask



- Ask the participants about their understanding of bagging on mill.

Elaborate

When a compound “bags” on the mill, it can be a major issue. Use E-SBR instead of S-SBR because S-SBR usually has the higher number average molecular weight and the narrower molecular weight distribution, which imparts bagging on the mill. Consider applying milk to the hot mill rolls to temporarily create a tacky mill surface and eliminate bagging. Because this is a temporary condition, milk may have to be reapplied every three or four batches. It is reported that powdered milk works also.

7.2.2.4: Back Rolling on Mill

Ask

- Ask the participants about their understanding of back rolling on mill.

Elaborate

Another common problem in compound that can occur in the factory is a stock going to the back roll when placed on a mill.

The nip distance for a two-roll mill can influence whether the rubber goes to the front or back roll while mixing. Adjusting this nip setting can cause the rubber compound to travel to the front or the back roll. The nip position where this change occurs is called the “front–back transition point.” The mill temperature, friction ratio, and radius can also have an effect.

7.2.2.5: Rheo Graph out of Specification

Ask

- Ask the participants about their understanding of reasons for rheo graph out of specification.

Elaborate

During Oscillating Disc Rheometer graph drawn comes out of specification. This happens due to wrong ingredients mixing. To correct this issue you need to review the ingredients as per specification before making next batch of compound.

7.2.2.6: Hardness low or High

Ask

- Ask the participants about their understanding of reasons for hardness high or low.

Elaborate

In this defect Hardness of compound remain high or low as compared to specification. This could be due to ingredients not weighed as per specification sheet. One of easy method for correcting this is adding oil for reducing the hardness. For increasing the hardness filler can be added as per requirement. Above mentioned solution has to be approved by supervisor with his expert advice. Else some other defect may get generated in the compound.

7.2.2.7: Specific Gravity low or High

Elaborate

In this defect Specific gravity of compound remain high or low as compared to specification. This could be due to ingredients not weighed as per specification sheet. One of easy method for correcting this is adding filler for increasing the specific gravity as per requirement. This solution has to be approved by supervisor with his expert advice. Else some other defect may get generated in the compound.

7.2.2.8: Ash Content High

Ask

- Ask the participants about their understanding of reasons for ash content high.

Elaborate

In this defect Ash content of compound remain high against specification. This could be due to ingredients not weighed as per specification sheet. The ingredients should be checked against specification. If problem still persists, then it should immediately be brought to notice of supervisor.

7.2.3: Quality Defect Analysis and Countermeasures

Explain

In principle, all quality problems generate due some issue in manufacturing process or design fault. If we can analyze the problem and can understand the problem root cause, then we can eliminate the problem, by taking appropriate action on the problem. The most used tools for root cause analysis are -

1. Fish-bone Diagram
2. Why-why analysis

7.2.3.1: Fish-Bone Diagram

Ask



- Ask the participants about their understanding of fish bone diagram and its use for problem

Explain



As the name suggest, it appears to be a fish-bone, that is why it is called fish-bone diagram. In this process, one team is made of all persons of related department. for example - for any manufacturing defect related issue, the team will have persons from Production, Quality, Process Engineering and design dept.

The team will first analyze the problem and then think that what could be the possible reasons which can create the problem. The key to this process is, that nobody question the other team member during this reason identification process. Once all the possible reasons are written then next step is to review all reasons and their actual contribution to problem.

After deep analysis, only most relevant reasons are left. Now action are taken on these reasons, which normally resolve the problem. If problem is still not resolved, then this process can be repeated again.

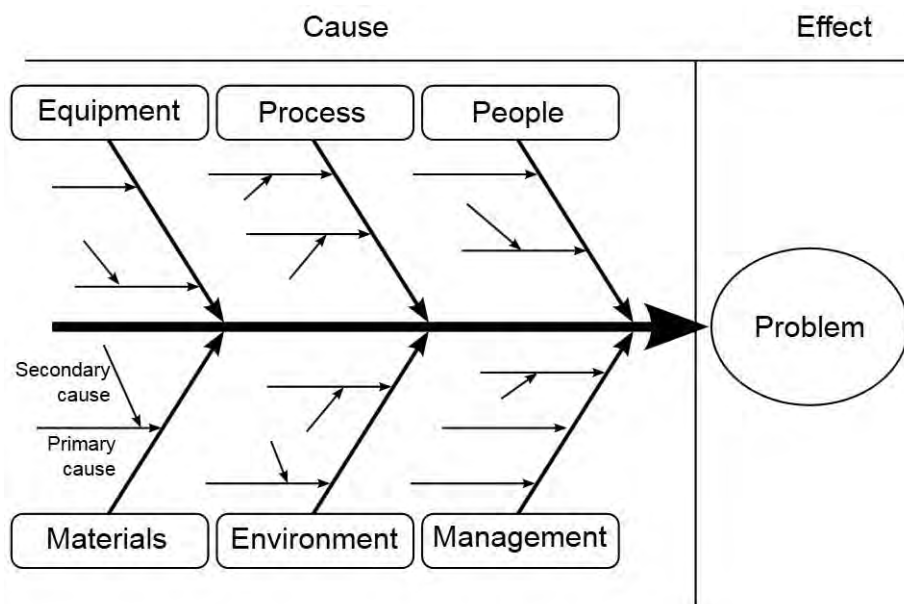


Fig. 7.2.2. Fish-bone diagram

Demonstrate



- Demonstrate use of fish-bone diagram to the participants.

7.2.3.2: Why-Why Analysis

Ask



- Ask the participants about their understanding of why-why analysis and its use for problem solving.

Explain



In this method of problem solving, Why's are asked for reason for any problem. These why's are asked till we reach last level of any process. Normally in 5 why's we reach to actual reason. This is very good for in-depth analysis. For Example -

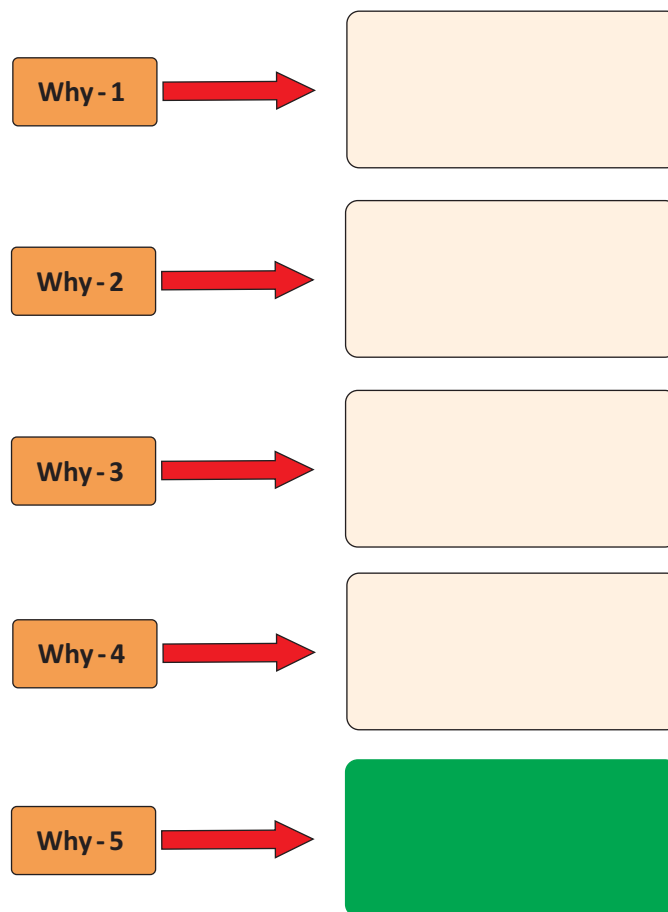


Fig. 7.2.3. Why-why analysis

Demonstrate



- Demonstrate use of why-why analysis to the participants.

Team Activity-1

Objective: Demonstration of problem solving skill: why-why analysis.

Procedure:

- Demonstrate the participants how to create a why-why analysis for any problem.
- Ask the participants to make a pair of 2 participants.
- Provide them an problem for which they have some deep knowledge.
- Ask them to create a why-why analysis for the given problem.

Activity Outcome:

- You will be able to test the skill of participants for why-why analysis.
- Participants will get opportunity to create a why-why analysis for a real scenario.

Activity	Time	Resources
Demonstration of problem solving skill: why-why analysis	8 Hours	White board & markers, facilitator notes, laptop/ slides + projector, flip charts

Table 7.2.1

Team Activity-2

Objective: Demonstration of problem solving skill: fish bone diagram.

Procedure:

- Demonstrate the participants how to create a fish bone diagram for any problem.
- Ask the participants to make a pair of 2 participants.
- Provide them an problem for which they have some deep knowledge.
- Ask them to create a fish bone diagram for the given problem.

Activity Outcome:

- You will be able to test the skill of participants for fish bone diagram.
- Participants will get opportunity to create a fish bone diagram for a real scenario.

Activity	Time	Resources
Demonstration of problem solving skill: fish bone diagram	8 Hours	White board & markers, facilitator notes, laptop/ slides + projector, flip charts

Table 7.2.2

Exercise

- Q1. Quality inspection of rubber compound is:**
 a. An important activity
 b. Not an important activity
 c. should be done only If time permits
 d. Time wasting activity
- Q2. Ruler can be used to measure?**
 a. Length
 b. Compressive strength
 c. Tensile strength
 d. None of the above
- Q3. Hardness tester is used for?**
 a. Dimension checking
 b. Weight checking
 c. Hardness checking
 d. None of the above
- Q4. Which of these is not a type of defect?**
 a. BIT
 b. Lumps in dumped Batches
 c. Simple cure
 d. Bagging on mill
- Q5. Which of these defects can be corrected by using lower surface area carbon black?**
 a. BIT
 b. Lumps in dumped batches
 c. Simple cure
 d. Bagging on mill
- Q6. Which of these issues can be corrected by using S-SBR in place of E-SBR:**
 a. BIT
 b. Lumps in dumped batches
 c. Simple cure
 d. Bagging on mill
- Q7. Fishbone diagram is a type of :**
 a. Production report
 b. Root cause analysis tool
 c. Inspection report
 d. Defect identification tag

Answers

1. a 2. a 3. c 4. c 5. a 6. d 7. b



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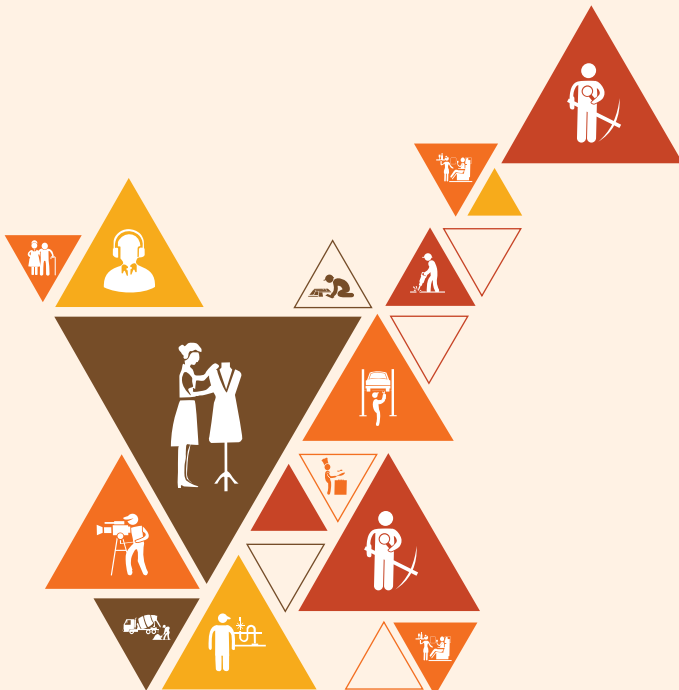


8. Health and Safety

Unit 8.1 – Hazards in rubber industry

Unit 8.2 – Safety equipment for rubber industry

Unit 8.3 – Handling fire hazard and other emergencies



RSC / N5007

Key Learning Outcomes

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

1. Describe the hazards
2. Identify hazard in rubber Industry
3. Describe chemical hazard
4. Describe physical hazard
5. Describe ergonomic hazard
6. Explain the health and safety requirements for rubber Industry
7. Discuss health and safety procedure of organisation
8. Explain what is PPEs
9. Discuss requirement of PPE
10. Identify different types of PPEs used in rubber Industry
11. Describe the purpose of various PPEs used in rubber Industry
12. Demonstrate the use of different PPEs.
13. Define what is emergency
14. Describe various emergency situations in Industry
15. Describe common injuries in industry
16. Describe first aid box and its constituents
17. Demonstrate how to handle fire emergencies
18. Demonstrate how to use a multi purpose fire extinguisher
19. Describe type and class of Fires
20. Describe suitable fire extinguisher as per fire type and class

Unit 8.1: Hazards in Rubber Industry

Unit Objectives

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

1. Explain what is hazard
2. Identify hazard in rubber Industry
3. Describe chemical hazard
4. Describe physical hazard
5. Describe ergonomic hazard

Resources to be Used

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

Do

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

8.1.1: What is Hazard?

Explain

'Hazard' is set of conditions, which can be risk to health or life. It can be atmosphere of work place or construction of machine or working procedure. Anything out of these or alone can be a hazard. For understanding it better we can see examples of various hazards and threat possessed by them. Oil on floor creates slip hazard. Use of Asbestos creates cancer and other breathing problem hazard. Use of broken electric wires creates electrocution hazard and fire hazard by potential sparking out of it.



Fig. 8.1.1. Hazard

8.1.2: Hazards in Rubber Industry

Ask



- Ask the participants their understanding of hazards in rubber Industry.
- Ask the participants the implications of different hazards in rubber Industry.

Elaborate



Apart from some common hazards of manufacturing industries, rubber industry has some exclusive hazard, which are associated with use of rubber, chemical and heat.

Explain rubber Industry hazard in detail –

- 1- Manual Handling – Around 40% of total accident in rubber industry is reported due this cause.
- 2- Accident by moving or falling object – this is the other big hazard in rubber industry. Some big parts like tyre are heavy in weight and it is difficult to manage its weight manually. During transportation if these parts are not secured properly then there is chance that they may fall from open moving vehicle or can fall on person who open the door of closed transportation vehicle. Special safety arrangement should be made to load these parts in side the vehicles.
- 3- Slips and falling – This is also a bigger reason for many accidents. Floor of shop should be free from any oil or slippery material. Also aisles should be clutter free so that movement of persons and trolleys remains smooth.
- 4- Rubber and Dust Fumes – Due to exposure to beta-naphthylamine, workers are prone to get cancer. Prolonged exposure to this chemical leads to bladder cancer. The employer should use a effective way of ventilation and prolonged exposure should be avoided.



Fig. 8.1.2. Hazard of manual handling



Fig. 8.1.4. Slip or fall



Fig. 8.1.3. Accident by moving / falling object

Other hazards can be classified in to three categories –

1. Chemical hazard.
2. Physical hazard.
3. Ergonomic hazard.

8.1.2.1: Chemical Hazards

Explain

There are many chemicals that are used in rubber industry. Prolonged exposure to these chemicals without using effective PPEs can affect human body adversely. There are three ways of getting affected by chemicals.

A- Inhalation: If any chemical is in Vapour of gaseous form, then a worker can inhale it while working near to that chemical.

B- Ingestion: It is possible by accidentally swallowing the chemical through eating or drinking

C- Absorption: There are some chemicals those get absorbed in body through contact with skin or eyes.

8.1.2.2: Physical Hazards

Explain

Physical hazards are types of energy that may be hazardous to workers. Following are example of physical hazards:

- Noise
- Vibration
- Temperature Extremes
- Cold illnesses and injuries



Fig. 8.1.5. Heat generated in tyre industry

Notes for Facilitation

- Explain the participants about implication of physical hazards.
- Explain the participants the procedure of escalating such hazards to their supervisor, while working at an organisation.

8.1.2.3: Ergonomic Hazards

Explain

Ergonomic hazards can cause painful and disabling injuries to joints and muscles. These can occur from:



Fig. 8.1.6. Ergonomic hazard

- Heavy, frequent, or awkward lifting, Repetitive tasks, Awkward grips, postures, Using excessive force, Over-exertion, Using wrong tools for the job or using tools improperly, Using improperly maintained tools, Hand-intensive work,

Explain Correct Lifting position -

- Chin tucked in, Comfortably straight back, Leaning slightly forward, Arms close to body, Secure grip, Bent knees, Proper foot position:

8.1.3: General Hazards in Rubber Industry

Explain

Slip and fall - Slip and Fall accidents can occur anywhere on the factory floor. Because water, chemicals, solvents and liquids are commonly used in factories, fatigue mats and non-slip floor surfaces should be provided. Deposits of oil and grease can create hazardous conditions on any surface.

Heavy Weight Lifting - Lifting heavy objects repeatedly causes a variety of serious health conditions and permanent disabilities. Whenever manual handling is required, a worker's health could be put in danger. Handling accidents can also occur during deliveries when loads fall on workers or cause muscle strain and back injuries. Falling shelves and unstable goods in warehouses can cause head trauma and crush injuries. All hydraulic systems, pallet jacks, hand trucks and lifting equipment must be properly maintained.

Injury by defective tool - Defective, faulty and improperly maintained equipment can make any job even more dangerous. Accidents often happen during operation and regular maintenance procedures. Disabling automatic shut-off buttons and critical safety components can cause deadly injuries. Workers and mechanics might also sustain injuries when attempting to complete necessary repairs.

Injury by Dangerous chemical - Dangerous chemicals and hazardous substances are found in many factories. Anytime workers are exposed to poisonous vapors and chemicals, their health can be impaired.

Injury by Fire / Explosion - Fires, explosions and electrical accidents occur in many factories where flammable substances and heat-generating equipment are found. Can cause a catastrophic fire and injure many workers.

Injury due to lack of training - Failing to properly train and supervise workers is a leading cause of factory accidents. Floor managers, supervisors and safety personnel are responsible for creating and maintaining a safe work environment. Factory owners and supervisors are also responsible for establishing and enforcing safety procedures and training requirements that prevent accidents. A small investment in enhanced safety tools and training can prevent expenses related to accidents and on-the-job injuries.

8.1.4: Hazards While Manufacturing Rubber

Explain

- Dust arises in rubber making where ingredients are handled, weighed, added to or mixed with uncured natural rubber or synthetic elastomers.
- Rubber process dust can cause cancer and dermatitis.
- Keep inhalation of rubber process dust as low as possible below the workplace exposure limit of 6 mg/m³ (8-hour time-weighted average) or as mentioned in the SOP.
- Rubber process dust does not include dust from cured rubber, e.g. from buffing or trimming.
- Fire and explosion hazards
- Many of the rubber compounding additives are fire sensitive, particularly:
 - Sulphur and organic peroxides (used as curing agents);
 - Azodicarbonamide (used as a blowing agent in some open celled rubber/lattices). Particular care is required in storage areas to make sure incompatible materials, such as carbon black and sulphur, are adequately segregated. There have been incidences of dust explosions in powder handling areas. Many rubber compounding additives such as azodicarbonamide, calcium and zinc stearates, are known to be highly explosive when in a finely divided state. Design dust extraction and collection systems for use with potentially explosive dusts. Good housekeeping will minimize the risk of secondary dust explosions.

8.1.5: Hazards and Safety Precaution While Doing Internal Mixing

Explain

Following are the main hazards of rubber internal mixing -

- Lung problem due to dust inhalation.
- Fall or slip due to oil spillage.
- Hand trap in machine.

Operator should wear all required PPEs, such as safety shoes, mask and gloves.

Relevant regulatory environmental help and safety instruction must be followed while working at workplace. Schedule for cleaning of machines and the shop floor should be followed strictly. Prescribed protective equipment to be used during working at machine must be worn positively.

Demonstrate



- Demonstrate use of all the PPEs to be used during internal mixing operation.
- Demonstrate health hazards situations at work place and their implications.

Team Activity-1



- Conduct 'safety risks identification skill demonstration' activity.
- Ask the participants to make a pair of 2 participants.
- Participants will have to demonstrate safety risks identification skill by identifying the evident safety hazards in the given equipment
- One group of participants will has 15 minutes for the demonstration.
- Appreciate efforts made by participants and clarify doubts, if any raised, during activity.

Activity	Time	Resources
Demonstration of safety risks identification skill by identifying the evident safety hazards in the given equipment	4 Hours	White board & markers, facilitator notes, laptop/ slides + projector, safety videos, internal mixing machine with safety issues, safety shoes, safety goggle, mask, safety gloves.

Table 8.1.1

8.1.6: Health & Safety Requirement of Rubber Industry

Explain



Every industry has some health and safety hazards while carrying out its operations. Organisations cannot avoid these hazards, but can eliminate the risk of accident or their affect on human health by taking some precautions. Different organisations have different type of hazard, which are associated with the nature of process they carry out. Some of them are below –

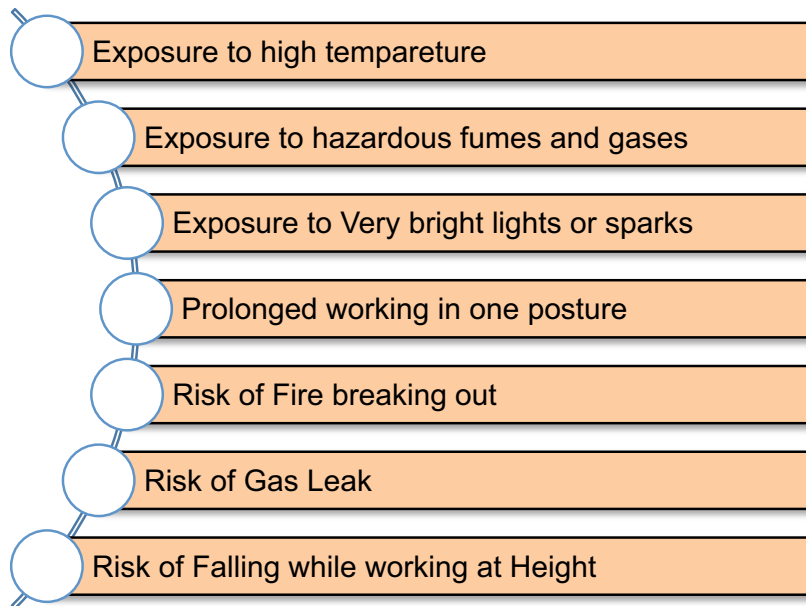


Fig. 8.1.7. Health and safety requirement of industry

8.1.7: Health and Safety Hazards of Rubber Industry

Explain



Due to excessive use of various chemicals and very high temperature processing of rubber, rubber industry has its own very high health and safety hazards.

Although natural rubber used in rubber manufacturing posses very less affect on human health but other ingredients, such as carbon black and some of special chemicals used in rubber making, posses great health hazard if exposed without PPEs for prolonged duration.

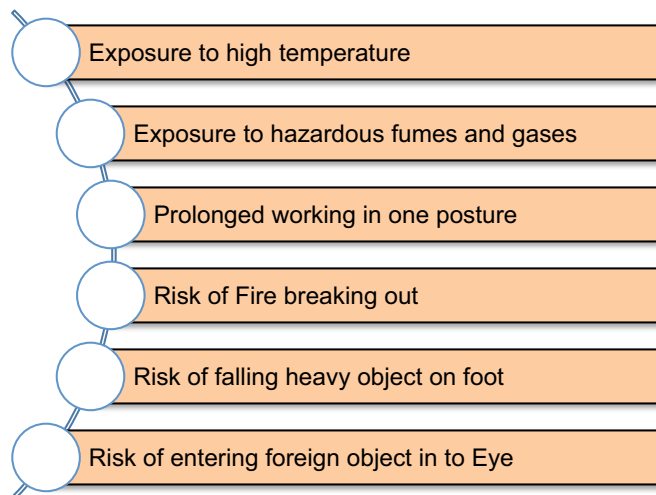


Fig. 8.1.8. Health and safety requirement of rubber industry

8.1.8: Health and Safety Procedure of an Organisation

Explain



To mitigate the risk of health and safety related issue every organisation prepares a procedure containing details of health and safety issues and actions to be taken. All the tyre-manufacturing organisations also follow this and have their own health & safety procedures.

As we know ingredient for Tyre is rubber and other chemical, which are substantially hazardous for human if exposed for longer duration without proper personal protective equipment. Main purpose of this document is to reduce risk of employees of organisation while working.

This document has guidelines on 'how-to' of all health and safety related issue. Apart from minute details it has –

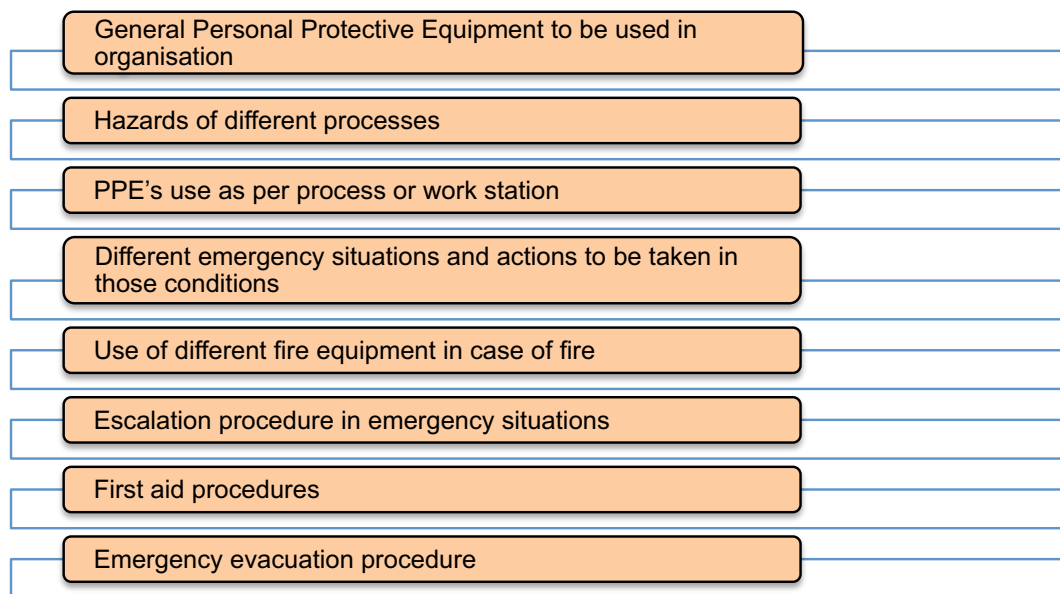


Fig. 8.1.9. Details of organisation's safety procedure

8.1.9: Response to Emergencies

Explain



Emergency is a abnormal situation which may lead to an accident. Following are the examples of emergencies –

1. Power failure
2. Any critical equipment failure, such as cooling tower, dust collector, etc.
3. Fire
4. Earthquake, etc.

All organizations used to have manual for responding to all above emergency situations. All employees should read the manual thoroughly and should act accordingly. If any emergency is encountered, which is not mentioned in the manual, then it is should be escalated immediately to your next supervisor. Any delay in response to emergency may cause loss in terms of money and physical well being.

Unit 8.2: Safety Equipment for Rubber Industry

Unit Objectives

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

1. Explain what is PPEs
2. Discuss requirement of PPE
3. Identify different types of PPEs used in rubber industry
4. Describe the purpose of various PPEs used in rubber industry
5. Demonstrate the Use of different PPEs.

Resources to be Used

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

Do

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

8.2.1: What is PPE – Personal Protective Equipment?

Ask

- Ask the participants what is PPE.
- Ask the participants what is the purpose of PPE.

Explain

Personal Protective Equipment or PPE, as it is commonly called, is wearable equipment, which saves us from potential harm of various substance and situations. Such as – Mask, gloves etc



Fig. 8.2.1. Type of personal protective equipment

8.2.2: Need of PPE

Explain



To ensure the greatest possible protection for employees in the workplace, the cooperative efforts of both employers and employees will help in establishing and maintaining a safe and healthful work environment.

In general, employees should:

- Properly wear PPE,
- Attend training sessions on PPE,
- Care for, clean and maintain PPE, and
- Inform a supervisor of the need to repair or replace PPE.

There are many type of PPEs. PPEs used in rubber or Tyre industry are following –

8.2.2.1: Respiratory Protection (RPE)

Explain



- RPE should not be needed if the controls work properly.
- RPE is usually needed for maintenance and cleaning.
- Provide RPE with an assigned protection factor (APF) of at least 10.
- Disposable RPE is acceptable - throw it away at the end of the task.
- Otherwise, replace RPE filters as recommended by the supplier.
- Make sure all RPE is properly fit-tested - get advice from your supplier.
- Keep RPE clean. Store it away from dust and other contaminants.



Fig. 8.2.2. Mask

8.2.2.2: Eye and Face Protection

Explain



Employees can be exposed to a large number of hazards that pose danger to their eyes and face. Employers to ensure that employees have appropriate eye or face protection if they are exposed to front and/or side impact hazards from:

- Flying objects and particles;
- Molten metal;
- Liquid chemicals;
- Acids or caustic liquids;
- Chemical gases or vapors;
- Potentially infected material;
- Glare;
- Injurious radiation;
- Electrical flash



Fig. 8.2.3. Safety goggles

8.2.2.3: Head Protection

Explain



A head injury can impair an employee for life or can be fatal. Protecting employees from potential head injuries by wearing a safety helmet or hardhat is one of the easiest ways to protect an employee's head from injury. Employers must ensure that their employees wear head protection if they are exposed to any of the following:

- Falling or flying objects;
- Other harmful contacts or exposures;
- Risk of injury from electrical shock;
- Chemicals;
- Temperature extremes;
- Hair entanglement



Fig. 8.2.4. Safety helmet

8.2.2.4: Foot and Leg Protection

Explain



Employees, who face possible foot or leg injuries from falling or rolling objects or from crushing or penetrating materials, should wear protective footwear. Also, employees whose work involves exposure to hot substances, corrosive, or poisonous materials must have protective gear to cover exposed body parts, including legs and feet. If an employee's feet may be exposed to electrical hazards, non-conductive footwear should be worn. On the other hand, workplace exposure to static electricity may necessitate the use of conductive footwear.

Safety shoes have impact-resistant toes and heat-resistant soles that protect the feet against hot work surfaces common in roofing, paving and hot metal industries. The metal insoles of some safety shoes protect against puncture. Safety shoes may also be designed to be electrically conductive to prevent buildup of static electricity or nonconductive to protect workers from workplace electrical hazards.



Fig. 8.2.5. Safety shoes

8.2.2.5: Hand and Arm Protection

Explain



Where potential injury to hands and arms cannot be eliminated through engineering and work practice controls, employers must ensure that employees wear appropriate protection. Potential hazards include:

- Skin absorption of harmful substances (look for 'skin' warning on MSDS);
- Chemical or thermal burns;
- Electrical dangers; and
- Bruises, abrasions, cuts, puncture.



Fig. 8.2.6. Safety gloves

Demonstrate



- Demonstrate different types of PPEs to be used during Tyre Moulding.
- Demonstrate implications of not using PPE on Tyre moulding operator safety.

Activity-1

Objective: PPE (Personal Protective Equipment) use demonstration.

Procedure:

- Demonstrate the participants how to use different PPEs required during rubber internal mixing operations.
- Provide them different types of PPEs.
- Ask them to demonstrate the use of PPEs, such as: safety shoes, safety goggles, mask, safety hat, safety gloves, etc.

Activity Outcome:

- Participant will be able to learn how to use different PPEs required during rubber internal mixing operations.
- Facilitator will be able to judge the skill level acquired by the participants.

Activity	Time	Resources
PPE (Personal Protective Equipment) use demonstration	4 Hours	White board & markers, facilitator notes, laptop/ slides + projector, safety videos, safety shoes, safety goggles, mask, safety hat, safety gloves.

Table 8.2.1

Unit 8.3: Handling Fire Hazard and Other Emergencies

Unit Objectives

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

1. Define what is emergency
2. Describe various emergency situations in industry
3. Describe common injuries in industry
4. Describe first aid box and its constituents
5. Demonstrate how to handle fire emergencies
6. Demonstrate how to use a multi purpose fire extinguisher
7. Describe type and class of fires
8. Describe suitable fire extinguisher as per fire type and class

Resources to be Used

- White Board + Marker /Black Board + Chalk
- Duster
- Laptop + Projector / Computer + Projector / Flipcharts
- Participant Handbook / Copies of Handout
- First Aid Box, Fire Extinguisher

Do

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

8.3.1: What is Emergency?

Ask

- Ask the participants what are the probable emergency situations in rubber Industry.
- Ask the participants what are the implications of different Emergency situations.

Say

Emergency is a sudden or unexpected state of situation, which, if not tackled properly, will lead to loss of property, health or life. In cases where any mitigation is not possible, immediate evacuation is needed.

8.3.2: Emergency Situation in Industry

Explain

There are various emergency situations in industry. Some of them are –

1. Accident Emergency
2. Electric shock Emergency
3. Medical Emergency
4. Natural Disaster Emergency – Flood, Earthquake, Tsunami, etc.
5. Fire Emergency

For first three emergencies we need to give first aid and immediately call Ambulance.

For Natural Disaster we should take shelter at safe place or follow company's emergency procedure.

For Fire Emergencies we will discuss in details. First we will understand about common Injuries in industries and their First Aid.

- When heavy objects such as barrels or tools might roll onto or fall on the employee's feet;
- Working with sharp objects such as nails or spikes that could pierce the soles or uppers of ordinary shoes;
- Exposure to molten metal that might splash on feet or legs
- Working on or around hot, wet or slippery surfaces; and
- Working when electrical hazards are present.

8.3.3: Common Injuries in Industry and How to Deal with them

Explain

Abrasions and small cuts

Clean wound with soap and water. Apply antibiotic cream or Providone-iodine solution. Bandage and check dressing daily. See your doctor if there are signs of infection: increased redness, pus or red lines running from wound.



Fig. 8.3.1. Abrasions

Splinters

Remove with sharp, pointed tweezers. (They should be sharp enough to pick up a single hair.) If splinter is completely under the skin, expose splinter end with sewing needle doused in alcohol, and then remove with tweezers.



Fig. 8.3.2. Splinters

Lacerations

Clean wound with soap and water. Assess damage: If laceration is gaping or more than 1/4 in deep, seek emergency help. Otherwise, apply pressure to stop bleeding. Close wound with butterfly closures or adhesive strips. Check dressing daily.



Fig. 8.3.3. Lacerations

Fractures

Signs include extreme pain, swelling, bruising and an inability to move an adjacent joint. If you have any of these signs, you should be seen by a doctor to see whether you need an X-ray to evaluate for a fracture.



Fig. 8.3.4. Fractures

Amputations

Apply pressure to wounded area with clean bandage. Don't panic. Call for help. Raise wounded area above heart. Wrap amputated appendage in plastic bag. Keep appendage cool, not directly on ice. Sit in a chair near door, and await help.



Fig. 8.3.5. Amputation

Eye injuries

Look in mirror to assess eye. If foreign matter is embedded in the eye, go to the emergency room. If foreign matter is on the surface, flush it with water, or use eye wash and cup. For chemical splashes, flush with running water for five to 10 minutes. If it hurts too much to open your eye, go to the emergency room.



Fig. 8.3.6. Eye injury

Fumes and dust

If you feel dizzy or are having trouble breathing, leave the area, and go to fresh air. If normal breathing doesn't return in 15 minutes, go to the emergency room.



Fig. 8.3.7. Fumes and dust

8.3.4: Basic Things in First Aid Box

Ask



- Ask the participants what first Aid
- Ask the participants what is the importance of First Aid

Explain



Top shelf: An asthma inhaler to counteract allergic reactions to fumes and to exotic-wood dust; sharp scissors for cutting bandages; adhesive tape for bandaging; an elastic bandage for securing dressings.

Middle shelf: Needles for splinter removal are stored in sterile alcohol; splinter tweezers, precise enough to pick up a single hair; 4-in. by 4-in. gauze pads for bandaging; assorted adhesive strips for small boo-boos; clean plastic bag for amputated parts; sterile rolled gauze for bandaging; butterfly bandages for drawing together larger lacerations.

Bottom shelf: Providone-iodine solution for killing germs; eyewash and cup; small mirror for eye inspections; instant ice packs to reduce swelling or for transporting amputated parts to the hospital; latex gloves for eye examinations.



Fig. 8.3.8. First aid box

8.3.5: Handling Fire Emergencies

Elaborate



Fires and explosions can severely damage or destroy premises or plant. Concentrations of small dust particles in the air can form a mixture that will explode if ignited. Often the explosions occur in dust extraction equipment and it is here that special precautions have to be taken. Secondary explosions can also follow the main explosion especially if dust deposits have accumulated in the workroom.

Rubber will also burn readily if ignited. There have been numerous fires started due to either badly maintained motors, electric sparks, or due to open wood burning stoves and cigarettes.

Make sure that all equipment is cleaned and that dust is not allowed to accumulate. Report any defects you see on equipment.

8.3.6: Types of Fire Extinguishers

Explain



Water Fire Extinguisher: It is used to extinguish the fire on wood, paper, cloth etc. It should not be used to extinguish the fire over electrical equipment.

Foam Extinguishers (Foam Extinguishers): It is used to extinguish the fire caused by kerosene, spirit, thinner etc. It also should not be used to extinguish the fire caused on electrical equipment.

Dry Powder Extinguishers (Dry Powder Extinguishers): This is used to extinguish – the fire evolving due to flammable liquids such as petrol, diesel etc.

Carbon di oxide Fire Extinguisher: Carbon dioxide evolves from this fire extinguisher and it can be used to extinguish fire over electric equipment, liquid gases or fluids.

These fire-extinguishing equipment should be installed at the proper place and it should be inspected, repaired and refilled regularly.





Extinguisher		Type of Fire				
Colour	Type	Solids (wood, paper, cloth, etc)	Flammable Liquids	Flammable Gasses	Electrical Equipment	Cooking Oils & Fats
	Water	✓ Yes	✗ No	✗ No	✗ No	✗ No
	Foam	✓ Yes	✓ Yes	✗ No	✗ No	✓ Yes
	Dry Powder	✓ Yes	✓ Yes	✓ Yes	✓ Yes	✗ No
	Carbon Dioxide (CO ₂)	✗ No	✓ Yes	✗ No	✓ Yes	✓ Yes

Fig. 8.4.9. Fire Extinguisher chart

8.3.7: Class and Type of Fires

Say

Class	Type
A	Wood, Paper, Ordinary Combustibles Extinguish by Cooling and Quenching Using Water or Dry Chemicals
B	Gasoline, Oil, Grease, Other Greasy Liquids Extinguish by Smothering, Cooling or Heat Shielding using carbon Dioxide or Dry Chemicals
C	Electrical Equipment Fires Extinguish with Non-conducting Agents such as Carbon Dioxide or Dry Chemicals. DO NOT USE WATER.
D	Fires in Combustible Metals Extinguish by Using Specialized Extinguishing Powders

Class of Fire and Type of Extinguisher to be used

Class of Fire	Fire Extinguisher Type
B or C	Regular Dry Chemical
A, B, C, or D	Multi-Purpose Dry Chemical
D	Purple K Dry Chemical
B or C	KCL Dry Chemical
D	Dry Powder Special Compound
B or C	Carbon Dioxide (Dry)
B or C	Halogenated Agent (Gas)
A	Water
A	Water With Anti-Freeze
A or B	Water, Loaded Steam Style
B,	Foam

8.3.8: How to Respond in Case of Fire

Explain



When fires do occur, the role of a person is to minimize the damage

- Extinguishing small fires
- Assisting in evacuations
- Notifying the local fire Brigade promptly
- Extinguishing fires

All fires consist of Heat plus Material plus Oxygen. Eliminating any one of these will eliminate a fire. Different types of fires require different responses to eliminate them. There are three general classifications of fires. Each requires a different type of fire extinguisher.

Class "A" fires involve wood, cloth, vegetable matter, paper, etc. Extinguishers for Class A fires use either water or soda and acid foam. Class "B" fires involve combustible liquids such as oil, solvents, and grease. Extinguishers for Class B fires use CO₂ or foam. Class "C" fires are electrical. Extinguishers for Class C fires use CO₂, which is not a conductor of electricity. Your life can depend on using the correct extinguishing agent and using it correctly.

Elaborate



1. Do not use water on Types B, C or D fires.
2. If it is used on Type B fires it can spread the flames.
3. Water conducts electricity so if it is used on Type C fires it can cause major shock.
4. If it is used on Type D fires it will react violently causing an explosion.

8.3.9: How to Operate a Multipurpose Fire Extinguisher

Explain



Remember **PASS**

P- Pull the pin. In some models you may have to remove a locking pin.

A- Aim. Aim low. Direct the hose or cone to the base of the fire.

S-Squeeze. Squeeze the handle. This will release the contents of the extinguisher.

S-Sweep. Sweep from side to side. Don't lessen the pressure on the handle. Try to keep it constant.



Fig. 8.4.10. Method of operating Fire extinguisher

It is important that you get fire extinguisher training before you have to use one. You don't want to waste valuable time trying to read directions or figure out how to remove a pin in an emergency situation. Other important information, like how far to stand away from a fire, when to move toward it, and how long the extinguisher contents last can only be understood by actually operating one. Make sure your employer and your Safety and Health Rep know that you need this training.

Demonstrate



- Demonstrate First Aid Box and medicines in it.
- Demonstrate First aid for different injuries.
- Demonstrate types of Fires and Fire Extinguisher for dosing each type of Fire.
- Demonstrate how to use a Fire Extinguisher.
- Demonstrate how to read evacuation plan and exit safely from workplace in case of any emergency.

Activity-1

Objective: Demonstration of fire extinguisher use.

Procedure:

- Demonstrate the participants how to use different fire extinguishers on applicable fires.
- Provide the participants different types of fire extinguishers and create fire for demonstration.
- Ask them to demonstrate the use of fire extinguisher on different fires, such as: Class-A, Class-B, Class-C, etc.

Activity Outcome:

- Participant will be able to learn how to use different fire extinguishers in case of any fire incident.
- Facilitator will be able to judge the skill level acquired by the participants.

Activity	Time	Resources
Demonstration of fire extinguisher use	8 Hours	White board & markers, facilitator notes, laptop/ slides + projector, fire extinguishing videos, safety shoes, safety goggle, mask, safety gloves, fire extinguisher, fire source

Table 8.3.1

Activity-2

Objective: Demonstration of first aid activities.

Procedure:

- Demonstrate the participants how to provide general first aid to any person in the need.
- Provide the participants a first aid box.
- Ask them to demonstrate first aid techniques for common injuries, such as: abrasions and small cut, splinters, lacerations, fractures, eye injuries etc.

Activity Outcome:

- Participant will be able to learn how to provide common first aid in case of any accident.
- Facilitator will be able to judge the skill level acquired by the participants.

Activity	Time	Resources
Demonstration of fire extinguisher use	8 Hours	White board & markers, facilitator notes, laptop/ slides + projector, first aid videos, First Aid box.

Table 8.3.2

Excercise



- Q1. Which of these is correct meaning of hazard?**
 a. It is set of good conditions at work place
 b. 'Hazard' is set of conditions, which can be risk to health or life
 c. The condition of no production is called hazard
 d. None of the above
- Q2. Which if these is main hazard of rubber industry?**
 a. Manual handling
 b. Accident by moving or falling object
 c. Rubber and dust fumes
 d. All of the above
- Q3. Which of these is not a type of hazard in rubber industry?**
 a. Chemical hazard
 b. Physical hazard
 c. Communication hazard
 d. Ergonomic hazard
- Q4. Which of these is a way of getting affected by chemicals?**
 a. Inhalation
 b. Ingestion
 c. Absorption
 d. All of the above
- Q5. Which of these is not a reason for Ergonomic hazard?**
 a. Heavy, frequent, or awkward lifting
 b. Awkward grips, postures
 c. Noise
 d. Hand-intensive work
- Q6. Which of these is not part of safety procedure of an organisation?**
 a. Safety equipment to be used in organisation
 b. Maximum leave a employee can take in a month / year
 c. Emergency evacuation plan
 d. Hazards of different processes of organisation
- Q7. Which of these is PPE is used for protection to Eye from flying objects?**
 a. Safety shoes
 b. Safety gloves
 c. Safety goggles
 d. Safety helmet
- Q8. Which of these PPE is used for protection of feet from heavy object falling?**
 a. Safety shoes
 b. Safety gloves
 c. Safety goggles
 d. Safety helmet
- Q9. Which of these should be part of first aid box?**
 a. sharp scissors
 b. adhesive tape
 c. Providone-iodine solution
 d. All of the above
- Q10. Which of these is class A fire :**
 a. Wood, Paper, Ordinary Combustibles
 b. Gasoline, Oil, Grease, Other Greasy Liquids
 c. Equipment fires
 d. Fires in combustible metals

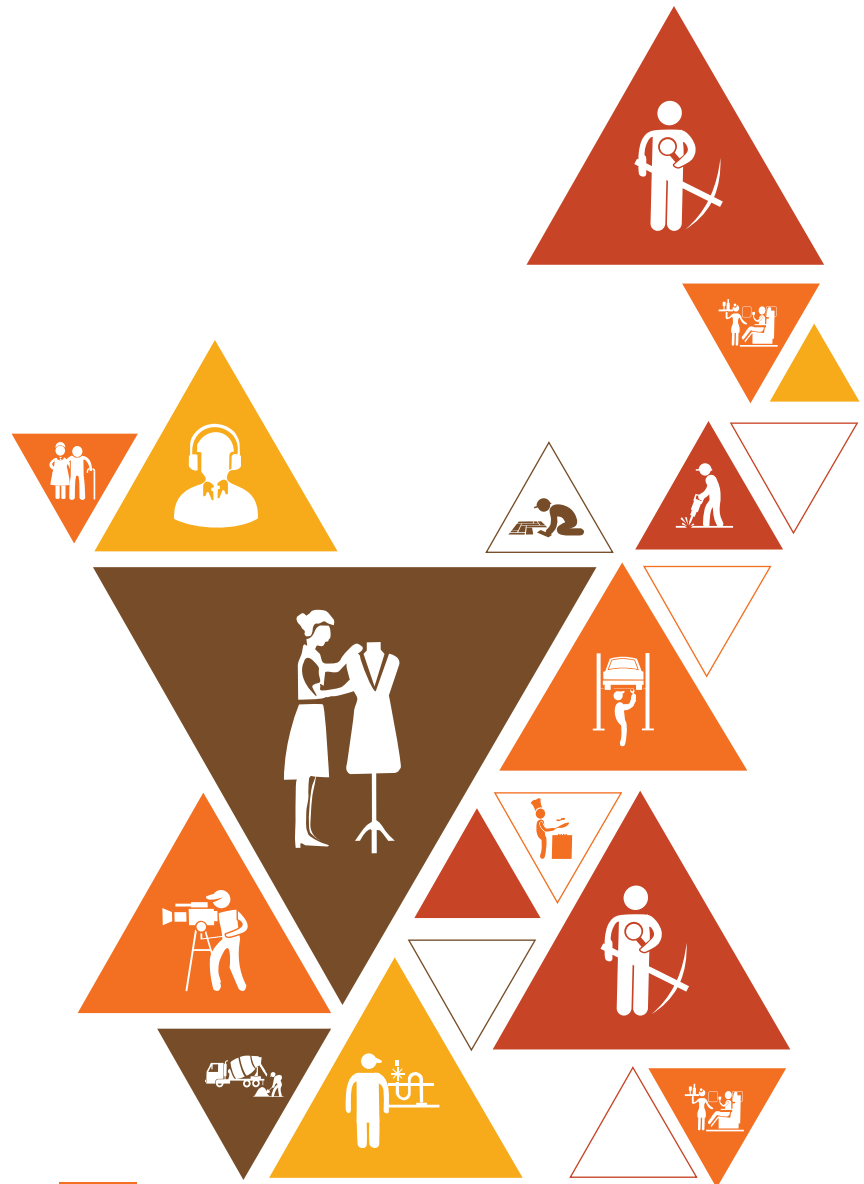
Answers

1. b 2. d 3. c 4. d 5. c 6. b 7.c 8. a 9. d 10. a

Notes



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& ENTREPRENEURSHIP



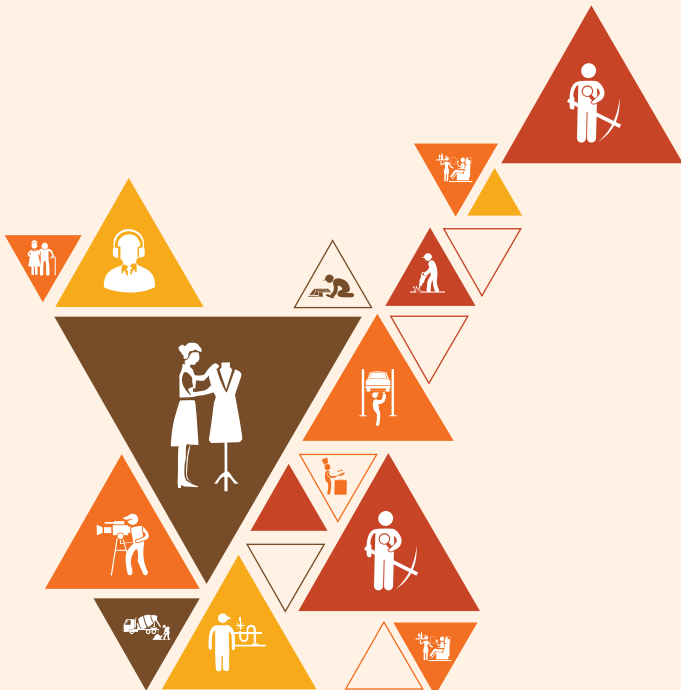
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9. Problem Identification and Escalation

Unit 9.1 – Problem Identification and Escalation to Supervisor



RSC / N5004

Key Learning Outcomes

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

1. Explain what is problem
2. Describe how to identify problem
3. Define hierarchies
4. Discuss hierarchy in rubber industry
5. Explain how to escalate problem
6. Describe need for escalation

Unit 9.1: Problem Identification and Escalation to Supervisor

Unit Objectives

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

1. Explain what is problem
2. Describe how to identify problem
3. Define hierarchies
4. Discuss hierarchy in rubber industry
5. Explain how to escalate problem
6. Describe need for escalation

Resources to be Used

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

Do

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

9.1.1: What is Problem?

Ask

- Ask the participants what situations are called Problem.
- Ask the participants what are the implications if problem not solved.

Say

Any abnormal situation is called problem. Any work condition, which is not as per standard work procedure, can be defined as 'Problem'.



Fig. 9.1.1. Problem

9.1.2: Problem Identification

Explain



For identifying problem, the person should be fully aware of normal situation or work condition. The operator should be vigilant for observing sign of any problem during process. He / She should use following process and activities while looking for problem –

1. The machine is working fine as per specification.
2. All the parameters for machine are available and giving good result during production.
3. Raw material is available for process
4. No abnormality observed in Raw material used for process
5. Parts produced are ok as per specification
6. Space is available for keeping produced parts
7. There is no fire hazard observed during work



Fig. 9.1.2. Identify problem

9.1.3: Hierarchy

Explain



Hierarchy is a reporting structure. It is a framework designed to divide, organize, and coordinate the different activities of an organisation. We can consider reporting structure as a group of people, which have been asked to coordinate with each other through some ground rules to accomplish organisational goals and objectives as shown in following figure:

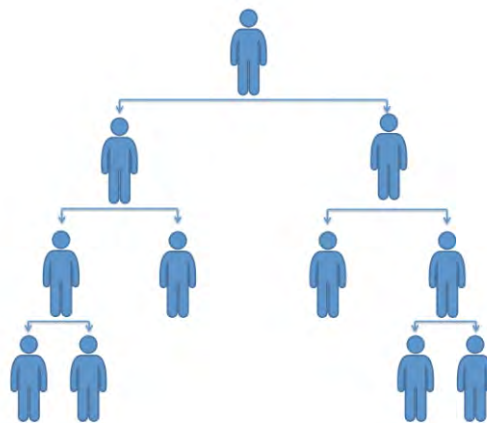


Fig. 9.1.3. Hierarchy

9.1.4: Hierarchy in Rubber Industry

Explain

Every organisation has hierarchy matrix, which decides reporting structure. It helps in smooth flow of information and maintains order in organisation. Without hierarchy, it is very difficult to manage organisation. Example of a Typical Tyre manufacturing organisation hierarchy is below –

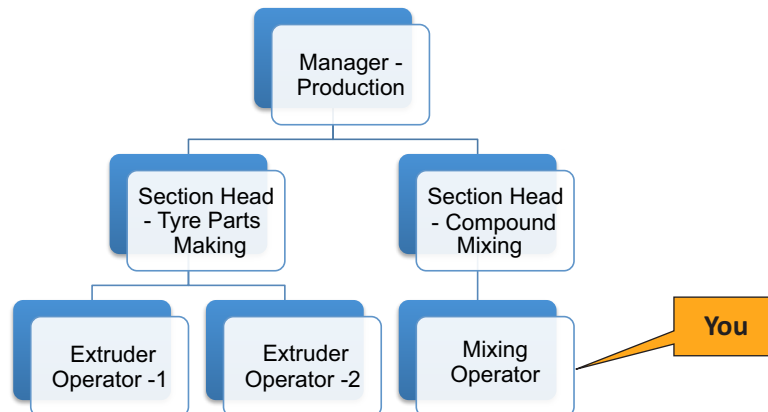


Fig. 9.1.4. Rubber internal mixing section hierarchy

9.1.5: Escalation of Problem

Explain

All the problems should be dealt as per procedure defined. If you think you cannot deal with problem appropriately or there is no procedure defined for dealing with the problem then it should immediately be escalated to your Supervisor for further action. It should be ensured that all such problem should be escalated without any delay. Any delay in escalation may worsen the problem. The escalation can be in any form –

1. Formal – written
2. Informal – verbal / telephonic

9.1.6: Why Escalation?

Explain

Although all employees should do their job as per procedure and work instruction for their particular job role and avoid any conflict or deviation from the procedure, but due to complexity of work there are various matter in organisation, which an employee need to bring in notice of his/ her superior. Due to position and experience superior is in better position of taking decision. If he is not able to take decision then he / she will take this issue to next level up and based on the issue, decision shall be taken at appropriate level.

Excercise



- Q1. Which of these condition is called problem:**
- Normal condition
 - condition not as per defined procedure
 - A & B Both
 - None of the above
- Q2. Which of following is a sign of a problem:**
- The machine is working fine as per specification
 - Raw material is not available for process
 - No abnormality observed in Raw material
 - Parts produced are ok as per specification
- Q3. Which of these is a correct statement for hierarchy?**
- System for quality
 - Attendance system
 - Reporting structure
 - None of the above
- Q4. Which of these is a benefit of hierarchy?**
- Reporting is easy
 - Escalation method is clear
 - Administration is easy
 - All of the above
- Q5. In rubber industry rubber internal mixer operator should report to?**
- Managing director
 - Section head mixing
 - Production manager
 - He can report to anybody in the organisation
- Q6. In simple words - A reporting structure is -**
- A group of people coordinating with each other
 - A group of people not speaking with each other
 - An individual person
 - None of the above
- Q7. Which of these is a correct method of escalation?**
- As per company procedure
 - As per individual's convenience
 - As per direction from colleague
 - All of the above
- Q8. Which of these is not a type of escalation method?**
- Verbal
 - Written
 - simple
 - All of the above
- Q9. Which of these is a benefit of escalation?**
- Timely escalation will reduce any loss from the problem
 - Immediate decision can be taken
 - Containment action can be made for countering problem
 - All of the above
- Q10. No escalation to authorities in case of abnormal condition, can lead to :**
- A potential loss to company
 - An increase in production
 - Timely completion of work
 - All of the above

Answers

1. b 2. b 3. c 4. d 5. b 6. a 7.a 8. c 9. a 10. a



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10. Employability & Entrepreneurship Skills

Unit 10.1 – Personal Strengths & Value Systems

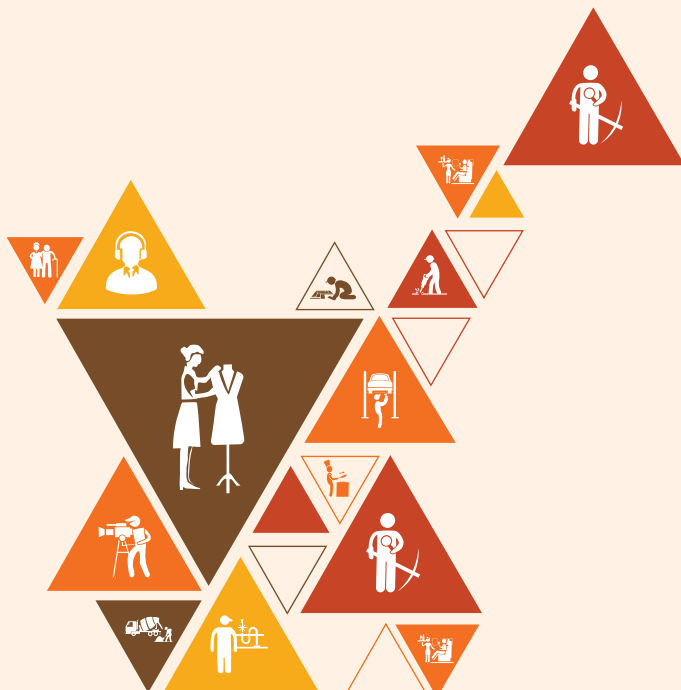
Unit 10.2 – Digital Literacy: A Recap

Unit 10.3 – Money Matters

Unit 10.4 – Preparing for Employment & Self Employment

Unit 10.5 – Understanding Entrepreneurship

Unit 10.6 – Preparing to be an Entrepreneur



Bridge Module

Unit 10.1: Personal Strengths & Value Systems

Key Learning Outcomes



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

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

10.1.1: Health, Habits, Hygiene: What is Health?

Unit Objectives

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

- Explain the meaning of health
- List common health issues
- Discuss tips to prevent common health issues
- Explain the meaning of hygiene
- Discuss the purpose of Swachh Bharat Abhiyan
- Explain the meaning of habit

Resources to be Used

- Participant Handbook

Ask

- What do you understand by the term “Health?”
- According to you, who is a healthy person?

Say

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

Ask

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

Say

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

Role Play

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

Summarize

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

Say 

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

Activity 

- Health Standard Checklist from the Participant Handbook.

Ask 

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

Say 

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

Do 

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

Summarize 

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

Ask **Discuss:**

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

Say 

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

Activity 

- Health Standard Checklist: Hygiene

Say 

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

Do 

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

Ask 

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

Summarize 

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

Ask 

- What is a habit?

Say 

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

Summarize 

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

10.1.2: Safety

Unit Objectives

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

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

Resources to be Used

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

Say

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

Team Activity

Safety Hazards

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

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

Table 10.1.1

Ask

- How could you or your employees get hurt at work?

Say

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

Do

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

Say

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

Do

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

Ask

De-briefing

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

Summarize

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

10.1.3: Self Analysis- Attitude, Achievement Motivation: What is Self Analysis?

Unit Objectives

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

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

Resources to be Used

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

Activity

- This is a paper pencil activity.

What are the three sentences that describe you the best?
What do you need to live happily?
What are your strengths and weaknesses?

Do

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

Say

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

Team Activity

Tower building

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

Do 

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

Ask 

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

Say 

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

Ask 

- Is your attitude positive or negative?

Say 

- Let me tell you a story :

It's Little Things that Make a Big Difference.

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

Ask 

- What did you learn from this story?

Activity **What Motivates You?**

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

Do 

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

Say



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

Summarize



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

10.1.4: Honesty & Work Ethics

Unit Objectives

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

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

Resources to be Used

- Participant Handbook

Ask

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

Say

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

Do

- Divide the class into four groups of maximum six participants depending on the batch size.
- Give one case study to each group.
- Instruct them to read the case carefully.
- Put down the de-brief questions on the board and ask the groups to focus their discussion around these questions.
- The group is expected to analyse and discuss the case amongst them and find a solution to the given problem. Give the class 5-10 minutes to discuss the case and note down their solutions.
- At the end of 10 minutes the team should present their case solution to the class. The presentation can be a narration or a role play.
- Ask the group to select a group leader for their group. The group leader to discuss and assign roles to the group members for the presentation.

Team Activity

Case Study Analysis

Scenario 1

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

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

Scenario 2

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

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

Scenario 3

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

Scenario 4

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

Say

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

Do 

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

Summarize 

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

10.1.5: Creativity and Innovation

Unit Objectives

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

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

Resources to be Used

- Participant Handbook
- Chart papers
- Marker pens

Ask

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

Say

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

A.P.J. Abdul Kalam

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

Water filter/purifier at source

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

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

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

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

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

Solar seeder

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

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

Looms for physically challenged

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

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

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

Ask 

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

Say 

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

Team Activity 

- This is a group activity.

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

Activity De-brief

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

Do 

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

Summarize

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

Notes for Facilitation

- Source for stories on innovations:

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

10.1.6: Time Management

Unit Objectives

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

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

Resources to be Used

- Participant Handbook

Ask

Does this sound like you?

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

Example

- Let's look at these two examples:

Example 1:

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

Example 2:

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

Ask

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

Activity



- Conduct a group discussion based on the above examples.
- Direct the discussion on how to prioritize work and manage time effectively.

Say



- Time management is not only about how hard you work but also about how smart you work.
- Discuss “What is Time Management” with the participants as given in the Participant Handbook.

Ask



- Why is it important to manage time? How does it help?
- What happens when you don't manage your time effectively?
- Do you find it difficult to prioritize your work?

Say



- Discuss the benefits of time management given in the Participant Handbook.
- Let's learn effective time management with the help of an activity.

Activity



Effective Time Management

- This activity has two parts:

PART 1 TO-DO LIST

- You have to make a to-do list.
- List all of the activities/ tasks that you have to do.
- Try to include everything that takes up your time, however unimportant it may be.
- If they are large tasks, break them into action steps, and write this down with the larger task.
- You can make one list for all your tasks or have separate to-do lists for personal and professional tasks.

PART 2 URGENT-IMPORTANT GRID

- You have to make a grid as shown on the board here. .
- This grid has four boxes. As you can see, each box has a different heading.
- At the heart of the urgent-important grid, are these two questions:
 - ♦ Is this task important?
 - ♦ Is this task urgent?
- Now, you have to think about each activity that you have written in your to-do list and put it into one of the four categories.
- **What do these categories depict?**
- **Category 1: Urgent/Important**
 - ♦ This category is for the highest priority tasks. They need to get done now.

- **Category 2: Not Urgent/Important**

- This is where you want to spend most of your time.
- This category allows you to work on something important and have the time to do it properly.
- This will help you produce high quality work in an efficient manner.
- The tasks in this category are probably the most neglected ones, but also the most crucial ones for success.
- The tasks in this category can include strategic thinking, deciding on goals or general direction and planning – all vital parts of running a successful business.

- **Category 3: Urgent/Not Important**

- This is where you are busy but not productive. These tasks are often mistaken to be important, when they're most often busywork.
- Urgent but not important tasks are things that prevent you from achieving your goals.
- However, some may be activities that other people want you to do.

- **Category 4: Not Important and Not Urgent**

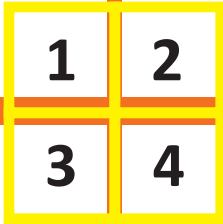
- This category doesn't really include tasks, but rather habits that provide comfort, and a refuge from being disciplined and rigorous with your time management.
- Some may be activities that other people want you to do.
- These might include unplanned leisure activities as well.

TO- DO list format

1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	
11.	
12.	
13.	
14.	
15.	

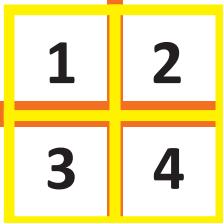
URGENT-IMPORTANT GRID

<p>URGENT/ IMPORTANT</p> <ul style="list-style-type: none"> • Meetings • Last minute demands • Project deadlines • Crisis 	<p>NOT URGENT/ IMPORTANT</p> <ul style="list-style-type: none"> • Planning • Working towards goals • Building relationship • Personal commitments
<ul style="list-style-type: none"> • Interruptions • Phone calls/ E-mails • Other people's minor demands <p>URGENT/ NOT IMPORTANT</p>	<ul style="list-style-type: none"> • Internet surfing • Social media • Watching TV <p>NOT URGENT/ NOT IMPORTANT</p>



URGENT/ IMPORTANT GRID format

<p>URGENT/ IMPORTANT</p>	<p>NOT URGENT/ IMPORTANT</p>
<p>URGENT/ NOT IMPORTANT</p>	<p>NOT URGENT/ NOT IMPORTANT</p>



Do

- Put down the formats for the to-do list and the urgent/important grid on the board.
- Instruct the participants to prepare their to-do list first.
- Give the participants 10 minutes to prepare the list.
- Once done, instruct them to divide the tasks in to-do list into the four categories.
- Explain the four categories to the participants giving examples specific to their context.
- As you explain the categories fill the grid with the type of tasks.
- Give the participants 40 minutes to fill the grid.
- Then explain how to balance the tasks between the four categories.
- Keep a check on time. Tell the group to wind up quickly if they go beyond the given time limit.

Say

Activity De-brief:

How can we balance tasks between the four categories?

How to manage time through this grid?

- **Category 1: Urgent/Important**
 - ♦ Try to keep as few tasks as possible here, with the aim to eliminate.
 - ♦ If you spend too much of your time in this category, you are working solely as a trouble shooter, and never finding time to work on longer-term plans.
- **Category 2: Not Urgent/Important**
 - ♦ Plan these tasks carefully and efficiently as they are most crucial ones for success.
 - ♦ If necessary, also plan where you will do these tasks, so that you're free from interruptions.
 - ♦ Include strategic thinking, deciding on goals or general direction and planning in your planning process.
- **Category 3: Urgent/Not Important**
 - ♦ Ask yourself whether you can reschedule or delegate them.
 - ♦ A common source of such activities is other people. Sometimes it's appropriate to say "no" to people politely, or to encourage them to solve the problem themselves.
- **Category 4: Not Important and Not Urgent**
 - ♦ You also want to minimize the tasks that you have in this category.
 - ♦ These activities are just a distraction – avoid them if possible.
 - ♦ You can simply ignore or cancel many of them.
 - ♦ Politely say "no" to work assigned by others, if you can, and explain why you cannot do it.
 - ♦ Schedule your leisure activities carefully so that they don't have an impact on other important tasks.
- Discuss the traits of effective time managers and effective time management techniques as given in the Participant Handbook.

Summarize

- Discuss the traits of effective time managers and effective time management techniques as given in the Participant Handbook.

Notes for Facilitation



- Here is a short story. You can conclude the session narrating the story. To make it more interesting you can perform the demonstration described and discuss the short story.
 - ♦ One day an expert in time management was speaking to a group of students. As he stood in front of the group, he pulled out a large wide-mouthed glass jar and set it on the table in front of him. Then he took out a bag of about a dozen rocks and placed them, one at a time, into the jar. When the jar was filled to the top and no more rocks would fit inside, he asked, "Is this jar full?" Everyone in the class said, "Yes." Then he said, "Really?"
 - ♦ He reached under the table and pulled out a bucket of gravel (small stones). He dumped some gravel in and shook the jar causing pieces of gravel to work themselves down into the space between the rocks. Then he asked the group once more, "Is the jar full?" By this time, the class began to understand. "Probably not," one of them answered. "Good!" he replied.
 - ♦ He reached under the table and brought out a bucket of sand. He started dumping the sand in the jar and it went into all of the spaces left between the rocks and the gravel. Once more he asked the question, "Is this jar full?" "No!" the class shouted. Once again he said, "Good." Then he grabbed a jug of water and began to pour it in until the jar was filled to the brim. Then he looked at the class and asked, "What is the point of this illustration?" "One student raised his hand and said, "No matter how full your schedule is, if you try really hard you can always fit some more things in it!" "No," the speaker replied, "that's not the point. The truth this illustration teaches us is: If you don't put the big rocks in first, you'll never get them in at all." What are the 'big rocks' in your life? Your children; your loved ones; your education; your dreams; a worthy cause; teaching or mentoring others; doing things that you love; time for yourself; your health; your mate (or significant other). Remember to put these BIG ROCKS in first or you'll never get them in at all. If you sweat about the little stuff (the gravel, sand, and water) then you'll fill your life with little things you worry about that don't really matter, and you'll never have the time you need to spend on the big, important stuff (the big rocks).
- End the story with these lines...

So, tonight, or in the morning tomorrow, when you are reflecting on this short story, ask yourself this question: What are the 'big rocks' in my life? Then, put those in your jar first

10.1.7: Anger Management

Unit Objectives

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

- Discuss the importance of anger management
- Describe anger management strategies
- Discuss tips for anger management

Resources to be Used

- Participant Handbook

Ask

- What is anger? Is anger good or bad?
- Is anger normal or an abnormal behaviour? How can anger harm you?
- Why is it important for entrepreneurs to manage their anger?

Say

- Talk about anger and the importance of anger management in entrepreneurs as discussed in the Participant Handbook.
- Let us do a small activity. This is an individual activity.
- Think of the incidents and situations that angered you and hurt you.

Do

- Instruct them to note down these situations under different categories (as given in the Activity).
- Give the class 3-5 minutes to think and note down their answers.
- At the end of 5 minutes, ask some participants to volunteer and present their answers.
- They can also share these situations with their fellow participants if they do not wish to share it with the entire class.

Activity

- Do you remember any incident which has hurt
 - ♦ you physically
 - ♦ you mentally
 - ♦ your career
 - ♦ your relationships.

Ask

- Do you ever get angry?
- What are the things that make you angry?
- Do you remember any incident where your anger management helped you in maintaining healthy relationship?
- Do you remember any incident where someone lost business/ friend/ relationship due to temper (anger)?

Say

- There are a few strategies which can help in controlling your anger. Let's do an activity to understand the anger management process better.
- This is an individual activity.
- Think of the incidents/ situations which trigger your anger (the cause).
- Then think what happened as a result of your anger (the effect).
- You need to come up with some techniques to manage your anger.

Do

- Give the class the anger triggers (the cause) as listed in the activity.
- Put down the activity format (Anger Triggers, Result of your Anger, Anger Management Techniques) on the board and instruct the class to write the answers under different categories.
- Give the class 3-5 minutes to think and note down their answers.
- At the end of 5 minutes, ask the participants who wish to volunteer and present their answers.

Activity

Trigger points and Anger Management Techniques Activity

Anger Triggers

List of triggers that make you angry:
Someone says you did something wrong.
You want something you can't have now.
You get caught doing something you shouldn't have been doing.
You are accused of doing something you didn't do.
You are told that you can't do something.
Someone doesn't agree with you.
Someone doesn't do what you tell him to do.
Someone unexpected happens that messes up your schedule.

Result of your anger:

--

Write the techniques that you use to manage your anger:

Anger Management Techniques

Say

- Now, let's discuss the problems and solution with all.
- The individual will first briefly describe trigger points to the class.
- Then discuss the result of the anger. Other participants are requested to remain quiet while one is making the presentation.
- Post presentation, other participants may ask questions.

Do

- Congratulate each individual for sharing their points.
- Ask the audience to applaud for them.
- Ask de-brief questions after the presentation to the class.
- Keep a check on the time. Ask the participants to wind up the activity quickly if they go beyond the given time limit.

Ask

De-brief questions:

- In the situation described by the presenter, who was at fault?
- How could you have handled this situation alternatively?

Summarize

- Close the discussion by summarizing the strategies and tips of anger management for entrepreneurs.
- Ask the participants what have they learnt from this exercise/ activity.
- Ask if they have any questions related to what they have talked about so far.

Notes for Facilitation

- Encourage the participants to share information about them while presenting the situations to the class.
- Keep the format of the Activity prepared in a chart paper so that it can be displayed during the session.

10.1.8: Stress Management: What is stress?

Unit Objectives

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

- Discuss the causes of stress
- Discuss the symptoms of stress
- Discuss tips for stress management

Resources to be Used

- Participant Handbook

Ask

- You are waiting in the reception for an interview or a very important meeting, suddenly your legs are shaky, your hands are cold, you are feeling nervous. Have you ever been in this kind of situation?
- Have you had days when you had trouble sleeping?
- Have you ever been so worried about something that you ended up with a terrible headache?

Say

- You've probably heard people say, "I'm really stressed out" or "This is making me totally stressed."

Ask

- What do you understand by stress?
- What gives you stress?
- How do you feel when you are stressed or what are the symptoms of stress?
- How can stress harm you?
- Why is it important for entrepreneurs to manage stress?

Say

- When we feel overloaded or unsure of our ability to deal with certain challenges, we feel stressed.
- Discuss about stress, causes of stress, and symptoms of stress as discussed in the Participant Handbook.
- Let's understand the causes of stress and how to deal with them with the help of some case scenarios.
- You will be given some cases.
- You have to analyse the case scenario and then find an appropriate solution to the problem.
- This will be a group activity.

Do

- Divide the class into four groups of 5-6 participants (depending on the batch size).
- Assign one case scenario to each group.
- Instruct them to read the case carefully.
- The group is expected to analyse and discuss the case amongst them and find a solution to the given problem.
- Explain their discussion should result in getting answers for the following questions:

- What was/ were the cause(s) of stress?
 - ♦ Was the stress avoidable or manageable under the given circumstances?
 - ♦ If yes, how do you think that the stress could be avoided (managed)?
 - ♦ If no, then why not?
- Give the class 10-12 minutes to discuss the case and note down their solutions.
- At the end of 12 minutes, the team should present their case solution to the larger group.
- Ask the group to select a group leader for their group.
- The group leader to discuss and assign roles to the group members for the presentation.

Team Activity

Case Study Analysis

Scenario 1

Akash's alarm doesn't go off and he gets late getting out of the house. He hits traffic and ends up 15 minutes late to work, which his boss notices. He gets to his desk and finds he has to complete 2 reports in next one hour. Just when he is about to begin work, a message pops up "Telecon with the client begins in 10 minutes. Please be in the conference room in 5 minutes."

His is not prepared for the call. He is stressed. He does not want to speak to his boss about this. He is stressed, feeling uncomfortable and sick. Not in a position to attend the call or finish the reports on time.

Scenario 2

While paying his overdue bills, Rahul realised that it's the middle of the month and he has only Rs 500 left in his account. He has already asked all of his friends, and family for loans, which he hasn't paid back yet. He is still contemplating over the issue when his phone rings. His sister's birthday is due next week and she has seen a beautiful dress which she wants to buy but cannot tell the parents as it is a bit expensive. She wishes if Rahul could buy the dress for her. Rahul has promised to buy her the dress for her birthday.

Rahul is stressed, does not understand what to do. He is unable to concentrate on his work and unable to complete the tasks assigned. His team leader has already warned him of the delay.

Scenario 3

Sheela calls the cable company as she has unknown charges on her bill. She has to go through the automated voice mail menu three times and still can't get through to a customer care executive. After 15 minutes of repeated efforts, her call is answered. She explains the entire issue to the customer care executive but before the person could suggest a way out, the call drops.

Now Sheela has to call back and repeat the whole process all over again with a new customer care executive. She is very angry and calls again but cannot connect this time.

She has to leave to office so she decides to call from office and check. When she connects this time she is angry and argues with the executive on the call. All her co-workers around are looking at her as her volume has suddenly increased. She bangs the phone and ends the call.

Her co-worker Neelam enquires what has happened to her. She ignores her and just walks off. She has become irritable and her behaviour and tone with other co-workers is not acceptable.

Scenario 4

Arpit is a young entrepreneur who started doing business through Facebook few weeks back. He had always been into a job. Although Arpit has very few financial liabilities, it wasn't an easy decision to leave a comfortable job at once and look for newer pastures. Arpit's boss warned him of the consequences and the challenges of starting a business when nobody ever in his family had been in business.

He has not been able to get a good deal till now. This is an important life shift for him which comes with unknown variables. Arpit is nervous and is wondering if he has what it takes to fulfill the requirement of his new role, or the new experiences he's likely to face.

Ask**De-brief questions:**

- What was/ were the cause(s) of stress?
- Was the stress avoidable or manageable under the given circumstances?
- If yes, how do you think that the stress could be avoided (managed)?
- If no, then why not?

Say

- Now, let's discuss the problem and solution with the larger group.
- The group will first briefly describe the case to the class.
- Then discuss the issue identified and the proposed solution.
- Post presentation, the other groups may ask questions to the group that has presented.

Do

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

Say

- While it is common and normal to feel some tension. This feeling nervous and tensed can interfere with your thinking process and can have a negative impact on your performance.
- Stress can deplete the most vibrant of souls. It can have a negative effect on every aspect of a person's life including their health, emotional well-being, relationships, and career. However, one needs to understand the causes and types of stress before looking for ways to manage it.

De-brief:**Scenario 1**

The cause of stress was lack of time management and the habit of procrastinating. If Akash would have managed his time well, planned alternate ways to get up on time, finished prior tasks on time and planned for client meetings in advance then he wouldn't have faced stress.

Scenario 2

The cause of stress was lack of financial planning. Rahul should have planned his financial resources well in advance and saved some money for the rainy day. Also, differentiating between needs and wants and keeping a check on non-essential expenditure would have saved Rahul from this situation.

Scenario 3

Sometimes, stress is caused due to external factors instead of internal ones. In this case, the stress was unavoidable because we have no control over this customer care system. Every time, you will get in touch with a new executive and will have to explain all over again. This might cause stress but despite being frustrated and angry there is little that we can do about it. All Sheela could do was to find ways to calm herself down through some breathing exercises and meditation, reading some good book or listening to music and then start afresh.

Scenario 4

A positive, major life change can be a source of good stress. Regardless of how good the change is, it can be stressful. Stress caused by a positive and major life change can be beneficial because it causes a person to step out of their comfort zone and learn new skills. Here, Arpit may become a successful entrepreneur or learn new ways to do things differently.

Now let us see this scenario, can I have a volunteer to read out this case to the class.

Do 

- Ask one of the participant who can volunteer and read out this scenario to the class.

Scenario 5

Rakesh lives in Kathmandu with his wife and two beautiful daughters Sarah and Sanya. Nepal was hit by a massive earthquake and Rakesh's building collapsed during the earthquake. During evacuation, Rakesh realised that though his wife and Sarah were fine and suffered only minor bruises, Sanya was nowhere in the scene. Panic stricken, he started calling her name and searching her frantically. A little later, he heard a meek voice from beneath the debris. He quickly removed the rubble to find a huge bed. Rakesh was pretty sure that Sanya was trapped underneath. Though he was badly bruised, he gathered all his courage and with all his might, he lifted the several-ton bed to save Sanya's life. Everyone was relieved to see Sanya alive and also extremely surprised to see this father's ability to access superhuman strength.

- Ask the audience to applaud for the participant after the scenario is read completely.
- Discuss the scenario, ask de-brief questions:
 - ♦ What kind of stress was Rakesh undergoing in this case?
 - ♦ Was the stress avoidable or manageable under the given circumstances?
 - ♦ What was the result of the stress?

Say **De-brief:**

- Not all stress is harmful; good stress is actually energizing. This was a case of lifesaving stress, or hero stress, which is an important example of good stress. You may have heard stories in which a person performs an impossible feat of physical strength in order to save their life or the life of someone they love. This type of stress causing a surge of adrenaline is good for us.

Summarize



- Close the discussion by summarizing the tips to manage stress as given in the Participant Handbook.
- Ask the participants what they have learnt from this exercise/ activity.
- Ask if they have any questions related to what they have talked about so far.

Notes for Facilitation



- Keep printed copies of the activities/ scenarios ready for the session.
- Put down the de-brief questions on a flip chart so that it can be displayed in the class during the activity.
- Encourage participation and make the discussions interactive.

Notes



Unit 10.2: Digital Literacy: A Recap

Key Learning Outcomes



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

1. Identify the basic parts of a computer
2. Identify the basic parts of a keyboard
3. Recall basic computer terminology
4. Recall the functions of basic computer keys
5. Discuss the main applications of MS Office
6. Discuss the benefits of Microsoft Outlook
7. Identify different types of e-commerce
8. List the benefits of e-commerce for retailers and customers
9. Discuss Digital India campaign will help boost e-commerce in India
10. Describe how you will sell a product or service on an e-commerce platform

10.2.1: Computer and Internet Basics: Basic Parts of a Computer

Unit Objectives

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

- Identify the basic parts of a computer
- Identify the basic parts of a keyboard
- Recall basic computer terminology
- Recall the functions of basic computer keys

Resources to be Used

- Participant Handbook
- Computer Systems with the required applications

Say

- Let's take a quick recap of the basic computer parts.
- Discuss 'Basic Parts of Computer' and 'Basic Parts of a Keyboard' with the class as given in the Participant Handbook.

Explain

- Explain all the parts of the computer and the keyboard by demonstrating on the real system.

Ask

- Do you know about internet?
- Have you ever used internet?
- Why do you think internet is useful?
- What was the last task you performed on internet?

Say

- Let's look at some basic internet terms.
- Discuss 'Basic Internet Terms' with the participants as given in the Participant Handbook.

Summarize

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

Practical

- Conduct a practical session.
- Ask the participants to assemble in the computer lab.
- Give some hands on practice exercises.

Do

- Group the participants for the activity depending on the batch size and the number of computer systems available in the lab.
- Explain the purpose and duration of the activity.
- Ensure the participants complete the practical exercises assigned.

10.2.2: MS Office and Email: About MS Office

Unit Objectives

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

- Discuss the main applications of MS Office
- Discuss the benefits of Microsoft Outlook

Resources to be Used

- Participant Handbook
- Computer Systems with MS Office

Ask

- What is the most frequent activity that you do on the computer?
- Do you know how to make presentations on the computer?

Say

- Give a brief introduction of MS Office as given in the Participant Handbook.
- Discuss the most popular office products. Explain in brief their application, benefits and working.
- **Microsoft Word** is a word processing program that allows for the creation of documents. The program is equipped with templates for quick formatting. There are also features that allow you to add graphics, tables, etc.
- **Microsoft Excel** is a tool for accounting and managing large sets of data. It can also simplify analysing data. It is also used to create charts based from data, and perform complex calculations. A Cell is an individual data box which will have a corresponding Column and Row heading. This gives the cell a name, referred to as the Cell Reference. There can be multiple pages in each workbook. Each page, or sheet, is called a Worksheet. When you open a new Excel file, it automatically starts you with three worksheets, but you can add more.

Explain

- Explain the working and frequently used features of Office on a real system.

Ask

- What do you know about e-mails?
- Do you have an email id?
- How often do you check your e-mails?

Say

- Communication is vital for every business. The fastest and the safest way to communicate these days are through emails. MS Outlook helps to manage your emails in a better way and also offers a host of other benefits.
- Discuss “Why Choose Microsoft Outlook?” with the participants as given in the Participant Handbook.

Do 

- Ask the participants to assemble in the computer lab.
- Explain the working of Outlook on a real system..

Demonstrate 

- Demonstrate how to create email id.
- Demonstrate how to write new mails, send mails.
- Demonstrate how to use MS Office application to create a letter and send it as attachment in an email.
- Demonstrate how to use other MS Office applications.

Practical 

- Give some hands on practice exercises
- Group the participants for the activity depending on the batch size and the number of computer systems available in the lab.
- Explain the purpose and duration of the activity.

Summarize 

- Ask the participants what they have learnt from this exercise/ activity.
- Ask if they have any questions related to what they have talked about so far.

10.2.3: E-Commerce

Unit Objectives

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

- Identify different types of e-commerce
- List the benefits of e-commerce for retailers and customers
- Discuss Digital India campaign will help boost e-commerce in India
- Describe how you will sell a product or service on an e-commerce platform

Resources to be Used

- Computer System with internet connection
- Participant Handbook

Ask

- How many of you have done shopping online?
- Can you name at least five shopping websites?
- What is the product that you most frequently buy online?
- Why do you do shopping online instead of going to the market?

Say

- Give a brief introduction of “What is E-commerce”. Refer to the Participant Handbook.
- E-commerce emerged in the early 1990s, and its use has increased at a rapid rate. Today, many companies sell their products online. Everything from food, clothes, entertainment, furniture and many other items can be purchased online.

Ask

- What other types of transactions have you performed on the internet other than buying products?

Say

- Give examples of e-commerce activities from Participant Handbook.

Team Activity

E-commerce examples

- Instruct the participants to list some of the payment gateways that they have used for e-commerce activities.
- Give them 5 minutes to make this list.
- Discuss payment gateways and transaction through payment gateways.
- Conclude the discussion by mentioning how important e-commerce has become in our day to day transactions.

Say

- E-commerce activities can be classified based on the types of participants in the transaction.
- Discuss “Types of E-commerce” from the Participant Handbook.

Do

- Discuss all types of E-commerce by giving examples and names of some popular websites which use them.
- Make the discussion interactive by asking the class to share some popular e-commerce sites of each type.

Say

- E-commerce activities bring a host of benefits for both, retailers and customers.
- Discuss benefits of E-commerce from the Participant Handbook.

Explain

- The majority of the population that uses E-commerce activities lives in tier-1 and tier-2 cities. To encourage the use of digital money in tier-3 and 4 areas, PM Mr. Modi launched the “Digital India Campaign”.
- Discuss “Digital India Campaign” from the Participant Handbook.
- By Digital India project the government will deliver services via mobile connectivity and in doing so, is expected to bring the internet and broadband to remote corners of the country. This connectivity will in turn enhance e-commerce activities also. Furthermore, the Indian Government is also modernizing India Post and aims to develop it as a distribution channel for e-commerce related services.

Say

- Now let us discuss how to sell a product using E-commerce.
- Every product has to be sold on a platform on the internet. Think of it as a shop that you have to sell your product. Now this shop can be your own or shared or rented. If the shop is your own or rented there will be only your products in that shop. If the shop is shared, there will be products of multiple sellers in that shop. A common example is a departmental store which has products from multiple brands in the shop.
- Similarly, in E-commerce the shop is the website where your products are displayed. If it is your own website it will exclusively showcase your products. In this case the cost that you will incur will be:
 - Developing the website
 - Hosting the website
 - Maintenance of the website
- If you rent a website it will also showcase your own products but the development, hosting and maintenance parts goes to the owner. This saves time and the cost to manage these activities.
- Smaller companies usually go for renting a website and the bigger ones develop their own website.
- The concept of shared platforms has become very popular in recent times. In this platform the sellers have to register and then they can sell their goods on a common platform. Among the most popular of these are Amazon, Myntra, Flipkart, etc.

Role Play

- Tell the participants to choose a product or service that they want to sell online.
- Tell them to write a brief note explaining how they will use existing e-commerce platforms, or create a new e-commerce platform to sell their product or service.

Ask 

- How much money are you carrying in your wallet?
- Do you have a credit/debit card?
- How do you make payments while doing online shopping?

Say 

- Demonetization has made carrying cash in the wallet very difficult. People either shop through cards or some other form of digital money.
- So what do you think is digital money?
- In this form the money is both paid and received digitally. There is no hard cash involved. It is an instant and convenient way to make payments.
- There are various types of digital payments. Let us discuss some of them in brief here.
- The first one is the most commonly used system i.e. the cards. Debit card, credit card, prepaid card, all fall under this category.
- Then is the e-wallet or the mobile wallet. This has become the most used form of digital money after demonetization. Examples are Paytm, state bank buddy, Freecharge, etc.
- Many other forms of digital money are also coming up in market like mobile apps, Aadhar card based payment, etc.

Do 

- Demonstrate how to make and receive payments through digital models like Paytm and state bank buddy.

Ask 

- Why do you think people have started using digital money instead of hard cash? Is demonetization the only reason?

Say 

- Digital money gives a lot of advantages over the conventional hard cash. Some of them are:
 - ♦ Digital payments are easy and convenient. You do not need to take loads of cash with you, a mobile phone or a card will suffice.
 - ♦ With digital payment modes, you can pay from anywhere anytime.
 - ♦ Digital payments have less risk.

Summarize 

- Ask the participants what they have learnt from this exercise/ activity.
- Ask if they have any questions related to what they have talked about so far.
- Close the discussion by summarizing the importance of e-commerce and digital money.

Unit 10.3: Money Matters

Key Learning Outcomes

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

1. Discuss the importance of saving money
2. Discuss the benefits of saving money
3. Discuss the main types of bank accounts
4. Describe the process of opening a bank account
5. Differentiate between fixed and variable costs
6. Describe the main types of investment options
7. Describe the different types of insurance products
8. Describe the different types of taxes
9. Discuss the uses of online banking
10. Discuss the main types of electronic funds transfer

10.3.1: Personal Finance – Why to Save?

Unit Objectives

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

- Discuss the importance of saving money
- Discuss the benefits of saving money

Resources to be Used

- Participant Handbook

Ask

- How many of you save money?
- Why do you feel the need to save it?
- Do you plan your savings?
- Where do you keep the money you save?
- How do you use the money that you have saved?

Example

- Let's look at these two examples:

Example 1:

Suhani works in a good company and earns Rs.30,000 month. She always saves 5000 per month and keeps it aside as a personal saving. She keeps the money at home and has saved quite a lot. One day her mother has a medical emergency and has to be taken to the hospital. Her family is worried about the amount they have to spend for the treatment. It will cost them atleast 40,000.

Suhani says tells her family not to worry and that she has about 50,000, which she has saved over the months.

Example 2:

Jasmeet works in the same company and earns the same as Suhani. She is very fond of shopping and spends most of her money on buying new clothes. At the end of the month, she is always asking her father for money as her pay is finished.

Ask

- Who do you identify with –Suhani or Jasmeet ?
- How do you think Suhani manages to save money which Jasmeet is unable to do?

Say

- We should always set aside some and save some money from our monthly pay. The future is unpredictable. Saving money not only gives you a sense of financial security but it can be used in case of emergencies.
- Discuss “Importance of Saving” with the participants as given in the Participant Handbook.

Ask

- What are the benefits of saving money?
- What does being financially independent mean to you?

Say

- Discuss “Benefits of Saving” with the participants as given in the Participant Handbook.
- Now let us continue with Suhani's story. Suhani has told her family not to worry and that she has about 50,000, which she has saved over the months. The family is happy about Suhani's decision of saving money, which will be of great help for them now.

Suhani is going to the hospital today to pay the first instalment for the treatment. Suddenly finds only 35,000 in her cash box when she counts and does not remember using it. She has not kept any record and now she is upset.

Ask

- Was it a good decision by Suhani to save a part of her earnings every month?
- Was it a wise decision to keep all her savings as cash in a cash box?
- Could she have managed to save money in a better and more effective manner?
- Do you want to learn how to save money and use it effectively?

Say

- Let's learn personal saving with the help of a group activity.

Team Activity

Personal Finance- Why to save

- This activity has two parts:

PART 1

WAYS TO SAVE MONEY

- You are earning 30,000/- per month. You have recently changed your job and have to move to a metropolitan city. You are now living as a paying guest paying 10,000/- per month. Your other estimated expenditures like travel, food, recreation would be around Rs. 17, 000 per month.
- Make a list of different ways to save money.

PART 2

HOW WILL YOU USE THE MONEY

- After a year how much have you been able to save?
- How will you use the money that you have saved?

Do

- Divide the class into groups of four.
- Instruct the participants to think and prepare a list of the various ways they can save money.
- Give the participants 10 minutes to prepare the list.
- Once done, instruct them to think of how they could use the money they have saved.
- Give the participants 10 minutes to prepare the list.
- Keep a check on time. Tell the group to wind up quickly if they go beyond the given time limit.

Activity De-brief

- What were the different ways you could save money?
- How much money were you able to save?
- How will you use the money you have saved in one year?

Say



- Discuss the importance of personal finance and why it is important to save money.

Summarize



You can summarize the session by discussing:

- The importance of saving money.
- Ways to save money.
- How the money saved can be used for different purposes.

10.3.2: Types of Bank Accounts, Opening a Bank Account

Unit Objectives

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

- Discuss the main types of bank accounts
- Describe the process of opening a bank account

Resources to be Used

- Account opening sample forms
- Participant Handbook

Ask

- How many of you save money?
- Where do you keep the money you save?
- How many of you have a bank account?
- What type of account do you have?

Example

- Let's look at the given example:

Reena is in the third year of college but in the evening she gives tuitions for children living in her colony. She earns 15,000/- per month. As her students stay in different parts of the city, she has to walk a lot.

To save time, she decides to buy a second hand scooter for herself. But she has to save money for it. Her class mate advises her to open a recurring deposit account in the bank.

She goes to the bank close to her home. The personal manager gives her some forms to fill. She is confused as she has never done this before. Her elder sister has an account in the same bank. She asks for help from her sister. She goes to the bank the next day with her sister. The personal banker gives her a list of documents that she will need to submit with the form for opening an account. The banker advises her to open a 6 months recurring deposit.

Ask

- Do you try to save money monthly but have to spend it on unforeseen expenditure?
- Have you ever thought of depositing your savings in a bank?

Say

- Before opening a bank account, you need to know the types of accounts we have in India.
- Discuss “Types of Bank Accounts” with the participants as given in the Participant Handbook.

Ask

- Can someone say what are the different types of bank accounts?

Say

- Let's learn about the different types of bank accounts through an activity.

Team Activity

- Divide the class in four groups.
- Label the groups as savings account, current account, recurring account and fixed deposit.
- On a chart paper, ask them to write the key points of their account.

Activity De-brief

- Ask each group to present the key points of their account.

Say

- Now that you know about the four different types of accounts, let's learn how to open a bank account.
- Discuss "Opening a Bank Account" with the participants as given in the Participant Handbook.
- Discuss "Tips" that the participants should keep in mind while opening a bank account as given in the Participant Handbook.

Ask

- What are the main documents required for opening a bank account?
- What are some important points to ask the bank personnel while opening an account?

Say

- Mention officially valid KYC documents (refer to the Participant Handbook)
- Now, let's understand the procedure of opening a bank account through an activity.

Team Activity

Opening a Bank Account

- This activity is done in groups.
- Divide the class in groups of four or six.

PART 1

FILLING A BANK ACCOUNT OPENING FORM

- You have to fill a bank opening form.
- You can refer to the section "Opening a Bank Account" of your Handbook for reference.
- List all the steps that you will be required to fill in the form.
- List the documents that you needs for filling the form.
- Now fill in the form.

Activity De-brief

How did you design the form?

- What all details did you fill in the form?
- What were your KYC documents?
- How would this activity help you in future?

Do 

- Instruct the participants to read the section "Opening a Bank Account" of the Participant Handbook.
- Give each group one sample account opening form.
- Give the participants 5 minutes to read the form.
- Give them 15 minutes to fill it.
- Assist them by explaining each category and how to fill it.
- Keep a check on time.
- Tell the group to wind up quickly if they go beyond the given time limit.

Summarize 

Note:

- You can summarize the unit through a role play.
 - ♦ A person wanting to open an account in the bank.
 - ♦ What is the procedure that he will go through?
 - ♦ Discuss the key points of different types of bank accounts.
 - ♦ How to select the type of account
 - ♦ How to fill the account opening form.
- A sample account opening form is given in the following page for reference. Use it for the activity in the class.

Sample Bank Account Opening form.

Photograph

XXX Bank

SAVING BANK ACCOUNT OPENING FORM

Account No.: _____ Date: _____

Name of the Branch		
Village/Town		
Sub District / Block Name		
District		
State		
SSA Code / Ward No.		
Village Code / Town Code		Name of Village / Town

Applicant Details:

Full Name	Mr./Mrs./Ms.	First	Middle	Last Name
Marital Status				
Name of Spouse/Father				
Name of Mother				
Address				
Pin Code				
Tel No. Mobile				Date of Birth
Aadhaar No.				Pan No.
MNREGA Job Card No.				
Occupation/Profession				
Annual Income				
No. of Dependents				

Detail of Assets	Owning House : Y/N	Owning Farm :
	Y/N	
	No. of Animals :	Any other :
Existing Bank A/c. of family members / household	Y / N	If yes, No. of A/cs. _____
Kisan Credit Card	Whether Eligible	Y / N

I request you to issue me a **Rupay Card**.

I also understand that I am eligible for an Overdraft after satisfactory operation of my account after 6 months of opening my account for meeting my emergency/ family needs subject to the condition that only one member from the household will be eligible for overdraft facility. I shall abide by the terms and conditions stipulated by the Bank in this regard.

Declaration:

I hereby apply for opening of a Bank Account. I declare that the information provided by me in this application form is true and correct. The terms and conditions applicable have been read over and explained to me and have understood the same. I shall abide by all the terms and conditions as may be in force from time to time. I declare that I have not availed any Overdraft or Credit facility from any other bank.

Place:

Date:

Signature / LTI of Applicant

Nomination:

I want to nominate as under				
Name of Nominee	Relationship	Age	Date of Birth in case of minor	Person authorised in case to receive the amount of deposit on behalf of the nominee in the event of my /minor(s) death.

Place:

Date:

Signature / LTI of Applicant

Witness(es)*

1. _____

2. _____

*Witness is requires only for thumb impression and not for signature

10.3.3: Costs: Fixed vs. Variables: What are Fixed and Variable Costs?

Unit Objectives

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

- Differentiate between fixed and variable costs

Resources to be Used

- Participant Handbook
- Blank sheets of paper
- Pens

Ask

- What is cost?
- Will a telephone bill fall under the category of a fixed or variable cost?

Say

- Discuss: Fixed and Variable cost with examples. Let us do a small activity.

Team Activity

Identify the type of cost

1. Rent
2. Telephone bill
3. Electricity bill
4. Machinery
5. Insurance
6. Office supplies/ Raw materials
7. Employee salaries
8. Commission percentage given to sales person for every unit sold
9. Credit card fees
10. Vendor bills

Do

- Divide the class into two groups. Read out the list of costs given in the activity.
- Read out each item from the cost list and ask the groups in turns to identify whether it is a fixed or variable cost.

Summarize

- Note: You can summarize the unit either by having a role play between a consultant and a budding entrepreneur explaining the differences between fixed and variable costs or by discussing the key points of the unit.

Notes for Facilitation

- Answers for the activity - Identify the type of cost
- | | |
|--|------------|
| 1. Rent | (Fixed) |
| 2. Telephone bill | (Fixed) |
| 3. Electricity bill | (Fixed) |
| 4. Machinery | (Fixed) |
| 5. Insurance | (Fixed) |
| 6. Office supplies/Raw materials | (Variable) |
| 7. Employee salaries | (Fixed) |
| 8. Commission percentage given to sales person for every unit sold | (Variable) |
| 9. Credit card fees | (Variable) |
| 10. Vendor bills | (Variable) |

10.3.4: Investments, Insurance and Taxes

Unit Objectives

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

- Describe the main types of investment options
- Describe the different types of insurance products
- Describe the different types of taxes

Resources to be Used

- Participant Handbook

Ask

- Ask the participants- “What do you see first thing in when you get your mobile bill? Apart from the amount and due date do you have a look at the taxes you are being billed for?”
- Why do you think people get their cars insured or have a medical insurance?
- You have saved money and want to invest it, how would you decide what is the best investment for your money?

Example

- Let's have a look at a few scenarios.

Ranbir has sold his house and deposited the money in his bank. His Chartered Accountant tells him that he will have to re-invest the money otherwise he will have to pay capital tax. What is capital tax and how is it different from income tax?

Jasmeet and Anup are blessed with a baby girl. They decide to have an insurance policy that will mature when their daughter is ready to higher education.

Shivani is working in a corporate office and getting good pay. She will have to pay income tax so she decides to invest her money in tax saving schemes. She goes to the bank manager to discuss the best products in which she can invest.

Say

- Discuss the Investment, Insurance and Taxes as given in the Participant Handbook.

Ask

- How do investments, insurances and taxes differ from each other?

Say

- Let's learn the differences between the three by having an activity.

Say

- We will have a quiz today.

Team Activity

- The activity is a quiz.

Do

- Divide the class into groups of three and give a name to each group
- Explain the rules of the quiz. For each correct answer the group gets 1 mark. If the group is unable to answer the question is rolled over to the next group.
- Explain the purpose and duration of the activity.
- On the blackboard write the names of the groups.
- Ask the questions of the quiz.
- Keep a score for the groups.
- Set guidelines pertaining to discipline and expected tasks.

Summarize

- Summarize the unit by discussing the key points and answering question

Notes for Facilitation

Questions for the quiz

1. What are bonds?
Bonds are instruments used by public and private companies to raise large sums of money.
2. Who issues the bonds?
Private and public companies issue the bonds.
3. Why are bonds issued?
To raise large amount of money as it cannot be borrowed from the bank.
4. Who is the buyer of stocks and equities?
The general public is the buyer.
5. What types of scheme is the Sukanya Samriddhi Scheme?
Small Saving Scheme
6. What is the difference between mutual and hedge funds?
Mutual funds are professionally managed financial instruments that invest the money in different securities on behalf of investors. Hedge funds invest in both financial derivatives and/or publicly traded securities.
7. Why is a loan taken from the bank to purchase real estate?
To lease or sell to make profit on appreciated property price.
8. Name the two types of insurances?
Life Insurance and Non-life or general insurance
9. Which insurance product offers financial protection for 15-20 years?
Term Insurance
10. What is the benefit of taking an endowment policy?
It offers the dual benefit of investment and insurance.
11. Mr. Das gets monthly return on one of his insurance policies. Name the policy?
Money Back Life Insurance

12. What are the two benefits of a Whole Life Insurance?

It offers the dual benefit of investment and insurance

13. Which policy covers loss or damage of goods during transit?

Marine Insurance

14. After what duration is the income tax levied?

One financial year

15. What is long term capital gain tax?

It is the tax payable for investments held for more than 36 months.

16. Name the tax that is added while buying shares?

Securities Transaction Tax

17. What is the source of corporate tax?

The revenue earned by a company.

18. Name the tax whose amount is decided by the state?

VAT or Value Added Tax

19. You have bought a T.V. What tax will you pay?

Sales Tax

20. What is the difference between custom duty and OCTROI?

Custom duty is the charges payable when importing or purchasing goods from another country. OCTROI is levied on goods that cross borders within India.

10.3.5: Online Banking, NEFT, RTGS, etc.

Unit Objectives

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

- Discuss the uses of online banking
- Discuss the main types of electronic funds transfer

Resources to be Used

- Participant Handbook
- Computer System with internet connection
- Debit card

Ask

- When was the last time you visited a bank?
- How do you pay your bill for electricity and telephone?
- Have you ever tried to transfer money from one bank account to another bank account using the online banking facility?

Say

- Most of us lead a busy life. Time has become more important than money. In this busy schedule no one has time to stand in bank queues. That's where Online Banking comes in. Online banking or internet banking means accessing your bank account and carrying out financial transactions through the internet.
- Discuss "What is online banking?" from the Participant Handbook.
- There are various advantages of online banking:
 - ♦ It saves time, as you need to visit the branch. .
 - ♦ You can conduct your banking transactions safely and securely without leaving the comfort of your home.
 - ♦ Online Banking also gives you round the clock access.
 - ♦ Online Banking makes it possible for you to pay your bills electronically.

Do

- Show them how they can use the internet banking.
- Use the computer system and show the demo videos on how to use internet banking provided on most banking sites. the computer system.
- Tell the class the various features of online banking:
 - ♦ Through their website set-up your online account.
 - ♦ Choose a secure username and password.
 - ♦ Set-up your contact information.
 - ♦ Once your information is verified, you are good to go.
 - ♦ Once you enter the portal explore all the features and learn your way through the portal.
- Discuss about maintaining the security of the online account.

Say



- One of the biggest advantage that online banking offers, as discussed earlier, is transferring money from one account to another. This transaction is called electronic funds transfer. Electronic transfers are processed immediately with the transferred amount being deducted from one account and credited to the other in real time, thus saving time and effort involved in physically transferring a sum of money.
- Discuss “Electronic Funds Transfer” from the Participant Handbook.

Do



- Discuss how to transfer money from one account to another using online banking (NEFT/ RTGS, etc.).
- Illustrate with an example.

Summarize



- Close the discussion by summarizing the about online banking.
- Ask the participants if they have any questions related to what they have talked about so far.

Notes



Unit 10.4: Preparing for Employment & Self Employment

Key Learning Outcomes

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

1. Discuss the steps to follow to prepare for an interview
2. Discuss the steps to create an effective Resume
3. Discuss the most frequently asked interview questions
4. Discuss how to answer the most frequently asked interview questions
5. Identify basic workplace terminology

10.4.1: Interview Preparation: How to Prepare for an Interview?

Unit Objectives

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

- Discuss the steps to follow to prepare for an interview

Resources to be Used

- Participant Handbook

Ask

- Have you ever attended an interview?
- How did you prepare before going for an interview?

Say

- An interview is a conversation between two or more people (the interviewer(s) and interviewee) where questions are asked by the interviewer to obtain information from the interviewee.
- It provides the employer with an opportunity to gather sufficient information about a candidate and help them select the ideal candidate.
- It also provides the interviewee with an opportunity to present their true potential to the employer, build confidence and help make a decision about the job by asking questions regarding designation, salary, perks, benefits, promotions, transfers, etc.
- Let's do an activity to understand how to prepare for interviews better.

Activity 1

- Introducing Yourself

Do

- Select a participant and ask him/her to answer the following questions: "What can you tell me about yourself?"
- Give the participant at least one minute to speak.
- Once he/she is done, ask the rest of the participant what they gathered about the participant who was providing information.
- Now repeat the exercise with five other participants.

Ask

- What information you should include when you are describing or introducing yourself in an interview?
- What information you should not include when you are describing or introducing yourself in an interview?

Say

- Tell the participants that when an interviewer asks you to say something about yourself, he/she is not asking you to present your life history.
- Introduction should be short and crisp, and should present you in a positive light. It should include the following points:
 - ♦ Any work experience that you might have
 - ♦ A brief summary of your educational qualifications
 - ♦ Your strengths and achievements
 - ♦ Any special projects that you might have been part of
- The following topics should be avoided during an introduction:
 - ♦ Detailed description of your family (unless you are specifically asked to do so)
 - ♦ Too much information about your weaknesses
 - ♦ Information that is not true

Do

- Congratulate each participant for sharing their points.
- Ask the audience to applaud for them.
- Ask de-brief questions to cull out the information from each group.
- Keep a check on time.

Activity 2

- Planning the right attire

Do

- Describe 2 individuals to the participants. One is wearing a casual t-shirt, jeans, and slippers. He has not combed his hair and neither has he trimmed or shaved his beard. The other individual is dressed formally with a shirt and pant, and is well-groomed. He has also worn formal shoes and a belt. Ask the participants which person would they prefer to hire in their organization and why?

Summarize

- Close the discussion by discussing 'how to prepare for an interview' as discussed in the Participant Handbook.
- You can add the following points to it:
 - ♦ Tell the participants to create a positive and good impression in an interview. It is important for them to prepare for an interview beforehand.
 - ♦ The interviewer analyses not only your technical knowledge in relation to the job, but also whether or not you are a fit for the organization.
 - ♦ Every employer looks at the whole package and not just one or two things in isolation. Therefore, the way you dress and the way you present yourself is also important along with your skills and talents.
 - ♦ The participants will get only one chance to create a good first impression.

10.4.2: Preparing an Effective Resume: How to Create an Effective R

Unit Objectives

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

- Discuss the steps to create an effective Resume

Resources to be Used

- Participant Handbook
- Blank papers
- Pens

Ask

- When preparing for an interview, what are the most important things that you need to do?
- What documents do you carry with you, when you go for an interview?
- What is a resume?
- Why do you need a resume?

Say

- Resume is not just a sheet of paper with your qualifications printed on it.
- It is a selling tool that will help the employer to see how and what you can contribute for company.
- Talk about the steps involved in creating an effective/attractive resumes discussed in the Participant Handbook.
- Now let's prepare a resume to understand the process in a better way.

Do

- This is an individual activity.
- Give the details of the activity.
- Instruct them to read the activity carefully.
- The participant is expected to make an attractive resume based on the information provided.
- Give the class 25-30 minutes to study the case and create a resume.
- At the end of 30 minutes, the participants should exchange the resume with the person sitting next to him or her.
- Every participant will evaluate the resume prepared with their fellow participants.

Say

- Do you think the candidate should apply for the job posting described in the advertisement?
- We have already discussed the steps involved in creating an effective/attractive resumes.
- Now let's prepare a resume for the candidate details given in the activity.

Activity

Case Study Analysis

- In the first section of the activity, you are being given the information about a candidate who is applying for a particular job.
- In the second section, you are being given the detailed description of the job posting. Create a resume for the candidate to apply for the job posting.
- Use the information that has been provided about the candidate to create this resume.

Candidate Details

Nipesh Singla was born on 20th April, 1988 in Chandigarh, India. He currently resides at 1XX7, Sector XX D, Chandigarh –160018. His mobile number is 988XXXXX01, and e-mail address is nxxxxxxxla@gmail.com. Nipesh attended middle and senior school at Government Boys Senior Secondary School, Sector 15, Chandigarh. He has been a very talented boy since school. He was fond of painting and watching old Hindi movies. As part of a school charity program, he volunteered at the children's hospital during his senior years.

In July 2007, he joined Westwood School of Hotel Management, Zirakpur to pursue a diploma course in Hotel Management and Catering. After completing this course, he joined XYZ Group of Hotels as a Housekeeping intern in June 2010 for six months. In this role, he was responsible for cleanliness and maintenance of one floor in the hotel. Taking advantage of his strong interpersonal skills, he also got opportunities to make housekeeping arrangements for corporate meetings. While pursuing education, he gained working knowledge of Microsoft Word, Excel, Access and PowerPoint.

Nipesh is detail-oriented, flexible and adaptable. He has successfully worked with a diverse work force. He gelled well with his peers, both in college and during his internship. After completing the internship, his objective has been to find a job opportunity where he can use his skills and experience. Backed by experience, he is confident about his skills as housekeeping assistant.

Job Posting

* Do you see yourself as a HOUSEKEEPING SUPERVISOR?

What's your passion? Whether you're into cricket, reading or hiking, at IHG we are interested in YOU. At IHG, we employ people who apply the same amount of care and passion to their jobs as they do in their hobbies - people who put our guests at the heart of everything they do. And we're looking for more people like this to join our friendly and professional team.

THE LOCATION:

At the moment, we are looking for HOUSEKEEPING SUPERVISOR to join our youthful and dynamic team at Holiday Inn Amritsar, Ranjit Avenue in Amritsar, Punjab (India). Holiday Inn Amritsar is ideally located in Amritsar's commercial district on Ranjit Avenue with the world famous Golden Temple located only a short distance away. Sparkling chandeliers mark an incomparable arrival experience as you escape to the welcoming environment that is, Holiday Inn Amritsar. The fresh international brand to celebrate and explore Amritsar.

Salary: Negotiable

Industry: Travel / Hotels / Restaurants / Airlines / Railways

Functional Area: Hotels, Restaurants

Role Category: Housekeeping

Role: Housekeeping Executive/Assistant.

Desired Candidate Profile

Friendly, pleasant personality, Service - oriented.

You should ideally be Graduate/ Diploma holder in HM and at least 2 years of experience as a supervisor in good brand with good communication skills, English is a must.

In return we'll give you a competitive financial and benefits package. Hotel discounts worldwide are available as well as access to wide variety of discount schemes and the chance to work with a great team of people. Most importantly, we'll give you the room to be yourself.

*Please get in touch and tell us how you could bring your individual skills to IHG.

Education-

UG: Any Graduate/ Diploma holder

PG: Post Graduation Not Required

Say

- Now, let's share the resume with the fellow participant sitting next to you and evaluate each other's effort.

Do

- Congratulate each participant for making their first attempt towards creating an effective resume.
- As a follow up activity, you can suggest them to prepare their own resume and show it to you the next day.

Summarize

- Close the discussion by showing some effective resume samples to the candidates.
- Ask the participants what they have learnt from this activity.
- Ask if they have any questions related to what they have talked about so far.

Notes for Facilitation

- Keep printed copies of the activity ready for the session.
- Put down the suggested format of the resume on the board while explaining the steps in preparing a resume.
- Do check the participants' resume and suggest necessary changes.
- Suggested example for the case presented:

Nipesh Singla

#1XX7, Sector XX-D

Chandigarh-160018

Mobile No: 91-988XXXXX01

E-mail: nxxxxxxxxla@gmail.com

Objective: Seeking an opportunity to use my interpersonal skills and experience to contribute to your company's growth, profitability and objectives.

Professional strengths:

- Proficient in housekeeping
- Experienced in and capable of working with a diverse work force
- Team player and friendly in nature
- Successful working in a multi-cultural environment

- Detail oriented, flexible, and adaptable
- Knowledge of Microsoft Word, Excel, Access and PowerPoint

Educational background:

- Diploma in Hotel Management and Catering, Westwood School of Hotel Management, Zirakpur
- High School, Government Boys Senior Secondary School, Sector 15, Chandigarh

Professional internships:

- Housekeeping Intern, XYZ Group of Hotels, New Delhi (June 2010 – August 2010)
 - ♦ Responsible for cleanliness and maintenance of one floor in the hotel.
 - ♦ Got opportunities to make housekeeping arrangements for corporate meetings.

Volunteer Work:

- Student volunteer at children's hospital in Chandigarh.

Nipesh Singla

10.4.3: Interview FAQs

Unit Objectives

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

- Discuss the most frequently asked interview questions
- Discuss how to answer the most frequently asked interview questions

Resources to be Used

- Participant Handbook

Say

- Tell the participants you will provide them with interview situation and questions and they have to try to answer them.
- Tell them you will also explain the different ways to approach these questions.

Do

- Divide the class in pairs and ask the participants to perform a role play.
- One partner will play the role of the interviewer while the other will play the role of the interviewee.
- Tell them the interviewer can start the interview by asking the interviewee to introduce himself/herself.
- Call all the pairs one by one in front of the class to enact the role play.
- Follow the same pattern for all other situations.
- Time allotted for each situation is 8-10 minutes.
- Congratulate each participant for giving their input.
- Ask the class to applaud each time a team has completed their role play.
- Keep a check on time.

Role Play

Conduct a role play for the situation given.

Situation 1

- The interviewer will start by asking the interviewee a few generic questions such as:
 - ♦ What is your name?
 - ♦ Tell me something about yourself?
 - ♦ Can you tell me something about your family?
- Then, the interviewer will bluntly ask the following questions:
 - ♦ How do you explain this huge time gap in your resume?
 - ♦ What is the reason for this?
 - ♦ Weren't you looking for a job or is it that no one selected you?

Say

De-brief:

- When you put information on your resume, you should be prepared to answer any questions about it.
- Be present and focused on the questions being asked to you.
- One way of tackling the blunt questions is to tell the interviewer you did not come across an opportunity where you were sufficiently satisfied with both the remuneration offered as well as the profile. Therefore, you waited for the right opportunity to come along while looking for an ideal job.

Role Play

Conduct a role play for the situation given.

Role Play – Situation 2

- The interviewer will start by asking the interviewee a few generic questions such as:
 - ♦ What is your name?
 - ♦ Tell me something about yourself?
 - ♦ Can you tell me something about your family?
- Then, at the end of the interview, ask the interviewee:
 - ♦ There are over 200 people who have applied for this job, some with excellent work experience. Why should I hire you?

Say

De-brief:

- There is nothing wrong with stating your strengths and achievements. However, do not come across as arrogant or too boastful.
- You need show the interviewee that you have unique skills or talents to contribute to the company. The interviewer needs to know how you stand apart from the rest of the crowd.
- Tell the interviewer you are looking forward to working with the company and that you are a hard-working individual.

Role Play

Conduct a role play for the situation given.

Role Play – Situation 3

- The interviewer will start by asking the interviewee a few generic questions such as:
 - ♦ What is your name?
 - ♦ Tell me something about yourself?
 - ♦ Can you tell me something about your family?
- Then, lean forward, clasp your hands on the table and in a soft voice ask the interviewee:
 - ♦ Did you ever experience any neglect or disregard from your previous office? In other words, did you ever suffer because your office or team displayed favouritism?

Say

De-brief:

- Keep this in mind: Do not criticize anyone during an interview.
- You are free to express your opinion, however, your language, answers, body language, and the tone of your voice should remain constructive and neutral.
- Since criticism will show you in negative light, you should keep your answers honest yet diplomatic.
- You can tackle such questions by saying, “I got along well with most of my faculty and peers.”

Role Play

Conduct a role play for the situation given.

Role Play – Situation 4

- The interviewer will start by asking the interviewee a few generic questions such as:
 - ♦ What is your name?
 - ♦ Tell me something about yourself?
 - ♦ Can you tell me something about your family?
- Then very bluntly ask the interviewee:
 - ♦ How long do you plan to stay with this company if you are selected?
- After the candidate responds, ask sarcastically:
 - ♦ Do you seriously mean that?

Say

De-brief:

- Don't provide unreal and idealistic answers.
- Your answers should be honest yet diplomatic. In a situation like this, the interviewer does not expect you to provide a specific timeline.
- You can say something like, “I would like to stay with the company as long as I can contribute constructively and develop as an employee, within the organization, professionally and financially.”

Role Play

Conduct a role play for the situation given.

Role Play – Situation 5

- The interviewer will start by asking the interviewee a few generic questions such as:
 - ♦ What is your name?
 - ♦ Tell me something about yourself?
 - ♦ Can you tell me something about your family?
- Ask him/her how important he/she thinks it is to be punctual in the corporate world.
- After he/she answers, look up sternly at the interviewee and in a crisp voice, say:
 - ♦ You were late for this interview by 10 minutes. That surely does not seem to be in line with what you just said?

Say

De-brief:

- Politely apologize for being late.
- You can add something such as, “I assure you this is not a habit”. All your future actions should be in line with this statement.
- Avoid giving any excuses.
- You might feel obligated to provide a justification for your tardiness, but the interviewer is not interested in that.
- Do not over apologize. Once this response is out of the way, turn your focus back to the interview.

Role Play

Conduct a role play for the situation given.

Role Play – Situation 6

- The interviewer will start by asking the interviewee a few generic questions such as:
 - ♦ What is your name?
 - ♦ Tell me something about yourself?
 - ♦ Can you tell me something about your family?
- After asking a few academic or job-related questions, ask the interviewee:
 - ♦ If you get this job, what salary package do you expect us to give you?

Say

De-brief:

- If there is no way for you to avoid this question, respond to the interviewer by providing a reasonable and well-thought out salary range.

Role Play

Conduct a role play for the situation given.

Role Play – Situation 7

- The interviewer will start by asking the interviewee a few generic questions such as:
 - ♦ What is your name?
 - ♦ Tell me something about yourself?
 - ♦ Can you tell me something about your family?
- Then, bringing the interview to a close, ask the interviewee:
 - ♦ Do you have any questions for me?

Say

De-brief:

- Ask relevant questions.
- Don't bombard the interviewer with questions.
- If you have questions about the result of the interview, you can limit your questions to 1 or 2. Keep them short and relevant like:
 - ♦ When will I be informed about the results of the interview?
 - ♦ What are the working hours?
 - ♦ Will the job require me to travel?

Explain

- Tell the participants to be prepared for answering different types of questions in an interview.
- Stay calm and focused, and take a moment to think about how you should respond. Always maintain a confident tone.
- Even if you don't intend to, your body language conveys your level of discomfort with a particular question. Try to keep your actions, tone, and gestures neutral.
- Maintain your composure while answering personal question.

Do

- Tell all the participants to form pairs again.
- Tell them to use the following list of frequently asked interview questions to conduct mock interviews.
- They will use all or some of these questions to conduct mock interviews with their partners.
- One partner will play the role of the interviewer while the other will play the role of the interviewee.
- After they are through asking and answering the questions, the roles will be reversed.
- The same list of questions will be used again.
- After each mock interview ask the interviewer to provide feedback and clear any doubts that may arise.
- Time allotted for each situation is 30-35 minutes.

Activity

Mock Interview Questions

Mock Interview Questions
Tell me something about your family.
What qualities would you look for in a Manager or a Supervisor?
Why did you apply for this job?
What do you know about this company?
How do you deal with criticism?
How do you plan to strike a good work-life balance?
Where do you see yourself five years from now?
Have you applied for jobs in other companies?
What kind of salary do you expect from this job?
Do you have any questions for me?

Summarize

- Close the discussion by discussing the questions in the both activities.
- Ask the participants what they have learned from this activity.
- Ask if they have any questions related to what they have talked about so far.

10.4.4: Work Readiness – Terms and Terminology

Unit Objectives

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

- Identify basic workplace terminology

Resources to be Used

- Participant Handbook
- Chart papers
- Blank sheets of paper
- Pens

Ask

- What do you understand by workplace terminology?
- Are offer letter and contract of employment the same?

Say

- Let's start this unit with an activity.

Team Activity

Workplace terminology

- This is a group activity conducted in three parts.

Part 1

Sheila received a call from the recruiter of MND Company. Before she is recruited by the company, think of the recruitment process she will have to go through. Start from the telephone call to signing her letter of acceptance. Write down all the words that come to your mind.

Activity De-brief

- Have the participants read out the words they have written
- Encourage all the participants to participate in the activity

Do

- Divide the class into small groups of 4 or 6.
- Instruct the participants that they will be doing a brainstorming activity.
- Give them one chart paper each. Tell them to divide the chart in two parts.
- Instruct them that they have to use one half of the chart paper now. The other half will be used later.
- The participants have to write all the words that come to their mind related to the recruitment process.
- Give them 10 minutes to do the activity.
- Tell them that there are no right or wrong answers.
- Keep a track of the time.

Say

- You all know quite a few words related to the terms used in the office.
- Let us talk about some new terms that have been missed out.
- Discuss “Work Readiness – Terms and Terminology” with the participants as given in the Participant Handbook.

Ask

- Why is it important to know the workplace terms?
- How do they help?
- Can the words be categorised further?

Say

- Let's now continue the activity.

Team Activity

Terms and Terminology

- This is again a group activity. The members of the group remain the same as in Activity 1.

Part 2

With the help of the new terms you have learned, make a flow chart of the hiring process of MND Company.

Activity De-brief

- Ask the groups to share the flow charts and the new terms they added while preparing the flow chart.

Do

- Instruct the participants that they have to use the 2nd half of the same chart they had used before.
- Using the new terminology and the terms they had previously written on the chart, they have to make a flow chart of the hiring process of the MND Company.
- Give them 10 minutes for this activity.
- Keep a check on time. Tell the group to wind up quickly if they go beyond the given time limit.

Say

- Let's go ahead with the activity.

Team Activity

Terms and Terminology

- The activity continues with the same group members.

Part 3

Sheila now works for the MND Company. She is not aware of the company culture and policies. She goes to the HR Department to get her doubts clarified. Can you think of the terms for which she wants clarity? Make a list of those words.

Activity De-brief

- Ask the groups to share their list of words. Some of the words are benefits, comp. time, deduction, employee training, holidays, lay-off, leave, maternity leave, mentor, notice, paternity leave, and time sheet.

Do



- Instruct the participants to identify the key terms an employee of a company should know. They can use the same chart paper for this activity.
- Give them 5 minutes for this activity.
- Keep a check on time. Tell the group to wind up quickly if they go beyond the given time limit.

Summarize



- Note: You can either summarize the key points of the unit or have a role play where an employee has just joined a company and the HR Manager explains the terms of employment.

Unit 10.5: Understanding Entrepreneurship

Key Learning Outcomes



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

1. Discuss the concept of entrepreneurship
2. Discuss the importance of entrepreneurship
3. Describe the characteristics of an entrepreneur
4. Describe the different types of enterprises
5. List the qualities of an effective leader
6. Discuss the benefits of effective leadership
7. List the traits of an effective team
8. Discuss the importance of listening effectively
9. Discuss how to listen effectively
10. Discuss the importance of speaking effectively
11. Discuss how to speak effectively
12. Discuss how to solve problems
13. List important problem solving traits
14. Discuss ways to assess problem solving skills
15. Discuss the importance of negotiation
16. Discuss how to negotiate
17. Discuss how to identify new business opportunities
18. Discuss how to identify business opportunities within your business
19. Explain the meaning of entrepreneur
20. Describe the different types of entrepreneurs
21. List the characteristics of entrepreneurs
22. Recall entrepreneur success stories
23. Discuss the entrepreneurial process
24. Describe the entrepreneurship ecosystem
25. Discuss the purpose of the Make in India campaign
26. Discuss key schemes to promote entrepreneurs
27. Discuss the relationship between entrepreneurship and risk appetite
28. Discuss the relationship between entrepreneurship and resilience
29. Describe the characteristics of a resilient entrepreneur
30. Discuss how to deal with failure

10.5.1: Concept Introduction (Characteristic of an Entrepreneur, types of firms/ types of enterprises)

Unit Objectives

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

- Discuss the concept of entrepreneurship
- Discuss the importance of entrepreneurship
- Discuss the characteristics of an entrepreneur
- Describe the different types of enterprises

Resources to be Used

- Participant Handbook

Say

- Let's start this session with some interesting questions about Indian entrepreneurs.

Team Activity

Quiz Questions

1. Who is the founder of Reliance Industries?
Dhirubhai Ambani
2. Who is the Chairman of Wipro Limited?
Azim Premji
3. Who launched e-commerce website Flipkart?
Sachin Bansal and Binny Bansal
4. Who is the founder of Paytm?
Vijay Shekhar Sharma
5. Who is CEO of OLA Cabs?
Bhavish Aggarwal
6. Who is the founder of Jugnoo?
Samar Singla (autorickshaw aggregator)
7. Who is the founder of OYO Rooms?
Bhavish Aggarwal

Do

- Tell them that you will ask them few questions about a few entrepreneurs.
- Divide the class in to two groups.
- In turns ask the quiz questions to the groups.
- If the answer is incorrect pass the question to the other group.
- Share the answer if the groups are not able to answer.
- Congratulate the participants who answered correctly.

Ask

- What do you understand by entrepreneurs?
- What is the importance of entrepreneurship in today's scenario?
- What do you think are the characteristics of successful entrepreneurs?
- What are different types of enterprises that an entrepreneur in India can own and run?

Say

- Talk about entrepreneurs, importance of entrepreneurship, characteristics of successful entrepreneurs, and different types of enterprises in India as discussed in the Participant Handbook.
- Tell the participants, stories of successful Indian entrepreneurs- their struggles, the moments of heartbreak, the perseverance and triumph.
- Ask them if they know of any such entrepreneur.

Summarize

- Close the discussion by summarizing about the opportunities for entrepreneurs in India.

Notes for Facilitation

- Check out different Government schemes for small entrepreneurs. Share the information with the participants.
- You can tell them about the government websites like Start Up India, mudra.org.in etc.
- Discuss about various schemes and policies by the Government of India for entrepreneurs.

10.5.2: Leadership and Teamwork

Unit Objectives

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

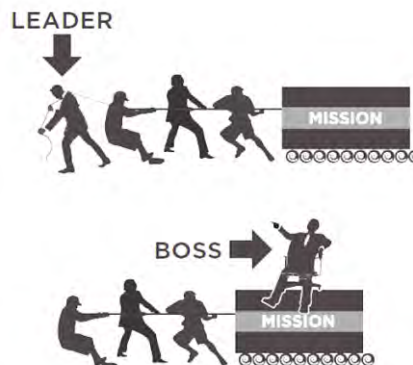
- List the qualities of an effective leader
- Discuss the benefits of effective leadership
- List the traits of an effective team

Resources to be Used

- Participant Handbook
- Blank sheets of paper
- Pens

Do

- Show the picture given below to the class.
- Ask them to quickly write on a piece of paper what comes to their mind after seeing the picture.
- Now ask them, “What do you understand from this picture?”
- Encourage participants to share their thoughts.



Say

- This picture depicts the qualities of a leader and the difference between a leader and a boss.
- A boss focuses on structure and inspires fear whereas a leader follows vision and generates enthusiasm.
- A boss blames employees for the breakdown whereas a leader fixes breakdowns.
- A boss depends on authority whereas a leader depends on goodwill.
- A boss says “I” and a leader says “We.”
- A boss drives employees whereas a leader coaches them.
- A boss takes credit whereas a leader gives credit.

Say

- Talk about leadership and leadership qualities for an entrepreneur as discussed in the Participant Handbook.

Ask

- Why is it important for a leader to be effective? How does it help the organization?

Say 

- Let us discuss benefits of effective leadership as discussed in the Participant Handbook.
- “Out-of-the-box thinking” is one of the new leadership styles. It means thinking differently and from a new perspective.

Ask 

- Do you consider yourself a team player?

Team Activity **Long Chain**

- This is a group activity.

Do 

- Divide the class into 2 teams.
- Ask each team to create a chain using materials they have in class such as shoe laces, belts, paper, handkerchief, ribbons, etc.
- The team that creates the longest chain wins the game.
- Observe if the participants are interacting with their team or working in isolation.
- Share your observations with the class.

Say **De-brief:**

- What did the winning team do differently?
- Who was responsible for the winning team's success?
- How does this activity explain the role of teamwork in entrepreneurial success?

Say 

- Tell the class that both the teams performed well.
- Discuss that the objective of this activity was to open communication channels and how this has been achieved.
- The participants should aim to keep the communication channels open when interacting with their peers and team members.
- It will set the pace and enthusiasm required for all the ensuing teamwork activities.
- Talk about teamwork and importance of teamwork in entrepreneurial success as discussed in the Participant Handbook.

Summarize 

- Close the discussion by summarizing about the importance of teamwork for employees.
 - Teamwork helps in reducing stress for the employees.
 - Teamwork helps employers in generating more number of solutions to a problem and developing improved communication amongst employees.
- Ask the participants what they have learned from these exercises.
- Ask if they have any questions related to what they have talked about so far.

10.5.3: Communication Skills: Listening & Speaking: The Importance of Listening Effectively

Unit Objectives

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

- Discuss the importance of listening effectively
- Discuss how to listen effectively
- Discuss the importance of speaking effectively
- Discuss how to speak effectively

Resources to be Used

- Participant Handbook

Activity 1

Activity – Chinese Whisper

Step 1: Form a circle.

Step 2: Start a whisper chain. Any one participant will whisper a message into his/her neighbour's ear. No one else must hear the message. The message can be serious or downright silly.

Step 3: The next person who first heard the message should whisper the message very quickly to the person sitting next to them.

Step 4: The game goes on until the last person says whatever they heard out loud and the first person reveals the real message.

Compare them and have a great laugh!

Ask

De-brief questions:

- Was the original message the same as the message that is communicated at the end of the game?
- Why do you think there was a difference in the messages?

Say

- No, the original message was not same at the end of game.
- The barriers to communication like language, disturbance and noise, poor listening skills, boredom, poor speaking skills, etc. are the potential reasons this happens.
- There are various aspects to communication. Speaking skills and listening skills are two major components to any communication. There is always some room for improvement in the way we communicate.
- It is important to accept the reality of miscommunication and work to minimise its negative impacts.

Say

- Communication is a two-way process where people exchange information or express their thoughts and feelings
- It involves effective speaking and effective listening.
- If I go to the store to get bread, I exchange money for the bread. I give something and get something in return. Communication takes place in the same manner. You have to provide and receive information for communication to take place.

Ask

- How often do you hear these statements?
 - ♦ “You're not listening to me!”
 - ♦ “Why don't you let me finish what I'm saying?”
 - ♦ “You just don't understand!”
- What do you think the other person is trying to convey to you through these sentences?
- We will not talk about the importance of listening effectively as discussed in the Participant Handbook.

Say

- Let's play a game to understand effective listening process better.

Do

- This is a class activity.
- The participants need to answer the questions they hear.
- Instruct them to listen carefully.
- You will read it at a stretch and if need be repeat it once more.
- Tell the participants to raise their hand if they know the answer to the question asked.
- Keep a check on time.

Activity 2

Riddles:

Is there any law against a man marrying his widow's sister?

If you went to bed at eight o'clock at night and set the clock's alarm to ring at nine o'clock, how many hours of sleep would you get?

Do they have a 26th of January in England?

If you had only one match and entered a dark room that had a kerosene lamp, oil heater, and a wood stove, what would you light first?

The Delhi Daredevils and the Chennai Super Kings play five IPL matches. Each wins three matches. No match was a tie or dispute. How is this possible?

There was an airplane crash. Every single person died, but two people survived. How is this possible?

If an airplane crashes on the border of two countries, would unidentified survivors be buried in the country they were travelling to or the country they were travelling from?

A man builds an ordinary house with four sides except that each side has a southern exposure. A bear comes to the door and rings the doorbell. What is the colour of the bear?

Answers:

There's no law against a man marrying his widow's sister, but it would be the neatest trick in the book since to have a widow, the man would have to be dead.

You'd get one hour's sleep since alarm clocks do not know the difference between morning and night.

Oh, yes. They have a 26th of January in England. They also have a 27th, a 28th, and so on.

First of all, you would light the match.

Who said the Delhi Daredevils and the Chennai Super Kings were playing against each other in those games?

Every SINGLE person died, but those two were married.

You can't bury survivors under any law especially if they still have enough strength to object.

The bear that rang the doorbell would have to be a white bear. The only place you could build a house with four southern exposures is at the North Pole where every direction is in South.

Ask **De-brief question:**

- What were the barriers that came into your way of listening?
- How can you overcome barriers to listening?

Say 

- There is a difference between hearing and listening.
- If you don't listen properly, the message may be misunderstood.
- Be open-minded while listening to someone.
- It is important to listen effectively and carefully without making assumptions.

Activity 3 **Elevator Pitch:**

You are in the lift of a hotel and you bumped into your former client who is a famous businessman. He has financed a lot of small business ventures and can finance your new start-up too. After exchanging pleasantries, he asks you what your new company does. You open your mouth, and then pause. Where do you even begin?

Then, as you try to organize your thoughts, his meeting is called, and he is on his way. If you would have been better prepared, you're sure that he would have stayed long enough to schedule a meeting with you too.

If you were given another chance, what would you have said to this person?

Do 

- Start off the task by providing a beginning sentence to get the story started, and then go around the classroom getting each one to add a new sentence to keep the story going.
- This task should be done spontaneously allowing only a little time to think (30 seconds).
- For example: **There was once a student who was looking for a job after graduation.**

Notes for Facilitation



- Tell the participants to follow these steps to create a great pitch, but bear in mind that you'll need to vary your approach depending on what your pitch is about.
 1. **Identify Your Goal:** Start by thinking about the objective of your pitch. For instance, do you want to tell the potential clients about your organization? Do you have a great new product idea that you want to pitch to an executive or do you want a simple and engaging speech to explain what you do for a living?
 2. **Explain What You Do:** Start your pitch by describing what your organization does. Focus on the problems that you solve and how you help people. Ask yourself this question as you start writing: what do you want your audience to remember most about you? Keep in mind that your pitch should excite you first. After all, if you don't get excited about what you're saying neither will your audience. People may not remember everything that you say, but they will likely remember your enthusiasm.
 3. **Communicate Your USP:** Your elevator pitch also needs to communicate your unique selling proposition or USP. Identify what makes you, your organization or your idea unique. You'll want to communicate your USP after you've talked about what you do.
 4. **Engage with a Question:** After you communicate your USP, you need to engage your audience. To do this, prepare open-ended questions (questions that can't be answered with a "yes" or "no" answer) to involve them in the conversation. Make sure that you're able to answer any questions that he or she may have.
 5. **Put it all Together:** When you've completed each section of your pitch, put it all together. Then, read it aloud and use a stopwatch to time how long it takes. It should be no longer than 20-30 seconds. Remember, the shorter it is, the better!

Example:

Here's how your pitch could come together:

"My company deals with cloth retail online business and we use various e-commerce platforms to sell our products. This means that you can do shopping with ease and spend time on other important tasks. Unlike other similar companies, we have a strong feedback mechanism to find out exactly what people need. This means that, on average, 95 percent of our clients are happy with our products. So, how can you help us in creating our own web portal?"

6. **Practice:** Like anything else, practice makes perfect. Remember, how you say it is just as important as what you say. If you don't practice, it's likely that you'll talk too fast, sound unnatural or forget important elements of your pitch. Set a goal to practice your pitch regularly. The more you practice, the more natural your pitch will become. Practice in front of a mirror or in front of colleagues until the pitch feels natural.

Summarize



- Close the discussion by summarizing how to speak effectively as discussed in the Participant Handbook.

10.5.4: Problem Solving & Negotiation Skills

Unit Objectives

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

- Discuss how to solve problems
- List the important problem solving traits
- Discuss ways to assess problem solving skills
- Discuss the importance of negotiation
- Discuss how to negotiate

Resources to be Used

- Participant Handbook

Ask

- What is a 'problem'?
- What do you think are the problems you may face in the process of becoming a successful entrepreneur?

Say

- Discuss the definition of problem as given in the Participant Handbook.
- In a hurdle race the hurdles are the obstacles on the way to reach your goal.
- Similarly, obstacles are the hurdles you may face while reaching your goal i.e. to set-up your own business. Your goal will be to reach the finishing line after crossing these hurdles.

Ask

- What do you do when you face a problem?
- How do you resolve it? You can pick examples from the question asked previously 'the problems they are likely to face in the process of becoming a successful entrepreneur'.

Say

- Discuss how to solve problems as given in the Participant Handbook.

Team Activity

- This is a group activity.
 - The groups will solve the problem and come up with the best solution in each case.
1. Unable to arrange for some extra finance for setting up a beauty parlour. The loan sanctioned and disbursed is not enough. You have tried all your contacts, friends and relatives. But unable to manage the extra amount. Bank will not sanction more amount as you have used up the complete sanction limit.
 2. You have rented a space for your business and all arrangements are done. You will be operating from the office space rented in two days. Now the owner comes up to you and says he wants to sell the place and wants you to vacate in 15 days.
 3. You have just set up your business and need extra human resource. You have tried inviting a few also tied up with an agency for getting the right candidate. But you are unable to get the right candidate. If the candidate is good, you cannot offer the salary demanded. If the candidate agrees to the salary, he/she has other demands like working hours to be reduced, leaves etc. which may not work for your set up.

Do 

- Divide the class into three groups. Give one scenario to each group.
- Explain the purpose and duration of the activity.
- Ask the groups to build on the scenario and present their solution as a role play.

Say **De-brief questions:**

1. What was the problem?
2. Is there any other alternative solution?
3. Is this the best solution presented?

Ask 

- Try to think of some people around you who are able to solve problems very easily. Even you or your friends might be approaching them when there is a problem. What qualities do they have? What personality traits do such people possess?

Say 

- Discuss the important traits for problem- solving as given in the Participant Handbook.

Ask 

- In order to build a successful organization, you need to hire people who possess good problem solving skills. How would you assess the level of problem solving skills of potential candidates before hiring them?

Say 

- Discuss how to assess for problem- solving skills as given in the Participant Handbook.

Summarize 

- Ask the participants the things that they have learnt so far.
- Ask if they have any questions related to what they have talked about so far.
- Summarize the discussion on problem solving.

Activity 

- The activity is to organise an election event. Select three volunteers from the group. They have to give a speech on their election manifesto to the class. They have to negotiate with the fellow participants and convince them to vote for them. The best negotiator will win the election.

Do 

- Ask three participants to volunteer for the activity.
- Explain the purpose and duration of the activity.
- Set guidelines pertaining to discipline and expected tasks.

Ask 

- Out of the three contestants, whom would you support? Why? What did they say or do which convinced you to make your decision?
- Have you ever tried to negotiate in your personal or professional life?
- Ask the class to share some of their experiences where they have been able to strike a deal by negotiating.

Say 

- Discuss “What is Negotiation?” as given in the Participant Handbook.

Ask 

- Why is it important to negotiate? As an entrepreneur, where do you think that negotiation skills will be needed?

Say 

- Discuss the importance of negotiation while starting a business as given in the Participant Handbook.

Say 

- Discuss the important steps to negotiate as given in the Participant Handbook.

Role Play 

- Conduct a role play activity.
- Ask the participants to assemble together.
- Explain the purpose and duration of the activity.
- Set guidelines pertaining to discipline and expected tasks.

Do 

- Divide them into groups of four (4) (depending on the batch size).
- Give them the hand-outs for role play scenarios.
- Two groups to be given scenarios on problem solving.
- Other two groups to be given scenarios on negotiation.
- The groups will build on the scenarios and prepare for the role play.
- Give the groups atleast 5 mins to discuss and be ready with the role play.
- Invite each group one by one to come and present their role play.

Problem solving Scenario 1

Avinash has a Mobile Repair Store in Allahabad. His outlet is one of the most popular one in the vicinity and he has great rapport with his customers. He is always well-dressed, jovial and full of energy.

It's around 11 AM, when a customer barges in to the shop and starts shouting at Avinash for giving her back the instrument which is still not working. The screen of her mobile is also cracked from one side. Avinash remembered thoroughly checking the handset before handing it over to the customer. The customer threatens to sue the company and to go to Consumer Court for cheating her.

Problem solving Scenario 2

You are running a successful small scale business, Shreeji Aggarbattis,. Your staff members do door to door selling and organise marketing campaigns in local markets. Your brand has established it's name in last few years.

Recently, lot of customers have been coming to you and lodging complaints that your staff members indulge in malpractices. Few of them informed you that a staff member engaged them in a friendly conversation. In the meanwhile, the other gave them lesser packets of aggarbattis than they paid for.

Another set of customers lodged complaint about the misconduct and rude behaviour of a particular staff member. You often hear from your customers that the orders don't get delivered on time or wrong products get delivered.

You have already been struggling with shortage of staff and such complaints are a serious concern as it is hampering your brand image. What strategies will you adopt to solve this problem?

Negotiation Scenario 1

You have interviewed a prospective new employee who could be a key member of your new entrepreneurial venture. The new person is demanding a salary that is 20% higher than you thought based on your business plan. Finances are tight, yet you believe this person could make a significant impact on future profits. If you paid the required salary for the new person, then you would have to restructure your entire business plan. You've been searching for an individual with this skill level for three months. to the candidate is waiting for your response. Now you have to call him in to make the final negotiations.

Negotiation Scenario 2

You are a young entrepreneur who has just registered his start up project and applied for a bank loan accordingly. You receive a letter saying that your loan application has been rejected as your start up idea did not appeal to the bank and they think that it is not a revenue generating model. You have taken an appointment to meet the manager and show your negotiation skills to get your loan approved.

Notes for Facilitation

**Facilitating Role Plays****Preparing for the activity**

1. Carefully review the details of the scenario and the character descriptions.
2. Become familiar with the key issues being addressed in the scenario.
3. Study the provided material so that you are ready to address issues related to the situations depicted in the role-plays.
4. Anticipate and know how to address issues participants might raise during the activity.

Conducting the activity

1. Introduce the activity. Emphasize that role-playing provides participants with an opportunity to apply their new knowledge, skills, and tools in situations that simulate actual interactions with customers.
2. Ask participants to form pairs. Direct the members of each group to choose who will play the roles. Remind the groups that each participant should be given the opportunity to play/practice the different roles.
3. Conduct a demonstration so that participants become familiar with the expectations related to the roles and support materials.
4. Give the pairs/ groups 10 to 15 minutes to conduct the role-play (depending on the duration of the session).
5. After all the groups have finished with the role-play, conduct a debriefing session on each role-play.
6. Ask the groups to take five minutes to talk about what happened during the role-play. The groups should discuss the questions given in the debriefing for each role-play. Encourage participants to provide constructive criticism during their discussions.

Summarize



- Wrap the unit up after summarizing the key points and answering questions.

10.5.5: Business Opportunity Identification: Entrepreneurs and Opportunities

Unit Objectives

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

- Discuss how to identify new business opportunities
- Discuss how to identify business opportunities within their business

Resources to be Used

- Participant Handbook
- Blank sheets of paper
- Pens

Ask

- How does an entrepreneur identify an opportunity?
- What do you think are the common queries or concerns faced by entrepreneurs?
- How can you identify new business opportunity?

Say

- Let's talk about opportunity, common queries or concerns faced by entrepreneurs, idea as an opportunity, factors to consider when looking for opportunities, ways to identify new business, and opportunity analysis as discussed in Participant Handbook.
- Let's do an activity to understand ways to identify business opportunities within your business.

Do

- Tell the class that this is an individual activity.
- Tell the participants to create a matrix on their notebooks.
- There will be four boxes in your matrix.
- Strength, Weakness, Opportunity and Threats will be the four headings of the matrix. This is called the SWOT matrix.
- Read out the questions to them and tell the participants they need to answer the questions asked in each matrix.
- Tell them they can also use their own understanding of themselves to fill the SWOT matrix.

Activity

Do your SWOT analysis

Strength

What are your strengths?
 What unique capabilities do you possess?
 What do you do better than others?
 What do others perceive as your strengths?

Weakness

What are your weaknesses?
 What do your competitors do better than you?

Opportunity

What trends may positively impact you?
 What opportunities are available to you?

Threat

Do you have solid financial support?
 What trends may negatively impact you?

Do

- Congratulate everyone for the class activity.
- Ask the audience to applaud for themselves.
- Allot the participants sufficient time to complete this activity, but do keep a check on time.
- Ask de-brief questions to cull out information from the participants.

Ask

De-brief questions:

- What are your weaknesses according to your SWOT analysis?
- Do you think you can change your weakness into strength? How?
- Do you think you can work on your threats? How?

Summarize

- Close the discussion by summarizing ways to identify business opportunities within your business.
- Ask the participants what they have learned from this exercise.
- Ask if they have any questions related to what they have talked about so far.

10.5.6: Entrepreneurship Support Eco-System

Unit Objectives

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

- Explain the meaning of entrepreneur
- Describe the different types of entrepreneurs
- List the characteristics of entrepreneurs
- Recall entrepreneur success stories
- Discuss the entrepreneurial process
- Describe the entrepreneurship ecosystem
- Discuss the purpose of the 'Make in India' campaign
- Discuss the key schemes to promote entrepreneurs

Resources to be Used

- Participant Handbook
- Chart papers
- Marker pens
- Pencils
- Colour pencils
- Scale
- Eraser
- Other requisite stationery material

Ask

- Do you think that entrepreneurs need support?
- What do you think is an eco-system?
- What do you think 'entrepreneurship support eco-system' means?

Say

- Let's learn what entrepreneurship support eco-system means.
- Discuss 'Entrepreneurship Support Eco-System' as given in the Participant Handbook.

Ask

- Can you define entrepreneurship support eco-system?
- What are the key domains of the support eco-system?

Say

- Let's learn more about these domains by conducting an activity.
- You have to make a poster showing the components of the six main domains of entrepreneurship support eco-system.

Team Activity

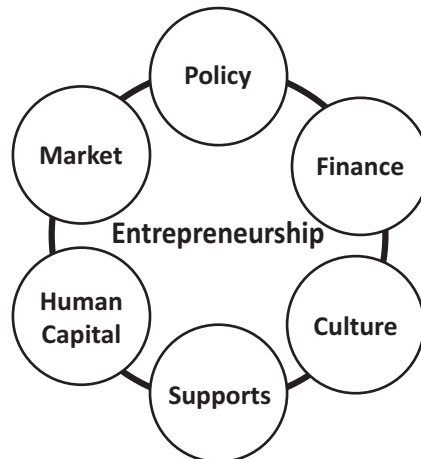
- Making a poster showing the entrepreneurship support eco-system.

Do

- Divide the class into groups of four or six.
- Hand out chart paper and coloured pens.
- Explain the purpose and duration of the activity.
- Go around checking the progress of each group.
- Set guidelines pertaining to discipline and expected tasks.

Activity De-brief

Ask each group to display their poster and explain the key domains of entrepreneurship support eco-system.



Ask

- What kind of government support eco-system is available for entrepreneurs in India?

Say

- Discuss 'Make in India' campaign as given in the Participant Handbook.

Team Activity

- Presentation on key schemes to promote entrepreneurs

Do

- Divide the class into pairs.
- Number each pair from 1-15.
- Assign a scheme, same as their group number, to each group.
- Ask them to read the scheme carefully and present it to the class.
- Explain the purpose and duration of the activity.
- Go around checking the progress of each group.
- Set guidelines pertaining to discipline and expected tasks.

Activity De-brief

- Ask each group to explain the scheme offered by government to promote entrepreneurs.

Summarize

- Summarize the unit by discussing the key points and answering questions the participants may have.

10.5.7: Risk Appetite & Resilience

Unit Objectives

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

- Discuss the relationship between entrepreneurship and risk appetite
- Discuss the relationship between entrepreneurship and resilience
- Describe the characteristics of a resilient entrepreneur

Resources to be Used

- Participant Handbook
- Chart papers
- Blank sheets of paper
- Pens
- Marker pens

Ask

- Can you define risk or explain what constitutes a risk?
- What do you people mean when they say, “This may be a risky proposition”?
- What risks are they talking about?

Example

- Let's have a look at these two examples:

Rohit and his family were travelling by car from Delhi to Nainital. It was their second trip there. Rohit was familiar with the road. His friends told him that the highway after Rampur was in a bad condition. They advised him to take a shortcut and turn left from Moradabad and take the Kaladhungi road. This road is in a better condition.

Since he was going with his family, and did not want to take the risk of getting lost, he left early. He took the Kaladhungi road and reached Nainital well in time.

Suresh and his family too were travelling by car from Delhi to Nainital. It was their second trip there. His friends too advised him to take a shortcut and turn left from Moradabad and take the Kaladhungi road as this road was in a better condition.

Suresh too decided to take the Kaladhungi road but he left Delhi in the afternoon. It was dark by the time he reached Kaladhungi, and he was sure that he was taking the correct turn. As it was late, he could not find anyone to give him directions. He ended up being in an unknown place that was scarcely inhabited.

Say

- Let's see what type of risks Rohit and Suresh took.
- Discuss 'Risk Appetite and Resilience' with the participants as given in the Participant Handbook.

Say

- Let's learn more about risk appetite and resilience with the help of an activity.

Team Activity

Risk Appetite

- This is a group activity.

- In the previous unit, you read success stories of Mr Dhirubhai Ambani and Dr Karsanbhai Patel.
- Mr Ambani left his job and started his company Reliance with just Rs. 50,000/-.
- Dr Patel kept his job, went door-to-door to sell Nirma, and only when the brand started gaining popularity did he start his own company.
- What types of risk did both of them take?
- What risk factors, do you think, did they keep in mind before launching their company?
- Write the Risk Appetite Statement of both the companies.

Activity De-brief

- Who took a greater risk?
- What are the differences between the Risk Appetite Statement of both the companies?

Do

- Instruct the participants that this is group work.
- Divide the class into small groups of 4.
- Give each group a chart paper.
- Tell the participants that they have to evaluate the risks taken by Mr Dhirubhai Ambani and Dr Karsanbhai Patel.
- Give the participants 15 minutes to discuss and write.
- Keep a check on time. Tell the group to wind up quickly if they go beyond the given time limit.

Ask

- Do you think all entrepreneurial ventures are successful?
- What happens if the first venture is not successful?
- Should the entrepreneur stop when faced with challenges or face them?

Example

- Let's have a look at the following example:

Vijay Shekhar Sharma is the founder of Paytm, which is a giant Indian e-commerce. He was born in a middle-class family in Uttar Pradesh. He started his first job at an MNC. He quit after six months and built a company One97 with his friends. As One97 grew bigger, it needed more money because it was running more servers, bigger teams, and had to pay royalty. At that time, the tech bubble popped and technology companies were running in losses. Finally, money ran out. So One97 took loans and then more loans at higher rates of interest, as high as 24 per cent, and became caught in a vicious cycle.

In 2014, Paytm was launched with online wallet services after which, the company enabled online payment transactions. The company got licenses from RBI in 2016 to launch India's first ever payment bank. Moreover, the main motive of Paytm was to transform India into a cashless economy.

After demonetization came into effect, Vijay Shekhar Sharma started promoting online and digital transactions to deal with the cash crunch. In fact, the service of the company's mobile wallet is accepted across India. The logo of Paytm is now popular almost everywhere from tea stalls to major companies.

Say 

- Let's see what qualities made Vijay Shekhar Sharma a resilient entrepreneur.
- Discuss Entrepreneurship and Resilience with the participants as given in the Participant Handbook.

Say 

- Let's learn more about entrepreneurship and resilience with the help of an activity.

Team Activity **Entrepreneurship and Resilience**

- This is a group activity.
- Think of some entrepreneurship ventures that faced challenging times, but later resulted in success stories.
 - Who is the founder of that company?
 - What challenging times did it face?
 - How did it overcome those challenges?
 - List the resilient characteristics of the entrepreneur.

Activity De-brief

- Each group to give their presentation.
- Why did you choose this company?
- What is the success story of the company?

Do 

- Instruct the participants that this is group work.
- Divide the class into small groups of 4.
- Give each group a chart paper.
- Tell the participants that they have to think of an entrepreneur who faced challenging times, but eventually succeeded.
- Give the participants 15 minutes to discuss and write.
- Keep a check on time. Tell the group to wind up quickly if they go beyond the given time limit.

Summarize 

- You can summarize the key points of the unit.
- Ask the participants what they learned from the activities.
- Clarify any questions or doubts they might have.

10.5.8: Success and Failures

Unit Objectives

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

- Discuss how to deal with failure

Resources to be Used

- Participant Handbook

Ask

- Have you heard the quote 'nothing is impossible'?
- What do you think it means?
- Do you think that all successful entrepreneurs became famous overnight or did they have to struggle or face failure before succeeding?

Example

- Let's have a look at this example.

Shah Rukh Khan, also known as, SRK or King Khan is a force to reckon with. Did he achieve stardom overnight? Shah Rukh Khan, who has seen many struggles in his life – he has slept on streets, struggled to support himself and his sister at a very young age, and lost his parents very early in life, which led to his sister seeking mental health support. Amidst all the chaos and challenges, he kept pushing himself, and today he stands tall as the 'Badshah of Bollywood'. Certainly those years were not easy for him.

When he was young, he stood at Marine Drive and said, "I will rule this city one day". Failure was not just his companion during or before his stardom, it is still a substantial part of his life. Success does not come easy. What made him a star was his acceptance of failure and the urge to improve.

Say

- How do you define success and failure?
- What is fear?
- Discuss "success and failure" with the participants as given in the Participant Handbook.

Ask

- Have you felt or experienced fear?
- What led you to feel that emotion?
- How did you handle it?

Say

- Let's learn the about success and failure with the help of an activity.

Team Activity

- Divide the class into groups of four.
- Instruct them to think of one scenario where they have to interview a successful entrepreneur.
- Explain the purpose and duration of the activity.
- Set guidelines pertaining to discipline and expected tasks.
- They have to choose one person from the group as the interviewee and one as the interviewer.
- Go around and make sure they have understood what is to be done and are discussing the roles properly.
- Check that everyone understands their role. Give clarifications if needed. Give the participants about 5 minutes to discuss and decide their roles.
- Ask the groups to stop the discussion as soon as the time is over.
- Invite each group one by one to come and present their interview as a role play.

Notes for Facilitation

Facilitating Role Plays

Preparing for the activity

1. Carefully review the details of the scenario and the character descriptions.
2. Become familiar with the key issues being addressed in the scenario.
3. Study the provided material so that you are ready to address issues related to the situations depicted in the role plays.
4. Anticipate potential questions that might be raised by the participants and be ready to address them.

Conducting the activity

1. Introduce the activity. Emphasize that role playing provides participants with an opportunity to apply their new knowledge, skills, and tools in situations that simulate actual interactions with customers.
2. Ask participants to form pairs. Direct the members of each group to choose who will play the roles. Remind the groups that each participant should be given the opportunity to play/practice the different roles.
3. Conduct a demonstration so that participants become familiar with the expectations related to the roles and support materials.
4. To maintain spontaneity of the interactions during the role play, ask the participants not to discuss the details of their roles prior to the role play.
5. Give the pairs 15-20 minutes to conduct the role play.
6. Circulate among the groups to answer any questions that may arise and provide guidance as needed.
7. After all the pairs have finished with the role play, conduct a de-briefing session on each role play.
8. Ask the groups to take five minutes to talk about what happened during the role play. The groups should discuss the questions given in the de-briefing for each role play. Encourage participants to provide constructive criticism during their discussions.
9. Conclude the activity by asking participants to think about whether and how they might use scripted role plays in their real life.

Summarize

- Wrap the unit up after summarizing the key points and answering questions.

Unit 10.6: Preparing to be an Entrepreneur

Key Learning Outcomes



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

1. Discuss how market research is carried out
2. Describe the 4 Ps of marketing
3. Discuss the importance of idea generation
4. Recall basic business terminology
5. Discuss the need for CRM
6. Discuss the benefits of CRM
7. Discuss the need for networking
8. Discuss the benefits of networking
9. Discuss the importance of setting goals
10. Differentiate between short-term, medium-term and long-term goals
11. Discuss how to write a business plan
12. Explain the financial planning process
13. Discuss ways to manage your risk
14. Describe the procedure and formalities for applying for bank finance
15. Discuss how to manage their own enterprise
16. List the important questions that every entrepreneur should ask before starting an enterprise

10.6.1: Market Study/ The 4Ps of Marketing/ Importance of an IDEA: Understanding Market Research

Unit Objectives

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

- Discuss how market research is carried out
- Describe the 4 Ps of marketing
- Discuss the importance of idea generation

Resources to be Used

- Participant Handbook
- Chart papers
- Markers pens
- Blank sheets of paper

Ask

- Suppose, you want to open a restaurant, what are the factors you will consider?
- How will you promote your restaurant?

Example

- Let's have a look at this example.

Arjun was an MBA working in a company. But he wanted to start a low cost budget hostel for foreign tourists coming to India. He did a lot of market research before starting the project. Based on the information he gathered, he made his business plan. His hostel is now flourishing and he is thinking of expanding to other tourist destinations.

Say

- Discuss “Market Study” with the participants. Refer to the Participant Handbook.
- Let's learn about market study and research with the help of an activity.

Team Activity

Market Study

- This is a group activity.
- You want to start your own tuition centre.
- What type of research will you do?

Activity De-brief

- Ask each group to come forward and give a brief presentation.
- Encourage other groups to be interactive and ask questions.
- What factors did you keep in mind while doing your research?
- Based on our research would you go ahead and open a tuition centre?

Do 

- Instruct the participants that this is group work.
- Divide the class into small groups of 4 or 6.
- Give each group a chart paper.
- Tell the participants that they have to start their own tuition centre.
- Give the participants 10 minutes to discuss and write the research work they need to do.
- Keep a check on time. Tell the group to wind up quickly if they go beyond the given time limit.

Say 

- By opening a tuition centre you are offering a service.

Ask 

- What factors will you keep in mind before opening it?

Say 

- Discuss “The 4Ps of Marketing” with the participants as given in the Participant Handbook.

Say 

- Let's learn about the 4Ps of Marketing with the help of an activity.

Team Activity **4 Ps of Marketing**

- This is a group activity.
- You have to sell a pen to four different segments:
 1. Rural villagers
 2. Rural middle class
 3. Urban middle class
 4. Upper end rich people (Niche market)

Keeping the 4Ps of Marketing in mind, what marketing strategy will you design to sell the pen?

Activity De-brief

- Ask each group to present their strategy.
- Encourage other groups to be interactive and ask questions.

Do 

- Instruct the participants that this is group work.
- Divide the class into four groups.
- Give each group a chart paper.
- Assign each group a target audience for selling the pens:
 1. Rural villagers
 2. Rural middle class
 3. Urban middle class

- 4. Upper end rich people
- Tell the participants that they have to design a marketing strategy keeping the 4Ps of Marketing in mind.
- Give the participants 20 minutes to discuss and come up with their strategy.
- Keep a check on time. Tell the group to wind up quickly if they go beyond the given time limit

Activity De-brief

- Ask each group to come forward and give a brief presentation.
- Ask each group what they kept in mind while designing their marketing strategy.
- Encourage other groups to be interactive and ask questions.

Say 

- Each entrepreneur has an idea of wants he wants to sell. It may be a service or a product.
- Discuss “Importance of an IDEA” as given in the Participant Handbook.

Summarize 

- Summarize the key points of the unit.
- Ask the participants what they learnt from the activities.
- Encourage them to ask if they have any doubts.

10.6.2: Business Entity Concepts

Unit Objectives

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

- Recall basic business terminology

Resources to be Used

- Participant Handbook

Say

- Let's recall some basic business terminology.
- Discuss the Business Entity Concepts as given in the Participant Handbook.
- Let's learn some basic business terminology by having an activity.
- We will have a quiz today.

Activity

- The activity is a quiz.

Do

- Divide the class in two groups and give a name to each group.
- Explain the rules of the quiz. For each correct answer the group gets 1 mark.
- If the group is unable to answer the question is passed to the next group.
- Explain the purpose and duration of the activity.
- Ask the questions of the quiz.
- Keep a score of the groups.
- Set guidelines pertaining to discipline and expected tasks.

Summarize

- Summarize the unit by discussing the key points.

Notes for Facilitation

QUESTIONS FOR THE QUIZ

1. What does B2B mean?
Business to business
2. What is a financial report?
A comprehensive account of a business' transactions and expenses
3. Who is a sales prospect?
A potential customer
4. How is working capital calculated?
Current assets minus current liabilities

5. What is an estimation of the overall worth of a business called?

Valuation

6. You are buying a house. What type of transaction is it?

Complex transaction

7. How will you calculate the net income?

Revenue minus expenses

8. How is Return on Investment expressed?

As percentage

9. How will you calculate the cost of goods sold?

Cost of materials minus cost of outputs

10. What is revenue?

Total amount of income before expenses are subtracted.

11. What is a Break-Even Point?

This is the point at which the company will not make a profit or a loss. The total cost and total revenues are equal.

12. What is the formula used to calculate simple interest?

*$A = P(1 + rt)$; $R = r * 100$*

13. What are the three types of business transactions?

Simple, Complex and Ongoing Transactions

14. The degrading value of an asset over time is known as .

Depreciation

15. What are the two main types of capital?

Debt and Equity

10.6.3: CRM & Networking

Unit Objectives

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

- Discuss the need for CRM
- Discuss the benefits of CRM
- Discuss the need for networking
- Discuss the benefits of networking

Resources to be Used

- Participant Handbook

Ask

- Can your business run without customers/buyers?
- Who is the most important entity in any business?

Say

- The key to every success business lies on understanding the customer's expectations and providing excellent customer service.
- Discuss about CRM and its benefits. Refer to the Participant Handbook.
- Providing excellent customer service entails:
 - ♦ Treating your customers with respect.
 - ♦ Be available as per their need/ schedule.
 - ♦ Handling complaints effectively.
 - ♦ Building long lasting relationships.
 - ♦ Collecting regular feedback.
- Handle customer complaints proactively. Ask “what happened”, “why it happened”, “how can it be avoided next time”, etc.
- Collecting feedback from the customers regularly will enable you to improve your good/service.
- “Let's understand it better with the help of some case scenarios. You will be given some cases within your groups. You have to analyse the case scenario that has been given to you and then find an appropriate solution to the problem.”

Do

- Divide the class into four groups of maximum six participants depending on the batch size.
- Give one case study to each group.
- Instruct them to read the case carefully.
- The group is expected to analyse and discuss the case amongst them and find a solution to the given problem.
- Put down the discussion points (de-brief questions) on the board. Give the class 5-10 minutes to discuss the case and note down their solutions.
- At the end of 10 minutes, the team should present their case solution to the class.

Team Activity

Case Study Analysis

Raju runs a business of wooden furniture. He has a huge list of customers on Facebook and WhatsApp who give him orders regularly. Ankita is one of his old and regular customers. She placed an order for a new chester and TV cabinet via WhatsApp and requested Raju to send them as soon as possible. When the parcel reached Ankita through courier she found that chester was broken and the TV unit was chipped from the bottom. Ankita was heartbroken. It was a complete waste of money. She sent a message to Raju on WhatsApp, expressing her anger and disappointment. Raju might lose an old customer forever if he doesn't satisfy the customer. What should Raju do to retain his customer?

Scenario 2

Rajni runs a boutique shop. She sells suits and sarees. She is one of the most successful designer in her city. Rajni swears that all the clothes in her boutique have unique designs. Smita has to attend her cousin's wedding; she goes to Rajni's boutique to buy a saree. Smita wanted a unique designer saree. Rajni customized a saree for her and sent it over the courier. When Smita had a look at the saree she realised her two friends had the same design sarees. She sent a message to Rajni on WhatsApp, expressing her anger and disappointment. Did Rajni make a false promise? Were her designs copied? What could happen to Rajni's image after this incident? What would you do if you were in Rajni's place?

Scenario 3

Shama is a beautician who offers parlour services to ladies by making home visits. Recently, Shama got her name registered on an e-commerce website. Two days earlier, she got a message from Mrs Sushma. The appointment was fixed for next day, 11:00 am and the remuneration for the services was decided beforehand. When Shama reached there at 10:50 am, Mrs Sushma was not at home. When Shama called her, she asked her to wait for a while. Mrs Sushma reached home at 11:45 am. Meanwhile, Shama had to reschedule her next appointment. After availing Shama's services, Mrs Sushma refused to pay the requisite amount and started finding faults in the services provided by her. Who was at fault in this scenario? What should you do in case the customer behaves unreasonably? What would you do if you were in Shama's place?

Scenario 4

Shailender is the manager of a car showroom. He proactively takes part in all the transactions that happen in his showroom. Vinita wants to buy a new car. She has chosen a car from Shailender's showroom. The salesperson has given her a very good discount and has also promised free service for one year. Vinita goes to the showroom and asks to complete all the formalities to purchase the car. When she sees the final bill she realize that she has not received the promised discount neither was there any mention of the free services. She immediately demands to see the Shailender. When Shailender's head asks how much discount Vinita was promised, he realised the discount will make the sale in loss. The car showroom owner might lose a customer and deal due to false commitments made by his manager. Besides, the customer might tell this to other people, creating a bad name and image for the showroom. If you owned that showroom, how would you have convinced your customer?

Say

- Now, let's discuss the problem and solution with the class.
- The group will first briefly describe the case to the class.
- Then discuss the issue identified and the proposed solution.
- Present the solution as a role play.
- Post presentation, the other groups may ask questions from the group that has presented.

Do 

- Congratulate each group for the presentation/ role play.
- Ask the audience to applaud for them.
- Keep a check on time. Tell the group to wind up the discussion quickly if they go beyond the given time limit.

Say 

- If your customers are happy with you they will give referrals which will help to grow your business.
- One more way of growing business is 'Networking'.
- Discuss Networking and its benefits. Refer to the Participant Handbook.

Activity **Group Discussion**

- Conduct a group discussion in the class on how they can do networking for their business.

Summarize 

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

10.6.4: Business Plan: Why Set Goals?

Unit Objectives

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

- Discuss the importance of setting goals
- Differentiate between short-term, medium-term and long-term goals
- Discuss how to write a business plan
- Explain the financial planning process
- Discuss ways to manage your risk

Resources to be Used

- Participant Handbook
- Chart papers
- Blank papers
- Marker pens
- Ruler

Ask

- Remember we had written SMART Goals in a previous session? Let's try and recall why it is important to set goals?
- While framing SMART goals, we talked about 'T' in SMART, which was 'Time Bound'? What do we mean by time bound goals?
- What time limit did you set for your goal- 3 weeks, 3 years, 10 years?

Say

- Talk about short term, long term and medium term goals, as discussed in the Participant Handbook.

Ask

- As you are planning to become an entrepreneur, you must have thought of an idea for a start-up. What is your business idea?

Do

- Ask few participants to share their business ideas.

Ask

- Have you created a business plan for your business idea?
- Do you think it is important to have a business plan in place? Why/ why not?

Say

- Talk about 'Why Create a Business Plan' as discussed in the Participant Handbook.
- Let's understand it better with the help of an activity.

Team Activity

Writing a business Plan

- This is a group activity.
- Give the groups the required resources such as chart paper and markers.
- This activity is divided into two parts:
 1. Create a business idea
 2. Develop a business plan
- The group will discuss and come up with a new business idea and present their idea to the class.
- In the second part of the activity the group will develop a business plan for the business idea.
- The business plan prepared will be presented by the groups to the class.

MY BUSINESS PLAN
Executive Summary: What is your Mission Statement?
Business Description: What is the nature of your business?
Market Analysis: What is your target market?
Organization and Management: What is your company's organizational structure?
Service or Product Line: What is the lifecycle of your product/ service?
Marketing and Sales: How will you advertise and sell your products?
Funding Request: How much fund is required and from where?

Say

- Teams will need to brainstorm for this part of the activity.
- Use the blank papers for the second part of this activity
- Make your business plan on a chart paper based on the following parameters:
 1. Executive Summary
 2. Business Description
 3. Market Analysis
 4. Organization and Management
 5. Service or Product Line
 6. Marketing and Sales
- Explain each parameter in detail as done in the Participant Handbook.
- Discuss each parameter with the business idea examples of the groups.
- Groups will discuss and develop the business plan for their business idea.

Say 

- Now, let's share our plan with the class.
- Each group will briefly describe the plan to the class.
- Post presentation, the other groups may ask questions to the group who have presented their plan.

Do 

- Congratulate each group for sharing their points.
- Ask the audience to applaud for them.
- Keep a check on time. Tell group to wind up the discussion quickly if they go beyond the given time limit.

Say 

- Along with a business plan, you need to create a financial plan and evaluate the risk involved with your start up.
- Discuss 'Financial Planning' and 'Risk Management' in detail as given in the Participant Handbook.

Summarize 

- Ask the participants what they have learnt from this exercise/ activity.
- Ask if they have any questions related to what they have talked about so far.

Notes for Facilitation 

- Keep the business plan format ready in a flipchart to display it during the activity.

10.6.5: Procedures and Formalities for Bank Finance

Unit Objectives

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

- Describe the procedure and formalities for applying for bank finance

Resources to be Used

- Participant Handbook
- Bank loan/finance form sample

Ask

- While preparing a business plan in the last session, we discussed financial planning to arrange financial resources for your start-up. Therefore, how will you collect funds to start your business?

Say

- While most entrepreneurs think 'product' is the most difficult thing to decide for a business, start-up capital poses an even a bigger obstacle. Though there are various ways of funding the business, to convince investors to invest money is the most challenging.
- Some of the funding options available in India are:
 - ♦ **Bootstrapping:** Also called self-financing is the easiest way of financing
 - ♦ **Crowd funding:** Funds are collected by consumers pre-ordering or donating for starting the business.
 - ♦ **Angel investors:** Individual or group of investors investing in the company
 - ♦ **Venture capitalists:** Venture capitals are professionally managed funds who invest in companies that have huge potential. They usually invest in a business against equity.
 - ♦ **Bank loans:** The most popular method in India.
 - ♦ **Microfinance Providers or NBFCs**
 - ♦ **Government programmes**
- Let us know discuss the most popular method i.e. bank finance in detail here.

Do

- Discuss the list of documents that are required to apply for a loan like letter of introduction, business brochure, references of other banks, and financial statements.
- Explain the details to be filled in a loan application form.
- Divide the class into groups. Give each group a loan application form.
- Ask the groups to discuss and fill the form.

Summarize

- Close the discussion by summarizing the important documents needed for bank loan.
- Ask the participants if they have any questions related to what they have talked about so far.

10.6.6: Enterprise Management – An Overview: How to Manage Your Enterprise?

Unit Objectives

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

- Discuss how to manage their own enterprise

Resources to be Used

- Participant Handbook

Ask

- Having set-up a business, do you think it is possible to do everything on your own?
- Does one require trained persons for help?
- What does management mean?

Say

- Let's have a look at this example:

Kapil had a small business that was beginning to pick up pace. He wanted to expand his business, and therefore employed few more people. One day, as he was walking past Ramesh, one of his new employees, he overheard Ramesh talking rudely to a customer on the phone. This set him thinking. Kapil realised that he should have regular team meetings to motivate his employees and speak with them about any problems they might be facing during work. He should also conduct training sessions on new practices, soft skills, and technology, and develop work ethics manual for managing his enterprise.

Say

- Was Kapil correct in his approach or he should have scolded Ramesh instantly in front of his other employees?
- Discuss “Enterprise Management – An Overview” with the participants as given in the Participant Handbook.

Say

- Let's learn how to effectively manage an enterprise or business through an activity.

Team Activity

Enterprise Management

- This is a group activity.
- Design a matrix listing the topics and key words that are needed to run an enterprise effectively and smoothly.

Activity De-brief

- Have each group present their matrix.
- Encourage participants of the other groups to ask question about each other's presentation.

Notes for Facilitation



- Checklist of documents is provided as resources for the session.
- You can make some copies and distribute it during the group activity.
- Download sample loan application forms from any nationalised bank's website. Print sufficient copies to circulate it amongst the groups.

CHECKLIST OF DOCUMENTS TO BE SUBMITTED ALONG WITH LOAN APPLICATION (Common for all banks)
1. Audited financial statements of the business concern for the last three years
2. Provisional financial statements for the half – year ended on _____
3. Audited financial statements of associate concern/s for the last three years
4. Copy of QIS II for the previous quarter ended on _____
5. Operational details in Annexure I
6. CMA data for the last three years, estimates for current year and projection for the next year
7. Term loan/DPG requirements in Annexure II
8. List of machinery in respect of machinery offered as security in Annexure III
9. Additional details for export advances furnished in Annexure IV
10. Property statements of all directors/partners/proprietor/guarantors
11. Copies of ITAO of the company for the last three years
12. Copies of ITAOs/WTAOs of the directors/partners/proprietor and guarantors
13. Copies of certificate from banks and financial institutions certifying the latest liability with them
14. Copy of board resolution authorizing the company to apply to your bank for the credit facilities mentioned in application
15. Copy of memorandum and article of association (in case of limited company)/partnership deed (in case of partnership firm)
16. Cash budget for the current year and next year in case of contractors and seasonal industries

Table 10.6.1

Do

- Instruct the participants that this is group work.
- Divide the class into small groups of 4.
- Give each group a chart paper and coloured pen.
- Tell the participants that they have to make a matrix they need to fill.
- They have to write the main topics and key words that will help them effectively manage their enterprise.
- Give the participants 15 minutes to discuss and write.
- Keep a check on time. Tell the group to wind up quickly if they go beyond the given time limit.

Summarize

- Ask the participants what they have learned from this exercise/activity.
- Ask if they have any questions related to what they have talked about so far.
- Close the discussion by summarizing the importance of effective management to run an enterprise as given in the Participant Handbook.

10.6.7: 20 Questions to Ask Yourself before Considering Entrepreneurship

Unit Objectives

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

- List the important questions that every entrepreneur should ask before starting an enterprise

Resources to be Used

- Participant Handbook
- Blank sheets of paper
- Pens

Ask

- Why do you want to become an entrepreneur?

Say

- It is very important to know why you want to become an entrepreneur. Your personal goals for becoming an entrepreneur play a key role in the success of your business. Your goals should be clear well before you start your business.
- Apart from the goals, the other aspects of business that you need to bear in mind are the potential problems that you may face to set-up, your areas of interest, and all the other dimensions of the business.
- Let's understand it better with the help of some questions that every entrepreneur should ask before starting their own business.
- Open the Participant Handbook section named '20 Questions to Ask Yourself Before Considering Entrepreneurship'. You have to answer the questions individually.
- Then, we will have a class discussion on all the questions.

Do

- Read out the questions one by one in front of all the participants.
- Participants have to answer all the one by one questions.
- Give the class 10-15 minutes to note down their answers.
- At the end of 15 minutes, open the discussion for all the questions.
- Moderate the discussion by focusing on the relevant points.
- Keep a check on time and don't let the discussion get sabotaged or lose track of time. Ensure all the questions are covered and discussed.

Summarize

- Ask the participants what they have learned from this exercise/activity.
- Ask if they have any questions related to what they have talked about so far.



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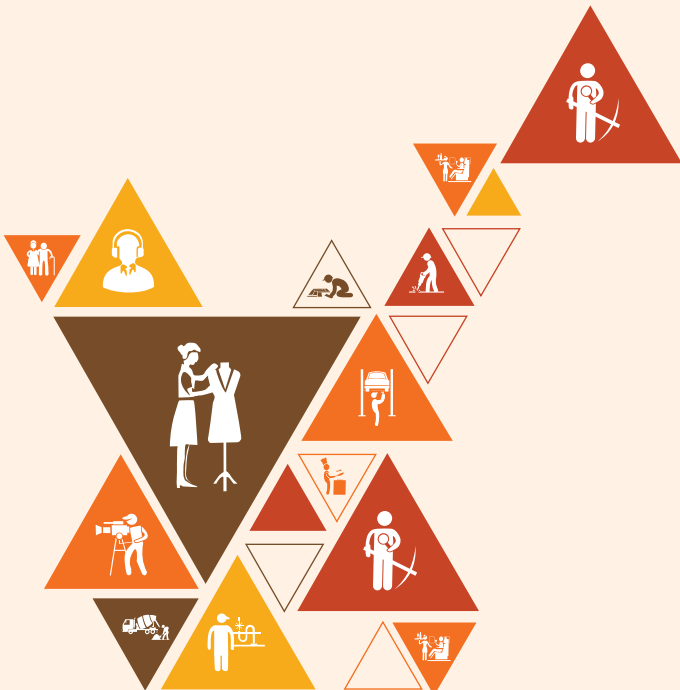
Transforming the skill landscape



11. Annexures

Annexure I: Training Delivery Plan

Annexure II: Assessment Criteria



Annexure I

Training Delivery Plan

Training Delivery Plan			
Program Name:	Rubber Internal Mixer Operator		
Qualification Pack Name & Ref. ID	Rubber Internal Mixer Operator - RSC/Q0112		
Version No.	1.0	Version Update Date	23/08/2017
Pre-requisites to Training (if any)	Class VIII th passed		
Training Outcomes	<p>By the end of this program, the participants will be able to:</p> <ol style="list-style-type: none"> 1- Prepare Internal Mixer & Accessories 2- Mix in Internal Mixer to prepare Rubber Compound 3- Undertake Post Internal Mixing Activities 4- Carry out housekeeping in rubber product manufacturing 5- Carry out reporting and documentation 6- Carry out quality checks 7- Carry out health & safety 8- Carry out problem identification and escalation 		

Sl. No	Module Name	Session Name	Session Objectives	NOS Reference	Methodology	Training Tools/Aids	Duration
1.	Introduction to Rubber	Introduction to rubber industry	<ul style="list-style-type: none"> • Discuss about the rubber. • Define types of rubber. • Describe natural rubber and process of extracting it from rubber tree. • Explain source of synthetic rubber and types of commonly used synthetic rubber. 	Bridge Module	<ul style="list-style-type: none"> • Facilitator led discussions • Quiz • Videos 	<ul style="list-style-type: none"> • White board & Markers • Notes • Laptop/Slides + Projector • Videos • Samples – RSS sheets, Crepe Rubber, TSR Rubber, Synthetic Rubber, Reclaimed Rubber, Rubber Product – 20 nos. 	8 Hrs

Sl. No	Module Name	Session Name	Session Objectives	NOS Reference	Methodology	Training Tools/Aids	Duration
			<ul style="list-style-type: none"> • Explain source of reclaimed rubber. • Describe Different uses of rubber. • Discuss about rubber industry in India. • Explain consumption of rubber in India • Discuss about various rubber bodies and associations. 				
2.	Introduction to Rubber	Types of Rubber Internal Mixing	<ul style="list-style-type: none"> • Explain what is rubber compound. • Describe history of rubber mixing. • Explain concept of rubber internal mixing. • Describe the construction of banbury mixer. • Describe the construction of intermix mixer. • Describe the construction of variable internal clearance mixer. 	RSC/N0133 KB1, KB2, KB4	<ul style="list-style-type: none"> • Facilitator led discussions • Quiz • Videos 	<ul style="list-style-type: none"> • White board & Markers • Notes • Laptop/Slides + Projector • Videos • Detailed diagram of Internal Mixer, Banbury mixer, VIC mixer • Samples of different rubber compounds. 	8 Hrs

Sl. No	Module Name	Session Name	Session Objectives	NOS Reference	Methodology	Training Tools/Aids	Duration
3.	Introduction to Rubber	Internal Mixing Basics	<ul style="list-style-type: none"> Describe Common Terminology used in Rubber Industry. Describe the ingredient materials of the Rubber Compound. Explain the application of Internal Mixing Process. Define type of Rubber compounds. 	RSC/N0133 KA1, KA14, KA16 KB12, KB14, KB16,	<ul style="list-style-type: none"> Facilitator led discussions Quiz Videos 	<ul style="list-style-type: none"> White board & Markers Notes Laptop/Slides + Projector Videos Rubber ingredient samples 	8 Hrs
4.	Introduction to Rubber	Equipment used in Rubber Internal Mixing	<ul style="list-style-type: none"> Explain the Equipment used in Internal Mixing process. Describe working of various equipment used in Internal Mixing Process. 	RSC/N0133 KB1, KB2, KB4	<ul style="list-style-type: none"> Facilitator led discussions Quiz Videos 	<ul style="list-style-type: none"> White board & Markers Notes Laptop/ Slides + Projector Videos Weighing scales Material handling equipment 	6 Hrs
5.	Introduction to Rubber	Job Role of a Rubber Internal Mixer Operator	<ul style="list-style-type: none"> Explain the Job role of a Internal Mixing Operator. 	RSC/N0133	<ul style="list-style-type: none"> Facilitator led discussions Quiz Videos 	<ul style="list-style-type: none"> White board & Markers Notes Laptop/ Slides + Projector Videos 	2 Hrs

Sl. No	Module Name	Session Name	Session Objectives	NOS Reference	Methodology	Training Tools/Aids	Duration
6.	Preparing Internal Mixing Machine	Internal Mixing Machine and its Parts	<ul style="list-style-type: none"> • Explain construction of a Internal Mixer. • Describe the details of parts of a Internal Mixer. 	RSC/N0133 KB1, KB2, KB4	<ul style="list-style-type: none"> • Facilitator led discussions • Question & answer sessions • Videos • Demonstrations • Practical activities 	<ul style="list-style-type: none"> • White board & Markers • Notes • Laptop/ Slides + Projector • Videos • Internal mixing machine 	8 Hrs
7.	Preparing Internal Mixing Machine	Machine Preparation for Internal Mixing	<ul style="list-style-type: none"> • Prepare Machine for Internal Mixing. • Demonstrate the cleaning process of Internal Mixer. • Describe the method to check ingredients of rubber compound. • Describe the process of arranging material for Internal Mixing. 	RSC/N0133 PC1, PC2, PC3, PC4, PC5, PC7, PC8	<ul style="list-style-type: none"> • Facilitator led discussions • Question & answer sessions • Videos • Demonstrations • Practical activities 	<ul style="list-style-type: none"> • White board & Markers • Notes • Laptop/ Slides + Projector • Videos • Internal mixing machine • Ingredients for rubber compound • material handling equipment • Machine cleaning equipment • Rags for machine cleaning 	8 Hrs
8.	Preparing Internal Mixing Machine	Machine Preparation for Internal Mixing	<ul style="list-style-type: none"> • Prepare Machine for Internal Mixing. • Demonstrate the cleaning process of Internal Mixer. • Describe the method to check ingredients of rubber compound. • Describe the process of arranging material for Internal Mixing. 	RSC/N0133 PC1, PC2, PC3, PC4, PC5, PC7, PC8, PC10, PC11, PC13, PC14, PC15	<ul style="list-style-type: none"> • Facilitator led discussions • Question & answer sessions • Videos • Demonstrations • Practical activities 	<ul style="list-style-type: none"> • White board & Markers • Notes • Laptop/ Slides + Projector • Videos • Internal mixing machine • Ingredients for rubber compound • material handling equipment • Machine cleaning equipment • Rags for machine cleaning 	8 Hrs

Sl. No	Module Name	Session Name	Session Objectives	NOS Reference	Methodology	Training Tools/Aids	Duration
9.	Preparing Internal Mixing Machine	Types of compound and their properties	<ul style="list-style-type: none"> • Explain main types of compound being used in industries. • Describe the properties of compounds. • Describe the use of various compounds. • Describe the application advantages of various rubber compound. 	RSC/N0134 KA4	<ul style="list-style-type: none"> • Facilitator led discussions • Question & answer sessions • Videos • Demonstrations • Practical activities 	<ul style="list-style-type: none"> • White board & Markers • Notes • Laptop/ Slides + Projector • Videos • Samples of rubber compound 	8 Hrs
10.	Preparing Internal Mixing Machine	Types of compound and their properties	<ul style="list-style-type: none"> • Explain main types of compound being used in industries. • Describe the properties of compounds. • Describe the use of various compounds. • Describe the application advantages of various rubber compound. 	RSC/N0134 KA4	<ul style="list-style-type: none"> • Facilitator led discussions • Question & answer sessions • Videos • Demonstrations • Practical activities 	<ul style="list-style-type: none"> • White board & Markers • Notes • Laptop/ Slides + Projector • Videos • Samples of rubber compound 	8 Hrs
11.	Preparing Internal Mixing Machine	Types of compound and their properties	<ul style="list-style-type: none"> • Explain main types of compound being used in industries. • Describe the properties of compounds. • Describe the use of various compounds. • Describe the application advantages of various rubber compound. 	RSC/N0134 KA4	<ul style="list-style-type: none"> • Facilitator led discussions • Question & answer sessions • Videos • Demonstrations • Practical activities 	<ul style="list-style-type: none"> • White board & Markers • Notes • Laptop/ Slides + Projector • Videos • Samples of rubber compound 	8 Hrs

Sl. No	Module Name	Session Name	Session Objectives	NOS Reference	Methodology	Training Tools/Aids	Duration
12.	Performing Internal Mixing Operation	Initial checks for Internal mixer	<ul style="list-style-type: none"> • Demonstrate Machine checkup points before Internal Mixing Operation. • Demonstrate Control Panel checkup points before Internal Mixing Operation. • Describe General operating instruction before Internal Mixing Operation. • Describe preparation points before Internal Mixing Operation. 	RSC/N0134 PC1, PC2, PC3, PC4, PC5, PC6, PC7, PC8, PC9,	<ul style="list-style-type: none"> • Facilitator led discussions • Question & answer sessions • Videos • Demonstrations • Practical activities 	<ul style="list-style-type: none"> • White board & Markers • Notes • Laptop/Slides + Projector • Videos • Internal mixing machine • Ingredients for rubber compound • material handling equipment 	8 Hrs
13.	Performing Internal Mixing Operation	Initial checks for Internal mixer	<ul style="list-style-type: none"> • Demonstrate Machine checkup points before Internal Mixing Operation. • Demonstrate Control Panel checkup points before Internal Mixing Operation. • Describe General operating instruction before Internal Mixing Operation. • Describe preparation points before Internal Mixing Operation. 	RSC/N0134 PC1, PC2, PC3, PC4, PC5, PC6, PC7, PC8, PC9,	<ul style="list-style-type: none"> • Facilitator led discussions • Question & answer sessions • Videos • Demonstrations • Practical activities 	<ul style="list-style-type: none"> • White board & Markers • Notes • Laptop/Slides + Projector • Videos • Internal mixing machine • Ingredients for rubber compound • material handling equipment 	8 Hrs

Sl. No	Module Name	Session Name	Session Objectives	NOS Reference	Methodology	Training Tools/Aids	Duration
14.	Performing Internal Mixing Operation	Operating rubber internal mixer	<ul style="list-style-type: none"> • Demonstrate the steps for performing Internal Mixing Operation. • Describe the Safety Precautions to be taken during Internal Mixing Operation. • Discuss Do's and Don'ts for Internal Mixing Operation. • Define Responsibilities of Internal Mixing Operator during Internal mixing. 	RSC/N0134 PC1, PC2, PC3, PC4, PC5, PC6, PC7, PC8, PC9,	<ul style="list-style-type: none"> • Facilitator led discussions • Question & answer sessions • Videos 	<ul style="list-style-type: none"> • White board & Markers • Notes • Laptop/Slides + Projector • Videos • Internal mixing machine • Ingredients for rubber compound • material handling equipment 	8 Hrs
15.	Performing Internal Mixing Operation	Operating rubber internal mixer	<ul style="list-style-type: none"> • Demonstrate the steps for performing Internal Mixing Operation. • Describe the Safety Precautions to be taken during Internal Mixing Operation. • Discuss Do's and Don'ts for Internal Mixing Operation. • Define Responsibilities of Internal Mixing Operator during Internal mixing. 	RSC/N0134 PC1, PC2, PC3, PC4, PC5, PC6, PC7, PC8, PC9,	<ul style="list-style-type: none"> • Facilitator led discussions • Question & answer sessions • Videos 	<ul style="list-style-type: none"> • White board & Markers • Notes • Laptop/Slides + Projector • Videos • Internal mixing machine • Ingredients for rubber compound • material handling equipment 	8 Hrs

Sl. No	Module Name	Session Name	Session Objectives	NOS Reference	Methodology	Training Tools/Aids	Duration
16.	Performing Internal Mixing Operation	Operating rubber internal mixer	<ul style="list-style-type: none"> • Demonstrate the steps for performing Internal Mixing Operation. • Describe the Safety Precautions to be taken during Internal Mixing Operation. • Discuss Do's and Don'ts for Internal Mixing Operation. • Define Responsibilities of Internal Mixing Operator during Internal mixing. 	RSC/N0134 PC1, PC2, PC3, PC4, PC5, PC6, PC7, PC8, PC9,	<ul style="list-style-type: none"> • Facilitator led discussions • Question & answer sessions • Videos 	<ul style="list-style-type: none"> • White board & Markers • Notes • Laptop/Slides + Projector • Videos • Internal mixing machine • Ingredients for rubber compound • material handling equipment 	8 Hrs
17.	Performing Internal Mixing Operation	Operating rubber internal mixer	<ul style="list-style-type: none"> • Demonstrate the steps for performing Internal Mixing Operation. • Describe the Safety Precautions to be taken during Internal Mixing Operation. • Discuss Do's and Don'ts for Internal Mixing Operation. • Define Responsibilities of Internal Mixing Operator during Internal mixing. 	RSC/N0134 PC1, PC2, PC3, PC4, PC5, PC6, PC7, PC8, PC9,	<ul style="list-style-type: none"> • Facilitator led discussions • Question & answer sessions • Videos 	<ul style="list-style-type: none"> • White board & Markers • Notes • Laptop/Slides + Projector • Videos • Internal mixing machine • Ingredients for rubber compound • material handling equipment 	8 Hrs

Sl. No	Module Name	Session Name	Session Objectives	NOS Reference	Methodology	Training Tools/Aids	Duration
18.	Performing Internal Mixing Operation	Operating rubber internal mixer	<ul style="list-style-type: none"> • Demonstrate the steps for performing Internal Mixing Operation. • Describe the Safety Precautions to be taken during Internal Mixing Operation. • Discuss Do's and Don'ts for Internal Mixing Operation. • Define Responsibilities of Internal Mixing Operator during Internal mixing. 	RSC/N0134 PC1, PC2, PC3, PC4, PC5, PC6, PC7, PC8, PC9,	<ul style="list-style-type: none"> • Facilitator led discussions • Question & answer sessions • Videos 	<ul style="list-style-type: none"> • White board & Markers • Notes • Laptop/Slides + Projector • Videos • Internal mixing machine • Ingredients for rubber compound • material handling equipment 	8 Hrs
19.	Performing Internal Mixing Operation	Operating rubber internal mixer	<ul style="list-style-type: none"> • Demonstrate the steps for performing Internal Mixing Operation. • Describe the Safety Precautions to be taken during Internal Mixing Operation. • Discuss Do's and Don'ts for Internal Mixing Operation. • Define Responsibilities of Internal Mixing Operator during Internal mixing. 	RSC/N0134 PC1, PC2, PC3, PC4, PC5, PC6, PC7, PC8, PC9,	<ul style="list-style-type: none"> • Facilitator led discussions • Question & answer sessions • Videos 	<ul style="list-style-type: none"> • White board & Markers • Notes • Laptop/Slides + Projector • Videos • Internal mixing machine • Ingredients for rubber compound • material handling equipment 	8 Hrs

Sl. No	Module Name	Session Name	Session Objectives	NOS Reference	Methodology	Training Tools/Aids	Duration
20.	Performing Internal Mixing Operation	Operating rubber internal mixer	<ul style="list-style-type: none"> • Demonstrate the steps for performing Internal Mixing Operation. • Describe the Safety Precautions to be taken during Internal Mixing Operation. • Discuss Do's and Don'ts for Internal Mixing Operation. • Define Responsibilities of Internal Mixing Operator during Internal mixing. 	RSC/N0134 PC1, PC2, PC3, PC4, PC5, PC6, PC7, PC8, PC9,	<ul style="list-style-type: none"> • Facilitator led discussions • Question & answer sessions • Videos 	<ul style="list-style-type: none"> • White board & Markers • Notes • Laptop/Slides + Projector • Videos • Internal mixing machine • Ingredients for rubber compound • material handling equipment 	8 Hrs
21.	Perform Post Internal Mixing Activities	Post Internal Mixing Activities	<ul style="list-style-type: none"> • Explain Post-Internal Mixing activities. • Describe the Quality issues in Internal Mixing operations. • Define the Countermeasures to be taken on quality issues related to Internal Mixing. 	RSC/N0135 PC1, PC2, PC3, PC4, PC5, PC6, PC7, PC8, PC9, PC10, KA2, KA4, KA5, KB1, KB3, KB7, KB11	<ul style="list-style-type: none"> • Facilitator led discussions • Question & answer sessions • Videos • Demonstrations • Practical activities 	<ul style="list-style-type: none"> • White board & Markers • Notes • Laptop/ Slides + Projector • Videos • Internal mixing machine • Rubber compound • material handling equipment 	8 Hrs

Sl. No	Module Name	Session Name	Session Objectives	NOS Reference	Methodology	Training Tools/Aids	Duration
22.	Perform Post Internal Mixing Activities	Post Internal Mixing Activities	<ul style="list-style-type: none"> • Explain Post-Internal Mixing activities. • Describe the Quality issues in Internal Mixing operations. • Define the Countermeasures to be taken on quality issues related to Internal Mixing. 	RSC/N0135 PC1, PC2, PC3, PC4, PC5, PC6, PC7, PC8, PC9, PC10, KA2, KA4, KA5, KB1, KB3, KB7, KB11	<ul style="list-style-type: none"> • Facilitator led discussions • Question & answer sessions • Videos • Demonstrations • Practical activities 	<ul style="list-style-type: none"> • White board & Markers • Notes • Laptop/ Slides + Projector • Videos • Internal mixing machine • Rubber compound • material handling equipment 	8 Hrs
23.	Perform Post Internal Mixing Activities	Post Internal Mixing Activities	<ul style="list-style-type: none"> • Explain Post-Internal Mixing activities. • Describe the Quality issues in Internal Mixing operations. • Define the Countermeasures to be taken on quality issues related to Internal Mixing. 	RSC/N0135 PC1, PC2, PC3, PC4, PC5, PC6, PC7, PC8, PC9, PC10, KA2, KA4, KA5, KB1, KB3, KB7, KB11	<ul style="list-style-type: none"> • Facilitator led discussions • Question & answer sessions • Videos • Demonstrations • Practical activities 	<ul style="list-style-type: none"> • White board & Markers • Notes • Laptop/ Slides + Projector • Videos • Internal mixing machine • Rubber compound • material handling equipment 	8 Hrs
24.	Perform Post Internal Mixing Activities	Post Internal Mixing Activities	<ul style="list-style-type: none"> • Explain Post-Internal Mixing activities. • Describe the Quality issues in Internal Mixing operations. • Define the Countermeasures to be taken on quality issues related to Internal Mixing. 	RSC/N0135 PC1, PC2, PC3, PC4, PC5, PC6, PC7, PC8, PC9, PC10, KA2, KA4, KA5, KB1, KB3, KB7, KB11	<ul style="list-style-type: none"> • Facilitator led discussions • Question & answer sessions • Videos • Demonstrations • Practical activities 	<ul style="list-style-type: none"> • White board & Markers • Notes • Laptop/ Slides + Projector • Videos • Internal mixing machine • Rubber compound • material handling equipment 	8 Hrs

Sl. No	Module Name	Session Name	Session Objectives	NOS Reference	Methodology	Training Tools/Aids	Duration
25.	Perform Post Internal Mixing Activities	Post Internal Mixing Activities	<ul style="list-style-type: none"> • Explain Post-Internal Mixing activities. • Describe the Quality issues in Internal Mixing operations. • Define the Countermeasures to be taken on quality issues related to Internal Mixing. 	RSC/N0135 PC1, PC2, PC3, PC4, PC5, PC6, PC7, PC8, PC9, PC10, KA2, KA4, KA5, KB1, KB3, KB7, KB11	<ul style="list-style-type: none"> • Facilitator led discussions • Question & answer sessions • Videos • Demonstrations • Practical activities 	<ul style="list-style-type: none"> • White board & Markers • Notes • Laptop/ Slides + Projector • Videos • Internal mixing machine • Rubber compound • material handling equipment 	8 Hrs
26.	Perform Post Internal Mixing Activities	Disposal of Rubber Waste	<ul style="list-style-type: none"> • Explain Post-Internal Mixing activities. • Describe the Quality issues in Internal Mixing operations. • Define the Countermeasures to be taken on quality issues related to Internal Mixing. 	RSC/N0135 PC7, KB4	<ul style="list-style-type: none"> • Facilitator led discussions • Question & answer sessions • Videos • Demonstrations • Practical activities 	<ul style="list-style-type: none"> • White board & Markers • Notes • Laptop/Slides + Projector • Videos • Rubber scrap samples • Field visit to scrap rubber dumping yard • Field visit to rubber recycling plant 	8 Hrs
27.	Carry out Housekeeping in Rubber Product Manufacturing	Need and Benefits of Housekeeping	<ul style="list-style-type: none"> • Explain what is housekeeping. • Define importance of Housekeeping. • Describe purpose of Housekeeping. • Explain benefits of Housekeeping. 	RSC/N5001 PC1, PC2, PC3, PC10, PC11, PC15, PC16, PC17, PC18, PC19, PC20	<ul style="list-style-type: none"> • Facilitator led discussions • Question & answer sessions • Videos • Demonstrations. • Practical activities 	<ul style="list-style-type: none"> • White board & Markers • Notes • Laptop/Slides + Projector • Videos • Different Cleaning Equipment 	8 Hrs

Sl. No	Module Name	Session Name	Session Objectives	NOS Reference	Methodology	Training Tools/Aids	Duration
28.	Carry out Housekeeping in Rubber Product Manufacturing	Need and Benefits of Housekeeping	<ul style="list-style-type: none"> • Explain what is housekeeping. • Define importance of Housekeeping. • Describe purpose of Housekeeping. • Explain benefits of Housekeeping. 	RSC/N5001 PC1, PC2, PC3, PC10, PC11, PC15, PC16, PC17, PC18, PC19, PC20	<ul style="list-style-type: none"> • Facilitator led discussions • Question & answer sessions • Videos • Demonstrations. • Practical activities 	<ul style="list-style-type: none"> • White board & Markers • Notes • Laptop/Slides + Projector • Videos • Different Cleaning Equipment 	8 Hrs
29.	Carry out Housekeeping in Rubber Product Manufacturing	'5S' Methodology of Housekeeping.	<ul style="list-style-type: none"> • Explain what is '5S'. • Define each 'S' and its meaning. 	RSC/N0134 KA13 RSC/N0135 KA10	<ul style="list-style-type: none"> • Facilitator led discussions • Question & answer sessions • Videos • Demonstra-tions • Practical activities 	<ul style="list-style-type: none"> • White board & Markers • Notes • Laptop/Slides + Projector • Videos • Different Cleaning Equipment 	8 Hrs
30.	Carry out Housekeeping in Rubber Product Manufacturing	'5S' Methodology of Housekeeping.	<ul style="list-style-type: none"> • Explain what is '5S'. • Define each 'S' and its meaning. 	RSC/N0134 KA13 RSC/N0135 KA10	<ul style="list-style-type: none"> • Facilitator led discussions • Question & answer sessions • Videos • Demonstra-tions • Practical activities 	<ul style="list-style-type: none"> • White board & Markers • Notes • Laptop/Slides + Projector • Videos • Different Cleaning Equipment 	8 Hrs
31.	Carry out Reporting and Documentat-ion	'Day to Day Activities Documentation	<ul style="list-style-type: none"> • Explain what is documenta-tion. • Describe the importance of documenta-tion. • Define purpose of documenta-tion. • Explain types of documenta-tion. 	RSC/N5002 PC1, PC2, PC3	<ul style="list-style-type: none"> • Facilitator led discussions • Question & answer sessions • Videos • Demonstra-tions • Practical activities 	<ul style="list-style-type: none"> • White board & Markers • Notes • Laptop/Slides + Projector • Videos • Sample of documenta-tions • Sample of reports • Sample of procedure • Sample of work instructions 	4 Hrs

Sl. No	Module Name	Session Name	Session Objectives	NOS Reference	Methodology	Training Tools/Aids	Duration
			<ul style="list-style-type: none"> Describe common documentations used in rubber industry. Explain what is reporting. Describe importance of Reporting. 				
32.	Carry out Reporting and Documentation	Organisation Procedure for Reporting and Documentation	<ul style="list-style-type: none"> Explain about Government Act and Bylaws. Describe about rules. Define meaning of Policies and Guidelines. Describe meaning of Procedure. Explain what is work instruction. Discuss Organisational Procedures for Reporting and Documentation Tyres. 	RSC/N5002 PC4, PC5, PC6, PC7	<ul style="list-style-type: none"> Facilitator led discussions Quiz Videos 	<ul style="list-style-type: none"> White board & Markers Notes Laptop/Slides + Projector Videos Sample of Documentations Sample of Reports Sample of Procedure Sample of Work Instructions 	4 Hrs
33.	Carry out Reporting and Documentation	Communication in Organization	<ul style="list-style-type: none"> Define what is communication. Describe communication process. Explain problems in communication. Describe various communication barriers. 	RSC/N5002 Pc4, PC5, PC6, PC7	<ul style="list-style-type: none"> Facilitator led discussions Quiz Videos 	<ul style="list-style-type: none"> White board & Markers Notes Laptop/Slides + Projector Videos 	6 Hrs

Sl. No	Module Name	Session Name	Session Objectives	NOS Reference	Methodology	Training Tools/Aids	Duration
			<ul style="list-style-type: none"> • Explain traits of Active Listening. • Discuss points of good writing skill. • Explain how to resolve conflict with team member. 				
34.	Carry out Reporting and Documentation	Work Management	<ul style="list-style-type: none"> • Decide priority of work required to be done. • Describe how to select work to do from pending work. 	RSC/N5002 Pc4, PC5, PC6, PC7	<ul style="list-style-type: none"> • Facilitator led discussions • Question & answer sessions • Videos • Practical activities 	<ul style="list-style-type: none"> • White board & Markers • Notes • Laptop/ Slides + Projector • Videos 	2 Hrs
35.	Carry Out Quality Checks	Quality in internal mixing	<ul style="list-style-type: none"> • Define need of Quality Control in Internal Mixing. • Identify and discuss inspection technique for Rubber compound. • Describe testing equipment for Rubber compound. 	RSC/N5003 PC1, PC2	<ul style="list-style-type: none"> • Facilitator led discussions • Question & answer sessions • Videos • Demonstra-tions • Practical activities 	<ul style="list-style-type: none"> • White board & Markers • Notes • Laptop/Slides + Projector • Videos • Inspection Tools – Vernier Caliper, Micrometer • Rubber Hardness Tester • Measuring Tape / ruler • Tensile testing machine • Mooney viscometer • Weighing scale • Oscillating disc rheometer • Heating oven 	8 Hrs

Sl. No	Module Name	Session Name	Session Objectives	NOS Reference	Methodology	Training Tools/Aids	Duration
36.	Carry Out Quality Checks	Quality in internal mixing	<ul style="list-style-type: none"> Define need of Quality Control in Internal Mixing. Identify and discuss inspection technique for Rubber compound. Describe testing equipment for Rubber compound. 	RSC/N5003 PC1, PC2	<ul style="list-style-type: none"> Facilitator led discussions Question & answer sessions Videos Demonstrations Practical activities 	<ul style="list-style-type: none"> White board & Markers Notes Laptop/Slides + Projector Videos Inspection Tools – Vernier Caliper, Micrometer Rubber Hardness Tester Measuring Tape / ruler Tensile testing machine Mooney viscometer Weighing scale Oscillating disc rheometer Heating oven 	8 Hrs
37.	Carry Out Quality Checks	Defects of compound and solving quality problems	<ul style="list-style-type: none"> Define various Quality defects of compound. Demonstrate problem solving techniques. Discuss Implication of Quality defects. 	RSC/N5003 PC1, PC2, PC3, PC4, PC5, PC6, PC7, PC8, PC9	<ul style="list-style-type: none"> Facilitator led discussions Question & answer sessions Videos Demonstrations Practical activities 	<ul style="list-style-type: none"> White board & Markers Notes Laptop/Slides + Projector Videos Defective rubber compound samples Samples of rubber parts produced with defective compound 	8 Hrs
38.	Carry Out Quality Checks	Defects of compound and solving quality problems	<ul style="list-style-type: none"> Define various Quality defects of compound. Demonstrate problem solving techniques. Discuss Implication of Quality defects. 	RSC/N5003 PC1, PC2, PC3, PC4, PC5, PC6, PC7, PC8, PC9	<ul style="list-style-type: none"> Facilitator led discussions Question & answer sessions Videos Demonstrations Practical activities 	<ul style="list-style-type: none"> White board & Markers Notes Laptop/Slides + Projector Videos Defective rubber compound samples Samples of rubber parts produced with defective compound 	8 Hrs

Sl. No	Module Name	Session Name	Session Objectives	NOS Reference	Methodology	Training Tools/Aids	Duration
39.	Health & Safety	Hazards in rubber industry	<ul style="list-style-type: none"> • Explain what is hazard. • Identify Hazard in rubber industry. • Describe Chemical hazard. • Describe Physical hazard. • Describe Ergonomic hazard. 	RSC/N5007 PC1, PC2, PC3, PC4, PC5, PC6, PC7, PC8, PC9	<ul style="list-style-type: none"> • Facilitator led discussions • Question & answer sessions • Videos • Demonstra-tions • Practical activities 	<ul style="list-style-type: none"> • White board & Markers • Notes • Laptop/ Slides + Projector • Videos 	4 Hrs
40.	Health & Safety	Health & Safety requirement for rubber industry	<ul style="list-style-type: none"> • Explain the health and safety requirements for rubber industry. • Discuss health and safety procedure of organisation. 	RSC/N5007 PC11, PC12, PC13, PC4, PC5, PC6, PC7, PC8, PC9	<ul style="list-style-type: none"> • Facilitator led discussions • Question & answer sessions • Videos • Demonstrations • Practical activities 	<ul style="list-style-type: none"> • White board & Markers • Notes • Laptop/ Slides + Projector • Videos 	4 Hrs
41.	Health & Safety	Safety equipment for rubber industry	<ul style="list-style-type: none"> • Explain what is PPEs. • Discuss requirement of PPE. • Identify different types of PPEs used in rubber industry. • Describe the purpose of various PPEs used in rubber industry. • Demonstrate the Use of different PPEs. 	RSC/N5007 Pc17, PC28, KB12	<ul style="list-style-type: none"> • Facilitator led discussions • Question & answer sessions • Videos • Demonstrations • Practical activities 	<ul style="list-style-type: none"> • White board & Markers • Notes • Laptop/Slides + Projector • Videos • Sample of PPEs – Safety Goggle, Safety Shoes, Safety Gloves, Safety Hat, Mask, Earmuff 	8 Hrs

Sl. No	Module Name	Session Name	Session Objectives	NOS Reference	Methodology	Training Tools/Aids	Duration
42.	Health & Safety	Handling fire and other emergencies	<ul style="list-style-type: none"> • Define what is emergency. • Describe various emergency situations in Industry. • Describe common injuries in industry. • Describe First Aid box and its constituents. • Demonstrate how to handle Fire Emergencies. • Demonstrate how to use a multi purpose Fire Extinguisher. • Describe type and class of Fires. • Describe suitable fire extinguisher as per fire type and class. 	RSC/N5007 PC11, PC12, PC13, PC14, PC15, PC16, PC17, PC18, PC19, KB3,	<ul style="list-style-type: none"> • Facilitator led discussions • Question & answer sessions • Videos • Demonstrations • Practical activities 	<ul style="list-style-type: none"> • White board & Markers • Notes • Laptop/ Slides + Projector • Videos • First Aid Box • Fire Extinguisher 	8 Hrs
43.	Health & Safety	Handling fire and other emergencies	<ul style="list-style-type: none"> • Define what is emergency. • Describe various emergency situations in Industry. • Describe common injuries in industry. • Describe First Aid box and its constituents. • Demonstrate how to handle Fire Emergencies. 	RSC/N5007 PC23, PC24, PC25	<ul style="list-style-type: none"> • Facilitator led discussions • Question & answer sessions • Videos • Demonstrations • Practical activities 	<ul style="list-style-type: none"> • White board & Markers • Notes • Laptop/ Slides + Projector • Videos • First Aid Box • Fire Extinguisher 	8 Hrs

Sl. No	Module Name	Session Name	Session Objectives	NOS Reference	Methodology	Training Tools/Aids	Duration
			<ul style="list-style-type: none"> • Demonstrate how to use a multi purpose Fire Extinguisher. • Describe type and class of Fires. • Describe suitable fire extinguisher as per fire type and class. 				
44.	Carry out Problem Identification and Escalation	Problem Identification and Escalating to Supervisor	<ul style="list-style-type: none"> • Explain what is Problem. • Describe how to identify problem. • Define hierarchies. • Discuss hierarchy in rubber industry. • Explain how to escalate problem. • Describe need for escalation. 	RSC/N5004 PC1, PC2, PC3, PC4, PC5, PC6, PC7, PC8, PC9, PC21, PC22, PC23, PC24	<ul style="list-style-type: none"> • Facilitator led discussions • Question & answer sessions • Videos • Practical activities 	<ul style="list-style-type: none"> • White board & Markers • Notes • Laptop/ Slides + Projector • Videos 	8 Hrs

Annexure II

Assessment Criteria

CRITERIA FOR ASSESSMENT OF TRAINEES

Assessment Criteria for Rubber Internal Mixer Operator	
Job Role	Rubber Internal Mixer Operator
Qualification Pack	RSQ/Q0112
Sector Skill Council	Rubber Industry
Sr. No.	Guidelines for Assessment
1	Criteria for assessment for each Qualification Pack will be created by the SectorSkill Council. Each Performance Criteria (PC) will be assigned marks proportional to its importance in NOS. SSC will also lay down proportion of marks for Theory and Skills Practical for each PC.
2	The assessment for the theory part will be based on knowledge bank of questions created by the SSC.
3	Assessment will be conducted for all compulsory NOS, and where applicable, on the selected elective/ option NOS/set of NOS.
4	assessment agencies will create unique question papers for theory part for each candidate at each examination/ training centre (as per assessment criteria below).
5	Individual assessment agencies will create unique evaluations for skill practical for every student at each examination/training centre based on this criteria.
6	To pass the Qualification Pack , every trainee should score a minimum of 70% of aggregate marks to successfully clear the assessment.
7	In case of unsuccessful completion, the trainee may seek reassessment on the Qualification Pack.

Assessable Outcomes	Assessment Criteria (PC)	Total Marks	Out of	Theory	Practical Skills
RSC/N0133 Prepare internal mixer and accessories_v2	PC1. Ensure that the mixer is clean and ready for operation	100	3	3	0
	PC2. Ensure functioning of safety features of Internal Mixer and other accessories		4	4	0
	PC3. Ensure proper functioning of different upstream and downstream equipment attached with the Mixer like hydraulic/pneumatic system, temperature control unit (TCU), lubrication system, energy control system (power integrator), dust extractor including material/ batch handling equipment as appropriate		15	5	10
	PC4. Set parameters for the equipment (mixing cycle time, temperature, energy and pressure) and Filler & Oil loading system as per company's SOP Raw material appropriateness		15	5	10
	PC5. Ensure availability of pre-weighed, approved rubber and other ingredients to be fed as per batch requirement		8	3	5
	PC6. Ensure that weighing scale(Put up or the scale used for weighing rubber, mixed chemicals) is calibrated		8	3	5
	PC7. Ensure that rubber compound to be fed is approved by laboratory		3	3	0
	PC8. Ensure that all raw materials have been assembled/organized (in correct sequence, if applicable) to be fed into mixer		8	3	5
	PC9. Ensure all ingredients are homogeneously mixed.		3	3	0

	PC10. Ensure proper housekeeping and safety in mixing area		3	3	0
	PC11. Ensure that electrical devices that may be exposed to carbon black dust are sealed.		3	3	0
	PC12. Blow periodically the electrical devices with clean/dry compressed air or vacuum clean.		3	3	0
	PC13. Ensure that the exhaust systems are used to maintain the concentration levels		8	3	5
	PC14. Adhere to all safety norms (like wearing protective gloves, shoes, Safety Glasses etc)		8	3	5
	PC15. Comply with health, safety, environment guidelines, regulations etc in accordance with international/national standards or organizational SOP		8	3	5
	Total		100	50	50
RSC/N0134 Mix in internal mixer to prepare rubber compound_v2	PC1. Handle the rubber compound to avoid contamination	100	3	3	0
	PC2. Ensure that batch size of rubber mix is as per company's SOP		3	3	0
	PC3. Ensure that identified & approved materials are used.		8	3	5
	PC4. Ensure that the sequence in shift is based on raw material availability to maximize output		8	3	5
	PC5. Add the ingredients in sequence as per SOP considering different types of mixing process possible		10	5	5
	PC6. Check and adjust cooling water flow rate (mixing temperature control)		10	5	5
	PC7. As per cycle, raise Ram/open kneader and brush powder inside kneader from machine side as per SOP		15	5	10
	PC8. Control mixing process and completion as per SOP (temperature or time or energy as programmed/ specified)		4	4	0
	PC9. Release the batch after completion of mixing cycle as per SOP		3	3	0
	PC10. Inform the batch off mill man about the release of batch as per SOP.		3	3	0
	PC11. Prepare the Internal Mixer for next batch as per Planning.		3	3	0
	PC12. Ensure Housekeeping and Safety in mixing area		3	3	0
	PC13. Ensure that electrical devices that may be exposed to carbon black dust are sealed.		3	3	0
	PC14. Blow periodically the electrical devices with clean/dry compressed air or vacuum clean.		3	3	0

	PC15. Ensure that the exhaust systems are used to maintain the concentration levels of various particulate matters within limits		6	3	3
	PC16. Adhere to all safety norms (like wearing protective gloves, shoes, Safety Glasses, etc.)		5	4	1
	PC17. Comply with health, safety, environment guidelines, regulations etc in accordance with international/national standards or organizational SOP		5	4	1
	Total		100	60	40
RSC/N0135 Undertake post internal mixing activities_v2	PC1. Tilt the kneader on completion of cycle or discharge the batch from internal mixer after completion of mixing cycle		8	3	5
	PC2. Unload master batch/compound in a tray		8	3	5
	PC3. Ensure that no compound has been left inside (before charging for next batch)		7	2	5
	PC4. Handle the finished batch on dump mill as per SOP		3	3	0
	PC5. Ensure shifting of the batch from dump mill to the batch off unit for cooling & stacking on the skids as per SOP		3	3	0
	PC6. Handover the equipment to the next operator in clean and good condition		3	3	0
	PC7. Dispose waste material in safe manner as per company's SOP		8	4	4
	PC8. Ensure identification and traceability by batch marking/coding for the right product as per instructions laid down by the company (in terms of batch number, colour, date stamp etc)		14	4	10
	PC9. Send sample of specified compound/ batch in specified form to lab for testing		4	4	0
	PC10. Send the remaining material to the designated storage area		5	0	5
	PC11. Ensure Housekeeping and Safety in mixing area		4	4	0
	PC12. Ensure that electrical devices that may be exposed to carbon black dust are sealed		4	4	0
	PC13. Blow periodically the electrical devices with clean/dry compressed air or vacuum clean		4	4	0
	PC14. Ensure that the exhaust systems are used to maintain the concentration levels of various particulate matters within limits		9	5	4
	PC15. Adhere to all safety norms (like wearing protective gloves, shoes, Safety Glasses, etc)		8	2	6

	PC16. Comply with health, safety, environment guidelines, regulations etc in accordance with international/national standards or organizational SOP		8	2	6
	Total		100	50	50
RSC/N5001 Carry out housekeeping in rubber product manufacturing	PC1. Inspect the area while taking into account various surfaces	100	4	2	2
	PC2. Inspect the area is free of usable material intended for mixing on the floor .		0	0	0
	PC3. Identify the material requirements for cleaning the areas inspected, by considering risk, time, efficiency and type of stain		5	2	3
	PC4. Ensure that the cleaning equipment is in proper working condition		4	2	2
	PC5. Select the suitable alternatives for cleaning the areas in case the appropriate equipment and materials are not available and inform the appropriate person		4	2	2
	PC6. Plan the sequence for cleaning the area to avoid re-soiling clean areas and surfaces		4	2	2
	PC7. Inform the affected people about the cleaning activity		2	0	2
	PC8. Display the appropriate signage for the work being conducted		6	1	5
	PC9. Ensure that there is adequate ventilation for the work being carried out		1	1	0
	PC10. Wear the personal protective equipment required for the cleaning method and materials being used		4	2	2
	PC11. Use the correct cleaning method for the work area, type of soiling and surface		2	2	0
	PC12. Carry out cleaning activity without disturbing others		5	0	5
	PC13. Deal with accidental damage, if any, caused while carrying out the work		10	0	10
	PC14. Report to the appropriate person any difficulties in carrying out your work		2	2	0
	PC15. Identify and report to the appropriate person any additional cleaning required that is outside one's responsibility or skill		2	2	0
	PC16. Ensure that there is no oily substance on the floor to avoid slippage		7	2	5
	PC17. Ensure that no scrap material is lying around		7	2	5
	PC18. Maintain and store housekeeping equipment and supplies		7	2	5

	PC19. Follow workplace procedures to deal with any accidental damage caused during the cleaning process		4	2	2
	PC20. Ensure that, on completion of the work, the area is left clean and dry and meets requirements		4	2	2
	PC21. Return the equipment, materials and personal protective equipment that were used to the right places making sure they are clean, safe and securely stored		4	2	2
	PC22. Dispose the waste garnered from the activity in an appropriate manner		4	2	2
	PC23. Dispose of used and un-used solutions according to manufacturer's instructions, and clean the equipment thoroughly		4	2	2
	PC24. Maintain schedules and records for housekeeping duty		2	2	0
	PC25. Replenish any necessary supplies or consumables		2	2	0
	Total		100	40	60
RSC/N5002 Carry Out Reporting And Documenta- tion	PC1. Report data/problems/incidents as applicable in a timely manner		15	5	10
	PC2. Report to the appropriate authority as laid down by the company		15	5	10
	PC3. Follow reporting procedures as prescribed by the company		15	5	10
	PC4. Identify documentation to be completed relating to one's role		10	5	5
	PC5. Record details accurately an appropriate format		5	5	0
	PC6. Complete all documentation within stipulated time according to company procedure		15	5	10
	PC7. Ensure that the final document meets with the requirements of the persons who requested it or make any amendments accordingly		8	3	5
	PC8. Make sure documents are available to all appropriate authorities to inspect		2	2	0
	PC9. Respond to requests for information in an appropriate manner whilst following organizational procedures		10	10	5
	PC10. Inform the appropriate authority of requests for information received		5	0	5
	Total		100	40	60
RSC/N5003 Carry Out Quality Checks	PC1. Ensure that total range of checks are regularly and consistently performed	100	7	2	5
	PC2. Use appropriate measuring instruments, equipment, tools, accessories etc ,as required		7	2	5
	PC3. Identify non-conformities to quality assurance standards		5	2	3
	PC4. Identify potential causes of non-conformities to quality assurance standards		15	5	10

	PC5. Identify impact on final product due to non-conformance to company standards		15	5	10
	PC6. Evaluating the need for action to ensure that problems do not recur		5	0	5
	PC7. Suggest corrective action to address problem		15	5	5
	PC8. Review effectiveness of corrective action		5	0	5
	PC9. Interpret the results of the quality check correctly		7	2	2
	PC10. Take up results of the findings with QC in charge/appropriate authority.		6	2	4
	PC11. Take up the results of the findings within stipulated time		6	2	4
	PC12. Record of results of action taken		4	2	2
	PC13. Record adjustments not covered by established procedures for future reference		2	2	0
	PC14. Review effectiveness of action taken		4	2	2
	PC15. Follow reporting procedures where the cause of defect cannot be identified		2	2	0
	Total		100	35	65
RSC/N5004 Carry Out Problem Identification And Escalation	PC1. Identify defects/indicators of problems	100	3	1	2
	PC2. Identify any wrong practices that may lead to problems		3	1	2
	PC3. Identify practices that may impact the final product quality		3	1	2
	PC4. Identify if the problem has occurred before		1	1	0
	PC5. Identify other operations that might be impacted by the problem		7	2	5
	PC6. Ensure that no delays are caused as a result of failure to escalate problems		5	2	3
	PC7. Take appropriate materials and sample, conduct tests and evaluate results to establish reasons to confirm suspected reasons for non-conformance (where required)		6	2	4
	PC8. Consider possible reasons for identification of problems		6	3	3
	PC9. Consider applicable corrections and formulate corrective action		6	3	3
	PC10. Formulate action in a timely manner		6	3	3
	PC11. Communicate problem/remedial action to appropriate parties		3	3	0
	PC12. Take corrective action in a timely manner		5	3	2
	PC13. Take corrective action for problems identified according to the company procedures		6	3	3
	PC14. Report/document problem and corrective action in an appropriate manner		5	2	3

	PC15. Monitor corrective action		4	2	2
	PC16. Evaluate implementation of corrective action taken to determine if the problem has been resolved		3	1	2
	PC17. Ensure that corrective action selected is viable and practical		3	1	2
	PC18. Ensure that correct solution is identified to an identified problem		5	2	3
	PC19. Take corrective action for problems identified according to the company procedures		5	2	3
	PC20. Ensure that no delays are caused as a result of failure to take necessary action		6	3	3
	PC21. Escalate problem as per laid down escalation matrix		2	1	1
	PC22. Escalate the problem within stipulated time		2	1	1
	PC23. Escalate the problem in an appropriate manner		2	1	1
	PC24. Ensure that no delays are caused as a result of failure to escalate problems		3	1	2
	Total		100	45	55
RSC/N5007 Carry out health and safety	PC1. Undertake basic safety checks before operation of all machinery and equipment and report hazards to the appropriate supervisor	100	4	2	2
	PC2. Work for which protective clothing or equipment is required is identified and the appropriate protective clothing or equipment is used in performing these duties in accordance with workplace policy.		4	2	2
	PC3. Read and understand the hazards of use and contamination mentioned on the labels of chemicals, utilities etc		2	0	2
	PC4. Prior to performing manual handling jobs, risk is assessed and work is carried out according to currently recommended safe practices.		4	2	2
	PC5. Use equipment and materials safely and correctly and return the same to designated storage when not in use		3	1	2
	PC6. Dispose off waste safely and correctly in a designated area		6	2	4
	PC7. Risks to bystanders are recognized and action taken to reduce risk associated with jobs in the workplace		2	0	2
	PC8. Perform work in a manner which minimizes environmental damage		2	0	2
	PC9. All procedures and work instructions for controlling risk are followed closely.		1	0	1
	PC10. Report any accidents, incidents or problems without delay to an appropriate person and take immediate necessary action to reduce further danger.		2	0	2

PC11. Follow procedures for dealing with accidents, fires and emergencies, including communicating location and directions to emergency.	100	6	2	4
PC12. Follow emergency procedures as per company standards and workplace requirements.		6	2	4
PC13. Use Emergency equipment in accordance with manufacturers' specifications and workplace requirements.		6	2	4
PC14. Provide treatment appropriate to the patient's injuries in accordance with recognized first aid techniques.		1	0	1
PC15. Recover (if practical), clean, inspect/test, refurbish, replace and store the first aid equipment as appropriate		2	0	2
PC16. Dispose off medical waste in accordance with workplace requirements		1	0	1
PC17. Report details of first aid administered in accordance with work place procedures.		5	3	2
PC18. Comply with general safety procedures		6	2	4
PC 19. Follow standard safety procedures while handling equipment, hazardous material or tool		2	0	2
PC20. Check parts of the workplace and take preventive actions like spraying and other steps to protect from leakages, water logging, pests, fire, pollution, etc.		6	2	4
PC21. Ensure no accidents and damages at the workplace, reporting of any breach of company safety procedure		1	0	1
PC22. Keep the workplace organized, swept, clean and hazard free		6	2	4
PC23. Attend fire drills and other safety related workshops organized at the workplace		4	1	3
PC24. Be aware of first aid, evacuation and emergency procedures		4	1	3
PC25. Be alert of any events and do not be negligent to any safety procedures to be followed		2	0	2
PC26. Avoid accidents while using hazardous chemicals, machines, sharp tools and equipment		4	1	3
PC27. Use safety materials such as protective gear, goggles, caps, shoes, etc. (as applicable with workplace)		4	2	2
PC28. Handle heavy and hazardous materials with care and using appropriate tools and handling equipment such as trolleys, ladders		4	1	3
Total		100	30	70





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