

Facilitator Guidebook

Fire Safety Officer



Facilitator Guide For Fire Safety Officer

Sector: Cross Sectoral

Sub-Sector: Hydrocarbon, Iron & steel, Mining, Power, Automotive, Construction, Chemicals & Petrochemicals, and others.

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The Facilitator Guidebook for **Fire Safety Officer, SSD/Q1101**, developed by the **Safety Skill Development Foundation (SSDF)**, reflects our commitment to industry requirement for the job role, best practices in the profession, quality training requirement, regulatory compliances, workplace safety, health and sustainable practices. This guide is enriched with insights from **Subject Matter Experts (SMEs), trainers, and industry professionals**, ensuring its relevance to real-world applications.

We extend our special thanks to **CORE-EHS Solutions Pvt Ltd** for their invaluable expertise and support in developing course materials, significantly enhancing the safety and quality aspects of this guide.

Our gratitude also goes to trainers, assessors, industry experts, government bodies, and sector skill councils for their contributions toward advancing occupational safety across industries, including Hydrocarbon, Iron & Steel, Mining, Power, Automotive, Construction, Chemicals & Petrochemicals, and more.

The qualification is aligned with **NSQF** and this guide supports the **Skill India** initiative and is dedicated to trainers committed to excellence in skill development. SSDF welcomes feedback for continuous improvement.

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About this Guidebook

The increasing focus on safety across various industries is driving a surge in the demand for qualified Fire Safety Officer. This heightened need is resulting in a greater requirement for trained professionals in the field. As a result, there is an escalating necessity for trainers to prepare individuals with the essential skills to become competent Fire Safety Officers.

This Facilitator Guide is designed for providing skill training and /or upgrading the knowledge level of the trainees to take up the job of an “Trainer” in the Cross Sectoral Sector.

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

1. SSD/VSQ/N1101: Understanding of Fire Accidents
2. SSD/VSQ/N1102: Accidents Prevention Methodologies.
3. SSD/VSQ/N1103: Fire Prevention, Fire Extinguishing Technique & Fire Extinguishers
4. SSD/VSQ/N1104: Fire Safety Equipment, Fire alarms & PPE
5. SSD/VSQ/N1105: Emergencies, Rescue, Firefighting & Fire Evacuation Plan
6. SSD/VSQ/N1106: Plan & Organize Fire Emergency Protocols
7. DGT/VSQ/N0102: Employability Skills (60 Hours)

The guidebook provides detailed insights on how facilitators can engage with participants, assess their training requirements, and convey essential concepts pertaining to Occupational Safety Health & Environment management System (OSHEMS). It guarantees that facilitators address all necessary subjects effectively, achieving the training goals within the allotted time.

At the start of each unit, key learning objectives for each National Occupational Standard (NOS) are presented, assisting facilitators in navigating the training process. Additionally, the symbols utilized in this guidebook are clarified to enhance facilitators' comprehension of the materials.

This guidebook serves as an extensive resource for trainers, ensuring they are adequately prepared to conduct effective safety audit training.

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1. Introduction

1.1. Key Learning Objectives

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

- Describe Hydrocarbon, Iron & steel, Mining, Power, Automotive, Construction, Chemicals & Petrochemicals.
- List the roles and responsibilities of Fire Safety Officer.

1.2. Overview of the Industry

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

- Describe about the Hydrocarbon sector in India
- Describe about the Iron & Steel sector in India
- Describe about the Mining sector in India
- Describe about the Power sector in India
- Describe about the Automotive sector in India
- Describe about the Construction sector in India
- Describe about the Chemicals & Petrochemicals in India
- Describe how each sub-sector contributes to skill development
- Compare the job potential of all sub-sectors

1. Resources to be used

- Available objects such as Projection screen, whiteboard, projection screen, laptop, speaker, notebook, pen, participant handbook, etc
- Flip chart
- Attendance sheet
- Activities (role plays and games)

2. Ask

- Ask the participants to share their expectations from the program
- Ask them to tell what they know about the Hydrocarbon sector, Iron & Steel sector, Mining sector, Power sector, Automotive sector, Construction sector, Chemicals & Petrochemicals
- What is the 'Make-in-India' initiative?

3. Do

- Introduce yourself to the participants.
- Give an overview of the program to the participants - duration of the program, objective etc.
- Give an overview of the Hydrocarbon sector, Iron & Steel sector, Mining sector, Power sector, Automotive sector, Construction sector, Chemicals & Petrochemicals sector in India.

4. Explain

- List the major segments in the Hydrocarbon sector, Iron & Steel sector, Mining sector, Power sector, Automotive sector, Construction sector, Chemicals & Petrochemicals sector.

5. Tips

- Go slow with information flow with participants.
- Observe each participant's body language.
- Keep a positive and supportive approach towards the candidates

6. Activity: Team Spot

- Separate the class in 2 different teams.
- Each team will be assigned with 3 different sector topics
- Ask them to present the given topics team after team, and state examples individually to explain

7. Notes for Facilitation

- Revise the important points discussed in this unit.
- Clear the doubts of the students, if any. Encourage them to ask questions.
- Discuss the question with the class and answer their queries satisfactorily.
- Help participants identify how to apply the skills taught in the course to their work
- Praise participants and the group on improving their performance and developing new skills.
- Encourage participants to move through the initial difficulties of learning new skills, by focusing on steps in their progress and the importance of what they are learning to do.

8. Summary

- **Hydrocarbon:** The hydrocarbon sector involves the extraction, refinement, and distribution of oil and natural gas. This sector plays a crucial role in energy production and the global economy, providing fuel and raw materials for various industries.
- **Iron & Steel:** The iron and steel sector are fundamental to industrial development. It focuses on producing metal alloys used in manufacturing, construction, and infrastructure. This sector is key to building economies and supporting technological advancements.
- **Mining:** The mining industry is concerned with extracting valuable minerals and materials from the earth. It provides essential raw materials for industries like construction, energy production, and manufacturing.
- **Power:** The power sector includes the generation, transmission, and distribution of electricity. This sector is vital to economic development and daily life, powering homes, businesses, and industries through a variety of sources such as coal, natural gas, renewables, and nuclear energy.
- **Automotive:** The automotive sector involves the design, production, and distribution of motor vehicles, including cars, trucks, and motorcycles. It is a significant driver of technological innovation and economic activity globally.
- **Construction:** The construction sector is involved in the building and infrastructure development of residential, commercial, and industrial projects. It supports urbanization and economic development by creating critical infrastructure such as roads, bridges, and buildings.
- **Chemicals & Petrochemicals:** This sector deals with the production of chemicals, fertilizers, and petrochemical products derived from petroleum. It plays a crucial role in manufacturing various goods such as plastics, pharmaceuticals, and industrial chemicals.
- **A Safety Auditor** assesses workplace safety practices, identifies hazards, ensures compliance with safety regulations, and recommends improvements to prevent accidents and ensure a safe working environment.

9. Exercise

1. Which of following is the most common cause of accidents in hydrocarbon sector?

- Equipment Failure
- Human Error
- Natural Disasters
- Fire

2. Routine inspections and maintenance are crucial for preventing accidents in oil and gas pipeline. (T/F)

3. Which of the following is major hazard in steel industry?

- a. Noise Pollution
- b. High Temperature
- c. Exposure to Hazardous Substance
- d. All the above

4. Proper PPE is essential for Workers handling molten metal. (T/F)

5. What is most common cause of fatalities in underground mines?

- a. Rock Falls
- b. Explosion
- c. Flooding
- d. Electrical Hazards

1.3. Roles and Responsibilities of a Fire Safety Officer

1. Key Learning Outcomes

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

- Identify roles and responsibilities of Fire Safety Officer
- Identify essential skills of Fire Safety Officer

Fire Hazard Identification and Assessment

- Conduct thorough inspections to identify potential fire hazards at the workplace.
- Distinguish between different fire classes and assess flammable materials, combustible gases, and ignition sources.
- Analyse fire-related terminologies, including exothermic reactions, flash points, and fire points.

Fire Prevention and Control

- Implement fire prevention measures, such as controlling fuel sources, ignition sources, and oxygen supply.
- Ensure compliance with fire safety codes, building regulations, and workplace standards.
- Install and maintain fire safety systems like hydrants, sprinklers, and alarms.

Operation and Maintenance of Fire Equipment

- Ensure proper placement, maintenance, and periodic testing of fire extinguishers, hydrants, and fire alarms.
- Familiarize employees with the use of firefighting equipment and PPE like SCBA, helmets, gloves, and turnout gear.

Emergency Planning and Response

- Develop comprehensive fire evacuation plans, including escape routes, assembly points, and emergency signages.
- Coordinate and conduct regular mock drills and firefighting exercises.
- Organize rescue operations and manage fire emergencies to ensure safety and minimize property damage.

Incident Investigation and Reporting

- Investigate fire incidents to determine the origin, cause, and contributing factors.
- Prepare detailed reports on fire hazards, preventive measures, and incidents for management and regulatory compliance.

Accident Prevention Methodologies

- Apply root cause analysis techniques, including HAZOP, Fault Tree Analysis, and HIRA, to identify risks.
- Analyse accident causation theories, such as Heinrich's Domino Theory and Swiss Cheese Model, to develop preventive strategies.

Training and Awareness

- Educate employees on fire safety principles, evacuation procedures, and emergency response protocols.
- Train staff in the proper use of fire extinguishers and adherence to workplace safety practices.

Resource Management

- Plan, organize, and allocate fire safety resources, including equipment, personnel, and emergency kits.
- Ensure timely coordination with coworkers, subordinates, and external firefighting authorities.

Ensuring Workplace Compliance

- Monitor adherence to workplace safety guidelines and statutory fire safety regulations.
- Enforce measures like proper storage of flammable materials, explosion-proof electrical equipment, and adequate ventilation of chemical facilities.

Preparedness for Special Scenarios

- Address specific fire safety challenges, such as automobile fire safety, hazardous material handling, and high-rise building evacuation.
- Stay updated on technological advancements like wireless fire detection systems and thermal imaging.

2. Resources to be used

- Available objects such as Projection screen, whiteboard, projection screen, laptop, speaker, notebook, pen, participant handbook, etc
- Flip chart
- Attendance sheet
- Activities (role plays and games)

3. Ask

- Ask the participants to share their expectations from the program

4. Do

- Give a brief introduction on the job description of Fire Safety Officer outlining their personal attributes to the participants
- Provide the participants with a List of Roles and Responsibilities of Fire Safety Officer.
- Talk about the skills and knowledge which are essential to become a Fire Safety Officer.

5. Explain

- Describe about the roles and responsibilities of Fire Safety officers.

6. Tips

- Go slow with information flow with participants.
- Observe each participant's body language.
- Keep a positive and supportive approach towards the candidates

7. Activity: Team Spot

- Separate the class in 2 different teams.

- Each team will be assigned with topics - Roles and responsibilities of Fire Safety Officer.
- Ask them to present the given topics team after team, and state examples individually to explain

8. Notes for Facilitation

- Revise the important points discussed in this unit.
- Clear the doubts of the students, if any. Encourage them to ask questions.
- Discuss the question with the class and answer their queries satisfactorily.
- Help participants identify how to apply the skills taught in the course to their work
- Praise participants and the group on improving their performance and developing new skills.
- Encourage participants to move through the initial difficulties of learning new skills, by focusing on steps in their progress and the importance of what they are learning to do.

9. Summary

- **Monitoring Safety Practices:** Ensuring that all fire safety procedures and regulations are followed, and that employees always comply with safety protocols.
- **Risk Assessment and Hazard Identification:** Identifying potential hazards in the work environment and assessing risks. This involves inspecting work sites, equipment, and processes to prevent accidents.
- **Developing Safety Plans:** Designing, implementing, and maintaining safety programs and procedures tailored to the specific needs of the workplace.
- **Training and Education:** Conducting safety training sessions for employees, helping them understand safety standards, emergency procedures, and proper equipment use.
- **Accident Investigation:** Investigating workplace accidents and incidents to determine causes, document findings, and recommend corrective actions to prevent recurrence.
- **Compliance with Regulations:** Ensuring the workplace adheres to local, state, and federal safety regulations and standards, including Occupational Safety and Health Administration (OSHA) guidelines.
- **Reporting and Documentation:** Maintaining accurate records of safety inspections, training sessions, incident reports, and safety audits. Regularly reporting on safety performance to management.
- **Promoting Safety Culture:** Encouraging a culture of safety within the organization by engaging employees, addressing concerns, and fostering a proactive attitude toward workplace safety.
- **Emergency Response:** Preparing for and managing emergency situations, ensuring proper response procedures are in place for accidents, fires, or other critical incidents.

10. Exercise

1. Which of the following is the primary responsibility of a Fire Safety Officer?

- Supervising all maintenance activities on-site
- Ensuring fire safety measures are implemented and maintained
- Conducting financial audits of the organization
- Approving construction blueprints

Answer: b) Ensuring fire safety measures are implemented and maintained

2. What is the role of a Fire Safety Officer during an emergency evacuation?

- Assist in extinguishing fires directly
- Oversee the safe evacuation of personnel
- Ensure all electrical equipment is shut off
- Report directly to the press regarding the situation

Answer: b) Oversee the safe evacuation of personnel

3. Which of the following tasks is a Fire Safety Officer responsible for?

- a) Conducting regular fire drills
- b) Preparing financial reports for fire insurance
- c) Managing human resources recruitment
- d) Overseeing the company's IT infrastructure

Answer: a) Conducting regular fire drills

4. A Fire Safety Officer is required to inspect fire protection systems. Which of the following is included in their inspection duties?

- a) Checking sprinkler systems and fire extinguishers
- b) Reviewing employee performance records
- c) Inspecting work schedules and shift timings
- d) Auditing company accounts for compliance

Answer: a) Checking sprinkler systems and fire extinguishers

5. Why is it important for a Fire Safety Officer to maintain accurate records?

- a) To provide data for annual performance reviews
- b) To track compliance with fire safety regulations
- c) To share information with competitors
- d) To ensure payroll processes run smoothly

Answer: b) To track compliance with fire safety regulations

2. Understanding Of Fire Accidents

2.1. Key Learning Objectives

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

- Identify fire hazards at workplace.
- Distinguish between different classes of fire.
- Flammable & combustible materials.
- Develop systematic approach in identifying and correcting probability of fire accidents and measure to minimize probability of fire accident.

2.1.1. Identifying Fire Hazards

2.1.1.1 Objectives

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

- Analyse the terms utilized in fire safety such as solid, liquid, and gaseous flammable substances & combustible materials and electrical fires.
- Differentiate between exothermic and endothermic reactions, determine the oxygen percentage in air, and ascertain the flash point and fire point.
- Register the various sources that pose fire hazards, including sources that provide fuel for fires and sources that can ignite fires.

2.1.1.2 Resources

- Whiteboard, erasable marker, board cleaner, projection screen, laptop, speaker, notebook, pen, participant handbook, etc
- Flip chart
- Participant Manual
- Projection screen and PowerPoint presentations.

2.1.1.3 Speak

Fire Safety Terms

- Define flammable substances (solid, liquid, gas) with examples.
- Explain combustible materials and their ignition properties.
- Highlight electrical fire causes and suitable extinguishing methods.

Exothermic and Endothermic Reactions:

- Differentiate between heat-releasing (exothermic) and heat-absorbing (endothermic) reactions.
- Relate exothermic reactions to fire hazards.

Oxygen in Air and Fire Behaviour:

- State the oxygen percentage in air (21%).
- Discuss its role in sustaining combustion.

Flash Point and Fire Point:

- Define flash point and fire point with practical examples.
- Stress their importance in fire risk assessment.

Fire Hazard Sources:

- Identify sources of fuel (e.g., flammable materials, chemicals).
- Discuss ignition sources (e.g., sparks, open flames, electrical faults).

2.1.1.4 Explain

Fire Safety Terms

- Definition and examples of flammable solids, liquids, and gases.
- Difference between flammable and combustible materials.
- Causes of electrical fires and appropriate extinguishing methods (e.g., CO₂ extinguishers).

Exothermic and Endothermic Reactions

- Difference between exothermic (heat-releasing) and endothermic (heat-absorbing) reactions.
- Role of exothermic reactions in fire propagation.

Oxygen Percentage in Air

- State oxygen content in air (21%).
- Importance of oxygen in sustaining fire and how reducing it can suppress fires.

Flash Point and Fire Point

- Define flash point (temperature at which a material releases vapor to form an ignitable mixture).
- Define fire point (temperature at which vapor sustains combustion).
- Practical examples for both.

Sources of Fire Hazards

- Common fuel sources: Flammable liquids, gases, solids, and dust.
- Ignition sources: Open flames, electrical equipment, hot surfaces, static electricity.
- Interaction between fuel, heat, and oxygen (Fire Triangle).

2.1.1.5 Activity

1. Fire Hazard Identification Exercise

- Objective: Participants identify fire hazards in a mock scenario or provided images.
- Steps:
 - Provide images or descriptions of workplace settings.
 - Ask participants to identify fuel sources, ignition sources, and oxygen availability (Fire Triangle).
 - Discuss how to mitigate each hazard.

2. Flash Point and Fire Point Demonstration

- Objective: Visually explain the concepts of flash point and fire point.
- Steps:
 - Use a safe, controlled environment to show a liquid reaching its flash point (vapor ignites but doesn't sustain fire).
 - Heat further to reach the fire point where combustion sustains.
 - (If live demo isn't feasible, use videos or animations.)

3. Reaction Types Sorting Game

- Objective: Differentiate exothermic and endothermic reactions.
- Steps:
 - Prepare cards with reaction examples (e.g., combustion, melting ice).
 - Participants classify them as exothermic or endothermic.

4. Air and Combustion Quiz

- Objective: Test knowledge about oxygen's role in combustion.
- Steps:
 - Ask quick questions like:
 - "What happens if oxygen drops below 16% in a fire scenario?"
 - "Can a fire burn in a vacuum?"

2.1.1.6 Notes for facilitation

- Summarize the important points and terms explained in the session.
- Ask participants if they have any doubts. Encourage them to ask questions.
- Answer questions, as needed, providing concrete and brief answers.
- Tell participants to complete the questions at the end of the unit.
- Ensure that every participant answers all the questions

2.1.1.7 Summary

a. Key Fire Safety Terms:

- Flammable substances (solid, liquid, gas) and combustible materials.
- Causes of electrical fires and appropriate extinguishing methods.

b. Reactions in Fire Safety:

- Exothermic reactions release heat (e.g., combustion).
- Endothermic reactions absorb heat.

c. Oxygen in Combustion:

- Air contains 21% oxygen, critical for sustaining fires.
- Reducing oxygen levels can suppress fires.

d. Flash Point and Fire Point:

- Flash Point: Temperature where vapours ignite momentarily.
- Fire Point: Temperature where sustained combustion occurs.

e. Sources of Fire Hazards:

- Fuel sources: Flammable liquids, gases, and solids.
- Ignition sources: Open flames, electrical faults, static electricity.

f. Practical Activities:

- Hazard identification exercises.
- Demonstrations of flash and fire points.
- Sorting reactions as exothermic or endothermic.
- Fire Triangle role-play to understand fire dynamics.

2.1.1.8 Exercise

1. What is the oxygen percentage in the air that supports combustion?

- a) 16%
- b) 21%
- c) 25%
- d) 30%

Answer: b) 21%

2. What is the difference between the flash point and the fire point of a material?

- a) Flash point is when a fire extinguishers; fire point is when it ignites.
- b) Flash point is the temperature for sustained combustion; fire point is for momentary ignition.
- c) Flash point is the temperature for momentary ignition; fire point is for sustained combustion.
- d) There is no difference between them.

Answer: c) Flash point is the temperature for momentary ignition; fire point is for sustained combustion.

3. Which of the following is an example of an exothermic reaction?

- a) Melting ice
- b) Burning wood
- c) Boiling water
- d) Dissolving salt in water

Answer: b) Burning wood

4. What are the three elements of the Fire Triangle?

- a) Heat, Light, Smoke
- b) Fuel, Heat, Oxygen
- c) Fuel, Spark, Water
- d) Smoke, Heat, Combustion

Answer: b) Fuel, Heat, Oxygen

5. Which of the following is a common ignition source for electrical fires?

- a) Overloaded circuits
- b) Wet floors
- c) High humidity
- d) Excessive ventilation

Answer: a) Overloaded circuits

2.1.2. Classes of fire

2.1.2.1 Objectives

- Understand the components of the Fire Triangle.
- Learn about different classes of fire and their specific extinguishing methods.
- Identify common reasons for fire accidents.
- Recognize materials and environmental factors that assist in the spread of fire.

2.1.2.2 Resources

- Whiteboard, erasable marker, board cleaner, projection screen, laptop, speaker, notebook, pen, participant handbook, etc
- Flip chart
- Participant Manual
- Projection screen and PowerPoint presentations.
- Activities (role plays)

2.1.2.3 Say

- Begin by emphasizing the importance of understanding fire dynamics to prevent accidents.
- Explain how fires occur and spread, using simple and relatable examples.
- Stress the need for proper fire prevention measures and awareness of fire hazards.

2.1.2.4 Explain

Fire Triangle

- Fuel: Examples include wood, paper, oil, and flammable gases.
- Heat: Sources like open flames, sparks, electrical equipment, or sunlight.
- Oxygen: Present in the air at 21%, essential for combustion.
- Explain how removing one element disrupts the fire.

Classes of Fire

- Class A: Fires involving solid combustibles (wood, paper, textiles).
- Class B: Fires involving flammable liquids (oil, gasoline, alcohol).
- Class C: Fires involving flammable gases (propane, methane).
- Class D: Fires involving metals (magnesium, aluminium).
- Class E: Electrical fires.
- Class F: Fires involving cooking oils and fats.
- Mention appropriate extinguishing methods for each class.

Common Reasons for Fire Accidents

- Electrical faults (short circuits, overloading).
- Improper storage of flammable materials.
- Open flames or sparks near combustible materials.
- Negligence during smoking or cooking.
- Poor housekeeping (clutter creating fire pathways).

Materials and Surroundings Assisting Fire Spread

- Flammable materials: Curtains, furniture, paper, chemicals.
- Environmental factors: Wind, dry conditions, poor ventilation.

2.1.2.5 Activity

Fire Triangle Role-Play

- Assign participants roles as Fuel, Heat, and Oxygen.
- Simulate a scenario where one element is removed to show how the fire is disrupted.

Fire Class Identification Game

- Provide scenarios or images depicting different fire types.
- Ask participants to identify the fire class and the appropriate extinguisher.

Hazard Spotting Exercise

- Show a mock workspace setup or an image.
- Have participants identify fire hazards and suggest controls.

2.1.2.6 Notes for facilitation

- Summarize the important points and terms explained in the session.
- Ask participants if they have any doubts. Encourage them to ask questions.
- Answer questions, as needed, providing concrete and brief answers.
- Tell participants to complete the questions at the end of the unit.
- Ensure that every participant answers all the questions.

2.1.2.7 Summary

- Fire Triangle: Fuel, Heat, and Oxygen are essential for fire. Removing one element extinguishes it.
- Classes of Fire:
 - Class A-F fires categorized by fuel type.
 - Different extinguishers are required for different classes.
- Fire Accident Causes:
 - Common causes include electrical faults, flammable materials, and negligence.
- Spread of Fire:
 - Assisted by flammable materials and environmental factors like wind and dryness.
- Practical Activities:
 - Role-play, fire class identification, and hazard spotting reinforce learning.

2.1.2.8 Exercise

1. Which component of the Fire Triangle is removed when using a fire blanket?

- a) Fuel
- b) Heat
- c) Oxygen
- d) All of the above

Answer: c) Oxygen

2. What type of fire is categorized as Class B?

- a) Fires involving solid combustibles like wood

- b) Fires involving flammable liquids like gasoline
- c) Fires involving electrical equipment
- d) Fires involving cooking oils and fats

Answer: b) Fires involving flammable liquids like gasoline

3. Which of the following is a common reason for fire accidents?

- a) Overloaded electrical circuits
- b) Regular housekeeping
- c) Use of non-flammable materials
- d) Proper ventilation

Answer: a) Overloaded electrical circuits

4. Which material can assist in the rapid spread of fire?

- a) Steel beams
- b) Curtains and upholstery
- c) Water pipes
- d) Concrete walls

Answer: b) Curtains and upholstery

5. Which fire extinguisher is most suitable for a Class E fire?

- a) Water extinguisher
- b) Foam extinguisher
- c) Dry powder extinguisher
- d) CO₂ extinguisher

Answer: d) CO₂ extinguisher

2.1.3. Transmission of fire

2.1.3.1 Objectives

- Understand how fire and heat transfer through conduction, convection, and radiation.
- Learn the four stages of fire development: incipient, growth, fully developed, and decay.
- Grasp the importance of unbiased and professional interviewing during fire incident investigations.

2.1.3.2 Resources

- Whiteboard, erasable marker, board cleaner, projection screen, laptop, speaker, notebook, pen, participant handbook, etc
- Flip chart
- Participant Manual
- Projection screen and PowerPoint presentations.
- Activities (role plays)

2.1.3.3 Say

- Introduce the concepts of fire transmission and heat transfer methods.
- Explain how understanding fire stages helps in firefighting and evacuation planning.
- Emphasize the significance of unbiased information gathering in fire investigations.

2.1.3.4 Explain

Transmission of Fire and Heat Transfer

- Conduction: Heat transfer through direct contact (e.g., metal beams conducting heat).

- Convection: Heat transfer through fluids (e.g., hot air or smoke rising).
- Radiation: Heat transfer through electromagnetic waves (e.g., heat felt from a fire at a distance).
- Provide real-life examples to relate these concepts to fire scenarios.

Four Stages of Fire Development

Incipient Stage:

- Ignition occurs; fire is small and localized.
- Oxygen availability is high.
- Early detection through smoke detectors can help extinguish the fire quickly.

Growth Stage:

- Fire spreads as more fuel ignites.
- Convection currents intensify heat and spread fire.
- Flashover may occur.

Fully Developed Stage:

- Fire reaches its maximum intensity.
- Heat transfer occurs through conduction, convection, and radiation.
- Oxygen is rapidly consumed.

Decay Stage:

- Fuel is depleted, and fire begins to die out.
- Backdraft risk if oxygen is suddenly introduced.

Professional Interviewing in Fire Investigations

- Importance of neutrality to avoid biased conclusions.
- Techniques for effective interviewing: active listening, open-ended questions, and avoiding leading questions.
- Involve fire investigation professionals to ensure the integrity of the information.

2.1.3.5 Activity

Heat Transfer Demonstration

- Use materials like metal rods, water, and a heat source to demonstrate conduction, convection, and radiation.
- Ask participants to identify the type of heat transfer occurring.

Fire Stages Visualization

- Show a video or images illustrating the four stages of fire.
- Pause at each stage to discuss key characteristics and firefighting strategies.

Role-Playing Interview Exercise

- Divide participants into roles: witness, investigator, and observer.
- Simulate an interview scenario and discuss how to gather unbiased information.

2.1.3.6 Notes for facilitation

- Summarize the important points and terms explained in the session.
- Ask participants if they have any doubts. Encourage them to ask questions.
- Answer questions, as needed, providing concrete and brief answers.

- Tell participants to complete the questions at the end of the unit.
- Ensure that every participant answers all the questions.

2.1.3.7 Summary

- Heat Transfer: Fire spreads through conduction (direct contact), convection (fluid movement), and radiation (heat waves).
- Stages of Fire Development:
 - Incipient: Early stage, easy to control.
 - Growth: Fire intensifies and spreads.
 - Fully Developed: Maximum intensity, hazardous stage.
 - Decay: Fire reduces as fuel depletes.
- Professional Interviews: Essential for unbiased incident investigations; involves listening skills and neutrality.
- Activities: Practical demonstrations and role-play exercises enhance understanding.

2.1.3.8 Exercise

1. Which method of heat transfer involves the movement of fluids like air or water?

- Conduction
- Convection
- Radiation
- Evaporation

Answer: b) Convection

2. At which stage of fire development is the risk of flashover highest?

- Incipient Stage
- Growth Stage
- Fully Developed Stage
- Decay Stage

Answer: b) Growth Stage

3. How does heat transfer occur through conduction?

- By electromagnetic waves
- By the movement of heated particles in fluids
- Through direct contact between objects
- Through chemical reactions

Answer: c) Through direct contact between objects

4. What is the primary objective of conducting professional interviews in fire investigations?

- To assign blame for the incident
- To gather unbiased and accurate information
- To validate insurance claims
- To create a report for legal purposes

Answer: b) To gather unbiased and accurate information

5. What happens during the decay stage of a fire?

- Fire spreads rapidly due to high oxygen levels.
- Fire reaches maximum intensity.
- Fire reduces as fuel is depleted.
- Fire becomes uncontrollable due to backdraft.

Answer: c) Fire reduces as fuel is depleted.

3. Accidents Prevention Methodologies

3.1. Key Learning Objectives

- Perform Hazard and Operability Analysis (HAZOP).
- Fault Tree analysis & Event Tree Analysis.
- Failure modes and effect Analysis.
- Job Safety Analysis.
- Perform Hazard Identification and Risk Assessment (HIRA)

3.1.1. Accident Prevention Theories

3.1.1.1 Objectives

- Understand the basic definitions related to accidents, injuries, and unsafe conditions.
- Analyse key accident causation theories.
- Learn how to calculate key safety metrics like frequency rate, incident rate, lost time case rate, DART rate, and severity rate.

3.1.1.2 Resources

- Whiteboard, erasable marker, board cleaner, projection screen, laptop, speaker, notebook, pen, participant handbook, etc
- Flip chart
- Participant Manual
- Projection screen and PowerPoint presentations.
- Activities (role plays)

3.1.1.3 Say

- Introduce the importance of understanding accident terminology to effectively manage safety in the workplace.
- Discuss various models of accident causation, explaining their significance in preventing accidents.
- Emphasize the need for accurate calculations of safety metrics to evaluate workplace safety performance.

3.1.1.4 Explain

Basic Definitions

- Incident: Any event, whether or not it causes harm, that disrupts normal operations.
- Accident: An unexpected event that results in injury, damage, or harm.
- Injury: Physical damage to the body caused by an accident.
- Lost Time Injury (LTI): An injury that results in the worker being unable to perform their usual duties for at least one full day after the incident.
- Unsafe Condition: A physical condition that could cause an accident, such as a slippery floor or defective equipment.
- Unsafe Act: An unsafe behaviour that can result in harm, like working without proper PPE or ignoring safety protocols.
- Dangerous Occurrences: Incidents with the potential to cause serious injury or damage but that were narrowly avoided.
- Hazard: A source of potential harm or damage.
- Error: A mistake made by a worker that leads to an unsafe condition or act.
- Near Miss: An event where an accident almost occurred but was prevented or did not result in harm.

Accident Causation Theories

- Heinrich's Domino Theory: Accidents are a result of a chain of events, where removing one domino (cause) prevents the whole chain (accident) from happening.
- Heinrich's 300-29-1 Model: For every 300 near misses, there are 29 minor injuries and 1 major injury. This model emphasizes the importance of addressing near misses.
- Ferrell's Human Factor Model: Accidents are a result of human factors such as errors, training deficiencies, and personal problems, which contribute to unsafe conditions or acts.
- Petersen's Accident/Incident Model: Accidents and incidents are caused by human behaviour, unsafe conditions, and management failure. Focuses on the prevention of unsafe acts and conditions.
- Reason's Swiss Cheese Model: Accidents occur due to multiple layers of defence (like cheese slices) failing at the same time. The "holes" in the slices align, leading to accidents.

3.1.1.5 Activity

Accident Cause Analysis

- Provide case studies or real-life examples of incidents.
- Ask participants to identify unsafe conditions or acts involved and discuss which accident causation theory applies.

Safety Metrics Calculation Exercise

- Present a set of data (number of injuries, hours worked, lost time, etc.).
- Have participants calculate the frequency rate, incident rate, lost time case rate, DART rate, and severity rate.

Group Discussion on Causation Theories

- Divide participants into groups and assign each group a causation theory.
- Ask each group to present the theory and provide a real-world example where it could be applied.

3.1.1.6 Notes for facilitation

- Summarize the important points and terms explained in the session.
- Ask participants if they have any doubts. Encourage them to ask questions.
- Answer questions, as needed, providing concrete and brief answers.

- Tell participants to complete the questions at the end of the unit.
- Ensure that every participant answers all the questions.

3.1.1.7 Summary

- Basic Definitions: Understanding key terms like incident, accident, injury, and unsafe conditions is essential for safety management.
- Accident Causation Theories: Various models, including Heinrich's Domino Theory and Reason's Swiss Cheese Model, explain the causes of accidents and highlight the importance of addressing multiple factors.
- Safety Metrics: Calculating rates like frequency, incident, lost time case, DART, and severity rates helps in evaluating safety performance and identifying areas for improvement.
- Practical Activities: Exercises focusing on real-world case studies and metric calculations help reinforce theoretical concepts.

3.1.1.8 Exercise

1. According to Heinrich's 300-29-1 Model, how many near misses typically occur for every major injury?

- 300
- 29
- 1
- 300-29-1

Answer: b) 29

2. What is the primary cause of accidents according to Ferrell's Human Factor Model?

- Unsafe conditions only
- Unsafe acts only
- Human factors such as errors and training deficiencies
- Lack of safety equipment

Answer: c) Human factors such as errors and training deficiencies

3. Which of the following formulas is used to calculate the Frequency Rate?

- Frequency Rate (FR) = $\frac{\text{Number of Lost Time Injuries (LTIs)} \times 10,00,000}{\text{Total Hours Worked}}$**
- Frequency Rate (FR) = $\frac{\text{Number of Recordable Incidents} \times 2,00,000}{\text{Total Manhours Worked}}$**
- Frequency Rate (FR) = $\frac{\text{Number of Lost Time Cases (LTCs)} \times 2,00,000}{\text{Total hours worked}}$**
- None of the above

Answer: a

4. Which safety metric indicates the total number of lost workdays due to injuries?

- Frequency Rate
- Incident Rate
- Severity Rate
- DART Rate

Answer: c) Severity Rate

5. What is a key factor in Reason's Swiss Cheese Model of accident causation?

- Multiple safety layers failing at once
- Only human error causing accidents
- Single point of failure leading to accidents
- Management systems are the only cause of accidents

Answer: a) Multiple safety layers failing at once

3.1.2. Accident Prevention Techniques

3.1.2.1 Objectives

- Understand and interpret Fault Tree Analysis (FTA) and Event Tree Analysis (ETA).
- Learn how to perform HAZOP (Hazard Operability Analysis) and Job Safety Analysis (JSA).
- Grasp the process of Hazard Identification and Risk Assessment (HIRA).
- Analyse the hierarchy of controls, its importance, and the steps involved.
- Examine an incident scene to identify the origin, cause, and circumstances of an event.
- Perform real-time risk evaluations to ensure safety and grant access to secure areas.

3.1.2.2 Resources

- Whiteboard, erasable marker, board cleaner, projection screen, laptop, speaker, notebook, pen, participant handbook, etc
- Flip chart
- Participant Manual
- Projection screen and PowerPoint presentations.
- Activities (role plays)

3.1.2.3 Say

- Introduce the importance of systematic analysis methods like FTA and ETA in identifying potential causes and consequences of incidents.
- Explain how HAZOP and JSA are proactive tools for identifying hazards and mitigating risks.
- Emphasize the critical role of HIRA in workplace safety.
- Highlight the importance of following the hierarchy of controls for effective risk management.
- Stress the need for careful scene examination and timely real-time risk evaluations.

3.1.2.4 Explain

Fault Tree Analysis (FTA) and Event Tree Analysis (ETA)

FTA:

- A deductive, top-down approach to identify possible causes of an event (e.g., system failure).
- Begins with the undesired event and breaks it into its potential root causes.

ETA:

- An inductive, bottom-up approach to analyse the possible outcomes of an initiating event.
- Focuses on the sequence of events and their potential consequences.

HAZOP (Hazard Operability Analysis)

- A structured method for identifying potential hazards and operability issues in processes.
- Team-based approach using guidewords like "more," "less," "reverse," etc., to brainstorm potential risks.

Job Safety Analysis (JSA)

- Breaks down a job into individual steps to identify associated hazards and implement controls.
- Focuses on eliminating risks at each step of the task.

Hazard Identification and Risk Assessment (HIRA)

- Identifies hazards, evaluates associated risks, and determines control measures to reduce risks to acceptable levels.
- Considers likelihood, severity, and exposure to risks.

Hierarchy of Controls

- Elimination: Remove the hazard entirely.
- Substitution: Replace the hazard with something less dangerous.
- Engineering Controls: Isolate people from the hazard.
- Administrative Controls: Change work policies or procedures.
- Personal Protective Equipment (PPE): Minimize exposure using protective gear.

Incident Scene Examination and Real-Time Risk Evaluation

- Systematically collect data from the scene, including photographs, witness interviews, and physical evidence.
- Evaluate the risk level in real-time and implement immediate controls before granting access.

3.1.2.5 Activity

Fault and Event Tree Analysis Exercise

- Provide a scenario (e.g., fire in a storage area).
- Ask participants to create a Fault Tree (possible causes) and an Event Tree (potential outcomes).

HAZOP Guideword Application

- Present a sample process diagram (e.g., chemical mixing).
- Ask participants to apply guidewords to identify potential hazards.

Job Safety Analysis Practical

- Assign a common task (e.g., ladder use).
- Have participants break it down into steps, identify hazards, and propose controls.

Incident Scene Investigation Role-Play

- Simulate an incident (e.g., equipment failure).
- Assign roles (e.g., investigator, witness) and have participants gather evidence, evaluate risks, and secure the area.

3.1.2.6 Notes for facilitation

- Summarize the important points and terms explained in the session.
- Ask participants if they have any doubts. Encourage them to ask questions.
- Answer questions, as needed, providing concrete and brief answers.
- Tell participants to complete the questions at the end of the unit.

- Ensure that every participant answers all the questions.

3.1.2.7 Summary

- FTA and ETA: Help identify causes and consequences of incidents systematically.
- HAZOP and JSA: Proactive tools to analyse processes and tasks for hazards and controls.
- HIRA: Provides a structured approach to identify, evaluate, and control workplace risks.
- Hierarchy of Controls: A step-by-step method to manage risks effectively.
- Incident Scene Examination: Involves gathering data and ensuring safety through real-time risk evaluations.

3.1.2.8 Exercise

1. Which of the following best describes Fault Tree Analysis (FTA)?

- a) Bottom-up approach focusing on outcomes
- b) Top-down approach focusing on causes
- c) Brainstorming hazards using guidewords
- d) Breaking down tasks into steps

Answer: b) Top-down approach focusing on causes

2. What is the primary purpose of HAZOP?

- a) Analyse potential consequences of an incident
- b) Identify operability issues in a process
- c) Investigate the origin of an accident
- d) Perform real-time risk evaluations

Answer: b) Identify operability issues in a process

3. Which of the following is the most effective step in the hierarchy of controls?

- a) PPE
- b) administrative controls
- c) Substitution
- d) Elimination

Answer: d) Elimination

4. What does HIRA focus on when assessing risks?

- a) Likelihood and severity
- b) Frequency and duration
- c) administrative policies
- d) Employee qualifications

Answer: a) Likelihood and severity

5. What is the key difference between FTA and ETA?

- a) FTA analyses cause, ETA analyses outcomes
- b) ETA is a top-down approach, FTA is bottom-up
- c) FTA focuses on hazards, ETA focuses on controls
- d) FTA is proactive, ETA is reactive

Answer: a) FTA analyses cause, ETA analyses outcomes

3.1.3. Theory of Hierarchical needs & Expectancy

3.1.3.1 Objectives

- Understand Maslow's Hierarchy of Needs and its application in motivation.
- Examine Herzberg's Two-Factor Theory and differentiate between hygiene factors and motivators.
- Analyse McClelland's Theory of Needs and its relevance to individual motivation.
- Study Vroom's Expectancy Theory and its focus on effort, performance, and rewards.
- Compare McGregor's Theory X and Theory Y to understand contrasting management styles.
- Explore Alderfer's ERG Theory and its relation to Maslow's model.

3.1.3.2 Resources

- Whiteboard, erasable marker, board cleaner, projection screen, laptop, speaker, notebook, pen, participant handbook, etc
- Flip chart
- Participant Manual
- Projection screen and PowerPoint presentations.
- Activities (role plays)

3.1.3.3 Say

- Introduce the importance of understanding motivational theories for effective leadership and management.
- Explain the similarities and differences between the theories.
- Highlight the practical application of each theory in workplace settings.
- Discuss how these theories can be used to motivate teams and individuals effectively.

3.1.3.4 Explain

Maslow's Hierarchy of Needs

- A five-level model of human needs: physiological, safety, love/belonging, esteem, and self-actualization.
- Needs are fulfilled in order, starting from the most basic.
- Practical application: Ensuring basic needs are met before expecting higher-level engagement.

Herzberg's Two-Factor Theory

- Hygiene factors: Prevent dissatisfaction (e.g., salary, work conditions).
- Motivators: Drive satisfaction and performance (e.g., recognition, achievement).
- Application: Focus on improving motivators while maintaining hygiene factors.

McClelland's Theory of Needs

- Three key motivators:
- Need for Achievement: Desire to excel.
- Need for Power: Desire to influence others.

- Need for Affiliation: Desire for social connections.
- Application: Identify dominant needs and tailor motivational strategies accordingly.

Vroom's Expectancy Theory

- Focuses on the relationship between effort, performance, and reward.
- Key components:
 - Expectancy: Belief effort leads to performance.
 - Instrumentality: Belief performance leads to rewards.
 - Valence: Value of the reward.
- Application: Align rewards with desired performance and ensure clear expectations.

McGregor's Theory X and Theory Y

- Theory X: Assumes employees are lazy and require strict control.
- Theory Y: Assumes employees are self-motivated and thrive under empowerment.
- Application: Adopt management styles based on employee needs and behaviours.

Alderfer's ERG Theory

- Condenses Maslow's five levels into three:
 - Existence: Basic material needs.
 - Relatedness: Interpersonal relationships.
 - Growth: Personal development.
- Highlights that multiple needs can be pursued simultaneously.

3.1.3.5 Activity

Group Discussion

- Divide participants into groups. Assign each group a motivational theory to discuss its application in workplace scenarios.

Case Study Analysis

- Present a workplace scenario (e.g., low employee morale).
- Ask participants to apply different motivational theories to propose solutions.

Role-Playing Exercise

- Assign roles of manager and employees with varying motivational needs.
- Role-play situations to address their needs using different theories.

3.1.3.6 Notes for facilitation

- Summarize the important points and terms explained in the session.
- Ask participants if they have any doubts. Encourage them to ask questions.
- Answer questions, as needed, providing concrete and brief answers.
- Tell participants to complete the questions at the end of the unit.
- Ensure that every participant answers all the questions.

3.1.3.7 Summary

- Maslow's Theory: Focus on fulfilling needs hierarchically, from basic to self-actualization.
- Herzberg's Theory: Distinguish between factors preventing dissatisfaction and those driving motivation.
- McClelland's Theory: Recognize individual needs for achievement, power, or affiliation.
- Vroom's Theory: Link effort, performance, and rewards for motivation.
- McGregor's Theory: Understand employee behaviour under Theory X or Y assumptions.
- Alderfer's ERG Theory: Simplifies Maslow's hierarchy, allowing simultaneous pursuit of multiple needs.

3.1.3.8 Exercise

1. According to Herzberg's Two-Factor Theory, which of the following is a motivator?

- a) Salary
- b) Work conditions
- c) Recognition
- d) Job security

Answer: c) Recognition

2. In Vroom's Expectancy Theory, what does 'valence' refer to?

- a) The belief that effort will lead to performance
- b) The belief that performance will lead to rewards
- c) The perceived value of the reward
- d) The relationship between employees and managers

Answer: c) The perceived value of the reward

3. Which level of Maslow's Hierarchy includes the need for friendship and belonging?

- a) Safety needs
- b) Esteem needs
- c) Love/belonging needs
- d) Self-actualization needs

Answer: c) Love/belonging needs

4. McGregor's Theory X assumes that employees are:

- a) Self-motivated and require minimal supervision.
- b) Lazy and need constant oversight.
- c) Motivated by growth and development.
- d) Primarily driven by interpersonal relationships.

Answer: b) Lazy and need constant oversight.

5. What is a key difference between Maslow's Hierarchy of Needs and Alderfer's ERG Theory?

- a) ERG theory includes five levels, while Maslow includes three.
- b) ERG theory allows pursuing multiple needs simultaneously.
- c) Maslow's theory focuses on growth, while ERG excludes it.
- d) ERG theory applies only to workplace motivation.

Answer: b) ERG theory allows pursuing multiple needs simultaneously.

4. Fire Prevention, Fire Extinguishing Technique & Fire Extinguishers

4.1. Key Learning Objectives

- Identify fire hazards & take preventive measures against fire hazards.
- Decide fire extinguisher technique to be used.
- Deployment of fire extinguisher and train people to use the fire extinguishers.

4.1.1. Fire Prevention & Fire Safety

4.1.1.1 Objectives

- Understand the core principles of fire safety: prevention, detection, communication, occupant protection, containment, and extinguishment.
- Recognize fire safety equipment and systems, including fire doors, Automatic Fire Suppression Systems (AFSS), and lightning protection systems.
- Learn procedures and SOPs for fire prevention and response.
- Analyse methods to control fire spread by managing fuel, ignition sources, and oxygen supply.

4.1.1.2 Resources

- Whiteboard, erasable marker, board cleaner, projection screen, laptop, speaker, notebook, pen, participant handbook, etc
- Flip chart
- Participant Manual
- Projection screen and PowerPoint presentations.
- Activities (role plays)

4.1.1.3 Say

- Begin with the importance of a proactive approach to fire safety in workplaces and homes.
- Emphasize that fire prevention is the first and most critical step in fire safety.
- Discuss the significance of fire detection systems and effective communication during emergencies.
- Highlight the importance of protecting occupants through evacuation plans, fire doors, and suppression systems.
- Explain containment strategies to prevent fire spread and the methods of extinguishment.

4.1.1.4 Explain

Fire Safety Principles

- Prevention: Eliminate or reduce hazards that can cause fire (e.g., faulty wiring, flammable materials).
- Detection: Use smoke detectors, heat sensors, and alarm systems to identify fires early.
- Communication: Develop and practice emergency communication plans and alarms.
- Occupant Protection: Implement evacuation routes, fire-resistant doors, and assembly points.

- Containment: Use fire barriers, fire doors, and compartmentalization to limit spread.
- Extinguishment: Understand fire extinguishers, sprinklers, and suppression systems.

Fire Safety Equipment and Systems

- Fire Doors: Prevent fire and smoke from spreading, buying time for evacuation.
- Automatic Fire Suppression Systems (AFSS): Suppress fires automatically using water, foam, or gas.
- Lightning Protection Systems: Prevent fires caused by lightning strikes.

Fire Prevention Methods

- Control Fuel Source: Regularly inspect and safely store flammable materials.
- Ignition Source Control: Address faulty electrical systems, open flames, and sparks.
- Oxygen Control: Use fire-resistant materials to limit oxygen availability to fires.

Standard Operating Procedures (SOPs)

- Steps for fire prevention, such as maintenance schedules and housekeeping.
- Evacuation drills and training for employees.
- Emergency response protocols and communication chains.

[4.1.1.5 Activity](#)

Fire Hazard Identification Drill

- Divide participants into groups and assign them areas to inspect for potential fire hazards.
- Have them present their findings and recommendations for mitigation.

Equipment Demonstration

- Show how to operate fire extinguishers, sprinklers, and other suppression systems.
- Demonstrate the use of fire doors and smoke detectors.

Role-Playing Exercise

- Create scenarios for fire emergencies and assign roles (e.g., alarm trigger, evacuation leader).
- Practice the response and evaluate effectiveness.

[4.1.1.6 Notes for facilitation](#)

- Summarize the important points and terms explained in the session.
- Ask participants if they have any doubts. Encourage them to ask questions.
- Answer questions, as needed, providing concrete and brief answers.
- Tell participants to complete the questions at the end of the unit.
- Ensure that every participant answers all the questions.

[4.1.1.7 Summary](#)

- Fire safety involves prevention, early detection, clear communication, and occupant protection.
- Containment through fire barriers and extinguishment with suppression systems are key strategies.
- Fire doors, AFSS, and lightning protection systems are vital equipment.
- Controlling fuel sources, ignition points, and oxygen supply can prevent fire spread.
- Well-documented procedures and regular training are essential for fire safety preparedness.

4.1.1.8 Exercise

1. What is the primary function of fire doors?

- a) To extinguish fires
- b) To prevent the spread of fire and smoke
- c) To detect fires early
- d) To alert occupants

Answer: b) To prevent the spread of fire and smoke

2. Which system is used to automatically suppress fires?

- a) Lightning Protection System
- b) Smoke Detector
- c) Automatic Fire Suppression System (AFSS)
- d) Fire Door

Answer: c) Automatic Fire Suppression System (AFSS)

3. What is a key method to prevent fire spread?

- a) Increase ventilation in the room
- b) Control fuel sources
- c) Avoid using fire extinguishers
- d) Disable smoke alarms

Answer: b) Control fuel sources

4. What is the first principle of fire safety?

- a) Detection
- b) Extinguishment
- c) Prevention
- d) Communication

Answer: c) Prevention

5. Which of the following is NOT part of the fire safety principles?

- a) Containment
- b) Occupant Protection
- c) Explosion Management
- d) Communication

Answer: c) Explosion Management

4.1.2. Fire Extinguishing Technique

4.1.2.1 Objectives

- Understand the principles on which fire extinguishers work: cooling, smothering, starving, and interrupting combustion.
- Learn about different extinguishing media: water, foam, dry chemical powder, and carbon dioxide.
- Analyse various types of fire-fighting equipment and their principles of operation.

4.1.2.2 Resources

- Whiteboard, erasable marker, board cleaner, projection screen, laptop, speaker, notebook, pen, participant handbook, etc
- Flip chart
- Participant Manual
- Projection screen and PowerPoint presentations.
- Activities (role plays)

4.1.2.3 Say

- Introduce the basic principles of fire extinguishing and why they are critical for different fire scenarios.
- Highlight the importance of selecting the right extinguishing media for each class of fire.
- Explain the types of fire-fighting equipment available and their operation in emergency situations.

4.1.2.4 Explain

Principles of Fire Extinguishing

- Cooling: Reduces heat (e.g., water extinguishers).
- Smothering: Removes oxygen to suffocate the fire (e.g., foam or CO₂ extinguishers).
- Starving: Removes fuel sources (e.g., isolating flammable materials).
- Interrupting Combustion: Breaks the chemical reaction (e.g., dry chemical powder).

Extinguishing Media

- Water: Effective on Class A fires (wood, paper); cools the material.
- Foam: Forms a barrier to smother and cool; used for liquid fires (Class B).
- Dry Chemical Powder: Multi-purpose; interrupts the chemical chain reaction in Classes A, B, and C fires.
- Carbon Dioxide (CO₂): Displaces oxygen; ideal for electrical fires (Class C).

Types of Fire-Fighting Equipment

- Portable Fire Extinguishers: Handheld; suitable for small fires.
- Fire Hose Reels: Used for Class A fires in large areas.
- Fire Buckets: Filled with water or sand; basic, manual tools.
- Automatic Sprinkler Systems: Activates automatically to cool and suppress fires.
- Fire Blankets: Smothers small fires by cutting off oxygen.

4.1.2.5 Activity

Fire Extinguisher Demonstration

- Show participants how to use various fire extinguishers (PASS method: Pull, Aim, Squeeze, Sweep).
- Practice identifying the correct extinguisher for each fire type.

Fire-Fighting Equipment Matching Game

- Provide images of equipment and their purposes.
- Ask participants to match the equipment to its use and fire class.

Fire Scenario Simulation

- Create scenarios involving different types of fires.
- Have participants choose the correct extinguishing media and equipment to respond.

4.1.2.6 Notes for facilitation

- Summarize the important points and terms explained in the session.
- Ask participants if they have any doubts. Encourage them to ask questions.
- Answer questions, as needed, providing concrete and brief answers.
- Tell participants to complete the questions at the end of the unit.
- Ensure that every participant answers all the questions.

4.1.2.7 Summary

- Fire extinguishers work by cooling, smothering, starving, or interrupting the combustion process.
- Selecting the correct extinguishing media is crucial to handling fires safely and effectively.
- Understanding the types of fire-fighting equipment and their operation helps ensure quick and appropriate responses during emergencies.

4.1.2.8 Exercise

1. Which principle does water extinguishers use to extinguish fires?

- a) Smothering
- b) Cooling
- c) Starving
- d) Interrupting combustion

Answer: b) Cooling

2. Which extinguishing media is most effective for electrical fires?

- a) Water
- b) Foam
- c) Carbon dioxide (CO₂)
- d) Sand

Answer: c) Carbon dioxide (CO₂)

3. Which type of fire is foam extinguishing media commonly used for?

- a) Class A fires (wood, paper)
- b) Class B fires (flammable liquids)
- c) Class C fires (electrical fires)
- d) Class D fires (metal fires)

Answer: b) Class B fires (flammable liquids)

4. What does the "PASS" method stand for in fire extinguisher usage?

- a) Pull, Aim, Squeeze, Sweep
- b) Push, Aim, Squeeze, Spray
- c) Pull, Adjust, Squeeze, Stop

d) Push, Adjust, Sweep, Spray

Answer: a) Pull, Aim, Squeeze, Sweep

5. Which fire-fighting equipment displaces oxygen to smother fires?

a) Fire blanket

b) Fire hose reel

c) Carbon dioxide extinguisher

d) Automatic sprinkler system

Answer: c) Carbon dioxide extinguisher

4.1.3. Fire Extinguisher

4.1.3.1 Objectives

- Learn and apply the PASS technique for fire extinguisher operation.
- Understand the operation of fire hydrants in emergency scenarios.
- Implement proper placement and accessibility of fire extinguishers in the workplace.
- Develop skills for maintaining fire extinguishers using a checklist.

4.1.3.2 Resources

- Whiteboard, erasable marker, board cleaner, projection screen, laptop, speaker, notebook, pen, participant handbook, etc
- Flip chart
- Participant Manual
- Projection screen and PowerPoint presentations.
- Activities (role plays)

4.1.3.3 Say

- Explain the importance of using the PASS technique to handle fire extinguishers efficiently.
- Highlight the critical role of fire hydrants as part of fire response systems.
- Discuss the proper placement of fire extinguishers to ensure quick and effective access.
- Emphasize the importance of regular maintenance to ensure fire extinguishers remain functional and compliant.

4.1.3.4 Explain

PASS Technique

- Pull: Pull the safety pin to unlock the extinguisher.
- Aim: Aim the nozzle at the base of the fire.
- Squeeze: Squeeze the handle to release the extinguishing agent.
- Sweep: Sweep the nozzle side to side at the base of the fire.

Fire Hydrant Operation

- Understand fire hydrant components: valve, hose, and nozzle.
- Steps to operate:
 - Open the hydrant valve.

- Attach the hose securely.
- Direct the water stream towards the fire's base.

Placement of Fire Extinguishers

- Key considerations: visibility, accessibility, and proximity to fire hazards.
- Mount extinguishers at an appropriate height (e.g., 3-5 feet off the ground).
- Ensure the placement complies with workplace safety regulations.

Maintenance of Fire Extinguishers

- Checklist for maintenance:
- Check for visible damage, corrosion, or leaks.
- Verify the pressure gauge is within the green zone.
- Ensure the safety pin and tamper seal are intact.
- Confirm the expiration date.
- Record maintenance in the logbook.

4.1.3.5 Activity

PASS Technique Drill

- Conduct hands-on training where participants practice the PASS technique using mock or real extinguishers on controlled fires.

Fire Hydrant Demo

- Demonstrate the operation of a fire hydrant, and let participants practice connecting hoses and directing water streams.

Fire Extinguisher Placement Walkthrough

- Tour the workplace to identify optimal fire extinguisher locations based on fire risks and accessibility.

Maintenance Checklist Exercise

- Provide participants with a sample checklist to inspect a fire extinguisher.
- Discuss findings and corrective actions based on their inspections.

4.1.3.6 Notes for facilitation

- Summarize the important points and terms explained in the session.
- Ask participants if they have any doubts. Encourage them to ask questions.
- Answer questions, as needed, providing concrete and brief answers.
- Tell participants to complete the questions at the end of the unit.
- Ensure that every participant answers all the questions.

4.1.3.7 Summary

- The PASS technique ensures quick and effective fire extinguisher use.
- Fire hydrants are essential for large-scale fire response, requiring proper operation knowledge.
- Proper placement of fire extinguishers enhances workplace fire safety.
- Regular maintenance ensures extinguishers are functional during emergencies.

4.1.3.8 Exercise

1. What does the "PASS" technique stand for?

- a) Pull, Adjust, Squeeze, Sweep
- b) Push, Aim, Squeeze, Spray
- c) Pull, Aim, Squeeze, Sweep
- d) Push, Adjust, Sweep, Stop

Answer: c) Pull, Aim, Squeeze, Sweep

2. What should you check first during fire extinguisher maintenance?

- a) Expiration date
- b) Visible damage or corrosion
- c) Pressure gauge
- d) All of the above

Answer: d) All of the above

3. What is the recommended height to mount a fire extinguisher?

- a) 1-2 feet from the ground
- b) 3-5 feet from the ground
- c) 6-8 feet from the ground
- d) At floor level

Answer: b) 3-5 feet from the ground

4. What is the purpose of a fire hydrant?

- a) To extinguish small fires
- b) To provide water for large-scale firefighting
- c) To alert employees of fire hazards
- d) To replace fire extinguishers

Answer: b) To provide water for large-scale firefighting

5. Which item is NOT part of the fire extinguisher maintenance checklist?

- a) Check for tamper seals
- b) Inspect hose connections
- c) Ensure extinguisher is in a hidden location
- d) Verify the pressure gauge

Answer: c) Ensure extinguisher is in a hidden location

4.1.4. Building Fire Safety Regulations

4.1.4.1 Objectives

- Understand fire zone classifications and construction restrictions within each zone.
- Learn measures to reduce fire hazards, including material restrictions and use of fire-resistant materials.
- Develop a fire plan based on building occupancy, height, and floor area.
- Install and maintain fire-fighting equipment, detection, and alarm systems.
- Understand regulations for specific materials and prepare emergency evacuation plans.

4.1.4.2 Resources

- Whiteboard, erasable marker, board cleaner, projection screen, laptop, speaker, notebook, pen, participant handbook, etc
- Flip chart
- Participant Manual
- Projection screen and PowerPoint presentations.
- Activities (role plays)

4.1.4.3 Say

- Highlight the importance of fire zones and the restrictions for ensuring fire safety.
- Discuss the role of reducing fire load and using fire-retardant materials in minimizing fire risks.
- Explain the process of preparing a fire safety plan tailored to the building's characteristics.
- Emphasize adherence to fire safety regulations for materials and evacuation planning.

4.1.4.4 Explain

Fire Zones and Building Restrictions

- Define fire zones (low, moderate, and high hazard).
- Restrictions on construction: height limits, type of materials allowed, and proximity to other structures.

Measures to Reduce Fire Hazards

- Prohibit storage of combustible materials in designated areas.
- Eliminate open flames and unnecessary ignition sources.
- Use non-combustible ladders and fire-resistant materials for construction.

Fire Plans Based on Building Characteristics

- Key factors:
- Occupancy type (residential, industrial, commercial).
- Building height and floor area.
- Fire resistance requirements for walls, floors, and structural elements.

Installation of Firefighting Equipment and Systems

- Types of equipment: extinguishers, sprinklers, hydrants.
- Fire detection systems: smoke detectors, heat sensors, and alarm systems.

Regulations and Emergency Preparedness

- Compliance with building codes for specific materials.
- Steps to develop an evacuation plan:
- Identify escape routes and exits.
- Assign emergency roles (e.g., fire warden, first responders).
- Conduct regular drills.

4.1.4.5 Activity

Fire Zone Mapping

- Provide a sample building layout. Ask participants to demarcate fire zones and identify restrictions for each zone.

Material Identification Exercise

- Present various materials and ask participants to categorize them as combustible or non-combustible.

Fire Plan Creation

- Divide participants into groups to create a fire safety plan based on a given scenario (e.g., an office building or warehouse).

Equipment Installation Demo

- Show the correct process for installing and maintaining fire-fighting equipment.

Evacuation Drill Simulation

- Conduct a mock evacuation drill, demonstrating the implementation of the emergency preparedness plan.

4.1.4.6 Notes for facilitation

- Summarize the important points and terms explained in the session.
- Ask participants if they have any doubts. Encourage them to ask questions.
- Answer questions, as needed, providing concrete and brief answers.
- Tell participants to complete the questions at the end of the unit.
- Ensure that every participant answers all the questions.

4.1.4.7 Summary

- Fire zones define construction and safety requirements based on fire risk levels.
- Reducing fire hazards includes prohibiting combustible materials and using fire-resistant materials.
- A tailored fire plan considers building type, height, and floor area.
- Installation and maintenance of firefighting equipment and detection systems are critical.
- Regulations and evacuation plans ensure safety during emergencies.

4.1.4.8 Exercise

1. What defines a fire zone?

- a) The population density of the area
- b) The risk of fire based on building type and usage
- c) The number of fire extinguishers available
- d) The proximity to emergency services

Answer: b) The risk of fire based on building type and usage

2. Which material is considered non-combustible?

- a) Wooden planks
- b) Steel ladders
- c) Plastic sheets
- d) Paper

Answer: b) Steel ladders

3. What is a key factor in preparing a fire safety plan?

- a) The color of the building's walls
- b) Occupancy type, height, and floor area

- c) The number of workers available
- d) The cost of fire extinguishers

Answer: b) Occupancy type, height, and floor area

4. Which is NOT a fire hazard reduction measure?

- a) Eliminating open fires
- b) Prohibiting combustible materials
- c) Using fire-resistant materials
- d) Installing decorative wooden walls

Answer: d) Installing decorative wooden walls

5. Why are evacuation drills important?

- a) To increase productivity in the workplace
- b) To ensure all employees know the evacuation plan
- c) To test the strength of fire doors
- d) To reduce the frequency of fires

Answer: b) To ensure all employees know the evacuation plan

5. Fire Safety Equipment, Fire Alarms & Ppe

5.1. Key Learning Objectives

- Understand fire safety equipment & its suitability.
- Understand use of fire alarms & new technology.
- Learn PPEs used in firefighting.

5.1.1. Fire Safety Equipment's & Design

5.1.1.1 Objectives

- Understand the design and pressure requirements of water hydrants and sprinklers.
- Learn about foam hydrant systems and their design considerations.
- Recognize various fire detection and alarm systems, including NFPA72 standards and emergency lighting.
- Identify firefighting equipment such as fire hoses, fire buckets, welding blankets, and sand.
- Comprehend the requirements of firefighting equipment as per IS15683.

5.1.1.2 Resources

- Whiteboard, erasable marker, board cleaner, projection screen, laptop, speaker, notebook, pen, participant handbook, etc
- Flip chart
- Participant Manual
- Projection screen and PowerPoint presentations.
- Activities (role plays)

5.1.1.3 Say

- Emphasize the importance of proper design and installation of firefighting systems like water hydrants and sprinklers.
- Explain the role of foam hydrant systems in combating specific types of fires.
- Discuss the need for reliable fire detection and alarm systems and compliance with NFPA72 standards.
- Highlight the importance of using certified equipment as per IS15683.

5.1.1.4 Explain

Water Hydrant and Sprinkler Design

- Hydrant systems: Types (wet riser, dry riser), pressure requirements, and flow rates.
- Sprinklers: Types (ceiling-mounted, sidewall), activation mechanisms, and design layouts.

Foam Hydrant Systems

- Foam types: Aqueous Film Forming Foam (AFFF), protein foam, etc.
- Design considerations for foam systems, including proportioning devices and application techniques.

Fire Detection and Alarm Systems

- Smoke detectors: Types (ionization, photoelectric), placement guidelines.
- Fire alarms: NFPA72 compliance, types of alarms, and testing procedures.
- Emergency lighting and flashing lights for evacuation routes.

Firefighting Equipment

- Equipment identification: Fire hoses, buckets, welding blankets, flame orbs, and sand.
- Applications and best practices for usage in different scenarios.

IS15683 Requirements

- Types of extinguishers: Portable, trolley mounted.
- Performance standards: Discharge time, pressure, and reusability.
- Maintenance and inspection schedules.

5.1.1.5 Activity

- Hydrant Design Workshop: Provide participants with a layout to design a water hydrant system considering pressure and flow rate requirements.
- Foam System Demonstration: Show the operation of a foam hydrant system, explaining its components and foam application techniques.
- Detection and Alarm System Setup: Conduct a hands-on activity to set up smoke detectors and alarms according to NFPA72 standards.
- Equipment Identification Challenge: Display various firefighting equipment and ask participants to identify and explain their use.
- Maintenance Checklist Creation: Task participants with creating a maintenance checklist for firefighting equipment based on IS15683.

5.1.1.6 Notes for facilitation

- Summarize the important points and terms explained in the session.
- Ask participants if they have any doubts. Encourage them to ask questions.
- Answer questions, as needed, providing concrete and brief answers.
- Tell participants to complete the questions at the end of the unit.
- Ensure that every participant answers all the questions.

5.1.1.7 Summary

- Water hydrants and sprinklers must be designed with specific pressure and flow requirements in mind.
- Foam hydrant systems are effective for fires involving flammable liquids.
- Fire detection systems and alarms ensure timely evacuation and must comply with NFPA72 standards.
- Firefighting equipment like hoses, blankets, and extinguishers should meet IS15683 requirements and be regularly maintained.

5.1.1.8 Exercise

1. What is the primary purpose of a foam hydrant system?

- a) To cool down high-temperature fires
- b) To combat flammable liquid fires
- c) To replace water hydrants
- d) To extinguish electrical fires

Answer: b) To combat flammable liquid fires

2. Which NFPA standard governs fire alarm systems?

- a) NFPA13
- b) NFPA25
- c) NFPA72
- d) NFPA101

Answer: c) NFPA72

3. What is the recommended pressure range for a fire hydrant system?

- a) 5-7 bar
- b) 7-10 bar
- c) 10-12 bar
- d) 3-5 bar

Answer: b) 7-10 bar

4. Which of the following is NOT included in IS15683 requirements?

- a) Discharge time
- b) Extinguisher weight
- c) Flame spread rate
- d) Pressure standards

Answer: c) Flame spread rate

5. What is the purpose of emergency lighting during a fire?

- a) To guide responders to the hydrants
- b) To illuminate escape routes during evacuation
- c) To power the fire alarm system
- d) To detect fire hotspots

Answer: b) To illuminate escape routes during evacuation

5.1.2. Fire Alarms & New Technology

5.1.2.1 Objectives

- Understand the importance of optimal placement and monitoring of smoke detectors, fire alarms, emergency lighting, and flashing lights.
- Identify technological interventions in fire safety, such as water mist systems, online hydrant pressure monitoring, and wireless fire detection systems.
- Recognize the latest technological advancements like thermal imaging and augmented reality (AR) in fire prevention and detection.

5.1.2.2 Resources

- Whiteboard, erasable marker, board cleaner, projection screen, laptop, speaker, notebook, pen, participant handbook, etc.
- Flip chart
- Participant Manual
- Projection screen and PowerPoint presentations.
- Activities (role plays)

5.1.2.3 Say

- Highlight the critical role of smoke detectors, alarms, and lighting in early fire detection and safe evacuation.
- Explain how technological interventions improve fire safety efficiency and reliability.
- Discuss emerging technologies such as thermal imaging and AR, which provide enhanced situational awareness and detection capabilities.

5.1.2.4 Explain

Smoke Detectors, Fire Alarms, and Emergency Systems

- **Placement:** Optimal locations for smoke detectors (e.g., ceilings near sleeping areas), fire alarms, and emergency lighting.
- **Monitoring:** Importance of integrating these systems into a central control panel for continuous monitoring.

Technological Interventions

- **Water Mist System:** How it works, applications, and advantages over traditional sprinklers.
- **Online Hydrant Pressure Monitoring:** Benefits of real-time pressure data for ensuring firefighting readiness.
- **Wireless Fire Detection Systems:** Advantages in retrofitting older buildings and minimizing installation disruptions.

Latest Technological Developments

- **Thermal Imaging:** Applications in detecting heat sources and locating individuals in smoke-filled environments.
- **Augmented Reality (AR):** Use in providing firefighters with real-time building layouts and hazard locations during emergencies.

5.1.2.5 Activity

- **Fire System Optimization Drill:** Task participants to identify the best locations for smoke detectors, fire alarms, and emergency lighting in a provided building layout.
- **Technology Demonstration:** Showcase videos or live demonstrations of water mist systems, thermal imaging cameras, and wireless fire detection systems.
- **AR Simulation:** Provide a simulated scenario where participants use an AR headset or app to navigate a building and identify fire hazards.

5.1.2.6 Notes for facilitation

- Summarize the important points and terms explained in the session.
- Ask participants if they have any doubts. Encourage them to ask questions.
- Answer questions, as needed, providing concrete and brief answers.
- Tell participants to complete the questions at the end of the unit.
- Ensure that every participant answers all the questions.

5.1.2.7 Summary

- The effective placement and monitoring of smoke detectors, fire alarms, and emergency lighting are crucial for early detection and safe evacuation.
- Technological advancements such as water mist systems and online hydrant monitoring enhance fire safety capabilities.
- Emerging technologies like thermal imaging and AR provide firefighters with real-time insights, improving their response and safety measures.

5.1.2.8 Exercise

1. What is the primary advantage of wireless fire detection systems?

- a) Increased weight of detectors
- b) Easy installation and retrofitting
- c) Higher water usage
- d) Reduced monitoring capabilities

Answer: b) Easy installation and retrofitting

2. How does a water mist system extinguish fires?

- a) By smothering the fire with foam
- b) By cooling and displacing oxygen
- c) By absorbing fuel from the fire
- d) By using dry chemical powder

Answer: b) By cooling and displacing oxygen

3. What is the key application of thermal imaging in fire safety?

- a) Monitoring water pressure
- b) Detecting heat sources and individuals in smoke-filled areas
- c) Installing fire alarms
- d) Extinguishing fires using lasers

Answer: b) Detecting heat sources and individuals in smoke-filled areas

4. What is the benefit of online hydrant pressure monitoring?

- a) Eliminates the need for hydrants
- b) Provides real-time pressure data for firefighting readiness
- c) Increases water consumption
- d) Requires manual monitoring of pressure

Answer: b) Provides real-time pressure data for firefighting readiness

5. What does AR technology offer to firefighters during emergencies?

- a) Real-time building layouts and hazard locations
- b) Automatic extinguishing of fires
- c) Replacement of smoke detectors
- d) Improved foam application techniques

Answer: a) Real-time building layouts and hazard locations

5.1.3. PPEs in fire-fighting

5.1.3.1 Objectives

- Understand the role of PPEs (e.g., helmets, turnout gear, gloves, and boots) in fire safety and their proper use.

- Recognize the use and importance of SCBA, respirators, and gas masks in fire safety and hazardous environments.
- Learn measures for storing flammable materials, using explosion-proof equipment, and fire suppression systems.
- Ensure proper labelling, handling of hazardous chemicals, and ventilation in chemical facilities.
- Emphasize the upkeep and periodic maintenance of PPEs to ensure readiness and reliability.

5.1.3.2 Resources

- Whiteboard, erasable marker, board cleaner, projection screen, laptop, speaker, notebook, pen, participant handbook, etc.
- Flip chart
- Participant Manual
- Projection screen and PowerPoint presentations.
- Activities (role plays)

5.1.3.3 Say

- Explain why PPEs are essential for personal safety in fire-related and hazardous scenarios.
- Highlight the importance of SCBA and respiratory protection in oxygen-deficient and toxic environments.
- Discuss safety measures for handling hazardous materials and preventing explosions or fires.
- Stress the need for proper storage, labelling, and ventilation to reduce risks in chemical facilities.

5.1.3.4 Explain

PPEs in Fire Safety

- **Helmet:** Protects the head from falling debris and heat.
- **Turnout Gear:** Shields the body from flames and heat.
- **Gloves and Boots:** Protect hands and feet from burns, sharp objects, and heat.

Respiratory Protection

- **SCBA:** Allows breathing in oxygen-deficient or smoke-filled areas.
- **Respirators and Gas Masks:** Filter out toxic gases and particulates.
- Periodic inspection and cleaning to ensure functionality.

Hazardous Materials Management

- Store flammable materials in designated fire-proof areas.
- Use explosion-proof electrical equipment in hazardous zones.
- Implement fire suppression systems (e.g., sprinklers, foam systems).
- Ensure proper labelling, handling, and ventilation for chemical facilities.

PPE Maintenance

- Routine inspections for wear and tear.
- Cleaning and proper storage of PPEs.
- Replace expired or damaged equipment promptly.

5.1.3.5 Activity

PPE Inspection Drill

- Divide participants into teams to inspect a set of PPEs for any defects or maintenance needs.
- Ask teams to identify missing or damaged equipment and suggest corrective actions.

SCBA Demonstration

- Conduct a live demo on the correct usage of SCBA and respirators.
- Let participants wear SCBA gear and practice in a simulated smoke-filled environment.

Chemical Labelling and Storage Exercise

- Provide participants with mock hazardous materials and ask them to create proper labels.
- Task them with arranging the materials in a model storage area, following safety guidelines.

5.1.3.6 Notes for facilitation

- Summarize the important points and terms explained in the session.
- Ask participants if they have any doubts. Encourage them to ask questions.
- Answer questions, as needed, providing concrete and brief answers.
- Tell participants to complete the questions at the end of the unit.
- Ensure that every participant answers all the questions.

5.1.3.7 Summary

- Proper use of PPEs, including helmets, turnout gear, gloves, and SCBA, is critical for protecting individuals in hazardous environments.
- Effective storage, handling, and labelling of hazardous materials reduce fire risks.
- Routine maintenance and inspections of PPEs ensure safety and functionality.
- Ventilation and explosion-proof equipment further mitigate risks in chemical facilities.

5.1.3.8 Exercise

1. What is the primary purpose of a fire helmet?

- To filter toxic gases
- To protect the head from heat and falling debris
- To extinguish fires
- To store breathing apparatus

Answer: b) To protect the head from heat and falling debris

2. What does SCBA stand for?

- Self-Controlled Breathing Apparatus
- Self-Contained Breathing Apparatus
- Standard Combustion Breathing Apparatus
- Secure Chemical Breathing Apparatus

Answer: b) Self-Contained Breathing Apparatus

3. Where should flammable materials be stored?

- In the main working area for accessibility
- In designated fire-proof areas
- Near electrical equipment for ease of use

d) In open spaces with no ventilation

Answer: b) In designated fire-proof areas

4. What is the purpose of explosion-proof electrical equipment?

a) To reduce electricity consumption

b) To prevent ignition in hazardous areas

c) To ensure faster operation of machinery

d) To eliminate the need for fire suppression systems

Answer: b) To prevent ignition in hazardous areas

5. How often should PPE be inspected for maintenance?

a) Only after an incident occurs

b) Once every two years

c) Periodically and before use

d) Never, if stored properly

Answer: c) Periodically and before use

6. Emergencies, Rescue, Firefighting & Fire Evacuation Plan

6.1. Key Learning Objectives

- Emergencies & Rescue Plan.
- Firefighting Plan.
- Fire Evacuation plan.

- Firefighting & evacuation drills and training

6.1.1. Emergencies & Rescue Plan

6.1.1.1 Objectives

- Understand different types of emergencies and the importance of emergency evacuation planning.
- Learn the requirements of escape routes as per IS1644 standards.
- Plan and implement fire doors, emergency directional signages, assembly points, and evacuation procedures.
- Understand the evacuation needs of differently abled individuals and the role of fire marshals.

6.1.1.2 Resources

- Whiteboard, erasable marker, board cleaner, projection screen, laptop, speaker, notebook, pen, participant handbook, etc.
- Flip chart
- Participant Manual
- Projection screen and PowerPoint presentations.
- Activities (role plays)

6.1.1.3 Say

- Emphasize the importance of preparedness for emergencies, including fire, natural disasters, and chemical spills.
- Highlight the critical role of escape routes, fire doors, and signages in ensuring safe evacuation.
- Discuss the responsibilities of fire marshals in coordinating and managing evacuations.
- Explain the unique considerations for evacuating differently abled individuals.

6.1.1.4 Explain

Types of Emergencies

- Fire, earthquake, floods, chemical spills, and gas leaks.
- Immediate and planned responses to each type.

Escape Route Requirements (IS1644)

- Minimum width, number of exits, and accessibility for all individuals.
- Placement of escape routes to avoid obstacles.
- Clear, illuminated, and obstruction-free pathways.

Key Elements of Emergency Evacuation Planning

- Fire Doors: Designed to slow the spread of fire and smoke.
- Emergency Directional Signages: Clearly marked routes to exits and assembly points.
- Assembly Points: Safe zones for gathering after evacuation.

Evacuation for Differently Abled Individuals

- Use of evacuation chairs or lifts.
- Assigning specific personnel to assist.
- Ensuring accessible escape routes and alternative methods of evacuation.

Role of Fire Marshals

- Conducting evacuation drills and training employees.

- Leading and supervising during an actual evacuation.
- Ensuring everyone is accounted for at assembly points.

6.1.1.5 Activity

Evacuation Drill

- Organize a mock evacuation scenario where participants practice reaching designated assembly points.
- Assign fire marshals and evaluate their performance.

Escape Route Inspection

- Provide a floor plan of a building and ask participants to identify escape routes, fire doors, and assembly points as per IS1644 standards.
- Suggest improvements to meet compliance.

Evacuation Role Play

- Simulate an evacuation, assigning roles for fire marshals, evacuees, and differently abled individuals.
- Evaluate the efficiency and identify areas for improvement.

6.1.1.6 Notes for facilitation

- Summarize the important points and terms explained in the session.
- Ask participants if they have any doubts. Encourage them to ask questions.
- Answer questions, as needed, providing concrete and brief answers.
- Tell participants to complete the questions at the end of the unit.
- Ensure that every participant answers all the questions.

6.1.1.7 Summary

- Emergency evacuation planning is crucial for ensuring safety during emergencies.
- Escape routes must adhere to IS1644 standards, be accessible, and remain obstruction-free.
- Fire doors, directional signages, and assembly points are key components of evacuation planning.
- Special considerations must be made for differently abled individuals to ensure inclusivity.
- Fire marshals play a vital role in organizing and executing evacuations effectively.

6.1.1.8 Exercise

1. What is the purpose of a fire door in emergency evacuation?

- To act as a regular entry door
- To slow the spread of fire and smoke
- To mark escape routes
- To reduce noise during an emergency

Answer: b) To slow the spread of fire and smoke

2. According to IS1644, what is a critical requirement for escape routes?

- They should be located near elevators.
- They should be illuminated and obstruction-free.
- They should be at least 1 meter wide.
- They should be designed for single use only.

Answer: b) They should be illuminated and obstruction-free.

3. What is the primary role of a fire marshal during an evacuation?

- a) To fight fires directly
- b) To assist the fire department upon arrival
- c) To lead and supervise the evacuation process
- d) To repair damaged equipment

Answer: c) To lead and supervise the evacuation process

4. Which of the following is a critical consideration for evacuating differently abled individuals?

- a) Providing designated seating in assembly points
- b) Ensuring alternative escape routes and assistance
- c) Allowing them to remain in the building for safety
- d) Restricting their movement during drills

Answer: b) Ensuring alternative escape routes and assistance

5. What should be included in emergency directional signages?

- a) The names of emergency personnel
- b) Clear, visible arrows and text indicating exit routes
- c) The building layout in detail
- d) Decorative elements for visibility

Answer: b) Clear, visible arrows and text indicating exit routes

6.1.2. Firefighting Plan & Drills

6.1.2.1 Objectives

- Develop and implement Standard Operating Procedures (SOPs) for firefighting.
- Conduct effective firefighting drills to ensure readiness.
- Learn the proper deployment and maintenance of firefighting equipment.
- Coordinate with local firefighting resources and authorities for emergency response.
- Facilitate communication and mutual assistance with neighbouring organizations.

6.1.2.2 Resources

- Whiteboard, erasable marker, board cleaner, projection screen, laptop, speaker, notebook, pen, participant handbook, etc.
- Flip chart
- Participant Manual
- Projection screen and PowerPoint presentations.
- Activities (role plays)

6.1.2.3 Say

- Firefighting SOPs are the backbone of a well-coordinated fire response. They outline actions to be taken during fire emergencies.
- Drills ensure that everyone is prepared and familiar with evacuation and firefighting procedures.
- Coordination with local authorities and resources is essential for managing larger incidents effectively.
- Regular maintenance of firefighting equipment is necessary to ensure functionality during emergencies.

6.1.2.4 Explain

Firefighting SOPs

- Step-by-step actions for responding to a fire, including:
- Activating alarms.
- Using fire extinguishers and hydrants.
- Evacuating occupants.
- Assigning roles and responsibilities to employees.

Firefighting Drills

- Importance of regular mock drills for preparedness.
- Simulating various fire scenarios, including:
- Building fires.
- Chemical spills.
- Electrical fires.
- Steps for conducting a drill: briefing, execution, and debriefing.

Equipment Deployment and Maintenance

- Types of firefighting equipment (extinguishers, hydrants, hoses, sprinklers).
- Guidelines for equipment placement and periodic maintenance.
- Checklists for inspecting fire extinguishers, hydrants, and alarms.

Local Firefighting Resources and Authorities

- Identifying local fire stations, emergency contact numbers, and resources.
- Procedures for calling local firefighting authorities during emergencies.
- Communication protocols and mutual aid agreements with neighbouring organizations.

6.1.2.5 Activity

SOP Development Workshop

- Divide participants into teams to draft SOPs for specific fire scenarios.

- Evaluate the SOPs for clarity and comprehensiveness.

Mock Drill Exercise

- Conduct a live fire drill simulating an emergency evacuation.
- Include the deployment of firefighting equipment and coordination with local authorities.

Equipment Inspection Drill

- Assign participants to inspect fire extinguishers, hydrants, and sprinklers.
- Use a checklist to ensure all equipment meets standards.

Communication Simulation

- Role-play scenarios where participants contact local firefighting authorities and coordinate assistance.

6.1.2.6 Notes for facilitation

- Summarize the important points and terms explained in the session.
- Ask participants if they have any doubts. Encourage them to ask questions.
- Answer questions, as needed, providing concrete and brief answers.
- Tell participants to complete the questions at the end of the unit.
- Ensure that every participant answers all the questions.

6.1.2.7 Summary

- Firefighting SOPs ensure clarity and coordination during emergencies.
- Regular mock drills enhance preparedness and identify gaps in the response plan.
- Proper maintenance of firefighting equipment is critical for functionality.
- Collaboration with local authorities and neighbouring organizations strengthens emergency response capabilities.

6.1.2.8 Exercise

1. What is the primary purpose of firefighting SOPs?

- To train new employees
- To outline actions during fire emergencies
- To improve workplace productivity
- To allocate funds for fire safety equipment

Answer: b) To outline actions during fire emergencies

2. How often should firefighting drills be conducted?

- Once a year
- Monthly
- Regularly, as per organizational policy
- Only during fire incidents

Answer: c) Regularly, as per organizational policy

3. Which of the following is NOT part of fire equipment maintenance?

- Refilling fire extinguishers.

- b) Inspecting hoses for leaks.
- c) Calibrating emergency alarms.
- d) Repainting fire extinguishers for aesthetics.

Answer: d) Repainting fire extinguishers for aesthetics

4. What is the first step in calling local firefighting authorities during an emergency?

- a) Provide accurate information about the fire's location.
- b) Evacuate the premises.
- c) Deploy firefighting equipment.
- d) Wait for the fire to spread.

Answer: a) Provide accurate information about the fire's location

5. What should be included in a fire drill debriefing?

- a) The name of the fire marshal.
- b) Evaluation of the response and areas for improvement.
- c) Detailed maintenance records of firefighting equipment.
- d) List of attendees only.

Answer: b) Evaluation of the response and areas for improvement

6.1.3. Fire Evacuation plan & drills

6.1.3.1 Objectives

- Develop effective evacuation and rescue plans.
- Conduct evacuation and rescue drills to ensure readiness.
- Understand the roles and responsibilities of fire marshals during evacuations.
- Ensure safe evacuation of differently abled individuals and secure removal of critical documents.
- Implement proper use of fire exits and assembly areas.

6.1.3.2 Resources

- Whiteboard, erasable marker, board cleaner, projection screen, laptop, speaker, notebook, pen, participant handbook, etc.
- Flip chart
- Participant Manual
- Projection screen and PowerPoint presentations.
- Activities (role plays)

6.1.3.3 Say

- Evacuation and rescue plans save lives during emergencies by ensuring a clear course of action.
- Fire marshals play a crucial role in maintaining order and facilitating safe evacuations.
- Emergency drills highlight potential gaps in the evacuation plan and improve overall readiness.
- Special consideration must be given to differently abled individuals during evacuation.

6.1.3.4 Explain

Evacuation and Rescue Plans

- Steps for preparing an evacuation plan:
- Identifying escape routes and exits.
- Assigning roles for fire marshals and team leaders.
- Creating rescue plans for differently-abled individuals.
- Importance of safe removal of critical documents and equipment.

Deployment of Fire Marshals

- Responsibilities of fire marshals, including:
- Ensuring all personnel are evacuated.
- Guiding individuals to designated assembly points.
- Communicating with emergency response teams.

Evacuation Hierarchy and Responsibilities

- Chain of command during evacuation:
- Leadership roles for supervisors, safety officers, and fire marshals.
- Responsibilities of employees.

Special Considerations for Differently Abled Individuals

- Providing evacuation chairs or other assistive devices.
- Training staff on assisting differently abled persons during evacuation.

Emergency Drills

- Procedure for conducting drills:
- Pre-drill briefing.
- Simulating emergency scenarios (fire, chemical spill, etc.).
- Post-drill evaluation and feedback.
- Use of assembly areas and headcount procedures.

6.1.3.5 Activity

Evacuation Plan Preparation

- Divide participants into groups to draft an evacuation plan for a hypothetical scenario.
- Evaluate plans for comprehensiveness and feasibility.

Emergency Evacuation Drill

- Conduct a live evacuation drill, including deployment of fire marshals.
- Simulate different challenges, such as blocked exits or assisting differently abled individuals.

Role-Playing Fire Marshal Responsibilities

- Assign participants as fire marshals and have them perform roles during a mock drill.
- Evaluate communication and decision-making skills.

Critical Document Removal Exercise

- Simulate a scenario requiring the safe removal of critical documents during evacuation.

6.1.3.6 Notes for facilitation

- Summarize the important points and terms explained in the session.
- Ask participants if they have any doubts. Encourage them to ask questions.
- Answer questions, as needed, providing concrete and brief answers.
- Tell participants to complete the questions at the end of the unit.
- Ensure that every participant answers all the questions.

6.1.3.7 Summary

- Evacuation and rescue plans ensure systematic and safe evacuation during emergencies.
- Fire marshals are responsible for guiding evacuations and maintaining order.
- Emergency drills improve preparedness and highlight gaps in plans.
- Differently abled individuals require specific support measures for safe evacuation.
- Assembly areas play a key role in ensuring everyone's safety post-evacuation.

6.1.3.8 Exercise

1. What is the primary responsibility of fire marshals during an evacuation?

- a) Extinguishing fires
- b) Guiding personnel to safety
- c) Handling critical documents
- d) Communicating with local authorities

Answer: b) Guiding personnel to safety

2. What should an evacuation plan prioritize?

- a) Speed over safety
- b) Clear escape routes and roles
- c) Only the removal of critical documents
- d) Individual decision-making during emergencies

Answer: b) Clear escape routes and roles

3. What is the first step in assisting differently-abled individuals during evacuation?

- a) Carry them to safety immediately.
- b) Ensure assistive devices are available.
- c) Wait for fire marshals to take action.
- d) Remove obstacles from their path.

Answer: b) Ensure assistive devices are available.

4. What is the purpose of assembly areas during an evacuation?

- a) Storing critical documents
- b) Conducting headcounts and ensuring safety
- c) Performing rescue operations
- d) Housing fire marshals during drills

Answer: b) Conducting headcounts and ensuring safety

5. Which factor is NOT essential in an evacuation plan?

- a) Identification of escape routes
- b) Responsibilities of fire marshals
- c) Location of firefighting equipment
- d) Employee holiday schedules

Answer: d) Employee holiday schedules

6.1.4. Automobile Fire Safety Regulations

6.1.4.1 Objectives

- Ensure vehicles are maintained according to manufacturer specifications to prevent fire risks.
- Understand and use multipurpose fire extinguishers effectively in vehicle-related fire incidents.
- Ensure fire safety measures align with automobile codes and regulations.
- Promote safe driving practices and secure transportation of materials to reduce fire hazards.

6.1.4.2 Resources

- Whiteboard, erasable marker, board cleaner, projection screen, laptop, speaker, notebook, pen, participant handbook, etc.
- Flip chart
- Participant Manual
- Projection screen and PowerPoint presentations.
- Activities (role plays)

6.1.4.3 Say

- Regular vehicle maintenance prevents malfunctions that can lead to fires.
- Multipurpose fire extinguishers are crucial for tackling fires involving vehicles.
- Adhering to fire safety regulations ensures safer vehicle operations and materials transportation.
- Safe driving and proper material handling minimize risks of vehicle fires.

6.1.4.4 Explain

Vehicle Maintenance

- Importance of maintaining electrical systems, fuel lines, and engines.
- Regular inspection of fire-prone components, such as batteries, wiring, and exhaust systems.
- Ensuring compliance with manufacturer guidelines for servicing.

Multipurpose Fire Extinguishers

- Types of multipurpose fire extinguishers (e.g., ABC class).
- Placement of extinguishers in vehicles for easy access.
- Basic operation using the PASS technique (Pull, Aim, Squeeze, Sweep).

Adhering to Codes and Regulations

- Overview of automobile fire safety standards (e.g., IS codes, NFPA 1901).
- Ensuring vehicles carrying flammable materials follow transportation guidelines.

- Legal responsibilities of vehicle operators regarding fire safety.

Safe Driving Practices and Material Transportation

- Avoiding overloading vehicles to prevent overheating.
- Proper securing and labelling of hazardous materials.
- Emergency response procedures during a fire.

6.1.4.5 Activity

Vehicle Inspection Drill

- Conduct a mock inspection of a vehicle's fire-prone components.
- Use a checklist to identify potential risks.

Fire Extinguisher Demonstration

- Provide hands-on training on the use of multipurpose fire extinguishers.
- Simulate a small, controlled fire to demonstrate proper extinguishing techniques.

Role-Playing Emergency Scenarios

- Assign participants to act out roles in a vehicle fire emergency (e.g., driver, passenger, responder).
- Evaluate their responses based on fire safety protocols.

Regulations and Safe Driving Quiz

- Test knowledge on fire safety codes and safe driving practices.

6.1.4.6 Notes for facilitation

- Summarize the important points and terms explained in the session.
- Ask participants if they have any doubts. Encourage them to ask questions.
- Answer questions, as needed, providing concrete and brief answers.
- Tell participants to complete the questions at the end of the unit.
- Ensure that every participant answers all the questions.

6.1.4.7 Summary

- Proper vehicle maintenance reduces fire risks significantly.
- Multipurpose fire extinguishers are vital tools for managing vehicle-related fires.
- Compliance with fire safety codes ensures safer operations and legal adherence.
- Safe driving and secure material transportation are critical to preventing fires and related hazards.

6.1.4.8 Exercise

1. What is the primary cause of vehicle fires?

- Poor driving skills
- Electrical malfunctions and fuel leaks
- Overuse of fire extinguishers
- Low tire pressure

Answer: b) Electrical malfunctions and fuel leaks

2. What does the "PASS" technique stand for in fire extinguisher use?

- Push, Activate, Sweep, Stop

- b) Pull, Aim, Squeeze, Sweep
- c) Press, Adjust, Squeeze, Stop
- d) Pull, Activate, Swing, Sweep

Answer: b) Pull, Aim, Squeeze, Sweep

3. Where should fire extinguishers be placed in a vehicle?

- a) In the trunk
- b) Under the passenger seat
- c) In an easily accessible and visible location
- d) Hidden for security

Answer: c) In an easily accessible and visible location

4. What is a key requirement for transporting hazardous materials?

- a) Unlabelled packaging
- b) Overloading the vehicle
- c) Proper securing and labelling of materials
- d) Avoiding fire extinguishers in the vehicle

Answer: c) Proper securing and labelling of materials

5. How often should vehicles carrying flammable materials be inspected?

- a) Once a year
- b) Every month
- c) Regularly as per regulatory requirements
- d) Only after a fire incident

Answer: c) Regularly as per regulatory requirements

7. Plan & Organize Fire Emergency Protocols

7.1. Key Learning Objectives

- Planning of resources for own work and communication to concerned subordinates, co-workers and superiors.
- Provide necessary support to subordinates, co-ordinate with co-workers and liaise with superiors and monitor.
- Setting up emergency protocols and implement at working places to minimise the loss in case of any incident or accident.

7.1.1. Planning of Work

7.1.1.1 Objectives

- Develop a detailed plan for safety resources, schedules, and measures aligned with project timelines.

- Understand and implement organizational hierarchy and effective communication across team levels.
- Assign tasks, supervise, and coordinate team members to ensure readiness and alignment with project goals.

7.1.1.2 Resources

- Whiteboard, erasable marker, board cleaner, projection screen, laptop, speaker, notebook, pen, participant handbook, etc.
- Flip chart
- Participant Manual
- Projection screen and PowerPoint presentations.
- Activities (role plays)

7.1.1.3 Say

- Effective safety planning ensures timely readiness and smooth operations.
- Understanding the organizational hierarchy is key to seamless communication and task delegation.
- Coordinated teamwork is essential for meeting project timelines while maintaining safety standards.
- Task assignment and supervision keep the team aligned with goals and reduce inefficiencies.

7.1.1.4 Explain

Planning Safety Resources, Schedules, and Measures

- Define necessary safety resources (PPE, equipment, emergency kits, etc.).
- Create a schedule for resource allocation and safety checks.
- Develop measures such as safety drills and risk assessments in sync with project timelines.

Organizational Hierarchy and Communication

- Explain roles and responsibilities across hierarchical levels.
- Demonstrate methods for effective communication (e.g., reporting protocols, escalation procedures).
- Highlight the importance of clear communication in preventing misunderstandings.

Task Allocation, Supervision, and Coordination

- Discuss criteria for task assignment based on skills and expertise.
- Supervision techniques to ensure adherence to safety standards and timelines.
- Strategies for fostering collaboration and resolving conflicts among team members.

7.1.1.5 Activity

Resource Planning Exercise

- Divide participants into groups to draft a safety resource plan based on a mock project.
- Evaluate the plan's effectiveness in addressing potential hazards.

Role-Playing Communication Scenarios

- Create scenarios where participants practice communicating across hierarchical levels.
- Assess the clarity and efficiency of their communication.

Task Assignment Simulation

- Provide a list of tasks and team members with varying skill sets.
- Ask participants to assign tasks and justify their decisions.

Team Coordination Drill

- Conduct a mock scenario requiring coordination (e.g., emergency response).
- Monitor team dynamics and provide feedback on their coordination.

7.1.1.6 Notes for facilitation

- Summarize the important points and terms explained in the session.
- Ask participants if they have any doubts. Encourage them to ask questions.
- Answer questions, as needed, providing concrete and brief answers.
- Tell participants to complete the questions at the end of the unit.
- Ensure that every participant answers all the questions.

7.1.1.7 Summary

- Safety resource planning, scheduling, and implementing measures are critical for readiness.
- Understanding the organizational hierarchy ensures efficient communication and task execution.
- Task allocation and effective supervision keep the team aligned with project objectives.
- Coordination among team members enhances productivity and safety compliance.

7.1.1.8 Exercise

1. What is the first step in planning safety resources?

- a) Allocating tasks to team members
- b) Identifying necessary safety equipment and measures
- c) Creating emergency response plans
- d) Supervising team members

Answer: b) Identifying necessary safety equipment and measures

2. Which of the following is NOT an effective communication method in an organizational hierarchy?

- a) Reporting protocols
- b) Escalation procedures
- c) Ignoring chain of command
- d) Regular team meetings

Answer: c) Ignoring chain of command

3. What is the primary factor in task allocation?

- a) Random assignment
- b) Skills and expertise of team members
- c) Proximity to the task location
- d) Number of team members available

Answer: b) Skills and expertise of team members

4. Which of the following ensures better team coordination?

- a) Lack of communication
- b) Role clarity and conflict resolution strategies

- c) Working independently without supervision
- d) Overlapping roles without clear responsibilities

Answer: b) Role clarity and conflict resolution strategies

5. Why is supervision essential during task execution?

- a) To micromanage every detail
- b) To ensure safety standards and timelines are met
- c) To assign more tasks randomly
- d) To reduce the need for team communication

Answer: b) To ensure safety standards and timelines are met

7.1.2. Organising & monitoring

7.1.2.1 Objectives

- Ensure effective collection and allocation of resources based on task requirements and timelines.
- Foster clear communication and provide guidance to coworkers, subordinates, and superiors.
- Monitor work progress, report updates, and prepare relevant documentation.

7.1.2.2 Resources

- Whiteboard, erasable marker, board cleaner, projection screen, laptop, speaker, notebook, pen, participant handbook, etc.
- Flip chart
- Participant Manual
- Projection screen and PowerPoint presentations.
- Activities (role plays)

7.1.2.3 Say

- Proper resource collection and allocation are critical for timely task completion.
- Guidance and communication ensure that everyone is aligned with the project goals.
- Monitoring and reporting progress helps maintain accountability and track milestones.
- Documentation supports transparency and record-keeping for future reference.

7.1.2.4 Explain

Resource Collection and Allocation

- Methods for identifying and acquiring necessary resources.
- Criteria for resource provisioning based on task requirements and deadlines.
- How to prioritize resource distribution for high-risk or high-priority tasks.

Communication and Guidance

- Techniques for briefing team members about tasks, expectations, and deadlines.
- Importance of two-way communication for feedback and issue resolution.
- How to provide actionable guidance to subordinates and coworkers.

Supervision and Monitoring

- Steps to effectively supervise work progress.
- Importance of periodic monitoring to ensure alignment with timelines and standards.
- Strategies for addressing deviations or delays in task completion.

Reporting and Documentation

- Key components of a progress report (status, challenges, solutions).
- Methods to maintain clear and concise documentation for accountability.
- How to use reports to inform decision-making and future planning.

7.1.2.5 Activity

Resource Allocation Simulation

- Present a scenario where participants must collect and allocate resources for a given task.
- Evaluate their ability to prioritize and manage resources effectively.

Communication Role-Play

- Assign roles (superior, subordinate, coworker) and have participants practice task briefings.
- Provide feedback on clarity, tone, and effectiveness.

Progress Monitoring Exercise

- Set up a mock project with milestones and potential obstacles.
- Participants supervise, monitor progress, and report findings in real-time.

Reporting and Documentation Task

- Ask participants to prepare a progress report for a completed task.
- Review reports for accuracy, completeness, and clarity.

7.1.2.6 Notes for facilitation

- Summarize the important points and terms explained in the session.
- Ask participants if they have any doubts. Encourage them to ask questions.
- Answer questions, as needed, providing concrete and brief answers.
- Tell participants to complete the questions at the end of the unit.
- Ensure that every participant answers all the questions.

7.1.2.7 Summary

- Effective resource collection and allocation ensure tasks are completed on time and efficiently.
- Clear communication and guidance align the team with project objectives.
- Supervision and monitoring help track progress and address issues promptly.
- Reporting and documentation provide accountability and aid in future planning.

7.1.2.8 Exercise

1. What is the primary criterion for resource allocation?

- a) Availability of resources
- b) Task requirements and deadlines
- c) Personal preferences of team members
- d) Cost of resources

Answer: b) Task requirements and deadlines

2. Which of the following is NOT a benefit of effective communication in task execution?

- a) Alignment of team members with goals
- b) Reduction in misunderstandings
- c) Elimination of all task delays
- d) Feedback on task progress

Answer: c) Elimination of all task delays

3. What is the main purpose of progress monitoring?

- a) To identify team members' weaknesses
- b) To track milestones and ensure adherence to timelines
- c) To reduce the workload of subordinates
- d) To eliminate the need for reports

Answer: b) To track milestones and ensure adherence to timelines

4. What is an essential component of a progress report?

- a) Personal opinions about team members
- b) Status updates, challenges, and solutions
- c) Detailed explanations of every team member's role
- d) Exact replication of previous reports

Answer: b) Status updates, challenges, and solutions

5. Why is documentation important in project management?

- a) To increase the workload
- b) To ensure transparency and accountability
- c) To avoid communication with team members
- d) To minimize the need for supervision

Answer: b) To ensure transparency and accountability

7.1.3. Emergency Protocols

7.1.3.1 Objectives

- **Develop Effective Emergency Plans:** Create comprehensive evacuation and rescue plans tailored to workplace needs.
- **Conduct Emergency Drills:** Implement regular drills to ensure preparedness and identify areas for improvement.
- **Understand Roles and Responsibilities:** Assign and clarify the roles of fire marshals and other team members during emergencies.
- **Ensure Safe Evacuation for All:** Address the specific needs of differently abled individuals in evacuation plans.
- **Maintain Clear Signage and Guidance:** Set up emergency assembly areas, evacuation routes, and clear signboards to guide occupants.

7.1.3.2 Resources

- Whiteboard, erasable marker, board cleaner, projection screen, laptop, speaker, notebook, pen, participant handbook, etc.
- Flip chart
- Participant Manual
- Projection screen and PowerPoint presentations.
- Activities (role plays)

7.1.3.3 Say

- Effective emergency planning and regular drills are essential for ensuring the safety of all employees during unexpected incidents.
- Fire marshals play a crucial role in guiding evacuations and ensuring that everyone follows the evacuation plan.
- Clear signage and designated assembly areas are vital for orderly and safe evacuations.
- Special considerations must be made to accommodate differently abled individuals to ensure their safe evacuation.

7.1.3.4 Explain

Emergency and Evacuation Planning

- Types of Emergencies:
 - Fire, chemical spills, natural disasters, and other workplace-specific incidents.
 - Evacuation Plans:
 - Detailed routes, exits, and procedures for safe evacuation.
 - Roles and responsibilities of each team member during an evacuation.
- Rescue Plans:
 - Strategies for assisting individuals who may need help evacuating, such as those who are differently-abled.
 - Requirements of Escape Routes (As per IS1644)
- Design Specifications:
 - Minimum width, number of exits, and accessibility requirements.
- Clear Pathways:
 - Ensuring escape routes are free from obstructions and clearly marked.
- Signage:
 - Placement of illuminated and visible exit signs and directional signboards.

Fire Doors and Emergency Directional Signages

- Fire Doors:
 - Their role in containing fires and preventing smoke spread.
 - Proper maintenance and regular checks to ensure functionality.
- Emergency Directional Signages:
 - Clear indicators directing occupants to the nearest exits and assembly points.
 - Use of standardized symbols and lighting for visibility during evacuations.

Assembly Points and Evacuation Procedures

- Assembly Areas:

- Designated safe zones outside the building where employees gather post-evacuation.
- Importance of headcounts to ensure everyone is accounted for.
- Evacuation Procedures:
 - Step-by-step actions to take during an evacuation, including alerting others, following signs, and moving to assembly areas.
 - Special procedures for assisting differently abled individuals.

Role of Fire Marshals

- Responsibilities:
 - Leading evacuations, ensuring all occupants are accounted for, and helping as needed.
 - Coordinating with emergency responders and communicating updates to management.
- Training:
 - Regular training to handle various emergency scenarios effectively.

7.1.3.5 Activity

Evacuation Plan Development

- Task:
 - Divide participants into groups and assign each group a different workplace scenario (e.g., office building, manufacturing plant).
 - Have each group develop an evacuation and rescue plan, including escape routes, assembly points, and roles of fire marshals.
- Outcome:
 - Present and evaluate each plan for comprehensiveness and practicality.

Fire Drill Simulation

- Task:
 - Conduct a live fire evacuation drill, assigning roles such as fire marshals, evacuees, and observers.
 - Simulate different challenges, such as blocked exits or assisting a differently-abled individual.
- Outcome:
 - Assess the effectiveness of the evacuation plan and identify areas for improvement.

Signage Placement Exercise

- Task:
 - Provide a floor plan of a workplace and a set of standard emergency signs.
 - Ask participants to determine optimal locations for emergency directional signages and fire doors.
- Outcome:
 - Review and discuss the placement choices based on visibility and accessibility standards.

Role-Playing Fire Marshal Duties

- Task:
 - Assign participants to act as fire marshals during a mock evacuation.
 - Have them guide evacuations, perform headcounts, and communicate with emergency responders.
- Outcome:
 - Evaluate their performance in leadership, communication, and coordination.

Evacuation Procedure Workshop

- Task:
 - Conduct a workshop where participants outline step-by-step evacuation procedures for different emergency scenarios.
 - Include special procedures for assisting differently abled individuals.
- Outcome:
 - Compile a comprehensive set of evacuation procedures for the workplace.

7.1.3.6 Notes for facilitation

- Summarize the important points and terms explained in the session.
- Ask participants if they have any doubts. Encourage them to ask questions.
- Answer questions, as needed, providing concrete and brief answers.
- Tell participants to complete the questions at the end of the unit.
- Ensure that every participant answers all the questions.

7.1.3.7 Summary

- Comprehensive Planning: Effective evacuation and rescue plans are essential for ensuring the safety of all employees during emergencies.
- Clear Communication: Understanding organizational hierarchy and maintaining clear communication channels are crucial for coordinated responses.
- Regular Drills: Conducting regular drills helps identify gaps in plans and ensures that all team members are familiar with their roles.
- Inclusivity: Special considerations must be made to accommodate differently-abled individuals to ensure their safe evacuation.
- Role of Fire Marshals: Fire marshals are key to leading evacuations, maintaining order, and ensuring all occupants reach assembly points safely.

7.1.3.8 Exercise

1. What is the primary purpose of an emergency assembly area?

- a) To store emergency supplies
- b) To provide a place for employees to gather safely after evacuation
- c) To conduct meetings during emergencies
- d) To house fire marshals

Answer: b) To provide a place for employees to gather safely after evacuation

2. According to IS1644, which of the following is a critical requirement for escape routes?

- a) They should be located near elevators
- b) They should be illuminated and obstruction-free
- c) They should be at least 1 meter wide
- d) They should be designed for single use only

Answer: b) They should be illuminated and obstruction-free

3. What is the main role of fire marshals during an evacuation?

- a) To extinguish the fire

- b) To guide and assist employees to safety
- c) To call the fire department
- d) To maintain fire extinguishers

Answer: b) To guide and assist employees to safety

4. Which of the following is essential for evacuating differently-abled individuals?

- a) Providing designated seating in assembly areas
- b) Ensuring accessible escape routes and assistive devices
- c) Allowing them to remain in the building for safety
- d) Restricting their movement during drills

Answer: b) Ensuring accessible escape routes and assistive devices

5. What should be included in emergency directional signages?

- a) Names of emergency personnel
- b) Clear, visible arrows and text indicating exit routes
- c) Detailed building layouts
- d) Decorative elements for visibility

Answer: b) Clear, visible arrows and text indicating exit routes

7.1.4. Case Study

7.1.4.1 Objectives

- Analyse major fire accidents in India to identify systemic and situational causes.
- Avoid unauthorized construction, promote the use of non-combustible materials, and ensure compliance with safety regulations.
- Develop robust emergency response strategies to mitigate the impact of fire incidents.
- Incorporate insights from past incidents to improve fire safety planning and implementation.

7.1.4.2 Resources

- Whiteboard, erasable marker, board cleaner, projection screen, laptop, speaker, notebook, pen, participant handbook, etc.
- Flip chart
- Participant Manual
- Projection screen and PowerPoint presentations.
- Activities (role plays)

7.1.4.3 Say

- Major fire accidents often stem from negligence, lack of adherence to safety norms, and poor planning. By analyzing past incidents, we can identify critical areas of improvement.
- Unauthorized construction and the use of combustible materials are recurring factors in fire accidents. Addressing these can significantly reduce risks.

- Emergency response strategies, when effectively planned and executed, save lives and minimize damage during fire incidents.

7.1.4.4 Explain

Analysis of Major Fire Incidents in India

- Common Causes:
 - Unauthorized construction and alterations that compromise fire safety.
 - Use of flammable building materials.
 - Electrical short circuits due to poor maintenance.
 - Overcrowding and lack of evacuation routes.
- Examples of Incidents:
 - Uphaar Cinema Tragedy (1997):
 - Key Issues: Blocked exits, lack of fire suppression systems.
 - Mumbai Kamala Mills Fire (2017):
 - Key Issues: Unauthorized structures, use of flammable roofing materials.
 - Delhi Anaj Mandi Fire (2019):
 - Key Issues: Overcrowded spaces, absence of fire alarms.

Preventive Measures

- Avoid Unauthorized Construction:
 - Regular inspections to ensure compliance with building codes.
 - Demolition of structures violating fire safety norms.
- Utilization of Non-Combustible Materials:
 - Mandatory use of fire-retardant materials in construction and interiors.
- Adherence to Safety Regulations:
 - Strict enforcement of National Building Code (NBC) guidelines and state fire safety rules.
 - Periodic fire audits and safety drills.
- Emergency Response Strategies:
 - Formation of emergency response teams and regular training.
 - Installation of fire detection and suppression systems.
 - Clear evacuation plans and signages.

Insights from Past Incidents

- Gaps Identified:
 - Lack of awareness and training on fire safety.
 - Delayed response due to inadequate emergency systems.
 - Poor coordination between agencies during emergencies.
- Actionable Learnings:
 - Regular fire safety training for staff and residents.
 - Improved coordination between fire services and local authorities.
 - Incorporation of modern fire safety technologies like smoke detectors and water mist systems.

7.1.4.5 Activity

Case Study Discussion

- Task:
 - Divide participants into groups, each assigned a major fire incident (e.g., Uphaar, Kamala Mills, Anaj Mandi).
 - Analyze the root causes, preventive measures that were missing, and lessons learned.
- Outcome: Present findings and propose actionable improvements for similar scenarios.

Fire Safety Audit Simulation

- Task:
 - Conduct a mock fire safety audit of a hypothetical building.
 - Identify violations such as blocked exits, use of combustible materials, and missing fire alarms.
- Outcome: Create a report with recommendations for compliance.

Emergency Response Drill

- Task:
 - Simulate a fire emergency, testing evacuation plans and response times.
 - Include scenarios where emergency exits are blocked, requiring alternate routes.
- Outcome: Evaluate the effectiveness of emergency preparedness.

Material Selection Exercise

- Task:
 - Provide participants with options for building materials (combustible and non-combustible).
 - Ask them to choose materials for constructing a fire-safe building.
- Outcome: Discuss the rationale behind their choices and emphasize the importance of non-combustible materials.

7.1.4.6 Notes for facilitation

- Summarize the important points and terms explained in the session.
- Ask participants if they have any doubts. Encourage them to ask questions.
- Answer questions, as needed, providing concrete and brief answers.
- Tell participants to complete the questions at the end of the unit.
- Ensure that every participant answers all the questions.

7.1.4.7 Summary

- Root Causes: Fire accidents often arise from unauthorized construction, the use of combustible materials, and non-compliance with safety regulations.
- Preventive Strategies: Enforcing building codes, using fire-resistant materials, and ensuring regular fire audits are crucial for prevention.
- Emergency Preparedness: Well-planned evacuation routes, trained personnel, and effective fire detection systems can save lives during incidents.
- Insights Applied: Learning from past tragedies helps in creating safer workplaces and residential spaces.

7.1.4.8 Exercise

1. What was a major contributing factor to the Uphaar Cinema Tragedy (1997)?
 - a) Overcrowding in the building

- b) Blocked exits and lack of fire suppression systems
- c) Poor coordination with fire services
- d) Use of combustible materials in the structure

Answer: b) Blocked exits and lack of fire suppression systems

2. Which fire safety measure can prevent fire spread in buildings?

- a) Use of fire-retardant materials
- b) Installing additional windows
- c) Increasing the building height
- d) Adding more decorative elements

Answer: a) Use of fire-retardant materials

3. What is a common cause of fire accidents in unauthorized constructions?

- a) Enhanced fire suppression systems
- b) Lack of adherence to building codes
- c) Overuse of non-combustible materials
- d) Excessive emergency exits

Answer: b) Lack of adherence to building codes

4. Why are emergency drills important in fire safety?

- a) To showcase the building's design features
- b) To test and improve evacuation plans and preparedness
- c) To reduce the number of fire exits needed
- d) To comply with decoration guidelines

Answer: b) To test and improve evacuation plans and preparedness

5. What is one key insight gained from the Kamala Mills Fire?

- a) The importance of rapid-fire response
- b) The necessity of flammable roofing materials
- c) The need for larger elevators
- d) The effectiveness of overcrowding

Answer: a) The importance of rapid-fire response

8. Employability Skills

8.1. Key Learning Objectives

- Introduction to Employability Skills Constitutional values - Citizenship
- Becoming a Professional in the 21st Century Basic English Skills
- Career Development & Goal Setting Communication Skills
- Diversity & Inclusion
- Financial and Legal Literacy Essential Digital Skills
- Entrepreneurship Customer Service
- Getting ready for Apprenticeship & Jobs

8.1.1. Preparing for Employment & Self Employment

8.1.1.1 Objectives

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

- Develop Job Readiness Skills.
- Create Effective Job Search Strategies.
- Prepare for job interviews and networking opportunities.
- Identify potential self-employment ideas and business opportunities.
- Understand Employment Rights and Responsibilities.
- Enhance Personal Branding.

- Develop Financial and Organizational Skills.

8.1.1.2 Resources

- Whiteboard, erasable marker, board cleaner, projection screen, laptop, speaker, notebook, pen, participant handbook, etc
- Flip chart
- Participant Manual
- Projection screen and PowerPoint presentations.
- Activities (role plays)

8.1.1.3 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

8.1.1.4 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.

8.1.1.5 Role Play

- Conduct a role play for the situation given.
- Role Play –
- 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?

8.1.1.6 Notes for Facilitation

- Summarize the important points and terms explained in the session.
- Ask participants if they have any doubts. Encourage them to ask questions.
- Answer questions, as needed, providing concrete and brief answers.
- Tell participants to complete the questions at the end of the unit.
- Ensure that every participant answers all the questions

8.1.1.7 Summary

- Job Readiness: Develop skills for seeking and securing employment or starting a business.
- Job Search Tools:
 - Create a professional resume, cover letter, and online presence.
 - Prepare for job interviews and networking.
- Self-Employment:
 - Identify and explore potential self-employment or business ideas.
 - Understand the basics of starting and managing a small business.
- Workplace Rights
 - Learn about employment laws, rights, and responsibilities.
- Personal Branding: Build a strong personal brand for career or business growth.
- Financial Planning: Develop essential financial and organizational skills for employment or entrepreneurship.

8.1.1.8 Exercise

1. What is the first step in preparing for employment?

- A) Writing a resignation letter
- B) Creating a resume
- C) Opening a business
- D) Networking with friend

2. Which of the following is NOT typically required for self-employment?

- A) A business plan
- B) An employer to answer to
- C) Financial management skills
- D) Marketing and sales strategies

3. What should be included in a self-employment business plan?

- A) The business idea and goals
- B) A list of personal contacts
- C) A resume
- D) A job offer letter

4. True or False: In self-employment, you are responsible for your own business operations, including financial management and legal compliance.

5. True or False: Having relevant qualifications and work experience is the only factor to consider when preparing for employment.

6. True or False: Personal branding is important for both self-employment and traditional employment opportunities.

8.1.2. Understanding Entrepreneurship

8.1.2.1 Objectives

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

- 1. Discuss the concept of entrepreneurship
- 2. Discuss the importance of entrepreneurship
- 3. Discuss 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 the important problem-solving traits
- 14. Discuss ways to assess problem solving skills

8.1.2.2 Resources

- Whiteboard, erasable marker, board cleaner, projection screen, laptop, speaker, notebook, pen, participant handbook, etc
- Flip chart
- Participant Manual
- Projection screen and PowerPoint presentations.
- Activities (role plays)

8.1.2.3 Say

- Let's start this session with some interesting questions about Indian entrepreneurs

8.1.2.4 Do

Tell them that you will ask them few questions about a few entrepreneurs.

- Divide the class into 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

8.1.2.5 Team Activity

- Divide the class into small teams (4-5 participants per team).
- Each team needs to come up with a unique business idea. Encourage participants to think creatively, focusing on solving a real-world problem.
- Teams should discuss and finalize their business idea
- Business Plan Development
- Teams will work together to develop a simple business plan for their idea. The plan should cover the following key points:

- Business Idea: What is the product or service? How does it solve a problem?
- Target Market: Who are the customers? What are their needs?
- Unique Value Proposition: Why is the business idea different or better than others in the market?
- Revenue Model: How will the business make money (e.g., sales, subscriptions, ads)?
- Marketing Strategy: How will the business attract customers?
- Launch Plan: How will they introduce the business to the market?

8.1.2.6 Notes for Facilitation

- Summarize the important points and terms explained in the session.
- Ask participants if they have any doubts. Encourage them to ask questions.
- Answer questions, as needed, providing concrete and brief answers.
- Tell participants to complete the questions at the end of the unit.
- Ensure that every participant answers all the questions

8.1.2.7 Summary

- Close the discussion by summarizing about the opportunities for entrepreneurs in India

8.1.2.8 Exercise

1. Which of the following is a good practice for writing a professional email?

- A) Using a casual tone and slang
- B) Including a clear subject line
- C) Writing long paragraphs without breaks
- D) Not using a greeting

2. Which research method is often used to assess market opportunities for a new business?

- A) Historical analysis
- B) Surveys and questionnaires
- C) Personal opinions
- D) Guesswork

3. Which of the following is a primary motivation for entrepreneurs?

- A) Seeking a stable salary
- B) Solving problems and creating value
- C) Avoiding risk
- D) Working within a corporate structure

4. True or False: An entrepreneur's role in the economy is limited to running a business for profit.

5. True or False: The entrepreneurial mindset involves risk-taking, resilience, and the ability to adapt to challenges.

6. True or False: Entrepreneurship only applies to individuals who start their own businesses and does not include individuals who work within large corporations.