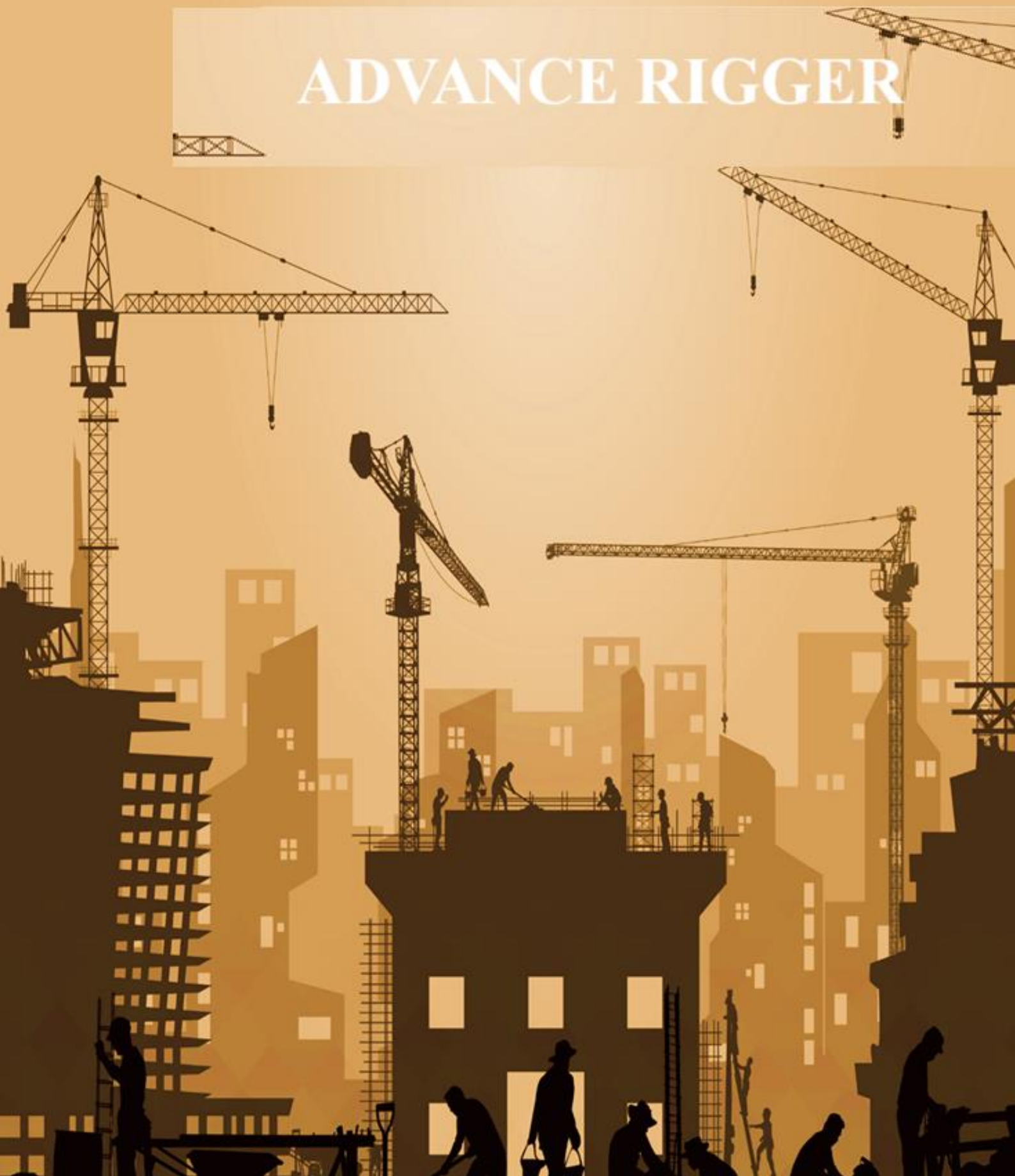
Facilitator Guidebook

ADVANCE RIGGER



Facilitator Guidebook

ADVANCE RIGGER

Sector:- Cross Sectoral

Sub-Sector:- Hydrocarbon, Iron & steel, Mining, Power, Automotive, Construction, Infrastructure, Chemicals & Petrochemicals

Occupation:- Lifting & Rigging Engineering & Management.

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Acknowledgments

The Facilitator Guidebook for **Advance Rigger**, **SSD/Q0302**, 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.

Disclaimer

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About this Guidebook

The increasing interest of heavy industries in safety, especially in operations involving machinery as well as lifting, has provided significant demand for trained personnel in this field. One such professional is the Advance Rigger whose expertise is needed for ensuring safe and efficient lifting operation. Industries finding ways to reduce risks and enhance their operation have never had a greater need for quality riggers than now. This demand calls for a complete training framework that can equip people with the required skills to plan, execute, and manage complex rigging operations in a safe manner.

This Facilitator Guide is designed to thoroughly train people who aspire to become competent Advance Rigger Safety Trainers. It is a valuable resource for trainers to prepare the next generation of safety professionals in this highly specialized field. The guide focuses on core competencies related to advanced rigging, emphasizing safety and regulatory standards, risk assessments, and critical operational procedures aimed at accident prevention.

By following the structured content of this guide, trainers will be able to enhance their instructional methods and design effective training programs. These programs will equip candidates with the knowledge and skills needed to take on the important responsibility of ensuring safe and efficient rigging practices in industries where cranes and heavy lifting equipment are utilized. This ultimately will lead towards a safety-oriented culture, bringing about better risks and accident-free heavy lifting and rigging operation.

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/N0309 v 1.0: Introduction to Advance Rigging

2.SSD/N0310 v 1.0: Safety Standards and Regulations in Rigging

3.SSD/N0311 v 1.0: Rigging Mathematics and Load Calculations

4.SSD/N0312 v 1.0: Identifying and Evaluating Lift Points

5.SSD/N0313 v 1.0: Working Load Limit & Selection of Rigging Component

6.SSD/N0314 v 1.0: Pre-Use Inspection of Rigging and Lift Points

7.SSD/N0315 v 1.0: Load Dynamics and Associated Hazards

8.SSD/N0316 v 1.0: Advanced Rigging Considerations

9.SSD/N0317 v 1.0: Emergency Response and Contingency Planning

10.SSD/N0318 v 1.0: Documentation and Reporting

11.DGT/N0102: Employability Skills

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This guide deals with the basic competencies in advanced rigging, touching on essential aspects of safety procedures, regulatory compliance, risk analysis, and the operation procedures needed to avoid accidents. Trainers will be better equipped to educate and upskill their trainees for the responsibility of ensuring safe and efficient rigging practices in diverse sectors.

Through this guide, trainers will be able to advance their training delivery skills, and in particular, practice the technique of maintaining a culture of safety in industries which may be involved in material handling or heavy lifting. This will help train rigging professionals to successfully tackle complex lifting operations and risk mitigation, which is crucial in ensuring safety at every aspect of rigging work.

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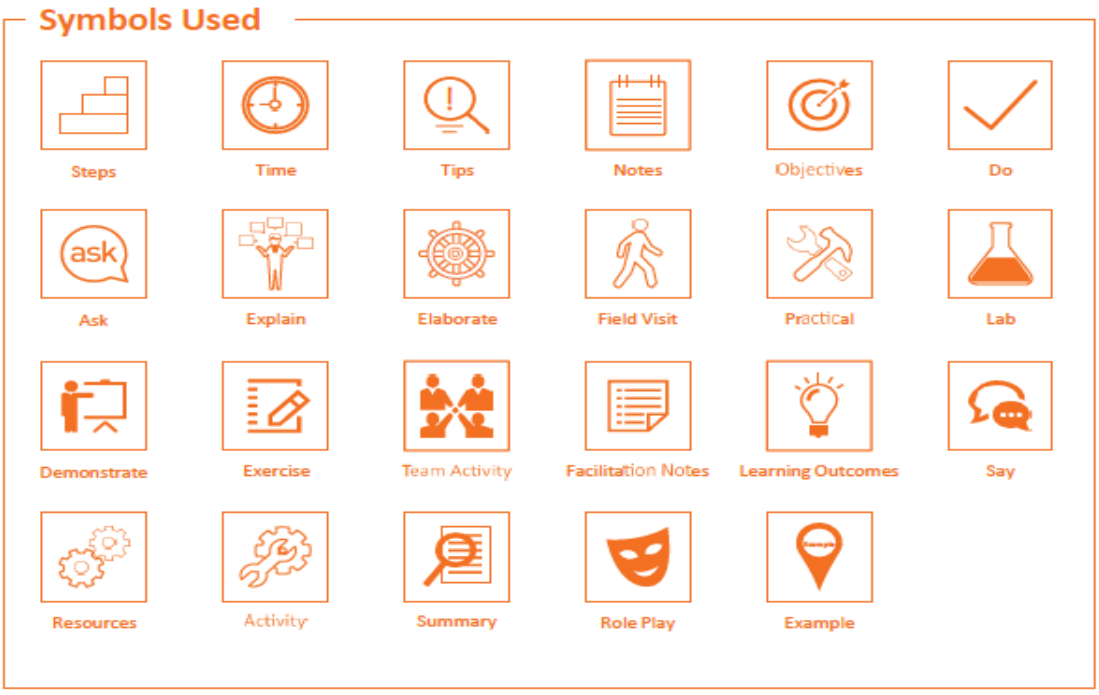
Symbols Used



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1. Unit 1 Introduction

1.1. Key Learning Outcomes

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 ADVANCE RIGGER

1.2. Unit 1.1: Overview of the Industry

1.2.1. Unit Objectives

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

1. Describe about the Hydrocarbon sector in India
2. Describe about the Iron & Steel sector in India
3. Describe about the Mining sector in India
4. Describe about the Power sector in India
5. Describe about the Automotive sector in India
6. Describe about the Construction sector in India
7. Describe about the Chemicals & Petrochemicals in India
8. Describe how each sub-sector contributes to skill development
9. Compare the job potential of all sub-sectors

1.2.2. 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)

1.2.3. 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?

1.2.4. 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.

1.2.5. Explain

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

1.2.6. Tips

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

1.2.7. 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

1.2.8. Notes for Facilitation

- Revise the important points discussed in this unit.

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- 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.

1.2.9. 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 is 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.

1.2.10. Exercise

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

A. Equipment Failure
B. Human Error
C. Natural Disasters
D. 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

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1.3. Unit 1.2: Roles and Responsibilities of a ADVANCE RIGGER

1.3.1. Unit Objectives

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

1.Identify roles and responsibilities of ADVANCE RIGGER

2.Identify essential skills of ADVANCE RIGGER

1.3.2. 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)

1.3.3. Ask

- Ask the participants to share their expectations from the program

1.3.4. Do

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

1.3.5. Explain

Describe about the roles and responsibility of advance rigger

1.3.6. Tips

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

1.3.7. Activity: Team Spot

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

1.3.8. 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.

1.3.9. Summary

An Advance Rigger is that person who guarantees the safety and efficiency of complex lifting operations in different industries. The major function of this type of rigger is planning, preparation, and execution of rigging activities for heavy or oversized loads following safety standards and regulations.

The important tasks of an Advance Rigger include:

Planning and coordination: Rigging plans are developed. Suitable rigging equipment is chosen, and proper coordination is carried out with the crane operators and all other personnel involved to ensure that lifting is done safely.

Equipment inspection: All the rigging equipment includes slings, chains, and other lifting gears subjected to thorough checks to confirm that they are in good condition besides being fit for the task involved.

Load Handling and Safety: Securing and balancing loads in the right manner to avoid accidents and ensuring they are safely lifted, moved, and positioned according to the job requirements.

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Risk Assessment and Mitigation: Identifying potential hazards and taking measures to mitigate risks and ensure that all personnel involved in the lifting operation are safe.
Compliance with Regulations: Ensuring all rigging tasks adhere to relevant safety standards, regulations, and industry best practices.
Training and mentoring: Provide leadership and training for less-experienced riggers and other workers on a safety-first culture and on the importance of proper rigging techniques.

1.3.10. Exercise

1. What is the primary responsibility of an Advance Rigger?
a) Operating cranes
b) Planning and executing safe rigging operations
c) Designing cranes
d) Managing construction projects
2. Which of the following is NOT part of an Advance Rigger's duties?
a) Inspecting rigging equipment
b) Coordinating lifting operations
c) Operating machinery without safety checks
d) Performing risk assessments
3. An Advance Rigger is responsible for ensuring the safe handling, movement, and placement of loads.(T/F)
4. An Advance Rigger does not need to be concerned with the regulatory standards or safety protocols during rigging operations.(T/F)
5.An Advance Rigger must develop a _____ to ensure safe and efficient lifting operations.
6.One of the key responsibilities of an Advance Rigger is to perform thorough _____ of rigging equipment before each operation.

2. Unit 2 NOS 1: SSD/N0309 v 1.0: Introduction to Advance Rigging

2.1. Key Learning Outcomes

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

- Advanced Rigging Techniques: Handling Complex Loads & Precision in Lifting.
- Equipment Selection and Use: Rigging Tools and Gear & Rigging Calculations.
- Safety and Compliance: Health and Safety Legislation & Risk Identification and Control measures.
- Inspection and Maintenance of Rigging Equipment: Pre- and Post-Operation Inspections & Maintenance and Record Keeping.
- Planning and Executing Rigging Operations: Lift Planning, Communication and Coordination.
- Load Dynamics and Environmental Considerations: Understanding Load Behaviour & Environmental Factors.
- Reporting and Documentation: Incident Reporting and Investigation & Record Keeping and Compliance Documentation

2.2. Unit 2.1: Planning and Preparing for Advanced Rigging Operations

2.2.1. Unit Objectives

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

- To evaluate the characteristics of a load and load factors
- To develop rigging plan
- To understand rigging equipment and safety protocols in compliance with industry standards.

2.2.2. Resources

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

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- Projection screen and PowerPoint presentations.
- Activities (role plays)

2.2.3. Say

- Describe about characteristics of a load and load factors
- Describe about rigging tools and equipment
- Describe about rigging plan

2.2.4. Explain

- Describe about characteristics of a load and load factors
- Describe about rigging tools and equipment
- Describe about rigging plan

2.2.5. Activity

- Each group will develop a rigging plan for their assigned load, considering Safe Lifting Techniques.
- Proper load movement paths (clearance, obstacles).
- Environmental factors such as nearby structures or equipment.
- Safety protocols (e.g., minimum sling angles, load capacity limits)

2.2.6. 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.

2.2.7. Summary

The primary components of successful execution in rigging operations are evaluating load characteristics, developing a comprehensive plan, selecting appropriate equipment, and safety.

Evaluate Load Characteristics

To determine the best rigging methods, it is essential to know the weight, shape, and centre of gravity of the load. These aspects will directly influence the rigging setup since loads with irregular shapes or high centres of gravity will need special rigging techniques to ensure stability in lifting and transporting.

Establish a Thorough Rigging Plan

A well-thought-out rigging plan considers the handling of the load, paths of movement, and any potential obstacles that exist in the environment. It determines the most efficient and safest path to move the load, for example, lift height, space, and surrounding hazards. Proper planning ensures that the load moves without incident and within the operational limits.

Select Advanced Rigging Equipment

The right rigging equipment, such as slings, rigging hooks, and hoisting devices, is selected to ensure safety and efficiency in the operation. This depends on the weight, shape, and handling requirements of the load. Specialized equipment may be required for non-standard loads or tasks that require higher precision or strength.

Safety and Hazard Mitigation

The rigging site needs to be examined for hazards. It involves installing the placement of barriers and warning signs and ensuring proper PPE is being used. One has to identify all the potential hazards before focusing on preventing accidents or injuries due to overhead obstacles or unstable ground.

2.2.8. Exercise

1. Which of the following factors is most important when evaluating a load for rigging?

a) The colour of the load

b) The load's weight, shape, and centre of gravity

c) The location of the load

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d) The material used in the load's construction
2. What is the primary purpose of a comprehensive rigging plan?
a) To minimize the weight of the load
b) To ensure efficient and safe movement of the load
c) To reduce the size of the rigging equipment
d) To increase the speed of the lifting process
3.The centre of gravity of a load affects how the load should be rigged and lifted.(T/F)
4.A comprehensive rigging plan does not need to take obstacles into account as long as the load's weight is known.(T/F)
5.When selecting rigging equipment, it is essential to choose slings, hooks, and hoisting devices that match the load's _____ and _____ requirements.
6.Ensuring the rigging site is free of _____ and has appropriate _____ signage is critical for maintaining safety during lifting operations.

2.3. Unit 2.2 Execution of Advanced Rigging Operations

2.3.1. Unit Objectives

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

- To observe load movements throughout the rigging process and ensure that loads are aligned and stable.
- To understand load dynamics or environmental conditions
- To effectively coordinate with the rigging team and other site personnel to maintain clear communication throughout the rigging process

2.3.2. 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)

2.3.3. Say

- Describe about load dynamics or environmental conditions
- Describe about process how to observe load movements throughout the rigging process
- Describe about how to coordinate with the rigging team

2.3.4. Explain

- Describe about load dynamics or environmental conditions
- Describe about process how to observe load movements throughout the rigging process
- Describe about how to coordinate with the rigging team

2.3.5. Role Play

- Begin by assigning roles to the participant, such as crane operator, rigging supervisor, signal person, safety officer, and rigging crew. Each participant will be responsible for communicating with others in their role during the operation.
- Discuss how well communication flowed between team members. Was there any miscommunication? Did everyone understand their role and the safety procedures? Provide feedback on improving communication and team coordination in future operations.

2.3.6. 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.

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- Ensure that every participant answers all the questions.

2.3.7. Summary

Advanced Rigging Techniques

Advanced rigging techniques include complex systems such as multi-lift and tandem lifts and other balancing loads. Utilize it for moving heavy, bulky loads or otherwise awkward in a safe, efficient manner in varied environments. This means that rigging professionals select proper rigging methods for a load according to characteristics and safety standards in order to conduct the operation with minimal risk to people, equipment, and the environment.

Lift Movements:

Loads need to be carefully followed at each point of the rigging procedure so that upon lifting, it is stabilized and aligned in a position. It is a process of vigilance and observation by which rigging professionals need to check any kind of instability or misalignment that may occur through a load movement. Identifying such potential problems is quick and will give opportunity for corrective actions so that the lifting process may take place without major accidents.

Rigging Configuration

Adjustment Load dynamics and environmental conditions may change during a rigging operation. As such, changes to rigging configurations are adjusted as necessary. This criterion demands flexibility and the ability to decide to change the rigging configuration when there is a change in load weight distribution, weather condition, or other unforeseen events. For real-time smooth working, the stability and safety of the load have to be maintained by changing the rigging configuration.

Coordinate with the Rigging Team

Coordination and communication is the basic ingredient of a successful rigging operation. This performance criterion emphasizes close coordination and interaction with the rigging team and other site personnel to ensure that everybody understands the rigging plan. Clear communication, through both words and body language, provides that roles and responsibilities are known and that safety procedures are implemented for lift purposes to happen the way it should be planned. Smooth team operations produce high effectiveness as well as mitigate chances for possible mistakes and threats on the lift process.

2.3.8. Exercise

1.What is the primary purpose of monitoring load movements during a rigging operation?
a) To ensure the load is being lifted at the correct height
b) To ensure alignment and stability of the load
c) To check for unnecessary slack in the rigging
d) To speed up the lifting process
2.When should rigging configurations be adjusted?
a) Only after the lift has been completed
b) When load dynamics or environmental conditions change
c) At the start of the rigging process
d) Only when there is a visible malfunction in the equipment
3.True or False: Monitoring load movements is only necessary at the beginning of a rigging operation.
4.True or False: Adjusting rigging configurations in response to changes in load dynamics or environmental conditions is critical to maintaining safety during a lift.
5.A _____ lift involves using two cranes to lift a single load in a controlled manner.
6.Rigging configurations must be adjusted when there are changes in _____ dynamics or _____ conditions.

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2.4. Unit 2.3: Safety Compliance and Risk Management

2.4.1. Unit Objectives

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

- To conduct detailed risk analyses prior to every rigging operation.
- To understand legal and safety requirements to ensure rigging operations are safe and efficient.
- To understand correct use of PPE for rigging operations, rigging process.
- To understand how to document and report any incidents, near misses, or safety issues that arise during rigging operations.

2.4.2. 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)

2.4.3. Say

- Describe about process of risk analysis of rigging operation
- Describe about legal and safety requirements of rigging operations
- Describe about use of PPE for rigging operations, rigging process
- Describe how to document and report any incidents

2.4.4. Explain

- Describe about process of risk analysis of rigging operation
- Describe about legal and safety requirements of rigging operations
- Describe about use of PPE for rigging operations, rigging process
- Describe how to document and report any incidents

2.4.5. Activity

- Divide the class into small groups.
- Assign each group a scenario based on real-world rigging operations (e.g., lifting heavy equipment, rigging in harsh weather conditions, etc.).
- Have them conduct a risk assessment for their assigned scenario, identifying potential hazards (e.g., equipment failure, falling objects, exposure to hazardous materials).
- Ask the groups to identify control measures to mitigate each risk (e.g., using the correct rigging equipment, securing the load, using spotters).
- Each group presents their risk assessment findings and control measures to the class.

2.4.6. 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.

2.4.7. Summary

Conduct risk assessments

Every rigging operation requires an all-inclusive risk assessment for equipment malfunction, environmental conditions, and human error, among others. After hazard identification, the control measures that will minimize the risks must be put in place, and every person must be on the safe side. This is evaluated based on the severity and likelihood of the hazard and how to apply the appropriate strategies, including the right rigging equipment, securing loads, and training people on safety.

Adhere to industry standards

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Rigging activities must be conducted in accordance with the industry standards and that also follows the best practices also to ensure the safety of people and integrity of work. The minimum standard which may be followed could be adherence to guidelines such as OSHA, ASME, and local regulatory provisions to minimize risks. One should be aware about these standards and must apply them to ensure safe and legally compliant operations, which in turn would save from accidents, fines, or damaging the reputation.

Wears PPE; Implements Safety Measure

PPE is one of the safety components during rigging operations. Everyone in the location is supposed to be wearing the appropriate PPE, such as helmets, gloves, safety harnesses, and eye protection. The person supervising the rigging operation has safety aspects to deal with, like making sure that the crew members for the rigging operation are attired correctly using the proper PPE and watching out for adherence to the entire operation. This will help decrease the risk of injury and guarantee the safety of everyone.

Recording and documentation of incidents.

Standardized and accurate records of each incident, near miss, and raised safety concerns form a very good way of maintaining a culture of safety in rigging operations. All events have to be documented in safety-related records, with reports of the incidents and every detail regarding the event, results from an investigation, and any corrective actions made. It, therefore, means continuous improvement in safety practices and prevents similar incidents from happening again. It also ensures compliance with the requirements of regulatory reporting.

2.4.8. Exercise

1.What is the first step in conducting a risk assessment for rigging operations?

a) Identify control measures

b) Identify potential hazards

c) Implement control measures

d) Report incidents

2.Which of the following is a key regulation that rigging operations must comply with?

a) ISO 9001

b) OSHA standards

c) EPA guidelines

d) National Fire Protection Association (NFPA)

3.Before starting any rigging operation, a risk _____ must be conducted to identify potential hazards.

4.Industry standards, regulations, and best practices must be followed to ensure _____ and compliance in Rigging operations.

5.Compliance with industry regulations and safety standards is optional during rigging operations.(T/F)

6.Personal protective equipment (PPE) must be used by the rigging team to prevent injuries and enforce safety on site.(T/F)

2.5. Unit 2.4: Equipment Maintenance and Troubleshooting

2.5.1. Unit Objectives

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

- To understand the need to inspect rigging equipment regularly for signs of wear or damage
- To understand how to execute proper maintenance procedures
- To understand the corrective measures for rigging equipment maintenance
- To understand importance of detailed records for every usage of all rigging equipment

2.5.2. 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)

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2.5.3. Say

- Describe about process of inspecting rigging equipment
- Describe about proper maintenance procedures of rigging equipment
- Describe about corrective measures for rigging equipment maintenance
- Describe about importance of detailed records for every usage of all rigging equipment

2.5.4. Explain

- Describe about process of inspecting rigging equipment
- Describe about proper maintenance procedures of rigging equipment
- Describe about corrective measures for rigging equipment maintenance
- Describe about importance of detailed records for every usage of all rigging equipment

2.5.5. Activity

- Divide the class into small groups and provide each group with a set of rigging equipment (e.g., slings, shackles, and hoists).
- Participant will follow a printed inspection checklist to inspect the equipment for signs of wear, damage, or malfunction. Common things to check include:
    - Cracks, rust, or corrosion
    - Worn or frayed cables/ropes
    - Proper lubrication for moving parts
    - Cleanliness and storage conditions
- After performing the inspections, participant will identify any issues and suggest the necessary corrective actions.
- Discuss findings as a group, highlighting common issues found in the inspection process.

2.5.6. 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.

2.5.7. Summary

In advanced rigging operations, the safety and functionality of rigging equipment must be ensured to avoid accidents and maintain operational efficiency. The following competencies are necessary to achieve this objective:

Perform Regular Inspections and Maintenance of Rigging Equipment

Routine checks and servicing of rigging equipment are essential in ensuring that all tools and machines are in excellent working condition. The inspection includes wear, damage, or malfunction indicators such as broken cables, rust, or mechanical failure. Performing routine inspections and preventive maintenance keeps rigging equipment safe, functional, and reliable, reducing the chances of a failure during operation.

Identifying and Troubleshooting Common Equipment Malfunctions

There will be a great need for rapid identification and troubleshoot of faulty common equipment for the rigging personnel. Among them, diagnostics can include some common malfunctions, such as hoists faultiness, wearing slings or shackles destruction. Once detected, the malfunction is to either correct or have the supervisor implement the corrective measure. Troubleshooting ensures efficient solution of faults that do not interrupt the work with a quick turnaround in continued operation.

Maintain equipment usage, inspection, and maintenance records

The records of equipment usage, inspections, and maintenance are maintained accurately to comply with safety regulations and for auditing purposes. Such records help in tracking the condition of rigging equipment over time, ensuring that it has been regularly maintained and is fit for use. Proper

documentation also provides a history of any issues and the corrective actions taken, which is vital for safety audits and ensuring the rigging operation meets industry standards and regulations.

2.5.8. Exercise

1.What is the primary purpose of performing regular inspections on rigging equipment?
a) To improve the equipment's appearance
b) To ensure the equipment's functionality and safety
c) To increase the equipment's weight capacity
d) To enhance its resale value
2.Which of the following is necessary for maintaining compliance with industry standards in rigging operations?
a) Regular cleaning of rigging equipment
b) Maintaining records of equipment inspections, usage, and maintenance
c) Changing the equipment every six months
d) Limiting the number of inspections
3.Regular _____ of rigging equipment helps identify potential issues before they lead to accidents or equipment failure.
4.To troubleshoot common rigging equipment malfunctions, it is important to first _____ the root cause of the issue.
5.Routine maintenance of rigging equipment is not necessary if it looks in good condition.(T/F)
6.Identifying and reporting equipment malfunctions is a crucial part of ensuring safety during rigging operations.(T/F)

3. Unit 3 NOS 2: SSD/N0310 v 1.0: Safety Standards and Regulations in Rigging

3.1. Key Learning Outcomes

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

- To understand Legal and Regulatory Compliance for Rigging
- To identification and mitigation of hazards through effective planning and safety protocols.
- To understand safe rigging equipment use, pre-operation checks, and secure load handling practices.
- To understand process of regular inspections and maintenance of rigging tools and equipment.
- To understand process of effective communication and coordination between rigging teams and other stakeholders.
- To understand process of emergency preparedness during rigging activity
- To understand importance of continuous training, certification, and meticulous record-keeping of incidents, equipment maintenance, and inspections

3.2. Unit 3.1. Familiarization with National Safety Standards

3.2.1. Unit Objectives

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

- To identify and interpret relevant Occupational Safety and Health Administration (OSHA) regulations and other national safety standards related to rigging operations.
- To conduct regular inspections and audits to ensure all rigging equipment and procedures meet safety standards.

3.2.2. Resources

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

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- Activities (role plays)

3.2.3. Ask

- Describe about Occupational Safety and Health Administration (OSHA) regulations and other national safety standards related to rigging operations.
- Describe about process of inspections of rigging equipment

3.2.4. Explain

- Describe about Occupational Safety and Health Administration (OSHA) regulations and other national safety standards related to rigging operations.
- Describe about process of inspections of rigging equipment

3.2.5. Activity

Participant will pair up and inspect various rigging equipment, checking for damage or non-compliance with safety standards. Each pair will complete an inspection checklist and report their findings to the class. Instructors will review their work and provide feedback on common errors or overlooked issues.

3.2.6. 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

3.2.7. Summary

- This would be about knowing and interpreting OSHA regulations and other national safety standards that regulate rigging operations. Such regulations are meant to address crucial areas of rigging safety, such as the proper use of equipment, load limits, and safe practices. Workers should be able to identify relevant regulations applicable to specific rigging scenarios for compliance and reduction of risk.
- It applies OSHA guidelines on lifting, securing, and moving loads. This means that to apply safe equipment and procedures is to meet the specifications of OSHA requirements. Adherence to such standards is necessary to prevent accidents, injuries, and damage to property in rigging operations.
- There must be regular inspection and audit of rigging equipment and procedures. In most work places rigging tools and techniques should always meet the set national safety standards so that a safe work environment is assured. It is only through inspection that any damage, wear, or non-compliance gets discovered so that only certified equipment, by inspection, can be used.
- Safety measures include proper hazard communication, proper use of PPE, and safe work practices. Workers need to be instructed on how to identify potential hazards and must apply appropriate PPE when performing rigging tasks. Following these safety measures is necessary to minimize the risk and create a safe work environment in line with regulatory requirements.

3.2.8. Exercise

1.What does OSHA require when lifting and securing loads during rigging operations?
a) Only a visual inspection of equipment
b) The use of appropriate lifting equipment and securing methods
c) No specific guidelines for load securing
d) Lifting equipment to be tested every year
2.Which of the following is an OSHA requirement for rigging operations?
a) Using outdated equipment as long as it is operational
b) Providing PPE only in hazardous environments
c) Regularly inspecting and maintaining rigging equipment to ensure safety
d) Only using rigging equipment during daytime hours

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3.When lifting and securing loads, OSHA requires that appropriate _____ equipment and securing methods be used to ensure safety.
4.Regular _____ and audits of rigging equipment help verify compliance with national safety standards and identify any potential hazards.
5.It is not necessary to inspect rigging equipment if the equipment has been recently used and appears to be in good condition.
6.National safety standards, such as those set by OSHA, apply only to large-scale rigging operations and not to smaller ones.

3.3. Unit 3.2. Understanding International Safety Standards

3.3.1. Unit Objectives

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

- To understand ISO 4309 (Cranes – Wire Ropes) and ISO 9927 (Cranes – Inspections)
- To understand EN (European Norm) regulations for rigging and load-handling
- To understand international safety regulations and best practices for lifting and rigging operations.
- To understand rigging procedures to align with both national and international safety standards

3.3.2. 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)

3.3.3. Say

- Describe about ISO 4309 (Cranes – Wire Ropes) and ISO 9927 (Cranes – Inspections)
- Describe about EN (European Norm) regulations for rigging and load-handling
- Describe about international safety regulations and best practices for lifting and rigging operations
- Describe about rigging procedures to align with both national and international safety standards

3.3.4. Explain

- Describe about ISO 4309 (Cranes – Wire Ropes) and ISO 9927 (Cranes – Inspections)
- Describe about EN (European Norm) regulations for rigging and load-handling
- Describe about international safety regulations and best practices for lifting and rigging operations
- Describe about rigging procedures to align with both national and international safety standards

3.3.5. Activity

In small groups, participant will read selected sections of ISO 4309 and ISO 9927 and interpret how the guidelines apply to rigging operations. Each group will present their interpretation, explaining how these ISO standards affect the choice and maintenance of rigging equipment, as well as the process of conducting crane inspections.

3.3.6. 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

3.3.7. Summary

It focuses on interpretation and application of ISO standards. For instance, ISO 4309 addresses inspection and maintenance of wire ropes for cranes and ISO 9927 offers guidelines on crane inspections. These standards will ensure that the lifting equipment operates safely and efficiently.

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It ensures that work is done by adhering to European Norm rigging and load-handling regulations, so that most of the risks are covered while lifting.
Keep aware of the worldwide best practices in lifting and rigging operations; be updated about new safety regulations, and be part of a continuous improvement culture which ensures adherence to safety guidelines.
It will ensure that rigging procedures are adjusted to meet the needs of national and international standards for the sake of maintaining consistency and safety across operational contexts and locations.

3.3.8. Exercise

1. Which of the following ISO standards relates to the inspection of wire ropes used in cranes?
a) ISO 9927
b) ISO 4309
c) ISO 9001
d) ISO 14001
2. What is the primary goal of adapting rigging procedures to align with both national and international safety standards?
a) To streamline the work process
b) To ensure consistency in safety practices
c) To maximize the weight lifted
d) To reduce inspection time
3. ISO 4309 focuses on the inspection and maintenance of cranes, while ISO 9927 provides guidelines for the inspection of wire ropes.(T/F)
4. EN regulations for rigging and load-handling are primarily concerned with ensuring compliance with international safety protocols.(T/F)
5. ISO 4309 provides guidelines for the inspection and maintenance of _____ used in cranes.
6. ISO 9927 focuses on the inspection and maintenance of _____.

3.4. Unit 3.3. Compliance and Legal Obligations

3.4.1. Unit Objectives

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

- To identify and understand the compliance requirements and legal obligations for rigging operations
- To develop procedures for reporting safety incidents, near misses, and equipment malfunctions in line with regulatory guidelines.
- To implement corrective actions and preventive measures to address safety violations or compliance gaps, ensuring a safe and legally compliant work environment.

3.4.2. 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)

3.4.3. Say

- Describe about compliance requirements and legal obligations for rigging operations
- Describe about procedures for reporting safety incidents
- Describe about corrective actions and preventive measures.

3.4.4. Explain

- Describe about compliance requirements and legal obligations for rigging operations
- Describe about procedures for reporting safety incidents
- Describe about corrective actions and preventive measures.

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3.4.5. Activity

- Divide participants into small groups.
- Assign each group a different aspect of compliance (e.g., documentation, reporting, legal obligations in rigging).
- Ask each group to discuss and identify key compliance requirements and legal obligations related to their assigned topic.
- Have them list these requirements on a flipchart or whiteboard.
- Each group will share their findings, followed by a group discussion on the importance of adhering to these requirements.

3.4.6. 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

3.4.7. Summary

- It is a compliance requirement that involves the knowledge of legal obligations that may entail the understanding of documentation, reporting, and record-keeping practices in order to ensure rigging operations meet all regulatory requirements. This will ensure safety, liability, and avoiding lawsuits.
- It is about clear procedures for reporting safety incidents, near misses, and equipment malfunctions according to regulatory guidelines. Proper reporting of such incidents ensures a documented potential hazard and its assessment, preventing the same occurrence in the future and promoting the culture of safety.
- It is the education of employees about the need for compliance, specific requirements they must adhere to, and the consequences of non-compliance. This includes informing them about the legal repercussions and penalties that can arise from failing to follow safety protocols and regulations. Effective education is key to fostering a compliant and safety-conscious workforce.
- It describes the corrective actions that should be taken and preventive measures to be adopted when a violation of safety or compliance has been identified, thus ensuring the continuous safety of rigging operations while at the same time being compliant with the legal obligation.

3.4.8. Exercise

1. Which of the following is a key compliance requirement for rigging operations?
a) Regular social gatherings among workers
b) Proper documentation and record-keeping of equipment inspections
c) Reducing work hours to increase efficiency
d) Encouraging workers to take extended breaks
2. When developing procedures for reporting safety incidents, near misses, or equipment malfunctions, what is essential?
a) Ensuring the incident is reported only at the end of the workday
b) Providing detailed information to regulatory authorities within a specific timeframe
c) Ignoring minor issues to focus on major incidents
d) Keeping incidents private to prevent panic
3.True or False: Proper documentation of rigging operations is a legal obligation that helps ensure safety and compliance with regulatory standards.
4. True or False: Near misses and safety incidents should be reported only if they result in injury or damage.
5._____ is essential for ensuring that rigging operations comply with safety regulations, as it helps maintain accountability and transparency.

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6.The procedures for reporting safety incidents and equipment malfunctions must align with _____ guidelines to ensure legal and safety compliance.

4. Unit 4 NOS 3: SSD/N0311 v 1.0: Rigging Mathematics and Load Calculation

4.1. Key Learning Outcomes

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

- To estimate load weights and determine the centre of gravity.
- To calculate safe sling angles, tension forces, and load distribution.
- To understand rigging gear based on the load's complexity and weight.
- To understand safety factors and follow legal guidelines to prevent overloading and equipment failure.
- To understand process to keep records of all calculations and inspections to ensure compliance and accountability.

4.2. Unit 4.1: Estimation of Load Weight and Centre of Gravity

4.2.1. Unit Objectives

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

- To understand use of load cells or scales for direct weight measurement
- To determine the centre of gravity (CoG) using physical measurement techniques
- To determine CoG for different load symmetry, shape, and weight distribution

4.2.2. 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)

4.2.3. Say

- Describe about process of use of load cells or scales for direct weight measurement
- Describe about how to determine the centre of gravity (CoG) using physical measurement techniques for different load symmetry, shape, and weight distribution

4.2.4. Explain

- Describe about process of use of load cells or scales for direct weight measurement
- Describe about how to determine the centre of gravity (CoG) using physical measurement techniques for different load symmetry, shape, and weight distribution

4.2.5. Activity

- Divide participant into small groups and assign them specific tasks to perform.
- Each group will be given a different load (e.g., a steel block, a container of liquid, or a concrete piece) to measure.
- Groups will use a load cell or scale to determine the exact weight of the load and record their findings.
- Discuss results and ensure everyone understands how direct weight measurement works.
- Each group receives a product's manufacturer's documentation (or an example document).
- Groups will identify the predefined weight of the load from the specifications.
- Compare the measurement with the manufacturer's stated weight and discuss discrepancies, if any.

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4.2.6. 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.

4.2.7. Summary

- It is direct weight measurement using load cells or scales to ensure that the weight of a load is accurately known so that proper lifting capacity can be determined.
- It makes use of the manufacturer's specifications and product documentation in the determination of pre-established load weights.
- It introduces the calculation of volume and density by the formula Weight = Volume x Density. It is used to calculate weight when direct measurement is not possible, for materials such as concrete, steel, and liquids.
- It stresses the use of standard density values for commonly rigged materials, thus assisting in effective weight estimation for routine lifting operations.
- It drives to the centre of gravity (CoG) of the load by applying physical measurement techniques, ensuring that a load is correctly positioned and that there will be no lifting hazards.
- Mathematical methods applied to calculate how CoG bears the weight of a load, considering the symmetry, shape, and distribution of the load's weight.
- It adjusts the points of lift for alignment with the CoG, therefore minimizing the danger of load tip or instability to ensure safety during a lift.
- Combining all of these, these points are together able to help in ensuring proper calculations of the loads' weight while keeping it on the right alignments and ensuring stable lifting with consideration of safety issues in rigging operations.

4.2.8. Exercise

1.Which of the following is a direct weight measurement method for determining the exact weight of a load?

a) Load cell

b) Estimating based on experience

c) Visual inspection

d) Using a ruler

2.Why is it important to determine the centre of gravity (CoG) of a load before lifting?

a) To increase the load's weight

b) To ensure proper alignment and prevent instability

c) To make lifting faster

d) To reduce the material cost

3.True or False: The formula Weight = Volume x Density is applicable only for liquids and does not work for solids.

4.True or False: The centre of gravity (CoG) of a load can be ignored as long as the load is not symmetrical.

5.Load cells and scales are commonly used methods for directly measuring the _____ of a load.

6.When calculating the centre of gravity (CoG), it is important to consider factors like load symmetry, shape, and _____ distribution.

4.3. Unit 4.2: Attaching Rigging with Knowledge of Hitch Configurations and Load Angle Factors

4.3.1. Unit Objectives

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

- To understand hitch ,type of hitch and hitch configurations.
- To create and interpret diagrams to visualize the impact of hitch angles on load distribution

- To understand load angle factor

4.3.2. 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)

4.3.3. Say

- Describe about hitch, type of hitch and hitch configurations
- Describe about how to create and interpret diagrams to visualize the impact of hitch angles on load distribution
- Describe about load angle factor

4.3.4. Explain

- Describe about hitch, type of hitch and hitch configurations
- Describe about how to create and interpret diagrams to visualize the impact of hitch angles on load distribution
- Describe about load angle factor

4.3.5. Activity

- Divide the class into small groups.
- Provide each group with a set of load descriptions (e.g., a cylindrical steel pipe, a delicate glass container, a large concrete slab) and ask them to determine the appropriate hitch configuration for each load.
- Each group should explain why they chose that hitch type based on the load's characteristics.
- Groups will present their answers to the class, with the instructor guiding the discussion to reinforce proper application of each hitch configuration.

4.3.6. 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.

4.3.7. Summary

- It notes that for other lift purposes and characteristics of load, the type of hitch must be appropriately selected so that these comprise Straight Hitch, Choker Hitch, and Basket Hitch. A Straight Hitch is ideally used for vertical lifts, wherein stability and balancing of loads are not required
- But a Choker Hitch is applied to cylindrical or irregularly shaped objects requiring a tighter hold, but lessened load capacity is achieved because greater tension is applied by this arrangement.
- A Basket Hitch, it, is beneficial when loads have to be spread out and not damaged and lifted evenly, such as when lifting delicate materials.
- Creating and interpreting diagrams that describe the relationship between hitch angles and load capacity will help ensure a safe and stable lift.
- It instructs students to use mathematical functions, particularly the sine and cosine, to compute the load angle factor using the hitch angle for computation of actual loads. PC 14 utilizes reference tables to extract load angle factors for most hitch types: To quickly calculate effectively and decisively, for load planning purposes, loads can be determined fast for several hitch types.

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4.3.8. Exercise

1.Which hitch configuration is most appropriate for lifting a cylindrical object that requires a tighter grip?
a) Basket Hitch
b) Straight Hitch
c) Choker Hitch
d) None of the above
2.What is the primary purpose of a Basket Hitch?
a) To increase load tension
b) To evenly distribute load weight, preventing damage to delicate materials
c) To reduce the load capacity
d) To lift cylindrical objects
3.True or False: The Basket Hitch is ideal for lifting delicate materials because it evenly distributes the load weight.
4.True or False: When calculating load angle factors, tables are not necessary as long as you use basic geometry.
5.A _____ Hitch is most effective for lifting cylindrical objects that need a tighter grip.
6.To evenly distribute the weight of a load and prevent damage to delicate materials, a _____ Hitch should be used.

5. Unit 5 NOS 4: SSD/N0312 v 1.0: Identifying and Evaluating Lift Points

5.1. Key Learning Outcomes

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

- To understand load characteristics and their influence on lift point selection
- To calculate the forces acting on lift point
- To conduct inspections of rigging equipment and to understand risk assessments of lift points
- To industry safety standards and legal requirements
- To understand how to records and documentation related to lift point evaluations

5.2. Unit 5.1: Criteria for Lift Point Identification

5.2.1. Unit Objectives

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

- To assess the structural integrity and strength of potential lift points, considering wear, corrosion, and deformation.
- To evaluate the reliability of lift points by analysing their design and construction to withstand lifting forces.
- To understand how to determine appropriate lift points based on the load's thickness and shape for balanced support.

5.2.2. 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)

5.2.3. Ask

- Describe structural integrity and strength of potential lift points
- Describe about how to evaluate the reliability of lift points by analysing their design and construction

- Describe about how to determine appropriate lift points based on the load's thickness and shape for balanced support.

5.2.4. Explain

- Describe structural integrity and strength of potential lift points
- Describe about how to evaluate the reliability of lift points by analysing their design and construction
- Describe about how to determine appropriate lift points based on the load's thickness and shape for balanced support

5.2.5. Activity

- Divide participant into small groups and provide each group with a different diagram of a load and its corresponding lift points.
- Ask each group to assess the structural integrity of the lift points, considering factors like wear, corrosion, and deformation. They should also evaluate the design and construction of the lift points, ensuring they can handle the forces exerted during lifting.
- Groups will present their findings to the class, discussing the reliability of the lift points and any issues that could compromise safety.

5.2.6. 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

5.2.7. Summary

- It says that it is necessary to measure the structural strength and stability of lift points under consideration to check their suitability for safety and reliability, about wearing, corroding, or deforming during service. Further emphasizes design and construction so that lift points have adequate robustness to withstand forces at the time of lifting.
- This presents the selection of lift points determined by the load material composition along with tensile strength, ductility, and hardness that could affect the loads bearing capacity along with its performance. This denotes the correct identification of the load's lift points based on shape and thickness, so as to support it properly.
- It ensures the proper placement of lift points. They must be equidistant from the load's centre of gravity, which allows the lift operation to be done with stability, avoiding tipping over the load. It ensures that lift points follow safety standards and the manufacturer's instructions to guarantee the lift will be performed within the set safety and industry requirements.

5.2.8. Exercise

1.Which of the following factors should be considered when assessing the structural integrity of a lift point?
a) Wear
b) Corrosion
c) Deformation
d) All of the above
2.To ensure load stability during lifting, lift points should be positioned:
a) At random points on the load
b) Symmetrically and equidistant from the centre of gravity
c) Close to the load’s centre
d) Far from the centre of gravity
3.True or False: The design and construction of lift points should be evaluated to ensure they can withstand the forces during lifting.

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4.True or False: Corrosion and wear are irrelevant when assessing the structural integrity of lift points.
5.When selecting lift points, material properties such as _____, ductility, and hardness should be considered to ensure the points can support the load effectively.
6.Lift points should be positioned symmetrically and _____ from the center of gravity to maintain load stability during lifting.

5.3. Unit 5.2: Lift Point Calculation

5.3.1. Unit Objectives

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

- To calculate the safe lift point capacity based on material strength, load weight, and distribution factors
- To understand load characteristics and lift point conditions
- To understand specific conditions of the lift, such as temperature, environmental factors, and potential dynamic loads.
- To understand how to document lift point evaluation and calculation results, ensuring transparency and traceability in rigging operations

5.3.2. 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)

5.3.3. Ask

- Describe about how to calculate the safe lift point capacity based on material strength, load weight, and distribution factors
- Describe about load characteristics and lift point conditions
- Describe about specific conditions of the lift, such as temperature, environmental factors, and potential dynamic loads.
- Describe about how to document lift point evaluation and calculation

5.3.4. Explain

- Describe about how to calculate the safe lift point capacity based on material strength, load weight, and distribution factors
- Describe about load characteristics and lift point conditions
- Describe about specific conditions of the lift, such as temperature, environmental factors, and potential dynamic loads.
- Describe about how to document lift point evaluation and calculation

5.3.5. Activity

- Divide participant into small groups and provide each group with a different lifting scenario, including:
- Material (e.g., steel, aluminium, concrete)
- Load weight
- Dimensions (e.g., cross-sectional area)
- Number of lift points
- Safety factor (to be chosen based on the load and conditions)
- Have the groups calculate the safe load capacity and load distribution factor using the provided formulas.
- For example: Calculate the safe load capacity for a steel beam with a cross-sectional area of 20 cm^2, a material strength of 250 MPa, and a safety factor of 1.5.

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- Encourage participant to refer to material charts for specific strengths of materials.

5.3.6. 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

5.3.7. Summary

- It use formulas along with some material strengths, weights of the loads, and distribution factors to determine if the lift points can safely support the loads or not.
- It is about the adjustment for uncertainty, or safety/view factor. On adding safety factors, by considering the danger of uncertainties for the kind of load condition characteristics, the load, and the possible variations of the lift points, a kind of tolerable margin is built into the setup.
- Safe Load Capacity = Material Strength x Area / Safety Factor
- Safe Load Capacity, describes a set of formulas given to compute the lift point capacity.
- Load Distribution Factor = Total load/number of lifts.
- Rigging Calculation can be performed in much more detail and on a quantitative scale to compare and compute many results with rigs.
- Charts and tables will show all the load capacities and tensile strengths of commonly used materials at a glance.
- Calculation modifications can also be made in respect of these specific conditions that will affect lifting conditions like temperature variations or environmental effects and dynamic loads, all of which will determine changes in the capacity of the lifting points to remain safe.
- It is outlets its identity closely in documentation. Transparency in respect of those written records of the evaluation and the calculations of the points would be a traceability term or essential requirement for the rigging operations concerning the health and safety standards and legislations.

5.3.8. Exercise

1.Which of the following is used to calculate the safe load capacity of a lift point?
a) Material strength
b) Cross-sectional area
c) Safety factor
d) All of the above
2.The formula for load distribution factor is:
a) Load Distribution Factor = Load Weight x Safety Factor
b) Load Distribution Factor = Total Load Weight / Number of Lift Points
c) Load Distribution Factor = Cross-Sectional Area / Material Strength
d) Load Distribution Factor = Load Weight x Number of Lift Points
3.True or False: The safe load capacity is determined by multiplying material strength, cross-sectional area, and safety factor.
4.True or False: Safety factors are only applied when the material strength is known with certainty.
5.True or False: The load distribution factor accounts for how the load is shared across the number of lift points.
6.The load distribution factor is calculated by dividing the total load weight by the _____.
7.Safety factors are used to account for uncertainties in _____ and lift point conditions, ensuring a margin of safety.

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6. Unit 6 NOS 5 SSD/N0313 v 1.0: Working Load Limit & Selection of Rigging Component

6.1. Key Learning Outcomes

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

- A thorough understanding of Working Load Limits and how they influence safe lifting operations.
- The ability to select appropriate rigging components based on load characteristics and WLL.
- Knowledge of various rigging configurations and their implications for safety and effectiveness.
- Skills to assess dynamic and static load conditions, including calculating forces and applying safety margins.
- Protocols for inspecting and maintaining rigging equipment to ensure reliability and safety.
- Emphasis on documentation, regulatory compliance, and risk assessment to mitigate hazards.
- A commitment to training and continuous learning to maintain competency in rigging practices.

6.2. Unit 6.1 Understanding Rigging Load Capacity

6.2.1. Unit Objectives

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

- To understand working limit load and safety factors of rigging components in lifting operation.
- To understand breaking strength and working limit load and its difference
- To understand how to calculate safe working loads (SWL)

6.2.2. 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)

6.2.3. Ask

- Describe about working limit load and safety factors of rigging components
- Describe about breaking strength
- Describe about how to calculate safe working loads (SWL)

6.2.4. Explain

- Describe about working limit load and safety factors of rigging components
- Describe about breaking strength
- Describe about how to calculate safe working loads (SWL)

6.2.5. Activity

- Provide different lifting scenarios (e.g., general rigging, critical lift, dynamic loads) along with rigging components' breaking strengths and required safety factors.
- Students will work in groups to calculate the SWL for each scenario and verify if the components are suitable for the lift.

6.2.6. 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

6.2.7. Summary

- Load capacity of rigging is to be understood and known such that lifting operation may be effectively and safely undertaken. Among them are:

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- Working Load Limit (WLL): It is the maximum load, which rigging components such as slings, shackles, hooks, and lifting devices are designed to withstand in safe conditions with regular usage. WLL depends on the properties of the materials used and specifications on the designs for each rigging component.
- Breaking Strength: The point at which the rigging component will fail under load is known as breaking strength. It is greater than WLL but going beyond the breaking strength during lifting operations might be catastrophic. Safety is not compromised if not exceeded by the breaking strength.
- Safety Factor: This is the safety factor that will account for the uncertainties in the load characteristics and dynamic forces that might be acting on the load such as swinging or sudden movements during lifts. The common ratios for safety factors are:
- General Rigging: 5:1 (Load Weight: Rigging Capacity)
- Critical Lifts: 10:1 or higher, depending on the complexity and risks involved.
- Safe Working Load (SWL): The SWL of rigging components is calculated
- SWL= Breaking Strength/Safety Factor
- This calculation ensures that rigging components are used within their safe operating limits, considering the appropriate safety factor for the situation.
- Selection of Rigging Components: While selecting rigging components, one must ensure that each component is rated for the specific weights and load characteristics involved in the lifting operation. The use of components with insufficient load capacity may lead to accidents or equipment failure.
- Inspection and Record Keeping: The rigging equipment is to be checked regularly to confirm that all the parts are sound and that the load-carrying capacities comply with the needs of the work. Check on manufacturer recommendations and safety standards and compare them against the safety regulation.

6.2.8. Exercise

1. What does WLL (Working Load Limit) represent in rigging?
a) The weight of the load being lifted
b) The maximum weight that rigging components can safely handle
c) The weight of the rigging equipment itself
d) The breaking strength of the rigging components
2. The WLL of a rigging component is determined by its material properties and design specifications.(T/F)
3. Breaking strength refers to the maximum load a rigging component can safely support before it fails.(T/F)
4. The Working Load Limit (WLL) is the maximum weight that a rigging component can safely handle during a _____ operation.
5. The Breaking Strength is the load at which a rigging component will _____.
6. It is important to verify the load capacity of rigging equipment through _____ and documentation review to ensure compliance with safety standards.

6.3. Unit 6.2 Selecting Rigging for Asymmetrical and Complex Loads

6.3.1. Unit Objectives

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

- To assess and address the complexities of load handling during rigging operations.
- To understand how to evaluate load shape, weight distribution, and the centre of gravity to determine the appropriate rigging configuration
- To understand about spreader bars, load equalizing beams, multi-leg slings, and adjustable spreader beams
- To understand about sling angle

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6.3.2. 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)

6.3.3. Ask

- Describe about complexities faces during rigging operations
- Describe about how to evaluate load shape, weight distribution, and the centre of gravity to determine the appropriate rigging configuration
- Describe about spreader bars, load equalizing beams, multi-leg slings, and adjustable spreader beams
- Describe about sling angle

6.3.4. Explain

- Describe about complexities faces during rigging operations
- Describe about how to evaluate load shape, weight distribution, and the centre of gravity to determine the appropriate rigging configuration
- Describe about spreader bars, load equalizing beams, multi-leg slings, and adjustable spreader beams
- Describe about sling angle

6.3.5. Activity

- Present participant with a series of diagrams or 3D models representing different types of loads (e.g., a wide beam, an irregular-shaped object, or a heavy load with an off-centre centre of gravity).
- In small groups, participant will evaluate each load, identifying key characteristics (shape, weight distribution, centre of gravity) and determine the appropriate rigging configuration.
- Each group will report their findings and justify their choices based on the load's characteristics.

6.3.6. 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

6.3.7. Summary

- It emphasizes the evaluation of the shape, weight distribution, and centre of gravity of a load. Proper assessment of these factors helps determine the best rigging configuration to ensure a balanced and safe lift.
- Spreaders are designed to transfer a wide or long load through one or more of the lifting points, to more evenly distribute weight. It keeps stress away from any point and allows easier movement.
- Load equalizing beams, which are used to lift the asymmetrical loads. Asymmetrical loads find balance and stabilize through these beams during lifting. They also try to prevent tipping over or losing balance.
- It addresses the selection of multi-leg slings for loads that have an unbalanced or shifting centre of gravity. It stresses the importance of ensuring each sling leg is rated to carry the load, thus enabling even distribution of the load and stability of the lifted load.

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- It highlights the importance of adjusting sling angles and lengths to achieve a balanced lift. Proper adjustments minimize the risk of load tipping or shifting, ensuring the load remains stable and safely positioned during the lift.
- It would require specialized rigging tools such as adjustable spreader beams, rotating hooks, or swivel hoists. The tools would ensure that the more complex lifting scenario is considered and flexibility and control can be provided during the handling of challenging loads.

6.3.8. Exercise

1. Which of the following is the primary purpose of evaluating a load's shape, weight distribution, and centre of gravity?
a) To determine the cost of the rigging operation
b) To choose the appropriate rigging configuration for safety and balance
c) To estimate the time required for the lift
d) To calculate the load's volume
2. Load equalizing beams are primarily used for:
a) Handling uniform loads with even weight distribution
b) Lifting long loads without changing the centre of gravity
c) Balancing weight distribution in asymmetrical loads
d) Increasing lifting capacity of slings
3. Evaluating the load's shape, weight distribution, and centre of gravity is essential for selecting the correct rigging configuration.(T/F)
4. Spreader bars should only be used for lifting single-point loads.(T/F)
5. The centre of gravity of a load plays a key role in determining the appropriate _____ configuration to ensure safe lifting.
6. Spreader bars are used to distribute the weight of a load evenly across _____ lift points.
7. Load equalizing beams are particularly useful when lifting _____ loads to maintain balance and prevent tipping.

6.4. Unit 6.3 Compliance and Documentation

6.4.1. Unit Objectives

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

- To understand industry standards and safety regulations, including OSHA, ASME, and ISO guidelines
- To understand process of load capacity verifications, and maintaining records for inspections, certifications, and usage.
- To understand importance of reporting discrepancies or non-compliance issues

6.4.2. 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)

6.4.3. Ask

- Describe about industry standards and safety regulations
- Describe about process of load capacity verifications, and maintaining records for inspections, certifications, and usage.
- Describe about importance of reporting discrepancies or non-compliance issues

6.4.4. Explain

- Describe about industry standards and safety regulations

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- Describe about process of load capacity verifications, and maintaining records for inspections, certifications, and usage.
- Describe about importance of reporting discrepancies or non-compliance issues

6.4.5. Activity

- Divide participant into small groups and give them a scenario card that includes a load requirement and a specific lift configuration.
- Each group will select the appropriate rigging components (e.g., sling, hook, shackle) based on the WLL of each component and the load to be lifted.
- Groups must use WLL charts and standards (OSHA, ASME, ISO) to ensure proper component selection.
- Groups will document their selection process, including the rigging components chosen, the WLL for each component, and how they verified compliance with industry standards.

6.4.6. 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

6.4.7. Summary

- It reinforces that all rigging components meet industry-accepted standards for fit so that they each meet the right level of industry-accepted safety parameters, such as OSHA standards, ASME, and international ISO. Ensure that those components chosen have been safely designed, engineered, and proof-tested before their possible usage to establish that they safely support the different loads they carry.
- It addresses the documentation of the selection and evaluation process for rigging components. It would include load capacity calculations, verification of the capability of the components to carry loads intended, and verification that the components meet applicable standards. Proper documentation will ensure accountability and safety.
- Accurate records of rigging inspections, certifications, and usage must be maintained. Traceability, safety protocol compliance, and continuous regulatory compliance are ensured by such records. Such records also indicate when parts should be replaced or re-certified.
- It underlines the critical task of reporting a nonconforming condition or potential problem about rigging equipment. That is, ensure timely corrective actions in order not to compromise working safety. Such tasks include conveying a problem or potential problem with a supervisor that he can easily act for before any accident occurs.

6.4.8. Exercise

1.Which of the following is essential to ensure that rigging components meet safety requirements?
a) They are visually inspected once per year
b) They are compliant with relevant industry standards and safety regulations
c) They are purchased at the lowest possible cost
d) They are always used without inspection
2.What is the primary purpose of documenting the selection and evaluation of rigging components?
a) To track the financial cost of rigging equipment
b) To ensure compliance with safety regulations and verify load capacity
c) To decide which rigging components are the most popular
d) To create a list of the available rigging equipment
3.Why is it important to maintain records of rigging inspections and certifications?
a) To comply with industry standards and ensure traceability for safety audits
b) To avoid any legal liability in case of a lifting accident

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c) To keep track of the equipment's usage for financial purposes
d) To ensure that rigging components are only used once
4 Rigging components should always be compliant with industry standards such as OSHA, ASME, and ISO.(T/F)
5.It is unnecessary to document the evaluation of rigging components if the components are new.(T/F)
6.Maintaining records of rigging inspections and certifications helps ensure equipment is safe and traceable for future use.(T/F).

7. Unit 7 NOS 6: SSD/N0314 v 1.0: Pre-Use Inspection of Rigging and Lift Points

7.1. Key Learning Outcomes

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

- Conduct of pre-use inspections of rigging equipment and lift points to ensure safety and compliance.
- Comprehensive inspection protocols for various types of rigging equipment.
- Identification of lift points, including structural integrity and load distribution.
- Compliance with industry regulations and standards to uphold safety and operational integrity.
- Maintain detailed inspection records and report any issues identified during inspections.

7.2. Unit 7.1. Inspection Procedures for Rigging Components

7.2.1. Unit Objectives

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

- To understand process of visual inspection of rigging components
- To understand all identification tags, markings, and manufacturer labels
- To understand how to report deficiencies and properly tag damaged components as "Out of Service" to ensure a safe working environment.

7.2.2. 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)

7.2.3. Ask

- Describe about process of visual inspection of rigging components
- Describe about identification tags, markings, and manufacturer labels
- Describe about process how to report deficiencies and properly tag damaged components as "Out of Service" to ensure a safe working environment.

7.2.4. Explain

- Describe about process of visual inspection of rigging components
- Describe about identification tags, markings, and manufacturer labels
- Describe about process how to report deficiencies and properly tag damaged components as "Out of Service" to ensure a safe working environment.

7.2.5. Activity

- Divide the class into small groups.
- Provide each group with a set of rigging components (e.g., a sling, hook, shackle, rope, multi-leg sling, spreader bar).
- Have each group inspect their assigned components using both visual and tactile methods. They should look for:

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- Visual Inspection : Signs of wear, cracks, corrosion, or deformation.
- Tactile Inspection :Feel for irregularities like fraying or cuts on ropes, slings, or wires.
- Hooks and Shackles :Look for stretching, bending, or alignment issues.
- Identification Tags : Ensure all tags are legible and match component specifications.
- Loose or Missing Parts : Check for missing pins, bolts, or parts that could compromise integrity.
- Each group will document their inspection findings on an inspection checklist, noting any deficiencies such as visible damage, illegible tags, or loose parts.
- They will also document the component's status (e.g., "Out of Service" for damaged components) and report any issues found.

7.2.6. 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

7.2.7. Summary

- A visual check will be carried on the rigging parts for observable signs of wear, deformation, corrosion, cracks and any form of damage which can compromise on safety.
- It would carry tactile inspection feeling through touch to observe the condition of rigging components and feel by touch its surface for cuts, abrasions, or fraying on slings, ropes or wires.
- It should be checked for stretching, bending, or misalignment that can impact the load-carrying capacity of hooks and shackles. They must be reliable under load.
- It is a process to check legibility and accuracy of identification tags, markings, and manufacturer labels in order to make sure that rigging components comply with the specifications and requirements.
- states that any loose or broken parts, pins, or bolts, especially in multi-leg slings or spreader bars, can compromise the entire rigging configuration and pose future hazards.
- asserts that all findings inspected must be documented with possible deficiencies or damage and reported to a supervisor for judgment and subsequent corrective actions.
- Any equipment that is in a defective condition or damaged should be tagged appropriately as "Out of Service" and removed from the rigging area to prevent its accidental usage, thus protecting personnel and equipment. All these competencies together ensure that safe rigging operations are conducted by following safety regulation requirements, therefore reducing the accident risk and providing equipment integrity.

7.2.8. Exercise

1.What should you check for during a visual inspection of rigging components?
a) Only for signs of wear
b) Wear, deformation, corrosion, cracks, and other visible damage
c) The manufacturer's name and tag
d) Only the load capacity
2.What must be verified to ensure rigging components meet safety standards?
a) The manufacturer's location
b) The legibility of identification tags, markings, and manufacturer labels
c) The weight of the load being lifted
d) The type of rope used
3.Visual inspections should include checking for any signs of wear, deformation, corrosion, cracks, and other visible damage.(T/F)
4.Tactile inspections should focus on checking the manufacturer's label only.(T/F)

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5.Hooks and shackles should be checked for stretching, bending, or improper alignment, as these can affect their load-bearing capacity.(T/F)

7.3. Unit 7.2. Lift Point Inspection

7.3.1. Unit Objectives

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

- To understand how to conduct thorough inspections of lift points including welds, bolts, and other attachment points to ensure they are free from cracks, rust, fatigue, or signs of poor workmanship
- To understand process for accepting or rejecting lift points based on industry standards and manufacturer recommendations.
- To understand how to document lift point inspection results, including corrective actions or recommendations for further evaluation.

7.3.2. 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)

7.3.3. Ask

- Describe about process how to conduct thorough inspections of lift points
- Describe about process for accepting or rejecting lift points based on industry standards and manufacturer recommendations
- Describe about how to document lift point inspection

7.3.4. Explain

- Describe about process how to conduct thorough inspections of lift points
- Describe about process for accepting or rejecting lift points based on industry standards and manufacturer recommendations
- Describe about how to document lift point inspection

7.3.5. Activity

- Divide the class into small groups and provide each group with sample lift points (either physical samples or images).
- Assign specific inspection criteria for each group:
  Group 1: Inspect for cracks, rust, and fatigue in welds
  Group 2: Assess weld conditions for signs of cracking, porosity, or poor workmanship
  Group 3: Verify that bolts and fasteners are properly tightened and free from corrosion
  Group 4: Check the alignment and positioning of lift points for load balance and stability

Each group will inspect their assigned components using the provided criteria, looking for any potential issues.

7.3.6. 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

7.3.7. Summary

- Lifting point inspection is very critical work, which needs to be carried out to ensure safety and integrity in the lifting operation. It includes examination of all the attachment points-welds, bolts,

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etc., for damage or wear and tear that would compromise the structure . Inspectors check the welds for cracks, porosity, or poor workmanship that may cause failure during lifting operations .Bolts and fasteners must be checked to ensure they are tightened properly and free from corrosion or wear, thus preventing the failure of the rigging setup

- In addition, lift points must be correctly positioned and aligned to avoid an imbalance and uncertainty in loads. Misalignment can pose a hazardous situation There must be standards or criteria established for the acceptance or rejection of lifting points from manufacturers' guidelines as well as those in industry for the sake of ensuring only acceptable lifting parts are used .Lastly, the inspection should provide all results from the observation such as corrections implemented or suggested to further examine as proof for record-keeping purposes and support of future safety improvement measures

All these actions altogether help to retain the integrity of the rigging setup, thus reducing the danger of accidents during lifting operations.

7.3.8. Exercise

1.What should be checked during a lift point inspection for signs of potential failure?

a) Only the colour of the components

b) Cracks, rust, and other signs of fatigue in welds, bolts, and attachment points

c) Weight of the load being lifted

d) Type of rope used

2.Why is it important to verify that bolts and fasteners at lift points are properly tightened?

a) To ensure they are aesthetically pleasing

b) To ensure they are free from corrosion and wear, preventing failure

c) To check if the weight of the load is evenly distributed

d) To verify the alignment of the lift points

3.Inspecting lift points for signs of rust, cracks, and fatigue is not necessary if the rigging setup appears to be in good condition.(T/F)

4.Assessing weld conditions for cracks, porosity, or poor workmanship is critical to avoid failure during lifting operations.(T/F)

5.Proper _____ and _____ of lift points are necessary to maintain load balance and stability

7.4. Unit 7.3. Documentation and Record-Keeping

7.4.1. Unit Objectives

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

- To develop and implement standardized checklists for pre-use inspections of rigging components and lift points
- To understand record-keeping system
- To understand procedures for reviewing and updating inspection records
- To understand protocol for reporting severe defects or non-compliance issues

7.4.2. 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)

7.4.3. Ask

- Describe about how to develop and implement standardized checklists for pre-use inspections of rigging components and lift points

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- Describe about process of record-keeping system
- Describe about process for reviewing and updating inspection records
- Describe about process for protocol for reporting severe defects or non-compliance issues

7.4.4. Explain

- Describe about how to develop and implement standardized checklists for pre-use inspections of rigging components and lift points
- Describe about process of record-keeping system
- Describe about process for reviewing and updating inspection records
- Describe about process for protocol for reporting severe defects or non-compliance issues

7.4.5. Activity

- Divide the class into small groups of 3-4 participants.
- Assign each group the task of creating a standardized checklist for pre-use inspections of rigging components and lift points, ensuring the checklist includes:
- Rigging components (e.g., slings, hooks, shackles, bolts, welds)
- Lift points (e.g., bolts, welds, alignment, wear)
- Common issues (e.g., corrosion, cracks, fatigue, alignment)
- Space for inspector's name, date, and comments
- Each group will develop their checklist based on industry standards (e.g., ASME, OSHA) and ensure it covers consistency and completeness in the inspection process.
- Groups will also create a section for noting corrective actions, non-compliance issues, and signatures.

7.4.6. 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

7.4.7. Summary

- Only standardized and thorough inspection practices ensure safety and follow industry standards for effective rigging operations. It develops a standard checklist for the peruse inspections of rigging components and lift points which assures consistency and completeness in the process of inspection. This check list is the most important inspection tool for any inspector to check rigging equipment for any type of damage or wear to improve the accuracy of inspections and avoid oversight.
- It states that a record of inspection, findings, corrective action, and the inspector's signature shall be maintained in an orderly manner. This would mean that all inspections are documented properly and any reference to it in the future would not be difficult. It provides some degree of transparency and accountability while rigging is carried out.
- The objective is that procedures shall be established to ensure regular review and update of inspection records. It shall be maintained as per the safety standards and audit requirements, current and reflecting any corrective actions taken. Such reviews keep integrity in rigging operations and identify issues that might continue to be repeated and therefore deserve more attention.

- It demands a reporting protocol for serious defects or non-compliance issues. The protocol states the procedure for handling critical safety issues. For instance, in case of a defect, immediate reporting for corrective action or equipment replacement should be done to avoid accidents and withdraw unsafe equipment from use in time to ensure the overall safety of the rigging operation.

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- Putting all the above elements into inspection processes of rigging therefore ensures proper maintenance of all its parts through inspection and documentation, is always achieved to meet or surpass the needed levels of safety .

7.4.8. Exercise

1.What is the primary purpose of developing a standardized checklist for pre-use inspections of rigging components and lift points?
a) To ensure consistency and completeness in the inspection process
b) To reduce the time spent on inspections
c) To increase the cost of inspections
d) To allow inspectors to skip unnecessary steps
2.Why is it important to regularly review and update inspection records?
a) To keep the records organized
b) To ensure compliance with safety standards and audit requirements
c) To make records look neat and tidy
d) To comply with personnel performance reviews
3.A standardized checklist for pre-use inspections ensures that every rigging inspection follows the same steps, reducing errors and omissions.(T/F)
4.Record-keeping is unnecessary if the inspection was conducted thoroughly during the rigging setup.(T/F)
5.Reviewing and updating inspection records regularly helps ensure that the rigging system remains compliant with safety standards and audit requirements.(T/F)
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8. Unit 8 NOS 7: SSD/N0315 v 1.0: Load Dynamics and Associated Hazards

8.1. Key Learning Outcomes

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

- Understanding of load dynamics, including different types of loads and their behaviours.
- Understand various forces acting on loads and their implications for safety.
- Identification of potential hazards linked to load dynamics and procedures for risk assessment.
- Understanding mitigation strategies to reduce risks during lifting operations.
- To understand industry regulations and standards to ensure safe and effective rigging practices.

8.2. Unit 8.1: Understanding the Impact of Load Dynamics

8.2.1. Unit Objectives

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

- To understand the basic principles of load dynamics, including inertia and momentum, in the context of lifting operations.
- To understand how inertia impacts the starting and stopping phases of lifting operations and implement measures to control load movement effectively
- To anticipate dynamic load changes by adjusting lift speed, rigging angles, and load configurations.

8.2.2. 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)

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8.2.3. Ask

- Describe about basic principles of load dynamics
- Describe about how inertia impacts the starting and stopping phases of lifting operations and implement measures to control load movement effectively
- Describe about how to anticipate dynamic load changes by adjusting lift speed, rigging angles, and load configurations

8.2.4. Explain

- Describe about basic principles of load dynamics
- Describe about how inertia impacts the starting and stopping phases of lifting operations and implement measures to control load movement effectively
- Describe about how to anticipate dynamic load changes by adjusting lift speed, rigging angles, and load configurations.

8.2.5. Activity

- Provide participant with a case study handout of a past rigging accident or equipment failure due to mismanagement of load dynamics (e.g., swinging load or instability during lifting).
- Ask participant to identify the root cause of the issue, focusing on changes in load dynamics (inertia, momentum, external factors).
- In small groups, have students discuss preventive strategies to avoid similar accidents, such as:
- Adjusting rigging angles
- Reducing lift speeds
- Implementing better communication and coordination
- Each group will present their analysis of the case study and the preventive strategies they would implement.
- Discuss how understanding load dynamics can help prevent rigging accidents and improve safety.

8.2.6. 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

8.2.7. Summary

- It deals with the basics of inertia, which is the resistance of a load to changes in motion, and momentum, which is the force generated by a moving load. These two are factors that significantly impact the stability and control of lifts. The principles are helpful to riggers in managing how loads behave, especially when it comes to starting, stopping, and controlling the motion during lifts.
- It discusses how environmental factors like wind, vibration, and jolts may cause changes in load dynamics when lifting. This could destabilize the load and control, so operators must be watchful and flexible.
- It deals with the special phases of lifting: take off and shutdown. In these phases, inertia tends to create sudden movements or jerks, making it difficult to control the load. The operator should therefore adopt techniques for a smooth start and stop in lifting.
- It recognizes unstable situations where the load momentum will cause the load to swing or tip uncontrollably if the load is not stabilized or rigged correctly. It should set provisions against such conditions through the adjustment of speed, angle of rigging, or the use of stabilizing equipment like taglines.

- It encourages preparedness and responsiveness to changing loads. Operators will be in control even if load conditions are changing because of the variables involved with the lift speed, rigging angles, and load configurations, thereby aiding in the risk management.
- It explains, through simulated cases or real case studies, how poor handling of load dynamics has led to rigging mishaps or machinery failures. Indeed, such living case studies have always been great help in displaying the potential incident and prevention capability in safety on the lifting platform, thanks to load dynamics understanding.

8.2.8. Exercise

1.What is inertia?
A) The force generated by a moving load
B) The resistance of a load to changes in motion
C) The ability to start and stop a load quickly
D) The speed at which a load is lifted
2.Which of the following is a potential risk if load momentum is not controlled during lifting?
A) The load may tip or swing uncontrollably
B) The load will stop suddenly
C) The load will remain stationary
D) The rigging system will fail immediately
3._____ is the resistance of a load to changes in motion, which affects the control and stability of lifting operations.
4.During the _____ phase of lifting, inertia can cause sudden movements or jerks that make it difficult to control the load
5.The take off and shutdown phases of lifting are not affected by inertia.(T/F)
6.If load momentum is not controlled, it may lead to the load swinging or tipping uncontrollably.(T/F)

8.3. Unit 8.2: Hazard Identification and Mitigation

8.3.1. Unit Objectives

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

- To understand how to Identify pinch points and crush zones and swing hazards caused by improper Centre of Gravity (CoG) alignment
- Understanding risk of overloading and structural failure and common hazards in rigging operations
- Understanding hazard control measures to control load movement, implementing proper rigging alignment
- To understand how to establish safety zones and barriers to protect personnel from identified hazards during rigging operations.
- To understand risk assessment checklist for identifying hazards and documenting mitigation strategies before commencing any rigging operation

8.3.2. 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)

8.3.3. Ask

- Describe about risk assessment for rigging operation
- Describe about how to establish safety zones and barriers to protect personnel from identified hazards during rigging operations.

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8.3.4. Explain

- Describe about risk assessment for rigging operation
- Describe about how to establish safety zones and barriers to protect personnel from identified hazards during rigging operations

8.3.5. Activity

- Provide each group with a rigging scenario (e.g., lifting a heavy object, working near energized equipment, or manoeuvring a load in tight spaces).
- Ask each group to:
    - Identify hazards from the scenario (e.g., pinch points, overloading, swing hazards).
    - Discuss possible consequences of those hazards (e.g., injuries, equipment damage).
    - Propose mitigation measures to control or eliminate those risks (e.g., using taglines, calculating load limits, or setting up safety zones).

Each group will present their findings and proposed hazard mitigation strategies to the class.

8.3.6. 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

8.3.7. Summary

- Pinch Points and Crush Zones: These dangers occur when riggers can get caught between the load and an immovable object. Knowing what these areas are and how to avoid them through proper clearances and spotters is a key way of preventing injury.
- Overloading and Structural Failure :The rigging equipment or the very structure may break due to overloading. Overloading can thus be avoided only when safe load calculations are implemented through equipment specifications with verification that the load does not exceed the limits of capacity.
- Swing Hazards :Improper CoG alignment or unexpected load movement can cause the load to swing uncontrollably. Riggers must recognize these risks and adopt control measures such as adjusting rigging angles, controlling lift speed, and stabilizing the load.
- Other Common Hazards : This comprises risks such as load shifting, falling objects, and proximity to energized equipment. These hazards are dealt with by situational awareness and precautionary measures such as securing loads, the use of protective barriers, and proper distances away from electrical hazards.
- HAZARD CONTROL MEASURES :Effective mitigation includes taglines for controlling the movement of loads, proper alignment of rigging, as well as maintaining an open relationship between team members when lifting. These measures help manage risks and ensure smooth and safe rigging procedures.
- Safety Zones and Barriers: Establishing safety zones and barriers is essential to protect personnel from potential hazards. This can include creating exclusion zones around the rigging area and ensuring that non-essential workers are kept at a safe distance.
- Prepare a risk assessment checklist before executing any rigging operation to detail the potential risks and mitigation plans. This can ensure that any kind of hazard associated with the specific process is identified ahead of time to minimize the scope of accidents.

8.3.8. Exercise

1.Which of the following is a common cause of pinch points in rigging operations?

a) Incorrect rigging angle

b) Load shifting

c) Load and fixed object contact

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d) Use of taglines
2.Which of the following control measures helps prevent swing hazards during rigging operations?
a) Adjusting rigging angles
b) Using taglines
c) Stabilizing the load
d) All of the above
3.True or False: Pinch points occur when riggers are caught between a load and a fixed object.
4.True or False: Overloading occurs when the load exceeds the rigging equipment's capacity, which can lead to structural failure.
5.True or False: Swing hazards can be caused by improper rigging alignment and sudden environmental changes.
6.Pinch points are areas where riggers can be caught between the load and a _____ object.
7.The risk of overloading can be prevented by conducting _____ load calculations to ensure the load does not exceed the equipment's capacity.

8.4. Unit 8.3: Implementing Control Measures

8.4.1. Unit Objectives

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

- To understand how to control the movement of loads with taglines to avoid swinging or rotation.
- Understanding Alignment of proper rigging for balancing and stability.
- To understand effective communication channels for coordination.
- To understand how to control dynamic force effect

8.4.2. 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)

8.4.3. Ask

- Describe about how to control the movement of loads with taglines to avoid swinging or rotation
- Describe about Alignment of proper rigging for balancing and stability
- Describe about effective communication channels for coordination
- Describe about how to control dynamic force effect

8.4.4. Explain

- Describe about how to control the movement of loads with taglines to avoid swinging or rotation
- Describe about Alignment of proper rigging for balancing and stability
- Describe about effective communication channels for coordination
- Describe about how to control dynamic force effect

8.4.5. Activity

- Divide the class into small teams (3-4 participant per team).
- Provide each team with a scenario card describing a lifting operation. Include load details, rigging conditions, and potential environmental challenges (e.g., wind, uneven ground, dynamic load).
- Assign roles within each team: Rigging team leader, spotter, communicator, and lifting operator.

8.4.6. 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.

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- Ensure that every participant answers all the questions

8.4.7. Summary

Use taglines to control load movement and prevent swinging or rotation during lifting and lowering operations

Taglines are the most important tools used to control the movement of the load in the process of lifting and lowering. Taglines attached to the load help riggers guide and prevent the load from swinging or rotating, thus ensuring the operation is stable and safe.

Rigging points are to be correctly aligned so that the load is kept in a stable condition from the start and throughout raising.

Proper alignment of rigging is critical as far as maintaining stability in holding a load. The prevention of imbalance and shifting provides conditions in lifting to reach dangerous alternatives. Proper alignment makes sure that weight is spread equally; this, in turn, may keep the load stable during upward and downward moves.

Establish effective communication channels. Utilize hand signals, radios, or other communication devices to keep situational awareness and coordination of actions among the members of the rigging team.

Effective communication is the basis of a good lifting operation. With hand signals, radios, and other communication devices, if clear and consistent communication channels can be established between the rigging team, the team will not lose coordination, and they can respond promptly in response to changes within the operation. It increases situational awareness and, thus, safety.

Utilize safety techniques, such as lowering lift speeds, using spotters, and visual cues to minimize dynamic forces acting on the load

Precautions are essential to minimize the threats that occur during lifting operations. Lowering speed reduces chances of better control over the falling loads and spotters with visual signals enhance safety since they may provide direction and ensure that the loads move in a predictable and correct motion. Such procedures minimize the probabilities of accidents due to dynamic forces including swinging or uncontrolled movement of loads.

Observe the wind velocity and stability of the ground so that there might be identification of possible load dynamic changes; adjustment in the process of lifting.

Environmental conditions such as the speed of the wind or even ground stability influence the load during lift operations to a very high degree. Observation of the stated environmental condition coupled with variation of the process should guarantee load stability. During lifting in windy situations, riggers must decrease lifting rates and modify their rigs for an apparent extra load added on their main loads.

8.4.8. Exercise

1.What is the primary purpose of using taglines during lifting operations?
a) To speed up the lifting process
b) To prevent the load from swinging or rotating
c) To increase the weight of the load
d) To lift the load higher
2.Why is proper rigging alignment critical during lifting operations?
a) To make the lift easier
b) To ensure the load remains balanced and stable
c) To reduce the need for taglines
d) To allow more weight to be lifted
3.Taglines help to prevent the load from swinging or rotating during lifting and lowering operations.(T/F)
4.Proper rigging alignment is not important as long as the load is lifted.(T/F)
5.Taglines are used to control the _____ of the load during lifting and lowering operations.
6.Proper rigging alignment ensures that the load remains _____ and stable throughout the lifting process.

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9. Unit 9 NOS 8: SSD/N0316 v 1.0: Advanced Rigging Considerations

9.1. Key Learning Outcomes

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

- Understanding of complex load management and advanced rigging techniques
- Understanding environmental factors influencing rigging operations and strategies for adaptation
- To understand rigging system design, load analysis, and component selection
- Understanding effective risk management strategies for rigging operation
- To understand industry standards and adoption of best practices for safe and effective rigging.

9.2. Unit 9.1. Lift Planning and Risk Assessment

9.2.1. Unit Objectives

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

- To analyse detailed load characteristics, and develop the lift plan
- To understand environmental factor affecting lifting operation and adjust lift plan
- To understand risk assessment of lifting operation and implement strategies against hazards and safeguarding protocols implemented
- To understand process of continuous review and revisions of lift plans and risk assessment

9.2.2. 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)

9.2.3. Say

- Describe about environmental conditions and the site condition suitable for lifting operations
- Describe about load and its characteristics
- Describe about lift plan
- Describe about risk assessment of lifting operation and implement strategies against hazards and safeguarding protocols implemented
- Describe about process of continuous review and revisions of lift plans and risk assessment

9.2.4. Explain

- Describe about environmental conditions and the site condition suitable for lifting operations
- Describe about load and its characteristics
- Describe about lift plan
- Describe about risk assessment of lifting operation and implement strategies against hazards and safeguarding protocols implemented
- Describe about process of continuous review and revisions of lift plans and risk assessment

9.2.5. Activity

Divide the class into small teams (3-4 participant).
Provide each team with a load simulation object (e.g., a weighted box or an irregularly shaped object).
Have them measure and assess the following characteristics:
Weight: Use scales or estimation to determine the load's weight.
Centre of Gravity: Demonstrate how to find the centre of gravity using balance techniques or measurement tools.

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Shape and Material Properties: Have students describe the shape and materials of the load (e.g., metal, wood, concrete) and discuss how these affect rigging and lifting.
Each team should record their findings and develop a basic lift plan, considering:
The type of rigging that would be required.
How to balance the load during the lift.

9.2.6. 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

9.2.7. Summary

Evaluation of load characteristics

This includes safe and efficient lift by the evaluation of weight, centre of gravity, shape, and material properties of the load. This determines the best rigging method for proper balance and load distribution during lifting operations. Knowing the characteristics of loads allows one to develop an appropriate and safe lift plan.

Selection of best rigging configuration

Once the load characteristics have been understood, it is necessary to choose a suitable rigging setup. This entails choosing the slings, shackles, and rigging points appropriate for the physical properties of the load with its weight. All rigging devices should be rated to handle the exact load and its characteristics; thus failures at lifting operations are avoided.

Environmental conditions

For instance, wind, ground stability, and proximity to structure can all be conditions that may largely determine the safety or success of the rigging job. Such conditions are therefore first assessed and weighed when designing the lift plan. Changes in a plan might also be necessary because of environmental problems that need mitigating risks-such as, for example, reducing lift speed in windy weather or rigging reinforcement in the case of ground instability.

Prepare a step-by-step lift plan

A step-by-step lift plan should contain the following: equipment requirements, rigging setup, load handling procedures, and contingency measures. This plan will guide the operation, ensuring that all team members know their responsibilities and how to proceed safely. Contingency measures should be able to address potential issues that may arise, ensuring preparedness for unexpected events.

Prepare a comprehensive risk assessment

Before beginning any rigging operation, conducting a thorough risk assessment is vital. This assessment identifies potential hazards—such as load instability, environmental challenges, and equipment failure—and evaluates them based on likelihood and severity. Categorizing these risks helps prioritize safety measures to minimize accidents during the operation.

Implement mitigation strategies

Implement mitigation measures once risk elements are determined for the safe rigging operation. This would mean using equipment specially designed for the rig, stabilization of load, or developing higher safety precautions. The avoidance of accidents could also be guaranteed, and the dynamic forces would be controlled which can be anticipated at the different phases of operations, by applying extra spotters or a slow lift.

Review and update lift plans and risk assessments regularly

The lift plan and risk assessments should regularly be reviewed and updated. Changes in environmental factors, availability of equipment, and load conditions may affect the operation. The team will be safe and efficient in the rigging operation only when flexibility and adaptation of plans into that change are done.

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9.2.8. Exercise

1. Which of the following is essential when evaluating load characteristics for a lift?
a) The load's colour
b) The weight, shape, centre of gravity, and material properties
c) The weather forecast
d) The load's cost
2. What is the primary goal of assessing environmental conditions before lifting?
a) To choose the best rigging components
b) To ensure the lift can be performed safely by accounting for factors like wind, ground stability, and nearby structures
c) To speed up the lift process
d) To reduce the weight of the load
3. Selecting the optimal rigging configuration is unnecessary if the load is light.(T/F)
4. Environmental conditions like wind and ground stability should be factored into the lift plan to ensure safety.(T/F)
5. To develop an appropriate lift plan, it is crucial to evaluate the load's _____, shape, centre of gravity, and material properties.
6. The optimal rigging configuration should be selected based on the load's _____ and other characteristics to ensure safety during the lift.

9.3. Unit 9.2. Load Test and Certification

9.3.1. Unit Objectives

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

- **Understanding importance of pre-lift inspections and functional tests of all rigging equipment**
- **To understand rigging configuration safety by load testing using calibrated equipment.**
- **To understand standardized load testing procedures with ASME and OSHA regulations.**
- **Understanding importance of document and maintain detailed records of load test results and certifications**

9.3.2. 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)

9.3.3. Ask

- Describe about importance of pre-lift inspections and functional tests of all rigging equipment
- Describe about rigging configuration safety by load testing using calibrated equipment
- Describe about standardized load testing procedures with ASME and OSHA regulations
- Describe about **importance of document and maintain detailed records of load test results and certifications**

9.3.4. Explain

- Describe about importance of pre-lift inspections and functional tests of all rigging equipment
- Describe about rigging configuration safety by load testing using calibrated equipment
- Describe about standardized load testing procedures with ASME and OSHA regulations
- Describe about **importance of document and maintain detailed records of load test results and certifications**

9.3.5. Activity

Divide the class into small groups.

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Each group will receive a set of rigging equipment (such as slings, shackles, or lifting hooks) along with an inspection checklist.
Groups will perform a pre-lift inspection on the equipment, identifying any potential issues (e.g., wear, corrosion, damage).
Groups will discuss their findings and report back to the class, explaining the steps they took during their inspection and what they found.

9.3.6. 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

9.3.7. Summary

Pre-lift inspections and functional tests of all equipment involved before a lift.

It is also a critical stage of a lift when the equipment should be put to the most extreme tests for thorough operational and safety checking, ensuring there will not be any failures or accidents in a lift.

Load Testing using calibrated equipment.

Rigging configurations should be checked to establish whether they will withstand the anticipated load. For this purpose, a load test is applied on calibrated equipment and used to confirm this fact. It would establish that the rigging will not yield for the load applied, hence safe and stable.

Compliance to Load Testing Procedures

The established standards must be met, ASME and OSHA included. It ensures that a process is adhered to strictly which will also keep the entire rigging system to all its pertinent safety measures.

Documentation Load Test Results

Load tests should be documented properly. This would include the load weight, test duration, equipment used, and any observations during the test. Proper documentation will ensure traceability and serves as a record for future reference or audits.

Load Test Certification

Once the load test is successfully conducted, a certification has to be obtained from a valid authority. A certification ensures the rigging equipment and configurations that are safe and meet all needed safety standards for use.

Record of certification and reports.

Maintain records of load test certifications, inspection reports, and all corrective actions undertaken. These documents ensure traceability, ensure compliance with regulatory requirements, and facilitate audits and inspections.

Regular Load Testing and Recertification Schedule

Rigging equipment should be subjected to regular load tests and re-certifications. A clear schedule ensures the continued integrity and safety of the rigging equipment, maintaining adherence to safety standards and regulatory requirements.

9.3.8. Exercise

1.What is the primary purpose of conducting pre-lift inspections of rigging equipment?
a) To ensure the equipment is properly cleaned
b) To ensure the equipment meets operational and safety standards
c) To check if the equipment is visually appealing

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d) To determine the cost of the rigging equipment

2.Which of the following standards should be followed when performing load tests on rigging equipment?

a) ANSI (American National Standards Institute)

b) ASME (American Society of Mechanical Engineers) and OSHA (Occupational Safety and Health Administration)

c) ISO (International Organization for Standardization)

d) ASTM (American Society for Testing and Materials)

3.True or False: Load testing is only necessary if the rigging equipment looks damaged.

4.True or False: Documenting load test results is essential for maintaining records and complying with regulatory requirements.

5.Load tests are performed using _____ equipment to ensure the rigging configuration can safely support the designated load.

6.It is essential to follow load testing procedures outlined by relevant standards such as _____ and _____ to ensure compliance and safety.

9.4. Unit 9.3. Review and Approval Processes

9.4.1. Unit Objectives

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

- **To ensure that all lift plans, risk assessments, and load test results are submitted for review and approval to a qualified supervisor or safety officer to confirm the safety and feasibility of the lift.**
- **To understand corrective actions and its importance**
- **To understand how to maintain accessible and well-organized documentation for all lift plans, risk assessments, and load test certifications to ensure compliance and readiness for audits or inspections by regulatory bodies.**

9.4.2. 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)

9.4.3. Ask

- Describe about lift plans, risk assessments, and load test
- Describe about corrective actions and its importance
- Describe about how to maintain accessible and well-organized documentation for all lift plans, risk assessments, and load test certifications to ensure compliance and readiness for audits or inspections by regulatory bodies.

9.4.4. Explain

- Describe about lift plans, risk assessments, and load test
- Describe about corrective actions and its importance
- Describe about how to maintain accessible and well-organized documentation for all lift plans, risk assessments, and load test certifications to ensure compliance and readiness for audits or inspections by regulatory bodies.

9.4.5. Activity

Divide the class into small groups (3-4 people per group).

Provide each group with a sample lift scenario (e.g., lifting a large steel beam or an oversized structure).

Each group will create a lift plan that includes the following:

A detailed lift procedure

Risk assessments addressing potential hazards

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Load test results (ensure the rigging configuration is safe for the specified load)
Identify all required certifications
Encourage groups to use appropriate rigging standards and to reference relevant regulations.

9.4.6. 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

9.4.7. Summary

Lifts shall be planned and designed in consultation with a qualified supervisor or safety officer. The supervisor or safety officer shall review all risk assessments, including load testing, and authorize the use of lifts.

Lift operations should be planned properly and assessed on the level of risk to avoid any serious mishaps. All the hazards identified in the process of lifting are examined by a competent supervisor or safety officer based on the presented plans, risk assessments, and results of load testing. Then, it confirms that the lifting operation follows the safety standards and the regulatory requirements so that accidents do not happen and the operations are successful.

Implementation of any recommendations or corrective actions resulting from the review to ensure the lift is used safely and efficiently.

All these documents accompanying the lift plan have to be read, and changes, suggestions, or corrective actions made must be implemented. All these changes would enhance the operation's safety and efficiency. Such corrective actions would include fine-tuning the technique in lifting, bringing in safety measures, or making changes in rigging configurations. The whole thing is to improve safety measures with the help of experts while still maximizing the efficiency of the lift.

Documentation on matters such as lift plans, risk assessments, and load test certification must be readily available to regulatory bodies during audits or inspection.

To remain in compliance with the safety standards, proper documentation must be conducted. All the records should be properly arranged and prepared for regulatory inspections or audits. These records are updated so that the lifting operation will always comply with the set standards and regulations and also help to provide evidence of accountability and safety for the inspectors. The records must be kept in such a manner that they will easily be obtained anytime there is a regulatory inspection or audit.

9.4.8. Exercise

1.Why is it necessary to submit lift plans, risk assessments, and load test results for review by a qualified supervisor or safety officer?
a) To comply with regulations and ensure safety
b) To make the lift process faster
c) To avoid having to conduct safety tests
d) To keep the supervisor busy
2. What should be done after receiving recommendations or corrective actions from a supervisor during the review process?
a) Ignore them if the plan seems safe
b) Implement the recommendations and corrective actions to improve safety
c) Submit the plan again without changes
d) Change only the aspects that seem most important to you
3.True or False: Submitting lift plans, risk assessments, and load test results for review is optional and not required for safety or compliance.
4.True or False: Documentation, including lift plans, risk assessments, and load test certifications, should be kept readily accessible for audits or inspections by regulatory bodies.

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5.Lift plans, risk assessments, and load test results must be submitted for _____ by a qualified supervisor or safety officer to ensure the lifting operation is safe and compliant with regulations.
6.After the review process, it is important to implement any _____ or corrective actions provided by the supervisor to improve the safety and effectiveness of the lift.

10. Unit 10 NOS 9 : SSD/N0317 v 1.0 : Emergency Response and Contingency Planning

10.1. Key Learning Outcomes

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

- **Understanding types of Emergencies**
- **Understanding levels of Emergency Management**
- **Understanding roles and responsibilities: Emergency Responders; Contingency Planners; Incident Commanders; Crisis Communication Specialists; Business Continuity Planners; and Health and Safety Officers**
- **Understanding about Risk Assessment and Analysis; Crisis Management; Communication Skills; Resource Coordination and Logistics, Legal and Ethical Awareness; and Post-incident Analysis and Continuous Improvement**
- **Understanding about Regulatory and Policy Frameworks: National Disaster Management Policies; International Guidelines; Industry-Specific Regulations**

10.2. Unit 10.1. Emergency Response and Contingency Planning

10.2.1. Unit Objectives

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

- **Understanding types of Emergencies**
- **Understanding levels of Emergency Management**
- **Understanding roles and responsibilities: Emergency Responders; Contingency Planners; Incident Commanders; Crisis Communication Specialists; Business Continuity Planners; and Health and Safety Officers**
- **Understanding about Risk Assessment and Analysis; Crisis Management; Communication Skills; Resource Coordination and Logistics, Legal and Ethical Awareness; and Post-incident Analysis and Continuous Improvement**
- **Understanding about Regulatory and Policy Frameworks: National Disaster Management Policies; International Guidelines; Industry-Specific Regulations**

10.2.2. 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)

10.2.3. Say

- Describe about types of Emergencies and levels of Emergency Management
- Describe about roles and responsibilities: Emergency Responders; Contingency Planners; Incident Commanders; Crisis Communication Specialists; Business Continuity Planners; and Health and Safety Officers
- Describe about Risk Assessment and Analysis; Crisis Management; Communication Skills; Resource Coordination and Logistics, Legal and Ethical Awareness; and Post-incident Analysis and Continuous Improvement
- Describe about Regulatory and Policy Frameworks: National Disaster Management Policies; International Guidelines; Industry-Specific Regulations

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10.2.4. Explain

- Describe about types of Emergencies and levels of Emergency Management
- Describe about roles and responsibilities: Emergency Responders; Contingency Planners; Incident Commanders; Crisis Communication Specialists; Business Continuity Planners; and Health and Safety Officers
- Describe about Risk Assessment and Analysis; Crisis Management; Communication Skills; Resource Coordination and Logistics, Legal and Ethical Awareness; and Post-incident Analysis and Continuous Improvement
- Describe about Regulatory and Policy Frameworks: National Disaster Management Policies; International Guidelines; Industry-Specific Regulations

10.2.5. Role Play

In this role play, the class will simulate an emergency during a lifting operation at a construction site. The rigging team will be called upon to respond to the situation by following emergency response procedures and protocols.

Roles:

Rigging Supervisor (Player 1)

Crane Operator (Player 2)

Site Safety Officer (Player 3)

Riggers (Player 4)

Emergency Response Team Member (Player 5)

Observer/Trainer (Player 6)

Objective:

The team will demonstrate their understanding of emergency response procedures related to rigging and lifting operations.

They will actively follow site-specific protocols, conduct a risk assessment, anticipate high-risk situations, and use emergency equipment.

The goal is to ensure safety, effective communication, and appropriate response to an emergency in a high-risk rigging operation.

Scenario:

During a lifting operation, a dynamic load shift causes the load to swing unexpectedly, and the crane malfunctions, causing the load to become unstable. The site experiences high wind speeds, and there is potential for the load to fall or hit surrounding structures.

Pre-Role Play Preparation:

Site-Specific Protocols: Review the emergency contact numbers, assembly points, evacuation routes, and emergency shutdown procedures.

Risk Assessment: The rigging supervisor will assess potential hazards (e.g., wind, equipment failure, load instability) and have mitigation strategies in place.

Emergency Response Equipment: Check that all equipment like fire extinguishers, first aid kits, and PPE are accessible.

Contingency Plans: Ensure backup rigging gear, personnel, and alternative plans are available.

Role Play Actions:

Step 1: Identifying the Emergency

The crane begins the lift of a large, unstable load when the rigging supervisor notices that the load is shifting rapidly due to wind. The crane also begins to malfunction, and there is a risk of the load swinging dangerously towards nearby structures.

Rigging Supervisor (Player 1): "We have a dynamic load shift, and the crane is malfunctioning. Everyone, stop work immediately. Notify the crane operator and safety officer. Prepare to follow emergency protocols."

Crane Operator (Player 2): "Acknowledged, I'm stopping the crane and activating the emergency stop. Can you confirm the wind speed?"

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Site Safety Officer (Player 3): "Wind is over the safe threshold; I'll inform the emergency response team and clear the area. Prepare for evacuation."
Step 2: Communicating the Emergency
The rigging supervisor communicates clearly with the crane operator, safety officer, and riggers about the emergency.
Rigging Supervisor (Player 1): "We need to implement the contingency plan. Backup rigging gear is ready, and we'll need to evacuate the area. Everyone, use your radios to confirm."
Riggers (Player 4): "Confirmed. Preparing to move to assembly point."
Step 3: Implementing Emergency Response
The emergency response team is activated, and all personnel are instructed to follow emergency procedures.
Emergency Response Team Member (Player 5): "I'll handle first aid and monitor the area for any fire hazards. Rigging Supervisor, please confirm the status of the load."
Rigging Supervisor (Player 1): "The load is unstable. We need backup personnel to secure the area and stabilize the load immediately. Use the backup rigging gear."
Step 4: Post-Incident Actions
Once the situation is under control, the rigging supervisor leads a post-incident investigation to understand the cause of the emergency.
Rigging Supervisor (Player 1): "We'll need to investigate the malfunction. Everyone, make a note of the timeline and any actions taken. Safety officer, please start the incident report."
Site Safety Officer (Player 3): "Starting the report now, supervisor. We'll gather witness statements and begin root cause analysis. All documentation will be submitted to the regulatory authorities."
Step 5: Review and Report
After the incident, the rigging supervisor submits a detailed report, including recommendations for future prevention, and schedules follow-up drills.
Rigging Supervisor (Player 1): "The incident report is ready. We'll schedule a debrief for the team to review the lessons learned and update our emergency protocols."
Site Safety Officer (Player 3): "I will ensure all relevant documentation is filed properly for audit and review."

10.2.6. 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

10.2.7. Summary

The worker should be well versed with the emergency response procedures so that he knows how to act in critical situations related to rigging and lifting operations. This includes having protocols in place for various emergencies, such as load failures, equipment malfunction, or crane instability.
One must be fully aware of site-specific emergency protocols. This entails the knowledge of the emergency contact number, assembly point, evacuation routes, and all other special emergency instructions specific to the site concerned.
Always risk assess and do so actively. Workers will identify potential hazards before and at the time of lifting operations that could lead to an emergency; therefore, always being vigilant with foresight.
Anticipate situations that could be hazardous, such as bad weather, unstable ground conditions, dynamic load shifts, or equipment malfunction. Workers must predict when these situations may arise and take action.
Be able to use emergency equipment (fire extinguishers, first aid kit, emergency stops) and the following are crucial in emergency preparation: all equipment should be examined, maintained and readily available for use.

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Developing contingency plans critical/ high-risk lift requires preparation. The preparation involved using backup rigging gear, alternative personnel, and lifting plans where possible to create safety during the emergency.

Communicating clearly effectively in emergency circumstances is very key. The actions of the members of the rigging team; crane operators must communicate well as the site supervisors coordinate the effort and solve it safety.
All personnel should be educated on emergency procedures and contingency plans, which are refreshed through regular drills, so that the whole team is prepared to respond in emergencies.
Quick and decisive action in response to rigging-related emergencies, combined with emergency shutdown procedures, are essential to minimize damage to people and equipment.
The post-incident investigation after the emergency or near-miss includes finding the root cause and making detailed reports, which are given to prevent any such incidents and enhance safety procedures in the future.
OSHA and ANSI standards should be followed strictly, and documentation on emergency response drills, incident reports, and contingency plans is also required to track the records, thus ensuring the compliance with regulatory requirements.
Continuous improvement is necessary in emergency response protocols based on lessons learned from drills or actual incidents. On-going training will ensure that the rigging team is up to date on the latest emergency response techniques and safety practices.

10.2.8. Exercise

1.Which of the following situations can be considered a high-risk scenario during rigging operations?
a) Stable weather conditions
b) Inclement weather or equipment malfunction
c) Normal operation of machinery
d) Proper maintenance of rigging equipment
2.What is the primary role of emergency response equipment during rigging operations?
a) To provide decoration for the worksite
b) To help ensure immediate action in case of an emergency
c) To maintain communication with the supervisor only
d) To monitor the load's weight
3.True or False: Backup rigging gear and alternative lifting plans are not required as long as the primary lifting plan is followed.
4.True or False: Effective communication with the rigging team, crane operators, and site supervisors is unnecessary during emergency situations.
5.During an emergency, a team member must communicate clearly with the rigging team, crane operators, and _____ to ensure safety and coordination.
6.Post-incident investigations help determine the _____ cause of an emergency or near-miss.

11. Unit 11 NOS 10: SSD/N0318 v 1.0: Documentation and Reporting

11.1. Key Learning Outcomes

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

- To understand accountability, compliance, and communication through effective documentation practices.
- Detailed coverage of the types of documentation required in various operational contexts.
- Established documentation standards that prioritize accuracy, timeliness, clarity, and consistency.
- Structured reporting procedures with emphasis on effective communication and feedback mechanisms.

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- Integration of technology to streamline documentation processes and enhance data management.
- Training and competency development to ensure personnel are equipped with necessary skills.
- Awareness of regulatory requirements and promotion of best practices in documentation and reporting.

11.2. Unit 10.1. Rigging Logbook and Documentation

11.2.1. Unit Objectives

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

- Understand how to maintain a detailed logbook for all rigging activities
- Understand how to Record all rigging inspections.
- Understand how to document lift plans for each lifting operation
- Understand about incident reports of rigging operation
- Understand documentation review process

11.2.2. 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)

11.2.3. Say

- Describe about how to maintain a detailed logbook for all rigging activities
- Describe about how to Record all rigging inspections
- Describe about how to document lift plans for each lifting operation
- Describe about incident reports of rigging operation
- Describe about documentation review process

11.2.4. Explain

- Describe about how to maintain a detailed logbook for all rigging activities
- Describe about how to Record all rigging inspections
- Describe about how to document lift plans for each lifting operation
- Describe about incident reports of rigging operation
- Describe about documentation review process

11.2.5. Activity

Give each participant or group of students a scenario card. Each card will describe a rigging operation, equipment conditions, environmental challenges, or a lifting plan.
Examples of scenarios:
“The lift involves a 5-ton load in gusty winds, requiring a multi-leg sling configuration.”
“The rigging equipment has just been inspected, but the cable is showing signs of wear.”
Participant must fill out the rigging logbook and lift plan templates based on their scenario.
They will record:
The inspection details for equipment involved.
Any maintenance performed or needed.
The lift plan, considering the load characteristics, rigging configuration, environmental factors, and safety protocols.
Details about the potential risks and safety measures.

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Once all participant complete the documentation, they will gather in small groups to share their findings and discuss the process of documenting inspections, lift plans, and incident reports.

11.2.6. 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

11.2.7. Summary

Keep a Detailed Logbook of Rigging Operations

A detailed logbook is necessary to record rigging operations, inspections, equipment maintenance, and daily lift activities. This documentation ensures that rigging equipment is properly maintained, inspections are carried out regularly, and every lifting operation is documented for safety, compliance, and future reference.

Record Rigging Inspections

All equipment conditions, defects, and corrective actions must be documented during rigging inspections. This ensures that the equipment remains in a safe working condition and adheres to the regulatory standards and does not fail or cause accidents during lifting operations.

Record Lift Plans

For every lifting operation, an extensive lift plan will be prepared. This includes the load's characteristics, the rigging setup, environmental conditions, and the safety precautions taken in the lift operation. Good documentation allows safe and efficient planning of lifts since all the hazards are accounted for and then reduced or eliminated.

Utilization of Standardized Templates for Documentation

Using standard templates when filling up for the rigging inspections, lift plans, and the actual incident reports must remain in sync. It means standardizing will aid in maintaining simplicity while making them easy to scan, trace, and audit if required in that structure.

Give proper detail during documentation

Documentation should capture all the essential details, including equipment serial numbers, inspection dates, the names of inspectors, and specific observations. This ensures that records are accurate and traceable, which is crucial for audits, inspections, and future reference.

Organize and Store Logbooks Effectively

Proper organization and documentation of logbooks and other pertinent documents are done so that they become easily accessible at the time of internal and external reviews, audits, and inspection. Good record-keeping shows compliance with existing regulations and gives access to needed information at required times.

Implement a Documentation Review Process

There must be a review process established in which logbooks and records should be checked regularly for reflecting the true status of the rigging operation and the equipment. Maintaining updated records ensures the monitoring of changes in due course of time, as well as the safety standards and regulatory conformance.

11.2.8. Exercise

1.Why is it important to keep a detailed logbook of rigging operations?

a) To track employee performance

b) To ensure that equipment is well-maintained and that inspections and lift operations are documented for safety and compliance

c) To reduce paperwork

d) To store unrelated information

2.What should be documented during rigging inspections?

a) Equipment brand and model

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b) Equipment condition, defects, and corrective actions taken
c) Number of employees involved
d) Weather conditions on the job site
3.True or False: The primary purpose of keeping a logbook of rigging operations is to track employees' work hours.
4.True or False: It is important to document equipment conditions, defects, and corrective actions during rigging inspections.
5.A detailed logbook is necessary to record _____, inspections, equipment maintenance, and daily lift activities.
6.During rigging inspections, it is essential to document the _____ of the equipment, any observed defects, and corrective actions taken.

11.3. Unit 10.2. Incident Reporting and Root Cause Analysis

11.3.1. Unit Objectives

At the end of this unit, students will be able to:
To understand structured and formalized procedure for reporting safety-related incidents and concerns during rigging operations
To understand root cause analyses of each incident and near-miss
To understand how to develop and implement action plans to address identified root causes, preventing recurrence of similar incidents in future rigging operations.

11.3.2. 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)

11.3.3. Say

- Describe about structured and formalized procedure for reporting safety-related incidents and concerns during rigging operations
- Describe about root cause analyses of each incident and near-miss
- Describe about how to develop and implement action plans to address identified root causes, preventing recurrence of similar incidents in future rigging operations

11.3.4. Explain

- Describe about structured and formalized procedure for reporting safety-related incidents and concerns during rigging operations
- Describe about root cause analyses of each incident and near-miss
- Describe about how to develop and implement action plans to address identified root causes, preventing recurrence of similar incidents in future rigging operations

11.3.5. Activity

Each group will read through the provided incident scenario, which includes details such as a near-miss or safety concern in rigging operations.
The group will discuss and decide the correct formal procedure for reporting the incident using a provided incident reporting template.
They will document key details like the incident's time, location, individuals involved, and a brief description of the event.

11.3.6. 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.

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

11.3.7. Summary

Have a Standardised Formal Process to Report All Types of Incidents, Near-Misses and Safety Concerns To have an event reporting system on rigging operations, this has to be done in a systematic and formalized way so that any occurrence, be it minor or major, can be documented and taken care of without delay. This procedure should be well defined and easily accessible to all personnel, which details the steps of reporting incidents, including who to report to, how to report, and what information to include.

An environment where the personnel are motivated to report concerns, incidents, or near misses without fear of retribution, which is one of the essential factors for the safety of rigging operations. This culture would facilitate a proactive approach towards safety, ensuring that issues can be addressed before they become significant problems. Employees are motivated to speak up under a no-punishment policy for reporting.

Use standardized incident reporting templates for documenting essential information such as the date, time, location, and individuals involved with a description of the event. This allows relevant information to be documented consistently for analysis, follow-up, and compliance. The use of templates also helps standardize reporting in a manner that facilitates the comparison and evaluation of incidents over time.

Document Corrective and Preventive Actions After an incident has been reported, it is critical to document corrective and preventive actions taken to deal with the situation. Such corrective and preventive actions should be followed up on to ensure they effectively solve the problem and avoid recurrence. Regular follow-up on such actions ensures accountability and verifies whether they have indeed been implemented properly and adequately.

Root Cause Analysis Root cause analysis is the most important process that helps understand why something happened or almost happened. The "5 Whys" or Fishbone Diagram are tools used to determine contributing factors and root causes. It is then possible to focus on the core issues in order to improve rigging operations so that the same kind of incident is not repeated again. Root cause analysis thus allows the team to address beyond symptoms and, thereby, take systematic changes which ultimately enhance safety.

Develop and Implement Action Plans Once root causes have been identified, action plans must be developed to address them. These plans should outline the specific actions needed, the individuals responsible for implementing them, and timelines for completion. Addressing root causes and corrective measures will help prevent future incidents and lead to continuous improvement in rigging operations.

Share Results to Improve Learning and Safety Awareness After conducting an investigation and a root cause analysis, the findings should be shared with all people involved. In this way, everyone is enlightened on what can be learned from the incident and thus apply this knowledge to improve their safety practices. Sharing results fosters a learning environment where all people are concerned with improving general safety standards and reducing the chance of future occurrences.

11.3.8. Exercise

1.What is the primary purpose of establishing a formal procedure for reporting incidents and safety concerns? a) To maintain an accurate log of employee attendance

b) To promote a culture of safety and transparency

c) To assign blame to the involved personnel

d) To ensure quick project completion

2.Which of the following is NOT typically included in an incident report template?

a) Date and time of the incident

b) Description of events

c) Names of all project stakeholders

d) Location of the incident

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3.A formal procedure for reporting incidents, near-misses, and safety concerns ensures that all incidents are ignored if they are deemed minor.(T/F)
4.Encouraging personnel to report incidents and safety concerns without fear of retribution helps to foster a culture of transparency and safety.(T/F)
5.A formal procedure for reporting incidents, near-misses, and safety concerns is essential for _____ in rigging operations.
6.Incident reports should include essential details such as _____, location, involved personnel, and a description of events.

11.4. Unit 10.3. Compliance and Continuous Improvement

11.4.1. Unit Objectives

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

- **To identify and apply relevant industry standards, including OSHA, ASME, and ISO guidelines, to ensure that all documentation and reporting procedures meet regulatory requirements for rigging operations**
- **To conduct regular audits of documentation and reporting processes to assess their accuracy, completeness, and compliance with industry standards and regulatory requirements.**
- **To develop and implement continuous improvement initiatives by analysing documentation reviews and incident reports, with the goal of enhancing rigging operations and safety practices.**
- **To utilize documented findings from audits and incident analysis to create and deliver training and awareness programs that address recurring issues and promote safe rigging practices within the organization**
- **To establish and monitor key performance indicators (KPIs) for documentation and reporting processes, using them to evaluate performance and identify areas for improvement.**

11.4.2. 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)

11.4.3. Say

- Describe about OSHA, ASME, and ISO guidelines and regulatory requirements for rigging operations
- Describe about regular audits of documentation and reporting processes of rigging operations
- Describe about process of monitoring of key performance indicators (KPIs) for documentation and reporting processes of rigging operations.

11.4.4. Explain

- Describe about OSHA, ASME, and ISO guidelines and regulatory requirements for rigging operations
- Describe about regular audits of documentation and reporting processes of rigging operations
- Describe about process of monitoring of key performance indicators (KPIs) for documentation and reporting processes of rigging operations.

11.4.5. Activity

Provide students with a set of sample documentation (e.g., safety reports, rigging inspection logs).
In pairs, ask them to review the documentation for accuracy, completeness, and compliance with relevant regulations.
Have students document discrepancies or missing information and propose corrective actions.
After completing the audit, students will present their findings to the class, including recommendations for improving the reporting process.
Discuss the importance of regular audits in maintaining compliance and safety.

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11.4.6. 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

11.4.7. Summary

Complies With Industry Standards/Regulatory Requirements

Rigging documents and reporting operations should be kept to the industry's standard. Such conditions include those in safety and health as provided in OSHA, ASME, and ISO. Maintaining scrupulous strictness for this requirement guarantees on-site safety for the workers, ensures increased safety, and prevents the risk of exposure to legal or risks.

Audits Documentation Reports Frequently

Documentation audits show an organization requires systematic periodic audits in regards to reporting process accuracy and adequacy so it should be compatible with the acceptable and required criteria as per safety rules and legislations. Any failure or loopholes in it have the potential for revealing gaps within these processes in providing safety and, of course, appropriate regulatory guidelines as well, helping organizations enhance sound decision making within a superior organizational safety culture.

Continuously Improve

Continuous improvement initiatives are very essential for enhancing the effectiveness of rigging operations and safety practices. According to documentation reviews and analysis of incidents, this performance criterion encourages identifying areas where processes can be refined, improved, or made more efficient. This initiative will encourage an environment that emphasizes safety and ensures the continuous optimization of rigging operations in terms of performance and safety.

Design Training and Awareness Programs

From the recorded findings, the organization should develop training and awareness programs focused on issues that repeat themselves to create safe rigging practices within the organization. This standard requires using practical data in developing training that employees are informed about safety protocols and will be able to avoid problems commonly arising in a system that leads to accidents and inefficient operations.

Develop and Track Key Performance Indicators

Key Performance Indicators (KPIs) are critical performance indicators for monitoring the documentation and reporting processes. The criterion requires appropriate KPIs that can be used to monitor the effectiveness of safety practices, completion rates of audits, and accuracy of documentation. By the regular monitoring of these KPIs, the organizations can monitor their performance, identify areas of improvement, and make data-driven decisions to improve overall operations and safety standards.

11.4.8. Exercise

1.Which of the following regulatory bodies sets safety standards relevant to rigging operations?

A) OSHA

B) ASME

C) ISO

D) All of the above

2.Regular audits help verify the _____ and _____ of documentation and reporting processes.

3.Continuous improvement initiatives should be implemented based on:

A) Documentation reviews

B) Incident analysis

C) Both A and B

D) None of the above

4.What should be the focus of training and awareness programs developed from documented findings?

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A) Addressing recurring issues
B) Improving production efficiency
C) Reducing paperwork
D) All of the above
5.Documented findings from incident reports and audits should not be used for developing training programs.(T/F)
6.Key Performance Indicators (KPIs) are essential for monitoring the effectiveness of documentation and reporting processes.(T/F)

12. Unit 12 NOS 11: Employability Skills (DGT/VSQ/N0102)

12.1. Key Learning Outcomes

- 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

12.2. Unit 12.1: Preparing for Employment & Self Employment

12.2.1. Unit Objectives

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

1. **Develop Job Readiness Skills**:
2. **Create Effective Job Search Strategies:**.
3. **Prepare for job interviews and networking opportunities.**
4. **Identify potential self-employment ideas and business opportunities.**
5. **Understand Employment Rights and Responsibilities:**
6. **Enhance Personal Branding:**
7. **Develop Financial and Organizational Skills:**

12.2.2. 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)

12.2.3. 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:
o Any work experience that you might have
o A brief summary of your educational qualifications
o Your strengths and achievements
o Any special projects that you might have been part of
• The following topics should be avoided during an introduction:
o Detailed description of your family (unless you are specifically asked to do so)
o Too much information about your weaknesses
o Information that is not true

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12.2.4. 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.

12.2.5. 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:

o What is your name?

o Tell me something about yourself?

o Can you tell me something about your family?

• Then, at the end of the interview, ask the interviewee:

o There are over 200 people who have applied for this job, some with excellent work experience.

Why should I hire you?

12.2.6. 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

12.2.7. 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.

12.2.8. 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

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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.

12.3. Unit 12.2. Understanding Entrepreneurship

12.3.1. Unit 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

12.3.2. 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)

12.3.3. Say

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

12.3.4. Do

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

• Divide the class in to two groups.

• In turns ask the quiz questions to the groups.

• If the answer is incorrect pass the question to the other group.

• Share the answer if the groups are not able to answer.

• Congratulate the participants who answered correctly

12.3.5. 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

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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 mark

12.3.6. 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

12.3.7. Summary

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

12.3.8. 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.