



Comprehensive Handbook on  
**Basic Rigger and  
Employability Skill**



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## Acknowledgments

This Participant Handbook of the **Basic Rigger** developed by the **Safety Skill Development Foundation (SSDF)**, provides essential information for current and prospective job holders. It reflects our collective commitment to fostering a culture of safety and equipping individuals in this role with the necessary skills to navigate and mitigate risks effectively. The content is compiled with valuable insights from Subject Matter Experts (SMEs) and industry professionals, ensuring its relevance and alignment with industry standards.

We extend our special thanks to **CORE-EHS Solutions Pvt Ltd** for their unwavering support & expertise in developing the course materials, which has significantly enhanced the quality and safety practices of this handbook. As our esteemed knowledge partner, CORE EHS has provided their invaluable expertise and insights to ensure the handbook is both practical and comprehensive, aligning with the highest safety and environmental standards.

We are grateful for the support of trainers, assessors, and industry experts who have enriched the content, ensuring it addresses the real-world needs of learners and fosters a culture of safety, health, and environmental consciousness.

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As the handbook is designed to support skill-based training, benefiting the participants, trainers, and evaluators. SSDF remains committed to uphold high-quality standards for QP/NOS-based training programs and welcomes suggestions from all stakeholders for future improvements.

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## **Preface**

In today's dynamic industrial environment, safety remains a top priority. Recognizing the critical role Riggers play in ensuring workplace safety, SSDF has developed this handbook to equip participants with the essential knowledge and skills needed to excel in their roles.

This resource provides a solid foundation in the principles of rigging safety, aligning with National Occupational Standards (NOS) and current industry practices. It bridges traditional rigging methods with modern approaches, helping participants stay updated with the latest tools, techniques, and regulations.

Designed for practical application, this handbook emphasizes not only technical proficiency but also the development of problem-solving skills vital for handling challenges in industrial settings. It serves as a lifelong reference, supporting Riggers in fostering a culture of safety and responsibility.

At SSDF, we believe safety is an ongoing journey. By engaging with this material, participants will enhance their expertise, contribute to safer workplaces, and ensure every job is completed efficiently and securely.

Welcome to the future of safety management.

Thank you.

J K Anand (Chairman)

Safety Skill Development Foundation (SSDF).

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## 1. Introduction:

In today's industrial environment, where operations involve heavy machinery, complex structures, and high-risk tasks, the safety and well-being of workers remain paramount. Industries have grown more dynamic, with advanced technologies and increased operational demands, making the need for robust safety practices critical.

A Basic Rigger plays a key role in this safety framework, ensuring that lifting, hoisting, and rigging activities are conducted efficiently and without incident. Their responsibilities go beyond merely following instructions; they involve identifying potential hazards, adhering to safety protocols, and actively contributing to a culture of caution and care.

Through proper equipment handling, risk assessments, and adherence to established safety standards, Basic Riggers ensure that operations are carried out safely, protecting not only their fellow workers but also the surrounding environment and the integrity of the worksite. By staying vigilant and committed to best practices, they serve as essential guardians of safety in the field.

### 1.1. Purpose of the Handbook

This handbook has been carefully developed by SSDF to serve as a comprehensive guide for individuals training to become Basic Riggers. It is designed to provide participants with the essential knowledge and practical skills required to perform rigging operations safely and effectively.

By focusing on both foundational principles and real-world applications, this handbook ensures that Basic Riggers are well-prepared to adhere to safety standards, identify potential hazards, and contribute to a safe and compliant work environment. Through this resource, trainees will gain the confidence and competence needed to excel in their roles while upholding the highest standards of safety and professionalism.

## 1.2. Scope and Content

The content of this handbook is aligned with the National Occupational Standards (NOS) for the Basic Rigger qualification (SSD/Q0103 v 1.0). It encompasses a comprehensive range of topics essential for performing rigging tasks safely and effectively across diverse industrial settings. These topics include:

### **Introduction to Basic Rigging**

An overview of rigging fundamentals, emphasizing safety, precision, and the role of a Basic Rigger in industrial operations.

### **Safety Standards and Regulations**

Covers essential safety standards, including national and international guidelines, to ensure compliance and promote a safe work environment.

### **Rigging Inspections**

Focuses on conducting pre-use checks and identifying equipment wear and damage to maintain safety and operational integrity.

### **Rigging Equipment and Slings**

Guidance on selecting, using, and maintaining rigging equipment like slings, ropes, and chains to ensure safe and efficient operations.

### **Lifting Devices and Below-the-Hook Lifters**

Introduces lifting devices and below-the-hook attachments, covering their applications, limitations, and safety precautions.

### **Manual Hoists and Load Handling**

Explains the safe use of manual hoists and proper load handling techniques to ensure stability and prevent accidents.

### **Rigging Techniques and Load Stability**

Covers essential rigging methods to ensure load stability, including centre of gravity, load angles, and rigging plans.

### **Contingency Strategies for Emergency Situations**

Outlines emergency protocols to handle equipment failures and other incidents, minimizing risks to workers and operations.

### **Employability Skills**

Highlights key skills like communication, teamwork, and digital literacy, essential for career success in the rigging field.

### **1.3. Learning Objectives**

The primary objective of this handbook is to prepare participants for the responsibilities of a Basic Rigger by providing them with a solid understanding of rigging principles, industry standards, and best practices. By the end of this course, participants will be able to:

- Identify and inspect rigging equipment and tools.
- Apply safe rigging techniques for various loads and lifting scenarios.
- Maintain load stability and prevent accidents during rigging operations.
- Adhere to safety regulations and industry standards in rigging practices.
- Respond effectively to emergencies and equipment malfunctions.
- Communicate rigging plans and safety protocols clearly to team members.

## **1.4. Alignment with Industry Norms and Innovation**

The rigging profession is continually advancing, with new equipment, techniques, and safety standards emerging regularly. This handbook not only covers established rigging practices but also introduces participants to innovative tools and methods essential for staying current in this evolving field. Whether it's understanding advancements in rigging equipment or learning to apply updated safety regulations, this handbook ensures that Basic Riggers are well-prepared to meet the demands of modern industrial operations.

## 1.5. Who Should Use This Handbook

This handbook is for anyone looking to become a Basic Rigger or is working in rigging operations within an industrial environment. It is especially useful for:

- **Aspiring Basic Riggers:** Individuals preparing for the Basic Rigger qualification will find this handbook essential for both learning and practical application.
- **Current Rigging Professionals:** Riggers and other professionals already working in the field can use this handbook to refresh their knowledge and refine their skills.
- **Trainers and Educators:** Those who train riggers can use this handbook as a comprehensive guide to ensure all critical rigging topics are covered.

## 1.6. How to Use This Handbook

The participants are encouraged to be very active with this handbook, using it as a learning resource and a practical reference guide. Each section is structured to build a solid foundation in rigging, progressing to advanced concepts and techniques. Practical examples, exercises, and tips are included to reinforce learning and provide real-world applications.

### To make the most of this handbook:

- Study each section carefully to understand how the concepts apply to everyday rigging tasks.
- Practice the exercises and examples to fill the gap between theory and practical application.
- Use the guidelines and tips to prepare for assessments to ensure you are up to par with the standards for certification.
- Take advantage of the additional resources for deeper insight into specialized topics and industry best practices.

### The Path Forward

This handbook becomes your guide as you begin and embark on the journey to becoming a proficient Basic Rigger. Beyond helping you become certified, the knowledge and techniques you acquire through this course will empower you to contribute meaningfully to safe and efficient rigging operations. At SSDF, we are committed to your success and are confident that with focus and dedication, you will excel as a competent and reliable Basic Rigger, ready to take on the challenges of the field.

### Overview of this Program:

A **Basic Rigger** is responsible for carrying rigging work, aligning, and anchoring the machinery, using correct rigging technique, attaching loads,

controlling the movement of heavy equipment and ensuring that the rigging is safe for use.

## **1.7. Key Responsibilities:**

- Support a safe working environment by following safe rigging practices.
- Inspect rigging equipment to identify and address potential hazards.
- Monitor rigging operations to ensure compliance with safety protocols.
- Communicate rigging plans and safety measures to team members and contractors.
- Participate in safety drills and training sessions to reinforce emergency response.
- Promote safety culture and awareness at the worksite.
- Report hazards, unsafe conditions, and near-miss incidents to supervisors.
- Maintain records of inspection and safety measures for equipment compliance.
- Prepare for emergencies such as load failure and mechanical equipment failure.
- Continuously contribute to improving rigging safety practices.

## 2. Job Description

The Basic Rigger is responsible for performing rigging tasks safely and efficiently. Their duties include:

Carrying out rigging operations, ensuring proper alignment and anchoring of machinery.

- Applying proper rigging techniques to secure loads.
- Controlling the movement of heavy equipment during lifting and transportation.
- All rigging equipment and techniques must be safe for use and meet the standards of safety.

This role demands attention to detail, safety protocols, and the ability to respond to any rigging-related challenges on the worksite.

### 3. Personal Attributes

A Minimum Rigger must have the following essential qualities:

- **Physical and Mental Fitness:** The job requires physical strength, endurance, and mental acuity to cope with the rigors of lifting and shifting heavy loads.
- **Compliance with Safety Standards:** The rigger must ensure that all rigging operations are conducted in accordance with safety and health standards, thus avoiding risk to themselves and others.
- **Advisory Skills:** The rigger should be able to give timely and accurate advice on safety and health concerns associated with rigging operations and workers' well-being.
- **Attention to Detail:** Maintaining a safe working environment is crucial, especially in inspecting equipment and potential hazards.
- **Judgment and Decision-Making:** Quick, sound judgment is needed, especially when responding to emergency situations or unexpected challenges.
- **Communication Skills:** The ability to communicate safety protocols, concerns, and instructions to team members and management is crucial for smooth operations and safety.

These attributes ensure that the Basic Rigger performs their duties safely, efficiently, and with a focus on both their well-being and the safety of others on-site.

## 4. List of applicable National Occupational Standards

1. SSD/NOS 301 v 1.0: Introduction to Basic Rigging
2. SSD/NOS 302 v 1.0: Safety Standards and Regulations
3. SSD/NOS 303 v 1.0: Rigging Inspections
4. SSD/NOS 304 v 1.0: Rigging Equipment and Slings
5. SSD/NOS 305 v 1.0: Lifting Devices and Below-the-Hook Lifters
6. SSD/NOS 306 v 1.0: Manual Hoists and Load Handling
7. SSD/NOS 307 v 1.0: Rigging Techniques and Load Stability
8. SSD/NOS 308 v 1.0: Contingency strategies for emergency situations
9. DGT/VSQ/N0101: Employability Skills

## 5. Qualification Parameters

**Minimum Job Entry Age: 18 years**

**Educational Qualifications:**

- **Graduate with Science or Equivalent:** Minimum 03 years of relevant work experience.
- **3 Year Diploma after 10<sup>th</sup>:** Minimum 3.5 years of experience (4.5 years).
- **10<sup>th</sup> class + I.T.I:** Minimum 5-10 years of experience (5.5 years).
- **Previous relevant Qualification of NSQF Level (4.5):** 1-2 Years of experience (1.5 Years)
- **Previous relevant Qualification of NSQF Level (4.0):** 3 Years of experience

**Training Duration:**

- For Regular Course- Duration: 360 hours (45 Days)
- **For RPL- Duration: approximately 2 days**
- Mode of Training: Classroom instruction, practical exercises, and on-the-job training.
- Qualification Levels:
- NSQF Level: 3, aligned with the National Skill Qualifications Framework.

## 6. Overview of this Program:

A **Basic Rigger** is responsible for carrying rigging work, aligning, and anchoring the machinery, using correct rigging technique, attaching loads, controlling the movement of heavy equipment and ensuring that the rigging is safe for use.

### 6.1. Key Responsibilities:

- Support a safe working environment by following safe rigging practices.
- Inspect rigging equipment to identify and address potential hazards.
- Monitor rigging operations to ensure compliance with safety protocols.
- Communicate rigging plans and safety measures to team members and contractors.
- Participate in safety drills and training sessions to reinforce emergency response.
- Promote safety culture and awareness at the worksite.
- Report hazards, unsafe conditions, and near-miss incidents to supervisors.
- Maintain records of inspection and safety measures for equipment compliance.
- Prepare for emergencies such as load failure and mechanical equipment failure.
- Continuously contribute to improving rigging safety practices.

## 7. Assessment

### 7.1. Assessment Guidelines

#### Assessment Methods:

- **Written Examinations:** Multiple-choice questions, short-answer questions, and essay-type questions to test theoretical knowledge.
- **Practical Assessments:** Hands-on tasks to assess the ability to apply knowledge in real-world scenarios.
- **Viva Voce:** Oral examinations to assess communication skills and understanding of concepts.
- **Projects:** Practical projects to demonstrate the application of learned skills.
- **Grading System:**
- **Grade A (70% and above):** Excellent performance, showing a strong understanding and application of safety protocols.
- **Grade B (60% to 69%):** Good performance, with a solid grasp of safety concepts and practical skills.
- **Grade C (50% to 59%):** Satisfactory performance, meeting basic requirements.
- **Fail (Below 50%):** Insufficient performance, requiring further study and re-assessment.

#### Re-assessment Opportunities:

- Trainees who fail can re-attempt the assessment in the next three months.
- Re-assessment focuses only on the failed NOS unless the overall score is below 50%, requiring a full re-assessment.

## 7.2. Assessment Weightage

| Sr No.       | National Occupational Standards (NOS)                             | Theory Marks | Practical Marks | Project Marks | Viva Marks | Total Marks | Weightage (In %) |
|--------------|---|--------------|-----------------|---------------|------------|-------------|------------------|
| 1            | SSD/N0301 v 1.0: Introduction to Basic Rigging                    | 40           | 60              | -             | -          | 100         | 9%               |
| 2            | SSD/N0302 v 1.0: Safety Standards and Regulations                 | 40           | 60              | -             | -          | 100         | 8%               |
| 3            | SSD/N0303 v 1.0: Rigging Inspections                              | 40           | 60              | -             | -          | 100         | 8%               |
| 4            | SSD/N0304 v 1.0: Rigging Equipment and Sling                      | 40           | 60              | -             | -          | 100         | 8%               |
| 5            | SSD/N0305 v 1.0: Lifting Devices and Below-the-Hook Lifters       | 40           | 60              | -             | -          | 100         | 17%              |
| 6            | SSD/N0306 v 1.0: Manual Hoists and Load Handling                  | 40           | 60              | -             | -          | 100         | 17%              |
| 7            | SSD/N0307 v 1.0: Rigging Techniques and Load Stability            | 40           | 60              | -             | -          | 100         | 17%              |
| 8            | SSD/N0308 v 1.0: Contingency strategies for emergency situations. | 40           | 60              | -             | -          | 100         | 8%               |
| 9            | Employability Skills  | 20           | 30              | -             | -          | 50          | 8%               |
| <b>Total</b> |   | <b>340</b>   | <b>510</b>      | <b>-</b>      | <b>-</b>   | <b>850</b>  | <b>100.0%</b>    |

## 8. Acronyms

1. SSDF - Safety Skill Development Foundation
2. NCVET - National Council for Vocational Education and Training
3. NSQF - National Skill Qualifications Framework
4. NOS - National Occupational Standards
5. QP - Qualification Pack

## 9. Glossary:

| Key Words  | Description  |
|--|--|
| Safety Skill Development Foundation (SSDF)                     | An Awarding Body recognized by NCVET, Ministry of Skill Development & Entrepreneurship, Government of India.   |
| NCVET (National Council for Vocational Education and Training) | Regulatory Authority of Government of India for Vocational Education and Training.   |
| NSQF (National Skill Qualifications Framework)                 | National Skill Qualifications Framework is a framework under which skills are categorized from level 1 to 10.  |
| Sector   | Sector is conglomeration of different business operations having similar business and interests.   |
| Sub-Sector   | Sub-Sector is further breakdown of Sector based on the characteristics and business components.  |
| Occupation   | Occupation is a set of job roles requiring similar/related competencies in the industry.   |
| Job role   | Job role is a set of functions required to get an employment opportunity in the industry and perform a task as per industry norms.   |
| Qualifications Pack (QP)                                       | Qualifications Pack comprises the set of Occupational Standard, required to perform a job role and is assigned a unique qualification pack code.   |
| Performance Criteria (PC)                                      | Performance Criteria are statements specifying the standard of performance required when conducting a task.  |
| Knowledge and Understanding (KU)                               | Knowledge and Understanding (KU) are statements which together specify the technical, professional, and organizational specific knowledge that an individual, needs to perform to the required standard. |
| Generic Skills (GK)  | Generic Skills are a group of skills typically needed to perform the task are needed in general to perform the task.   |
| Occupational Standards (OS)                                    | OS is the standards of performance an individual must achieve when conducting a function in the workplace.   |
| National Occupational Standards (NOS)                          | NOS are Occupational Standards in the Indian context and approved by NCVET.  |
| NOS Code   | NOS code is a unique identifier for an Occupational Standard, which is denoted by an 'N'   |

## 10. National Occupational Standards (NOS):

**National Occupational Standards (NOS)** are a set of standards that describe the skills, knowledge, and competencies required to perform a specific job or task effectively in a particular industry. They are developed by industry experts and stakeholders, often in collaboration with government agencies or sector skills councils, to ensure that the workforce meets the industry's current and future needs.

### Key Features of National Occupational Standards:

1. **Competency-Based:** NOS are designed around the competencies needed for specific job roles. They outline what a person should be able to do, know, and understand to perform their job effectively.
2. **Industry-Specific:** NOS are tailored to specific industries, ensuring that the skills and knowledge are relevant and up-to-date with the industry's practices, technologies, and regulatory requirements.
3. **Standardization:** By providing a consistent benchmark for skills and competencies, NOS help standardize the qualifications and training across an industry, making it easier for employers to identify qualified candidates and for workers to understand the expectations of their roles.
4. **Foundation for Qualifications:** NOS often form the basis for developing vocational qualifications, training programs, and certification processes. For example, they are used to create National Vocational Qualifications (NVQs) or similar qualifications in other countries.
5. **Guidance for Employers and Employees:** Employers use NOS to develop job descriptions, assess employee performance, and design training programs. Employees can use NOS to understand the skills they need to develop for career progression.
6. **Support for Workforce Development:** NOS are instrumental in workforce planning and development, helping industries ensure that their employees are skilled, competent, and able to meet the demands of their roles.

### Global Perspective:

While the term "National Occupational Standards" is commonly used in countries like the UK and India, many other countries have similar frameworks, though they might use different terms (e.g., "Occupational Standards," "Competency Standards"). The goal remains the same: to create a skilled and competent workforce that can meet industry needs and support economic development.

## 10.1. SSD/N0301 v 1.0 : Introduction to Basic Rigging

### 10.1.1. Overview:

This NOS equips riggers with the foundational knowledge and skills required for safe and effective rigging operations. It covers essential terms and definitions, key rigging concepts like load distribution and stability, and familiarizes users with commonly used materials and hardware such as ropes, chains, shackles, and hooks.

Special emphasis is placed on slings, their types (wire rope, synthetic, chain slings, etc.), and their applications, along with an understanding of the Working Load Limit (WLL) to ensure safety and prevent overloading. The module also highlights the advantages of different sling types and provides guidelines for their proper handling, inspection, and maintenance.

By mastering these basics, riggers can confidently perform lifting tasks while adhering to safety standards, laying the groundwork for advanced rigging techniques and workplace efficiency.

### 10.1.2. Scope: The scope of SSD/N0301 v 1.0 covers important areas of workplace safety that every rigger needs to know, including:

- Familiarization with Terms and Principles
  - Introduces key terms and definitions used in rigging applications and inspections.
  - Explains the basic principles of rigging theory, including load dynamics and stability.
- Rigging Hardware and Equipment
  - Identifies various rigging tools such as shackles, hooks, and slings, along with their applications.
  - Explains different sling types, their advantages, and the conditions under which each type is used.
- Advantages of Rigging Hardware
  - Highlights the specific benefits of different rigging tools and hardware, demonstrating how each is suited for unique tasks and use cases.
- Load Management
  - Covers critical topics like Working Load Limit (WLL), load weight calculation, and determining the centre of gravity for various types of loads and slings.
  - Emphasizes the importance of selecting the correct equipment for the job based on these factors.
- Safety Standards and Regulations
  - Provides an overview of the safety standards and regulations governing rigging activities.
  - Focuses on inspections, proper usage, and preventive measures to ensure workplace safety.

This introduction serves as a starting point for understanding the principles and practices of rigging, enabling riggers to perform their tasks with precision, efficiency, and adherence to safety protocols.

### 10.1.3. Learning Objectives

The learning objectives of SSD/N0301 focus on providing basic riggers with practical knowledge and skills to ensure safe rigging practices while aligning with workplace health, safety, and environmental standards. The key learning objectives include:

- Familiarization with Rigging Terms and Tools
  - Familiarization with rigging terminologies and definitions commonly used.
  - Familiarization with slings, hitches, and other hardware utilized in rigging.
- Familiarization with Load Principles
  - Weight distribution basics and the principles of centre of gravity and the influence of angles in loads in the rigging operations.
- Familiarization with Rigging Equipment
  - Various rigging tools, properties, and their limitations to apply the right tools in the specific application.
- Basic Inspections
  - Simple rigging equipment safety inspections for ease of being in good condition and ready to use.
- Applying Safety Standards
  - Observe workplace standards, rules, and procedures on safety and best practices to avoid accidents and ensure safe rigging operations.
- Identify Hazards and Control Them
  - Identify potential hazards in the rigging operation and take appropriate steps for control or eliminating risks.

This means that the above learning objectives will provide basic riggers with the foundation knowledge and skills for effective and safe performance.

### 10.1.4. Performance Criteria:

To successfully meet the goals of SSD/N0301, basic riggers are expected to show their ability in the following areas:

- Vocabulary and Fundamentals of Rigging
  - Define hitches, slings, and loads to communicate with each other easily.
  - Familiarize yourself with various types of rigging equipment and their functions.
- Core Principles of Rigging
  - Explain the impact of load angles and weight distribution on stability in rigging.
  - Explain the significance of the center of gravity in terms of load placement and rigging setup.
- Rigger's Role and Responsibilities
  - Explain simple rigger jobs in setting up and tethering loads for lifting.
  - Observe standard procedures to ensure it is performed safely and efficiently during rigging.
- Types of Rigging Tools and Application
  - Define rigging tools, such as shackles, hooks, and slings, and how they should apply.
  - Make inspections that all rigging tools are safe to be used before anyone uses it.

- Calculation of Load Weight and Center of Gravity
  - Determine the load's weight and its center of gravity to set up suitable rigging for it.
  - Use the principles of weight distribution to stabilize the load during lifting.
- Selecting the Right Lifting Apparatus
  - Determine suitable lifting apparatus depending on the kind of loads, its weight and size
  - Learn the limitations and safety aspects associated with different lifting equipment.
- Load Angles and Safety
  - Describe how load angles affect both the safety and efficacy of the operations carried out in rigging.
  - Modify rigging configurations to the safe load angle calculations to ensure risk is minimized
- Various Types of Slings and Their Characteristics
  - Identify and be familiar with the different types of slings, wire rope, chain and synthetic.
  - Select sling type that will meet the requirements of load characteristics along with the required lifting operation
- Proper Selection of Rigging Equipment
  - Select rigging hardware as per the specific lifting operation and the type of load.
  - All rigging hardware must meet safety and load requirements.
- Correct Hitching Techniques for Load Securing
  - Demonstrate the use of different hitching techniques, such as vertical, basket, and choker, for securing loads.
  - Determine the appropriate hitch based on the shape, size, and stability needs of the load.
- Safety Standards and Rigging Regulations
  - Understand the safety standards and regulations that govern rigging operations.
  - Adhere to safety procedures and meet the relevant safety laws and guidelines.
- Identifying and Managing Rigging Hazards
  - Recognize common rigging hazards and take preventive measures to reduce risks.
  - Report unsafe practices and conditions promptly to ensure a safe work environment.
- Implementing Safety Protocols During Rigging Tasks
  - Apply safety protocols, including the use of personal protective equipment (PPE), during rigging operations.
  - Proper procedures for the safe lifting of the load and the rigging team.

These performance standards ensure that basic riggers are prepared to perform their work safely, efficiently, and according to industry best practices.

### **10.1.5. Assessment Criteria:**

The assessment for SSD/N0302 v 1.0 : Safety Standards and Regulations is divided into theoretical and practical components to evaluate both the knowledge and the practical application required to ensure compliance with safety regulations in rigging operations:

- **Theory (40 Marks):**
  - Assesses the understanding of key safety standards and regulations, including OSHA, ANSI, and other relevant guidelines.

- Evaluates knowledge of company-specific safety policies, procedures, and the responsibilities of riggers in maintaining safety compliance.
- **Practical (60 Marks):**
  - Evaluates the rigger's ability to identify potential hazards in rigging operations, assess risks, and implement appropriate control measures.
  - Assesses the correct use of personal protective equipment (PPE) and adherence to safety protocols during rigging tasks, including reporting non-compliance and maintaining safety documentation.

#### **10.1.6. Conclusion:**

NOS 01: Concept of Occupational Safety, Health, and Environment SSD/N0301 v 1.0 outlines the essential knowledge and skills for a Basic Rigger to understand workplace safety. This includes familiarization with rigging terminology, concepts, equipment, and safety regulations. The rigger must understand the role and responsibilities in rigging operations, the safe handling of materials, load calculations, and the importance of safety measures. The NOS also emphasizes the use of appropriate rigging tools, the correct application of slings, and adherence to safety protocols to mitigate hazards and comply with safety standards in rigging tasks.

## 10.2. SSD/N0302 v 1.0 : Safety Standards and Regulations

### 10.2.1. Overview:

This NOS equips Basic Riggers with the foundational knowledge and skills required to perform rigging tasks safely and in compliance with legal and safety standards. It focuses on understanding the safety regulations governing rigging and lifting operations, hazard identification, risk management, and ensuring adherence to occupational health and safety (OHS) protocols. Riggers will gain proficiency in recognizing and mitigating potential risks in the workplace, ensuring a safe and efficient work environment during rigging operations. The module emphasizes the importance of complying with safety regulations and using personal protective equipment (PPE) to minimize workplace injuries.

**Scope:** The scope of SSD/N0302 v 1.0 covers the key safety standards and regulations that riggers must follow, focusing on compliance with safety protocols, hazard prevention, and maintaining a safe work environment during rigging and lifting operations:

- **Safety in Rigging Activities**
  - Focuses on the safety aspects of rigging operations, ensuring that all tasks are performed following safety standards and regulations.
  - Emphasizes the importance of complying with safety guidelines during lifting and rigging tasks to prevent accidents.
- **Industry-Specific Safety Protocols**
  - Explains the safety protocols specific to rigging and lifting activities, outlining hazard identification and risk prevention strategies.
  - Provides guidelines for maintaining a safe work environment, ensuring riggers are aware of the risks and how to manage them.
- **Use of Personal Protective Equipment (PPE)**
  - Highlights the significance of PPE in rigging operations, detailing the necessary protective gear and its correct usage.
  - Ensures riggers understand how to properly select and use PPE, contributing to safer work practices and compliance with OHS regulations.

By understanding these safety aspects, Basic Riggers will be equipped to carry out rigging tasks with greater awareness of potential hazards, the correct safety measures, and a clear understanding of their responsibilities in maintaining a safe working environment.

### 10.2.2. Learning Objectives:

The learning objectives for SSD/N0302 v 1.0 aim to provide Basic Riggers with the knowledge and skills necessary to ensure safety during rigging and lifting operations. Upon completion of this module, riggers will:

- **Understand Safety Standards and Regulations**
  - Gain knowledge of key safety standards and regulations such as OSHA, ANSI, and other relevant guidelines that govern rigging operations.
- **Comprehend Company Safety Policies**
  - Learn about company-specific safety policies, safety equipment requirements, and operational procedures essential for safe rigging practices.
- **Identify Hazards and Assess Risks**
  - Develop the ability to identify potential hazards in rigging operations and assess the associated risks to ensure safety.
- **Use and Maintain PPE**

- Understand the correct use, care, and maintenance of personal protective equipment (PPE) and other safety devices to minimize risks.

#### **Follow Documentation Practices**

- Learn how to complete and maintain inspection records, safety checklists, and incident reports to ensure compliance with safety standards.

#### **Report Non-Compliance and Safety Incidents**

- Understand the procedures for reporting non-compliance, safety incidents, and unsafe practices to maintain a safe working environment.

### **10.2.3. Performance Criteria:**

- **Understand Safety Regulations**
  - Recognize and explain the key safety standards and regulations relevant to rigging operations, such as OSHA and ANSI.
  - Ensure compliance with legal safety guidelines by following the established industry standards.
- **Clarify Legal Responsibilities**
  - Understand and explain the legal requirements for maintaining a safe workplace during rigging tasks.
  - Acknowledge the Basic Rigger's responsibility in upholding safety practices and regulations.
- **Implement Company Safety Guidelines**
  - Demonstrate knowledge of the company's safety policies and ensure their application in day-to-day rigging tasks.
  - Follow specific safety procedures related to rigging activities and report any deviations.
- **Recognize Hazards in Rigging Operations**
  - Identify potential hazards like load instability, equipment malfunction, and environmental risks during rigging tasks.
  - Assess and report any safety concerns regarding rigging conditions and operational setups.
- **Assess and Control Risks**
  - Evaluate the risks related to identified hazards and apply control measures to mitigate them.
  - Implement risk reduction strategies effectively to maintain a safe working environment.
- **Create Risk Management Strategies**
  - Develop a clear risk management plan that addresses common rigging hazards.
  - Actively implement safety measures to minimize risks during rigging and lifting operations.
- **Ensure Correct PPE Usage**
  - Verify that personal protective equipment (PPE) is used correctly and meets safety standards before each rigging operation.
  - Inspect PPE regularly for wear and ensure its readiness and compliance with safety protocols.
- **Follow Safe Rigging Practices**
  - Adhere strictly to safety protocols during rigging tasks, including load handling, lifting, and securing.
  - Ensure that all rigging procedures align with safety standards to prevent accidents.
- **Report Non-Compliance and Safety Issues**
  - Report safety concerns, non-compliance, or unsafe conditions to supervisors immediately.
  - Communicate any violations of safety regulations to the appropriate safety officer or authority.

- **Document Safety Inspections and Incidents**
  - Maintain thorough and accurate records of safety inspections, equipment checks, and incident reports.
  - Follow regulatory requirements for documentation, ensuring all reports are complete and timely.
- **Complete Safety Forms and Reports**
  - Accurately fill out safety checklists, hazard assessments, and compliance reports.
  - Ensure that all forms are completed per industry standards and submitted to the proper channels.
- **Effectively Communicate Safety Concerns**
  - Discuss safety issues, concerns, and non-compliance matters clearly with team members.
  - Communicate with supervisors to ensure timely resolution of any safety-related problems.

These performance standards ensure that basic riggers are equipped to carry out their tasks safely, in compliance with safety regulations, and in line with industry standards for rigging and lifting operations.

#### **10.2.4. Assessment Criteria:**

The assessment for SSD/N0302 v 1.0 : Safety Standards and Regulations is divided into theoretical and practical components to evaluate both the knowledge and the practical application required to ensure compliance with safety regulations in rigging operations:

- **Theory (40 Marks):**
  - Assesses the understanding of key safety standards and regulations, including OSHA, ANSI, and other relevant guidelines.
  - Evaluates knowledge of company-specific safety policies, procedures, and the responsibilities of riggers in maintaining safety compliance.
- **Practical (60 Marks):**
  - Evaluates the rigger's ability to identify potential hazards in rigging operations, assess risks, and implement appropriate control measures.
  - Assesses the correct use of personal protective equipment (PPE) and adherence to safety protocols during rigging tasks, including reporting non-compliance and maintaining safety documentation.

#### **10.2.5. Conclusion:**

**NOS 02** Concept of Occupational Safety, Health, and Environment SSD/N0302 v 1.0 outlines the critical knowledge and skills required for a Basic Rigger to maintain workplace safety and compliance. It focuses on understanding safety standards, regulations, and company-specific policies while emphasizing hazard identification, risk assessment, and mitigation strategies. The NOS ensures riggers are equipped to use personal protective equipment (PPE) correctly, adhere to safety protocols, and maintain accurate safety documentation. By mastering these principles, riggers contribute to safer rigging operations and compliance with industry safety standards.

## 10.3. SSD/N0303 v 1.0 : Rigging Inspections

### 10.3.1. Overview:

This NOS equips Basic Riggers with the essential knowledge and skills required to conduct effective and thorough inspections of rigging equipment, ensuring safety and compliance in lifting operations. It focuses on pre-use, periodic, and post-use inspections to identify defects, assess equipment wear and tear, and document findings in accordance with industry safety standards. The module emphasizes the application of OSHA and ANSI guidelines to maintain operational integrity and prevent accidents during material handling and lifting tasks. By mastering these inspection processes, riggers contribute to safer and more efficient rigging practices.

#### Scope:

The scope of SSD/N0303 v 1.0 covers the critical aspects of rigging inspections, focusing on maintaining safety and operational efficiency through regular evaluations of equipment:

- **Inspection of Rigging Equipment**
  - Covers the inspection of tools and components such as slings, chains, wire ropes, hooks, and hardware used in lifting operations.
  - Emphasizes identifying potential defects and assessing the condition of equipment to ensure safety during material handling tasks.
- **Defect Identification and Documentation**
  - Focuses on recognizing wear and tear, understanding inspection frequency requirements, and maintaining accurate inspection records.
  - Highlights the importance of documenting inspection results to comply with safety protocols and industry standards.
- **Adherence to Safety Standards**
  - Explains compliance with safety regulations like OSHA and ANSI to ensure equipment safety and operational efficiency.
  - Provides guidelines for implementing safety practices to mitigate risks and maintain workplace integrity.

By gaining proficiency in these areas, Basic Riggers will ensure their rigging equipment is safe, reliable, and compliant, reducing the likelihood of accidents and contributing to a secure working environment.

### 10.3.2. Learning Objectives:

The learning objectives for SSD/N0303 v 1.0 aims to provide Basic Riggers with the foundational knowledge and skills required to perform thorough and compliant inspections of rigging equipment. By the end of this module, learners will be able to:

- **Understand Rigging Inspection Standards**
  - Gain a comprehensive understanding of inspection procedures and standards for slings, chains, wire ropes, and other rigging hardware.
  - Familiarize with OSHA and ANSI guidelines specific to rigging equipment inspections.
- **Recognize Wear and Damage**
  - Identify wear and damage criteria for rigging equipment, including chain stretch, sling abrasion, and wire rope fraying.
  - Assess environmental factors affecting equipment integrity and determine their impact on safe operations.
- **Comprehend Equipment Labelling and Ratings**

- Understand labelling requirements, identification markings, and load capacity ratings for various rigging tools.
- Ensure proper identification of rigging equipment to maintain safety during lifting operations.
- **Document and Report Inspection Findings**
  - Learn proper tagging procedures and the documentation required for defective or unsafe equipment.
  - Develop skills to create detailed inspection reports, maintain records, and ensure compliance with safety standards.

By achieving these objectives, learners will be prepared to perform rigging inspections effectively, ensuring the safety and reliability of equipment in material handling and lifting operations.

### 10.3.3. Performance Criteria:

The following performance criteria outline the key abilities a certified professional under SSD/N0303 v 1.0: Rigging Inspections must demonstrate to ensure safe and effective rigging inspections:

- **Hazard Identification and Risk Management**
  - Identify potential hazards such as load instability, equipment failure, and environmental factors in rigging and lifting operations.
  - Develop risk management plans to address hazards, considering the operational limits and specifications of different rigging tools and devices.
- **Regulatory Compliance**
  - Understand and apply key safety standards and regulations, including OSHA, ANSI, and other relevant standards in rigging operations.
  - Adhere to safety protocols and procedures during load handling, lifting, and securing activities.
- **Inspection and Documentation**
  - Conduct thorough inspections to identify signs of wear, damage, or defects in rigging equipment.
  - Maintain accurate documentation of inspection findings and report unsafe or non-compliant equipment.
- **Load Handling and Calculation**
  - Perform precise load calculations, considering weight, center of gravity, and balance to ensure safe lifting operations.
  - Ensure that no personnel stand under suspended loads during operations.
- **Team Coordination and Emergency Preparedness**
  - Coordinate with team members to ensure synchronized and safe execution of rigging tasks.
  - Develop and practice emergency response plans specific to rigging operations.
- **PPE Compliance and Safety Measures**
  - Ensure proper use of personal protective equipment (PPE) and inspect PPE for compliance with safety standards.
  - Raise hooks to the upper limit switch, place all controls in the off position, and visually inspect for dangerous conditions before operations.

By adhering to these criteria, riggers will ensure the safety, efficiency, and compliance of rigging inspections, contributing to a secure work environment.

#### 10.3.4. Assessment Criteria:

The assessment for SSD/N0303 v 1.0: Rigging Inspections is divided into theoretical and practical components to evaluate both the knowledge and practical application required to conduct comprehensive rigging inspections and ensure safe lifting operations:

- **Theory (40 Marks):**
  - Assesses understanding of key safety standards, such as OSHA and ANSI, and their application in rigging inspections.
  - Evaluates knowledge of inspection procedures, operational limits of rigging tools, and identification of wear, damage, or defects in rigging equipment.
- **Practical (60 Marks):**
  - Evaluates the ability to conduct detailed rigging inspections, identify potential hazards, and document inspection findings accurately.
  - Assesses the correct use of personal protective equipment (PPE), adherence to inspection protocols, and implementation of safety measures, such as ensuring no personnel stand under suspended loads.

This assessment ensures that certified riggers possess both the foundational knowledge and hands-on skills required to perform inspections that comply with safety standards, mitigate risks, and maintain operational safety.

#### 10.3.5. Conclusion:

**NOS 03** Concept of Rigging Inspections SSD/N0303 v 1.0 outlines the essential knowledge and skills required for a certified professional in rigging inspections. This includes the ability to identify potential hazards, ensure compliance with safety standards, and perform accurate load calculations. The professional must be proficient in inspecting rigging equipment for defects, coordinating safe operations, and implementing emergency response plans. The NOS emphasizes the importance of using personal protective equipment (PPE) and adhering to safety protocols, ensuring safe and efficient rigging and lifting tasks while minimizing risks.

## 10.4. SSD/N0304 v 1.0 : Rigging Equipment's and Slings

### 10.4.1. Overview:

This NOS provides essential knowledge and skills for handling rigging equipment and slings in lifting and material handling operations. Designed for Basic Riggers, it focuses on selecting, using, and maintaining rigging equipment and slings to ensure safety and efficiency. It includes understanding the properties and limitations of wire rope, chain, synthetic, and metal mesh slings, as well as rigging hardware like hooks, shackles, and clips. The unit also covers essential knots, including bowline, clove hitch, and square knot, used with different ropes such as manila, fibre, and synthetic types, ensuring proper load securing and handling.

#### Scope:

1. Selection and safe use of rigging equipment and slings based on load characteristics and environment.
2. Understanding and application of sling materials and their suitability for different conditions.
3. Proficient use of rigging hardware and accessories to enhance load stability and control.
4. Mastery of knots and rope types for secure load handling and safety.
5. Regular inspection, maintenance, and adherence to safety practices to ensure the integrity of equipment and compliance with standards.

By applying these skills, Basic Riggers will contribute to safe and effective lifting and material handling operations.

### 10.4.2. Learning Objectives:

By the end of this unit, the certified professional will gain knowledge and understanding in the following areas:

- **Rigging Sling Types and Applications**
  - Identify various rigging sling types and their properties.
  - Understand the appropriate applications of slings based on load characteristics and conditions.
- **Rigging Hardware Usage**
  - Learn the proper use of rigging hardware such as hooks, shackles, wire rope clips, and turnbuckles.
  - Ensure safe and efficient lifting operations through correct hardware application.
- **Safety Standards and Regulations**
  - Develop awareness of safety standards related to rigging equipment selection and usage.
  - Understand load ratings and the importance of identification markings on equipment.
- **Inspection and Maintenance**
  - Perform sling and rope inspection procedures to detect damage or wear.
  - Apply maintenance practices to ensure the longevity and safety of equipment.
- **Sling Hitch Configurations**
  - Understand the configurations of vertical, choker, and basket hitches.
  - Analyse their effects on load stability and distribution during lifting.
- **Knots and Their Applications**
  - Master knots such as bowline, clove hitch, square knot, and double half hitch.
  - Use these knots effectively with different rope types, including manila, fiber, and synthetic ropes.
- **Rope Material Properties**
  - Understand the properties of various rope materials and their suitability for different tasks.

- Evaluate the impact of rope materials on knot stability and load securing effectiveness.
- **Environmental Impact on Equipment Performance**
  - Recognize how temperature, moisture, and chemical exposure affect rigging slings and ropes.
  - Implement measures to mitigate environmental impacts on equipment performance and safety.

These learning objectives will enable Basic Riggers to perform their tasks with a strong foundation in rigging safety, equipment handling, and operational efficiency.

### 10.4.3. Performance Criteria:

The following performance criteria outline the key abilities a certified professional under SSD/N0304 v 1.0: Rigging Equipment and Slings must demonstrate to ensure the safe and effective handling, inspection, and maintenance of rigging equipment and slings:

- **Selection of Rigging Slings and Hardware**
  - Identify various types of slings, such as wire rope, chain, synthetic, and metal mesh slings.
  - Select appropriate rigging hardware like hooks, shackles, clips, and turnbuckles based on load requirements.
- **Load Evaluation and Configuration**
  - Evaluate load weight, centre of gravity, and lifting requirements to determine the correct rigging setup.
  - Calculate load angles and stress factors for balanced and safe lifting.
- **Knot Tying and Rope Usage**
  - Demonstrate proper knots, such as bowline, clove hitch, and square knot, for securing loads.
  - Understand the properties and limitations of manila, fibre, and synthetic ropes in rigging operations.
- **Sling Hitch Applications**
  - Use sling hitches like vertical, choker, and basket configurations for stable load handling.
  - Employ proper techniques to prevent sling slippage and ensure load security.
- **Inspection and Maintenance**
  - Inspect rigging slings, ropes, and hardware for signs of wear, damage, or defects before use.
  - Perform basic maintenance on equipment and remove unsafe items from service as per guidelines.
- **Safety and Operational Standards**
  - Adhere to manufacturer specifications and safety protocols during rigging operations.
  - Ensure proper techniques to prevent load swinging, tipping, or hardware failure.
- **Environmental Considerations**
  - Assess the impact of environmental factors, such as temperature and moisture, on equipment performance.
  - Mitigate risks through appropriate equipment selection and usage practices.

These performance criteria ensure Basic Riggers perform their tasks effectively while adhering to safety and operational standards.

### 10.4.4. Assessment Criteria:

The assessment for SSD/N0304 v 1.0: Rigging Equipment and Slings is divided into theoretical and practical components to evaluate both knowledge and practical skills in safe rigging operations:

- **Theory (40 Marks):**

- Assesses understanding of rigging slings, their properties, selection criteria, and the application of safety standards for various rigging operations.

- **Practical (60 Marks):**

- Evaluates the ability to correctly select, inspect, and use rigging slings and hardware, ensuring safe lifting operations while adhering to safety protocols and manufacturer guidelines.
- This assessment ensures that certified riggers possess the essential knowledge and practical skills to safely manage rigging equipment and execute lifting tasks in compliance with safety standards.

#### **10.4.5. Conclusion:**

NOS 04 Concept of Rigging Equipment and Slings SSD/N0304 v 1.0 outlines the essential knowledge and skills for a professional involved in rigging operations. This includes a thorough understanding of various types of rigging slings, such as wire rope, chain, synthetic web, round, and metal mesh slings, along with their properties, strengths, and limitations. The professional must be proficient in selecting the appropriate slings and rigging hardware based on load characteristics, lifting conditions, and environmental factors. The NOS highlights the importance of performing inspections, conducting maintenance as per manufacturer guidelines, and following safety protocols to prevent accidents, ensuring safe and effective rigging operations.

## 10.5. SSD/N0305 v 1.0 : Lifting Devices and Below-the-Hook Lifters

### 10.5.1. Overview:

This section covers the skills needed for a Basic Rigger to safely select, operate, and maintain lifting devices and below-the-hook equipment, such as lifting beams, spreader beams, clamps, magnets, and vacuum lifters. Riggers will learn to choose the right device based on load and conditions to ensure safe and efficient handling.

#### Scope

- **Selection, Inspection, and Operation:**
  - Learn to select, inspect, and operate lifting devices safely during material handling and lifting tasks.
- **Understanding Applications and Limitations:**
  - Understand the strengths, limitations, and proper uses of each lifting device to ensure safe operation.
- **Integration with Rigging Components:**
  - Ensure lifting devices are properly integrated with other rigging components for stable and safe lifting operations.
  - This ensures Basic Riggers can safely use and maintain lifting devices in rigging operations.

### 10.5.2. Learning Objectives:

By the end of this section, the Basic Rigger will be able to:

1. **Know Different Lifting Devices:**  
Understand the types of lifting devices like lifting beams, spreader beams, clamps, magnets, and vacuum lifters.
2. **Handle Loads Safely:**  
Learn how to estimate load weight, find the centre of gravity, and know how to balance the load for safe lifting.
3. **Follow Safety Rules:**  
Know the safety rules (like OSHA and ANSI) for using lifting devices to keep yourself and others safe.
4. **Inspect and Maintain Equipment:**  
Learn how to check lifting equipment for damage and know what to do if it's unsafe. Understand how to tag it if it's broken.
5. **Know the Impact of Weather:**  
Understand how things like temperature, wind, and humidity can affect lifting equipment and make it unsafe.
6. **Understand How Loads Move:**  
Learn how the angle of the load, stress, and balance affect the safety and stability when lifting.

These learning objectives are designed to help Basic Riggers safely use and maintain lifting devices while working in different conditions.

### 10.5.3. Performance Criteria:

The following performance criteria outline the key abilities a certified professional under **SSD/N0305 v 1.0: Lifting Devices and Below-the-Hook Lifters** must demonstrate to ensure the safe and effective operation, inspection, and maintenance of lifting devices and below-the-hook lifters:

- Know the Types of Lifting Devices
  - Learn about different lifting tools like beams, clamps, magnets, and vacuum lifters.
  - Understand how each tool works and when to use it.
- Choose the Right Lifting Tool
  - Pick the right lifting tool for the job based on how heavy the load is, where it will be lifted, and the weather conditions.
  - Make sure the tool you choose will keep the load stable and safe.
- Use Lifting Tools Safely
  - Follow the instructions for using lifting beams, clamps, magnets, and vacuum lifters properly.
  - Always make sure the load is secure and won't slip or tip over.
- Check and Take Care of Lifting Tools
  - Inspect the lifting tools before using them to make sure they are not damaged.
  - Perform basic maintenance to keep tools in good working condition.
- Understand the Load and Environment
  - Know the weight of the load, how it will balance, and how it will be distributed.
  - Keep in mind things like the weather (wind, temperature) and how the load will move when lifted.
- Use the Right Rigging Techniques
  - Use the correct rigging methods and secure the load properly during lifting.
  - Follow safety rules to avoid accidents and make sure lifting is done safely.

These performance criteria ensure Basic Riggers are equipped to safely operate, inspect, and maintain lifting devices and below-the-hook lifters, ensuring safety and efficiency during lifting tasks.

### 10.5.4. Assessment Criteria:

The assessment for SSD/N0305 v 1.0 is divided into theoretical and practical components:

- **Theory (40 Marks):**
  - Assesses knowledge of different lifting devices, their properties, and how they should be used in various lifting situations.
  - Evaluates understanding of safety standards, load handling techniques, and environmental impacts on lifting operations.
- **Practical (60 Marks):**
  - Evaluates the ability to select, inspect, and operate lifting devices safely according to manufacturer guidelines.
  - Assesses skills in securing loads, inspecting devices for damage, and applying proper rigging techniques to ensure stable and safe lifting.

This ensures riggers have both the knowledge and practical skills required to safely handle lifting devices and perform safe lifting operations in compliance with safety standards.

### **10.5.5. Conclusion:**

NOS 04: Concept of Rigging Equipment and Slings SSD/N0304 v 1.0 outlines the key knowledge and skills needed for professionals in rigging operations. It covers understanding different rigging slings, such as wire rope, chain, synthetic web, round, and metal mesh slings, and knowing their properties, strengths, and limitations. The professional should be skilled in selecting the right sling and rigging hardware based on load details, lifting conditions, and the environment. The NOS emphasizes the need for inspections, proper maintenance according to manufacturer guidelines, and following safety protocols to avoid accidents, ensuring safe and efficient rigging tasks.

## 10.6. SSD/N0306 v 1.0 :Manual Hoists and Load Handling

### 10.6.1. Overview:

This section explains how to safely use manual hoists like chain hoists, lever hoists, and hand-operated winches for lifting loads. It teaches Basic Riggers how to choose the right hoist, inspect it before use, and handle loads safely. You will learn how to handle loads carefully and follow safe lifting practices, making sure the equipment is used properly to avoid accidents.

#### Scope

- **Using Manual Hoists for Lifting**
  - Learn how to use manual hoists for lifting and moving materials safely.
  - Understand the different types of hoists and when to use each one.
- **Understanding Hoists and Safety**
  - Know the capacity and limitations of manual hoists and how to inspect them before use.
  - Learn safe techniques for handling loads to prevent accidents.
- **Estimating Loads and Managing Hazards**
  - Learn how to estimate the weight of loads and set up the hoist properly for lifting.
  - Understand how to identify and manage hazards during lifting operations to keep everyone safe.

This guide will help you understand the basics of using manual hoists, ensuring safe and efficient lifting operations.

### 10.6.2. Learning Objectives:

By the end of this unit, the certified professional will gain knowledge and understanding in the following areas:

1. **Know Different Manual Hoists**
  - Learn about different types of manual hoists, such as chain hoists and lever hoists, and when to use them for lifting loads.
2. **Understand How Hoists Work**
  - Understand the parts of a hoist, like load chains, hooks, gears, and brakes, and how they help lift loads.
3. **Follow Safety Rules**
  - Know the safety standards and rules for using hoists, such as load limits and safety factors, to ensure safe lifting.
4. **Inspect Hoists for Problems**
  - Learn how to check hoists for damage or wear before using them, ensuring they are safe to operate.
5. **Use Proper Rigging Techniques**
  - Learn how to attach loads properly to hoists, making sure they are secure and stable during lifting.
6. **Manage Risks and Hazards**
  - Understand how to identify and handle risks or dangers during lifting operations to keep yourself and others safe.

These objectives will help you understand how to use manual hoists safely and effectively, ensuring that you can perform lifting tasks without accidents.

### 10.6.3. Performance Criteria:

The following performance criteria outline the key abilities a certified professional under **SSD/N0306 v 1.0: Manual Hoists and Load Handling** must demonstrate to ensure the safe and effective operation, inspection, and maintenance of manual hoists and load handling equipment:

#### 1. Understand and Select Manual Hoists

- Know different types of manual hoists (like chain hoists and lever hoists) and when to use each one based on load weight and lifting height.
- Choose the right hoist for the job, considering the load and environmental conditions.

#### 2. Safe Operation of Manual Hoists

- Operate hoists carefully to lift and lower loads steadily and safely.
- Use the correct techniques to avoid load swinging or imbalance while lifting.

#### 3. Perform Regular Inspections

- Inspect hoists before use to check for wear and damage like chain defects or hook issues.
- Ensure all parts of the hoist, including hooks and chains, meet safety standards.

#### 4. Proper Rigging and Load Attachment

- Secure loads properly to hoists using safe rigging techniques and hardware.
- Make sure loads are safely attached to avoid accidents during lifting.

#### 5. Handle Risks and Hazards<sup>1</sup>

- Identify possible hazards like overhead obstacles or uneven ground and take steps to avoid them.
- Apply safe lifting setups to keep the load stable and reduce risk.

#### 6. Maintenance and Documentation

- Perform basic maintenance like lubrication and adjustments on hoists as per guidelines.
- Keep records of inspections, maintenance, and any issues according to company rules.

These performance criteria ensure Basic Riggers are equipped to safely operate, inspect, and maintain manual hoists and load handling equipment, ensuring safety and efficiency during load handling tasks.

### 10.6.4. Assessment Criteria:

The assessment for SSD/N0306 v 1.0: Manual Hoists and Load Handling is divided into theoretical and practical components to evaluate both knowledge and practical skills in safely operating manual hoists and handling loads:

#### • Theory (40 Marks):

- Assesses understanding of different types of manual hoists, their properties, and how to select the right hoist for specific load handling tasks.
- Evaluates knowledge of safety standards, load capacity, and the importance of proper rigging techniques in ensuring safe operations.

#### • Practical (60 Marks):

- Evaluates the ability to safely operate manual hoists, ensuring correct load attachment and controlled, stable lifting and lowering.

- Assesses the ability to inspect manual hoists for defects, perform routine maintenance, and manage hazards while following safety guidelines during lifting operations.

This assessment ensures that certified riggers have the required knowledge and practical skills to operate manual hoists safely and perform load handling tasks according to industry safety standards.

#### **10.6.5. Conclusion:**

NOS 05: Concept of Manual Hoists and Load Handling outlines the essential knowledge and skills needed for safe operation of manual hoists and handling of loads. This includes understanding different types of manual hoists, how to select and use them correctly, and ensuring safety during lifting operations. The professional must be able to perform inspections, maintain hoists, and handle loads in a way that prevents accidents. Emphasizing safety measures, proper rigging techniques, and hazard management, this NOS ensures that Basic Riggers can handle lifting tasks with confidence while following industry safety standards.

## 10.7. SSD/N0307 v 1.0 : Rigging Techniques and Load Stability

### 10.7.1. Overview:

This section teaches the knowledge and skills needed to handle loads safely while using rigging techniques. It explains how to choose the right rigging methods, manage load balance, and prevent accidents during lifting. Understanding how loads move, how to adjust sling angles, and how to use different types of hitches will help keep the load stable and safe.

#### Scope

1. **Using Rigging Techniques:** Learn how to choose the right rigging method for different loads and ensure stability during lifting.
2. **Choosing the Right Rigging:** Understand which rigging methods and hitches to use based on load type and how to control the load's movement.
3. **Managing Load Risks:** Identify possible hazards like slipping or tipping and learn how to prevent them by managing load stability and following safety practices.

### 10.7.2. Learning Objectives:

By the end of this unit, the certified professional will gain knowledge and understanding in the following areas:

1. **Learn Different Rigging Techniques:** Understand the different rigging methods to keep loads stable and prevent accidents during lifting.
2. **Understand Load Dynamics:** Learn how the weight of the load, its center of gravity, and sling angles affect the load's stability.
3. **Know Hitch Types and Their Uses:** Understand the three main hitch types (vertical, choker, and basket) and how they help control the load and keep it steady.
4. **Calculate Sling Angles and Load Forces:** Learn how to measure sling angles and load forces to make sure rigging setups are safe and effective.
5. **Identify Hazards and Manage Risks:** Recognize potential risks during lifting and learn how to prevent accidents by keeping the load stable.
6. **Use Additional Rigging Equipment Safely:** Learn how to use equipment like spreader beams or lifting beams to make sure the load is distributed evenly and stays stable.

These objectives will help you understand how to apply rigging techniques and maintain load stability safely and effectively, ensuring that you can perform rigging tasks with precision and without accidents.

### 10.7.3. Performance Criteria:

The following performance criteria outline the key abilities a certified professional under **Basic Rigger Handbook: SSD/N0307 v 1.0 - Rigging Techniques and Load Stability** must demonstrate to ensure the safe and effective application of rigging techniques and maintenance of load stability:

- **Understanding Rigging Concepts and Load Dynamics**
  - Know how to define load angles, center of gravity, and how they affect load stability.
  - Understand how forces and sling angles impact the stability of the load during lifting.
- **Selecting and Applying Hitch Types**
  - Choose the right hitch type (vertical, choker, or basket) based on the load and lifting needs.
  - Apply the correct rigging techniques to ensure the load is stable and secure.
- **Managing Sling Angles and Load Balance**

- Properly calculate sling angles to reduce stress and ensure balanced lifting.
- Use multiple slings or spreader beams to distribute the load evenly and prevent instability.
- **Monitoring Load Stability**
  - Assess the center of gravity and adjust rigging to keep the load level during lifting.
  - Continuously monitor and adjust rigging to prevent load tipping or swinging.
- **Implementing Safety Measures**
  - Use tag lines or secondary rigging to control load movement and avoid unwanted shifts.
  - Ensure load stability by taking safety precautions and communicating risks to the team.
- **Identifying and Managing Hazards**
  - Recognize risks such as imbalanced loads or swinging and take action to prevent them.
  - Apply risk management strategies to reduce hazards and maintain safe lifting operations.
- **Effective Communication for Safety**
  - Clearly communicate hazards and control measures to team members and supervisors.
  - Ensure everyone is aware of safety steps to take during the lifting process to avoid accidents.

These performance criteria ensure Basic Riggers are equipped to apply rigging techniques and maintain load stability safely and effectively, ensuring safety and precision during rigging and load handling tasks.

#### 10.7.4. Assessment Criteria:

The assessment for SSD/N0307 v 1.0: Rigging Techniques and Load Stability is divided into theoretical and practical components to evaluate both knowledge and practical skills in ensuring safe and stable load handling during lifting operations:

- **Theory (40 Marks):**
  - Assesses the understanding of rigging concepts such as load angles, center of gravity, sling angles, and their impact on load stability.
  - Evaluates knowledge of different rigging techniques (vertical, choker, and basket hitches), how to select the appropriate technique, and the importance of understanding load dynamics for stability.
- **Practical (60 Marks):**
  - Evaluates the ability to apply the correct rigging techniques and hitch types based on load characteristics and lifting requirements to ensure load stability and safety.
  - Assesses the ability to properly calculate sling angles, distribute load evenly using spreader beams or lifting beams, and make adjustments to maintain load control during lifting.

Tests the competence to implement safety measures such as using tag lines or secondary rigging, and to identify, assess, and mitigate hazards related to load instability.

This assessment ensures that certified riggers possess the essential knowledge and practical skills required to execute safe and stable rigging operations, mitigating risks related to load handling and complying with safety standards.

#### 10.7.5. Conclusion:

**NOS 07** Rigging Techniques and Load Stability outlines the essential knowledge and skills needed to ensure safe and stable handling of loads during lifting operations. This includes understanding load characteristics, selecting the right rigging techniques, and managing sling angles to maintain load stability. The professional must be able to assess load stability, use appropriate rigging configurations, and prevent hazards such as tipping or swinging during lifting. By emphasizing safety measures and risk management, this NOS ensures that Basic Riggers can safely and efficiently manage lifting tasks while following industry safety standards.

## 10.8. SSD/N0308 v 1.0 : Contingency Strategies for Emergency Situations

### 10.8.1. Overview:

This section teaches the skills and knowledge you need to handle emergency situations that may happen while working with rigs and lifting equipment. It focuses on planning for emergencies, knowing what can go wrong, and taking action to keep everyone safe. You'll learn how to handle problems like equipment breakdowns, unstable loads, and hazards like bad weather.

#### Scope:

- **Recognizing Emergency Risks:**
  - Understand what could go wrong during rigging work.
  - Know how to plan for these emergencies in advance.
- **Emergency Plans:**
  - Learn how to follow emergency plans if something goes wrong.
  - Know how to communicate and work with safety teams or first responders in case of an emergency.
- **Practice Makes Perfect:**
  - Participate in emergency drills to be prepared for real situations.
  - Stay aware of specific emergency procedures at the work site.

This part of the training helps you stay safe by teaching you how to act fast and smart in case something goes wrong during rigging and lifting.

### 10.8.2. Learning Objectives:

By the end of this unit, the certified professional will gain knowledge and understanding in the following areas:

1. **Recognizing Emergency Risks:**
  - Learn about emergencies that can happen during rigging, like equipment failure, unstable loads, or bad weather.
2. **Understanding Emergency Plans:**
  - Understand the steps to take when an emergency happens, including who does what and how to communicate with others.
3. **Knowing Safety Rules:**
  - Be aware of safety standards and rules that tell you how to prepare and respond to emergencies in rigging work.
4. **Knowing What to Do in an Emergency:**
  - Learn the proper actions in an emergency, like turning off equipment, securing the load, or evacuating people.
5. **Working with Safety Teams:**
  - Understand how to work with safety personnel, first responders, and other emergency services when an emergency occurs.
6. **Learning from Emergencies:**
  - Know how to look back after an emergency, write down what happened, and find ways to improve emergency plans for the future.

These objectives will help you understand how to stay safe and respond correctly if an emergency occurs during rigging and lifting work.

### 10.8.3. Performance Criteria:

The following performance criteria outline the key abilities a certified professional under **Basic Rigger Handbook: SSD/N0308 v 1.0: Contingency Strategies for Emergency Situations** must demonstrate to ensure the safe and effective implementation of contingency strategies during emergency situations:

- **Identifying and Understanding Emergency Scenarios**
  - Recognize different emergencies like equipment failure, unstable loads, or environmental risks.
  - Understand how these scenarios can affect safety, equipment, and the environment.
- **Developing and Following Emergency Plans**
  - Create clear plans for handling emergencies, including equipment shutdown and securing loads.
  - Know who is responsible for each task during an emergency and follow the plan to keep everyone safe.
- **Communication and Coordination**
  - Set up easy communication steps to notify supervisors, safety teams, and emergency services.
  - Work together with safety personnel and first responders to handle the situation quickly.
- **Training and Drills**
  - Regularly practice emergency drills to ensure everyone knows what to do in an emergency.
  - Provide training on what actions to take, like equipment shutdown and evacuations.
- **Evaluating Emergency Responses**
  - After an emergency, review the response to find what worked and what can be improved.
  - Document everything, including what happened, what actions were taken, and any damage or injuries.
- **Updating Plans and Actions**
  - Use feedback from drills and actual emergencies to improve the emergency response plan.
  - Make corrective actions based on lessons learned to ensure better safety for future operations.

These performance criteria ensure Basic Riggers are equipped to effectively handle emergency situations, applying appropriate contingency strategies to ensure safety and minimize risks during unforeseen events.

### 10.8.4. Assessment Criteria:

The assessment for SSD/N0308 v 1.0 - Contingency Strategies for Emergency Situations is divided into theoretical and practical components to evaluate both knowledge and practical skills in safely operating manual hoists and handling loads.

- **Theory (40 Marks):**
  - Assesses understanding of various emergency scenarios that could occur during rigging and lifting operations, such as equipment failure, load instability, and environmental hazards.
  - Evaluates knowledge of emergency response plans, communication protocols, and the importance of proper roles and responsibilities during an emergency.
- **Practical (60 Marks):**
  - Assesses the ability to identify potential emergency situations and assess their impact on safety, equipment, and the environment.
  - Evaluates the ability to implement contingency plans effectively, including securing loads, coordinating with safety personnel, and conducting post-emergency evaluations.

- Tests skills in performing emergency response actions, such as load stabilization, equipment shutdown, and communication with emergency services.

This assessment ensures that certified riggers have the necessary knowledge and practical skills to respond effectively to emergency situations, maintaining safety during rigging and lifting operations according to industry standards.

#### **10.8.5. Conclusion:**

**NOS 08:** Contingency Strategies for Emergency Situations outlines the essential knowledge and skills needed to handle emergencies during rigging and lifting operations. This includes recognizing potential emergencies, such as equipment failure or load instability, and knowing how to act quickly and safely. The professional must be able to develop emergency plans, secure loads, and coordinate with safety teams. By focusing on safety, communication, and effective response actions, this NOS ensures that Basic Riggers can manage emergencies confidently and prevent accidents while following industry safety standards.

## 10.9. DGT/VSQ/N0101: Employability Skills

### 10.9.1. Overview:

This section explains the basic skills needed to get and keep a job. It includes how to manage money, use digital tools, and communicate with your boss or customers. These skills are important for workers to be successful in any job, including rigging work. By learning these skills, you can improve your chances of getting hired, doing your job well, and working safely with others.

#### Scope:

This section covers important skills to help you succeed in your job and career:

1. **Understanding Job Skills:** Learn why employability skills are important for getting and keeping a job.
2. **Basic Values and Ethics:** Understand your rights, duties, and how to act responsibly at work and in the community.
3. **Communication:** Learn how to talk and work well with others, using basic English and good manners.
4. **Money and Legal Knowledge:** Learn how to manage money and understand your legal rights at work.
5. **Digital Skills and Technology:** Get familiar with using digital devices, the internet, and social media safely for work-related tasks

### 10.9.2. Learning Objectives:

By the end of this unit, the certified professional will gain knowledge and understanding in the following areas:

- Understanding Employability Skills
  - Recognize the importance of skills needed for employment.
  - Identify the skills required to succeed in the workplace.
- Building Professional Values and Ethics
  - Learn about personal responsibilities and ethical behavior at work.
  - Understand environmental sustainability and civic duties.
- Improving Communication Skills
  - Develop the ability to communicate effectively with others in the workplace.
  - Understand the importance of good manners and teamwork.
- Financial and Legal Awareness
  - Gain knowledge of basic financial skills like managing money and savings.
  - Understand legal rights and how to approach authorities if needed.
- Digital Literacy
  - Learn how to safely use digital devices, the internet, and social media.
  - Understand how to apply digital skills in the workplace.
- Customer Service and Professionalism
  - Understand the needs of different customers and how to address them.
  - Learn to maintain good hygiene and grooming standards.
- Job Search and Apprenticeship Preparation
  - Learn how to create a basic resume and search for jobs.

- Identify apprenticeship opportunities and the steps to apply for them.

These objectives will help you understand how to develop key employability skills, ensuring that you can respond effectively to workplace challenges and enhance your career prospects in rigging and lifting work.

### 10.9.3. Performance Criteria:

The following performance criteria outline the key abilities a certified professional under **Basic Rigger Handbook: DGT/VSQ/N0101 - Employability Skills** must demonstrate to ensure the effective application of employability skills in the workplace, including communication, teamwork, and problem-solving:

- **Understanding Employability Skills**
  - Recognize the importance of skills for getting and keeping a job.
  - Understand how having the right skills helps meet job expectations.
- **Constitutional Values and Citizenship**
  - Identify personal duties and rights as a citizen.
  - Understand ethical practices and how they affect work and the environment.
- **Professionalism in the 21st Century**
  - Practice good behaviour, time management, and positive thinking at work.
  - Show awareness of social, cultural, and emotional factors in the workplace.
- **Basic English Communication**
  - Use simple English phrases to communicate with co-workers.
  - Understand basic instructions and give clear responses in English.
- **Good Communication and Teamwork**
  - Communicate politely with co-workers and supervisors.
  - Work effectively as part of a team, helping others when needed.
- **Respecting Diversity and Inclusion**
  - Treat everyone with respect, regardless of gender or disability.
  - Report any issues related to unfair treatment or harassment.
- **Financial and Legal Awareness**
  - Understand how to use financial services and manage money.
  - Know where to go for help if faced with unfair treatment or legal problems.
- **Digital Literacy**
  - Safely use digital devices, internet, and social media for work tasks.
  - Follow best practices for online safety and security.
- **Entrepreneurship**
  - Identify possible business ideas and opportunities for self-employment.
  - Understand how to manage money and legal matters related to business.
- **Job Readiness and Apprenticeships**
  - Create a simple resume and search for jobs.
  - Find apprenticeship opportunities and apply for them according to requirements.

These performance criteria ensure Basic Riggers are equipped with essential employability skills, enabling them to communicate effectively, work collaboratively, and adapt to workplace challenges for enhanced professional performance.

#### **10.9.4. Assessment Criteria:**

The assessment for DGT/VSQ/N0101: Employability Skills evaluates both theoretical knowledge and practical skills to ensure workers are prepared for workplace requirements and professional growth.

- **Theory (20 Marks):**
  - Assesses understanding of employability skills, including communication, teamwork, and professionalism.
  - Evaluates knowledge of constitutional values, financial literacy, digital skills, and workplace safety.
- **Practical (30 Marks):**
  - Evaluates the ability to communicate effectively in English and work collaboratively in a team.
  - Assesses practical application of digital skills, customer service standards, and preparation for job opportunities, including creating resumes and searching for apprenticeships.

This assessment ensures that workers are equipped with the necessary skills and knowledge to meet job requirements, communicate effectively, and excel in their professional roles.

#### **10.9.5. Conclusion:**

NOS 09: Concept of **Employability Skills** outlines the basic skills needed to succeed in the workplace. This includes understanding good communication, teamwork, and professional behaviour. Workers learn to handle finances, use digital devices, and follow workplace rules. They also learn how to create resumes, find jobs, and work safely with others. By building these skills, this NOS helps workers improve their job readiness and confidence to meet workplace expectations.

## **11. Chapter 1: Introduction to Basic Rigging < SSD/N0301 v 1.0>**

### **11.1. Introduction:**

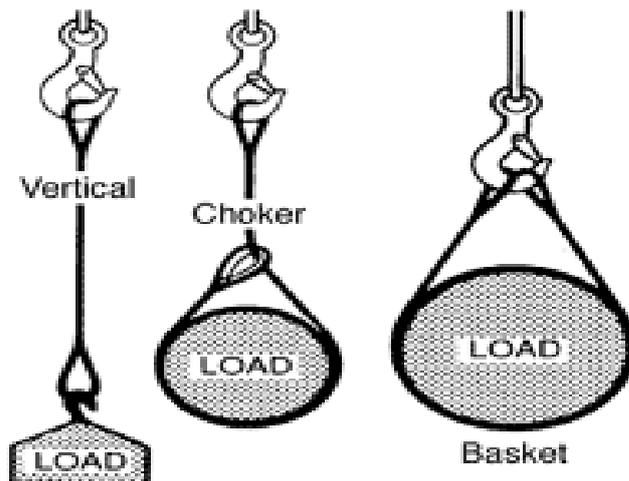
Outlines the foundational knowledge and skills essential for professionals in the rigging domain. This standard familiarizes individuals with key terms, definitions, and concepts commonly used in rigging operations. It provides an in-depth understanding of rigging materials, hardware, slings, and their various types, including the advantages of each. Additionally, it emphasizes the importance of understanding working load limits to ensure safe and efficient handling of loads. This comprehensive overview equips professionals with the technical acumen required for rigging tasks in diverse industrial settings.

## 11.2. Key Terms in Rigging

- **Hitches:**

A hitch is the way a sling is arranged around a load to ensure it can be lifted safely. Common types of hitches include:

- **Vertical Hitch:** A single sling is used to lift a load vertically.
- **Choker Hitch:** The sling tightens around the load for a secure hold.
- **Basket Hitch:** The sling forms a loop under the load, providing better stability.



- **Slings:**

Slings are flexible lifting devices made of materials like wire rope, chain, or synthetic webbing. They are used to connect the load to the lifting equipment.

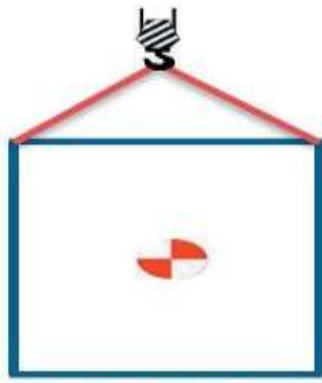
- **Wire Rope Slings:** Strong and durable, used for heavy loads.
- **Chain Slings:** Highly resistant to heat and abrasion.
- **Synthetic Slings:** Lightweight and flexible, ideal for delicate loads.



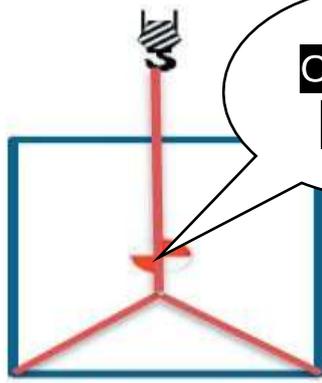
- **Loads:**

A load is the object or material being lifted. It's important to understand:

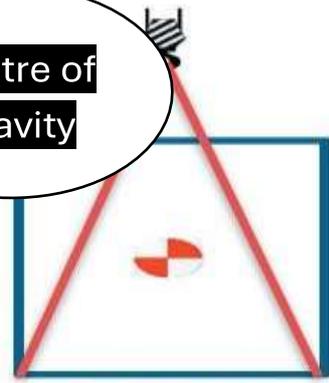
- The **weight of the load** to select the right rigging equipment.
- The **centre of gravity** to ensure the load is balanced during lifting.



1. Stable



2. Unstable



3. Stable

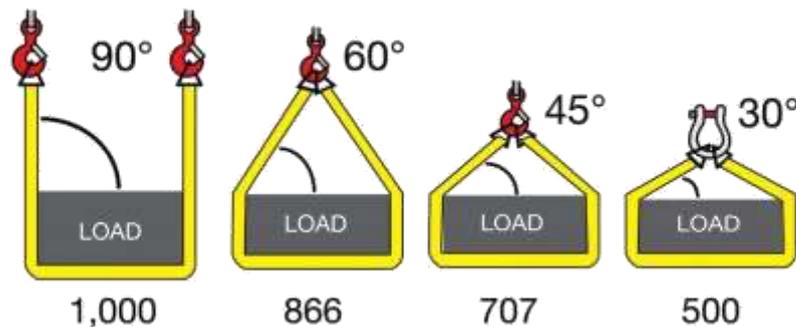
Centre of Gravity

### 11.3. Basic Concepts in Rigging

- **Working Load Limit (WLL):**  
The maximum weight a sling, hitch, or rigging hardware can safely handle without risk of failure. Always check the WLL before lifting.



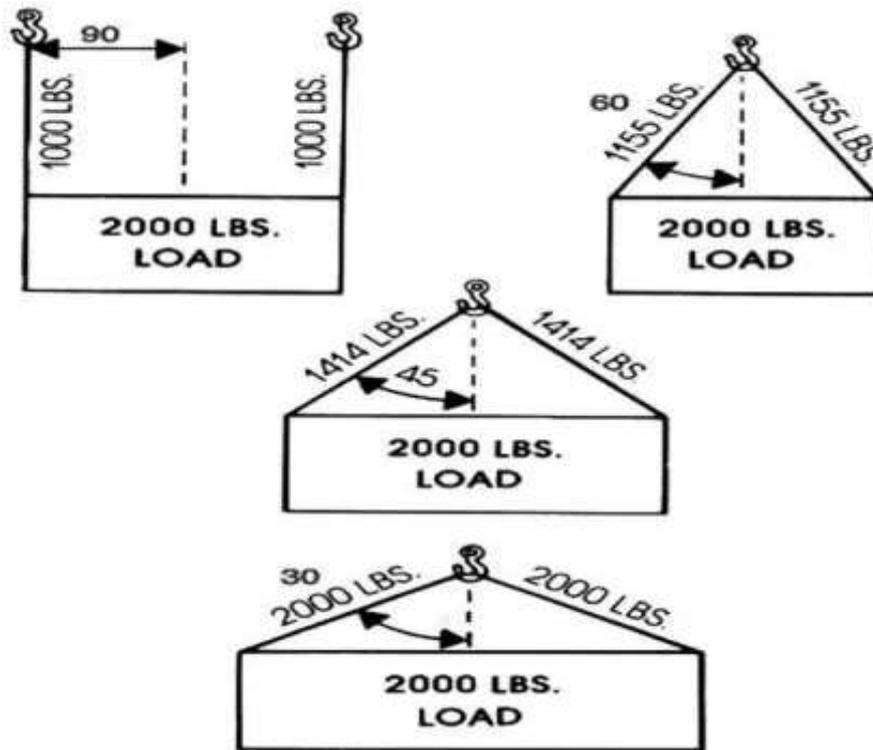
- **Sling Angle Factor:**  
The angle at which the sling is used affects its strength. Smaller angles increase the stress on the sling, reducing its capacity.



- **Safety Factor:**  
This is an extra margin of safety built into the design of rigging equipment to account for unexpected stresses.



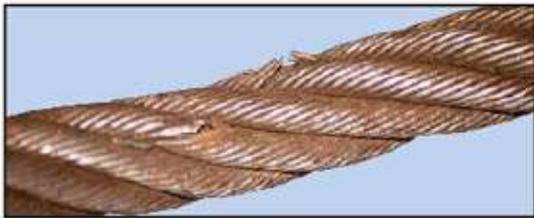
- **Weight Distribution:** Ensure the load's weight is evenly distributed across all rigging points to maintain stability.



## 11.4. Key Points to Remember

- Always inspect slings and hardware for wear or damage before use.
- Choose the appropriate hitch and sling type based on the load and lifting conditions.
- Understand the weight and center of gravity of the load to avoid accidents.
- Follow safety guidelines and never exceed the working load limit.

**Broken Wires**



**Kinked Wire**



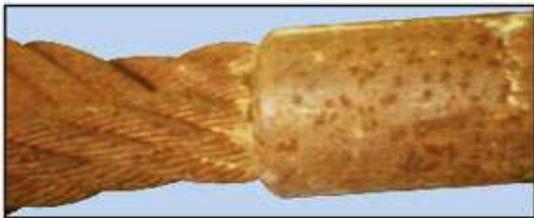
**Abraded/Worn Wire**



**Popped Core**



**Corrosion**



**Heat Damage**



**Bird Caging**



**Damaged Fittings**



## 11.5. Roles and Responsibilities of a Basic Rigger

### 11.5.1. Roles

1. **Equipment Handling:** Set up, adjust, and dismantle rigging tools like slings, hooks, and shackles.
2. **Load Handling:** Secure and balance loads using proper rigging techniques.
3. **Guidance:** Provide clear signals or instructions to crane operators and monitor load movements.

### 11.5.2. Responsibilities



1. **Safety:** Inspect equipment, follow protocols, and use personal protective equipment (PPE).
2. **Efficiency:** Follow procedures, ensure compliance with weight limits, and coordinate with the team.
3. **Reporting:** Report equipment issues or unsafe conditions immediately.



## 11.6. Rigging Tools

- **Slings:** Used for lifting loads. Types include wire rope, synthetic, and chain slings, each suited for different load types.
- **Hooks:** Attach rigging equipment to loads or cranes. Ensure the hook is the right size and in good condition.
- **Shackles:** Connect parts of the rigging system. Types include screw pin, bolt, and round pin shackles. They must be securely fastened.
- **Turnbuckles:** Adjust tension in slings or ropes to control load movement.
- **Rigging Plates:** Distribute the load evenly to avoid overloading a single part of the rigging.
- **Cranes/Hoists:** Used for heavy lifting. Check weight capacity and ensure proper operation before use.
- **Chain Blocks:** A mechanical lifting device used for raising heavy loads with a chain. Ensure the chain block is rated for the load's weight and condition.
- **I-Bolts:** Used for securing loads or anchoring rigging equipment. Properly install and ensure the I-bolt is rated for the load it will support.
- **Rope:** Used in combination with slings and pulleys for lifting or securing loads. Check the rope for wear, knots, or damage before use.

As a rigger, understanding and using the correct rigging tools is essential for completing tasks safely and efficiently. Always inspect tools such as slings, chain blocks, and ropes before use, and ensure they are suitable for the job at hand.



## 11.7. Load Calculation:

Knowing the weight and centre of gravity (COG) of a load is essential for safe lifting. It ensures the right equipment is used and prevents instability during the lift.

- Calculating the Weight

Use the formula:

Weight (W) = Mass (M) × Gravity (g)

For example, if the mass is 100 kg, weight =  $100 \text{ kg} \times 9.81 \text{ m/s}^2 = 981 \text{ N}$ .

- Estimating the Center of Gravity (COG)
  - Symmetrical Load (Box): The COG is in the center.
  - Irregular Load (Pipe): Balance it to find the COG.

Calculating weight and COG helps riggers lift loads safely and choose the right equipment, reducing the risk of accidents during lifting operations.

## 11.8. Selection of Tools and Equipment's:

Choosing the right slings and rigging hardware is key to safe and effective lifting. Wrong choices can cause accidents, load damage, or injury.

### 11.8.1. Types of Slings

- Wire Rope Slings: Strong, durable, for heavy loads.
- Synthetic Slings: Lightweight, flexible, for delicate or polished items.
- Chain Slings: Tough, for hot or sharp-edged materials.
- Round Slings: Soft, for irregular or fragile loads.

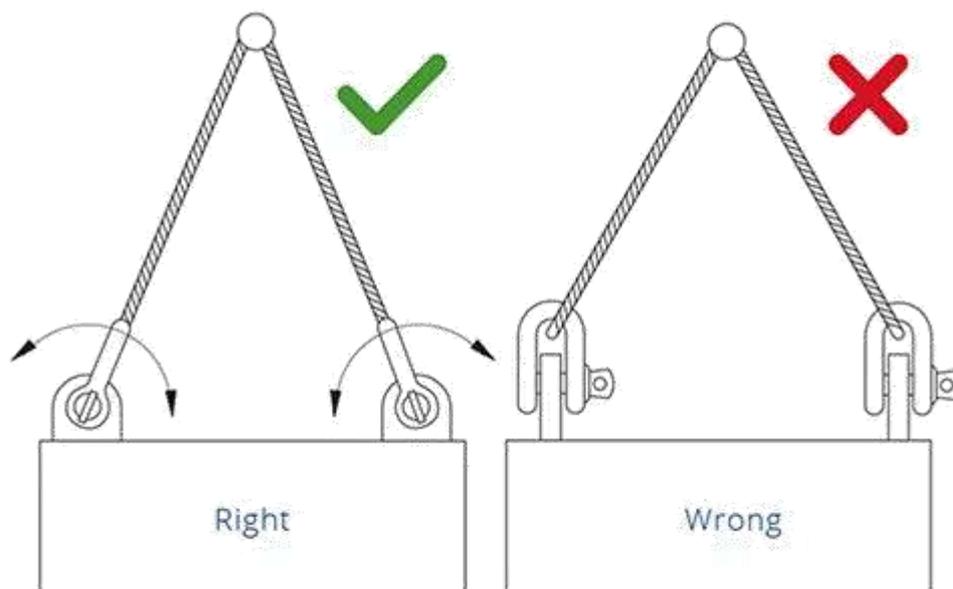
### 11.8.2. Types of Rigging Hardware

- Shackles: Connect slings to lifting devices.
- Hooks: Attach to loads for lifting.
- Turnbuckles: Adjust sling tension.
- Rigging Plates: Distribute load weight evenly.

### 11.8.3. Selection Tips

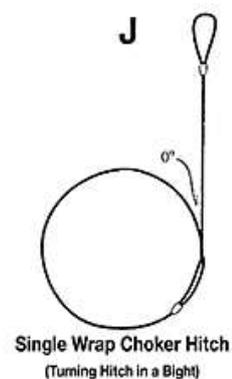
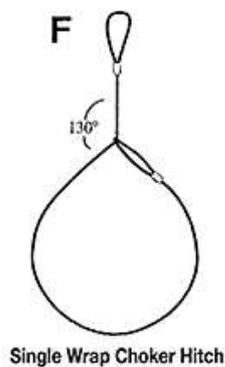
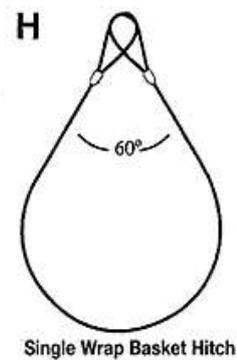
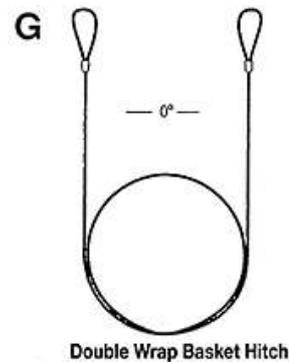
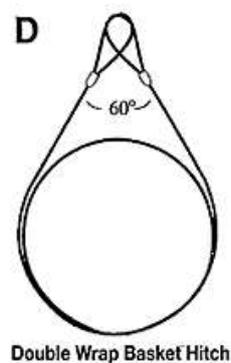
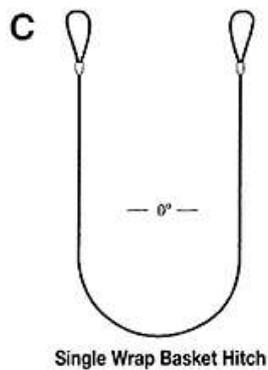
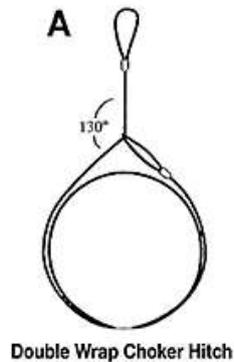
- Weight: Ensure slings and hardware match the load's weight.
- Shape: Use round slings for irregular loads.
- Environment: Choose appropriate materials for hot or rough conditions.

Always select the right slings and hardware for each lift to ensure safety, efficiency, and load protection. Regularly inspect the equipment before use.



## 11.9. Hitch Configurations

Proper hitch configurations are essential for securing loads safely during lifting to avoid accidents or damage.



- Single Hitch (Vertical Hitch):
  - Use: Secures load at one point.
  - Best for: Balanced loads like bags or boxes.

- Double Hitch (Choker Hitch):
  - Use: Sling tightens around the load.
  - Best for: Irregular or round items like pipes.
- Basket Hitch:
  - Use: Sling forms a basket under the load for support.
  - Best for: Large or flat loads like crates.
- Double Basket Hitch:
  - Use: Two slings for extra support.
  - Best for: Heavy, large loads like steel beams.

### **11.9.1.      Selecting the Right Hitch**

- Load Shape: Use basket or double basket for large/irregular loads.
- Weight: For heavy loads, use more secure hitches.
- Balance: Choose a hitch that distributes the weight evenly.

Select the correct hitch based on load type, shape, and weight for safe and efficient lifting. Always check the hitch is secure before lifting.

## 11.10. Case study:

- **Industry Type:**  
Construction
- **What happened:**  
A steel beam was being lifted by a crane, but the wrong sling was used. The synthetic sling was damaged, causing the beam to fall. Fortunately, no one was hurt, but the beam was damaged.
- **Why Happened:**  
Incorrect sling type was chosen for the heavy load. The sling was not inspected. Load angles were not considered properly.
- **Learnings:**  
Always use the right sling for the load. Inspect rigging equipment before use. Consider load angles and follow safety protocols.
- **Action:**  
Retrained team on proper sling selection and load angles. Introduced a pre-lift inspection checklist. Implemented regular safety audits.

## **11.11. Summery and Review Question:**

### **11.11.1. Summery:**

In this chapter on **Basic Rigging**, you learned about the essential concepts and safety practices that every rigger must follow. Key topics included understanding rigging terms like slings, hitches, and loads, and recognizing the importance of selecting the right tools and slings for different lifting tasks. You also explored the importance of understanding the center of gravity, load angles, and weight distribution to perform safe rigging operations. Rigging safety standards, the correct use of personal protective equipment (PPE), and safety protocols were also emphasized to prevent accidents. By adhering to these practices, you can ensure that rigging operations are both safe and efficient.

### **11.11.2. Review Question:**

1. What is the importance of selecting the correct sling type for lifting a load?
2. How does the center of gravity impact rigging operations?
3. Why is it necessary to inspect rigging equipment before each use?
4. Name two safety standards or regulations that riggers must follow during lifting operations.
5. What are the key factors to consider when calculating the weight and center of gravity of a load?

## 12. Chapter 2: Safety Standards and Regulations < SSD/N0302 v 1.0>

### 12.1. Introduction:

This chapter focuses on the importance of safety standards and regulations that every Basic Rigger must follow. Safety is crucial in rigging and lifting tasks, as it helps prevent accidents and injuries. The chapter will help you understand the safety rules that apply to rigging activities, how to spot hazards, and what actions to take to keep the worksite safe. It covers various regulations and safety measures, including the use of Personal Protective Equipment (PPE), industry-specific safety protocols, and procedures to ensure that the rigging tasks are performed in a safe and legal manner. By following these standards, you will help ensure that rigging operations are safe, efficient, and in compliance with the law.

## 12.2. Safety standards and regulations

As a rigger, you must follow safety standards and regulations to ensure safe rigging operations. These standards protect workers and equipment from accidents and damage.

1. **OSHA (Occupational Safety and Health Administration):**  
OSHA provides rules for safe lifting and handling. It ensures that workers are protected from falling loads and unsafe practices.
2. **ANSI (American National Standards Institute):**  
ANSI sets guidelines for rigging equipment such as slings and hoists, ensuring they are safe and meet strength requirements.
3. **IS (Indian Standards):**  
In India, IS standards cover the safe use of lifting equipment like cranes and slings, ensuring safety during rigging tasks.
4. **Company Safety Procedures:**  
Companies have their own safety rules, which include equipment checks and specific procedures to follow during rigging operations.



## 12.3. Legal Requirements for Workplace Safety

1. **OSHA Regulations:** OSHA ensures that work environments are safe and provides guidelines for rigging tasks, such as regular equipment checks and proper training.
2. **Local Safety Laws:** Countries and states have their own safety laws, like the Indian Factories Act, that protect workers during rigging tasks.
3. **Employer's Responsibility:** Employers must provide safe equipment, proper training, and safety gear to workers.

### 12.3.1. Responsibilities of a Basic Rigger

- Follow Safety Rules: Always follow the safety regulations for rigging tasks.
- Use PPE: Wear necessary safety equipment, such as helmets, gloves, and boots.
- Inspect Equipment: Check all rigging equipment before use and report any damage.
- Report Hazards: If you notice unsafe conditions, report them to your supervisor immediately.
- Follow Company Procedures: Stick to your company's safety procedures at all times.
- Adhere to OSHA and local safety regulations.
- Always wear and use PPE.
- Inspect equipment and report hazards.
- Follow company safety procedures.

## 12.4. Company Safety Policy:

Each company has rules for safe work. As a rigger, it's important to read the safety manual and attend training to understand the company's safety policies.

- Inspect Equipment: Always check rigging tools and equipment for damage before use.
- Use PPE: Wear the required safety gear like helmets, gloves, and boots.
- Safe Rigging Practices: Follow proper techniques to lift loads safely.
- Emergency Procedures: Know what to do in an emergency, like where to exit or find first aid.

If you see unsafe conditions, report them immediately to prevent accidents.

1. Read and follow safety policies.
2. Inspect equipment and wear PPE.
3. Report safety issues right away.

## 12.5. Rigging hazard's and the natures:

### 12.5.1. Understanding Hazards

Hazards are things that can cause harm or accidents. Identifying them is important because it helps prevent injuries, saves lives, and protects equipment.

### 12.5.2. Types of Hazards



- **Load Instability:** Load instability occurs when the load being lifted is not balanced or secure. For example, the load might tilt or fall during lifting due to uneven weight distribution. To prevent this, always check the load's balance before lifting and use proper slings and securing methods.
- **Equipment Failure:** Equipment failure happens when rigging tools or machines break or malfunction. This includes broken hooks, chains, or faulty cranes. To avoid such issues, inspect all equipment before use and replace any damaged or worn-out parts immediately.



- **Environmental Factors:** Environmental factors include surroundings that make lifting unsafe, such as strong winds, rain, or poor visibility. Slippery surfaces or uneven ground also pose risks. It's important to avoid lifting in bad weather and ensure the area is clean, dry, and level.



### 12.5.3. Identify Hazards

- **Inspect the Work Area:**
  - Look for obstacles or unsafe conditions like overhead power lines or restricted spaces.
- **Examine the Load:**
  - Ensure it is properly secured and balanced.
  - Confirm that the weight is within the equipment's capacity.
- **Inspect the Equipment:**
  - Look for visible damage or wear.
  - Test equipment to ensure it is functioning correctly.
- **Monitor the Environment:**
  - Check weather conditions.
  - Look for hazards like slippery floors or loose objects.



## 12.6. Evaluating Risks

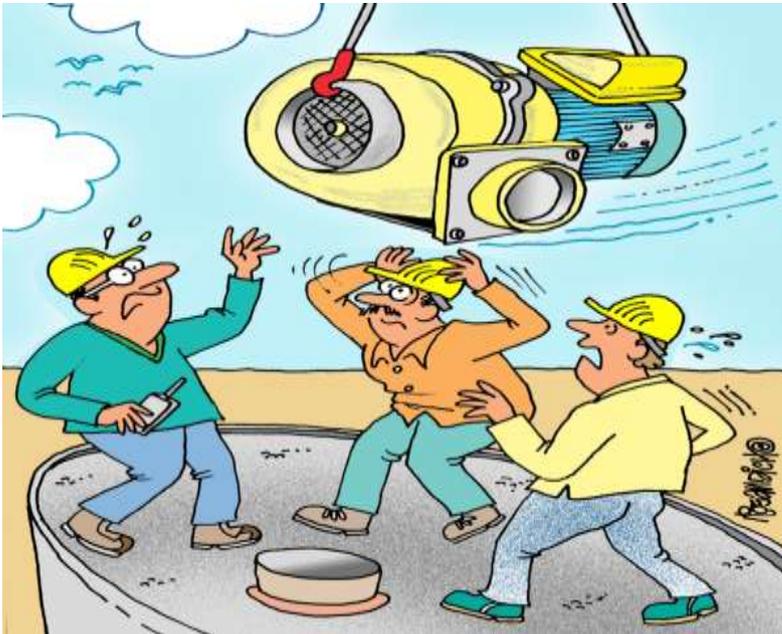
Risks occur when these hazards are not managed properly. For example, if a crane lifts an improperly rigged load, there's a high chance it could fall and cause injury or damage. Workers must inspect the rigging gear and the surroundings carefully to identify any potential risks.

- Check all rigging equipment for defects.
- Understand the weight limits and capacities of rigging tools.

To evaluate risks in rigging, think about:

1. The weight of the load: Is it within the safe capacity of the equipment?
2. The condition of rigging gear: Are slings, ropes, and chains free of damage?
3. The setup of the lift: Is the load evenly distributed, and are the attachment points secure?

Focus on the most critical risks, such as an unstable load or worn-out equipment, as these can lead to severe accidents.



## 12.7. Mitigating Rigging Risks

- Ensure all rigging gear is inspected before use. Damaged or worn-out tools must be replaced immediately. (Prepare and implement checklist)
- Use the correct rigging methods to secure loads properly. Avoid shortcuts or unsafe practices.
- Wear personal protective equipment (PPE) like helmets, gloves, and steel-toed boots to reduce the impact of accidents.
- Set up the load properly by balancing and securing it.
- Perform the lift slowly and steadily, monitoring for any signs of instability.
- Reassess the setup if anything seems unsafe during the process.



Training is essential. Workers must know how to use rigging gear correctly and understand load limits. Emergency plans, such as having first aid kits on-site and clear communication during lifts, also help mitigate risks.



### 12.7.1. Example:

A team is lifting a heavy steel beam using slings and a crane. Before starting, they inspect the slings for wear and tear and find one with frayed edges. They replace it with a new one, ensuring safety. The beam is then secured evenly, and the lift is performed slowly, with one worker acting as a spotter to guide the process. This approach prevents accidents and ensures a safe lift.

## 12.8. Risk management Plan

### 12.8.1. Steps:

- **Identify Hazards:** Inspect the site for dangers like loose tools, damaged ropes, or unstable surfaces.
- **Assess the Risk:** Rate hazards as low, medium, or high based on their likelihood and severity.



- **Control the Risk:**
  - Wear safety helmets, gloves, and boots.
  - Inspect all rigging gear before use.
  - Mark danger zones with warning signs or barriers.
- **Monitor and Review:** Regularly check if safety measures are working and update the plan as needed.

### 12.8.2. Communication and convey:

Explain the plan to the team in simple language so everyone understands their role. Use visual aids like diagrams and posters to show proper rigging practices and equipment usage.



### 12.8.3. Emergency Preparedness

In case of emergencies, stop all rigging activities immediately, move to a safe zone, and contact emergency services or the site supervisor. Always keep essential tools ready, such as first aid kits, fire extinguishers, and emergency contact information.



## 12.9. Personal Protective Equipment (PPE)

Personal Protective Equipment (PPE) is any gear used to protect workers from injuries while working. This equipment can include items like helmets, gloves, safety shoes, eye protection, and clothing. It's important to wear the right PPE for each job to stay safe.

- **Head Protection:** Helmets or hard hats to protect the head from falling objects.
- **Eye and Face Protection:** Goggles or face shields to protect the eyes and face from flying debris, chemicals, or harmful light.
- **Hand Protection:** Gloves to protect the hands from sharp objects, chemicals, or extreme temperatures.
- **Foot Protection:** Safety shoes or boots to protect the feet from heavy objects or sharp materials.
- **Hearing Protection:** Earplugs or earmuffs to protect the ears from loud noise.
- **Body Protection:** Coveralls or vests to protect the body from chemicals, heat, or cuts.

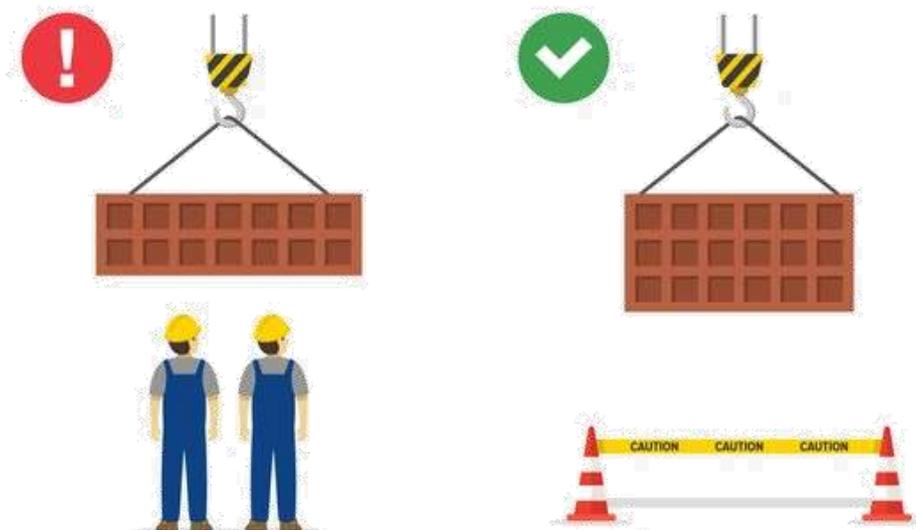


## 12.10. Safety Protocols in Rigging

When performing rigging tasks, it's very important to follow safety rules to avoid accidents. These rules help make sure the lifting, moving, and securing of loads are done safely.

- **Pre-Task Inspection:**
  - Check all equipment (like ropes, chains, and lifting devices) before use to make sure it is in good condition.
  - Ensure all lifting equipment is rated for the weight of the load you are moving.
- **Load Handling:**
  - Always know the weight and size of the load before lifting it.
  - Ensure the load is properly balanced to avoid accidents.
  - Make sure no one is standing directly under the load while it is being lifted or moved.
- **Lifting the Load:**
  - Use proper lifting techniques to avoid injury.
  - Ensure the lifting equipment (crane, hoist, etc.) is secure and positioned correctly.
  - Avoid sudden jerks or movements while lifting the load.
- **Securing the Load:**
  - Make sure the load is securely fastened to prevent it from shifting or falling.
  - Double-check all connections and knots before lifting the load.
  - Ensure ropes, chains, or slings are not twisted or damaged.

### BARRICADE LIFTING ZONE AND DON'T SUSPEND LOADS OVER PERSONS



## 12.11. Non-Compliance Reporting:

### 12.11.1. Importance of Reporting Safety Issues

**12.12. Reporting safety problems is important to keep the workplace safe for everyone. If you see something that could be dangerous or if safety rules are not being followed, it is your responsibility to let someone know.**

### 12.12.1. When to Report Safety Issues

You should report safety issues if you notice any of the following:

- Damaged or broken equipment
- Unsafe working conditions (e.g., slippery floors, poor lighting)
- Workers not wearing required personal protective equipment (PPE)
- Hazardous materials not being handled properly
- Unsafe lifting or rigging practices
- Violations of safety rules or regulations

### 12.12.2. How to Report:

- Identify the Issue:
  - Clearly notice what is wrong or unsafe.
  - Think about how it could affect people's safety.
- Report to the Right Person:
  - Tell your supervisor or safety officer about the problem.
  - If the supervisor is unavailable, report to a safety officer or another authority figure.
- Provide Details:
  - Explain clearly what the issue is.
  - Give details about the location, the equipment involved, and the possible danger.
- Follow Up:
  - After reporting, check to see if the issue was fixed.
  - If the problem continues or is not resolved, follow up with the supervisor or safety officer.



### **12.13. Safety Records:**

- Safety Inspections:
  - Record details of safety checks in the workplace.
- Equipment Inspections:
  - Record the condition of rigging equipment (e.g., ropes, slings) before use.
- Incident Reports:
  - Document any accidents, near-misses, or safety issues during rigging tasks.

## 12.14. How to Maintain Accurate Records

- Be clear and detailed about dates, names, and findings.
- Use the correct forms for each record.
- Keep records organized and up-to-date.

### 12.14.1. Safety Checklists

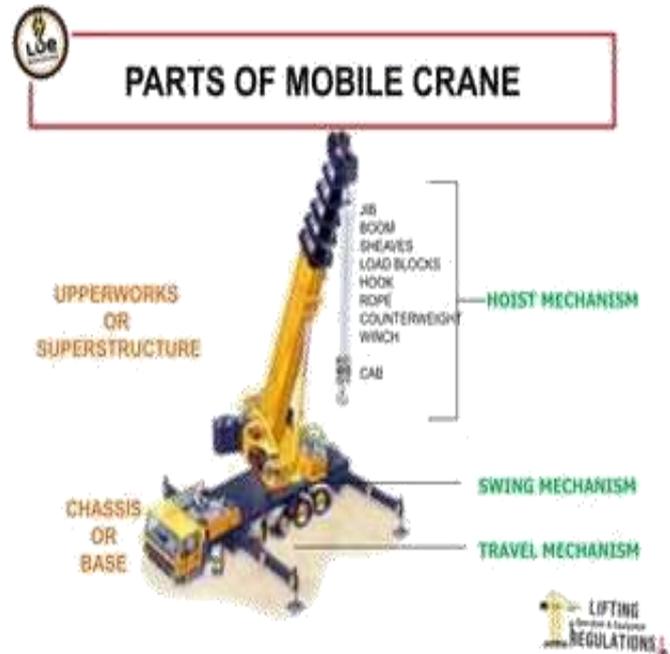
Safety checklists help ensure everything is in order before rigging tasks. You inspect equipment, the work area, and PPE to avoid accidents.

### 12.14.2. Hazard Assessments

Hazard assessments identify potential dangers in the work area. As a rigger, you find risks, evaluate them, and take action to prevent accidents.

### 12.14.3. Compliance Reports

Compliance reports document safety checks and assessments. They show that safety regulations are being followed and help communicate with supervisors.



## 12.15. Case Study:

1. **Industry Type:**  
Construction (Rigging and Lifting Operations)
2. **What happened:**  
A rigging team was lifting a heavy load when the load became unstable, causing debris to fall and injuring a rigger. The team did not follow proper safety procedures, leading to the incident.
3. **Why Happened:**
  - Equipment was not properly inspected.
  - Hazards, like wind and obstacles, were not assessed.
  - PPE was not fully checked, and some workers were not wearing the right gear.
  - Communication and safety protocols were not followed.
4. **Learnings:**
  - Inspect equipment and check the environment before starting the job.
  - Always wear the correct PPE.
  - Communicate risks and follow safety procedures.
5. **Action:**
  - The company reviewed safety procedures and updated protocols.
  - Additional training on safety checks and PPE use was provided.
  - Improved communication systems were set up, and regular equipment inspections were enforced.

## **12.16. Summery and Review Question:**

### **12.16.1. Summery:**

In rigging operations, safety is the top priority. As a rigger, you need to know and follow key safety standards and regulations, like those set by OSHA and ANSI. It's important to understand your role in maintaining safety by knowing workplace requirements and using personal protective equipment (PPE). Always identify potential hazards like unstable loads or equipment failure and take steps to reduce risks. Following safety protocols, completing safety checklists, and reporting any issues are vital to ensuring everyone stays safe. You must communicate any safety concerns to your team and supervisors effectively, helping to prevent accidents. Keeping accurate records of inspections and safety reports is also essential to comply with safety laws.

### **12.16.2. Review Question:**

1. What are some key safety standards and regulations you should follow as a rigger?
2. Why is it important to inspect equipment and the work area before starting a rigging task?
3. What should you do if you see a safety issue or someone not following safety rules?
4. How can you help reduce risks and hazards during rigging and lifting tasks?
5. What is the importance of using personal protective equipment (PPE) and ensuring it is safe to use?

## **13. Chapter 3: Rigging Inspections < SSD/N0303 v 1.0>**

### **13.1. Introduction:**

The purpose of this chapter is to help riggers understand how to properly inspect rigging equipment and materials. This includes tools like slings, chains, wire ropes, and hooks. Proper inspection ensures that all equipment is safe and ready for lifting and material handling tasks. As a rigger, you will learn how to check for damage, wear, and tear on equipment to prevent accidents. It also covers how often equipment should be inspected, how to document findings, and the importance of following safety standards like OSHA and ANSI.

## 13.2. Risk Assessment and Safety Measures for Rigging Tasks

1. Identify Hazards Before Starting
  - **Look for Potential Risks:** Before beginning any rigging task, carefully look around the work area for any potential hazards such as obstacles, uneven surfaces, or other equipment.
  - **Check for Weather Risks:** Weather conditions like high winds or rain can affect rigging safety. Make sure conditions are safe to work in.
  - **Assess Load Risks:** Check the load to be lifted. Ensure it is stable and secured before lifting.
2. Risk Control Measures
  - **Use Safety Gear:** Always wear the required personal protective equipment (PPE) such as helmets, gloves, and safety shoes.
  - **Secure the Load:** Ensure that slings, ropes, and hardware are correctly used to secure the load and prevent accidents.
3. Communicate Hazards
  - **Talk to Your Team:** If you spot any risk or hazard, inform your team and supervisors immediately to take corrective actions.



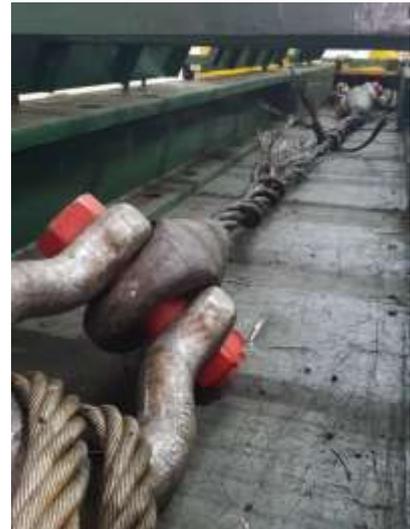
### 13.3. Identify Damage Tools:

#### 1. Inspect Rigging Gear

- **Check for Visible Damage:** Look for any cracks, fraying, or cuts in slings, ropes, and chains. Damaged gear can be dangerous.
- **Look for Wear:** Over time, rigging gear can show signs of wear, such as stretched or worn-out ropes. Replace them before use.
- **Inspect Hooks and Hardware:** Check hooks for cracks or deformation. Make sure they move freely and securely.

#### 2. Document Issues

- **Write Down the Findings:** If you find damage or defects, make a note of it in the inspection log. Include the type of damage and the equipment affected.
- **Report to Supervisors:** Ensure that the issue is reported to the supervisor or safety officer so that repairs or replacements can be made.



## 13.4. Communicate with Team

### 1. Communication is Key

- **Discuss the Plan:** Before starting, talk with your team about the rigging plan. Ensure everyone understands their roles and responsibilities.
- **Use Clear Signals:** Use hand signals or radios to communicate clearly, especially in noisy environments.

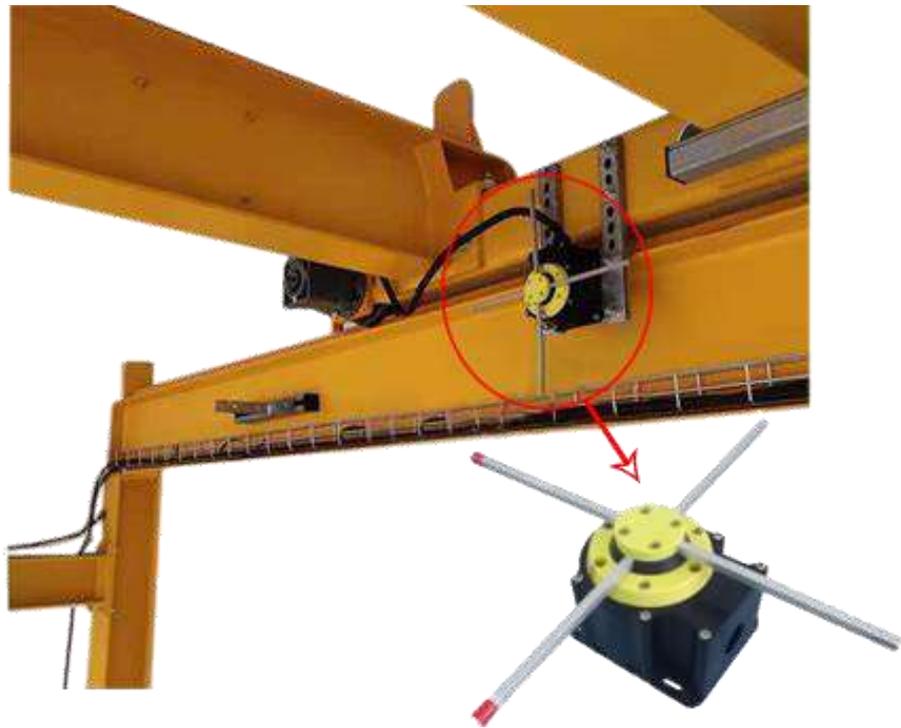
### 2. Working Together Safely

- **Stay in Position:** Ensure everyone is in the correct position and aware of the load's movement.
- **Monitor the Lift:** Watch the load throughout the lift to ensure it is stable and no one is in danger.



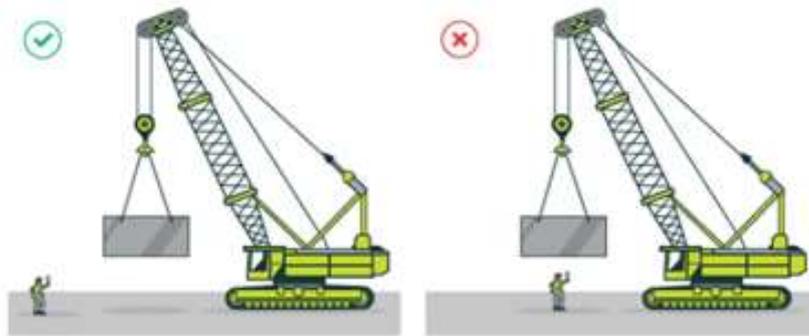
## 13.5. Pre-Operation Safety Checklist for Hook and Control Systems

1. Test Equipment Before Use
  - **Raise Hooks to Maximum Height:** Ensure all hooks are raised to the upper limit switch to check if the equipment functions properly.
  - **Check Control Settings:** Set all controls to the off position when the equipment is not in use.
2. Visual Inspection
  - **Look for Dangerous Conditions:** Visually check the work area and equipment for any unsafe conditions like loose wires, obstacles, or improperly secured loads.
  - **Ensure Safe Operation:** Confirm that all rigging equipment is working properly and safely before starting any rigging task.



## 13.6. Line of Fire

1. Keep People Away from Suspended Loads
  - **Safety Zone:** Always create a safe zone around the load. No one should stand under or close to a load that is being lifted or suspended.
  - **Clear Communication:** Make sure everyone on the team knows that standing under suspended loads is strictly prohibited.
2. Reinforce Safety Rules
  - **Warn Workers:** If workers are near suspended loads, alert them to move out of the danger zone.
  - **Monitor Constantly:** Continuously monitor the area to ensure no one enters the danger zone while a load is suspended.



## 13.7. Case Study:

1. Industry Type: Construction
2. **What Happened:**

During a construction project, a heavy load slipped from the sling while being lifted, causing damage to nearby equipment. Fortunately, no one was injured.
3. Why Happened:
  - The rigging gear was not inspected for wear and tear before use.
  - Team members were not properly coordinated, leading to miscommunication during the lift.
  - The work area was not checked for hazardous conditions, and personnel were present near the suspended load.
4. Learnings:
  - Rigging equipment must always be inspected for damage or defects before every use.
  - Clear communication and coordination among team members are critical for safe rigging operations.
  - Ensure that no personnel are present under suspended loads.
  - Pre-lift inspections, including raising hooks to test controls, should be conducted.
5. Action:
  - Implement regular inspections of all rigging tools and equipment and document findings.
  - Establish clear communication protocols and use hand signals or radios during lifting tasks.
  - Create a safety zone to prevent anyone from standing under or near suspended loads.
  - Train workers on the importance of inspecting the work area and equipment before operations.

## **13.8. Summary & Review Question:**

### **13.8.1. Summary**

Rigging inspections are essential to ensure the safety and effectiveness of lifting operations. Regular checks for wear, damage, or defects in rigging equipment help prevent accidents. Clear communication and teamwork among rigging crew members enhance operational safety. Workers must inspect the work area, ensure no personnel are near suspended loads, and follow proper safety measures. Adhering to these practices minimizes risks and ensures compliance with safety standards, creating a safer working environment.

### **13.8.2. Review Questions**

1. Why is it important to inspect rigging equipment before every use?
2. What safety measure should be taken to prevent personnel from standing under suspended loads?
3. How can team coordination improve safety during rigging operations?
4. What should be done if a rigging tool shows signs of wear or damage?
5. Why is it necessary to inspect the work area before starting a rigging task?

## 14. Chapter 4: Rigging Equipments and Slings <SSD/N0304 v 1.0>

### 14.1. Introduction:

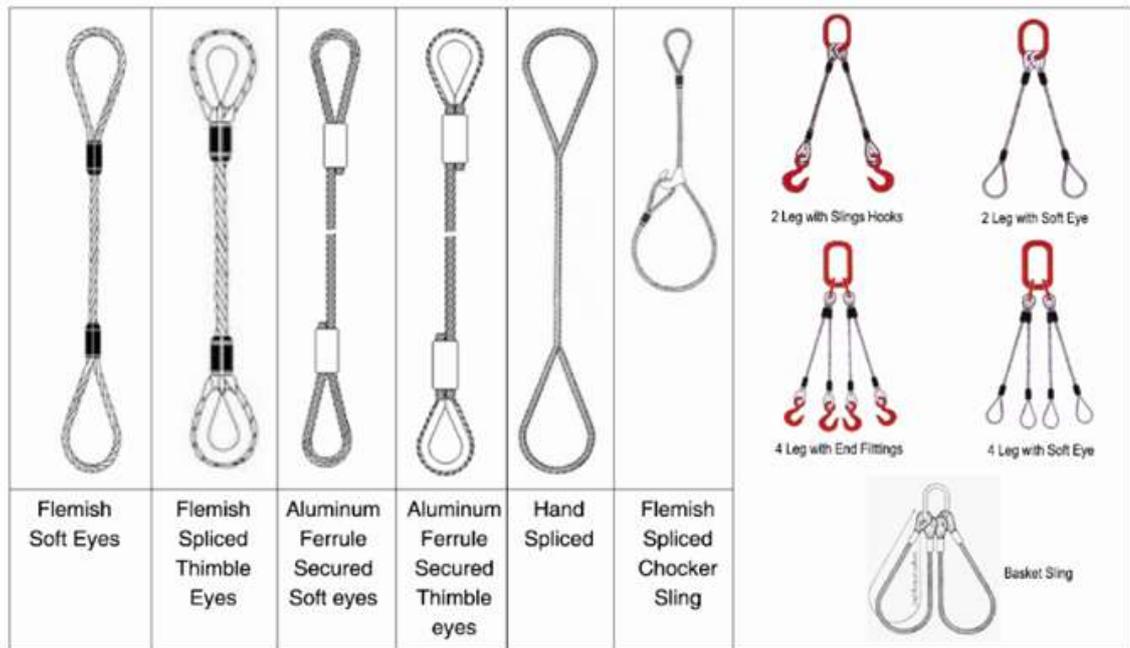
This chapter provides an overview of the essential rigging equipment and slings used in lifting and material handling operations. It introduces Basic Riggers to different types of slings, such as wire rope, chain, synthetic, and metal mesh, along with their properties, applications, and limitations. Additionally, it covers the use of rigging hardware like hooks, shackles, and clips, as well as the proper techniques for tying knots like the bowline, clove hitch, and square knot. By understanding the correct selection, use, and maintenance of these tools, riggers can ensure safe and efficient operations while minimizing risks in the workplace.

## 14.2. Properties, Strengths, and Limitations of Sling Types

Selecting the right sling type is crucial for the safety and efficiency of rigging operations. There are several types of slings available, including wire rope slings, chain slings, synthetic slings, and more. Each type has specific properties, strengths, and limitations that determine their suitability for different lifting tasks.

### 1. Wire Rope Slings

- **Strengths:** High strength, resistant to abrasion, and works well for heavy lifting.
- **Limitations:** Less flexible and prone to fraying or kinks; not ideal for irregularly shaped loads.



### 2. Chain Slings

- **Strengths:** Extremely durable, suitable for heavy and rough lifting.
- **Limitations:** Heavy, can be difficult to handle, and require regular inspection for wear and elongation.



### 3. WEB Slings

- **Strengths:** Light, flexible, and suitable for lifting delicate or irregularly shaped loads.
- **Limitations:** Can be damaged by high temperatures, chemicals, or UV light.



#### Factors to Consider When Selecting a Sling

1. **Load Characteristics:** Consider the weight, shape, and size of the load. For heavy, bulky items, use chain or wire rope slings. For irregular shapes, synthetic slings are more flexible.
2. **Environmental Conditions:** Consider factors like weather (rain, sunlight), exposure to chemicals, and temperature. For outdoor and rough conditions, chain slings may be more suitable, while synthetic slings work well indoors or in mild conditions.

|        | WLL<br>in kg | Width<br>in mm | Load in %   |   |   |   |   |
|--------|--------------|----------------|---|---|---|---|---|
|        |              |                | Factors   |   |   |   |   |
|        |              |                | 100 %   | 200 %   | 140 %<br><small>from 2° to 45°</small>  | 80 %  | 100 %<br><small>from 45° to 68°</small>   |
|        |              |                |  |  |  |  |  |
| PURPLE | 1 000        | 30             | 1 000   | 2 000   | 1 400   | 800   | 1 000   |
| OLIVE  | 1 500        | 50             | 1 500   | 3 000   | 2 100   | 1 200   | 1 500   |
| GREEN  | 2 000        | 60             | 2 000   | 4 000   | 2 800   | 1 600   | 2 000   |
| WHITE  | 2 500        | 75             | 2 500   | 5 000   | 3 500   | 2 000   | 2 500   |
| YELLOW | 3 000        | 90             | 3 000   | 6 000   | 4 200   | 2 400   | 3 000   |
| GREY   | 4 000        | 120            | 4 000   | 8 000   | 5 600   | 3 200   | 4 000   |
| RED    | 5 000        | 150            | 5 000   | 10 000  | 7 000   | 4 000   | 5 000   |
| BROWN  | 6 000        | 180            | 6 000   | 12 000  | 8 400   | 4 800   | 6 000   |
| BLUE   | 8 000        | 240            | 8 000   | 16 000  | 11 200  | 6 400   | 8 000   |
| ORANGE | 10 000       | 300            | 10 000  | 20 000  | 14 000  | 8 000   | 10 000  |
| ORANGE | 15 000       | 240            | 15 000  | 30 000  | 21 000  | 12 000  | 15 000  |
| ORANGE | 20 000       | 300            | 20 000  | 40 000  | 28 000  | 16 000  | 20 000  |

#### 14.2.1. Key Selection Tips

- Always check the load capacity rating of the sling.
- Ensure the sling is in good condition, with no signs of damage or wear.
- Select a sling that fits the shape of the load and the environmental conditions.

## 14.3. Selecting and Attaching Appropriate Rigging Hardware

Rigging hardware like hooks, shackles, clips, and turnbuckles are essential for ensuring load stability and control during lifting. The right hardware must be selected and properly attached to avoid accidents.

### 14.3.1. Common Types of Rigging Hardware

- **Hooks:** Used for attaching slings to the load. Ensure hooks have a safety latch to prevent accidental detachment.
- **Shackles:** These connect slings to the load. Make sure the shackle is rated for the load capacity and correctly fastened.
- **Clips and Turnbuckles:** These are used to adjust tension and secure slings or ropes. Turnbuckles help maintain the required load tension.



### 14.3.2. Correct Attachment

- Always ensure hardware is securely attached to prevent slippage during lifting.
- Use appropriate-sized hardware for the job. For example, using a shackle that's too small can result in failure.

## 14.4. Correct Use of Hitches

The right hitch can make a big difference in how effectively and safely a load is handled. Sling hitches such as the vertical, choker, and basket hitch are commonly used in rigging.

### 14.4.1. Types of Sling Hitches

- **Vertical Hitch:** Suitable for lifting loads from a single point. Ensure the sling supports the load evenly.
- **Choker Hitch:** Used to secure the load tightly. However, it can reduce the sling's capacity due to the choking effect.
- **Basket Hitch:** Used for lifting a load from two points. This hitch distributes the load evenly and is stronger than a vertical hitch.

### 14.4.2. Choosing the Right Hitch

- Select the hitch type based on the load's size, shape, and weight.
- Make sure the load is balanced and the hitch is securely fastened before lifting.

## 14.5. Appropriate Knots

Knots are essential for securing loads during rigging. Different types of knots are used for different purposes, depending on the rope material and the load.

### 14.5.1. Common Knots Used in Rigging

- **Bowline Knot:** Used to create a fixed loop at the end of a rope. It is strong and easy to untie.
- **Clove Hitch:** Secures the rope to an anchor or load. It is simple to tie but should be checked regularly to ensure it doesn't slip.
- **Square Knot:** Used for joining two ropes of equal size. It should be tied securely to prevent it from coming undone.
- **Double Half Hitch:** Ideal for tying a rope to a stationary object, ensuring it doesn't slip.

### 14.5.2. Knots for Load Securing

- Make sure to choose the right knot for the material being used (e.g., manila, fiber, or synthetic rope).
- Check all knots for security before starting the lifting operation.

## 14.6. Types of Ropes

Ropes are essential tools in rigging operations, used for securing, lifting, or guiding loads. The properties of ropes vary depending on the material they are made from, and understanding these differences helps in selecting the right rope for each job.

### 14.6.1. Types of Ropes and Their Properties

- **Manila Rope:** Made from natural fibers, manila ropes are strong and durable. However, they are prone to rot in wet conditions and can weaken with UV exposure.
- **Fiber Rope:** Typically made from synthetic materials, fiber ropes are lighter and more flexible than manila ropes. They resist UV rays and water but may have lower abrasion resistance.
- **Synthetic Rope:** Made from materials like nylon or polyester, these ropes are strong, flexible, and resistant to chemicals and weather. However, they may stretch under load, reducing their effectiveness in some applications.



### 14.6.2. Impact on Knot Selection and Load Securing

The type of rope affects how knots hold, as some materials, like synthetic rope, are slippery, making certain knots less secure. Manila ropes, on the other hand, are easier to tie but may fray quickly.

## 14.7. Basic Maintenance on Rigging Slings and Equipment

Rigging slings, equipment, and ropes are essential for safe lifting operations. Regular maintenance ensures that these tools remain in good condition, preventing accidents and extending their service life.

### 14.7.1. Maintenance Guidelines

- **Visual Inspections:** Check slings, ropes, and hardware for any visible signs of wear, fraying, or corrosion. Any damaged parts should be replaced immediately.
- **Cleaning:** Ropes and slings should be kept clean and free from dirt, chemicals, and other contaminants that could weaken their structure. Follow the manufacturer's cleaning instructions.
- **Lubrication:** Apply lubrication to hardware like hooks and shackles to prevent rust and ensure smooth operation.

### 14.7.2. Maintenance Frequency

Regular inspections should be performed before and after each use. Periodic checks should be done according to industry standards, such as every six months for wire ropes.

## 14.8. Removing Unsafe or Defective Rigging Slings

Ensuring that rigging slings, ropes, and equipment are safe to use is critical for maintaining safety during lifting operations. Any equipment that is found to be unsafe must be immediately removed from service.

### 14.8.1. Signs of Unsafe Equipment

- **Wire Ropes:** Check for broken wires, kinks, or frays. If the wire rope has any of these defects, it should be taken out of service.
- **Synthetic Slings:** Look for cuts, abrasions, or fading from UV exposure. If the sling is damaged in any way, it should not be used.
- **Hardware:** Inspect shackles, hooks, and turnbuckles for cracks, corrosion, or signs of excessive wear.

### 14.8.2. Action to Take

- Tag out any defective equipment with a “Do Not Use” tag.
- Remove it from the work area to avoid accidental use.



## 14.9. Calculating Load Angles and Stress Factors

When using multiple slings to lift a load, it's important to calculate the load angles and stress factors to ensure that the lift is balanced and safe.

### 14.9.1. Load Angles and Stress

- **Load Angle Impact:** The angle at which a sling is used affects the load it carries. A wider angle puts more strain on the sling, which can cause failure if the sling isn't rated for the increased load.
- **Stress Factors:** When using multiple slings, the load on each sling can increase depending on the angle between them. Calculate the load angle to ensure each sling is not overloaded.

### 14.9.2. Calculating Safe Angles

For safe lifting, ensure that the angle between slings does not exceed a certain degree (usually 60 degrees). If the angle is too steep, the load on the slings increases, putting them at risk of failure.

## 14.10. Proper Rigging Techniques

Using the correct rigging techniques is essential for ensuring that the load is secured properly during lifting. Improper rigging can cause issues like sling slippage, rope untying, load swinging, or tipping.

### 14.10.1. Preventing Sling Slippage and Load Swinging

- **Secure Knots:** Always ensure knots are tied correctly and securely. Use the appropriate knot for the rope material and load type.
- **Balanced Lifts:** Ensure that the load is balanced, and the slings are correctly positioned. This reduces the risk of swinging or tipping during the lift.

### 14.10.2. Additional Techniques for Safety

- **Use of Hardware:** When needed, use shackles, hooks, or turnbuckles to secure the load more effectively. Make sure these are rated for the load's weight.
- **Inspection Before Lifting:** Always check that the rigging equipment is secure, and the load is stable before starting the lift.
- Why is it necessary to inspect the work area before starting a rigging task?

## 14.11. Case Study:

### Industry Type:

Shipping and Logistics Industry

### What happened:

A logistics company was tasked with lifting and securing a large metal cargo container for transport. The rigging crew used a combination of chain slings and hooks for the lift. However, during the operation, one of the chain slings snapped, causing the load to swing uncontrollably and damage surrounding equipment. Fortunately, no injuries occurred, but the incident led to significant downtime and a safety audit.

### Why happened:

- The wrong sling type was selected based on the load's weight and characteristics.
- The chain slings were not inspected before use, and signs of wear on the chains went unnoticed.
- The sling hitches were improperly tied, leading to load imbalance and excessive strain on one of the slings.
- The load angle and stress factors were not properly calculated for multiple sling use, resulting in overloading of one of the slings.
- The rigging hardware, such as hooks and shackles, were not correctly sized for the load, contributing to the sling's failure.

### Learning:

- Proper selection of rigging slings based on load characteristics and environmental factors is crucial for safety.
- Routine inspections of slings, ropes, and hardware can help identify wear or damage before use.
- Correct rigging techniques, such as the proper use of sling hitches and knot types, are necessary to prevent load slippage and imbalance.
- Calculating load angles and stress factors for multiple sling configurations helps maintain load stability and prevents overloading.
- Following manufacturer guidelines for rigging hardware and slings ensures compliance with safety standards.

### Action plan:

1. Provide additional training for rigging teams on the selection of sling types based on load characteristics and conditions.
2. Implement a stricter pre-lift inspection process for slings, ropes, and rigging hardware to check for signs of wear or damage.
3. Ensure that rigging hitches are correctly tied and load angles are calculated to prevent sling overloading.
4. Review and standardize rigging hardware usage to ensure compatibility with the load's weight and lifting requirements.
5. Conduct regular audits of rigging practices and equipment maintenance to ensure compliance with safety standards and manufacturer specifications.

## **14.12. Summery and Review Question:**

### **14.12.1. Summary:**

Rigging slings and equipment are essential components in ensuring safe and efficient load lifting operations. A certified professional in rigging must understand the different types of slings, including wire rope slings, chain slings, synthetic web slings, round slings, and metal mesh slings, and their respective properties, strengths, and limitations. The ability to select the correct sling type based on load characteristics, lifting conditions, and environmental factors is crucial. Proper use of rigging hardware, such as hooks and shackles, and the correct application of sling hitches and knots, ensure load stability and safety during lifting operations. Routine inspections, maintenance, and following manufacturer guidelines are key practices to prevent accidents. Additionally, professionals must understand how to calculate load angles and stress factors to maintain balance and prevent load instability.

### **14.12.2. Review Questions:**

1. What factors should be considered when selecting the appropriate sling type for a lifting operation?
2. How do the properties of manila, fibre, and synthetic ropes influence knot selection and load securing?
3. Why is it important to inspect rigging slings and equipment before use, and what signs of damage should be looked for?
4. How can calculating load angles and stress factors help prevent issues when using multiple rigging slings?
5. What are the key steps in ensuring that rigging slings and hardware are maintained in accordance with manufacturer guidelines and safety standards?

## 15. Chapter 5: Lifting Devices and Below-the-Hook Lifters <SSD/N0305 v 1.0>

### 15.1. Introduction

This chapter is all about learning how to safely use tools and equipment that help lift and move heavy objects. These tools include lifting beams, clamps, magnets, and vacuum lifters, which are attached below the hook of a crane or hoist. You will learn how to choose the right tool based on the weight and shape of the object, check that it is safe to use, and understand its limits. By following these steps, you can make sure the job is done safely and smoothly. This chapter keeps the explanations simple so that everyone can understand and work confidently.

## 15.2. Types of Lifting Devices and Below-the-Hook Lifters

To lift and move heavy objects safely, it is important to know the different types of below-the-hook lifters and their uses. Each tool is designed for a specific purpose and task.

### Types of Lifters:

- **Lifting Beams:** Long bars that balance and support heavy loads.
- **Spreader Beams:** Beams with extra attachments for handling wide or uneven loads.
- **Plate Clamps:** Clamps that securely hold metal sheets for lifting.
- **Lifting Magnets:** Devices that use magnetic force to lift metal objects.
- **Vacuum Lifters:** Tools that use suction to hold and lift smooth surfaces like glass or plastic.

## 15.3. Lifting Devices: Properties, Applications, and Limitations

Every lifting device has unique features, strengths, and limitations. Understanding these helps ensure you choose the right tool for the job and use it safely.

### Understanding Each Device:

#### 1. Lifting Beams:

- **Properties:** Strong, rigid, and ideal for even weight distribution.
- **Applications:** Best for lifting long, heavy, or wide objects.
- **Limitations:** Cannot adjust to curved or irregular shapes.

#### 2. Spreader Beams:

- **Properties:** Includes extra hooks or slings for larger loads.
- **Applications:** Suitable for large items like pipes or beams.
- **Limitations:** Requires more space for operation.

#### 3. Plate Clamps:

- **Properties:** Grips metal plates firmly without damage.
- **Applications:** Ideal for lifting flat sheets of metal.
- **Limitations:** Only works on specific thicknesses of metal.

#### 4. Lifting Magnets:

- **Properties:** Uses magnetic force, no slings or clamps needed.
- **Applications:** Perfect for lifting steel or iron.
- **Limitations:** Cannot lift non-metal or rusty items.

#### 5. Vacuum Lifters:

- **Properties:** Uses suction to lift smooth surfaces.
- **Applications:** Great for glass, plastic, or other flat materials.
- **Limitations:** Needs a clean and smooth surface to work properly.

## 15.4. Using Lifting Beams and Spreader Beams Safely

Proper use of lifting and spreader beams ensures loads are lifted safely and efficiently. It involves steps to prepare, attach, and operate these tools correctly.

### Step-by-Step Process:

1. **Inspect the Beam:** Check for cracks, bends, or wear before use.
2. **Attach the Beam:** Securely connect the beam to the crane or hoist.
3. **Connect the Load:** Use hooks or slings to attach the load evenly to the beam.
4. **Test the Balance:** Lift the load slightly off the ground to check stability.
5. **Perform the Lift:** Move the load carefully, ensuring safe operation.

### Tips:

- Always keep the load balanced.
- Do not exceed the weight limit of the beam.

### LIFTING BEAMS



### SPREADER BEAMS



## 15.5. Operate Clamps, Lifting Magnets, and Vacuum Lifters

Different tools like clamps, magnets, and vacuum lifters require specific steps for safe operation. Each tool is used based on the type of load and surface.

### Operating Clamps:

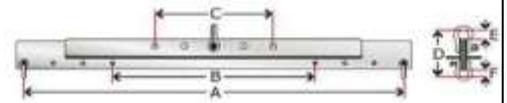
- Open the clamp and position it on the object.
- Tighten the clamp to ensure a secure grip.
- Test the hold by lifting the load slightly.

### Using Lifting Magnets:

- Place the magnet on a clean metal surface.
- Activate the magnet using the control mechanism.
- Ensure the magnet is strong enough to lift the load safely.

### Using Vacuum Lifters:

- Position the suction cups on a flat, clean surface.
- Turn on the vacuum pump to create suction.
- Verify the hold before lifting the object.



## 15.6. Securing Lifting Devices to Loads

Attaching lifting devices properly ensures the load stays stable and secure during the operation. Follow these steps to prevent accidents.

### Steps for Secure Attachment:

1. **Choose the Right Device:** Match the lifting device to the size and weight of the object.
2. **Secure the Load:** Attach the device using proper hooks, slings, or clamps.
3. **Check Stability:** Ensure the load is balanced and does not tilt or slide.
4. **Lift Safely:** Test by lifting the load a few inches off the ground to ensure security.

## 15.7. Pre-Use Inspections

Pre-use inspections help identify any defects or damage in lifting devices, ensuring safe operation. Always inspect before every use.

### Inspection Checklist:

- Look for cracks, rust, or damage on the device.
- Check moving parts for proper function.
- Test the controls of magnets and vacuum lifters.
- Ensure all labels and safety warnings are visible.
- Replace any worn or damaged parts immediately.



## 15.8. Proper Rigging Configurations and Hitches

Using the right rigging configurations and hitch types ensures stability and control during lifting operations. Always follow best practices for safety.

### Rigging Configurations:

- **Straight Hitch:** For lifting loads vertically.
- **Basket Hitch:** For balancing loads and spreading weight evenly.
- **Choker Hitch:** For securing loads tightly.

### Steps for Stability:

1. **Select the Right Rigging:** Use ropes, slings, or chains appropriate for the load.
2. **Check the Setup:** Ensure no sharp edges or weak points.
3. **Communicate Clearly:** Use clear signals during lifting operations.
4. **Lift and Move Cautiously:** Keep the path clear and avoid sudden movements.
5. **Safety Tip:** Always double-check rigging before lifting to prevent accidents.

## 15.9. Case Study:

### Industry Type:

Construction Industry

### What happened:

A construction site was using a crane to lift a heavy steel beam for a building structure. The crew used a spreader beam to ensure the load was evenly distributed, but due to improper selection of the lifting device, the beam became unbalanced and tipped during the lift. This caused the beam to swing uncontrollably, resulting in minor damage to nearby equipment and a safety risk to the workers.

### Why happened:

- Incorrect assessment of the load's weight and centre of gravity.
- Wrong lifting device (spreader beam) chosen for the load's size and weight.
- Lack of pre-lift checks to ensure rigging was secure.
- No pre-use inspection of the lifting device to identify defects or wear.

### Learning:

- Importance of selecting the correct lifting device based on load characteristics and environmental factors.
- Need for thorough pre-use inspections of lifting devices to identify defects.
- Criticality of calculating load weight, centre of gravity, and load distribution for stability.
- Necessity of using proper rigging techniques to maintain load control and safety.
- Adherence to manufacturer specifications and safety guidelines during lifting operations.

### Action plan:

1. Conduct thorough training on the correct selection of lifting devices based on load characteristics and environmental conditions.
2. Implement a standardized pre-use inspection checklist for all lifting devices to check for defects or wear.
3. Ensure that lifting beams and spreader beams are properly sized for the load's weight and centre of gravity.
4. Review safety guidelines and ensure all rigging is done according to manufacturer specifications and best practices.
5. Regularly conduct safety drills to reinforce proper lifting techniques and rigging configurations.

## **15.10. Summary and Review Question:**

### **15.10.1. Summary:**

In lifting operations, the proper selection, use, and maintenance of lifting devices and below-the-hook lifters are crucial for ensuring safety and efficiency. This case study from the construction industry highlights the importance of choosing the right equipment, understanding load characteristics, and performing pre-lift checks. The incident occurred due to improper assessment of the load and a failure to inspect lifting devices, leading to instability and a safety risk. The lessons learned include the need for thorough training, routine inspections, and adherence to safety protocols to prevent similar accidents in the future.

### **15.10.2. Review Questions:**

1. What are the key factors to consider when selecting a lifting device for a specific load?
2. Why is it essential to conduct pre-use inspections of lifting devices before operation?
3. How does load weight and centre of gravity impact the choice of lifting device?
4. What are the consequences of failing to use appropriate rigging techniques during lifting operations?
5. How can training and safety protocols prevent accidents related to lifting devices in the construction industry?

## 16. Chapter 6: Manual Hoists and Load Handling <SSD/N0306 v 1.0>

### 16.1. Introduction

This chapter provides Basic Riggers with essential knowledge and skills required for the safe and efficient operation of manual hoists in lifting and material handling operations. This section covers the selection, operation, and maintenance of various manual hoists such as chain hoists, lever hoists, and hand-operated winches. It emphasizes the importance of understanding each hoist's characteristics, capacities, and limitations, as well as performing thorough pre-use inspections. Additionally, the chapter focuses on applying proper load handling techniques, estimating load requirements, and selecting the right hoist configurations to ensure safety. By adhering to these principles, Basic Riggers can ensure safe lifting practices, hazard management, and compliance with industry standards during lifting operations.

### 16.2. Types of Manual Hoists

Manual hoists are devices that use human power to lift or pull heavy loads. The correct understanding of the different types of hoists is essential for selecting the right tool for the task.

#### Types:

- **Chain Hoists:**
  - Operate using a chain to lift heavy loads.
  - Suitable for high-capacity lifting.
  - Ideal for lifting heavy equipment or materials vertically.
- **Lever Hoists:**
  - Operate using a lever to lift or pull.
  - Great for use in confined spaces.
  - Easy to control and adjust tension.
- **Hand-Operated Winches:**
  - Use a hand-crank mechanism to wind and unwind a rope.
  - Ideal for pulling and lifting over a long distance.
  - Often used for recovery and tensioning applications.

#### Applications:

- Chain hoists are preferred for heavy lifting tasks.
- Lever hoists are used for tasks in restricted areas.
- Winches are utilized for distance-based pulling or lifting tasks.

### 16.3. Selecting the Right Hoist

Choosing the appropriate manual hoist is crucial for safe and efficient load handling. Several factors must be considered to select the right hoist for a given task.

- Load Weight:
  - Select a hoist with an adequate weight capacity.
  - Overloading a hoist can cause failure and accidents.
- Lifting Height:
  - Choose a hoist that can lift to the required height without strain.



- Environmental Conditions:
  - In wet or corrosive environments, consider hoists with protective coatings.
  - For dusty or dirty conditions, select hoists with easy-to-clean designs.
- Other Factor's:
  - Assess the task's requirements thoroughly before selecting a hoist.
  - Always refer to manufacturer guidelines for weight and height specifications.

## 16.4. Understanding Limitations

Manual hoists are not suitable for all lifting scenarios. Understanding their limitations helps ensure that they are used safely.

- Load Capacity:
  - Each hoist type has a maximum load capacity. Never exceed this limit to avoid equipment failure.
  - Always verify the load weight before use.
- Operational Distance:
  - Some hoists may not be suitable for long-distance lifts or pulls.
  - Consider whether the hoist can meet the required operational distance for the task.
- Required Force:
  - The force needed to operate the hoist increases with heavier loads. If the force exceeds what can be safely exerted, the hoist may malfunction.
  - Factor in the physical effort required to safely operate the hoist.



## 16.5. Safe Operation of Hoists

Safety is the top priority when operating manual hoists. Proper handling and control techniques ensure smooth and stable lifting.

- Smooth Lifting and Lowering:
  - Operate the hoist in a controlled manner, avoiding jerks or sudden movements.
  - Always check the alignment of the hoist before initiating the lift.
- Stable Lifting:
  - Ensure that the hoist is properly aligned above the load.
  - Never lift a load that is unbalanced or improperly rigged.
  - Maintain a steady hand and controlled movements during operation to ensure smooth handling.

## 16.6. Correct Positioning and Alignment

Proper lifting techniques are essential for preventing load sway, imbalance, or accidents during lifting.

- Correct Positioning:
  - Ensure that the hoist is directly above the load before beginning the lift.
  - The load should be evenly balanced to prevent tipping or swinging.
  - Always double-check load positioning before starting the lift.
- Alignment of the Hoist:
  - Align the hoist with the load to reduce the risk of side pulls or instability.
  - If using multiple hoists, ensure that each one is aligned correctly.

## 16.7. Secure Load Attachment

Before lifting, ensuring that the load is properly attached to the hoist is critical for safety.

Rigging Techniques:

- Use the correct hardware such as hooks, shackles, or slings to attach the load securely.
- Check that all connections are secure before beginning the lift.

Hardware Selection:

- Choose rigging hardware that is compatible with the hoist and load capacity.
- Always inspect the rigging hardware before use.
- Use the right size and type of rigging components for each job.



## 16.8. Pre-Use Inspection Checklist

Before each use, manual hoists must be thoroughly inspected to ensure they are in proper working condition. Always inspect every component before use and If any defects are found, do not use the hoist and remove it from service.

- Visual Inspection:
  - Check for signs of wear, damage, or deformation, such as worn chains or damaged hooks.
- Functional Check:
  - Operate the hoist briefly to ensure it runs smoothly and without obstruction.
- Component Integrity:
  - Inspect gears, cables, and hooks to ensure there are no defects.

## 16.9. Regular Maintenance Practices

Routine maintenance ensures that manual hoists remain functional and safe over time.

- Lubrication:
  - Regularly lubricate the mechanical components of the hoist as recommended by the manufacturer.
- Adjustment of Components:
  - Adjust gears, chains, and other parts to ensure proper alignment and smooth operation.
- Procedure:
  - Follow the manufacturer's maintenance guidelines.
  - Schedule regular maintenance checks to prevent unexpected failures.



## 16.10. Hazard Identification and Mitigation

Being aware of potential hazards during load handling is essential for preventing accidents and ensuring safe operations.

- Overhead Obstacles:
  - Always check for any overhead hazards, such as beams or other structures, before lifting.
  - Remove all obstacles in the lifting area.
- Ground Stability:
  - Ensure that the hoist is placed on stable, even ground to prevent tipping or instability during the lift.
  - Verify that the ground is solid and level before lifting.

## 16.11. Proper Lifting Configurations

Choosing the right lifting configuration ensures that the load is stable and handled correctly throughout the lifting process.

- Vertical Lifting:
  - For simple, direct lifting, use a vertical configuration.
- Angled Lifting:
  - For lifting at an angle, ensure that the hoist is aligned properly to avoid unnecessary strain.
  - Choose the lifting configuration that minimizes the risk of load instability.
- Multiple Hoist Setups:
  - For heavier or awkward loads, use multiple hoists to evenly distribute the load and maintain stability.
  - Calculate load angles and assess the weight distribution when using multiple hoists.



## 16.12. Case Study:

### Industry Type:

Construction

### What happened:

A construction worker used a chain hoist to lift a large steel beam. The load became unstable and swung excessively. The worker safely lowered the load without incident, but an investigation followed to understand the cause.

### Why happened:

- The hoist used was unsuitable for the load's weight and size.
- Pre-use inspection was not thorough, and signs of chain wear were missed.
- The weight and centre of gravity of the beam were not properly estimated.
- The hoist was misaligned, and the load was not securely attached.
- Environmental hazards, such as nearby scaffolding, were not considered.
- Routine maintenance, including lubrication, was not performed.
- Safety guidelines were not fully followed.

### Learning:

- Always perform a thorough pre-use inspection of hoists and components.
- Select the appropriate hoist based on load weight, size, and centre of gravity.
- Ensure proper rigging, hoist alignment, and secure load attachment.
- Regular maintenance is crucial for optimal hoist function.
- Identify and mitigate environmental hazards before lifting.
- Adhere strictly to safety standards and procedures.

### Action Plan:

- Implement a pre-use inspection checklist for hoists and components.
- Review hoist selection procedures based on load weight and centre of gravity.
- Train workers on proper rigging, hoist operation, and load attachment.
- Establish a regular maintenance schedule, including lubrication.
- Conduct site assessments to identify and address hazards.
- Ensure strict compliance with safety standards and regulations.

## **16.13. Summary and Review Question:**

### **16.13.1. Summary:**

In this chapter, the focus is on the safe and efficient use of manual hoists, including chain hoists, lever hoists, and hand-operated winches. Basic Riggers are trained to identify and operate different types of hoists and understand their properties and limitations. This includes selecting the right hoist for various load weights, lifting heights, and environmental conditions. Pre-use inspections, routine maintenance, and ensuring that all components, such as hooks and chains, meet safety standards are essential for safe operation. Proper rigging, lifting techniques, and hazard identification are crucial for load stability and preventing accidents. Compliance with industry standards such as OSHA and ANSI ensures that all lifting operations are carried out safely and effectively.

### **16.13.2. Review Questions:**

1. What are the key factors to consider when selecting a manual hoist for lifting operations?
2. Explain the importance of pre-use inspections and what should be checked during the inspection process.
3. How does load weight and centre of gravity affect the safe operation of manual hoists?
4. What are some common hazards to look for during load handling, and how can they be mitigated?
5. Why is routine maintenance important for manual hoists, and what are the common maintenance tasks that should be performed?

## 17. Chapter 7: Rigging Techniques and Load Stability <SSD/N0307 v 1.0>

### 17.1. Introduction:

This chapter provides essential knowledge and skills for ensuring the safe and stable handling of loads during lifting operations. This section covers the application of various rigging techniques and configurations, which are crucial for maintaining load stability throughout the lifting process. It emphasizes the importance of understanding load characteristics, managing sling angles, and utilizing the correct hitch types to control load movement and prevent accidents. By selecting appropriate rigging methods based on load requirements and identifying potential hazards, riggers can effectively manage load stability, ensuring safe and efficient lifting operations.

## 17.2. Key Rigging Concepts

To ensure safe lifting operations, riggers need to understand key rigging concepts such as load angles, centre of gravity, load weight distribution, and how sling angles affect load stability.

- **Load Angles:** The angle between the rigging sling and the load. The greater the angle, the more stress it puts on the sling.
- **Centre of Gravity:** The point where the load is balanced. If not properly managed, it can cause the load to tip or swing.
- **Load Weight Distribution:** Ensuring the weight is evenly distributed across the rigging slings to maintain balance during the lift.
- **Sling Angles:** The angle formed by the sling and the load, which directly impacts the sling's load capacity and the stability of the load.

### 17.3. Managing Sling Angles

Sling angles directly impact load distribution and sling stress. Managing these angles properly ensures balanced lifting and reduces the chance of sling failure.

- **Optimal Sling Angles:** Aim for a 30-60-degree angle for the slings to avoid unnecessary stress on the rigging system.
- **Balancing the Load:** Adjust sling angles to ensure the load is balanced and evenly distributed to prevent tipping or swinging.
- **Minimizing Stress:** Correct angles reduce the strain on the rigging components, increasing the safety of the lift.

## 17.4. Monitoring Load Movement

Continuous monitoring of the load during the lift is essential for maintaining control. Adjustments to sling tension and rigging configurations may be required to ensure the load remains stable.

### Monitoring and Adjusting:

- **Monitor Load Movement:** Keep a close watch on the load's position and movement during the lift.
- **Adjust Sling Tension:** If the load shifts, adjust the sling tension to regain balance and ensure the load stays cantered.
- **Rigging Configurations:** If necessary, change the rigging setup to prevent any unwanted swinging or tilting of the load.



## 17.5. Safety Measures

Tag lines and secondary rigging help control load movement, especially when the load is suspended high or over obstacles. These safety measures reduce the risk of accidents caused by uncontrolled load shifts.

### Safety Measures:

- **Tag Lines:** Use tag lines to control and guide the load, particularly when lifting large or difficult-to-control objects.
- **Secondary Rigging:** In certain cases, additional rigging may be required to support the load and prevent swinging or tipping during the lift.
- **Controlled Movement:** Tag lines and secondary rigging allow the operator to control the load's movement, ensuring it remains stable and in the intended position.

## 17.6. Identifying Hazards and Risks

Recognizing hazards that can compromise load stability is crucial to ensure safe lifting operations. Identifying these issues early can help prevent accidents.

### Hazards and Risks:

- **Imbalanced Loads:** Loads that are not properly balanced can shift, tip, or swing, creating instability.
- **Swinging Loads:** Loads can swing during lifting, causing damage or risk to workers and equipment.
- **Load Tipping:** If the centre of gravity is not properly managed, the load may tip, leading to accidents or equipment damage.
- **Environmental Hazards:** Overhead obstacles, wind, or uneven ground can affect load stability and should be accounted for before lifting.



## 17.7. Case Study:

### Industry Type:

Construction

### What happened:

During the construction of a commercial building, a large steel beam weighing 2 tons was being lifted to the third floor using a crane. The rigging setup involved two slings and a spreader beam. Midway through the lift, the beam began to sway, causing it to collide with a scaffold structure, resulting in minor damage and halting operations temporarily.

### Why happened:

- Improper calculation of **sling angles**, leading to uneven load distribution.
- **Centre of gravity** not adequately assessed, causing imbalance during the lift.
- Lack of **tag lines** to control load movement.
- Team members were not fully briefed about **hazards and control measures** for load stability.
- Pre-use **rigging configurations** were not checked thoroughly for effectiveness.

### Learning:

- Always calculate sling angles to reduce stress on the rigging and ensure balanced lifting.
- Conduct a thorough assessment of load characteristics, including weight distribution and centre of gravity.
- Use safety measures such as tag lines or secondary rigging to control load sway or tipping.
- Ensure team communication regarding potential hazards and control measures is clear and consistent.
- Regularly inspect rigging setups and adjust configurations before lifting.

### Action Plan:

- **Training:** Conduct refresher training for all riggers on sling angle calculations, centre of gravity assessment, and hitch configurations.
- **Pre-lift Inspections:** Implement mandatory pre-lift checks of all rigging configurations and equipment.
- **Hazard Management:** Use tag lines for large or heavy loads to control movement.
- **Communication:** Establish a clear communication protocol for identifying and mitigating risks during lifting operations.
- **Equipment:** Ensure availability of appropriate rigging equipment like spreader beams and lifting beams for complex loads.

## 17.8. Summery and Review Question:

### 17.8.1. Summary

The chapter on Rigging Techniques and Load Stability emphasizes the importance of proper rigging configurations, load dynamics, and hazard management for safe lifting operations. It outlines the key concepts such as sling angles, centre of gravity, and load weight distribution, which are critical for ensuring load stability. Certified professionals are equipped to select appropriate hitches, monitor load movement, and apply safety measures like tag lines to prevent accidents. Effective communication and risk management are essential to addressing hazards such as load tipping, swinging, or imbalance during operations.

By mastering these techniques, riggers can handle loads safely and maintain control throughout the lifting process, ensuring compliance with industry standards and workplace safety regulations.

### 17.8.2. Review Questions

1. What is the significance of calculating sling angles during a lift, and how does it impact load stability?
2. Describe the principles of load dynamics and their role in preventing load swinging or tipping during lifting operations.
3. List the key factors to consider when selecting hitch configurations (vertical, choker, or basket) for a specific load.
4. How can tag lines or secondary rigging be used to enhance load control and prevent unwanted movement?
5. What steps should be taken to identify and mitigate hazards associated with load stability in lifting operations?

## **18. Chapter 8: Contingency Strategies for Emergency Situations <SSD/N0308 v 1.0>**

### **18.1. Introduction:**

Rigging operations involve inherent risks, and unforeseen emergencies such as equipment failure, load instability, or environmental hazards can arise at any moment. This chapter equips riggers with the necessary knowledge and skills to identify potential emergency scenarios, develop effective contingency plans, and implement appropriate response actions to safeguard personnel, equipment, and the work environment. By understanding emergency protocols, coordinating with safety teams, and conducting regular drills, riggers can ensure a state of preparedness to handle unexpected events efficiently and minimize potential risks. This proactive approach fosters a safe and resilient workplace during rigging and lifting operations.

## 18.2. Potential Emergency Scenarios

Recognizing emergencies before they occur is the foundation of risk management. Rigging operations involve dynamic elements that can lead to incidents if not anticipated.

### Detailed Description:

- Potential scenarios include:
  - **Equipment Failure:** Breakage of hoists, slings, or hardware.
  - **Load Instability:** Swinging, tipping, or unbalanced loads.
  - **Environmental Hazards:** High winds, rain, or unstable ground.
- Early identification allows for proactive measures to mitigate risks.
- Awareness ensures that personnel stay alert during critical lifting operations.



### 18.3. Assessing Emergency Impact

Understanding the consequences of emergencies ensures informed decision-making to protect personnel, equipment, and the work environment.

#### Detailed Description:

- Evaluate potential risks to:
  - **Personnel Safety:** Injuries caused by falling loads or equipment malfunctions.
  - **Equipment Integrity:** Damage to hoists, slings, or supporting structures.
  - **Worksite Conditions:** Potential hazards to adjacent operations or areas.
- Focus on mitigating the most severe and high-probability risks first.

## 18.4. Evaluating Probability and Severity

Prioritizing risks helps in developing an effective emergency response plan. Scenarios must be ranked based on their likelihood and impact.

### Detailed Description:

- Use a risk assessment matrix:
  - **Low Risk:** Minor delays with little safety impact.
  - **Moderate Risk:** Potential for injury or equipment damage.
- **High Risk:** Likely to cause significant harm or operational shutdown.
- Allocate resources and plan responses based on these evaluations.



## 18.5. Developing Contingency Plans

Well-structured contingency plans provide clear guidance for managing emergencies and minimizing disruptions.

### Detailed Description:

- Elements of a contingency plan:
  - **Equipment Shutdown:** Steps to stop operations safely.
  - **Load Securing:** Measures to stabilize loads.
  - **Evacuation Protocols:** Routes and assembly points for personnel.
- Plans must be tailored to specific operational contexts and updated regularly.

## Contingency Planning Process



## 18.6. Defining Roles and Responsibilities

Clarity in roles during emergencies reduces confusion and ensures timely action.

### Detailed Description:

- Assign specific responsibilities, such as:
  - **Supervisors:** Oversee emergency execution and decision-making.
  - **Operators:** Secure equipment and manage immediate hazards.
  - **Safety Personnel:** Liaise with first responders and manage evacuation.
- Train all team members on their roles to ensure confidence in execution.

## 18.7. Communication Protocols

Effective communication is crucial for managing emergencies, ensuring that all parties are informed and aligned.

### Detailed Description:

- Set up clear protocols for:
  - **Emergency Notification:** Contacting supervisors and safety teams.
  - **Onsite Communication:** Using radios, alarms, or hand signals.
  - **Coordination with First Responders:** Providing critical information about the incident.
- Regularly test communication systems for reliability.

## 18.8. Emergency Response Actions

Executing planned actions swiftly and accurately can save lives and protect equipment during emergencies.

### Detailed Description:

- Follow predefined contingency plans.
- Actions include:
  - **Securing Loads:** Using additional rigging to prevent tipping.
  - **Shutting Down Equipment:** Ensuring machinery is turned off safely.
  - **Evacuating Personnel:** Moving team members to safe areas promptly.



## 18.9. Securing Unstable Loads or Equipment

Preventing further hazards during emergencies requires stabilizing loads and securing equipment.

### Detailed Description:

- Techniques for securing loads:
  - Use tie-downs or additional slings to stabilize.
  - Lower loads to the ground if possible.
- Inspect the equipment to ensure no secondary failures occur.

## **18.10. Coordinating with Safety Personnel**

Collaboration with safety teams and first responders ensures a unified and effective emergency response.

### **Detailed Description:**

- Provide detailed information about the incident, such as:
  - Nature of the emergency.
  - Current actions taken.
  - Areas needing immediate attention.
- Assist safety personnel in implementing control measures.

## 18.11. Emergency Drills

Drills prepare personnel to respond effectively, ensuring familiarity with procedures and identifying areas for improvement.

### Detailed Description:

- Simulate realistic scenarios to test:
  - Emergency evacuation.
  - Equipment shutdown and securing.
- Use feedback from drills to refine contingency plans

## 18.12. Providing Emergency Training

Training equips personnel with the skills to handle emergencies confidently and competently.

- Focus areas for training:
  - **Hazard Identification:** Recognizing risks during operations.
  - **Response Actions:** Proper steps to secure loads and shut down equipment.
  - **Communication Protocols:** Ensuring clear and efficient communication.

### **18.13. Reviewing and Updating Plans**

Regular reviews of contingency plans ensure their continued relevance and effectiveness.

- **Incorporate:**
  - Feedback from drills.
  - Lessons learned from past emergencies.
  - Changes in site conditions or equipment.

## 18.14. Post-Emergency Evaluations

Evaluating the response to emergencies helps identify strengths and areas for improvement.

### Detailed Description:

- Assess the sequence of actions taken.
- Identify any missteps or gaps in communication.
- Document findings for future reference.



## 18.15. Documenting Emergency Incidents

Maintaining records of incidents is essential for compliance and learning.

- **Record:**
  - Timeline of events.
  - Actions taken.
  - Outcomes, including injuries or damages.

## 18.16. Implementing Corrective Actions

Corrective actions ensure continuous improvement in emergency management.

- **Detailed Description:**
  - Update plans based on evaluation findings.
  - Address gaps through additional training or equipment upgrades.
  - Monitor implementation to ensure effectiveness.

## 18.17. Case Study:

### Industry Type:

Construction

### What happened:

During a high-rise construction project, a load of steel beams being hoisted to the 20th floor became unstable due to a sudden gust of wind. The instability caused the beams to swing, endangering workers and nearby equipment. The rigging team quickly intervened to stabilize the load, but one beam slipped partially from its sling, requiring immediate emergency actions.

### Why happened:

- The rigging configuration did not account for potential high winds at the worksite.
- The sling angle was improperly calculated, leading to uneven weight distribution.
- The contingency plan was outdated and did not include specific measures for environmental hazards like wind.

### Learning:

- Always assess environmental conditions before starting rigging operations.
- Regularly review and update contingency plans to address all potential hazards.
- Conduct thorough pre-lift inspections and calculations, including sling angles and load stability.
- Emergency drills are critical for ensuring personnel are familiar with procedures.

### Action Plan:

- **Hazard Assessment:** Implement a daily assessment of weather and site conditions.
- **Improved Rigging Practices:** Train riggers on precise load calculations, including sling angles and centre of gravity.
- **Enhanced Contingency Plans:** Update emergency procedures to address environmental hazards like high winds.
- **Drills and Training:** Conduct regular emergency response drills tailored to site-specific scenarios.
- **Communication Protocols:** Establish clear and reliable communication channels for emergencies.
- **Incident Review:** After the incident, conduct a thorough evaluation and implement corrective actions, including equipment upgrades and additional safety measures.

## **18.18. Summery and Review Question:**

### **18.18.1. Summary**

This chapter highlights the critical importance of contingency planning and emergency response in rigging operations. It emphasizes identifying potential hazards, developing effective contingency strategies, and executing response actions to ensure the safety of personnel, equipment, and the environment. By regularly reviewing and updating plans, conducting drills, and maintaining clear communication, rigging professionals can mitigate risks and handle emergency scenarios effectively.

### **18.18.2. Review Questions**

1. Why is it essential to identify potential emergency scenarios before beginning rigging operations?
2. What factors should be considered when developing a contingency plan for rigging operations?
3. How can regular emergency drills improve the effectiveness of contingency strategies?
4. What role does communication play during emergency situations in rigging operations?
5. How can post-emergency evaluations and corrective actions enhance future rigging safety?

## **19. Chapter 9: Employability Skills < DGT/VSQ/N0101>**

### **19.1. Introduction:**

This chapter focuses on equipping rigging professionals with essential employability skills that extend beyond technical expertise. It emphasizes the importance of acquiring generic skills such as effective communication, financial management, digital literacy, and professional interaction with employers and customers. These skills are crucial for securing employment, maintaining workplace relationships, and adapting to evolving industry demands. By developing these capabilities, professionals can enhance their career prospects and contribute more effectively to their organizations.

## **19.2. Understanding Employability and Professional Conduct**

- Recognize the importance of employability skills in meeting job requirements.
- Embrace constitutional values, personal ethics, and environmentally sustainable practices.
- Develop 21st-century skills such as time management, problem-solving, creative thinking, and emotional awareness.
- Maintain hygiene and grooming standards for professional appearance.

### **19.3. Communication and Teamwork Skills**

- Use basic English phrases or sentences for effective communication.
- Practice good manners and appropriate behaviour with all team members, including people with disabilities and all genders.
- Report issues related to harassment or inappropriate behaviour to authorities.
- Collaborate effectively in teams and maintain a cheerful, motivated outlook.

## **19.4. Financial Literacy and Security**

- Use financial products and services securely.
- Calculate income, expenses, and savings to manage personal finances effectively.
- Approach legal authorities for addressing financial exploitation.
- Explore opportunities for funding small business ideas and understand financial challenges.

## 19.5. Digital and Online Safety

- Operate digital devices securely and use their applications effectively.
- Safely browse the internet and engage on social media platforms.



## **19.6. Job Search and Customer Interaction Skills**

- Create a basic biodata to apply for jobs.
- Search for suitable employment and apprenticeship opportunities.
- Identify different customer types and address their needs effectively.

## **19.7. Summery and Review Question**

### **19.7.1. Summary:**

The employability skills outlined are crucial for Basic Riggers to enhance their career prospects and professional conduct. These skills encompass understanding the importance of employability, demonstrating effective communication and teamwork, managing finances, ensuring digital safety, and securing job opportunities. By acquiring these competencies, riggers can improve their job readiness, ensure personal and professional development, and navigate the workplace environment confidently and securely.

### **19.7.2. Review Questions:**

1. Why are employability skills important for a Basic Rigger's career?
2. How can Basic Riggers demonstrate effective communication and teamwork in the workplace?
3. What are some essential financial literacy skills that Basic Riggers need to manage their income and expenses?
4. How can Basic Riggers ensure their online and digital activities are secure?
5. What steps should Basic Riggers take when searching for suitable jobs or apprenticeship opportunities?

