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MINISTRY OF SKILL DEVELOPMENT
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Construction Skill Development Council of India

Facilitator Guide



Sector
Construction

Sub-Sector
Real Estate and Infrastructure Construction

Occupation
Bar Bending & Fixing

Reference ID: CON/Q0201, Version 4.0
NSQF Level 2

Helper Bar Bender and Steel Fixer

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Tower 4B, DLF Corporate Park, 201 & 202 4B, Mehrauli-Gurgaon Rd, DLF Phase 3,
Gurugram, Haryana 122002, India
Email: standards@csdcindia.org
Website: www.csdcindia.org
Phone: 0124-4513915-18 Ext-22

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Disclaimer

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

Shri Narendra Modi
Prime Minister of India

Acknowledgement

We are thankful to all organizations and individuals who have helped us in the preparation of this Facilitator Guide. We also wish to extend our gratitude to all those who reviewed the content and provided valuable inputs for improving the quality, coherence and content presentation of chapters. This Facilitator Guide will lead to the successful rollout of the skill development initiatives, helping greatly our stakeholders particularly trainees, trainers and assessors etc. We are thankful to our Subject Matter Expert for the content and for helping us in the preparation of this Facilitator Guide.

It is expected that this publication would meet the complete requirements of QP/NOS based training delivery. We welcome suggestions from users, industry experts and other stakeholders for any improvement in future.

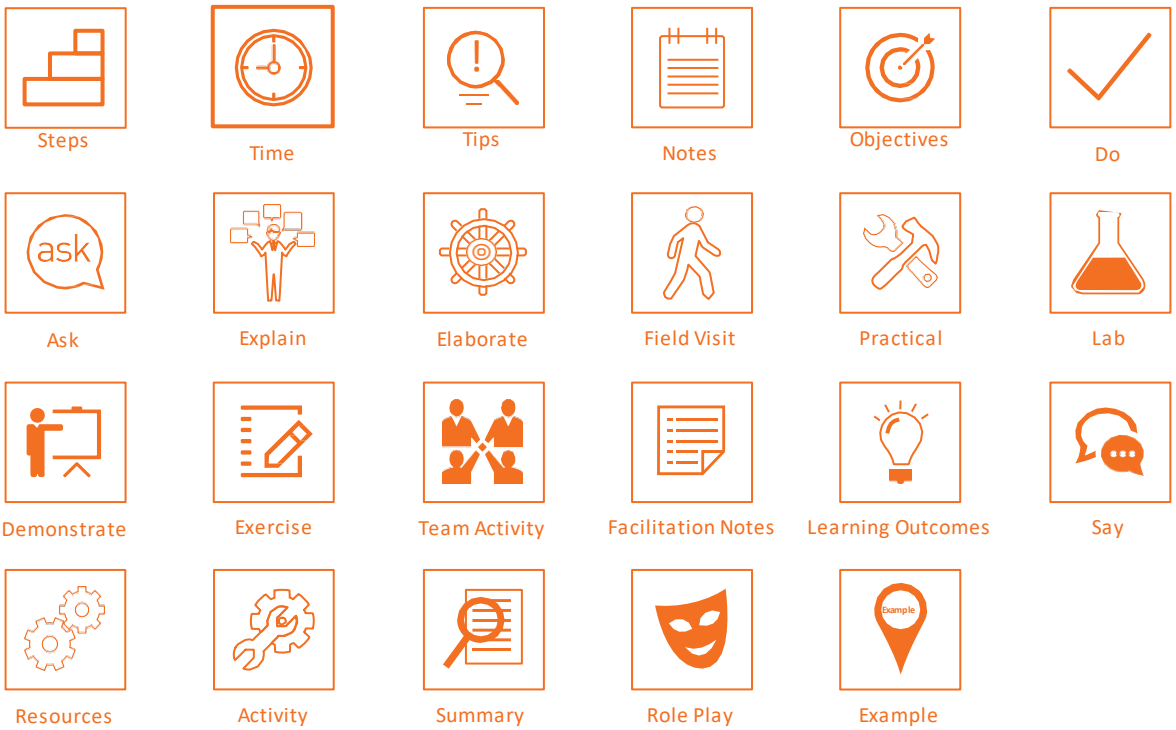
About this book

The objective of the guide is to provide an approach map for interacting with the trainees undergoing training in this job role. The course aims to provide both theoretical and practical knowledge to the trainees and also to guide them about Helper Bar Bender and Steel Fixer. The guide is neither a substitute nor a complete road map, but an aid to help to pass on the knowledge on all the aspects to the trainees in a systematic manner. It is expected that the trainer is fully conversant with all the contents of the guide. The guide is just to indicate how to proceed in covering a topic and includes some additional information that may be necessary for the trainer to develop better comprehension of the following aspects:

- **Knowledge and Understanding:** Satisfactory operational learning and comprehension to play out the required chore.
- **Performance Criteria:** Pick up the required aptitudes through hands-on preparation and play out the required operations inside the predetermined measures.
- **Professional Skills:** Capacity to settle on operational choices relating to the zone of work.

The job will also include judging comprehension and also help them learn more through hands-on training. But it has to be ensured that these are following the knowledge imparted and time spent on each unit. It is expected that irrespective of the region, knowledge of all aspects will be imparted to trainees.

Symbols Used



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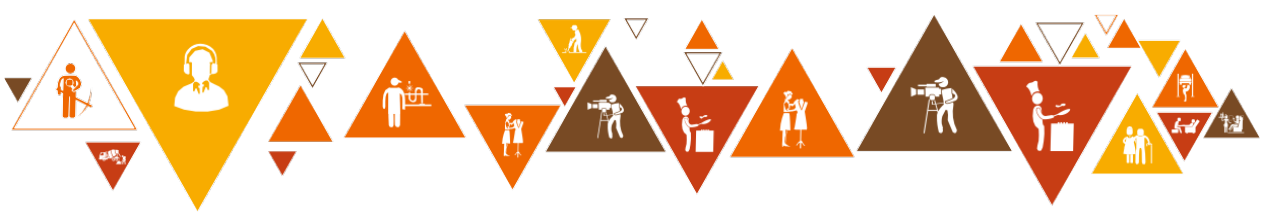

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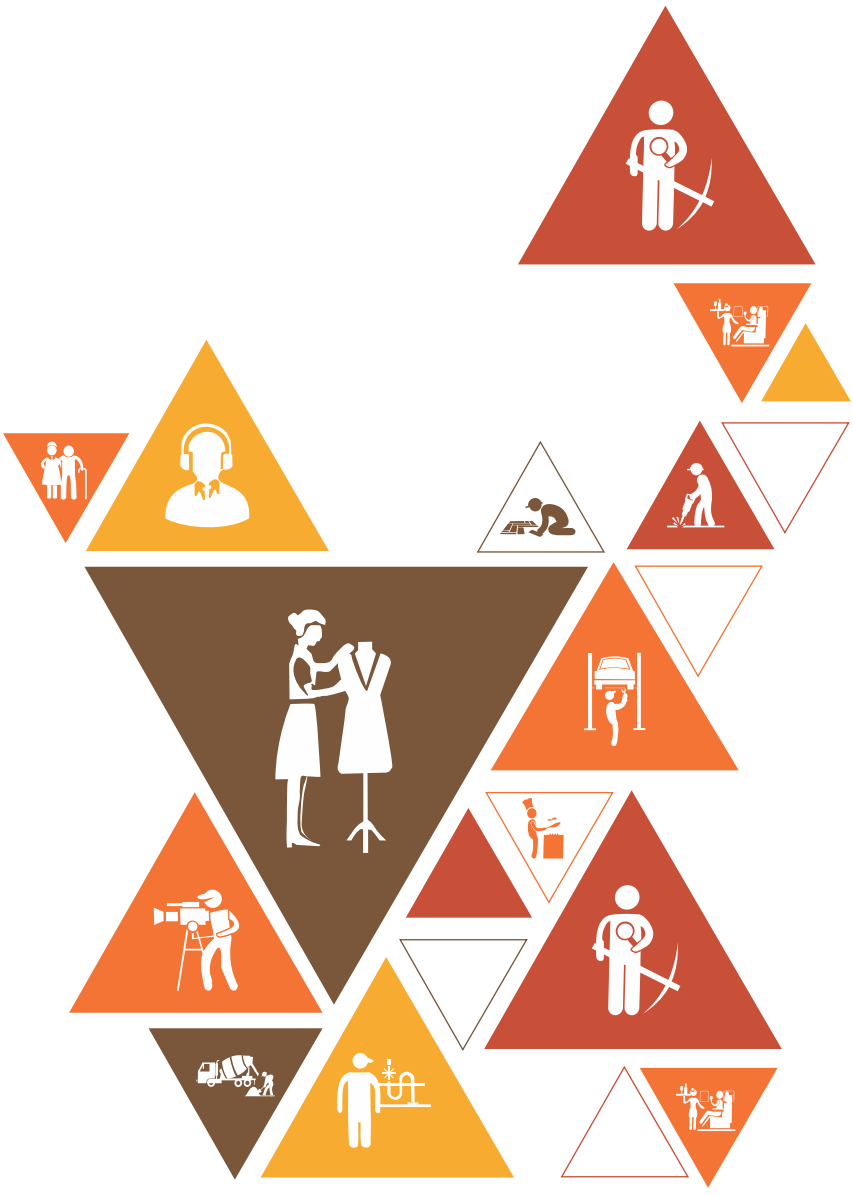

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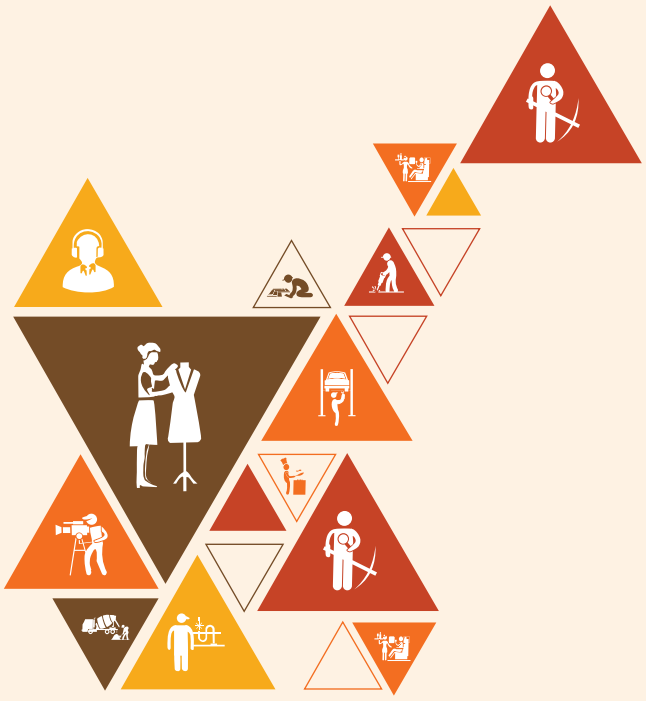
1. Introduction of Construction Sector and Job Role

Unit 1.1 – Introduction to Construction Industry

Unit 1.2 – Brief about Bar Bending & Steel Fixing Occupation



Bridge Module

Key Learning Outcomes

At the end of this module, trainer will ensure that participant will be able to:

1. Describe the size and scope of the construction industry and its sub-sectors.
2. Discuss the role and responsibilities of a Helper Bar Bender and Steel Fixer.
3. Identify various employment opportunities for a Helper Bar Bender and Steel Fixer.

Unit 1.1 – Introduction to Construction Industry

Unit Objectives

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

1. Describe the size and scope of the construction industry and its sub-sectors
2. Compare urban and rural construction
3. Observe and outline modernization of construction
4. Know about major occupations in the construction sector

Resources to be used

- Theory
    - Training Kit - Trainer Guide & Participant Handbook, Presentations, Whiteboard, Marker, Projector, Laptop, Video Films.

Say

Let's begin with an ice-breaking session, introduce yourself and ask participants to introduce themselves.

Team Activity

- Purpose: This activity aims to familiarise the participants in the group with one another.
- Tentative Duration: 15 Mins
- Procedure:
    - Ask the participants to pronounce their name with an adjective beginning with the initial letter of their name.
    - Request that they additionally provide a brief introduction of themselves.
- Expected Outcome: The outcome of this activity is that the participants will become familiar with each other.

Explain

Introduction to Major Occupations in Construction Sector:

- Explain about construction sector in India
- Compare urban and rural construction types
- Observe and outline modernization of construction
- Know about major occupations in the construction sector

Notes for Facilitation

- Use the Helper Bar Bender and Steel Fixer PHB and refer unit 1.1 to explain Construction Industry.
- The construction industry in India is a critical driver of economic growth, encompassing various sectors such as real estate, infrastructure, and rural construction. Let's take a closer look at each of these segments:
    - Real Estate Sector: The real estate sector in India includes the development of residential, commercial, and industrial properties. It has a substantial impact on urbanization and provides essential spaces for living, working, and recreation. Key Points are:
        - Residential Properties: The demand for housing, especially in urban areas, remains high due to rapid urbanization and population growth.
        - Commercial Properties: The growth of industries and businesses fuels demand for office spaces, retail outlets, and commercial complexes.
        - Industrial Properties: As manufacturing and industrial sectors expand, there's a need for well-designed industrial facilities and warehouses.
    - Infrastructure Development: India's focus on infrastructure development is crucial for economic progress and improving the quality of life for its citizens. Key Points are:
        - Transportation: Roadways, highways, railways, airports, and ports are being developed to improve connectivity.
        - Energy: Investment in power plants and renewable energy projects is essential for meeting the energy needs of a growing economy.
        - Urban Development: The "Smart Cities Mission" aims to create sustainable and efficient urban centers.
    - Rural construction focuses on developing infrastructure and facilities in rural areas to bridge the urban-rural divide and improve the living standards of rural communities. Key Points are:
        - Housing: Initiatives like "Pradhan Mantri Awas Yojana - Rural" aim to provide affordable housing to rural populations.
        - Rural Infrastructure: Building roads, schools, healthcare facilities, and water supply systems enhances rural living conditions.
- The construction sector encompasses a wide range of job opportunities across various occupations. Here are some major occupations in the construction industry along with a few job roles under each occupation:
- Civil Engineers: Civil engineers play a key role in designing, planning, and overseeing construction projects. They ensure projects are completed safely, efficiently, and according to specifications.
    - Structural Engineer: Designs and analyzes the structural components of buildings and infrastructure projects.
    - Geotechnical Engineer: Evaluates soil conditions and provides recommendations for foundation design.
    - Transportation Engineer: Designs roads, highways, and transportation systems to ensure smooth mobility.

- Architects: Architects are responsible for designing the overall layout, aesthetics, and functionality of buildings and structures.
    - Residential Architect: Designs homes and residential buildings, focusing on functionality and aesthetics.
    - Commercial Architect: Specializes in designing commercial spaces, offices, and retail complexes.
    - Landscape Architect: Plans outdoor spaces, parks, and landscapes within construction projects.
- Construction Managers: Construction managers oversee the entire construction process, including budgeting, scheduling, and coordinating various teams.
    - Project Manager: Manages all aspects of a construction project, from planning to completion.
    - Site Manager: Supervises on-site activities, ensuring safety and efficient progress.
    - Estimator: Calculates project costs and prepares budgets for construction projects.
- Electricians: Electricians are responsible for installing and maintaining electrical systems in buildings and structures.
    - Residential Electrician: Installs electrical systems in homes and residential complexes.
    - Commercial Electrician: Works on electrical installations in commercial buildings and offices.
    - Industrial Electrician: Focuses on electrical systems in factories and industrial facilities.
- Plumbers: Plumbers install, repair, and maintain water supply and drainage systems in buildings.
    - Residential Plumber: Handles plumbing systems in homes and residential buildings.
    - Commercial Plumber: Works on plumbing installations in commercial spaces and offices.
    - Pipefitter: Installs and maintains pipes in industrial settings.
- Welders and Fabricators: Welders and fabricators join and shape metal parts to create structures and components.
    - Structural Welder: Welds and assembles metal parts for construction projects.
    - Pipe Welder: Specializes in welding pipes for plumbing and industrial systems.
    - Sheet Metal Fabricator: Crafts metal components used in construction projects.
- Surveyors: Surveyors measure and map out the land, providing crucial data for construction projects.
    - Land Surveyor: Measures and defines property boundaries and topography.
    - Quantity Surveyor: Estimates materials and costs for construction projects.
    - Geodetic Surveyor: Uses advanced techniques to map larger areas and create accurate models.
- Construction Laborers: Construction laborers perform various physical tasks on construction sites to support other professionals.
    - Concrete Worker: Pours, levels, and finishes concrete for foundations and structures.

- Carpenter: Constructs and installs wooden components in buildings.
- Mason: Lays bricks, stones, and other masonry materials to build structures.

- Each of these major occupations within the construction sector offers a wide range of job opportunities and career paths. From engineering and design to hands-on labor, the construction industry provides diverse roles that contribute to building the world around us.

Say

- Let us now perform an activity based on various career opportunities available for a Helper Bar Bender and Steel Fixer.

Team Activity

- **Purpose:** Familiarize participants with diverse employment opportunities for a Helper Bar Bender and Steel Fixer, highlighting roles, responsibilities, and potential career paths.
- **Resources Required:** PowerPoint Presentation, Handouts or printouts of job descriptions.
- **Tentative Duration: 60 Mins**
- **Procedure:**
  i. Explain the importance of a Helper Bar Bender and Steel Fixer in the construction industry.
  ii. Emphasize the objective of exploring employment opportunities in the industry.
  iii. Encourage participants to share their initial thoughts on the roles and responsibilities of a Helper Bar Bender and Steel Fixer.
  iv. Provide handouts or printouts of various employment opportunities in the construction industry as per different NSQF Levels.
  v. Discuss each opportunity, highlighting roles, responsibilities, and required skills.
  vi. Divide participants into small groups.
  vii. Assign each group a specific employment opportunity to discuss key aspects, qualifications, skills, and career progression.
  viii. Now ask each group to provide a short researched explanation of the opportunity assigned.
  ix. Summarize key points, emphasizing the range of career paths and the importance of a Helper Bar Bender and Steel Fixer.
- **Expected outcome:** Participants gain awareness of the wide range of employment opportunities in the construction industry, understand the specific roles and responsibilities of a Helper Bar Bender and Steel Fixer, and will be inspired to explore potential career paths within the field.

Exercise

Key Solutions to PHB Exercise

A. Short Answers:

2. The scope of the construction industry and its sub-sectors involves the creation, maintenance, and renovation of physical structures, encompassing residential, commercial, and infrastructure projects.
3. The primary responsibilities of a Helper Bar Bender and Steel Fixer include assisting in bending and assembling steel components for reinforced concrete structures.
4. The construction industry contributes to the economy by generating employment, fostering infrastructure development, and stimulating related sectors.
5. Potential employment opportunities for Helper Bar Benders and Steel Fixers include working on construction sites, infrastructure projects, and with contractors specializing in steel reinforcement.
6. The construction industry is considered diverse due to its broad range of projects, roles, and specialties, including architecture, engineering, and various trades.

B. Fill-in-the-Blanks Questions:

1. The construction industry encompasses the creation, maintenance, and renovation of physical structures.
2. The role of a Helper Bar Bender and Steel Fixer involves assisting in bending and assembling steel components.
3. The construction industry provides employment opportunities for various roles, including engineers, surveyors, and architects.
4. The scope of the construction industry ranges from residential buildings to infrastructure projects.
5. Helper Bar Benders and Steel Fixers work with reinforcing rebars used in concrete structures.

C. True/False Questions:

1. False
2. False
3. False
4. False
5. True

Notes

Unit 1.2 – Brief about Bar Bending & Steel Fixing Occupation

Unit Objectives

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

1. Discuss the role and responsibilities of a Helper Bar Bender and Steel Fixer.
2. Identify various employment opportunities for a Helper Bar Bender and Steel Fixer.

Resources to be used

- Theory
    - Training Kit - Trainer Guide & Participant Handbook, Presentations, Whiteboard, Marker, Projector, Laptop, Video Films.

Explain

- Explain bar bending and it elements.
- Describe the career progression under bar bending occupation

Career Progression Path

- Show and explain the various stages of career progression path.
- List down the important mile stones in the progression path.
- Discuss the advantages of the career progression path.

Elaborate

- About the necessity of defining roles and responsibilities.
- List the roles and responsibilities of a Helper Bar Bender and Steel Fixer in detail.
- Correlate the roles and responsibilities of a Helper Bar Bender and Steel Fixer.
- About the necessity of personal attributes.
- List the personal attributes of a Helper Bar Bender and Steel Fixer in detail.
- Correlate the roles, responsibilities and personal attributes of a Helper Bar Bender and Steel Fixer.
- Show and explain the various stages of career progression path.
- Discuss the advantages of the career progression path.

Notes for Facilitation

- Use the Helper Bar Bender & Steel Fixer PHB and refer unit 1.3 to explain about Masonry Occupation.
- The role of a Helper Bar Bender & Steel Fixer in the construction industry is to support skilled masons and contribute to the smooth execution of masonry projects. Their responsibilities involve a range of tasks that assist in the construction of various structures using bricks, stones, concrete blocks, and other materials.
- Here are the typical roles and responsibilities of a Helper Bar Bender & Steel Fixer:

1. Material Preparation:
    - Assist in preparing mortar by mixing cement, sand, and water to the required consistency.
    - Cut bricks, stones, or other materials to the desired size and shape using appropriate tools.
2. Equipment Setup:
    - Set up scaffolding, ladders, and safety barriers to create a safe and organized work environment.
    - Arrange and transport tools and equipment required for the masonry work.
3. Brick and Material Handling:
    - Transport bricks, stones, and other construction materials to the work area.
    - Assist skilled masons in lifting and positioning heavy materials accurately.
4. Mortar Application:
    - Hand over mortar to the skilled mason for laying bricks or stones.
    - Help apply mortar to bricks or stones as directed by the mason.
5. Bricklaying Assistance:
    - Hand bricks or stones to the skilled mason in the correct order and position for laying.
    - Ensure that the mason has a steady supply of materials during the bricklaying process.
6. Cleaning and Maintenance:
    - Clean excess mortar, debris, and waste materials from the work area to maintain cleanliness and safety.
    - Keep tools and equipment clean and organized.
7. Following Instructions:
    - Listen and follow instructions from skilled masons and supervisors to complete tasks accurately.
    - Collaborate with other team members to achieve efficient workflow.
8. Safety Compliance:
    - Adhere to safety protocols and guidelines to prevent accidents and maintain a safe working environment.
    - Wear appropriate personal protective equipment (PPE) to ensure personal safety.
9. Learning and Skill Development:
    - Observe and learn masonry techniques, tools usage, and construction processes from skilled masons.
    - Develop skills in handling tools, materials, and equipment related to masonry.

10. Communication:
    - Communicate effectively with skilled masons and other team members to coordinate tasks and maintain workflow.
11. Assist in Repairs:
    - Support skilled masons in repair and maintenance projects, such as fixing cracks or replacing damaged bricks.
12. Maintaining Workspace:
    - Keep the work area organized and free of obstacles to facilitate smooth operations.
13. Physical Endurance:
    - Perform physically demanding tasks, such as lifting heavy materials and working in various weather conditions.
14. Teamwork:
    - Collaborate with skilled masons, laborers, and other construction professionals to achieve project goals.

- Helper Bar Bender & Steel Fixers play a vital role in the construction industry by providing essential assistance to skilled masons. Through their efforts, they contribute to the successful completion of masonry projects while gaining valuable experience that may lead to career advancement within the construction field.

Say

Let us now perform an activity based on various career opportunities available for a Helper Bar Bender and Steel Fixer.

Activity

- **Purpose:** Familiarize participants with diverse employment opportunities for a Helper Bar Bender and Steel Fixer, highlighting roles, responsibilities, and potential career paths.
- **Resources Required:** PowerPoint Presentation, Handouts or printouts of job descriptions.
- **Tentative Duration: 60 Mins**
- **Procedure:**
  i. Explain the importance of a Helper Bar Bender and Steel Fixer in the construction industry.
  ii. Emphasize the objective of exploring employment opportunities in the industry.
  iii. Encourage participants to share their initial thoughts on the roles and responsibilities of a Helper Bar Bender and Steel Fixer.
  iv. Provide handouts or printouts of various employment opportunities in the construction industry as per different NSQF Levels.
  v. Discuss each opportunity, highlighting roles, responsibilities, and required skills.
  vi. Divide participants into small groups.

vii. Assign each group a specific employment opportunity to discuss key aspects, qualifications, skills, and career progression.

viii. Now ask each group to provide a short researched explanation of the opportunity assigned.

ix. Summarize key points, emphasizing the range of career paths and the importance of a Helper Bar Bender and Steel Fixer.

- **Expected outcome:** Participants gain awareness of the wide range of employment opportunities in the construction industry, understand the specific roles and responsibilities of a Helper Bar Bender and Steel Fixer, and will be inspired to explore potential career paths within the field.

Exercise

Key Solutions to PHB Exercise:

A. Short Answers:

1. The scope of the construction industry and its sub-sectors involves the creation, maintenance, and renovation of physical structures, encompassing residential, commercial, and infrastructure projects.
2. The primary responsibilities of a Helper Bar Bender and Steel Fixer include assisting in bending and assembling steel components for reinforced concrete structures.
3. The construction industry contributes to the economy by generating employment, fostering infrastructure development, and stimulating related sectors.
4. Potential employment opportunities for Helper Bar Benders and Steel Fixers include working on construction sites, infrastructure projects, and with contractors specializing in steel reinforcement.
5. The construction industry is considered diverse due to its broad range of projects, roles, and specialties, including architecture, engineering, and various trades.

F. Fill-in-the-Blanks Questions:

1. The construction industry encompasses the creation, maintenance, and renovation of physical structures.
2. The role of a Helper Bar Bender and Steel Fixer involves assisting in bending and assembling steel components.
3. The construction industry provides employment opportunities for various roles, including engineers, surveyors, and architects.
4. The scope of the construction industry ranges from residential buildings to infrastructure projects.
5. Helper Bar Benders and Steel Fixers work with reinforcing rebars used in concrete structures.

F. True/False Questions:

1. False
2. False
3. False
4. False
5. True

Notes

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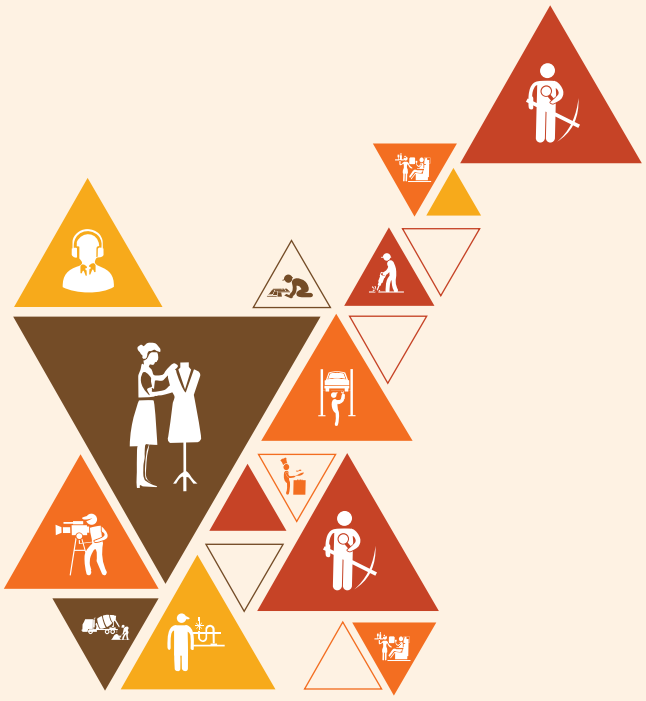
2. Core/Generic Skills

Unit 2.1 – Numeracy Skills

Unit 2.2 – Systems of Measurements



(CON/N0505)

Key Learning Outcomes

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

1. Explain brief on metric system of measurement;
2. Explain briefly inch system of measurement;
3. Perform basic arithmetic calculations;
4. Know about basic geometrical shapes;
5. Calculate area, volume and perimeter of different shapes;

UNIT 2.1: Numeracy Skills

Unit Objectives

At the end of this unit, trainer will ensure that participant will be able to:

1. Perform basic mathematical calculation
2. Identify the different types of shapes
3. Calculate the perimeter of a square, rectangle, triangle and circle

Resources to be used

- Theory
  - Training Kit - Trainer Guide & Participant Handbook, Presentations, Whiteboard, Marker, Projector, Laptop, Video Films.
- Practical
  - Calculator, conversion charts, measurement tapes

Do

- Perform basic mathematical calculation
- Identify the different types of shapes
- Calculate the perimeter of a square, rectangle, triangle and circle

Notes for Facilitation

- Use the Helper Bar Bender and Steel Fixer PHB and refer unit 2.1 to explain Numeracy Skills.
- Helper Bar Benders and Steel Fixers need foundational mathematical skills to accurately measure, calculate dimensions, and estimate material quantities. They perform calculations for lengths, angles, and quantities of steel reinforcement components.
- These professionals must recognize various shapes, such as squares, rectangles, triangles, and circles. This skill helps them understand the layout of steel components and ensures precise placement based on project designs.
- Helper Bar Benders and Steel Fixers calculate the perimeter of different shapes to determine the required amount of steel reinforcement. For example, they add the lengths of all sides for squares and rectangles, sum up the lengths of all three sides for triangles, and use formulas involving the radius for circles. This ensures accurate steel placement according to design specifications.
- Perimeter of a Square:

- Formula: Perimeter = 4 * side
- Application: In bar bending and steel fixing, the perimeter of a square helps determine the total length of steel reinforcement needed for all four sides of the square structure.

- Perimeter of a Rectangle: Formula: Perimeter = 2 * (length + width) Application: Calculating the perimeter of a rectangle guides the amount of steel reinforcement required for both the longer sides (length) and the shorter sides (width) of the rectangle.
- Perimeter of a Triangle: Formula: Perimeter = side1 + side2 + side3 Application: In bar bending and steel fixing, calculating the perimeter of a triangle informs the length of steel reinforcement needed for each of the three sides of the triangular structure.
- Circumference of a Circle: Formula: Circumference = 2 * π * radius Application: The circumference of a circular structure determines the length of steel reinforcement required to reinforce its curved perimeter.

Say

- Let's engage in a quick and practical activity that focuses on enhancing the ability of Helper Bar Benders and Steel Fixers to identify and differentiate various shapes commonly encountered in the construction industry. This activity aims to provide a hands-on experience in recognizing shapes and their applications, which is essential for accurate positioning and arrangement of steel components as per design specifications.

Activity

Identifying Construction Shapes for Helper Bar Benders and Steel Fixers

- **Purpose:** This activity aims to develop the ability of Helper Bar Benders and Steel Fixers to identify and differentiate various shapes encountered in steel reinforcement work, facilitating precise placement and arrangement of steel components.
- **Resources Required:** Visual aids or images depicting different shapes (square, rectangle, triangle, circle, etc.), paper or cards with shape names, flip charts, markers.
- **Tentative Duration: 30 Minutes**
- **Procedure:**
  - Introduction: Begin by discussing the significance of recognizing different shapes in steel reinforcement work and how it aids in accurate steel placement.
  - Shape Presentation:
    - Present visual aids or images of common shapes: square, rectangle, triangle, circle, etc.
    - Explain the characteristics and attributes of each shape briefly in the context of steel components.
  - Shape Recognition Game:
    - Distribute paper or cards with shape names to participants.
    - Display images of various steel reinforcement components with different shapes.
    - Participants match the correct shape name to each displayed steel component.

- Group Discussion:
  - Engage participants in a discussion about the importance of recognizing these shapes in steel reinforcement scenarios.
  - Participants share their observations about how this skill benefits accurate steel placement.
- Scenario-based Application:
  - Describe steel reinforcement scenarios where identifying specific shapes is crucial (e.g., positioning steel bars for concrete support).
  - Participants discuss and suggest appropriate strategies based on shape recognition.
- Q&A Session:
  - Allow participants to ask questions and seek clarifications about shape recognition in the context of steel fixing.
- Reflection and Conclusion:
  - Engage participants in reflecting on the insights gained about shape identification's significance in steel reinforcement work.
  - Summarize key takeaways, highlighting how this skill contributes to precise steel component arrangement.

- **Expected Outcome:** Through this activity, Helper Bar Benders and Steel Fixers will develop a practical understanding of identifying and differentiating shapes relevant to steel reinforcement work. They will recognize the value of this skill in accurately positioning and arranging steel components according to design specifications.

Notes

UNIT 2.2: Systems of Measurement

Unit Objectives

At the end of this unit, trainer will ensure that participant will be able to:

1. List the different types of systems of measurement
2. Follow the conversion of measurements
3. Read a measuring tape in imperial system
4. Read a measuring tape in metric system

Resources to be used

- Theory
  - Training Kit - Trainer Guide & Participant Handbook, Presentations, Whiteboard, Marker, Projector, Laptop, Video Films.
- Practical
  - Calculator, conversion charts, measurement tapes

Do

- Explain the different types of systems of measurement
- Describe the conversion of measurements
- Explain the measuring tape in imperial system
- Explain the measuring tape in metric system

Notes for Facilitation

- Use the Helper Bar Bender and Steel Fixer PHB and refer unit 2.2 to explain Systems of Measurement.
- In construction, there are two primary systems of measurement: the Imperial system and the Metric system. The Imperial system, commonly used in some regions, includes units like inches, feet, and pounds. The Metric system, widely used internationally, employs units like millimeters, centimeters, meters, and kilograms. For bar bending and steel fixing, understanding both systems is crucial, as project specifications and materials may be provided in either format. Being skilled in both systems ensures accurate measurements and adherence to design requirements.
- Conversion of measurements is the process of changing values from one unit of measurement to another within the same system (e.g., from inches to feet) or between different systems (e.g., from inches to centimeters). For bar bending and steel fixing, conversion skills are essential when working with project documents or specifications provided in different units. Helper Bar Benders and Steel Fixers must accurately convert measurements to ensure that materials are cut,

positioned, and installed correctly according to the project requirements.

- A measuring tape in the Imperial system typically displays units in feet and inches. Each foot is divided into 12 inches. The measuring tape will have markings indicating feet and inches, with fractions of an inch (usually down to 1/16 or 1/32 of an inch) also marked. Helper Bar Benders and Steel Fixers use the Imperial measuring tape to take precise measurements of steel components, ensuring they are cut and positioned accurately as per project specifications provided in the Imperial system.
- In the Metric system, the measuring tape displays units in millimeters, centimeters, and meters. Each centimeter is divided into 10 millimeters. The measuring tape will show markings for centimeters and millimeters. Helper Bar Benders and Steel Fixers use the Metric measuring tape to measure and cut steel components according to project specifications provided in the Metric system. It allows for precise placement and alignment of steel within the metric measurements specified in the design.

Activity-1

Mathematical skills - Practice

Conduct a group activity.

- **Ask the participants to assemble at a designated place.**
- **Distribute the 'Practical Activity Format' which includes task, duration allowed, specific instructions, method statements, etc.**
- **Explain the purpose and duration of the activity.**
- **Set guidelines pertaining to discipline and expected tasks.**
- **Maximum duration mentioned in the below table is for extensive practice and corresponding guidance until the skill is acquired by the participants.**
- **Explain the roles to each of them.**
- **Rotate the roles after completing one cycle.**

Sub activity	Skill Practice	Time	Resources
1	Measure the size of the classroom in metric system by using a tape measure	2 Hours	Tape measure, stationary items (pen, marker, scale and notebook)
2	Measure the size of the classroom in imperial system by using a tape measure	2 Hours	
3	Convert the following: • 100000 mm into ..... mts, and • 1000mts into ..... mm. • 100 inches into ..... ft. • 10000 sft into ..... m^2	1 Hour	

	• $1m^3$ into …… mm^3		
4	Solve the below: 300-200+100x50-30/5 = …… 100-20/3+15-150 = …… 1.5-0.2/4+2.8-1500+15000 = ……	1 Hour	
5	Calculate, how many 600x600 mm tile units are needed to install flooring for an area of 20 sft?	2 Hours	
6	Demonstrate and practice 3-4-5 method for squaring of corners of the classroom	2 Hours	

Table 2.2.1 – Mathematical skills

Specific Instructions:

- Make sure all the participants are wearing proper PPEs.
- Explain the overall procedure and key points of measuring the classroom with a tape measure before commencing the exercise.
- Use the unit conversion table for the activity.
- Give hints on the method of converting the units easily.
- Assist them wherever, it is necessary during the activity.
- At end of the process ask each one of them to mention the experience they had in activity.
- Clarify doubts, if any.
- Check and observe that all the steps followed by the participants.
- Complete the activity in scheduled time, at the end of activity, to assess the skill and knowledge acquired, call a person randomly from the group and ask him to explain the steps involved for mathematical conversion of units, calculation of area/volume and squaring of corners.

Exercise

Key Solutions to PHB Exercise

A. Short Answers:

1. Helper Bar Benders and Steel Fixers require basic mathematical skills to perform calculations related to measurements and dimensions.
2. Identifying various types of shapes is important for accurate material estimation and proper placement of steel components.
3. To calculate the perimeter of a square, Helper Bar Benders and Steel Fixers can addthe lengths of all four sides.
4. Helper Bar Benders and Steel Fixers should be familiar with both the imperial and metric measurement systems.

5. Reading a measuring tape in both the imperial and metric systems is significant for understanding measurements used in diverse construction projects

B. Fill-in-the-Blanks Questions:

1. Helper Bar Benders and Steel Fixers need to measure various shapes accurately.
2. Calculating the perimeter of a square involves adding all four sides.
3. Conversion of measurements is essential for ensuring consistency between different units.
4. Helper Bar Benders and Steel Fixers should be skilled in reading a measuring tape in both fractions and decimals.
5. Different types of measurement systems are used across construction projects.

C. True/False Questions:

1. False
2. True
3. False
4. False
5. True

Notes

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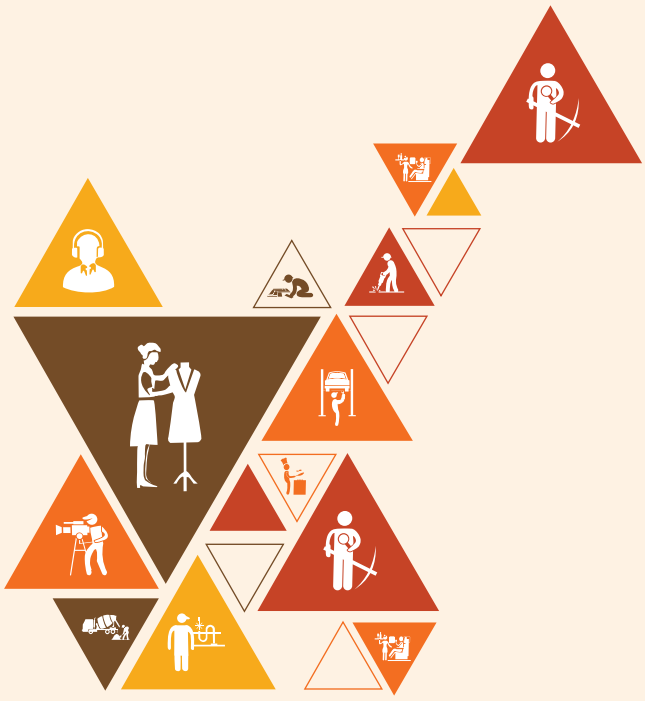
3. Shift and Stack Materials, Tools and Equipment for Reinforcement Work

Unit 3.1 – Reinforcement Materials & Its Protection

Unit 3.2 – Handling and Storage of Reinforcement Steel

Unit 3.3 – Tools used in Bar Bending Works



(CON/N0201)

Key Learning Outcomes

At the end of this module, trainer will ensure that the participant will be able to:

1. Explain the different types, diameters, and grades of reinforcement materials.
2. Show how to interpret and follow diagrams and blueprints for shifting and stacking materials in reinforcement work.
3. Identify and classify the different hand tools used in reinforcement work.
4. Identify and classify different power tools used in reinforcement work.
5. Demonstrate how to inspect, maintain and handle the relevant hand and power tools.
6. Elucidate potential hazards associated with reinforcement work.
7. Demonstrate the proper usage, maintenance, and storage of PPE.
8. Explain different types of slings, shackles, and lifting belts.
9. Explain the importance of inventory management and stock control procedures for materials, tools and equipment for reinforcement work.
10. Show proper manual handling techniques to prevent injuries during lifting and moving operations.
11. Identify common causes and types of corrosion affecting reinforcement steel.
12. Explain how to protect the reinforcement steel from corrosion and weather conditions
13. Demonstrate the techniques for safe and efficient loading, unloading, shifting, and stacking of reinforcement steel.

UNIT 3.1: Reinforcement Materials & Its Protection

Unit Objectives

At the end of this unit, trainer will ensure that participant will be able to:

1. Explain the different types, diameters, and grades of reinforcement materials
2. Identify common causes and types of corrosion affecting reinforcement steel
3. Explain how to protect the reinforcement steel from corrosion and weather conditions

Topic Introduction

- Give the participants a brief overview of this unit
- Applications in various job environment

Resources to be used

- Theory
  - Training Kit - Trainer Guide & Participant Handbook, Presentations, Whiteboard, Marker, Projector, Laptop, Video Films.
- Practical
  - Chisel, Lever, Hook, Measuring Tape, Sledge Hammer, Bar tying hook, Bending lever, Gauge measure, Spanner, Hack saw blade and frame, Steel scale, Try Scale, Spirit level, Plumb bob, Measurement tape, Cutting machine, Lifting appliance (Sling, Shackle, Belts), Safety Helmet, Safety Goggles, Safety shoes, Safety belt, Cotton gloves, Ear plugs, Reflective jackets, Dust mask, Fire Prevention kit.

Do

- Describe the different types of steel used to make bars
- Explain the different building materials used in construction
- Describe the handling and transportation of steel bars
- Explain causes and types of corrosion affecting reinforcement steel and its Protectio

Notes for Facilitation

- Use the Helper Bar Bender & Steel Fixer PHB and refer unit 3.1 to explain Reinforcement Materials & Its Protection.
- In the context of bar bending and steel fixing, various types of steel are utilized to create reinforcing bars for construction. These types include:
  - Mild Steel: Easily bendable and cost-effective, commonly used for smaller projects.
  - Deformed Steel Bars: Have surface deformations for better concrete bonding and strength.
  - High-Strength Deformed Bars (HYSD): Offer higher yield and tensile strength for demanding applications.
  - TMT (Thermo-Mechanically Treated) Bars: Subjected to heat treatment for enhanced strength, ductility, and corrosion resistance.
- Bar bending and steel fixing are integral parts of construction, involving several building materials:
  - Concrete: Comprising cement, aggregates, and water, used for foundations and structures.
  - Bricks: Made from clay or concrete, used for walls and facades.
  - Steel: Used as structural support and reinforcement.
  - Wood: Utilized for framing, flooring, and finishes.
  - Cement: Binds materials in concrete and mortar.
  - Glass: Employed for windows, doors, and facades.
  - Stone: Used for decorative and functional purposes.
- Handling and transporting steel bars in bar bending and steel fixing require careful procedures:
  - Storage: Keep bars off the ground in a dry area to prevent corrosion.
  - Handling: Use proper lifting equipment; avoid dragging or dropping bars.
  - Loading: Securely fasten bars during transportation to prevent movement or damage.
  - Unloading: Gently lower bars to prevent impact.
  - Inspection: Check bars for damage before use.
  - On-Site Storage: Store bars in designated areas, organized and above ground.

Exploring Building Materials in Construction for Helper Bar Bender & Steel Fixer

Activity

- **Purpose:** Familiarize participants with the diverse range of building materials used in construction, specifically in the context of bar bending and steel fixing roles. This activity aims to highlight the significance of these materials in construction projects.
- **Resources Required:** Visual aids (images or samples) of building materials, printouts listing characteristics of each material, flip charts, markers.
- **Tentative Duration: 45 Minutes**
- **Procedure:**
  - **Introduction:** Begin by explaining the crucial role of building materials in construction. Highlight that this activity will provide an opportunity to explore and understand various

materials commonly used in construction projects involving bar bending and steel fixing.

- **Building Material Presentation:** Display visual aids depicting each building material listed: concrete, bricks, steel, wood, cement, glass, and stone. Briefly introduce each material's properties and common applications.
- **Characteristics Discussion:** Distribute printouts listing the key characteristics of each building material to participants. These characteristics may include strength, durability, versatility, appearance, and suitability for specific tasks.
- **Group Discussion:** Divide participants into small groups. Assign each group one building material. Instruct them to discuss and identify scenarios where their assigned material would be the most suitable, considering its specific attributes.
- **Scenario Presentation:** Ask each group to present their assigned building material, along with scenarios in which it would excel. Encourage participants to explain how the material's properties align with construction requirements.
- **Comparative Analysis:** Facilitate a group discussion comparing and contrasting the building materials. Encourage participants to share insights into why certain materials are preferred for specific tasks.
- **Role Relevance:** Discuss how building materials relate to the roles of bar bender and steel fixer. Explain how these professionals work with these materials and how material properties impact their work.
- **Summary and Reflection:** Summarize the key attributes of each building material and their role in construction. Engage participants in reflecting on how a strong understanding of building materials enhances their effectiveness in bar bending and steel fixing.

- Expected Outcome: Through this activity, participants will gain a comprehensive understanding of various building materials used in construction, particularly in the context of bar bending and steel fixing. They will recognize the importance of material properties in determining the most suitable applications, contributing to their proficiency in working with these materials.

Notes

UNIT 3.2: Handling and Storage of Reinforcement Steel

Unit Objectives

At the end of this unit, trainer will ensure that participant will be able to:

1. Explain the Handle and store reinforcement bars
2. Describe the storage and transportation of steel bars
3. Describe the tagging procedure
4. Explain the DO's and Don'ts while handling and storing the rebars

Topic Introduction

- Give the participants a brief overview of this unit
- Applications in various job environment

Resources to be used

- Theory
  - Training Kit - Trainer Guide & Participant Handbook, Presentations, Whiteboard, Marker, Projector, Laptop, Video Films.
- Practical
  - Chisel, Lever, Hook, Measuring Tape, Sledge Hammer, Bar tying hook, Bending lever, Gauge measure, Spanner, Hack saw blade and frame, Steel scale, Try Scale, Spirit level, Plumb bob, Measurement tape, Cutting machine, Lifting appliance (Sling, Shackle, Belts), Safety Helmet, Safety Goggles, Safety shoes, Safety belt, Cotton gloves, Ear plugs, Reflective jackets, Dust mask, Fire Prevention kit.

Do

- Describe the different types of steel used to make bars
- Explain the different building materials used in construction
- Describe the handling and transportation of steel bars
- Explain causes and types of corrosion affecting reinforcement steel and its Protectio

Notes for Facilitation

- Use the Helper Bar Bender & Steel Fixer PHB and refer unit 3.2 to Handling and Storage of Reinforcement Steel.
- Reinforcement bars, commonly known as rebars, are vital components in construction projects. Proper handling and storage are crucial to maintain their quality and ensure safety.
- Rebars should be stored on elevated surfaces to prevent contact with soil or water. They must be organized and kept in designated areas to avoid obstruction. When transporting, ensure secure bundling and appropriate vehicle conditions.
- Tagging involves labelling rebars with essential information such as size, grade, and batch number. This helps in identification and tracking throughout the construction process.
- DO's and DON'Ts while Handling and Storing Rebars:
    - DO's:
        - Wear Protective Gear: Use gloves and appropriate attire to protect against cuts and injuries.
        - Handle Carefully: Lift rebars using proper lifting techniques to avoid strain.
        - Organize: Keep rebars neatly stacked and sorted by size and type.
        - Securely Store: Elevate rebars on pallets or racks to prevent corrosion.
        - Tagging: Label each bundle with relevant details for identification.
    - DON'Ts:
        - Drag Rebars: Avoid dragging rebars as it can cause damage and weaken them.
        - Overload: Do not stack too many rebars on top of each other, risking damage and instability.
        - Exposure: Keep rebars covered with protective material to prevent exposure to moisture and contaminants.
        - Mishandling: Avoid dropping rebars from heights or striking them against hard surfaces.

Activity

Identification of Masonry Tools, Materials and Equipment

Conduct a skill practice activity.

- Ask the participants to assemble at a designated place.
- Distribute the 'Practical Activity Format' which includes task, duration allowed, specific instructions, method statements, etc.
- Explain the purpose and duration of the activity.
- Set guidelines pertaining to discipline and expected tasks.
- Maximum duration mentioned in the below table is for extensive practice and corresponding guidance until the skill is acquired by the participants.
- Explain the roles to each of them.
- Rotate the roles after completing one cycle.

Sub Activity	Skill Practice	Time	Resources
1	Identify and use construction material	8 hours	Tool Box With Lock And Key, Measuring Tape/Rule, Scale, Steel Square, Trowel, Water Level, Spirit Level, Plumb Bob, Straight Edge, Mason's Hammer, String Line, Jointers, Mallets, Wedges, Screeds, Floats, Bolster Chisel, Rubber/Wooden Hammers, Spade, Sponge, Volume Box, Weighing Balance, Tile Scribes Or Hand Held Tile Cutters, Screeds, Floats , Power Wet Saws , Electric Drills, Grinders , Vibrators , Hand Operated Concrete Mixer, Mortar Mixing Board/Mortar Pan, Safety Helmets, Hand Gloves, Safety Shoes, Safety Harness, Nose Mask
2	Identify measuring equipment	4 hours	
3	Check various trowels and utilize them	2 hours	
4	Identify and use power tools for masonry	4 hours	
5	Identify and operate hand, power tools	8 hours	
6	Identify and operate equipment with PPEs	6 hours	

Table 3.2.1 – Identification of tools & equipment

Specific Instructions

- Demonstrate and show the use of each tool, device and equipment.
- Ask the participant to practice the same.
- Check whether the participants are following the standard and safe procedure of usage of tools and equipment.
- Intervene wherever needed and correct the mistakes done by participants.
- Ensure that each of the participants are well versed in identifying and using the masonry tools and equipment.
- Make sure that the participants are well versed in checking the condition and run any immediate maintenance of masonry tools and equipment.
- Ensure that the participants are well versed in requesting and returning the new material and unused material respectively to the store.
- Complete the activity in scheduled time, at the end of activity to assess the skill acquired, call a person randomly from the group and ask him to demonstrate any tool.

Notes

UNIT 3.3: Tools Used in Bar Bending Works

Unit Objectives

At the end of this unit, trainer will ensure that participant will be able to:

1. Identify and classify the different hand tools used in reinforcement work.
2. Identify and classify different power tools used in reinforcement work.
3. Demonstrate how to inspect, maintain and handle the relevant hand and power tools.
4. Explain the importance of inventory management and stock control procedures for materials, tools and equipment for reinforcement work.

Topic Introduction

- Give the participants a brief overview of this unit
- Applications in various job environment

Resources to be used

- Theory
  - Training Kit - Trainer Guide & Participant Handbook, Presentations, Whiteboard, Marker, Projector, Laptop, Video Films.
- Practical
  - Chisel, Lever, Hook, Measuring Tape, Sledge Hammer, Bar tying hook, Bending lever, Gauge measure, Spanner, Hack saw blade and frame, Steel scale, Try Scale, Spirit level, Plumb bob, Measurement tape, Cutting machine, Lifting appliance (Sling, Shackle, Belts), Safety Helmet, Safety Goggles, Safety shoes, Safety belt, Cotton gloves, Ear plugs, Reflective jackets, Dust mask, Fire Prevention kit.

Do

- Explain the different hand tools used in reinforcement work.
- Explain different power tools used in reinforcement work.
- Demonstrate how to inspect, maintain and handle the relevant hand and power tools.
- Explain the importance of inventory management and stock control procedures for materials, tools and equipment for reinforcement work.

Notes for Facilitation

- Use the Helper Bar Bender & Steel Fixer PHB and refer unit 3.3 to Tools used in Bar Bending Works.
- Bar bending and steel fixing involve a range of tools for various tasks. Hand tools include pliers, wrenches, hammers, and cutters. Power tools like rebar benders and cutters offer efficiency and precision.
- Terminology in Bar Bending: Understanding terminology is crucial in bar bending. Terms include:
  - Bend Angle: The angle formed when a rebar is bent.
  - Bend Radius: The inner radius of a bent rebar.
  - Bar Length: The overall length of a rebar.
  - Camber: A slight arch in a rebar to compensate for deflection.
- Tools and Machines for Earthwork: Earthwork involves preparing construction sites. Tools include:
  - Excavators: For digging and moving soil.
  - Bulldozers: Grading and levelling surfaces.
  - Backhoes: Digging trenches and holes.
  - Compactors: Compact soil to increase stability.
- Safety is a top priority on a construction site. To ensure the well-being of all workers:
  - Follow safety guidelines and protocols provided by supervisors and site management.
  - Wear appropriate PPE, such as hard hats, gloves, safety glasses, and respiratory protection if needed.
  - Use caution signs or barriers to mark hazardous areas or stored materials.
  - Know the proper procedures for handling hazardous or flammable materials.
  - Use mechanical aids like cranes or forklifts for heavy or awkward materials.
  - Keep walkways and work areas clear to prevent tripping hazards.

Say

Let's engage in a quick and practical activity that focuses on understanding the importance of proper storage practices for construction materials. This activity aims to provide Helper Bar Benders & Steel Fixers with hands-on experience in recognizing and implementing essential storage measures to maintain material quality and safety on construction sites.

Activit

Sensitizing Helper Bar Benders & Steel Fixers to Material Storage Practices

- **Purpose:** This activity aims to familiarize Helper Bar Benders & Steel Fixers with the significance of proper construction material storage, focusing on preserving quality and safety.
- Resources Required: Visual aids showing correct storage practices, flip charts, markers.
- **Tentative Duration: 30 Minutes**

- **Procedure:**
  - Introduction: Discuss the importance of proper material storage in construction and its impact on quality and safety.
  - Storage Practice Presentation:
    - Present visuals of appropriate storage practices: Elevated Surfaces, Designated Areas, Covers or Tarps, Segregated Storage for Hazardous Materials.
    - Explain the rationale and outcomes of each practice.
  - Storage Method Discussion:
    - Facilitate a discussion about participants' observations of material storage practices on construction sites.
    - Encourage participants to share insights on the advantages of following these practices.
  - Group Scenario Analysis:
    - Present scenarios (e.g., storing steel bars, cement bags, chemicals) and discuss the applicability of each storage practice.
    - Participants evaluate the suitability of practices for each scenario.
  - Q&A Session:
    - Allow participants to ask questions and seek clarifications about proper material storage techniques.
  - Reflection and Conclusion:
    - Engage participants in reflecting on their newfound knowledge of material storage practices.
    - Summarize key takeaways, underscoring the role of proper storage in upholding material quality and site safety.
- **Expected Outcome:** This activity equips Helper Bar Benders & Steel Fixers with practical insights into effective construction material storage. They will understand the necessity of adhering to these practices to ensure materials' quality and the construction site's safety.

Exercise

Key Solutions to PHB Exercise

A. Key Solutions to PHB Exercise:

1. Different types of reinforcement materials used in construction include steel rebars, welded wire mesh, fiber-reinforced polymers (FRP), and reinforced concrete.
2. Interpreting and following diagrams and blueprints for shifting and stacking materials in reinforcement work involves understanding symbols, dimensions, and placement instructions to ensure accurate and safe arrangement.
3. Common hand tools used in reinforcement work include rebar cutters, rebar benders, tying tools, pliers, and wrenches. They are classified as cutting tools, bending tools, tying tools, gripping tools, and tightening tools.

4. Power tools used in reinforcement work include rebar cutters, rebar benders, and portable drills. They are classified as cutting tools and bending tools.

5. Inspecting, maintaining, and handling hand and power tools in reinforcement work involves regular checks for damage, proper storage, cleaning, and lubrication. Tools should be used according to their intended purpose and manufacturer's instructions.

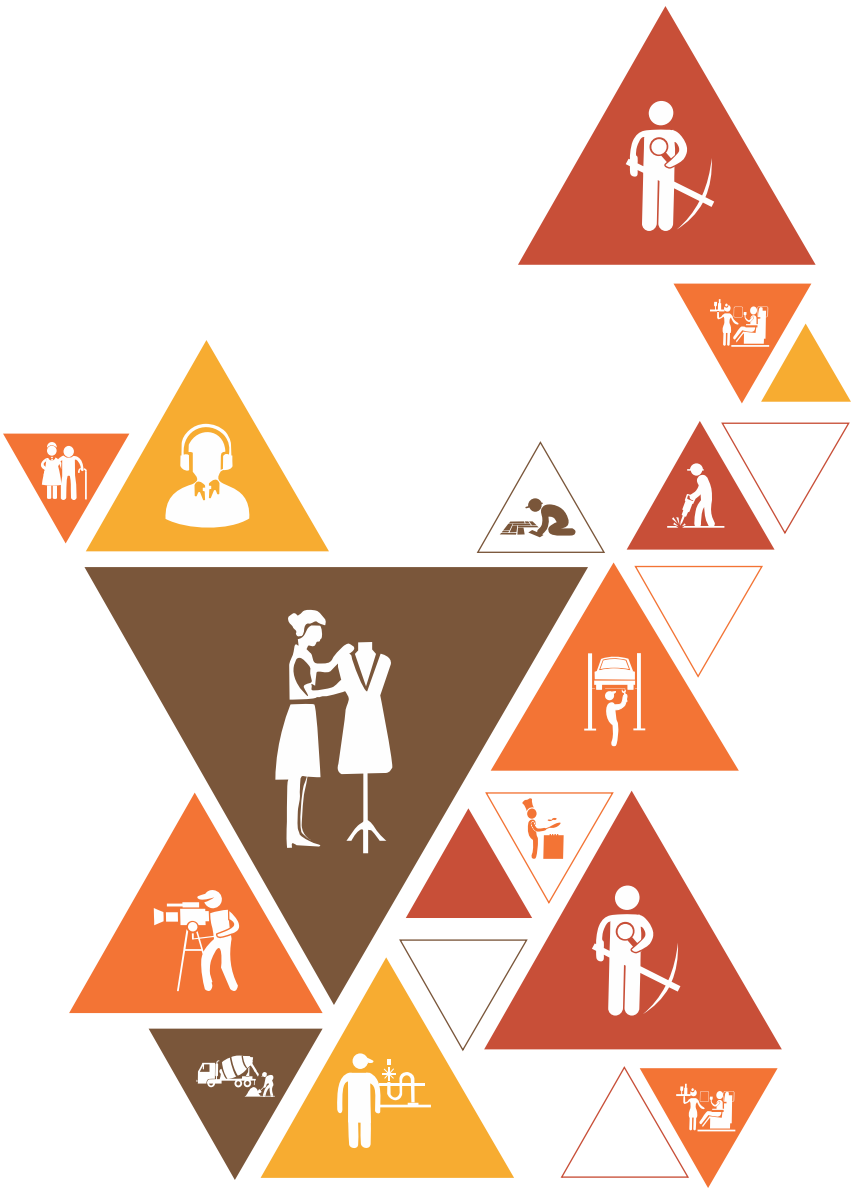
B. Fill-in-the-Blanks Questions' Answers:

1. Different types of slings, shackles, and lifting belts are used for lifting operations.
2. Proper inventory management procedures ensure the availability of materials and tools.
3. Protection against corrosion is essential for reinforcement steel.
4. Personal Protective Equipment (PPE) includes items like helmets, gloves, and safety shoes.
5. Safe and efficient loading, unloading, shifting, and stacking of reinforcement steel require proper training.

C. True/False Questions' Answers:

1. Diagrams and blueprints are not essential for shifting and stacking materials in reinforcement work. (False)
2. Power tools are generally safer to use than hand tools in reinforcement work. (False)
3. Inventory management and stock control procedures are not necessary for reinforcement work. (False)
4. Corrosion is not a common issue affecting reinforcement steel. (False)
5. Personal Protective Equipment (PPE) is not required for reinforcement work. (False)

Notes



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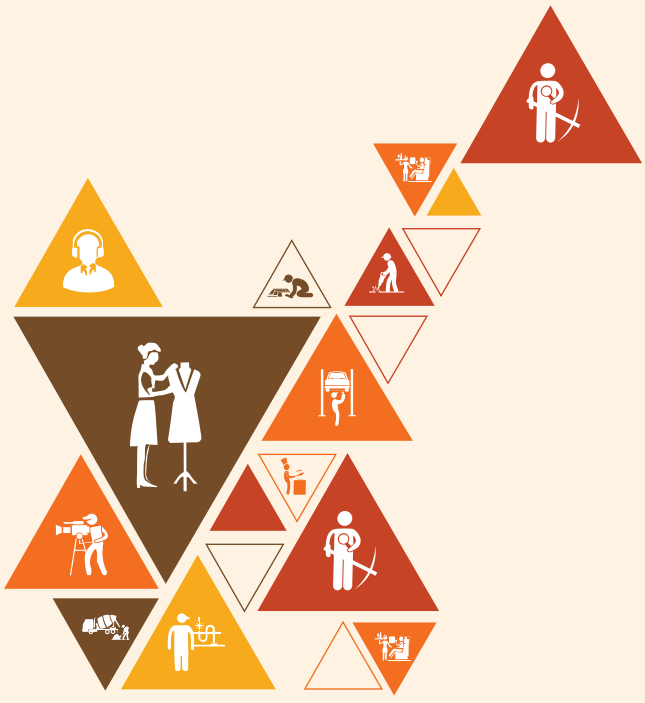
4. Mark and Cut Reinforcement Bars to the Required Length

Unit 4.1 – Application of paint on masonry surface



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Key Learning Outcomes

At the end of this module, trainer will ensure that the participant will be able to:

1. Explain the different types, grades, and diameters of reinforcement bars.
2. Demonstrate how to accurately measure and mark cut lengths on reinforcement bars.
3. Identify different types of ties used in reinforcement work.
4. Elaborate on the purpose and appropriate applications of each type of tie on different structural elements.
5. Explain the techniques and precautions to maintain the integrity of reinforcement bars during the straightening process.
6. Show how to straighten reinforcement bars of different diameters using a bending lever and pipe.
7. Explain the purpose, functions, and specific applications of each hand and power tool used in reinforcement work.
8. Demonstrate how to select and use the appropriate cutting tools, such as hand-cutting machine, circular cutting machine, or shearing machine, for cutting rebar.
9. Show proper techniques and safety measures when using hand tools for cutting rebar.
10. Describe the standard stacking practices to ensure safe and organized storage of cut reinforcement bars based on length and diameter.
11. Demonstrate the tagging and stacking techniques for cut reinforcement bars.

UNIT 4.1: Straightening, Cutting and Bending of Bars

Unit Objectives

At the end of this unit, trainer will ensure that participant will be able to:

1. Explain the different types, grades, and diameters of reinforcement bars.
2. Demonstrate how to accurately measure and mark cut lengths on reinforcement bars.
3. Identify different types of ties used in reinforcement work.
4. Elaborate on the purpose and appropriate applications of each type of tie on different structural elements.
5. Explain the techniques and precautions to maintain the integrity of reinforcement bars during the straightening process.
6. Show how to straighten reinforcement bars of different diameters using a bending lever and pipe.
7. Explain the purpose, functions, and specific applications of each hand and power tool used in reinforcement work.
8. Demonstrate how to select and use the appropriate cutting tools, such as hand-cutting machine, circular cutting machine, or shearing machine, for cutting rebar.
9. Show proper techniques and safety measures when using hand tools for cutting rebar.
10. Describe the standard stacking practices to ensure safe and organized storage of cut reinforcement bars based on length and diameter.
11. Demonstrate the tagging and stacking techniques for cut reinforcement bars

Topic Introduction

- Give the participants a brief overview of this unit
- Applications in various job environment

Resources to be used

- Theory
  - Training Kit - Trainer Guide & Participant Handbook, Presentations, Whiteboard, Marker, Projector, Laptop, Video Films.
- Practical
  - Chisel, Lever, Hook, Measuring Tape, Sledge Hammer, Bar tying hook, Bending lever, Gauge measure, Spanner, Hack saw blade and frame, Steel scale, Try Scale, Spirit level, Plumb bob, Measurement tape, Cutting machine, Lifting appliance (Sling, Shackle, Belts), Safety Helmet, Safety Goggles, Safety shoes, Safety belt, Cotton gloves, Ear plugs, Reflective jackets, Dust mask, Fire Prevention kit.

Do

- Explain the different types, grades, and diameters of reinforcement bars.
- Demonstrate how to accurately measure and mark cut lengths on reinforcement bars.
- Explain different types of ties used in reinforcement work.
- Elaborate on the purpose and appropriate applications of each type of tie on different structural elements.
- Explain the techniques and precautions to maintain the integrity of reinforcement bars during the straightening process.
- Show how to straighten reinforcement bars of different diameters using a bending lever and pipe.
- Explain the purpose, functions, and specific applications of each hand and power tool used in reinforcement work.
- Demonstrate how to select and use the appropriate cutting tools, such as hand-cutting machine, circular cutting machine, or shearing machine, for cutting rebar.
- Show proper techniques and safety measures when using hand tools for cutting rebar.
- Describe the standard stacking practices to ensure safe and organized storage of cut reinforcement bars based on length and diameter.
- Demonstrate the tagging and stacking techniques for cut reinforcement bars

Notes for Facilitation

- Use the Helper Bar Bender & Steel Fixer PHB and refer unit 4.1 of Straightening, Cutting and Bending of Bars.
- Different Types of Ties: Ties are used to secure reinforcement bars in position. Common types include saddle ties, snap ties, and double-loop ties.
- Purpose and Applications of Ties: Different ties serve distinct purposes, like holding intersecting bars, maintaining spacing, and securing vertical bars in walls or columns.
- Maintaining Bar Integrity During Straightening: When straightening bent bars, avoid over-bending, heating, or hitting to prevent structural damage. Gently work bars in small increments.
- Straightening Bars Using a Bending Lever and Pipe: To straighten bars, place the bar over a pipe and apply leverage with a bending lever, gradually correcting bends. Use protective gear and measure straightness.
- Hand and Power Tool Functions: Hand tools like pliers and wire twisters aid in tying, while power tools such as cutting machines and grinders facilitate cutting and shaping bars.
- Selecting and Using Cutting Tools: Choose tools like hand-cutting machines for small jobs and circular/shearing machines for bulk cutting. Follow safety guidelines and wear protective gear.
- Safe Cutting Techniques: Maintain a firm grip on tools, wear eye and hand protection, and keep the tool's cutting area clear. Position yourself to prevent accidents.
- Standard Stacking Practices for Storage: Stack cut bars of similar lengths and diameters neatly, with spacers between layers to prevent damage. Avoid overloading stacks to ensure stability.
- Tagging and Stacking Techniques: Tag cut bars with relevant information and organize stacks based on diameter, length, and type. Place flat spacers between layers to prevent tangling.

Say

Let's engage in a practical activity that focuses on enhancing the skills of Helper Bar Benders and Steel Fixers in straightening reinforcement bars of various diameters using a bending lever and pipe. This activity aims to provide hands-on experience in using the correct technique for straightening bars, which is essential for maintaining the integrity of construction structures.

Activity

Straightening Reinforcement Bars Using a Bending Lever and Pipe

- **Purpose:** This activity aims to develop the proficiency of Helper Bar Benders and Steel Fixers in straightening reinforcement bars of different diameters using a bending lever and pipe, emphasizing proper technique and safety.
- **Resources Required:** Reinforcement bars of varying diameters, bending lever, sturdy pipe, safety gear.
- **Tentative Duration: 45 Minutes**
- **Procedure:**
    - Introduction: Explain the importance of correctly straightening reinforcement bars for structural integrity and safety.
    - Demonstration: Show the correct technique of using a bending lever and pipe to straighten bars. Highlight the gradual and controlled approach.
    - Hands-On Practice:
        - Distribute reinforcement bars of different diameters to participants.
        - Provide bending levers and sturdy pipes.
    - Participants Practice:
        - Participants pair up.
        - One participant plays the role of a Helper Bar Bender while the other holds the pipe.
        - Helper Bar Benders use the bending lever to straighten the bars, while their partners hold the pipe steady.
        - Partners ensure the correct angle and guide the bar through the pipe.
    - Rotating Roles: After a set time, participants switch roles to allow everyone to practice both tasks.
        - Observation and Feedback:
        - Observe participants' techniques and provide immediate feedback.
        - Offer guidance on maintaining control and applying gradual pressure.
    - Group Discussion:
        - Engage participants in a discussion on the challenges faced and lessons learned during the activity.
        - Encourage participants to share tips for effective bar straightening.
    - Reflection and Conclusion:

- Lead a reflection on the importance of proper bar straightening in construction.
- Summarize key takeaways, highlighting the significance of technique and safety.

- **Expected Outcome:** Through this activity, Helper Bar Benders and Steel Fixers will enhance their skill in straightening reinforcement bars using a bending lever and pipe. They will gain practical experience in maintaining the integrity of bars while ensuring safety, contributing to the quality and stability of construction projects.

Exercise

Key Solutions to PHB Exercise:

A. Short Questions' Answer:

1. Different types of reinforcement bars used in construction include mild steel bars, deformed bars, and epoxy-coated bars, with varying grades such as Fe415, Fe500, and Fe550. Diameters range from 6mm to 40mm, catering to structural needs.
2. Accurate measurement and marking of cut lengths on reinforcement bars involve using a tape measure for length and chalk or marker for marking. Consider design requirements, add extra length for overlapping, and use appropriate cutting tools for precision.
3. Various types of ties in reinforcement work include snap ties, twist ties, saddle ties, and wire ties. These secure the bars together, maintaining proper spacing and alignment during concrete pouring.
4. Ties are crucial in reinforcement work as they prevent displacement of bars during concrete placement, ensuring structural integrity. They are applied differently based on the structural element: column ties encircle vertical bars, beam ties connect horizontal bars, and slab ties hold mesh together.
5. To maintain the integrity of reinforcement bars during straightening, avoid excessive force that may weaken the bars. Use proper tools, like a bending lever and pipe, to gently apply pressure at intervals, while ensuring bars remain within their elastic limit to prevent permanent deformation.

B. Fill-in-the-Blanks Questions' Answer:

1. The purpose of ties in reinforcement work is to secure rebars.
2. Different hand and power tools have specific functions and applications in reinforcement work.
3. Accurate measurement and marking of cut lengths on reinforcement bars are essential for precision.
4. Proper stacking practices for cut reinforcement bars help ensure safe storage.
5. The selection of cutting tools like hand-cutting machines or circular cutting machines depends on the diameter of the rebar.

C. True/False Questions' Answer:

1. Reinforcement bars are available only in one type, grade, and diameter. (False)
2. Ties are used in reinforcement work to create decorative patterns on the structure. (False)
3. It is not necessary to measure and mark cut lengths accurately on reinforcement bars. (False)
4. The integrity of reinforcement bars cannot be compromised during the straightening process. (True)
5. There are no specific stacking practices for cut reinforcement bars. (False)

Notes

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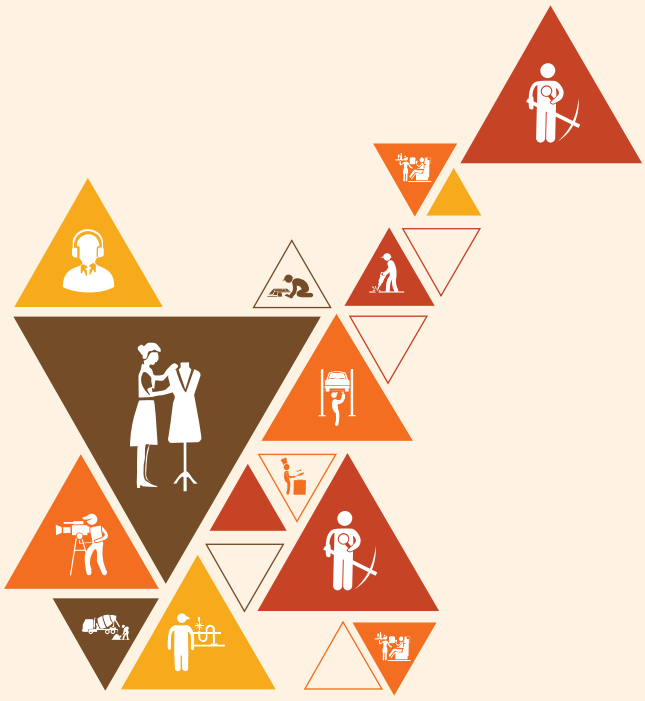
5. Process of Tying Reinforcement Bars

Unit 5.1 – Tying Reinforcement Bars



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Key Learning Outcomes

At the end of this module, trainer will ensure that the participant will be able to:

1. Explain the importance of proper tying of reinforcement bars.
2. Demonstrate the use of different types of binding wire, including the calculation of the appropriate length of binding wire required for different types of ties.
3. List the different types of binding wires used for tying reinforcement bars.
4. Explain the application of different types of ties in different structural members, like columns, beams, slabs, etc.
5. Demonstrate the use of different types of ties used in reinforcement work, such as slash tie, ring slash tie, hairpin tie, ring hairpin tie, crown tie, and splice tie.
6. State the characteristics of binding wires, including tensile strength, flexibility, and corrosion resistance.
7. Show how to accurately measure and cut the binding wire to the required length using appropriate cutting tools.
8. Identify and classify different hand and power tools used for tying rebar.
9. Explain the importance of appropriate spacing in tying reinforcement bars.
10. Show how to ensure proper alignment and positioning of reinforcement bars during the tying process.

UNIT 5.1: Tying Reinforcement Bars

Unit Objectives

At the end of this unit, trainer will ensure that participant will be able to:

1. Explain the importance of proper tying of reinforcement bars.
2. Demonstrate the use of different types of binding wire, including the calculation of the appropriate length of binding wire required for different types of ties.
3. List the different types of binding wires used for tying reinforcement bars.
4. Explain the application of different types of ties in different structural members, like columns, beams, slabs, etc.
5. Demonstrate the use of different types of ties used in reinforcement work, such as slash tie, ring slash tie, hairpin tie, ring hairpin tie, crown tie, and splice tie.
6. State the characteristics of binding wires, including tensile strength, flexibility, and corrosion resistance.
7. Show how to accurately measure and cut the binding wire to the required length using appropriate cutting tools.
8. Identify and classify different hand and power tools used for tying rebar.
9. Explain the importance of appropriate spacing in tying reinforcement bars.
10. Show how to ensure proper alignment and positioning of reinforcement bars during the tying process.

Topic Introduction

- Give the participants a brief overview of this unit
- Applications in various job environment

Resources to be used

- Theory
  - Training Kit - Trainer Guide & Participant Handbook, Presentations, Whiteboard, Marker, Projector, Laptop, Video Films.
- Practical
  - Hacksaw, Rail piece, Pointed chisel, Sledgehammer, Bending lever, Pin plate, Working bench, Measurement tape, Cutting machine, Bending machine, M.S, TOR steel, TMT steel Binding wires, Steel cutting blade, Cover blocks, Wooden planks, Rebar tying machine, Lifting appliance (Sling, Shackle, Belts), Safety Helmet, Safety goggles, Safety shoes, Safety belt, Cotton gloves, Ear plugs, Reflective jackets, Dust mask, Fire Prevention kit

Do

- Explain the importance of proper tying of reinforcement bars.
- Demonstrate the use of different types of binding wire, including the calculation of the appropriate length of binding wire required for different types of ties.
- List the different types of binding wires used for tying reinforcement bars.
- Explain the application of different types of ties in different structural members, like columns, beams, slabs, etc.
- Demonstrate the use of different types of ties used in reinforcement work, such as slash tie, ring slash tie, hairpin tie, ring hairpin tie, crown tie, and splice tie.
- State the characteristics of binding wires, including tensile strength, flexibility, and corrosion resistance.
- Show how to accurately measure and cut the binding wire to the required length using appropriate cutting tools.
- Identify and classify different hand and power tools used for tying rebar.
- Explain the importance of appropriate spacing in tying reinforcement bars.
- Show how to ensure proper alignment and positioning of reinforcement bars during the tying process.

Notes for Facilitation

- Use the Helper Bar Bender & Steel Fixer PHB and refer unit 5.1 of Tying Reinforcement Bars.
- **Importance of Proper Tying of Reinforcement Bars:** Proper tying of reinforcement bars, also known as rebar, is crucial for ensuring the structural integrity, stability, and longevity of concrete structures. The reinforcement bars provide the necessary strength to the concrete, helping it withstand various types of loads such as bending, tension, compression, and shear. Tying the bars correctly enhances the overall performance of the structure by:
    - Structural Integrity: Properly tied rebar maintains the desired spacing and positioning within the concrete, preventing the bars from shifting or dislodging during concrete placement and curing. This ensures that the concrete and rebar work together effectively to resist structural loads.
    - Load Distribution: Correctly tied rebar allows for the even distribution of loads throughout the structure, minimizing stress concentrations and preventing localized failures.
    - Crack Control: Adequately tied rebar helps control cracking in concrete by enhancing its tensile strength. This is crucial in preventing the formation and propagation of cracks, which can compromise the structural integrity and durability of the concrete.
    - Shear Resistance: Properly tied stirrups and ties around beams and columns enhance the structure's ability to resist shear forces, which are diagonal forces that can cause sections of concrete to slide relative to each other.
    - Durable Bond: Effective tying ensures a strong bond between the rebar and the surrounding concrete. This bond transfers forces between the concrete and the reinforcement, allowing them to work together as a composite material.
- **Types of Binding Wire and Calculation of Length:** Different types of binding wire, usually made of

steel, are used for tying rebar. The appropriate length of binding wire required for different types of ties depends on the thickness of the rebar and the complexity of the tie. The length calculation generally involves adding the circumference of the rebar bundle to the length required for wrapping and twisting. This length ensures a secure and stable tie.

- **Types of Binding Wires:** Common types of binding wires include annealed wire, galvanized wire, and epoxy-coated wire. These wires vary in terms of corrosion resistance, tensile strength, and flexibility.
- **Application of Different Types of Ties:** Different types of ties are used in various structural members based on the specific requirements of the construction. For example:
    - Columns: Hairpin ties, ring hairpin ties, and crown ties are commonly used to secure vertical reinforcement bars in columns.
    - Beams: Slash ties, ring slash ties, and splice ties are used to tie horizontal and diagonal rebar in beams.
    - Slabs: Ties are used to secure reinforcement in slabs to prevent displacement during concrete placement and curing.
- **Demonstration of Different Types of Ties:**
    - Slash Tie: A simple tie formed by twisting the binding wire around intersecting rebar.
    - Ring Slash Tie: Similar to the slash tie, but with an additional loop that encircles both bars for increased stability.
    - Hairpin Tie: A U-shaped tie used to secure vertical bars in columns by wrapping around the horizontal ties.
    - Ring Hairpin Tie: Similar to the hairpin tie but with an additional loop encircling the vertical bar for added security.
    - Crown Tie: Used to secure multiple bars together at a common point, often seen at the top of columns.
    - Splice Tie: Used to connect two lengths of rebar together, typically in beams or columns.
- **Characteristics of Binding Wires:** Binding wires should possess characteristics such as high tensile strength, flexibility for easy manipulation, and good corrosion resistance to ensure long-lasting performance in different environmental conditions.
- **Measuring and Cutting Binding Wire:** To accurately measure and cut binding wire, follow these steps:
    - Use a tape measure to determine the required length for the tie.
    - Add extra length for twisting and wrapping (usually 3-4 times the diameter of the bundle).
    - Use appropriate cutting tools, such as pliers or wire cutters, to cut the wire to the calculated length.
- **Hand and Power Tools for Tying Rebar:** Hand tools include pliers, wire twisters, and cutters. Power tools, such as rebar tying machines, automate the tying process for increased efficiency.
- **Importance of Appropriate Spacing:** Proper spacing between ties ensures that the rebar remains in the desired position within the concrete, preventing shifting and maintaining the required cover depth. Incorrect spacing can lead to inadequate concrete cover, reducing durability and structural performance.
- **Alignment and Positioning of Reinforcement Bars:** To ensure proper alignment and positioning:

- Place the rebar according to the design specifications.
- Use spacers or chairs to maintain the required concrete cover.
- Secure the bars in place with appropriate ties, ensuring they are centered and evenly spaced.

Say

Let's participate in a practical activity that focuses on honing the skills of Helper Bar Benders and Steel Fixers in accurately measuring and cutting binding wire for reinforcement tying. This activity aims to provide hands-on experience in following proper steps to ensure precise measurements and cuts of binding wire.

Activity

Precision Binding Wire Measurement and Cutting

- **Purpose:** This activity aims to develop the expertise of Helper Bar Benders and Steel Fixers in accurately measuring and cutting binding wire for reinforcement tying, considering proper techniques and safety.
- **Resources Required:** Tape measure, binding wire, cutting tools (pliers or wire cutters).
- **Tentative Duration: 30 Minutes**
- **Procedure:**
  - Introduction: Explain the importance of accurate binding wire measurements and cuts in reinforcement work.
  - Demonstration: Show the participants how to use a tape measure for precise length determination.
  - Measurement Practice:
    - Provide various lengths for participants to measure using a tape measure.
    - Instruct them to add extra length for twisting and wrapping (3-4 times the diameter of the bundle).
  - Cutting Techniques:
    - Explain the types of cutting tools (pliers or wire cutters) suitable for cutting binding wire.
    - Demonstrate safe and proper cutting techniques.
  - Hands-On Activity:
    - Distribute binding wire to participants.
    - Guide them to measure and cut binding wire accurately based on provided measurements.
  - Sharing and Discussion:
    - Encourage participants to share their experiences and challenges.
    - Discuss the importance of precision in binding wire cutting.
  - Reflection:
    - Engage participants in reflecting on the significance of accurate binding wire measurements

and cuts in reinforcement work.

- Summarize key takeaways and emphasize safety measures.

Expected Outcome: Through this activity, Helper Bar Benders and Steel Fixers will gain practical skills in accurately measuring and cutting binding wire, ensuring they are well-equipped to perform this crucial task in reinforcement work.

Say

Let's engage in a practical activity that focuses on mastering the techniques of aligning and positioning reinforcement bars accurately, a vital skill for Helper Bar Benders and Steel Fixers. This activity aims to provide hands-on experience in ensuring the correct placement of reinforcement bars as per design specifications.

Activity

Precision Alignment and Positioning of Reinforcement Bars

- **Purpose:** This activity aims to develop the expertise of Helper Bar Benders and Steel Fixers in achieving accurate alignment and positioning of reinforcement bars, considering proper techniques and quality standards.
- **Resources Required:** Reinforcement bars, spacers or chairs, tying materials (binding wire), design specifications.
- **Tentative Duration: 30 Minutes**
- **Procedure:**
  - Introduction: Explain the significance of precise alignment and positioning of reinforcement bars for ensuring structural integrity.
  - Demonstration: Show the participants how to place reinforcement bars according to design specifications.
  - Alignment and Positioning Practice:
    - Provide participants with designated areas for placing reinforcement bars.
    - Instruct them to use spacers or chairs to maintain the required concrete cover.
  - Tying Techniques:
    - Explain the appropriate techniques for securing reinforcement bars with ties.
    - Highlight the importance of centered and evenly spaced bars.
  - Hands-On Activity:
    - Distribute reinforcement bars, spacers, chairs, and tying materials.
    - Guide participants to place the bars, maintain covers, and secure them with ties.
  - Sharing and Discussion:
    - Encourage participants to share their observations and challenges during the activity.
    - Discuss the significance of precise alignment and positioning for structural stability.

- Reflection:
  - Engage participants in reflecting on the skills gained in aligning and positioning reinforcement bars.
  - Summarize key takeaways and emphasize the role of proper techniques in construction quality.

- **Expected Outcome:** Through this activity, Helper Bar Benders and Steel Fixers will enhance their abilities to align and position reinforcement bars accurately according to design specifications. They will understand the importance of maintaining proper concrete cover and evenly spaced bars to ensure structural integrity.

Exercise

Key Solutions to PHB Exercise:

A. Short Questions' Answer:

1. Proper tying of reinforcement bars is crucial in construction to ensure structural stability and integrity. Ties prevent displacement of bars during concrete pouring, maintaining their positions and spacing, which is essential for the strength and durability of the structure.
2. Yes, I can demonstrate the use of different types of binding wire for tying reinforcement bars. Different types include loop ties, saddle ties, and figure-eight ties. These wire ties secure bars together, maintaining proper spacing and alignment.
3. Various types of ties used in reinforcement work include snap ties, twist ties, saddle ties, and wire ties. Each type serves the purpose of securing bars in place and maintaining proper spacing during concrete placement.
4. Different types of ties are applied based on the structural members. For example, column ties encircle vertical bars to prevent lateral movement, beam ties connect horizontal bars to maintain spacing, and slab ties hold mesh together for concrete pouring.
5. Unfortunately, I can't physically demonstrate, but I can explain the process. Slash ties involve looping the wire around the intersecting bars and twisting them together. Hairpin ties form a U-shape and are placed around two parallel bars, then twisted to secure them tightly. These ties ensure proper alignment and spacing of reinforcement bars.

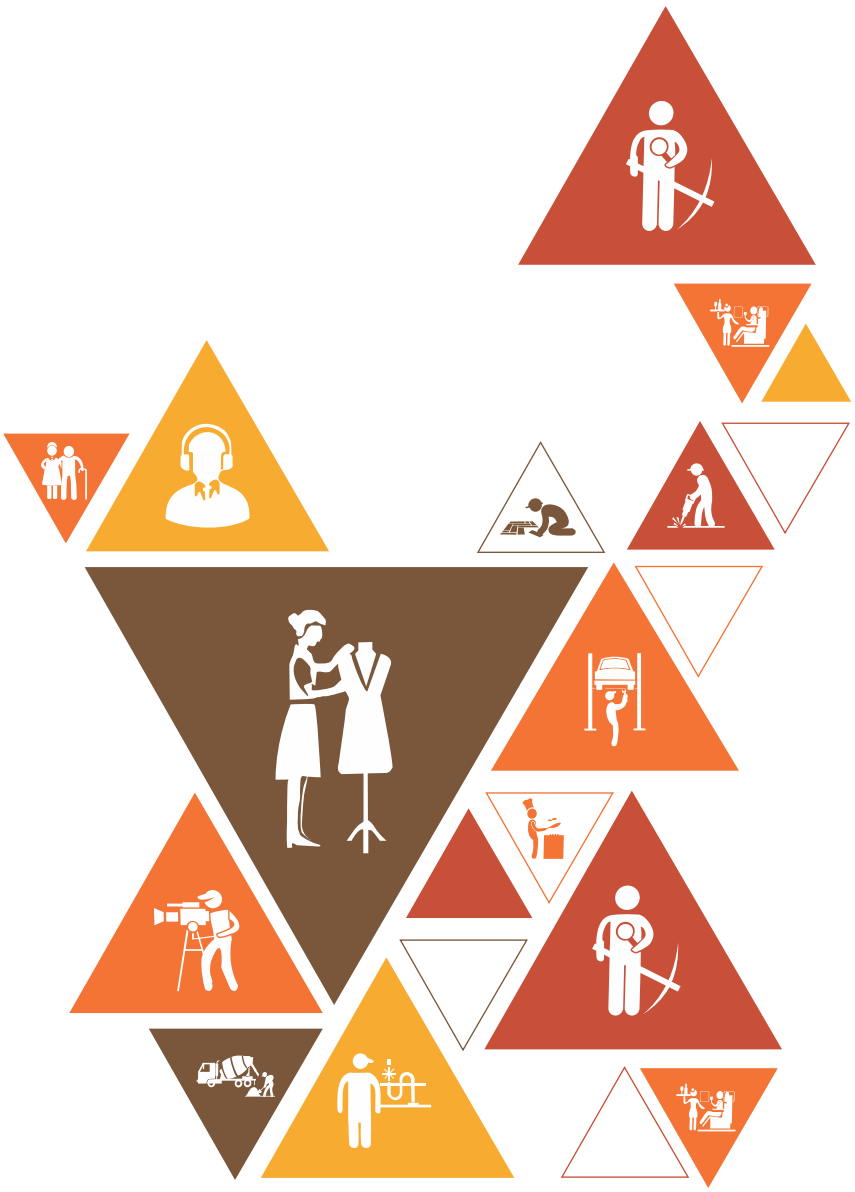
B. Fill-in-the-Blanks Questions' Answer:

1. The characteristics of binding wires include tensile strength, flexibility, and corrosion resistance.
2. Proper alignment and positioning of reinforcement bars during tying ensure structural integrity.
3. Different cutting tools are used for measuring and cutting binding wire to the required length.
4. The types of ties used in reinforcement work include slash tie, ring slash tie, and crown tie.
5. Appropriate spacing in tying reinforcement bars ensures proper concrete cover.

C. True/False Questions' Answer:

1. Proper tying of reinforcement bars is essential for ensuring structural strength and integrity. (True)
2. Different types of binding wires have the same characteristics in terms of tensile strength and flexibility. (False)
3. he spacing between ties in reinforcement work does not impact the structural stability. (False)
4. The same type of tie can be used for all structural members like columns, beams, and slabs. (False)
5. Alignment and positioning of reinforcement bars are not important during the tying process. (False)

Notes



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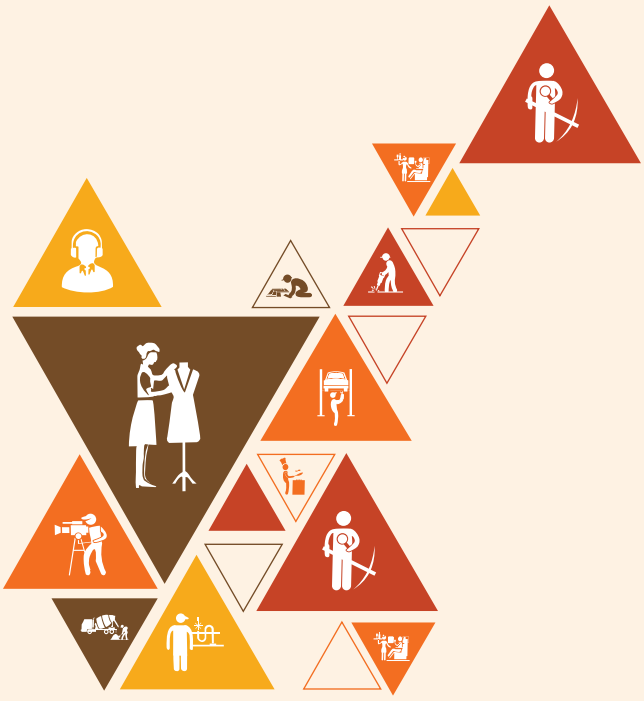
6. Process of Erecting and Dismantling Temporary Scaffold Up to 3.6 Meter Height

Unit 6.1 - Basics of Scaffolding

Unit 6.2 - Concept of Conventional Scaffolding

Unit 6.3 - Concept of Modular Scaffolding System

Unit 6.4 - Erecting and Dismantling of Temporary Scaffolding



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Key Learning Outcomes

At the end of this module, trainer will ensure that the participant will be able to:

1. Explain the use of different types of scaffolds, e.g. cup-lock and frame scaffold.
2. Demonstrate how to level the area where the scaffold needs to be erected and check the ground compactness.
3. Elucidate the identification and use of different scaffolding components.
4. Show how to use appropriate components and erect a temporary scaffold up to 3.6 m in height.
5. List the standard size of scaffolding components.
6. Describe the standard procedure for erecting and dismantling a 3.6 m temporary scaffold.
7. Demonstrate the use of relevant tools and tackles in erecting and dismantling temporary scaffolds.
8. Demonstrate the process of setting up walk-boards, guard rails, toe-boards and other components on the scaffold's working platform.
9. Show how to clean and stack all components properly after dismantling.

UNIT 6.1: Basics of Scaffolding

Unit Objectives

At the end of this unit, trainer will ensure that participant will be able to:

1. Explain the use of different types of scaffolds, e.g. cup-lock and frame scaffold.
2. Elucidate the identification and use of different scaffolding components.
3. List the standard size of scaffolding components.

Topic Introduction

- Give the participants a brief overview of this unit
- Applications in various job environment

Resources to be used

- Theory
  - Training Kit - Trainer Guide & Participant Handbook, Presentations, Whiteboard, Marker, Projector, Laptop, Video Films.
- Practical
  - Hammer, Spanner (set), Wrench, Pulley, Rope, Nuts and bolts, Measuring tape, Spirit level, Plumb-bob, Mason's line, Helmet, Safety shoes, Safety belt, Cotton hand gloves, Goggles, Reflective jackets

Do

- Describe about the basic concept of a temporary scaffolding
- Explain the benefits of a scaffolding
- Reiterate the types of temporary scaffolding

Notes for Facilitation

- Use the Helper Bar Bender & Steel Fixer PHB and refer unit 6.1 to explain Basics of Scaffolding.
- Temporary scaffolding is a temporary structure erected at a construction site to provide a safe and elevated platform for workers to perform various tasks, such as masonry work, painting, or repairs. It consists of a framework of tubes, poles, or other components that support working platforms at different levels. Scaffolding is used to access higher areas of a building or structure that are otherwise difficult to reach.

- Scaffolding offers several benefits to Helper Bar Bender & Steel Fixers and other construction workers:
  - Safety: Provides a stable and secure platform for working at height, reducing the risk of accidents and falls.
  - Access: Allows easy access to various parts of a building or structure for construction, maintenance, and repairs.
  - Efficiency: Improves work efficiency by reducing the need to constantly climb up and down ladders.
  - Space: Creates a larger work area, enabling multiple workers to perform tasks simultaneously.
  - Flexibility: Scaffolding can be adjusted and customized to fit different shapes and sizes of structures.
- There are several types of temporary scaffolding used in construction, each with its own advantages and applications:
  - Tube and Coupler Scaffolding: Consists of tubes and couplers that can be connected to form various configurations, suitable for a wide range of structures.
  - Frame Scaffolding: Comprises vertical and horizontal frames that are easily assembled, making it versatile and efficient.
  - System Scaffolding: Uses prefabricated components that fit together in a modular fashion, offering quick assembly and adaptability.
  - Suspended Scaffolding: Hangs from ropes or cables, commonly used for work on the sides of buildings or bridges.
  - Cantilever Scaffolding: Extends from a structure's floor, used when ground support is limited.
  - Mobile Scaffolding: Equipped with wheels for easy mobility, ideal for smaller tasks and when mobility is needed.

Say

Let's engage in a practical activity that delves into the various types of temporary scaffolding used in construction. This activity will provide Helper Bar Bender & Steel Fixers with hands-on experience in understanding the advantages and applications of each scaffolding type, contributing to their knowledge of safe and effective construction practices.

Activity

Exploring Types of Temporary Scaffolding

- **Purpose:** This activity aims to familiarize Helper Bar Bender & Steel Fixers with different types of temporary scaffolding used in construction and their respective advantages and applications.
- **Resources Required:** Visual aids or images depicting each scaffolding type, flip charts, markers.
- **Tentative Duration: 45 Minutes**
- **Procedure:**

- Introduction: Begin by discussing the importance of selecting the appropriate scaffolding type based on the construction requirements for safety and efficiency.
- Types of Scaffolding Presentation:
  - Present visual aids or images of each scaffolding type: Tube and Coupler, Frame, System, Suspended, Cantilever, and Mobile.
  - Briefly describe the characteristics, components, and applications of each type.
- Advantages and Applications Group Activity:
  - Divide participants into groups, assigning each group a specific scaffolding type.
  - Provide flip charts and markers to each group.
  - In their groups, participants discuss and list the advantages and primary applications of their assigned scaffolding type.
- Advantages and Applications Sharing:
  - Each group presents their findings to the larger group.
  - Facilitate a brief discussion after each presentation to encourage knowledge sharing.
- Comparative Analysis:
  - Discuss the scenarios where one type of scaffolding might be more suitable than others.
  - Engage participants in a comparative analysis of the scaffolding types based on different project requirements.
- Q&A Session:
  - Allow participants to ask questions and seek clarifications about the presented scaffolding types.
- Reflection and Conclusion:
  - Engage participants in reflecting on the activity's insights and the importance of selecting the right scaffolding type for different construction scenarios.
  - Summarize key takeaways and underscore the significance of safe and efficient construction practices.

- **Expected Outcome:** Through this activity, Helper Bar Bender & Steel Fixers will gain a practical understanding of various types of temporary scaffolding, their advantages, and applications. This knowledge will equip them to make informed decisions when selecting scaffolding for different construction tasks, enhancing safety and efficiency on the worksite.

Notes

UNIT 6.2: Concept of Conventional Scaffolding

Unit Objectives

At the end of this unit, trainer will ensure that participant will be able to:

1. Describe the material used in bamboo scaffolding
2. Know how to erect and dismantle a bamboo scaffolding

Topic Introduction

- Give the participants a brief overview of this unit
- Applications in various job environment

Resources to be used

- Theory
  - Training Kit - Trainer Guide & Participant Handbook, Presentations, Whiteboard, Marker, Projector, Laptop, Video Films.
- Practical
  - Hammer, Spanner (set), Wrench, Pulley, Rope, Nuts and bolts, Measuring tape, Spirit level, Plumb-bob, Mason's line, Helmet, Safety shoes, Safety belt, Cotton hand gloves, Goggles, Reflective jackets

Do

- Describe the material used in bamboo scaffolding
- Know how to erect and dismantle a bamboo scaffolding

Notes for Facilitation

- Use the Helper Bar Bender & Steel Fixer PHB and refer unit 6.2 to explain Concept of Conventional Scaffolding.
- Bamboo scaffolding is a traditional and widely used method of scaffolding in some regions. It involves using bamboo as the primary material for creating the scaffolding structure. Bamboo is chosen for its strength, flexibility, and availability. In bamboo scaffolding, different lengths of bamboo poles are tied together using bamboo strips or ropes to create a scaffold frame. The joints are secured with traditional knots or lashings.
  - Erecting and dismantling bamboo scaffolding involves the following steps:
    - Erecting:

- Site Preparation: Choose a suitable location, ensuring a firm and level foundation for the scaffold base.
- Setting Base Poles: Insert longer bamboo poles vertically into the ground to serve as the base support.
- Building Frames: Assemble the bamboo poles horizontally and vertically to create a sturdy scaffold frame.
- Tying Joints: Secure the joints using ropes, bamboo strips, or traditional knotting techniques.
- Adding Platforms: Place bamboo planks or boards on the frames to create working platforms at various levels.
- Stabilizing: Use diagonal braces and ties to provide stability to the scaffold structure.
- Inspecting: Perform a thorough inspection to ensure the scaffold is stable, secure, and safe for use.

◦ Dismantling:

- Removing Platforms: Carefully remove the bamboo planks or boards from the working platforms.
- Loosening Joints: Untie the ropes or bamboo strips securing the joints of the scaffold frames.
- Disassembling Frames: Disassemble the bamboo frames in a systematic manner, starting from the top.
- Removing Base Poles: Remove the longer bamboo poles used as the base support.
- Organizing Components: Bundle and organize the bamboo poles and components for storage or reuse.
- Safe Handling: During dismantling, ensure that workers are using appropriate personal protective equipment (PPE) and following safety guidelines.

Say

Let's dive into a practical activity that focuses on the process of erecting bamboo scaffolding. This activity will provide Helper Bar Bender & Steel Fixers with hands-on experience in understanding the steps involved in setting up bamboo scaffolding, contributing to their knowledge of safe and effective construction practices.

Activity

Erecting Bamboo Scaffolding Steps

- **Purpose:** This activity aims to familiarize Helper Bar Bender & Steel Fixers with the sequential steps involved in erecting bamboo scaffolding, highlighting the importance of each step for a secure and stable structure.
- **Resources Required:** Visual aids depicting the bamboo scaffolding erection process, rope or string for knot-tying practice, bamboo strips (optional), bamboo poles (shorter lengths for demonstration), flip charts, markers.

- **Tentative Duration: 60 Minutes**
- **Procedure:**
  - Introduction: Begin by discussing the significance of proper scaffold erection for safety and efficient work on construction sites.
  - Step-by-Step Presentation:
    - Present visual aids or images illustrating the bamboo scaffolding erection process, step by step.
    - Describe each step: Site Preparation, Setting Base Poles, Building Frames, Tying Joints, Adding Platforms, Stabilizing, and Inspecting.
  - Base Pole Insertion Practice:
    - Demonstrate how to insert longer bamboo poles vertically into the ground.
    - Participants practice this step using shorter bamboo poles or sticks and the designated area.
  - Frame Assembly and Knot-Tying:
    - Discuss horizontal and vertical bamboo pole assembly to create frames.
    - Provide rope or string for participants to practice securing joints using knot-tying techniques.
  - Platform Placement Demonstration:
    - Demonstrate placing bamboo planks or boards on the frames to create working platforms.
    - Participants observe and discuss the proper method.
  - Stabilization and Inspection:
    - Explain the use of diagonal braces and ties to stabilize the scaffold.
    - Discuss the importance of thorough inspection for stability and safety.
  - Group Discussion and Sharing:
    - Participants discuss the challenges and key takeaways from each step.
    - Share insights about the critical nature of proper scaffold erection.
  - Q&A Session:
    - Allow participants to ask questions and seek clarifications about the bamboo scaffolding erection process.
  - Reflection and Conclusion:
    - Engage participants in reflecting on the practical insights gained from the activity.
    - Summarize key points and emphasize the importance of following each step for secure and safe bamboo scaffold erection.
- Expected Outcome: Through this activity, Helper Bar Bender & Steel Fixers will acquire practical understanding of the sequential process of erecting bamboo scaffolding. They will appreciate the importance of each step in ensuring the stability, safety, and effectiveness of the scaffold for construction tasks.

Notes

UNIT 6.3: Concepts of Modular Scaffolding Systems

Unit Objectives

At the end of this unit, trainer will ensure that participant will be able to:

1. Understand about types of modular scaffolding
2. Summarize the components of cuplock system scaffolding
3. Identify the components of frame system scaffolding

Topic Introduction

- Give the participants a brief overview of this unit
- Applications in various job environment

Resources to be used

- Theory
  - Training Kit - Trainer Guide & Participant Handbook, Presentations, Whiteboard, Marker, Projector, Laptop, Video Films.
- Practical
  - Hammer, Spanner (set), Wrench, Pulley, Rope, Nuts and bolts, Measuring tape, Spirit level, Plumb-bob, Mason's line, Helmet, Safety shoes, Safety belt, Cotton hand gloves, Goggles, Reflective jackets

Do

- Explain about types of modular scaffolding
- Explain the components of cuplock system scaffolding
- Explain the components of frame system scaffolding

Notes for Facilitation

- Use the Helper Bar Bender & Steel Fixer PHB and refer unit 6.3 to explain Concepts of Modular Scaffolding Systems.
- Modular scaffolding refers to scaffolding systems that are pre-fabricated and assembled using standardized components. These systems offer efficiency, versatility, and ease of assembly. Two common types of modular scaffolding are:
  - Cuplock System Scaffolding: This system uses vertical standards with cup-like nodes that hold

horizontal ledgers and transoms. It offers quick assembly and versatility for various applications.

- Frame System Scaffolding: This system comprises vertical frames and horizontal cross braces that create a strong and stable structure. Frame scaffolding is known for its simplicity and suitability for various tasks.

- The Cuplock System Scaffolding consists of several key components:
  - Standards (Verticals): Vertical tubes with cup joints that form the main vertical support.
  - Ledgers (Horizontals): Horizontal tubes that connect to the cup joints on the standards.
  - Transoms: Horizontal tubes that connect ledgers and provide support for scaffold boards.
  - Cup Joints: Nodes on the standards that securely hold ledgers and transoms in place.
  - Base Jacks: Adjustable components placed at the bottom of standards to level the scaffold on uneven ground.
  - Top Cups and Bottom Cups: Attach to the standards to secure the ledgers and transoms.
- Frame System Scaffolding consists of several main components:
  - Vertical Frames: Upright frames that provide vertical support and stability.
  - Cross Braces: Diagonal braces that connect vertical frames and add structural integrity.
  - Coupling Pins: Securely lock the cross braces to the vertical frames.
  - Scaffold Boards: Planks placed on horizontal rungs of the frames to create the working platform.
  - Base Plates: Flat plates placed under the vertical frames to distribute weight and stabilize the scaffold.
  - Guardrails and Toeboards: Safety components added to prevent falls and provide a safe working environment.

Say

Let's delve into a practical activity that focuses on the components of Frame System Scaffolding. This activity will provide Helper Bar Bender & Steel Fixers with hands-on experience in understanding the various components that make up this scaffolding type, contributing to their knowledge of safe and effective construction practices.

Activity

Exploring Frame System Scaffolding Components

- **Purpose:** This activity aims to familiarize Helper Bar Bender & Steel Fixers with the main components of Frame System Scaffolding and their roles in creating a secure and safe working platform.
- **Resources Required:** Visual aids or images depicting each scaffolding component, flip charts, markers.
- **Tentative Duration: 45 Minutes**
- **Procedure:**

- Introduction: Begin by discussing the importance of understanding the components of Frame System Scaffolding to ensure proper setup and safe usage.
- Component Presentation:
  - Present visual aids or images of each scaffolding component: Vertical Frames, Cross Braces, Coupling Pins, Scaffold Boards, Base Plates, Guardrails, and Toeboards.
  - Briefly describe the purpose and function of each component.
- Component Role Play:
  - Divide participants into small groups.
  - Assign each group a specific scaffolding component.
  - Participants discuss and list the purpose, installation process, and significance of their assigned component.
- Component Presentation and Discussion:
  - Each group presents their findings to the larger group.
  - Facilitate a discussion after each presentation to encourage knowledge sharing.
  - Comparative Analysis:
  - Discuss scenarios where one component might be more critical than others for specific tasks.
  - Engage participants in analyzing the interdependence of components.
- Q&A Session:
  - Allow participants to ask questions and seek clarifications about the presented scaffolding components.
- Reflection and Conclusion:
  - Engage participants in reflecting on the insights gained about scaffolding components and their roles.
  - Summarize key takeaways and underscore the significance of proper component understanding for secure scaffolding setup.

- **Expected Outcome:** Through this activity, Helper Bar Bender & Steel Fixers will gain practical familiarity with the components of Frame System Scaffolding. They will comprehend the roles and importance of each component in ensuring a safe and effective working platform, enhancing their ability to set up and use scaffolding systems correctly.

Notes

UNIT 6.4: Erecting and Dismantling Modular Scaffolding System

Unit Objectives

At the end of this unit, trainer will ensure that participant will be able to:

1. Describe the standard procedure for erecting and dismantling a 3.6 m temporary scaffold.
2. Demonstrate how to level the area where the scaffold needs to be erected and check the ground compactness.
3. Show how to use appropriate components and erect a temporary scaffold up to 3.6 m in height.
4. Demonstrate the use of relevant tools and tackles in erecting and dismantling temporary scaffolds.
5. Demonstrate the process of setting up walk-boards, guard rails, toe-boards and other components on the scaffold's working platform.
6. Show how to clean and stack all components properly after dismantling.

Topic Introduction

- Give the participants a brief overview of this unit
- Applications in various job environment

Resources to be used

- Theory
  - Training Kit - Trainer Guide & Participant Handbook, Presentations, Whiteboard, Marker, Projector, Laptop, Video Films.
- Practical
  - Hammer, Spanner (set), Wrench, Pulley, Rope, Nuts and bolts, Measuring tape, Spirit level, Plumb-bob, Mason's line, Helmet, Safety shoes, Safety belt, Cotton hand gloves, Goggles, Reflective jackets

Do

- Describe the scaffolding tools
- Explain the usage of scaffolding tools
- Erect cuplock system scaffold in correct way
- Erect frame system scaffold in correct way
- Dismantle the scaffold
- Explain how to Work safely while erecting and dismantling the scaffold

Notes for Facilitation

- Use the Helper Bar Bender & Steel Fixer PHB and refer unit 6.4 to explain Erecting and Dismantling Modular Scaffolding System.
- Scaffolding tools are specialized tools used by construction workers to assemble, use, and dismantle scaffolding safely and efficiently. These tools include items like wrenches, hammers, pliers, safety gear, and components specific to the scaffold system being used.
- Proper use of scaffolding tools is crucial for safe and effective construction practices. Helper Bar Bender & Steel Fixers should be trained to use these tools correctly to ensure that the scaffold is erected securely and according to safety standards.
- Erecting a cuplock system scaffold involves these steps:
    - Set up base standards and secure them using base jacks.
    - Attach ledger and transom components to the cup joints on the standards.
    - Add diagonal braces for stability.
    - Continue building upward by adding standards, ledgers, and transoms.
    - Ensure proper alignment, levelness, and secure connections.
    - Install scaffold boards and guardrails as needed for the working platform.
- Erecting a frame system scaffold involves these steps:
    - Set up vertical frames with proper spacing and alignment.
    - Attach cross braces to create stability and structural integrity.
    - Securely lock coupling pins to the frames and cross braces.
    - Install scaffold boards on the horizontal rungs to form the platform.
    - Add guardrails and toeboards for safety.
- Dismantling a scaffold involves these steps:
    - Remove scaffold boards and other platform components.
    - Carefully disassemble frames, cross braces, and other components in reverse order.
    - Organize and store components for future use.
    - Follow manufacturer guidelines and safety protocols during dismantling.
- Safety is paramount during scaffold erection and dismantling:
    - Wear appropriate personal protective equipment (PPE) including helmets, gloves, and harnesses.
    - Adhere to proper lifting techniques and teamwork when handling heavy components.
    - Avoid working on windy or inclement weather days.
    - Follow safe practices for working at height, including fall protection measures.
    - Ensure proper access and egress to and from the scaffold.
    - Stay clear of moving equipment and machinery during scaffold operations.

Say

Let's engage in a practical activity focused on promoting safety awareness during scaffold erection and dismantling. This activity aims to provide Helper Bar Bender & Steel Fixers with hands-on experience in understanding and practicing essential safety measures for safeguarding themselves and their colleagues during these critical construction activities.

Activity

Safety Measures for Scaffold Erection and Dismantling

- **Purpose:** This activity aims to sensitize Helper Bar Bender & Steel Fixers to the paramount importance of safety during scaffold erection and dismantling, emphasizing key safety measures and practices.
- **Resources Required:** Visual aids or images depicting safety equipment, flip charts, markers.
- **Tentative Duration: 45 Minutes**
- **Procedure:**
    - Introduction: Begin by highlighting the critical significance of safety during scaffold erection and dismantling to prevent accidents and ensure a secure working environment.
    - Safety Measure Presentation:
        - Present visual aids or images illustrating each safety measure: PPE, Proper Lifting Techniques, Weather Considerations, Fall Protection, Access and Egress, and Avoidance of Moving Equipment.
        - Describe the importance and implications of each measure.
    - Safety Measure Role Play:
        - Divide participants into pairs.
        - Assign each pair a specific safety measure.
        - Participants discuss and demonstrate the application of their assigned safety measure.
    - Safety Measure Presentation and Discussion:
        - Each pair presents their safety measure, its application, and its relevance.
        - Facilitate a discussion after each presentation to encourage insights and clarifications.
    - Comparative Analysis:
        - Discuss scenarios where one safety measure might take precedence over others in specific situations.
        - Engage participants in analyzing the cumulative impact of adhering to multiple safety measures.
    - Q&A Session:
        - Allow participants to ask questions and seek clarifications about the presented safety measures.
    - Reflection and Conclusion:
        - Engage participants in reflecting on the practical insights gained about scaffold safety measures.

- Summarize the key points and emphasize the overarching importance of safety vigilance.

- Expected Outcome: Through this activity, Helper Bar Bender & Steel Fixers will internalize the significance of safety during scaffold erection and dismantling. They will grasp the importance of each safety measure and how their collective adherence contributes to maintaining a secure and hazard-free work environment on construction sites.

Exercise

Key Solutions to PHB Exercise:

A. Short Questions' Answers:

1. Different types of scaffolds, like cup-lock and frame scaffold, are used in construction to provide elevated work platforms for workers and materials.
2. Leveling the area and checking ground compactness before erecting a scaffold is essential to ensure stability and prevent uneven settling.
3. Identifying and using different scaffolding components is important for assembling safe and stable scaffolds that meet specific construction needs.
4. Demonstrating the process of erecting a temporary scaffold up to 3.6 meters in height involves following standard procedures for component assembly and platform construction.
5. Standard sizes of scaffolding components used in construction include vertical posts, horizontal ledgers, diagonal braces, and platform planks.

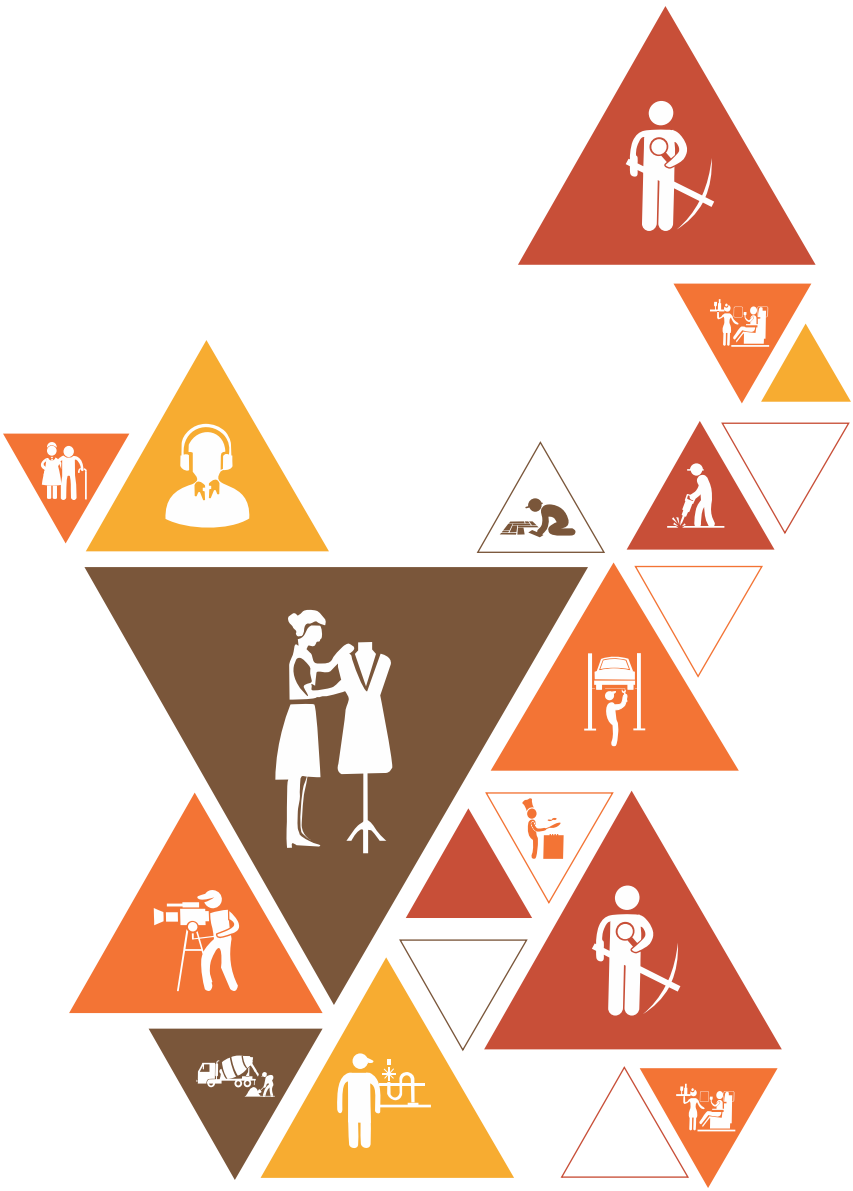
B. Fill-in-the-Blanks Questions' Answers:

1. Scaffolding components need to be stacked properly after dismantling.
2. Walk-boards, guard rails, and toe-boards are essential components for the scaffold's working platform.
3. The process of setting up a temporary scaffold involves using appropriate components.
4. Cup-lock and frame scaffold are examples of different types of scaffolds.
5. Erecting and dismantling a temporary scaffold requires the use of relevant tools and tackles.

C. True/False Questions' Answers:

1. The ground's compactness does not impact the stability of erected scaffolds. (False)
2. Different scaffolding components have distinct purposes and functions. (True)
3. Temporary scaffolds can only be erected up to 3 meters in height. (False)
4. The process of setting up walk-boards and guard rails is not necessary for scaffold safety. (False)
5. Proper cleaning and stacking of scaffold components after dismantling are not important. (False)

Notes



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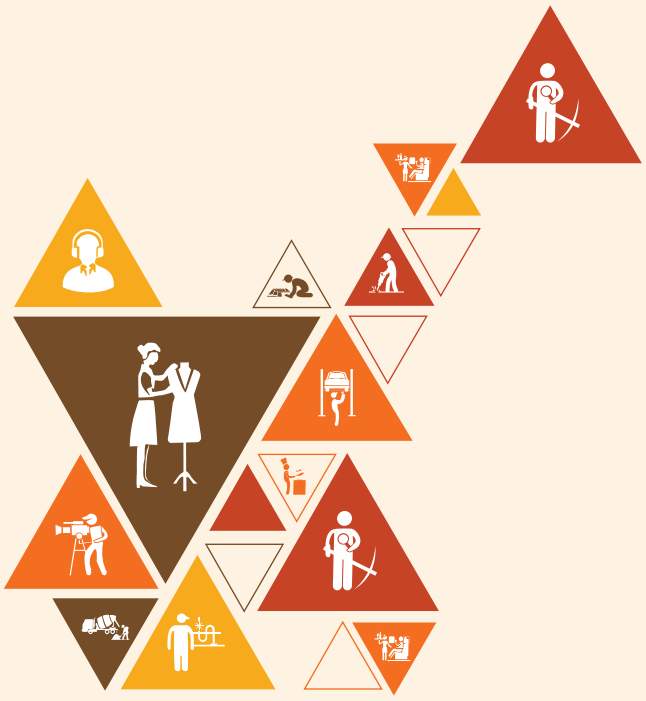
7. Maintaining a Safe, Hygienic and Secure Working Environment

Unit 7.1 – Hazards and Emergency Situations

Unit 7.2 - Safety Drills, PPEs and Fire Safety

Unit 7.3 - Hygiene and Safe Waste Disposal Practices

Unit 7.4 - Infectious Disease and Its Cure



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Key Learning Outcomes

At the end of this module, trainer will ensure that the participant will be able to:

1. Describe the reporting procedures in cases of breaches or hazards for site safety, accidents, and emergencies as per guidelines.
2. Explain different types of safety hazards at construction sites.
3. Demonstrate how to follow emergency and evacuation procedures in case of accidents, fires, or natural calamities.
4. Discuss basic ergonomic principles as per applicability.
5. Describe the procedure for responding to accidents and other emergencies at the site.
6. Explain the importance of handling tools, equipment, and materials as per applicable norms.
7. Explain the effect of construction material on health and environments as per applicability.
8. Describe various environmental protection methods as per applicability.
9. Explain the storage requirement of waste including non-combustible scrap material and debris, combustible scrap material and debris, general construction waste and trash (non-toxic, non-hazardous), any other hazardous wastes and any other flammable wastes at the appropriate location.
10. Show how to collect, segregate and deposit construction waste into appropriate containers based on their toxicity or hazardous nature.
11. Explain how to use hazardous material in a safe and appropriate manner as per applicability.
12. Explain types of fire.
13. Describe the procedure of operating different types of fire extinguishers.
14. Show how to operate different types of fire extinguishers corresponding to various types of fires as per EHS guidelines.
15. State safety relevant to tools, tackles, and equipment as per applicability.
16. Demonstrate the use of appropriate Personal Protective Equipment (PPE) as per work requirements for Head Protection, Ear Protection, Fall Protection, Foot Protection, Face and Eye Protection, Hand and Body Protection, and Respiratory Protection (if required).
17. Demonstrate how to check and install all safety equipment as per standard guidelines.
18. List housekeeping activities relevant to the task.
19. Elucidate ways of transmission of infection Explain the ways to manage infectious risks at the workplace.
20. Describe different methods of cleaning, disinfection, sterilization, and sanitization.
21. Show how to clean and disinfect all materials, tools and supplies before and after use.
22. List the symptoms of infection like fever, cough, redness, swelling, and inflammation.

Unit 7.1 - Hazards and Emergency Situations

Unit Objectives

At the end of this unit, trainer will ensure that participant will be able to:

1. Understand the types of hazards at the construction sites and identify the hazards specific to the domain related works.
2. Recognize the safety control measures and actions to be taken under emergency situation.
3. Know the reporting procedure to the concerned authority in case of emergency situations.

Topic Introduction

- Give the participants a brief overview of this unit
- Applications in various job environment

Resources to be used

- Theory
  - Training Kit - Trainer Guide & Participant Handbook, Presentations, Whiteboard, Marker, Projector, Laptop, Video Films.
- Practical
  - Leather Hand Gloves, Jump suit, Wire brush, Hand and Leg guard leather, Safety goggles, Nose mask, Ear protection, Fire extinguishers, Sand buckets Flashback arrestors, Welding helmet, Welding glass, Fire Extinguisher, Fire prevention kit, First Aid box, Safety tags and Safety Notice board.

Do

- Explain the types of hazards at the construction sites and identify the hazards specific to the domain related works.
- Reiterate about safety control measures and actions to be taken under emergency situation.
- Share reporting procedure to the concerned authority in case of emergency situations.

Notes for Facilitation

- Use the Helper Bar Bender & Steel Fixer PHB and refer unit 7.1 to explain Hazards and Emergency Situations.
- Types of Hazards at Construction Sites (Including Domain-Related Hazards for Helper Bar Bender

& Steel Fixers): Construction sites present various hazards, including but not limited to:

- Physical Hazards: Falling objects, machinery, excavation risks.
- Chemical Hazards: Exposure to hazardous substances, chemicals, or gases.
- Biological Hazards: Exposure to infectious agents, mold, or bacteria.
- Ergonomic Hazards: Strain from lifting, repetitive motions, or awkward postures.
- Electrical Hazards: Contact with live wires or faulty electrical equipment.
- Fire and Explosion Hazards: Flammable materials, faulty wiring, combustible gases.

- Domain-Related Hazards for Helper Bar Bender & Steel Fixers might include:
  - Falling Hazards: Working at heights without proper fall protection.
  - Manual Handling Hazards: Lifting heavy materials improperly.
  - Hazardous Substances: Exposure to cement dust, chemicals in mortar, etc.
  - Tool and Equipment Hazards: Misuse of tools, lack of proper maintenance.
- Recognizing Safety Control Measures and Emergency Actions:
  - Safety Control Measures: To mitigate hazards at construction sites, the following safety control measures can be taken:
    - Personal Protective Equipment (PPE).
    - Training: Ensure workers are trained in proper handling of tools, equipment, and materials to prevent accidents.
    - Safe Work Practices.
    - Ventilation and Dust Control.
  - Emergency Actions: In case of emergency situations at the construction site, follow these actions:
    - Evacuation.
    - First Aid.
    - Emergency Contacts.
  - Reporting Procedures in Emergency Situations:
    - Internal Communication: Notify your immediate supervisor or project manager about the emergency situation.
    - Established Protocol: Follow the organization's established protocol for reporting emergencies, including specific contact persons or numbers.
    - Documentation: If safe to do so, document the details of the emergency, including the time, location, nature of the incident, and any injuries.
    - Cooperate with Authorities: Provide accurate information to emergency responders and cooperate with their instruction.

Say

Let's engage in a practical activity focused on the reporting procedures that a Helper Bar Bender & Steel Fixer should follow during emergency situations. This activity underscores the importance of effective communication and coordination to ensure the safety and well-being of all individuals on the construction site.

Activity

Reporting Emergency Situations for Helper Bar Bender & Steel Fixers

- **Purpose:** This activity aims to provide Helper Bar Bender & Steel Fixers with hands-on experience in understanding and practicing the reporting procedures essential for effective emergency response.
- **Resources Required:** Scenario cards describing emergency situations, writing materials.
- **Tentative Duration: 45 Minutes**
- **Procedure:**
    - Introduction: Begin by emphasizing the significance of prompt and accurate reporting during emergencies to maintain a safe work environment.
    - Scenario Distribution: Distribute scenario cards, each depicting a unique emergency situation, to participants.
    - Internal Communication Role Play:
        - Form pairs among participants.
        - Assign roles in each pair: one as the Helper Bar Bender & Steel Fixer and the other as the supervisor or project manager.
        - Helper Bar Bender & Steel Fixers practice communicating the emergency to their supervisor using the established reporting procedures.
    - Discussion on Established Protocol:
        - Gather participants for a discussion about the organization's established protocol for reporting emergencies.
        - Emphasize the significance of adhering to these protocols for an organized response.
    - Documentation Practice:
        - Participants individually document the specifics of the emergency scenario assigned to them.
        - They note down the time, location, incident nature, and any injuries if applicable.
    - Cooperation with Authorities Exercise:
        - Present a scenario involving cooperation with emergency responders.
        - Participants engage in role-play, providing accurate information and following instructions from the responders.
    - Group Discussion and Sharing:
        - Participants share their experiences and insights from the role-playing exercises.
        - Facilitate a discussion on challenges faced and best practices for reporting emergencies.
    - Reflection and Conclusion:

- Engage participants in reflecting on the significance of precise reporting for maintaining safety during emergencies.
- Summarize the key learnings and underscore the importance of following reporting procedures.

- **Expected Outcome:** Through this activity, Helper Bar Bender & Steel Fixers will gain practical familiarity with reporting procedures during emergency situations. They will comprehend the importance of effective communication, documentation, and cooperation with authorities to ensure the safety and well-being of themselves and their colleagues on the construction site.

Notes

Unit 7.2 - Safety Drills, PPEs and Fire Safety

Unit Objectives

At the end of this unit, trainer will ensure that participant will be able to:

1. Explain the classes of fire and types of fire extinguishers.
2. Demonstrate the operating procedure of the fire extinguishers.
3. Explain the importance of participation of workers in safety drills.
4. List out basic medical tests required for working at construction site.
5. Explain the purpose and importance of vertigo test at construction site.
6. Explain the types and benefits of basic ergonomic principles, which should be adopted while carrying out specific task at the construction sites.
7. Demonstrate use of PPEs as per work requirements.

Topic Introduction

- Give the participants a brief overview of this unit
- Applications in various job environment

Resources to be used

- Theory
  - Training Kit - Trainer Guide & Participant Handbook, Presentations, Whiteboard, Marker, Projector, Laptop, Video Films.
- Practical
  - Leather Hand Gloves, Jump suit, Wire brush, Hand and Leg guard leather, Safety goggles, Nose mask, Ear protection, Fire extinguishers, Sand buckets Flashback arrestors, Welding helmet, Welding glass, Fire Extinguisher, Fire prevention kit, First Aid box, Safety tags and Safety Notice board.

Do

- Explain the classes of fire and types of fire extinguishers.
- Demonstrate the operating procedure of the fire extinguishers.
- Explain the importance of participation of workers in safety drills.
- Enlist basic medical tests required for working at construction site.

- Explain the purpose and importance of vertigo test at construction site.
- Explain the types and benefits of basic ergonomic principles, which should be adopted while carrying out specific task at the construction sites.
- Demonstrate use of PPEs as per work requirements.

Notes for Facilitation

- Use the Helper Bar Bender & Steel Fixer PHB and refer unit 7.2 to explain Safety Drills, PPEs and Fire Safety.
- Classes of Fire: Fires are classified into different classes based on the type of fuel involved:
  - Class A: Fires involving common combustible materials like wood, paper, and cloth.
  - Class B: Fires involving flammable liquids, gases, or greases.
  - Class C: Fires involving energized electrical equipment.
  - Class D: Fires involving combustible metals.
  - Class K: Fires involving cooking oils and fats, commonly found in kitchens.
- Types of Fire Extinguishers: Different types of fire extinguishers are designed to handle specific classes of fire:
  - Water Extinguishers (Class A): Suitable for Class A fires, but not for fires involving flammable liquids or electrical equipment.
  - Foam Extinguishers (Class A and B): Effective on Class A and B fires, but not for electrical fires.
  - Dry Powder Extinguishers (Class A, B, C, and D): Suitable for a range of fires, including electrical fires and flammable liquids.
  - CO2 Extinguishers (Class B and Electrical Fires): Effective for flammable liquid and electrical fires, but not for Class A fires.
  - Wet Chemical Extinguishers (Class K): Specifically designed for kitchen fires involving cooking oils and fats.
- Operating Procedure of Fire Extinguishers:
  - Pull: Pull the pin to break the seal and unlock the operating lever.
  - Aim: Aim the nozzle at the base of the fire where the fuel source is.
  - Squeeze: Squeeze the operating lever to release the extinguishing agent.
  - Sweep: Sweep the nozzle from side to side while directing the agent at the base of the fire until it's extinguished.
- Importance of Participation in Safety Drills: Participation in safety drills is important for several reasons:
  - Familiarity: Workers become familiar with evacuation routes and emergency procedures.
  - Response Practice: Workers practice how to respond to emergencies, minimizing confusion during real incidents.
  - Efficiency: Regular drills improve the efficiency of evacuation and emergency response.
  - Identification of Weaknesses: Drills help identify areas that need improvement in the emergency plan.

- Basic Medical Tests Required for Construction Site: Common medical tests for construction site workers include:
  - Physical Examination: Overall health assessment.
  - Vision and Hearing Tests: Ensuring good visual and auditory health.
  - Lung Function Test: Assessing respiratory health.
  - Blood Pressure and Heart Rate Check: Monitoring cardiovascular health.
- Purpose and Importance of Vertigo Test: A vertigo test assesses a worker's balance and susceptibility to dizziness, which is crucial for working at heights. Vertigo can lead to accidents and falls, making this test vital for maintaining site safety.
- Types and Benefits of Basic Ergonomic Principles: Ergonomic principles for construction tasks include proper lifting techniques, maintaining neutral body positions, and using suitable tools. Benefits include reducing strain, preventing musculoskeletal injuries, and enhancing overall worker well-being.
- Demonstrating Use of PPEs: Proper PPE usage involves:
  - Selection: Choose the appropriate PPE for the task.
  - Fitting: Ensure PPE fits correctly and comfortably.
  - Wearing: Wear PPE consistently throughout the task.
  - Adjusting: Make necessary adjustments for comfort and effectiveness.
  - Maintaining: Regularly inspect and maintain PPE to ensure it functions properly.
- Using PPE correctly safeguards workers from potential hazards like head injuries, respiratory issues, and more, contributing to a safer work environment for Helper Bar Bender & Steel Fixer.

Activity

General Safety at a Construction Site

Conduct a role play activity on following emergency procedure in case of accidental fire at work place.

- Ask the participants to assemble at a designated place.
- Distribute the 'Practical Activity Format' which includes task, duration allowed, specific instructions, method statements, etc.
- Explain the purpose and duration of the activity.
- Set guidelines pertaining to discipline and expected tasks.
- Ask two persons who are very much interactive to participate in the role play.
- Explain the roles to each of them.
- Rotate the roles after completing one cycle.

Sub Activity	Time	Resources
Start the fire alarm	1 hour	Stationary items, Fire extinguisher, wood and paper pieces, match box
Use fire extinguisher	6 hours	
Call for medical help and carryout primary first aid for the injured person	2 hours	
Instruct co-workers to gather at the collection point	2 hours	

Table 7.2.1 – General safety at a construction site

Specific Instructions

- Select four persons from the group.
- Name the persons selected as Peron A, B, C and D.
- Explain and demonstrate the method to perform the sub activities.
- Consider Person A to be a Helper Bar Bender & Steel Fixer and the rest are co-workers.
- Start the role play and check whether it is happening as per the plan.
- Guide closely wherever needed.
- Complete the activity as per scheduled time.
- Ask the watching group to explain the steps that are performed.
- Clarify doubts, if any.

Activity 1

Working at Heights

Conduct a skill practice activity on using ladder safely at heights with proper PPE.

- Ask the participants to assemble at a designated place.
- Distribute the 'Practical Activity Format' which includes task, duration allowed, specific instructions, method statements, etc.
- List and explain the safety guidelines followed at heights.
- Explain the purpose and duration of the activity.
- Set guidelines pertaining to discipline and expected tasks.
- Maximum duration mentioned in the below table is for extensive practice and corresponding guidance until the skill is acquired by the participants.

Sub Activity	Time	Resources
Practice wearing PPE	2 hours	Ladder, PPE
Erect the ladder	2 hours	
Practice climbing the ladder safely	2 hours	

Table 7.2.2 – Working at heights

Specific Instructions

- Show the PPE matrix that has to be followed at a construction site.
- Demonstrate the standard procedure for wearing the PPE.
- Demonstrate the important checks that are to be performed while erecting the ladder.
- Ask the participants to practice wearing PPE, check and ensure that there is no deviation of standard procedure.

- Ask the participant to practice using ladder.
- Guide and correct the participants wherever necessary.
- List the advantages of using PPE.
- Clarify doubts, if any.

Notes

Unit 7.3 - Hygiene and Safe Waste Disposal Practices

Unit Objectives

At the end of this unit, trainer will ensure that participant will be able to:

1. Follow the practices to maintain personal hygiene, workplace hygiene and site/ workplace sanitization
2. Understand the importance of housekeeping works
3. Keep an eye on safe housekeeping practices
4. Understand different types of waste at construction sites and their disposal method
5. Know safe waste disposal practices followed at construction site

Topic Introduction

- Give the participants a brief overview of this unit
- Applications in various job environment

Resources to be used

- Theory
  - Training Kit - Trainer Guide & Participant Handbook, Presentations, Whiteboard, Marker, Projector, Laptop, Video Films.
- Practical
  - Leather Hand Gloves, Jump suit, Wire brush, Hand and Leg guard leather, Safety goggles, Nose mask, Ear protection, Fire extinguishers, Sand buckets Flashback arrestors, Welding helmet, Welding glass, Fire Extinguisher, Fire prevention kit, First Aid box, Safety tags and Safety Notice board.

Do

- Explain the practices to maintain personal hygiene, workplace hygiene and site/ workplace sanitization
- Describe the importance of housekeeping works
- Discuss the safe housekeeping practices and ask them to follow
- Explain different types of waste at construction sites and their disposal method
- Explain safe waste disposal practices followed at construction site

Notes for Facilitation

- Use the Helper Bar Bender & Steel Fixer PHB and refer unit 7.3 to explain Hygiene and Safe Waste Disposal Practices.
- Personal Hygiene: Maintaining personal hygiene involves practices such as washing hands before and after work, wearing clean and appropriate clothing, and using personal protective equipment (PPE) to prevent contamination and protect oneself from hazards.
- Workplace Hygiene: Workplace hygiene includes keeping work areas clean, organized, and free from hazards. Regular cleaning of tools, equipment, and surfaces helps prevent accidents, maintain efficiency, and promote a healthy work environment.
- Site Sanitization: Site sanitization involves cleaning and disinfecting shared areas to prevent the spread of germs and ensure a safe working environment. This is especially important in light of health concerns and global events.
- Importance of Housekeeping Works: Housekeeping works are crucial in the construction industry for several reasons:
    - Safety: A clean and organized workspace reduces the risk of slips, trips, falls, and other accidents.
    - Efficiency: Proper organization of tools, materials, and equipment improves work efficiency.
    - Prevention: Regular cleaning prevents the buildup of dust, debris, and potential fire hazards.
    - Morale: A clean and organized work environment boosts worker morale and job satisfaction.
- Safe Housekeeping Practices:
    - Daily Clean-up: Clean-up work areas at the end of each day to ensure a fresh start the next day.
    - Tool Storage: Properly store tools, equipment, and materials after use to prevent tripping hazards and damage.
    - Waste Disposal: Dispose of waste properly and promptly to prevent clutter and hygiene issues.
- Different Types of Waste at Construction Sites and Their Disposal:
    - General Waste: Regular construction debris like paper, packaging, and non-hazardous materials.
    - Hazardous Waste: Includes chemicals, solvents, paints, and materials that pose health or environmental risks.
    - Electronic Waste: Old or broken electronic equipment, requiring proper disposal due to environmental concerns.
- Safe Waste Disposal Practices at Construction Site:
    - Separation: Segregate waste into different categories for appropriate disposal.
    - Labelling: Clearly label hazardous waste containers to prevent accidents.
    - Storage: Store waste in designated areas to avoid contamination and health hazards.
    - Legal Compliance: Follow local regulations and guidelines for waste disposal.
- Maintaining personal and workplace hygiene, implementing proper housekeeping practices, and ensuring safe waste disposal contribute to a safer and more organized construction site environment, benefitting both workers and the overall project.

Activity 1

Safe Disposal of Waste

Conduct a role play activity.

- Ask the participants to assemble at a designated place.
- Distribute the 'Practical Activity Format' which includes task, duration allowed, specific instructions, method statements, etc.
- Explain the purpose and duration of the activity.
- Set guidelines pertaining to discipline and expected tasks.
- Ask two persons who are very much interactive to participate in the role play.
- Explain the roles to each of them.
- Rotate the roles after completing one cycle.

Sub Activity	Time	Resources
Practice wearing PPE	1 hour	Waste containers, masonry pan, sample construction waste
Segregate the Wastes	2 hours	
Dispose the waste in the allocated container	2 hours	

Table 7.3.1 – Safe disposal of waste

Specific Instructions

- Ensure the participants are wearing the PPE properly.
- Select two persons from the group who are effective in communication
- Consider one as helper and the other as mason, now ask the helper to deposit the waste in one location and place the containers at another location.
- Ask the mason to instruct the helper to segregate or differentiate the type of wastes
- Then ask the mason to tell the helper to transfer the segregated waste with the help of masonry pan.
- Ensure that both the persons communicate properly by giving hints in between.
- Tell them to complete the activity on the speculated time and ensure that the wastes are properly placed in the containers and it is secured properly.

Notes

Unit 7.4 - Infectious Disease and Its Cure

Unit Objectives

At the end of this unit, trainer will ensure that participant will be able to:

1. Know different types of infectious disease that can spread/ originate at a construction site
2. Understand the ways of transmission of the various infectious disease.
3. Recognize the methods to check the spread of the infectious disease.
4. Understand the symptoms and cure of the various infectious disease.
5. Apprehend the procedure to report to the concerned authority regarding the outbreak/ hazard of any infectious disease/ pandemic.

Topic Introduction

- Give the participants a brief overview of this unit
- Applications in various job environment

Resources to be used

- Theory
  - Training Kit - Trainer Guide & Participant Handbook, Presentations, Whiteboard, Marker, Projector, Laptop, Video Films.
- Practical
  - Leather Hand Gloves, Jump suit, Wire brush, Hand and Leg guard leather, Safety goggles, Nose mask, Ear protection, Fire extinguishers, Sand buckets Flashback arrestors, Welding helmet, Welding glass, Fire Extinguisher, Fire prevention kit, First Aid box, Safety tags and Safety Notice board.

Do

- Clarify different types of infectious disease that can spread/ originate at a construction site
- Explain the ways of transmission of the various infectious disease.
- Mention the methods to check the spread of the infectious disease.
- Explain the symptoms and cure of the various infectious disease.
- Apprehend the procedure to report to the concerned authority regarding the outbreak/ hazard of any infectious disease/ pandemic.

Notes for Facilitation

- Use the Helper Bar Bender & Steel Fixer PHB and refer unit 7.4 to explain Infectious Disease and Its Cure.
- Infectious diseases that can spread or originate at construction sites include:
  - Respiratory Infections: Such as the flu, common cold, and COVID-19.
  - Skin Infections: Like bacterial infections, fungal infections, and rashes.
  - Gastrointestinal Infections: Including foodborne illnesses due to poor hygiene.
  - Vector-Borne Diseases: Like mosquito-borne diseases (e.g., Zika, dengue) due to stagnant water.
- Ways of Transmission of Infectious Diseases:
  - Airborne Transmission: Respiratory infections can spread through respiratory droplets released when an infected person coughs, sneezes, or talks.
  - Direct Contact: Skin infections can be transmitted through direct skin-to-skin contact or contact with contaminated surfaces.
  - Fecal-Oral Route: Gastrointestinal infections can spread through contaminated food, water, or surfaces.
  - Vector-Borne Transmission: Insects like mosquitoes can carry and transmit diseases from person to person.
- Methods to Check the Spread of Infectious Diseases:
  - Hand Hygiene: Regularly washing hands with soap and water or using hand sanitizers.
  - Respiratory Hygiene: Covering mouth and nose when coughing or sneezing.
  - Personal Protective Equipment (PPE): Wearing appropriate PPE like masks and gloves.
  - Disinfection: Regularly cleaning and disinfecting surfaces and shared equipment.
- Understanding Symptoms and Cure of Infectious Diseases:
  - Respiratory Infections: Symptoms include fever, cough, sore throat, and shortness of breath. Treatment includes rest, fluids, and in severe cases, medical attention.
  - Skin Infections: Symptoms include redness, swelling, itching, and rashes. Treatment depends on the type of infection and may involve antibiotics or antifungal medications.
  - Gastrointestinal Infections: Symptoms include nausea, vomiting, diarrhea, and abdominal pain. Treatment involves staying hydrated and in severe cases, medical intervention.
  - Vector-Borne Diseases: Symptoms vary based on the disease. Treatment ranges from supportive care to specific antiviral or antibiotic medications.
- Reporting Infectious Disease Outbreaks to Concerned Authorities:
  - Immediate Reporting: If an infectious disease outbreak is suspected, immediately inform your supervisor, manager, or the designated health and safety personnel.
  - Follow Protocols: Follow the organization's protocols for reporting infectious diseases or pandemics, including informing co-workers who may have been exposed.
  - Health Authorities: If necessary, local health authorities should be contacted to ensure proper containment and response.
  - Understanding, preventing, and reporting infectious diseases is crucial to maintaining a healthy and safe working environment in the Masonry industry. It protects both workers and the community from potential health risks.

Say

Let's participate in a practical activity focused on the reporting procedures that a Helper Bar Bender & Steel Fixer should follow in the event of an infectious disease outbreak. This activity highlights the critical importance of swift and accurate reporting to maintain the health and safety of everyone on the construction site.

Activity

Reporting Infectious Disease Outbreaks for Helper Bar Bender & Steel Fixers

- **Purpose:** This activity aims to provide Helper Bar Bender & Steel Fixers with hands-on experience in understanding and practicing the reporting procedures necessary for responding effectively to infectious disease outbreaks.
- **Resources Required:** Scenario cards depicting infectious disease outbreak situations, writing materials.
- **Tentative Duration: 45 Minutes**
- **Procedure:**
  - Introduction: Begin by discussing the vital role of immediate and accurate reporting during infectious disease outbreaks to safeguard the health of all individuals on the construction site.
  - Scenario Distribution: Distribute scenario cards, each portraying a distinct infectious disease outbreak situation, to participants.
  - Immediate Reporting Role Play:
    - Form pairs among participants.
    - Assign roles: one participant as the Helper Bar Bender & Steel Fixer and the other as the supervisor or health and safety personnel.
    - Helper Bar Bender & Steel Fixers practice promptly informing their supervisor or designated personnel about the infectious disease outbreak in their assigned scenario.
  - Discussion on Protocol Adherence:
    - Gather participants for a discussion about the organization's protocols for reporting infectious diseases or pandemics.
    - Emphasize the importance of following these protocols for effective containment.
  - Health Authorities Interaction Exercise:
    - Present a scenario requiring interaction with local health authorities.
    - Participants engage in role-play, contacting health authorities if necessary to ensure proper response and containment measures.
  - Group Discussion and Sharing:
    - Participants share their experiences and insights from the role-playing exercises.
    - Facilitate a discussion on challenges faced and the significance of accurate reporting during infectious disease outbreaks.
  - Reflection and Conclusion:
    - Engage participants in reflecting on the critical role of reporting procedures in safeguarding the health of the construction site community.
    - Summarize the key takeaways and underline the importance of swift reporting and following established protocols.

- Expected Outcome: Through this activity, Helper Bar Bender & Steel Fixers will gain practical understanding of reporting infectious disease outbreaks. They will recognize the significance of immediate reporting, protocol adherence, and cooperation with health authorities in ensuring the safety and health of themselves and their colleagues on the construction site.

Exercise

Key Solutions to PHB Exercise

A. Short Questions' Answer:

1. Reporting procedures for breaches or hazards at the construction site involve notifying supervisors or management immediately as per established guidelines.
2. Common safety hazards at construction sites include falls, electrical hazards, confined spaces, struck-by or caught-in-between incidents, and chemical exposure.
3. Demonstrating emergency and evacuation procedures involves knowing evacuation routes, using fire alarms, assisting injured individuals, and assembling at designated safe areas.
4. Basic ergonomic principles focus on designing workspaces and tasks to fit the worker's abilities, reducing strain and discomfort during construction activities.
5. In response to accidents and emergencies, steps include assessing the situation, providing first aid if necessary, notifying supervisors, securing the area, and cooperating with emergency responders.

B. Fill-in-the-Blanks Questions' Answer:

1. Proper handling of tools, equipment, and materials is essential as per applicable norms.
2. Different types of fire extinguishers correspond to various types of fires.
3. Using hazardous materials safely involves following standard guidelines.
4. Proper disposal methods are important to manage construction waste.
5. Personal Protective Equipment (PPE) includes items like head protection, ear protection, and fall protection.

A. True/False Questions' Answer:

1. Accidents and hazards don't need to be reported if they result in minor injuries. (False)
2. Ergonomic principles focus on optimizing workspaces and equipment for worker comfort and safety. (True)
3. All types of fire extinguishers can be used interchangeably on different types of fires. (False)
4. Using Personal Protective Equipment (PPE) is not necessary if you're experienced in construction work. (False)
5. Proper cleaning and disinfection of materials, tools, and supplies is not important in construction work. (False)

Notes

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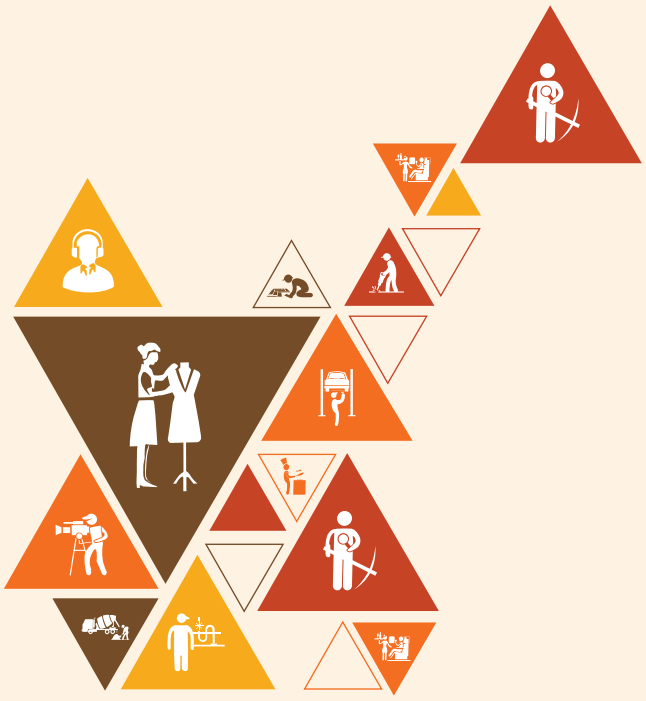
8. Employability Skills (60 Hours)

It is recommended that all trainings include the appropriate Employability skills Module. Content for the same can be accessed

https://www.skillindiadigital.gov.in/content/list



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Notes

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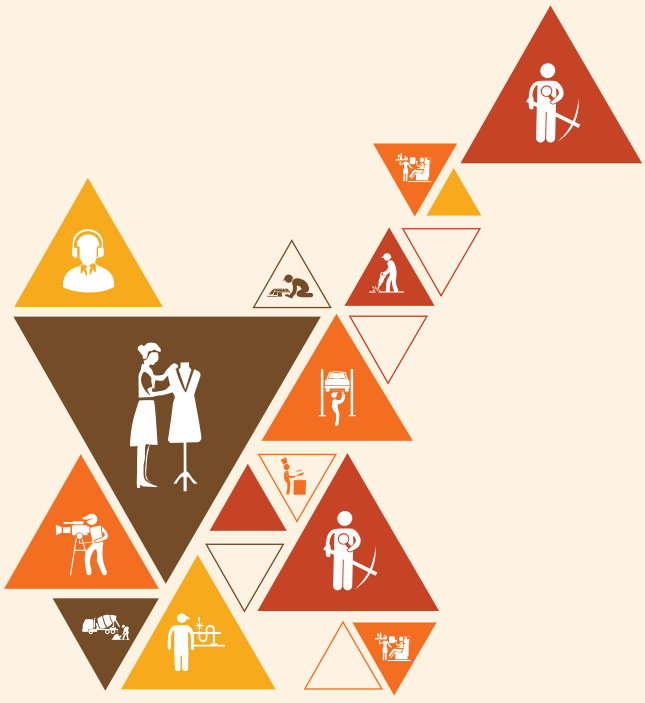
9. Process of Carrying out Manual Earthwork at Construction Sites

Unit 9.1 – Preparatory Work and Soil Cutting

Unit 9.2 – Backfilling and Compaction Manually



Key Learning Outcomes

At the end of this module, trainer will ensure that the participant will be able to:

1. List the appropriate hand tools for removing unwanted materials and objects from the earth's surface before marking activity and earth work.
2. Describe the preparatory works carried out before the excavation of the pit/trench.
3. Explain the importance of excavation and its purpose in construction projects.
4. Explain the methods to excavate a pit/ trench of desired depth/ slope, length and width.
5. Demonstrate the application of different excavation techniques and relevant safety measures.
6. Demonstrate the process of excavating a pit/trench, maintaining the required slope, length, width and depth of the excavation, using the appropriate tools.
7. Show how to properly handle and dispose of materials removed during earth work.
8. Elucidate the concept of slope and its significance in excavation.
9. List the appropriate tools for shifting and placing earth.
10. Demonstrate the proper handling and storage of fencing/ barricading materials, safety signage, ladders, ropes, and earth-cutting and shifting tools.
11. Show how to inspect the excavated pit for loose material, soil lumps, pebbles, or any other debris.
12. Show how to compact the base layer of the excavated pit to achieve the desired compaction levels.
13. Explain the purpose and importance of sorting gravels or oversized aggregates from the soil for backfilling.
14. Demonstrate the process of refilling the excavated trenches, pits, or areas surrounding structures.

UNIT 9.1: Preparatory Work and Soil Cutting

Unit Objectives

At the end of this unit, trainer will ensure that participant will be able to:

1. List the appropriate hand tools for removing unwanted materials and objects from the earth's surface before marking activity and earth work.
2. Describe the preparatory works carried out before the excavation of the pit/trench.
3. Explain the importance of excavation and its purpose in construction projects.
4. Explain methods to excavate a pit/ trench of desired depth/ slope, length and width.
5. Demonstrate application of excavation techniques and relevant safety measures.
6. Demonstrate the process of excavating a pit/trench, maintaining the required slope, length, width and depth of the excavation, using the appropriate tools.
7. Show how to properly handle and dispose of materials removed during earth work.
8. Elucidate the concept of slope and its significance in excavation.
9. List the appropriate tools for shifting and placing earth.
10. Demonstrate the proper handling and storage of fencing/ barricading materials, safety signage, ladders, ropes, and earth-cutting and shifting tools.
11. Show how to inspect excavated pit for loose material, soil lumps, pebbles, or debris.

Topic Introduction

- Give the participants a brief overview of this unit
- Applications in various job environment

Resources to be used

- Theory
  - Training Kit - Trainer Guide & Participant Handbook, Presentations, Whiteboard, Marker, Projector, Laptop, Video Films.
- Practical
  - Trowel, Pointing Trowel, Shovel, Mortar Pan, Spade, Pick axe, GI bucket 5L capacity, Wheel Barrow, Lime powder, Wooden pegs, Hammer, Hard broom, Source of water, Ladder, Measuring tape, Mason's line, Hand roller, Plate vibrator, Power source, Helmet, Safety shoes, Cotton hand gloves, goggles, Reflective jackets, Safety message boards

Do

- Explain the operations done in earthwork
- Describe preparatory work prior to earthwork
- Explain the process of Excavating the earth manually like digging, trenching
- Carrying out the dressing work after excavation job
- Identifying the Do's and Don'ts in excavation

Notes for Facilitation

- Use the Helper Bar Bender & Steel Fixer PHB and refer unit 9.1 of Preparatory Work and Soil Cutting.
- Earthwork involves various tasks related to the excavation and movement of soil, rock, and other materials on a construction site. These operations are crucial for creating foundations, trenches, and other groundwork. Helper Bar Bender & Steel Fixers might be involved in tasks such as excavating, backfilling, grading, and levelling to prepare the site for construction.
- Before starting earthwork, Helper Bar Bender & Steel Fixers engage in preparatory tasks like surveying the site, marking the boundaries, and setting up reference points. They might remove vegetation, debris, and obstacles from the area and ensure proper access for heavy equipment.
- Helper Bar Bender & Steel Fixers may manually excavate the earth by digging, trenching, or using hand tools like shovels and picks. They carefully remove soil to the required depth while maintaining the correct angles and dimensions specified by engineers or supervisors. Safety is paramount during excavation to prevent cave-ins and accidents.
- After excavating, dressing work involves shaping the excavated area to the desired profile. This might include levelling the bottom of a foundation trench, creating slopes, and ensuring proper compaction of the soil. Helper Masons play a role in ensuring that the excavated area is prepared according to the project specifications.
- Do's and Don'ts in Excavation (for Helper Bar Bender & Steel Fixer):
    - Do's:
        - Wear proper personal protective equipment (PPE), including helmets, gloves, and sturdy footwear.
        - Follow safety protocols and guidelines provided by supervisors.
        - Ensure that the excavation area is adequately supported to prevent cave-ins.
        - Test for hazardous gases if needed before entering confined spaces.
        - Work with caution near utilities to avoid damaging underground services.
    - Don'ts:
        - Don't work in an unsupported or unstable excavation.
        - Don't enter a trench or excavation without proper training and safety measures.
        - Don't remove soil too quickly, as it can destabilize the trench walls.
        - Don't work near overhead power lines without appropriate precautions.
        - Don't ignore warning signs or barriers placed around excavation areas.

Say

Let's participate in a practical activity that sheds light on the preparatory tasks and activities that Helper Bar Bender & Steel Fixers engage in before commencing earthwork. This activity aims to provide participants with hands-on experience in understanding the essential steps taken by Helper Bar Bender & Steel Fixers to ensure safe and accurate excavation and site preparation.

Activity

Exploring Preparatory Tasks and Earthwork by Helper Bar Bender & Steel Fixers

- **Purpose:** This activity aims to familiarize participants with the preparatory tasks and earthwork processes carried out by Helper Bar Bender & Steel Fixers before construction begins.
- **Resources Required:** Visual aids or images depicting surveying, excavation, and dressing work, flip charts, markers.
- **Tentative Duration: 45 Minutes**
- **Procedure:**
    - Introduction: Begin by discussing the importance of preparatory tasks and earthwork in construction projects and their impact on the overall project.
    - Task Presentation:
        - Present visual aids or images illustrating preparatory tasks (surveying, marking boundaries, removing obstacles), excavation using hand tools, and dressing work.
        - Describe each task briefly, emphasizing its purpose and significance.
    - Group Discussion - Earthwork Process:
        - Divide participants into groups.
        - Assign each group a specific task (e.g., excavation using hand tools, marking boundaries).
        - Participants discuss and brainstorm the steps involved in their assigned task.
    - Scenario Discussion:
        - Describe a construction site scenario that involves preparatory tasks and earthwork.
        - Groups present how their assigned tasks would be executed in the given scenario.
    - Safety Emphasis:
        - Highlight safety precautions during excavation to prevent accidents and cave-ins.
        - Discuss the importance of proper angles and dimensions in excavation work.
    - Q&A Session:
        - Allow participants to ask questions and seek clarifications about preparatory tasks and earthwork.
    - Reflection and Conclusion:
        - Engage participants in reflecting on the insights gained about preparatory tasks and earthwork.
        - Summarize key takeaways, underscoring the role of Helper Bar Bender & Steel Fixers in ensuring safe and accurate site preparation.
- Expected Outcome: Through this activity, participants will develop practical knowledge about the preparatory tasks and earthwork processes carried out by Helper Bar Bender & Steel Fixers. They will appreciate the significance of adhering to proper angles, dimensions, and safety measures during excavation, contributing to safe and effective construction practices

Notes

UNIT 9.2: Backfilling and Manual Compaction

Unit Objectives

At the end of this unit, trainer will ensure that participant will be able to:

1. Show how to compact the base layer of the excavated pit to achieve the desired compaction levels.
2. Explain the purpose and importance of sorting gravels or oversized aggregates from the soil for backfilling.
3. Demonstrate the process of refilling the excavated trenches, pits, or areas surrounding structures.

Topic Introduction

- Give the participants a brief overview of this unit
- Applications in various job environment

Resources to be used

- Theory
  - Training Kit - Trainer Guide & Participant Handbook, Presentations, Whiteboard, Marker, Projector, Laptop, Video Films.
- Practical
  - Trowel, Pointing Trowel, Shovel, Mortar Pan, Spade, Pick axe, GI bucket 5L capacity, Wheel Barrow, Lime powder, Wooden pegs, Hammer, Hard broom, Source of water, Ladder, Measuring tape, Mason's line, Hand roller, Plate vibrator, Power source, Helmet, Safety shoes, Cotton hand gloves, goggles, Reflective jackets, Safety message boards

Do

- Explain the importance of backfilling
- Describe backfilling work effectively
- Explain the importance of compaction
- Explain the compacting work effectively
- Explain the Do's and Don'ts in backfilling and compaction

Notes for Facilitation

- Use the Helper Bar Bender & Steel Fixer PHB and refer unit 9.2 of Backfilling and Manual Compaction.
- Backfilling is the process of refilling an excavated area with soil or other materials after completing construction or utility installation. Proper backfilling is important to restore stability to the site, prevent settling, and avoid voids that could lead to future problems like sinkholes or structural instability.
- Backfilling work involves carefully placing and compacting soil or other materials into an excavated area. Helper Bar Bender & Steel Fixers may use hand tools, machinery, or a combination of both to ensure even distribution of backfill material. This helps restore the original ground level and ensures proper support for structures and utilities.
- Compaction is the process of compressing soil or other materials to reduce air voids and increase its density. Compacted soil provides better load-bearing capacity, reduces settling, and enhances stability. Proper compaction is crucial to ensure that the backfilled area supports the intended load and maintains its structural integrity over time.
- Compacting work involves using mechanical equipment, such as compactors or rollers, to compress the backfill material. Helper Bar Bender & Steel Fixers assist in operating the equipment, ensuring that the soil is evenly compacted layer by layer. Compaction improves the density of the soil, minimizes settling, and provides a solid foundation for construction.
- Do's and Don'ts in Backfilling and Compaction (for Helper Bar Bender & Steel Fixer):
    - Do's:
        - Do use appropriate backfill material, such as granular soils, to ensure proper drainage and stability.
        - Do compact the backfill material in thin layers using suitable compaction equipment.
        - Do follow compaction specifications provided by engineers or supervisors.
        - Do avoid over compaction, which can lead to excessive settlement.
        - Do ensure proper compaction around utility trenches and foundations.
    - Don'ts:
        - Don't use unsuitable materials like organic or clay soils for backfilling.
        - Don't skip the compaction process, as it can result in uneven settling.
        - Don't backfill too quickly without proper compaction, risking future settlement.
        - Don't neglect to test the compacted soil's density if required by the project specifications.
        - Don't backfill too close to structures without proper consideration for load distribution.

Say

Let's engage in a practical activity that delves into the concept of backfilling and the importance of proper compaction in construction. This activity aims to provide participants with hands-on experience in understanding the significance of backfilling and compaction processes carried out by Helper Bar Bender & Steel Fixers to ensure stability and structural integrity in construction sites.

Activity

Exploring Backfilling and Compaction in Construction

- **Purpose:** This activity aims to familiarize participants with the concept of backfilling, the importance of proper compaction, and the role of Helper Bar Bender & Steel Fixers in ensuring stable and durable construction sites.
- **Resources Required:** Visual aids or images depicting backfilling, compaction equipment, flip charts, markers.
- **Tentative Duration: 45 Minutes**
- **Procedure:**
  - Introduction: Begin by discussing the significance of backfilling and proper compaction in construction, highlighting their role in maintaining stability and structural integrity.
  - Concept Presentation:
    - Present visual aids or images illustrating backfilling, compaction equipment, and the benefits of proper compaction.
    - Describe each concept briefly, emphasizing its impact on construction sites.
  - Group Discussion - Backfilling Process:
    - Divide participants into groups.
    - Assign each group a specific task related to backfilling (e.g., even distribution, compaction).
    - Participants discuss and brainstorm the steps involved in their assigned task.
  - Scenario Discussion:
    - Describe a construction site scenario that involves backfilling and compaction.
    - Groups present how their assigned tasks contribute to the scenario.
  - Compaction Significance:
    - Highlight the importance of proper compaction in enhancing load-bearing capacity and minimizing settling.
    - Discuss how compacted soil provides a stable foundation for structures.
  - Q&A Session:
    - Allow participants to ask questions and seek clarifications about backfilling and compaction.
  - Reflection and Conclusion:
    - Engage participants in reflecting on the insights gained about backfilling and compaction processes.
    - Summarize key takeaways, underscoring the role of Helper Bar Bender & Steel Fixers in ensuring stable and durable construction sites.
- **Expected Outcome:** Through this activity, participants will develop a practical understanding of backfilling and compaction processes in construction. They will appreciate the importance of proper compaction in maintaining soil density, load-bearing capacity, and structural integrity, contributing to successful and stable construction projects.

Exercise

Key Solutions to PHB Exercise:

A. Short Questions' Answers:

1. Some appropriate hand tools for removing unwanted materials before earthwork include shovels, pickaxes, mattocks, and hoes.
2. Preparatory works before excavating a pit or trench include site marking, utility clearance, soil testing, and ensuring proper safety measures.
3. Excavation is important as it creates the foundation for construction, allows for proper soil compaction, and accommodates utilities and structures.
4. Methods to excavate a pit or trench with desired dimensions involve manual digging, using mechanical excavators, and following proper slope guidelines.
5. The process of excavating a pit or trench while maintaining the required slope and dimensions includes careful measurement, proper equipment use, and monitoring during excavation.

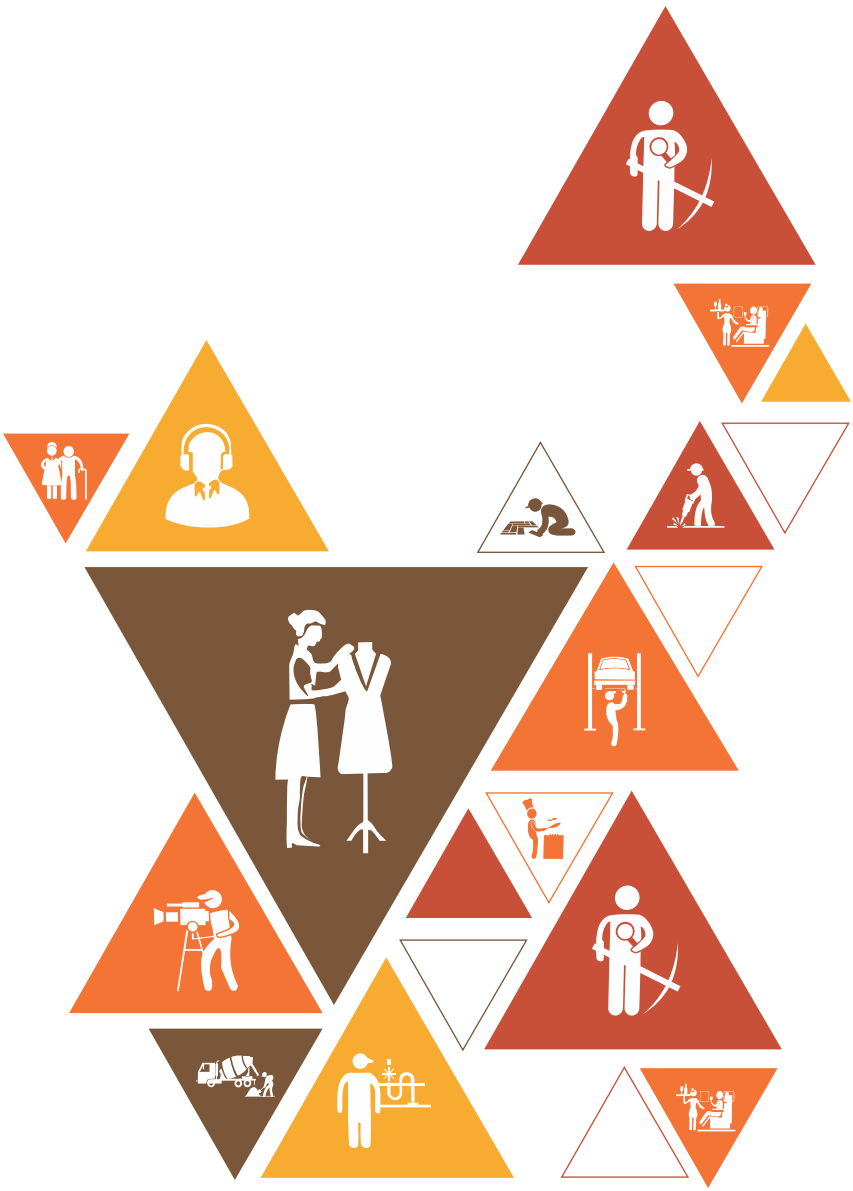
B. Fill-in-the-Blanks Questions' Answers:

1. Slope is a key concept in excavation that ensures proper drainage.
2. Sorting gravels or oversized aggregates from soil is essential for proper compaction.
3. Excavation involves removing earth to create a foundation for construction.
4. Appropriate tools are needed for shifting and placing earth during construction.
5. Preparatory works before excavation include site analysis for potential hazards.

6. True/False Questions' Answers:

1. Excavation is not an essential process in construction projects. (False)
2. Slope plays no role in ensuring stable and safe excavations. (False)
3. Sorting gravels from soil is not necessary for backfilling. (False)
4. Excavation involves only removing unwanted materials from the earth's surface. (False)
5. Preparatory works before excavation do not impact safety during the process. (False)

Notes

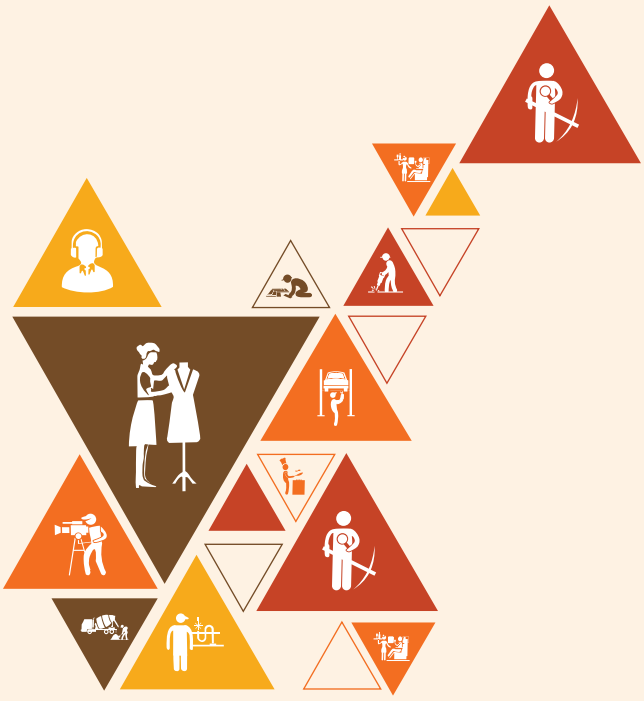


10. Annexures

Annexure I - Training Delivery Plan

Annexure II - Assessment Criteria

Annexure III – QR Code fro Vidoe



Annexure I

Training Delivery Plan

Training Delivery Plan			
Program Name:	Certificate Course for Helper Bar Bender and Steel Fixer		
Qualification Pack Name & Ref. ID	Helper Bar Bender and Steel Fixer, CON/Q0201		
Version No.	4	**Version Update Date**	31/08/2023
Pre-requisites to Training (if any)	• No formal education prescribed.		
Training Outcomes	**By the end of this program, the participants will be able to:**		
	1. Shift and Stack Materials, Tools and Equipment for Reinforcement Work		
	2. Mark and Cut Reinforcement Bars to the Required Length		
	3. Tie Reinforcement Bars using Different Types of Ties		
	4. Erect and Dismantle Temporary Scaffold up to 3.6 – meter height		
	5. Work according to Personal Health, Safety and Environment Protocols at Construction Site		
	6. Employability Skills (30 Hours)		
	7. Carry out Manual Earthwork at Construction Site		

Sl No.	Module	Unit	Session Name	Session Objectives	NOS Reference	Methodology	Training Tools/ Aids	Duration (hours)
1	Introduction of Construction Sector and Job Role	UNIT 1.1: Introduction to Construction Industry	Size and scope of the construction industry and its sub-sectors	Participant will be able to, • Size and scope of the construction industry and its sub-sectors	NA	Interactive Lecture	PPT	2
		UNIT 1.2: Brief about Bar Bending & Steel Fixing Occupation	Role and responsibilities of a Helper Bar Bender and Steel Fixer	Participant will be able to, • Role and responsibilities of a Helper Bar Bender and Steel Fixer	NA	Interactive Lecture	PPT	2

			Employment opportunities for a Helper Bar Bender and Steel Fixer	Participant will be able to, • Employment opportunities for a Helper Bar Bender and Steel Fixer	NA	Interactive Lecture	PPT	2
2	Generic Skills	UNIT 2.1: Numeracy Skills	Basic mathematical calculation	Participant will be able to, • The different types of systems of measurement	NA	Interactive Lecture	PPT	2
			The different types of shapes	Participant will be able to, • The conversion of measurements	NA	Interactive Lecture	PPT	2
			The perimeter of a square, rectangle, triangle and circle	Participant will be able to, • The measuring tape in imperial & metric system	NA	Interactive Lecture	PPT	2
		UNIT 2.2: Systems of Measurement	Different types of systems of measurement	Participant will be able to, • The different types of systems of measurement	NA	Interactive Lecture	PPT	2
			Conversion of measurements	Participant will be able to, • The conversion of measurements	NA	Interactive Lecture	PPT	2

			Reading a measuring tape	Participant will be able to, • The measuring tape in imperial & metric system	NA	Interactive Lecture	PPT	2
3	CON/N0201: Identify, shift and stack materials, tools and equipment relevant to reinforcement works	Unit 3.1 – Reinforcement Materials & Its Protection	Different types, diameters, and grades of reinforcement materials	Participant will be able to, • Different types, diameters, and grades of reinforcement materials	CON/N0201, PC1 to PC9, KU1 to KU20, GS1 to GS08	Interactive Lecture	PPT	4
			Common causes and types of corrosion affecting reinforcement steel	Participant will be able to, • Common causes and types of corrosion affecting reinforcement steel	CON/N0201, PC1 to PC9, KU1 to KU20, GS1 to GS08	Interactive Lecture	PPT	4
			Protect the reinforcement steel from corrosion and weather conditions	Participant will be able to, • Protect the reinforcement steel from corrosion and weather conditions	CON/N0201, PC1 to PC9, KU1 to KU20, GS1 to GS08	Demonstration and practice	PPT	4
		Unit 3.2 – Handling and Storage of Reinforcement	Handle and store reinforcement bars	Participant will be able to, • Handle and store reinforcement bars	CON/N0201, PC1 to PC9, KU1 to KU20, GS1 to GS08	Interactive Lecture	PPT	4

		Steel	Storage and transportation of steel bars	Participant will be able to, • Storage and transportation of steel bars	CON/N0201, PC1 to PC9, KU1 to KU20, GS1 to GS08	Interactive Lecture	PPT	4
			Tagging procedure. DO's and Don'ts while handling and storing the rebars	Participant will be able to, • Tagging procedure. DO's and Don'ts while handling and storing the rebars	CON/N0201, PC1 to PC9, KU1 to KU20, GS1 to GS08	Demonstration and practice	PPT	4
		Unit 3.3 – Tools used in Bar Bending Works	Classify the different hand tools used in reinforcement work	Classify the different hand tools used in reinforcement work	CON/N0201, PC1 to PC9, KU1 to KU20, GS1 to GS08	Interactive Lecture	PPT	4
			Inspect, maintain and handle the relevant hand and power tools	Inspect, maintain and handle the relevant hand and power tools	CON/N0201, PC1 to PC9, KU1 to KU20, GS1 to GS08	Interactive Lecture	PPT	4
			Inventory management and stock control procedures for materials, tools and equipment for reinforcement work	Inventory management and stock control procedures for materials, tools and equipment for reinforcement work	CON/N0201, PC1 to PC9, KU1 to KU20, GS1 to GS08	Demonstration and practice	PPT	4

4	CON/N0202: Identify, mark and cut reinforcement bar to required length	Unit 4.1 – Straightening, Cutting and Bending of Bars	Different types, grades, and diameters of reinforcement bars	Different types, grades, and diameters of reinforcement bars	CON/N0202, PC1 to PC9, KU1 to KU12, GS1 to GS8	Interactive Lecture	PPT	4
			How to accurately measure and mark cut lengths on reinforcement bars.	How to accurately measure and mark cut lengths on reinforcement bars.	CON/N0202, PC1 to PC9, KU1 to KU12, GS1 to GS8	Demonstration and practice	Required Tools & Equipments	4
			Identify different types of ties used in reinforcement work	Identify different types of ties used in reinforcement work	CON/N0202, PC1 to PC9, KU1 to KU12, GS1 to GS8	Demonstration and practice	Required Tools & Equipments	4
			Purpose and appropriate applications of each type of tie on different structural elements	Purpose and appropriate applications of each type of tie on different structural elements	CON/N0202, PC1 to PC9, KU1 to KU12, GS1 to GS8	Demonstration and practice	Required Tools & Equipments	4
			Techniques and precautions to maintain the integrity of reinforcement bars during the straightening process	Techniques and precautions to maintain the integrity of reinforcement bars during the straightening process	CON/N0202, PC1 to PC9, KU1 to KU12, GS1 to GS8	Demonstration and practice	Required Tools & Equipments	4

			Show to straighten reinforcement bars of different diameters using a bending lever and pipe	Show to straighten reinforcement bars of different diameters using a bending lever and pipe	CON/N0202, PC1 to PC9, KU1 to KU12, GS1 to GS8	Demonstration and practice	Required Tools & Equipments	4
			Purpose, functions, and specific applications of each hand and power tool used in reinforcement work	Purpose, functions, and specific applications of each hand and power tool used in reinforcement work	CON/N0202, PC1 to PC9, KU1 to KU12, GS1 to GS8	Demonstration and practice	Required Tools & Equipments	4
			Demonstrate how to select and use the appropriate cutting tools, such as hand-cutting machine, circular cutting machine, or shearing machine, for cutting rebar	Demonstrate how to select and use the appropriate cutting tools, such as hand-cutting machine, circular cutting machine, or shearing machine, for cutting rebar	CON/N0202, PC1 to PC9, KU1 to KU12, GS1 to GS8	Demonstration and practice	Required Tools & Equipments	4
			Proper techniques and safety measures when using hand tools for cutting rebar	Proper techniques and safety measures when using hand tools for cutting rebar	CON/N0202, PC1 to PC9, KU1 to KU12, GS1 to GS8	Demonstration and practice	Required Tools & Equipments	4

			Standard stacking practices to ensure safe and organized storage of cut reinforcement bars based on length and diameter	Standard stacking practices to ensure safe and organized storage of cut reinforcement bars based on length and diameter	CON/N0202, PC1 to PC9, KU1 to KU12, GS1 to GS8	Demonstration and practice	Required Tools & Equipments	4
			Tagging and stacking techniques for cut reinforcement bars	Tagging and stacking techniques for cut reinforcement bars	CON/N0202, PC1 to PC9, KU1 to KU12, GS1 to GS8	Demonstration and practice	Required Tools & Equipments	4
5	CON/N0203: Tie reinforcement bar using different types of ties	Unit 5.1 – Tying Reinforcement Bars	Different types of binding wire, including the calculation of the appropriate length of binding wire required for different types of ties	Participant will be able to, • Different types of binding wire, including the calculation of the appropriate length of binding wire required for different types of ties	CON/N0203, PC1 to PC7, KU1 to KU16, GS1 to GS9	Interactive Lecture	PPT	4
			Different types of ties used in reinforcement work, such as slash tie, ring slash tie, hairpin tie, ring hairpin tie,	Participant will be able to, • Different types of ties used in reinforcement work, such as slash tie, ring slash	CON/N0203, PC1 to PC7, KU1 to KU16, GS1 to GS9	Demonstration and practice	Required Tools & Equipments	4

			crown tie, and splice tie	tie, hairpin tie, ring hairpin tie, crown tie, and splice tie				
			Show how to accurately measure and cut the binding wire to the required length using appropriate cutting tools	Participant will be able to, • Show how to accurately measure and cut the binding wire to the required length using appropriate cutting tools	CON/N0203, PC1 to PC7, KU1 to KU16, GS1 to GS9	Demonstration and practice	Required Tools & Equipments	4
			Identify and classify different hand and power tools used for tying rebar	Participant will be able to, • Identify and classify different hand and power tools used for tying rebar	CON/N0203, PC1 to PC7, KU1 to KU16, GS1 to GS9	Demonstration and practice	Required Tools & Equipments	4
			Importance of appropriate Spacing in tying Reinforcement Bars	Participant will be able to, • Importance of appropriate Spacing in tying Reinforcement Bars	CON/N0203, PC1 to PC7, KU1 to KU16, GS1 to GS9	Demonstration and practice	Required Tools & Equipments	4

6	CON/N0101: Erect and dismantle temporary scaffold up to 3.6 meter	Unit 6.1 - Basics of Scaffolding	Basic concept of a temporary scaffolding	Participant will be able to, • Basic concept of a temporary scaffolding	CON/N0101, PC1 to PC12, KA1 to KA6, KB1 to KB11	Interactive Lecture	PPT	4
			Benefits of a scaffolding	Participant will be able to, • Benefits of a scaffolding	CON/N0101, PC1 to PC12, KA1 to KA6, KB1 to KB11	Demonstration and practice	Required Tools & Equipments	4
			Types of temporary scaffolding	Participant will be able to, • Types of temporary scaffolding	CON/N0101, PC1 to PC12, KA1 to KA6, KB1 to KB11	Demonstration and practice	Required Tools & Equipments	4
		Unit 6.2 - Concept of Conventional Scaffolding	Material used in bamboo scaffolding	Participant will be able to, • Material used in bamboo scaffolding	CON/N0101, PC1 to PC12, KA1 to KA6, KB1 to KB11	Interactive Lecture	PPT	4
			How to erect and dismantle a bamboo scaffolding	Participant will be able to, • How to erect and dismantle a bamboo scaffolding	CON/N0101, PC1 to PC12, KA1 to KA6, KB1 to KB11	Demonstration and practice	Required Tools & Equipments	4
		Unit 6.3 - Concept of Modular Scaffolding System	About types of modular scaffolding	Participant will be able to, • About types of modular scaffolding	CON/N0101, PC1 to PC12, KA1 to KA6, KB1 to KB11	Interactive Lecture	PPT	4
			Components of cuplock system scaffolding	Participant will be able to, • Components of cuplock system scaffolding	CON/N0101, PC1 to PC12, KA1 to KA6, KB1 to KB11	Demonstration and practice	Required Tools & Equipments	4
			Components of frame system	Participant will be able to, •	CON/N0101, PC1 to PC12, KA1	Demonstration and practice	Required Tools &	4

			scaffolding	Components of frame system scaffolding	to KA6, KB1 to KB11		Equipments	
		Unit 6.4 - Erecting and Dismantling of Temporary Scaffolding	Scaffolding tools	Participant will be able to, • Scaffolding tools	CON/N0101, PC1 to PC12, KA1 to KA6, KB1 to KB11	Interactive Lecture	PPT	4
			Use the scaffolding tools	Participant will be able to, • Use the scaffolding tools	CON/N0101, PC1 to PC12, KA1 to KA6, KB1 to KB11	Demonstration and practice	Required Tools & Equipments	4
			Erect cuplock system scaffold in correct way	Participant will be able to, • Erect cuplock system scaffold in correct way	CON/N0101, PC1 to PC12, KA1 to KA6, KB1 to KB11	Demonstration and practice	Required Tools & Equipments	4
			Erect frame system scaffold in correct way	Participant will be able to, • Erect frame system scaffold in correct way	CON/N0101, PC1 to PC12, KA1 to KA6, KB1 to KB11	Demonstration and practice	Required Tools & Equipments	4
			Dismantle the scaffold	Participant will be able to, • Dismantle the scaffold	CON/N0101, PC1 to PC12, KA1 to KA6, KB1 to KB11	Demonstration and practice	Required Tools & Equipments	4
			Work safely while erecting and dismantling the scaffold	Participant will be able to, • Work safely while erecting and dismantling the scaffold	CON/N0101, PC1 to PC12, KA1 to KA6, KB1 to KB11	Demonstration and practice	Required Tools & Equipments	4

7	CON/N9001: Work according to personal health, safety and environment protocol at construction site	Unit 7.1 – Hazards and Emergency Situations	Types of hazards at the construction sites and identify the hazards specific to the domain related works	Participant will be able to, • Types of hazards at the construction sites and identify the hazards specific to the domain related works	CON/N9001, PC1 to PC12, KA1 to KA3, KB1 to KB09	Interactive Lecture	PPT	2
			Recognize the safety control measures and actions to be taken under emergency situation	Participant will be able to, • Recognize the safety control measures and actions to be taken under emergency situation	CON/N9001, PC1 to PC12, KA1 to KA3, KB1 to KB09	Demonstration and practice	Required Tools & Equipments	2
			Reporting procedure to the concerned authority in case of emergency situations	Participant will be able to, • Reporting procedure to the concerned authority in case of emergency situations	CON/N9001, PC1 to PC12, KA1 to KA3, KB1 to KB09	Demonstration and practice	Required Tools & Equipments	2
		Unit 7.2 - Safety Drills, PPEs and Fire Safety	The classes of fire and types of fire extinguishers	Participant will be able to, • The classes of fire and types of fire extinguishers	CON/N9001, PC1 to PC12, KA1 to KA3, KB1 to KB09	Interactive Lecture	PPT	2
			The operating procedure of the fire extinguishe	Participant will be able to, • The operating procedure	CON/N9001, PC1 to PC12, KA1 to KA3, KB1 to	Demonstration and practice	Required Tools & Equipments	2

			rs	of the fire extinguishers	KB09			
			The importance of participation of workers in safety drills	Participant will be able to, • The importance of participation of workers in safety drills	CON/N9001, PC1 to PC12, KA1 to KA3, KB1 to KB09	Demonstration and practice	Required Tools & Equipments	2
			Basic medical tests required for working at construction site	Participant will be able to, • Basic medical tests required for working at construction site	CON/N9001, PC1 to PC12, KA1 to KA3, KB1 to KB09	Demonstration and practice	Required Tools & Equipments	2
			Purpose and importance of vertigo test at construction site	Participant will be able to, • Purpose and importance of vertigo test at construction site	CON/N9001, PC1 to PC12, KA1 to KA3, KB1 to KB09	Demonstration and practice	Required Tools & Equipments	2
			Types and benefits of basic ergonomic principles, which should be adopted while carrying out specific task at the construction sites	Participant will be able to, • Types and benefits of basic ergonomic principles, which should be adopted while carrying out specific task at the construction sites	CON/N9001, PC1 to PC12, KA1 to KA3, KB1 to KB09	Demonstration and practice	Required Tools & Equipments	2

			Use of PPEs as per work requirements	Participant will be able to, • Use of PPEs as per work requirements	CON/N9001, PC1 to PC12, KA1 to KA3, KB1 to KB09	Demonstration and practice	Required Tools & Equipments	2
		Unit 7.3 - Hygiene and Safe Waste Disposal Practices	Follow the practices to maintain personal hygiene, workplace hygiene and site/ workplace sanitization	Participant will be able to, • Follow the practices to maintain personal hygiene, workplace hygiene and site/ workplace sanitization	CON/N9001, PC1 to PC12, KA1 to KA3, KB1 to KB09	Interactive Lecture	PPT	2
			The importance of housekeeping works	Participant will be able to, • The importance of housekeeping works	CON/N9001, PC1 to PC12, KA1 to KA3, KB1 to KB09	Demonstration and practice	Required Tools & Equipments	2
			Keep an eye on safe housekeeping practices	Participant will be able to, • Keep an eye on safe housekeeping practices	CON/N9001, PC1 to PC12, KA1 to KA3, KB1 to KB09	Demonstration and practice	Required Tools & Equipments	2
			Different types of waste at construction sites and their disposal method	Participant will be able to, • Different types of waste at construction sites and their disposal method	CON/N9001, PC1 to PC12, KA1 to KA3, KB1 to KB09	Demonstration and practice	Required Tools & Equipments	2

			Know safe waste disposal practices followed at construction site	Participant will be able to, • Know safe waste disposal practices followed at construction site	CON/N9001, PC1 to PC12, KA1 to KA3, KB1 to KB09	Demonstration and practice	Required Tools & Equipments	2
		Unit 7.4 - Infectious Disease and Its Cure	Different types of infectious disease that can spread/ originate at a construction site	Participant will be able to, • Different types of infectious disease that can spread/ originate at a construction site	CON/N9001, PC1 to PC12, KA1 to KA3, KB1 to KB09	Interactive Lecture	PPT	2
			The ways of transmission of the various infectious disease	Participant will be able to, • The ways of transmission of the various infectious disease	CON/N9001, PC1 to PC12, KA1 to KA3, KB1 to KB09	Demonstration and practice	Required Tools & Equipments	2
			Methods to check the spread of the infectious disease	Participant will be able to, • Methods to check the spread of the infectious disease	CON/N9001, PC1 to PC12, KA1 to KA3, KB1 to KB09	Demonstration and practice	Required Tools & Equipments	2
			Symptoms and cure of the various infectious disease	Participant will be able to, • Symptoms and cure of the various infectious disease	CON/N9001, PC1 to PC12, KA1 to KA3, KB1 to KB09	Demonstration and practice	Required Tools & Equipments	2

			Procedure to report to the concerned authority regarding the outbreak/ hazard of any infectious disease/ pandemic	Participant will be able to, • Procedure to report to the concerned authority regarding the outbreak/ hazard of any infectious disease/ pandemic	CON/N9001, PC1 to PC12, KA1 to KA3, KB1 to KB09	Demonstration and practice	Required Tools & Equipments	2
8	DGT/VSQ/ N0101: Employability Skills (30 Hours)	Unit 8.1: Employability Skills	Introduction to Employability Skills	Discuss the Employability Skills required for jobs in various industries. List different learning and employability related GOI and private portals and their usage.	DGT/VSQ/ N0101	Team Activity: Interactive discussion	Handbook	2
			Constitutional values - Citizenship	Explain the constitutional values, including civic rights and duties, citizenship, responsibility towards society and personal values and ethics such as honesty, integrity, caring and respecting	DGT/VSQ/ N0101	Classroom lecture, discussion, demonstration, practical	Handbook	2

				others that are required to become a responsible citizen. Show how to practice different environmentally sustainable practices.				
			Becoming a Professional in the 21st Century	Discuss importance of relevant 21st century skills. Exhibit 21st century skills like Self-Awareness, Behavior Skills, time management, critical and adaptive thinking, problem-solving, creative thinking, social and cultural awareness, emotional awareness, learning to learn etc. in personal or professional life. Describe the benefits of	DGT/VSQ/N0101	Classroom lecture, discussion, demonstration, practical	Handbook	4

				continuous learning.				
			Basic English Skills	Show how to use basic English sentences for everyday conversation in different contexts, in person and over the telephone. Read and interpret text written in basic English. Write a short note/paragraph / letter/e-mail using basic English.	DGT/VSQ/N0101	Team Activity: Roleplay, video session	Handbook	5

			Communication Skills	Demonstrate how to communicate effectively using verbal and nonverbal communication etiquette. Explain the importance of active listening for effective communication. Discuss the significance of working collaboratively with others in a team.	DGT/VSQ/N0101	Classroom session, Team Activity: Round of Inter-active discussion	Handbook	2
			Diversity & Inclusion	Demonstrate how to behave, communicate, and conduct oneself appropriately with all genders and PwD. Discuss the significance of escalating sexual harassment issues as per POSH act.	DGT/VSQ/N0101	Classroom lecture, discussion, demonstration, practical	Handbook	2

			Financial and Legal Literacy	Outline the importanc e of selecting the right financial institution, product, and service. Demonstra te how to carry out offline and online financial transaction s, safely and securely. List the common componen ts of salary and compute income, expenditur e, taxes, investment s etc. Discuss the legal rights, laws, and aids.	DGT/VSQ/ N0101	Classroom lecture, discussion , demonstr ation, practical	Handb ook	7

			Essential Digital Skills	Describe the role of digital technology in today's life. Demonstrate how to operate digital devices and use the associated applications and features, safely and securely. Discuss the significance of displaying responsible online behavior while browsing, using various social media platforms, e-mails, etc., safely and securely. Create sample word documents, excel sheets and presentations using basic features utilize virtual collaboration tools to	DGT/VSQ/N0101	Classroom lecture, discussion, demonstration, practical	Handbook	10

				nt. Create a sample business plan, for the selected business opportunity.				
			Customer Service	Describe the significance of analysing different types and needs of customers. Explain the significance of identifying customer needs and responding to them in a professional manner. Discuss the significance of maintaining hygiene and dressing appropriately.	DGT/VSQ/N0101	Classroom lecture, discussion, Demonstration, practical, Team Activity: Role play, video session	Handbook	4

			Getting Ready for apprentice ship & Jobs	Create a professional Curriculum Vitae (CV). Use various offline and online job search sources such as employment exchanges, recruitment agencies, and job portals respectively. Discuss the significance of maintaining hygiene and confidence during an interview. Perform a mock interview. List the steps for searching and registering for apprentice ship opportunities.	DGT/VSQ/ N0101	Classroom lecture, discussion, Demonstration, practical, Team Activity: Role play, video session	Handbook	4
9	CON/N0104: Carry out manual earthwork at construction site	UNIT 9.1: Preparatory Work and Soil Cutting	Discuss the operations done in earthwork	Participant will be able to, • Discuss the operations done in earthwork	CON/N0104, PC1 to PC16, KA1 to KA4, KB1 to KB7	Interactive Lecture	PPT	4

			Carry out preparatory work prior to earthwork	Participant will be able to, • Carry out preparatory work prior to earthwork	CON/N0104, PC1 to PC16, KA1 to KA4, KB1 to KB7	Demonstration and practice	Required Tools & Equipments	4
			Excavate the earth manually like digging, trenching	Participant will be able to, • Excavate the earth manually like digging, trenching	CON/N0104, PC1 to PC16, KA1 to KA4, KB1 to KB7	Demonstration and practice	Required Tools & Equipments	4
			Carry out the dressing work after excavation job	Participant will be able to, • Carry out the dressing work after excavation job	CON/N0104, PC1 to PC16, KA1 to KA4, KB1 to KB7	Demonstration and practice	Required Tools & Equipments	4
			Identify the Do's and Don'ts in excavation	Participant will be able to, • Identify the Do's and Don'ts in excavation	CON/N0104, PC1 to PC16, KA1 to KA4, KB1 to KB7	Demonstration and practice	Required Tools & Equipments	4
		UNIT 9.2: Backfilling and Manual Compaction	Understand the importance of backfilling	Participant will be able to, • Understand the importance of backfilling	CON/N0104, PC1 to PC16, KA1 to KA4, KB1 to KB7	Interactive Lecture	PPT	4
			Carry out backfilling work effectively	Participant will be able to, • Carry out backfilling work effectively	CON/N0104, PC1 to PC16, KA1 to KA4, KB1 to KB7	Demonstration and practice	Required Tools & Equipments	4
			Understand the importanc	Participant will be able to, •	CON/N0104, PC1 to PC16, KA1	Demonstration and practice	Required Tools &	4

			e of compactio n	Understan d the importanc e of compactio n	to KA4, KB1 to KB7		Equipm ents	
			Carry out compactin g work effectively	Participant will be able to, • Carry out compactin g work effectively	CON/N010 4, PC1 to PC16, KA1 to KA4, KB1 to KB7	Demonstr ation and practice	Require d Tools & Equipm ents	4
			Do’s and Don'ts in backfilling and compactio n	Participant will be able to, • Do’s and Don'ts in backfilling and compactio n	CON/N010 4, PC1 to PC16, KA1 to KA4, KB1 to KB7	Demonstr ation and practice	Require d Tools & Equipm ents	4

Annexure II- Assessment Criteria

CRITERIA FOR ASSESSMENT OF TRAINEES

For updated Assessment criteria please refer to Qualification Pack of this Job role available at https://www.nqr.gov.in/

Assessment Weightage	
Job Role	Helper Bar Bender & Steel Fixer
Qualification Pack	CON/Q0201
Sector Skill Council	Construction

Sr. No.	Guidelines for Assessment
1	Criteria for assessment for each Qualification Pack will be created by the Sector Skill Council. Each Performance Criteria (PC) will be assigned marks proportional to its importance in NOS. SSC will also lay down proportion of marks for Theory and Skills Practical for each PC.
2	The assessment for the knowledge part will be based on knowledge bank of questions created by Assessment
3	Individual assessment agencies will create unique question papers for knowledge/theory part for assessment of candidates as per assessment criteria given below
4	Individual assessment agencies will create unique evaluations for skill practical for every student at each examination/training center based on assessment criteria.
5	The passing percentage for each QP will be 50%. To pass the Qualification Pack, every trainee should score a minimum of 50% individually in each NOS.
6	The Assessor shall check the final outcome of the practices while evaluating the steps performed to achieve the final outcome
7	The trainee shall be provided with a chance to repeat the test to correct his procedures in case of improper performance, with a deduction of marks for each iteration.
8	After the certain number of iteration as decided by SSC the trainee is marked as fail, scoring zero marks for the procedure for the practical activity.
9	In case of successfully passing only certain number of NOS's, the trainee is eligible to take subsequent assessment on the balance NOS's to pass the Qualification Pack within the specified timeframe set by SSC.
10	Minimum duration of Assessment of each QP shall be of 4hrs/trainee.

National Occupational Standardst	Theory Marks	Practical Marks	Project Marks	Viva Marks	Total Marks	Weightage
Shift and Stack Materials, Tools & Equipment for Reinforcement Work (CON/N0201)	20	80	-	-	100	20
Mark and Cut Reinforcement Bars to the Required Length (CON/N0202)	20	80	-	-	100	30
Tie Reinforcement Bars using Different Types of Ties (CON/N0203)	20	80	-	-	100	20
Erect and Dismantle Temporary Scaffold up to 3.6 – meter height (CON/N0101)	20	80	-	-	100	15
Work according to personal health, safety & environment protocol at construction site (CON/N9001)	20	80	-	-	100	10
Employability Skills (DGT/VSQ/N0101)	20	30	0	0	50	05
Total	**120**	**430**	**0**	**0**	**550**	**100**
Carry out manual earthwork at construction site (CON/N0104)	20	80	-	-	100	05
Total	**20**	**80**	**-**	**-**	**100**	**5**

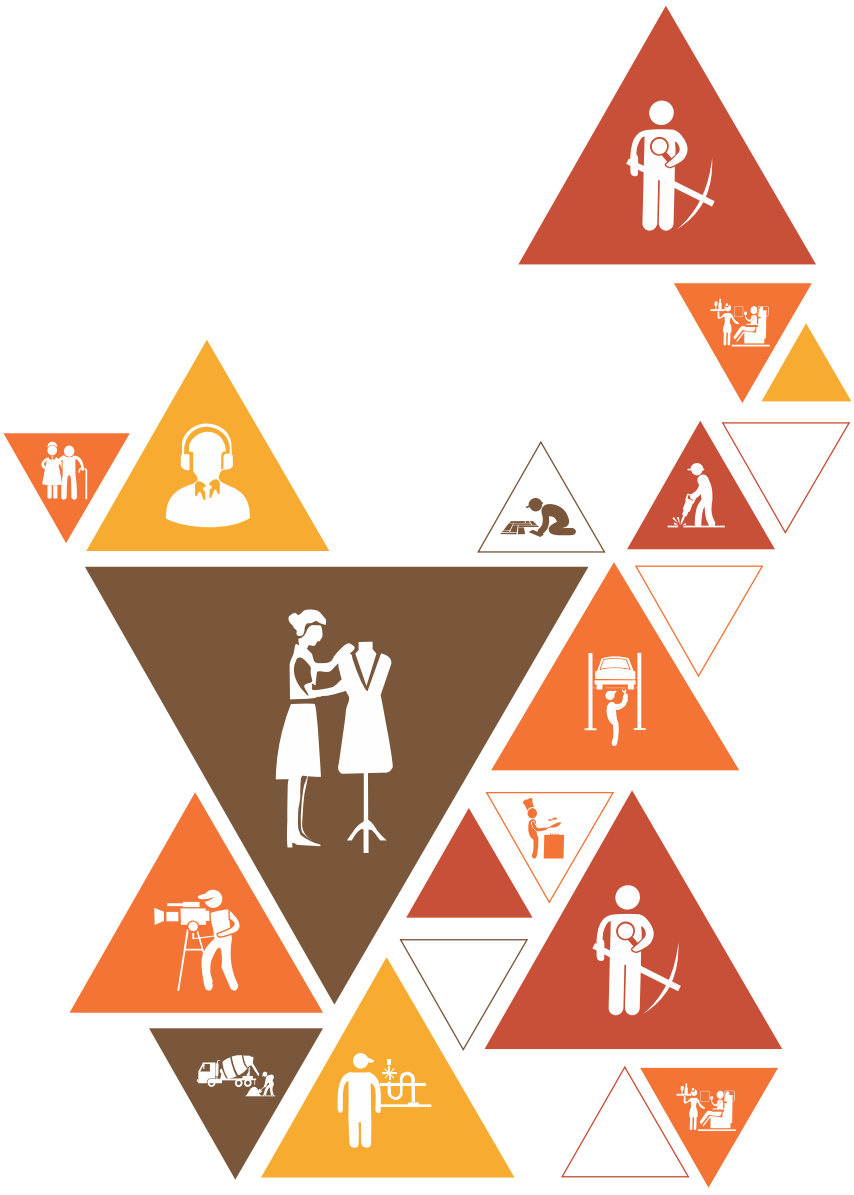
Annexure III- QR Codes –Video Links

Chapter Name	Unit Name	Topic Name	URL	QR Code
Chapter 1: Introduction of Construction Sector and Job Role	UNIT 1.1: Introduction to Construction Industry	Overview of Construction Sector in India	https://youtu.be/yhjDhav4Pfw	Overview of Construction Sector in India
	UNIT 1.2: Brief about Bar Bending & Steel Fixing Occupation	Responsibilities of Helper Bar Bender and Steel Fixer	https://youtu.be/KQ_hc3-Ol-A	Responsibilities of Helper Bar Bender and Steel Fixer
Chapter 2: Core/Generic Skills	Unit 2.1 – Numeracy Skills	Different System of Measurement	https://youtu.be/H1xo5UVJKVo	Different System of Measurement
	Unit 2.2 – Systems of Measurements	Area, volume and perimeter of geometrical shapes	https://youtu.be/OhTubw4C0to	Area, volume and perimeter of geometrical shapes

Chapter 3: Shift and Stack Materials, Tools and Equipment for Reinforcement Work (CON/N0201)	Unit 3.1 – Masonry Hand Tools and Equipment	Introduction to Common Construction Materials	https://youtu.be/a1cQcIJfjPw	Introduction to Common Construction Materials
	UNIT 3.2: Handling and Storage of Reinforcement Steel	Storage and Stacking of Reinforcement Bars	https://youtu.be/WA1PWw6Re2E	Storage and Stacking of Reinforcement Bars
	UNIT 3.3: Tools used in Bar Bending Works	Hand and Power Tools	https://youtu.be/NIh1CXfw880	Hand and Power Tools
Chapter 4: Mark and Cut Reinforcement Bars to the Required Length (CON/N0202)	Unit 4.1 – Cutting and Bending of Rebar	Types, Grades, and Diameters of Reinforcement Bars	https://youtu.be/lQbKYg-DN8s	Types, Grades, and Diameters of Reinforcement Bars
		Different Types of Ties Used in Reinforcement Work	https://youtu.be/ldLNOmp3olA	Different Types of Ties Used in Reinforcement Work

Chapter 5: Process of Tying Reinforcement Bars (CON/N0203)	UNIT 5.1: Tying Reinforcement Bars	Tools used for Tying Rebar	https://youtu.be/34mtpno_3pE	Tools used for Tying Rebar
		Importance of appropriate Spacing in Tying Reinforcement Bars	https://youtu.be/4vlBLE4_dhs	Importance of appropriate Spacing in Tying Reinforcement Bars
Chapter 6: Process of Erecting and Dismantling Temporary Scaffold Up to 3.6 meter height (CON/N0101)	Unit 6.1 – Basic Concept of Temporary Scaffolding	Types of Scaffolding	https://youtu.be/YuBFUtGGcbk	Types of Scaffolding
	Unit 6.2 – Concept of Conventional Scaffolding	Material used in Conventional Bamboo	https://youtu.be/8DP_7OK6dCw	Material used in Conventional Bamboo
	Unit 6.3 – Concept of Modular Scaffolding System	Modular Scaffolding System	https://youtu.be/oRxg2LLfxO4	Modular Scaffolding System
	Unit 6.4 – Erecting and Dismantling of Temporary Scaffolding	Erecting a Frame-System Scaffold	https://youtu.be/VQ1e0VZmTmM	Erecting a Frame-System Scaffold

Chapter 9: Process of Carrying out Manual Earthwork at Construction Sites (CON/N0104)	Unit 9.1 – Preparatory Work and Soil Cutting	Introduction to Earthwork	https://youtu.be/0yVyFD5RAFc	Introduction to Earthwork
	Unit 9.2 – Backfilling and Compaction Manually	Steps for Carrying out Backfilling and Compaction	https://youtu.be/BxSLst_fVP4	Steps for Carrying out Backfilling and Compaction



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