Skill India
कौशल भारत-कुशल भारत

सत्यमेव जयते
GOVERNMENT OF INDIA
MINISTRY OF SKILL DEVELOPMENT
& ENTREPRENEURSHIP

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National
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Transforming the skill landscape

Construction Skill Development Council

Facilitator Guide



Sector
Construction Skill Development Council of India

Sub-Sector
Real Estate and Infrastructure Construction

Occupation
Surveying

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NSQF Level: 2

Assistant Surveyor

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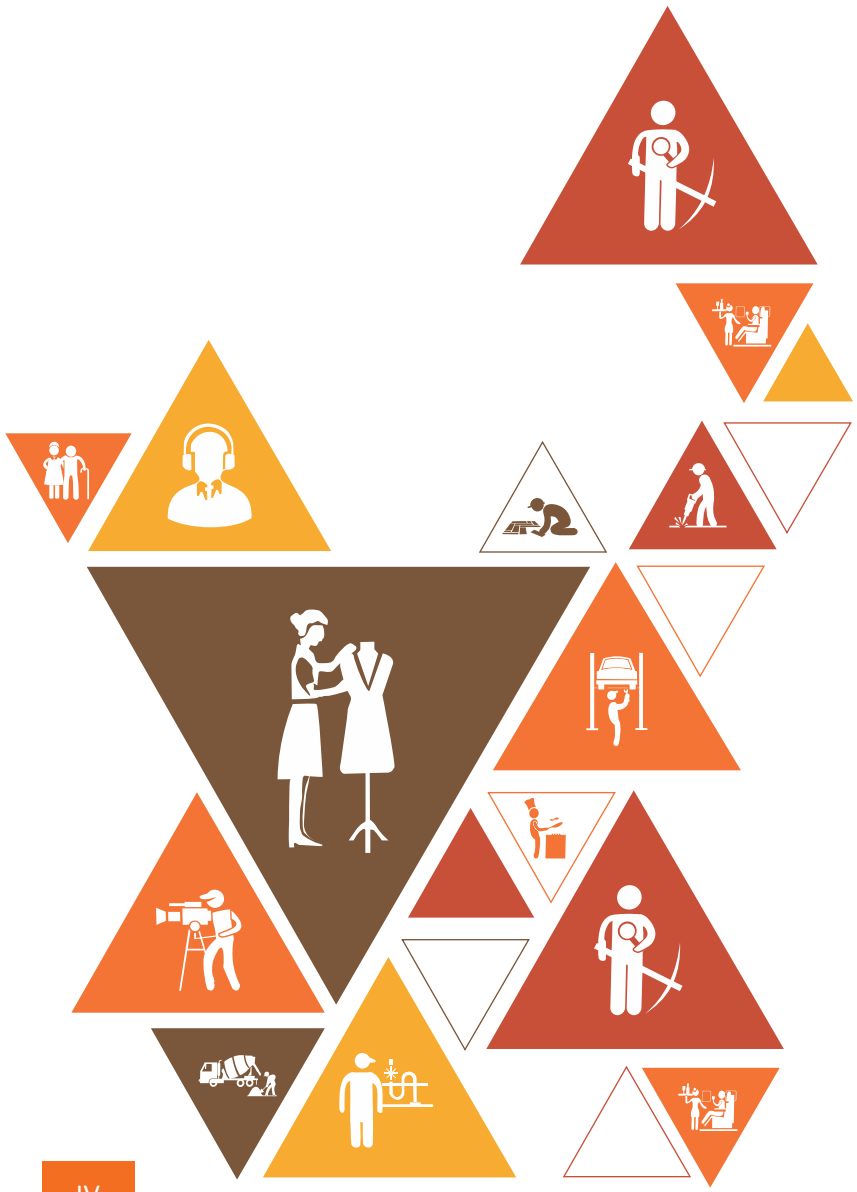
Disclaimer

"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.

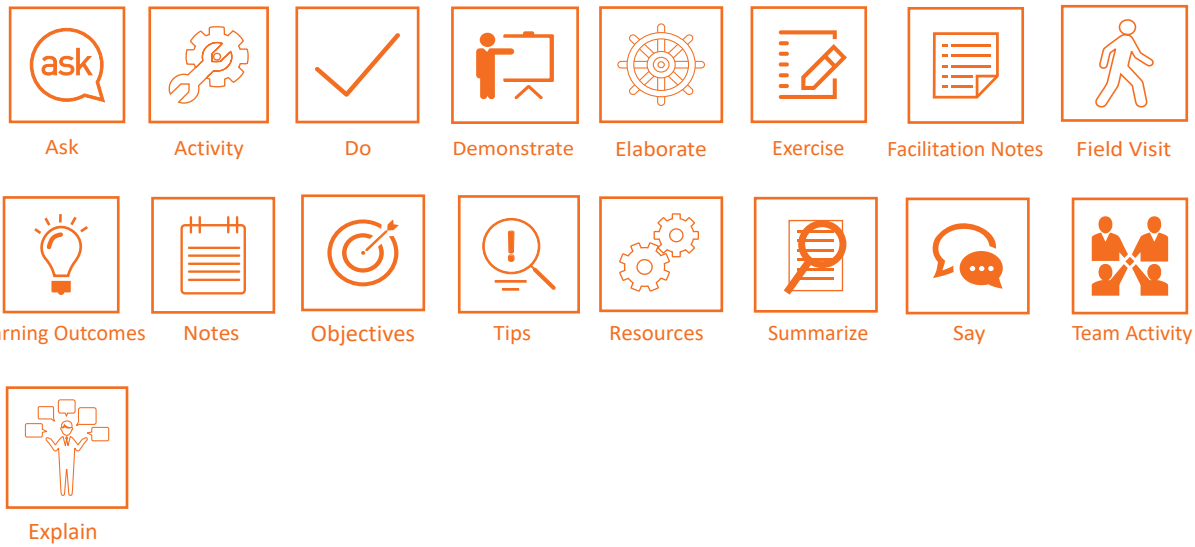
About the Book

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 Assistant Surveyor. 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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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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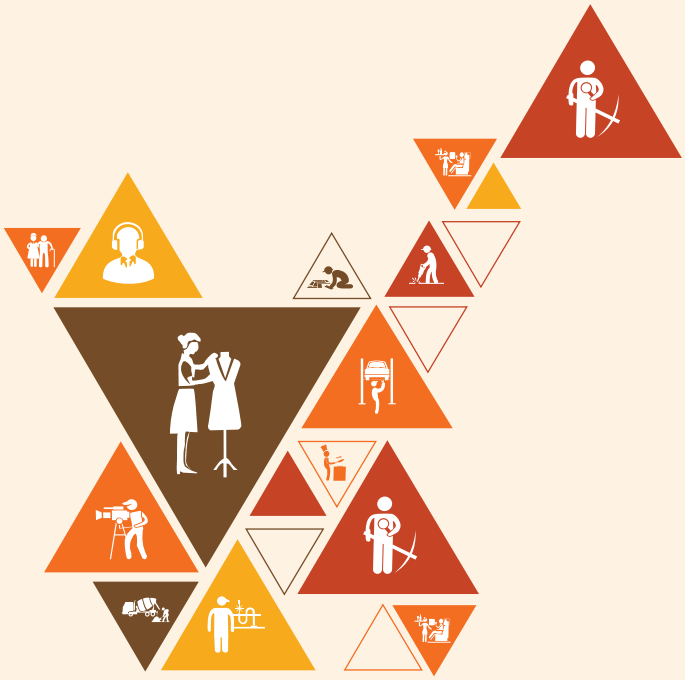
1. Introduction to the Job Role of an Assistant Surveyor

Unit 1.1 - Introduction to Surveying

Unit 1.2 - Role and Responsibilities of an Assistant Surveyor



Bridge Module

Key Learning Outcomes

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

1. Explain the role and responsibilities of Assistant surveyor.
2. Identify the career progression for the Assistant surveyor.

Unit 1.1: Introduction to Construction

Unit Objectives

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

1. Give an overview of the construction sector.

Resources to be used

- Available objects such as training kit - trainer guide, presentations, whiteboard, marker, projector, laptop, video films, etc.
- PowerPoint slides, pictures/posters and videos depicting various information about the construction industry, types of construction, basic categories of construction projects, and market segments of the construction industry.

Say

- In this session, we shall learn key facts about the construction industry, types of construction, basic categories of construction projects, and market segments of the construction industry.
- 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:**
    1. Ask the participants to pronounce their name with an adjective beginning with the initial letter of their name.
    2. 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.

Say

I hope everyone enjoyed our first activity and now let's move on to the topics covered in this session.

Ask

- What do you understand about the construction industry?
- Do you know how many types of construction are there?

Elaborate

With the help of audio-visual aids and the participant handbook, elaborate:

- Construction Industry
- Construction Industry in India
- Types of Construction
- Construction Project Categories
- Market Segments of the Construction Industry

Demonstrate

Show a PowerPoint presentation to the class on Construction Industry in India - https://www.slideserve.com/frieda/construction-sector-in-india-powerpoint-ppt-presentation and ask participants to note down the important points.

Say

- Let us now perform an activity based on various market segments of the construction industry.

Team Activity

- **Purpose:** The objective of this activity is to introduce participants to the different market segments within the construction industry.
- **Resources Required:** Presentation materials (slides or handouts) explaining market segments in the construction industry, internet access or library resources for research, whiteboard or flip chart with markers, printed construction industry reports or data (optional but helpful), worksheets for students to complete during the activity.
- **Tentative Duration:** 60-90 minutes
- **Methods/Procedure:**

    1. Introduction- Begin the activity by discussing the importance of understanding market segments in the construction industry. Explain that market segmentation helps professionals identify specialized opportunities and areas of expertise within the broader field of construction.

2. **Presentation-** Deliver a presentation on the different market segments within the construction industry. Include information on residential construction, commercial construction, industrial construction, infrastructure development, and specializations like green building, renovation, and restoration. Use visual aids to make the information more engaging and accessible.
3. **Group Research-** Divide the students into small groups and assign each group a specific market segment to focus on. Provide the groups with access to the internet or library resources to conduct research on their assigned market segment. They should explore the scope, current trends, major players, challenges, and potential career opportunities within their segment.
4. **Group Presentation-** Each group presents their findings to the rest of the class. Encourage them to use visuals, statistics, and examples to support their presentation. Allow for a short Q&A session after each presentation to clarify doubts and exchange insights.
5. **Reflection and Discussion-** Lead a class discussion to debrief the activity. Encourage students to share their thoughts on which market segments they find most appealing and why. Discuss the skills and qualifications required for different market segments and how students can prepare to excel in their chosen area.

- **Expected Outcome:** By the end of this classroom activity, students are expected to:

1. Understand the concept of market segmentation in the construction industry.
2. Identify the various market segments within the construction field, including residential, commercial, industrial, infrastructure, and specialized sectors.
3. Analyze the characteristics, opportunities, and challenges associated with each market segment.
4. Gain insights into potential career paths and specialization options within the construction industry.
5. Reflect on their interests and skills to make informed decisions about their vocational course and future career goals in construction.

Say

Did you think the activity improved your understanding? I'm hoping now you have a better idea of the various market segment of the construction industry.

Summarize

- Note down the important points related to the construction industry, types of construction, and various market segments.
- Revise these points with the participants.

Notes for facilitation

- Arrange the relevant handouts and leaflets for a better understanding of the topics
- Arrange audio-visual aids for a better understanding of the topics.
- Ask the participants if they have any questions.
- Encourage every participant to answer those questions and encourage peer learning in the class.

Notes

Unit 1.2: Role and Responsibilities of an Assistant Surveyor

Unit Objectives

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

1. Discuss the roles and responsibilities of an assistant surveyor.
2. Explain expected personal attributes required in surveying occupation.
3. Discover future possible progression and career development options of an assistant surveyor

Resources to be used

- Available objects such as training kit - trainer guide, presentations, whiteboard, marker, projector, laptop, video films, etc.
- PowerPoint slides, pictures/posters and videos depicting various information about the role and responsibilities, personal attributes, and career path of a assistant surveyor

Say

- In this session, we shall learn key facts about the role and responsibilities, personal attributes, and career path of an assistant surveyor.

Ask

- What do you know about the job role of an Assistant surveyor?
- Do you know the career opportunities available for an Assistant surveyor?

Elaborate

With the help of audio-visual aids and the participant handbook, elaborate:

- Introduction to the job role of Assistant surveyor
- Responsibilities of an Assistant surveyor
- Personal Attributes required by an Assistant surveyor
- Career Path of an Assistant Surveyor

Say

- Let us now perform an activity based on various career opportunities available for an assistant surveyor

Activity

- **Purpose:** Familiarize participants with diverse employment opportunities for an Assistant surveyor, highlighting roles, responsibilities, and potential career paths.
- **Resources Required:** PowerPoint Presentation, Handouts or printouts of job descriptions.
- **Tentative Duration:** 60 Mins
- **Procedure:**
    1. Explain the importance of an Assistant surveyor in the construction industry.
    2. Emphasize the objective of exploring employment opportunities in the industry.
    3. Encourage participants to share their initial thoughts on the roles and responsibilities of an assistant surveyor
    4. Provide handouts or printouts of various employment opportunities in the construction industry as per different NSQF Levels.
    5. Discuss each opportunity, highlighting roles, responsibilities, and required skills.
    6. Divide participants into small groups.
    7. Assign each group a specific employment opportunity to discuss key aspects, qualifications, skills, and career progression.
    8. Now ask each group to provide a short researched explanation of the opportunity assigned.
    9. Summarize key points, emphasizing the range of career paths and the importance of an assistant surveyor
- **Expected outcome:** Participants gain awareness of the wide range of employment opportunities in the construction industry, understand the specific roles and responsibilities of an Assistant surveyor, and will be inspired to explore potential career paths within the field.

Say

- There are various career opportunities available for an Assistant surveyor, I'm hoping now you have a better idea of them.

Summarize

- Note down the important points related to the role and responsibilities, personal attributes, and career path of an assistant surveyor
- Revise these points with the participants.

Notes for facilitation

- Arrange the relevant handouts and leaflets for a better understanding of the topic:
- Arrange audio-visual aids to make them understand
- Ask the participants if they have any questions.
- Encourage every participant to answer those questions and encourage peer learning in the class.

Exercise

Key Solutions to PHB Exercise

A.

i. True

ii. False

iii. True

iv. True

v. False

B.

i. Surveying

ii. consciousness

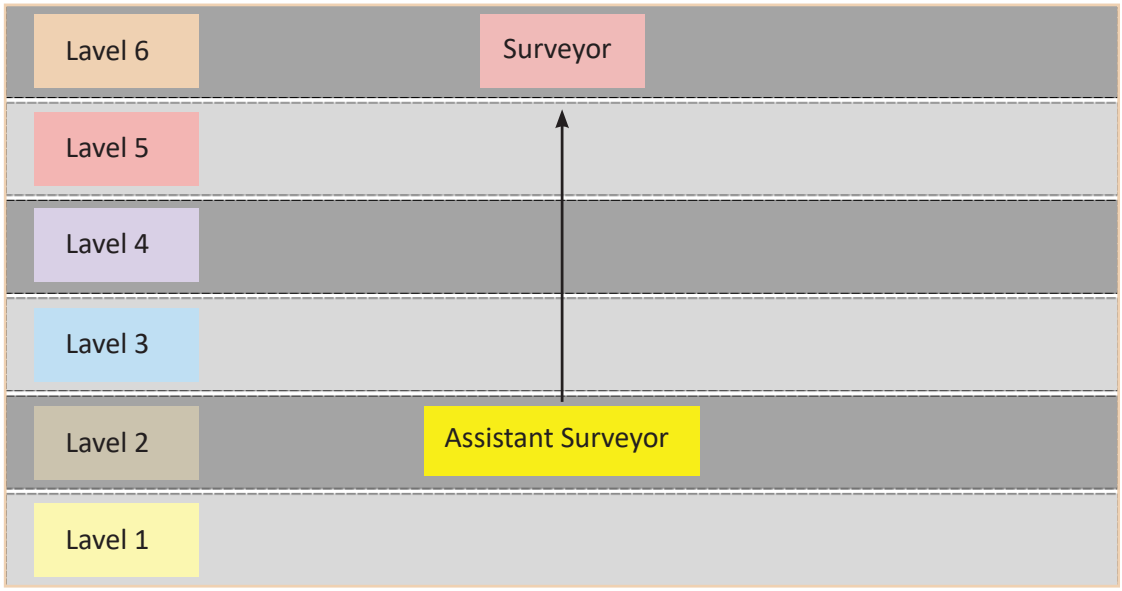
iii. data

iv. detail

v. coordinate systems

C.

1.



2. **The primary responsibilities an Assistant Surveyor are:**

   i. Handle Tools and Instruments

   ii. Store Tools and Instruments

   iii. Preparatory Works for Measurement

   iv. Assist in Linear Measurements

   v. Assist in Angular Measurement and Leveling

   vi. Assist in Setting Out

3. **The personal attributes required by an Assistant Surveyor are:**

   i. Physical Fitness and Adaptability

   ii. Resilience and Adaptation

   iii. Team-Oriented

   iv. Attention to Detail

   v. Problem-Solving Skills

   vi. Communication Skills

   vii. Time Management

   viii. Safety Consciousness

Notes

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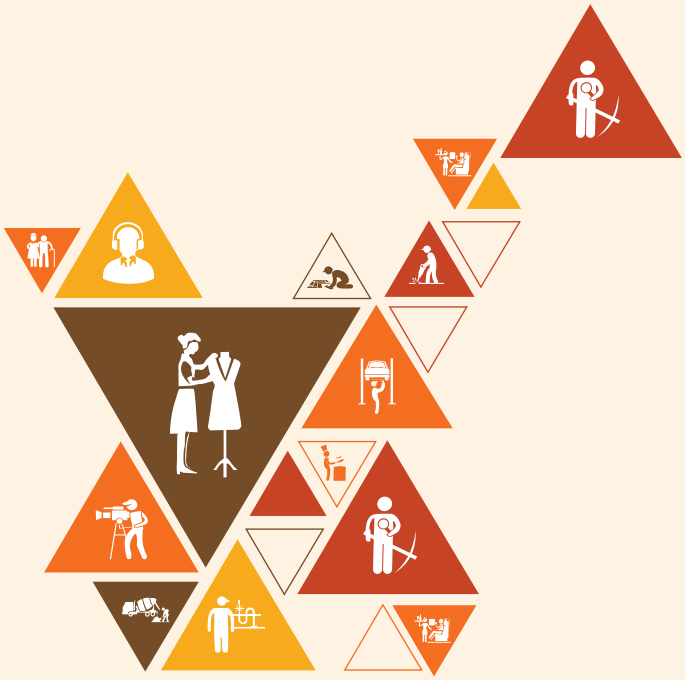
2. Handle and Store Surveying Tools and Instruments

Unit 2.1 - Linear Measurement Instruments

Unit 2.2 - Levelling and Angle Measurement Instruments

Unit 2.3 - Miscellaneous Survey Tools and Instruments



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Key Learning Outcomes

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

1. Identify and handle various tools and instruments used in surveying.
2. Demonstrate handling, storing and stacking of surveying tools, instruments and materials.

Unit 2.1: Linear Measurement Instruments

Unit Objectives

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

1. List various tools and accessories such as chains, tapes, offsets, poles, compass, pegs etc. used in chain and compass surveying.
2. Explain the purpose and area of applications of linear measurement instruments.
3. Classify various instruments types of surveying instruments such as linear, level and bearing measurement instruments etc.
4. Explain the process and use of levelling accessories such as arrows and pegs.
5. Demonstrate handling of chains and tapes for precise reading.
6. Demonstrate handling of offsets, levelling equipment, angles, and angle measuring instruments and other tools and accessories used in surveying works.

Resources to be used

- Available objects such as whiteboard, duster, marker, notepad, pens, participant handbooks, computer, projector, flipcharts etc.
- PowerPoint slides, pictures/ posters depicting various information about the linear measurement instruments used in surveying.

Say

- In the previous session, we discussed the roles and responsibilities of an assistant surveyor. In this session, we shall learn about various linear measurement instruments used in surveying.

Ask

- Have you ever used any surveying tools or instruments before? If so, which ones?
- Do you think surveying tools have changed much with advancements in technology? How?

Notes for facilitation

- Initiate the session with the participants by discussing the objectives of the module.
- Make the session interactive by asking the participants to share their expectations from the module on the blackboard/whiteboard.
- Introduce the topics to be covered and give some information about them.
- Give the participants a general idea about what will be covered in the module.

Elaborate

With the help of audio-visual aids and the participant handbook, elaborate:

- Tools and Accessories in Chain and Compass Surveying
- Purpose and Area of Applications of Linear Measurement Instruments
- Classification of Surveying Instruments
- Levelling Accessories and Their Use
- Handling Chains and Tapes for Precise Reading

Activity-1

- **Topic:** Surveying Tool Identification and Handling
- **Objective:** The purpose of the activity is to provide students with hands-on experience in identifying and handling various surveying tools used in chain and compass surveying, enabling them to learn to recognize each tool, understand its purpose, and practice proper handling techniques.
- **Materials Needed:**
    - Various surveying tools (chains, tapes, offsets, poles, compasses, pegs, leveling staff, arrows, etc.).
    - Display area or tables for arranging the tools.
    - Identification cards or labels for each tool.
    - Safety equipment (e.g., gloves and safety goggles)
- **Procedure:**
    - **Introduction**
        - Begin by explaining the purpose and objectives of the practical activity.
        - Stress the importance of hands-on learning in understanding surveying tools.
    - **Tool Identification**
        - Display the various surveying tools on tables or a designated area.
        - Assign each tool an identification card or label with its name and purpose.
        - In small groups, students should rotate among the tools, examining and reading the labels to identify each tool.
    - **Group Discussion**
        - Gather students in a group and facilitate a discussion.
        - Ask students to share their findings: which tools they recognized and what they think each tool is used for.

- Clarify any misconceptions and provide additional information about each tool.

- **Hands-On Handling**
  - In their groups, provide students with selected surveying tools.
  - Instruct them to handle the tools as they would in a real surveying situation.
  - Emphasize safety practices, such as wearing gloves when handling sharp tools.
- **Tool Functions Demonstration**
  - Assemble the class and demonstrate how to use a few key tools, such as a measuring tape, compass, or leveling staff.
  - Explain their functions and proper handling techniques.
  - Encourage students to ask questions and seek clarification.
- **Tool Rotation (15 minutes):**
  - Have students rotate among different tools to practice handling and get a feel for each tool's weight and construction.
  - Provide guidance and supervision as needed.

- **Expected Outcomes:** By the end of this, students should be able to identify common surveying tools, understand their purposes, and have gained initial experience in handling them safely. This hands-on activity will enhance their practical knowledge and familiarity with surveying tools used in chain and compass surveying.

Do

- Conduct a brief session for students to share their experiences and challenges in handling the tools.
- Ask students if they feel more confident in identifying and handling surveying tools after the activity.

Say

- Did you find this activity interesting? Let us do another activity.

Activity-2

- **Topic:** Demonstrate Handling of Chains and Tapes for Precise Reading
- **Objective:** The objective of this activity is to provide students with practical experience in handling chains and tapes for precise measurements in land surveying. Participants will learn how to use

these tools accurately and understand their role in surveying projects.

- **Location:** A suitable outdoor location with marked distances for practical measurements.
- **Materials Needed:**
    - Surveying chains and tapes
    - Surveying equipment (level, theodolite, pegs, etc.)
    - Surveying materials (stakes, flags, notebooks, pencils, etc.)
    - Measuring markers or flags
    - Safety equipment (e.g., safety vests and hard hats)
    - Instructor or expert guide
- **Procedure:**
    - **Introduction**
        - Gather the students at the field location and provide an overview of the day's activities.
        - Explain the importance of precise measurements in land surveying and how chains and tapes play a crucial role.
    - **Tool Familiarization**
        - Introduce the surveying chains and tapes to the students.
        - Explain the different types of chains and tapes, their lengths, and when each should be used.
        - Highlight the significance of accurate measurements in surveying projects.
    - **Demonstration**
        - Conduct a live demonstration of how to handle chains and tapes for precise measurements.
        - Show students how to lay out a baseline, use pegs and markers, and maintain proper tension on the chain or tape.
        - Explain the process of taking accurate readings and recording data.
    - **Hands-On Practice**
        - Divide students into small groups, and assign each group a specific measurement task.
        - Provide them with chains or tapes and the necessary equipment.
        - Instruct each group to measure a designated distance accurately and record their readings.
    - **Measurement Assessment**
        - Review each group's measurements and discuss any discrepancies.
        - Provide guidance on error correction and the importance of consistency in

measurements.

- Allow students to repeat the measurements as needed.
- Safety and Clean-up
- Remind students to adhere to safety guidelines and ensure that all equipment is properly stored.
- Collect any markers or flags used during the activity.

- **Expected Outcomes:** By the end of this activity, students should have gained practical experience in handling chains and tapes for precise measurements. They will understand the importance of accurate measurements in surveying projects and be better prepared to apply this knowledge in their future work as surveyors.

Do

- Summarize the key takeaways from the field visit, emphasizing the importance of precise measurements in surveying.
- Encourage students to reflect on their experiences and share their insights.
- Discuss the challenges and lessons learned during the activity.
- Conduct a question-and-answer session to address any queries or concerns.
- Jot down the crucial points on the whiteboard as the students speak.
- Share your input and insight to encourage the students and add onto what they talk about.
- Ensure that all students participate in the class.

Notes for facilitation

- Arrange the relevant handouts and leaflets for a better understanding of the topic:
  - https://slideplayer.com/slide/12881575/
  - https://www.slideshare.net/gauravhtandon1/compass-surveying-26300956
  - https://www.slideshare.net/FreeTime5/surveying-instruments-with-their-uses
- Arrange audio-visual aids to make them understand
- Ask the participants if they have any questions.
- Encourage every participant to answer those questions and encourage peer learning in the class.

Notes

Unit 2.2: Levelling and Angle Measurement Instruments

Unit Objectives

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

1. List the various level and bearing measuring instruments such as dumpy level, auto level, tilting level, etc.
2. Explain the process and use of levelling accessories such as levelling staff, arrows and pegs.
3. List various level and angle measuring instruments like tachometer, theodolite, total station, etc.
4. Demonstrate handling of offsets, levelling equipment, angles, and angle measuring instruments and other tools and accessories used in surveying works.

Resources to be used

- Available objects such as whiteboard, duster, marker, notepad, pens, participant handbooks, computer, projector, flipcharts etc.
- PowerPoint slides, pictures/ posters depicting various information about levelling and angle measurement instruments used in surveying.

Say

In the previous session, we discussed the linear measurement Instruments used in surveying. In this session, we shall learn about the essential knowledge and skills required to handle and store levelling and angle measurement tools and instruments effectively in the field.

Ask

- Have you ever wondered how construction sites or maps are accurately measured and laid out?
- Do you know the difference between measuring angles horizontally and vertically? How do you think surveyors measure these angles?

Notes for facilitation

- Initiate the session with the participants by discussing the objectives of the module.
- Make the session interactive by asking the participants to share their expectations from the module on the blackboard/whiteboard.
- Introduce the topics to be covered and give some information about them.
- Give the participants a general idea about what will be covered in the module.

Elaborate

With the help of audio-visual aids and the participant handbook, elaborate:

- Level and Bearing Measuring Instruments
- Levelling Accessories and Their Process
- Level and Angle Measuring Instruments
- Handling Offsets, Levelling Equipment, and Angles
- Tools and Accessories in Surveying Works

Activity-1

- **Topic:** Introduction to Level and Angle Measuring Instruments
- **Objective:** The purpose of this field practical activity is to provide students with hands-on experience in using level and angle measuring instruments commonly used in surveying. Students will learn how to set up and operate these instruments, measure angles and elevations, and understand their practical applications in the field.
- **Materials Needed:**
    - Theodolite or total station
    - Leveling staff or leveling rod
    - Tripod for instrument support
    - Measurement targets (reflective prisms or surveying targets)
    - Field notebook and writing instruments
    - Safety equipment (e.g., gloves and safety goggles)
- **Procedure:**
    - **Introduction**
        - Begin by conducting a brief classroom session to introduce students to the theodolite or total station, leveling staff, and their functions.
        - Explain the objectives of the field practical activity and its relevance to surveying applications.
    - **Field Setup**

      Transport the theodolite or total station, leveling staff, tripod, and measurement targets to the chosen field location.
        - Set up the tripod securely, ensuring it is level and stable.
        - Mount the theodolite or total station on the tripod and secure it in place.

- Calibrate and level the instrument.

- **Angle Measurement**
  - Demonstrate how to use the instrument to measure horizontal and vertical angles.
  - Instruct students to take turns using the instrument to measure angles between various points or targets in the field.
  - Have students record their angle measurements in their field notebooks.
- **Elevation Measurement**
  - Introduce the leveling staff and its use in measuring elevations.
  - Show students how to read and record height differences using the leveling staff and instrument.
  - Assign elevation measurement tasks to students, where they measure and record height differences between points.
- **Practical Applications**
  - Discuss practical applications of angle and elevation measurements in surveying, such as topographic mapping or construction site layout.
  - Encourage students to think critically about how these measurements are used in real-world surveying projects.
  - Data Analysis and Discussion 15. Return to the classroom or a designated discussion area.
  - Have students analyze and discuss the data they collected in the field.
  - Facilitate a discussion on the accuracy of measurements, potential sources of error, and how to improve accuracy.
- **Expected Outcomes:** By the end of this field practical activity, students should have gained practical experience in using level and angle measuring instruments. They should also understand their applications in surveying and have improved their data collection and measurement skills, which are essential for accurate surveying work.

Do

- Summarize the key takeaways from the field practical activity.
- Emphasize the importance of accurate measurements in surveying and its impact on various industries.

Say

Did you find this activity interesting? Let us do another activity.

Activity-2

- **Topic:** Introduction to Theodolite Surveying
- **Objective:** The objective of this activity is to familiarize students with the theodolite, a fundamental instrument used in surveying. Students will learn how to set up and operate the theodolite, measure horizontal and vertical angles, and understand its applications in real-world surveying tasks.
- **Materials Needed:**
    - Theodolite
    - Tripod for instrument support
    - Measurement targets (reflective prisms or surveying targets)
    - Field notebook and writing instruments
    - Safety equipment (e.g., gloves and safety goggles)
    - Compass (optional)
- **Procedure:**
    - **Introduction:**
        - Begin with a classroom session to introduce students to theodolites, their functions, and their importance in surveying.
        - Explain the objectives of the field practical activity and its relevance to surveying applications.
    - **Field Setup:**

      Transport the theodolite, tripod, and measurement targets to the chosen field location.
        - Set up the tripod securely, ensuring it is level and stable.
        - Mount the theodolite on the tripod and secure it in place.
        - Calibrate and level the theodolite.
    - **Horizontal Angle Measurement:**

      Demonstrate how to use the theodolite to measure horizontal angles between various points or targets in the field.
        - Instruct students to take turns using the theodolite to measure horizontal angles.
        - Have students record their angle measurements in their field notebooks.
    - **Vertical Angle Measurement:**
        - Show students how to measure vertical angles using the theodolite's vertical circle.
        - Assign tasks to measure vertical angles between points of interest.
        - Ensure that students record these measurements accurately.

- **Orientation with Compass (Optional)**

  If a compass is available, demonstrate how it can be used in conjunction with theodolite measurements to determine magnetic north or to establish a reference direction.

- **Practical Applications Discussion**

  Discuss the practical applications of theodolite measurements in surveying, such as land boundary surveys, construction site layout, or topographic mapping.

  - Encourage students to think critically about how these measurements are used in real-world surveying projects.

- **Data Analysis and Discussion**

  Return to the classroom or a designated discussion area.

  - Have students analyze and discuss the data they collected in the field, including horizontal and vertical angles.
  - Facilitate a discussion on the importance of accuracy in surveying and the role of theodolites in achieving precise measurements.

- **Expected Outcomes:** By the end of this field practical activity, students should have gained practical experience in setting up and using theodolites. They should understand their applications in surveying, have improved their data collection and measurement skills, and recognize the importance of precise angle measurements in various surveying tasks.

Do

- Summarize the key takeaways from the field practical activity.
- Emphasize the significance of theodolite measurements in surveying and their role in ensuring the accuracy of various engineering and construction projects.
- Discuss the challenges and lessons learned during the activity.
- Conduct a question-and-answer session to address any queries or concerns.
- Jot down the crucial points on the whiteboard as the students speak.
- Share your input and insight to encourage the students and add onto what they talk about.
- Ensure that all students participate in the class.

Notes for facilitation

- Arrange the relevant handouts and leaflets for a better understanding of the topic.
- Arrange audio-visual aids to make them understand
- Ask the participants if they have any questions.
- Encourage every participant to answer those questions and encourage peer learning in the class.

Notes

Unit 2.3: Miscellaneous Survey Tools and Instruments

Unit Objectives

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

1. Demonstrate handling of miscellaneous instruments such as those used in GPS, photogrammetry and transit surveys.
2. Demonstrate storing and stacking of surveying tools and instruments.
3. Demonstrate handling, stacking and storing different surveying materials such as lime, strings, hurdles, and paints etc. as per standard practices/instructions.

Resources to be used

- Available objects such as whiteboard, duster, marker, notepad, pens, participant handbooks, computer, projector, flipcharts etc.
- PowerPoint slides, pictures/ posters depicting various information about the tools and instruments used in surveying.

Say

In the previous session, we discussed levelling and angle measurement tools and instruments used in surveying. In this session, we shall learn about handling, stacking and storing different surveying materials and miscellaneous survey instruments.

Ask

- Have you ever used any surveying tools or instruments before? If so, which ones?
- Do you think surveying tools have changed much with advancements in technology? How?

Notes for facilitation

- Initiate the session with the participants by discussing the objectives of the module.
- Make the session interactive by asking the participants to share their expectations from the module on the blackboard/whiteboard.
- Introduce the topics to be covered and give some information about them.
- Give the participants a general idea about what will be covered in the module.

Elaborate

- Handling of Miscellaneous Surveying Instruments
- Storing and Stacking Surveying Tools and Instruments
- Handling, Stacking, and Storing Surveying Materials
- GPS, Photogrammetry, and Transit Survey Instruments
- Standard Practices for Surveying Material Storage

Activity-1

- **Topic:** Proper Storage and Handling of Surveying Tools and Materials
- **Objective:** The objective of this activity is to educate students on the importance of proper storage and handling of surveying tools and materials. Students will learn how to organize, store, and handle various surveying tools and materials to ensure their longevity and effectiveness in surveying tasks.
- **Materials Needed:**
  - Various surveying tools and materials (hammers, measuring tapes, plumb bobs, wooden pegs, enamel paint, brushes, red oxide powder, lime/chalk powder, line dory/thread, etc.)
  - Suitable storage racks, shelves, containers, and boxes
  - Tags for identification
  - Safety equipment (gloves)
- **Procedure:**
  - **Introduction**
    - Begin with an introduction, emphasizing the importance of proper storage and handling of surveying tools and materials, especially considering the challenging conditions these tools may encounter.
  - **Material Identification**
    - Display the various surveying tools and materials in the classroom.
    - Ask students to identify each tool/material and briefly describe its purpose.
    - Correct any misconceptions and provide additional information about the tools and materials.
  - **Safety Guidelines**
    - Discuss safety guidelines for handling and storing surveying materials, including the use of gloves when necessary.

- **Demonstration: Handling and Stacking**
    - Lead a hands-on demonstration of how to properly handle, stack, and store surveying tools and materials based on the guidelines provided.
    - Highlight the significance of keeping materials organized and accessible.
- **Practical Exercise**
    - Divide students into small groups.
    - Provide each group with a set of surveying tools and materials.
    - Instruct each group to organize, stack, and store their materials according to the provided guidelines.
- **Group Discussion**
    - After the practical exercise, gather the groups for a discussion.
    - Ask each group to share their experiences, including any challenges they encountered during handling and storage.
    - Encourage students to suggest improvements and best practices based on the provided guidelines.
- **Evaluation and Feedback**
    - Assess each group's organization and storage of surveying tools and materials.
    - Provide feedback and guidance on improving material management techniques.
- **Conclusion**
    - Summarize the key takeaways from the activity, emphasizing the importance of proper storage and handling for the efficient operation of surveying teams and the preservation of materials.

- **Expected Outcomes:** By the end of this activity, students should have a clear understanding of how to properly handle, stack, and store surveying tools and materials. They will appreciate the significance of organized material management for the smooth execution of surveying tasks and the responsible use of resources, especially considering the challenging conditions these tools may encounter

Do

- Conduct a brief session for students to share their experiences and challenges in handling the survey materials.
- Ask students if they feel more confident in storing and stacking surveying material before and after the usage.
- Conduct a question-and-answer session to address any queries or concerns.
- Jot down the crucial points on the whiteboard as the students speak.
- Share your input and insight to encourage the students and add onto what they talk about.
- Ensure that all students participate in the class.

Notes for facilitation

- Arrange the relevant handouts and leaflets for a better understanding of the topic:
- Arrange audio-visual aids to make them understand
- Ask the participants if they have any questions.
- Encourage every participant to answer those questions and encourage peer learning in the class.

Exercise

Key Solutions to PHB Exercise

A.

1. Equipment and Tools Used in Chain Surveying:
   i. Chain (Gunter's or Engineer's chain)
   ii. Arrows
   iii. Ranging rods
   iv. Plumb bob
   v. Measuring tape
   vi. Compass
   vii. Clinometer
   viii. Pegs and flags
   ix. Field notebook and pencils

2. Linear measurement instruments are used to measure distances accurately in surveying. Their primary purpose is to determine the length between two points, helping surveyors establish accurate maps, plans, and land boundaries.

3. A theodolite is a precision instrument used in surveying and construction to measure horizontal and vertical angles. Its primary function is to precisely measure angles, which are crucial for tasks like triangulation, setting out construction projects, and determining the direction of lines.

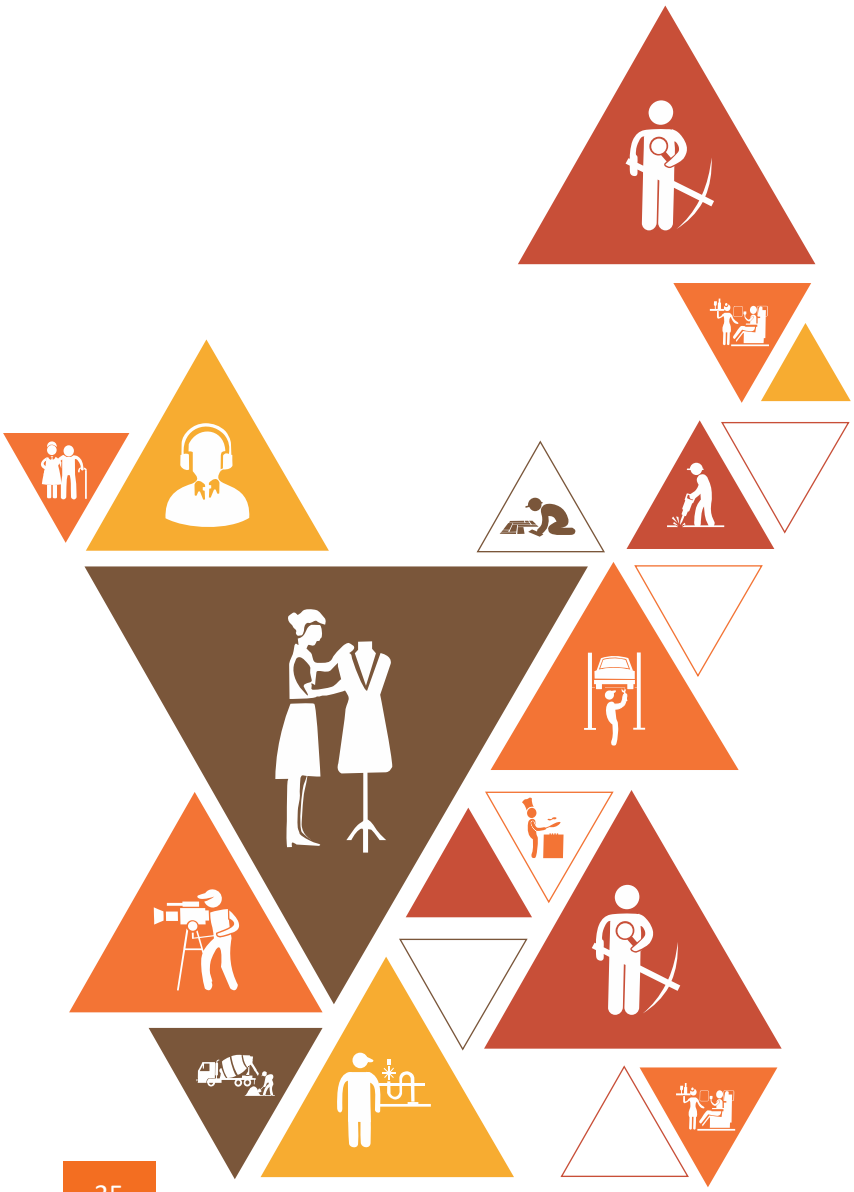
4. Different Types of Cross-Staff:
   i. Open Cross-Staff
   ii. French Cross Staff
   iii. Adjustable Cross Staff

5. Different Types of Tapes:
   i. Linen/Cloth Tape
   ii. Invar Tape
   iii. Metallic Woven Tape
   iv. Steel Tape

B.

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

Notes



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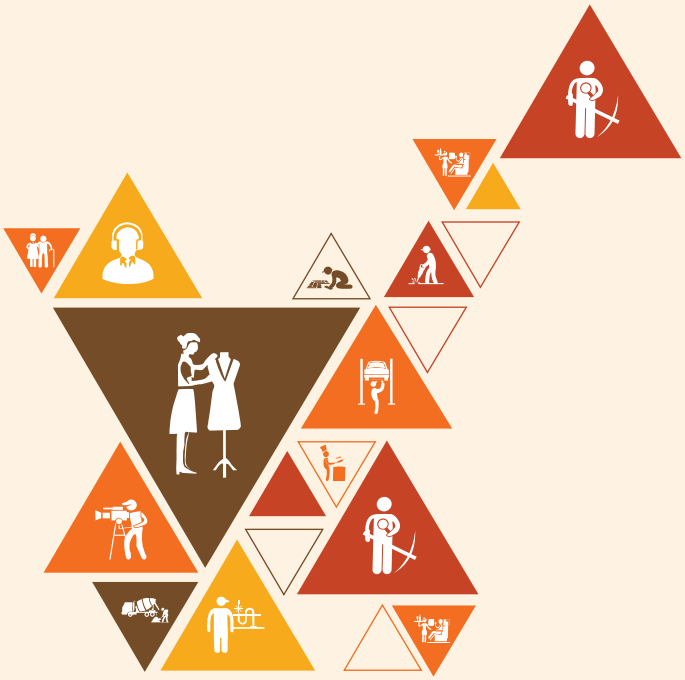
3. Provide Support in Various Surveying Works

Unit 3.1 - Preparatory Works Prior to Surveying

Unit 3.2 - Assist in Linear Measurement of Distances and Lengths

Unit 3.3 - Angular Measurement, Levelling and Setting out



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Key Learning Outcomes

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

1. Explain the standard procedures of levelling, linear and angular measurements.
2. Demonstrate placement and fixing of tripod.
3. Demonstrate initial setup and fixing of staff for angular measurement and levelling.
4. Demonstrate layout marking for setting out.

Unit 3.1: Preparatory Works Prior to Surveying

Unit Objectives

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

1. Explain selection of tripods based upon the instrument to be used.
2. Describe importance of placing the tripod at the exact location of marking.
3. Demonstrate selection and shifting of tools and materials to the instructed location.
4. Demonstrate placing and fixing of tripod on the marked location.
5. Demonstrate unfolding of the chain as per standard practices.

Resources to be used

- Available objects such as whiteboard, duster, marker, notepad, pens, participant handbooks, computer, projector, flipcharts etc.
- PowerPoint slides, pictures/ posters depicting various information about tripods used in surveying.

Say

In this session, we shall learn about the essential procedures and techniques for precise surveying, including tripod selection, correct instrument placement, various measurement methods, staff usage, layout marking, and the critical process of layout for excavation using lime.

Ask

- Have you ever used a tripod or any surveying instruments before, even in a non-professional setting?
- What do you think might be the challenges in setting up surveying equipment accurately in the field?

Notes for facilitation

- Initiate the session with the participants by discussing the objectives of the module.
- Make the session interactive by asking the participants to share their expectations from the module on the blackboard/whiteboard.
- Introduce the topics to be covered and give some information about them.
- Give the participants a general idea about what will be covered in the modul

Elaborate

- Tripod Selection
- Proper Tripod Placement
- Standard Measurement Procedures

Activity-1

- **Objective:** The objective of this is to reinforce students' knowledge of surveying materials and their appropriate use. In this interactive matching game, students will work individually or in pairs to match different surveying materials with their corresponding uses.
- **Materials Needed:**
    - Surveying material cards (index cards or printouts)
    - Marker or pen
    - Timer (optional)
    - Whiteboard or flip chart for keeping score
- **Duration:** Approximately 30-45 minutes
- **Procedure:**
    - **Preparation**
        - Prepare a set of surveying material cards. On one set of cards, write the names of various surveying materials (e.g., lime, strings, hurdles, paint, leveling staff, compass, etc.). On another set of cards, write the specific uses or applications of these materials (e.g., marking layout, measuring angles, leveling, etc.).
    - **Introduction**
        - Begin by explaining the purpose of the "Surveying Material Match-Up" activity.
        - Divide the students into pairs or allow them to choose their partners.
    - **Matching Game**
        - Distribute the surveying material cards randomly among the pairs or individual students.
        - Set a timer (if desired) and instruct students to match each surveying material with its correct use as quickly and accurately as possible.
        - Encourage students to discuss their choices with their partners and provide reasoning for their matches.
        - Emphasize that this is a collaborative learning opportunity.

- **Scoring**
    - After the game, gather the students and review their matches.
    - Award points for each correct match.
    - Keep a scoreboard on the whiteboard or flip chart to track scores.
    - Debrief and Discussion (5 minutes):
    - Discuss the correct matches as a group, emphasizing the importance of using the right materials for specific surveying tasks.
    - Encourage students to share any insights or challenges they encountered during the game.
- **Conclusion**
    - Summarize the key takeaways from the activity, reinforcing the importance of proper material selection in surveying.
    - Highlight the practical knowledge gained through this interactive game.
- **Expected Outcomes:** This matching game will help students reinforce their understanding of surveying materials and their applications. By participating in the activity, students will gain a clearer grasp of which materials are suitable for specific surveying tasks, contributing to their overall knowledge and readiness for future surveying projects.

Say

- Did you find this activity interesting? Let us do another activity.

Activity-2

- **Topic:** Surveying Practical Demonstrations
- **Objective:** The objective of this field visit activity is to provide students with practical demonstrations of various surveying techniques and procedures. Students will have the opportunity to observe and learn from experienced instructors as they demonstrate essential aspects of surveying in a real-world outdoor setting.
- **Location:** An outdoor location suitable for practical demonstrations, such as a field or open area.
- **Materials Needed:**
    - Surveying instruments (theodolite, leveling equipment, chains, ranging rods, arrows, measuring tape, etc.)
    - Tripods and other surveying equipment
    - Surveying tools and materials (lime, hurdles, stakes, flags, etc.)

- Safety equipment (e.g., safety vests and hard hats)
- Instructor or expert guide

- **Duration:** Approximately 2-3 hours, depending on the number of demonstrations and group size.
- **Procedure:**
  - **Introduction**
    - Gather the students at the field location and provide an overview of the day's activities.
    - Introduce the instructors who will be demonstrating various surveying techniques.
    - Emphasize the importance of paying close attention and asking questions during the demonstrations.
  - **Tool and Material Selection and Shifting**
    - Instructor demonstration: Selecting the appropriate tools and materials for a specific surveying task and shifting them to the designated location.
    - Explain the thought process behind tool and material selection and efficient shifting.
  - **Tripod Placement**
    - Instructor demonstration: Properly placing and fixing a tripod on a marked location.
    - Discuss the significance of precise tripod placement for accurate measurements.
  - **Chain Unfolding and Linear Measurements**
    - Instructor demonstration: Unfolding a surveying chain and conducting linear measurements using chains, ranging rods, and arrows.
    - Explain the standard practices for chain unfolding and measurement techniques.
    - Interpret hand signals during measurements.
  - **Angular Measurement and Leveling**
    - Instructor demonstration: Setting up surveying instruments and fixing a staff for capturing readings in angular measurement and leveling.
    - Discuss the steps involved in initial instrument setup and staff placement.
  - **Setting Out and Layout Marking (30 minutes):**
    - Instructor demonstration: The process of setting out, including marking points of layout, installing hurdles, marking grids, and connecting hurdles based on a layout or work plan.
    - Explain the importance of accurate layout marking for construction projects.
  - **Layout for Excavation**
    - Instructor demonstration: How to mark the layout for excavation using lime.

- Discuss the significance of precise excavation layout for construction or excavation projects.

- **Q&A and Discussion**
  - Conclude the demonstrations with a question-and-answer session.
  - Encourage students to ask questions and seek clarification on any aspect of the demonstrations.

- **Conclusion**
  - Summarize the key takeaways from the field visit, emphasizing the practical knowledge gained through observations and demonstrations.
  - Highlight the importance of hands-on experience in surveying.

- **Expected Outcomes:** This field visit activity will provide students with valuable practical insights into surveying techniques and procedures. By observing experienced instructors, students will gain a better understanding of tool selection, tripod placement, measurement techniques, layout marking, and excavation layout, enhancing their readiness for future surveying projects.

Do

- Summarize the key takeaways from the field visit.
- Encourage students to reflect on their experiences and share their insights.
- Discuss the challenges and lessons learned during the activity.
- Conduct a question-and-answer session to address any queries or concerns.
- Jot down the crucial points on the whiteboard as the students speak.
- Share your input and insight to encourage the students and add onto what they talk about.
- Ensure that all students participate in the class.

Notes for facilitation

- Arrange the relevant handouts and leaflets for a better understanding of the topic.
- Arrange audio-visual aids to make them understand.
- Ask the participants if they have any questions.
- Encourage every participant to answer those questions and encourage peer learning in the class.

Notes

Unit 3.3: Angular Measurement, Levelling and Setting out

Unit Objectives

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

1. Explain standard procedure for marking various points and symbols for layout, using paint.
2. Elucidate the procedure for setting out using hurdles/profiles for layout marking.
3. Explain procedures for installing hurdles and profiles for setting out.
4. Describe importance of correct setting out.
5. Elucidate the process of marking layout for excavation using lime.
6. Show the process of setting out — marking points of layout and installing hurdles, marking grids and connecting hurdles —as per layout/work plan.
7. Show how to mark the layout for excavation using lime.

Resources to be used

- Available objects such as whiteboard, duster, marker, notepad, pens, participant handbooks, computer, projector, flipcharts etc.
- PowerPoint slides, pictures/ posters depicting various information about the tools and instruments used in surveying.

Say

In this session, we shall learn about the essential procedures and techniques for precise surveying, including various measurement methods, staff usage, layout marking, and the critical process of layout for excavation using lime.

Ask

- What do you understand by the term “setting out” in the context of construction or surveying?
- Are you familiar with any methods or tools used to mark specific points and layouts accurately in construction or surveying projects?

Notes for facilitation

- Initiate the session with the participants by discussing the objectives of the module.
- Make the session interactive by asking the participants to share their expectations from the module on the blackboard/whiteboard.
- Introduce the topics to be covered and give some information about them.
- Give the participants a general idea about what will be covered in the module.

Elaborate

- Layout Marking with Paint
- Setting Out with Hurdles/Profiles
- Installing Hurdles and Profiles
- Importance of Correct Setting Out
- Layout Marking with Lime
- Setting Out: Marking Points and Installing Hurdles

Activity-1

- **Objective:** The objective of this is to reinforce students' knowledge of surveying materials and their appropriate use. In this interactive matching game, students will work individually or in pairs to match different surveying materials with their corresponding uses.
- **Materials Needed:**
    - Line dory/thread
    - Lime
    - Enamel paint (various colors)
    - Red oxide powder
    - Plumb bob
    - Nails
    - PCC or concrete surface (for demonstration)
    - Safety equipment (gloves and safety goggles)
    - Surveying tools (optional)
- **Duration:** Approximately 2-2.5 hours
- **Procedure:**
    - Introduction (Classroom Session):
        - Begin with an introduction to the importance of layout marking using lime in construction and surveying projects.
        - Explain the materials used and the significance of accurate markings.
    - Demonstration (Field Activity):
        - Conduct the following steps in a suitable outdoor area with a PCC or concrete surface:
        - Connect nails with line dory to create survey lines.

- Transfer points to the ground using a Plumb Bob and fix corner points.
- Connect survey points using the thread to create a layout framework.
- Apply lime over the thread, covering the designated area.
- Remove the thread, leaving behind the lime markings.

- **Hands-On Activity:**
  - Divide participants into small groups.
  - Provide each group with the necessary materials (line dory, lime, etc.).
  - Instruct each group to replicate the process demonstrated in the field, marking out a designated area for excavation or construction using lime.
- **Group Discussion:**
  - After the hands-on activity, gather the groups for a discussion.
  - Ask each group to share their experiences and observations.
  - Discuss the importance of accurate layout marking and how it affects construction or surveying projects.
- **Safety Guidelines:**
  - Emphasize safety guidelines and the use of safety equipment when working with lime and construction materials.
- **Conclusion (Classroom Session):**
  - Summarize the key takeaways from the activity, highlighting the role of lime in precise layout marking for excavation or construction.
  - Discuss real-world applications and the importance of following established procedures in the field.

- **Expected Outcomes:** By the end of this activity, participants will have a practical understanding of how to use lime for layout marking in construction and surveying. They will appreciate the importance of accurate markings in project planning and execution, ensuring that excavation or construction work proceeds as planned.

Do

- Summarize the key takeaways from the activity.
- Highlight the practical knowledge gained through this interactive game.
- Discuss the challenges and lessons learned during the activity.
- Conduct a question-and-answer session to address any queries or concerns.
- Jot down the crucial points on the whiteboard as the students speak.
- Share your input and insight to encourage the students and add onto what they talk about.
- Ensure that all students participate in the class.

Notes for facilitation

- Arrange the relevant handouts and leaflets for a better understanding of the topic.
- Arrange audio-visual aids to make them understand.
- Ask the participants if they have any questions.
- Encourage every participant to answer those questions and encourage peer learning in the class.

Exercise

Answer the following questions:

Key Solutions to PHB Exercise

A.

1.

i. Consider the instrument type (e.g., Theodolite, Total Station, Level, GPS Receiver).

ii. Evaluate stability, portability, and adjustability requirements.

iii. Ensure compatibility with the instrument's mounting mechanism.

iv. Opt for a tripod that balances instrument weight and provides a stable base.

2. Use of Arrows in Surveying:

i. Arrows are used to mark survey points or reference points.

ii. They enhance visibility, making it easier to spot marked points from a distance.

iii. Arrows help ensure accuracy and precision in surveying measurements.

3. Holding the Levelling Staff:

i. Hold the levelling staff vertically.

ii. Ensure it is in line with the line of sight to the surveying instrument.

iii. Maintain a steady grip to prevent tilting or swaying.

iv. Keep the staff plumb and stable during measurements.

4. Process of Marking Layout for Excavation Using Lime:

i. Spread lime powder on the ground surface.

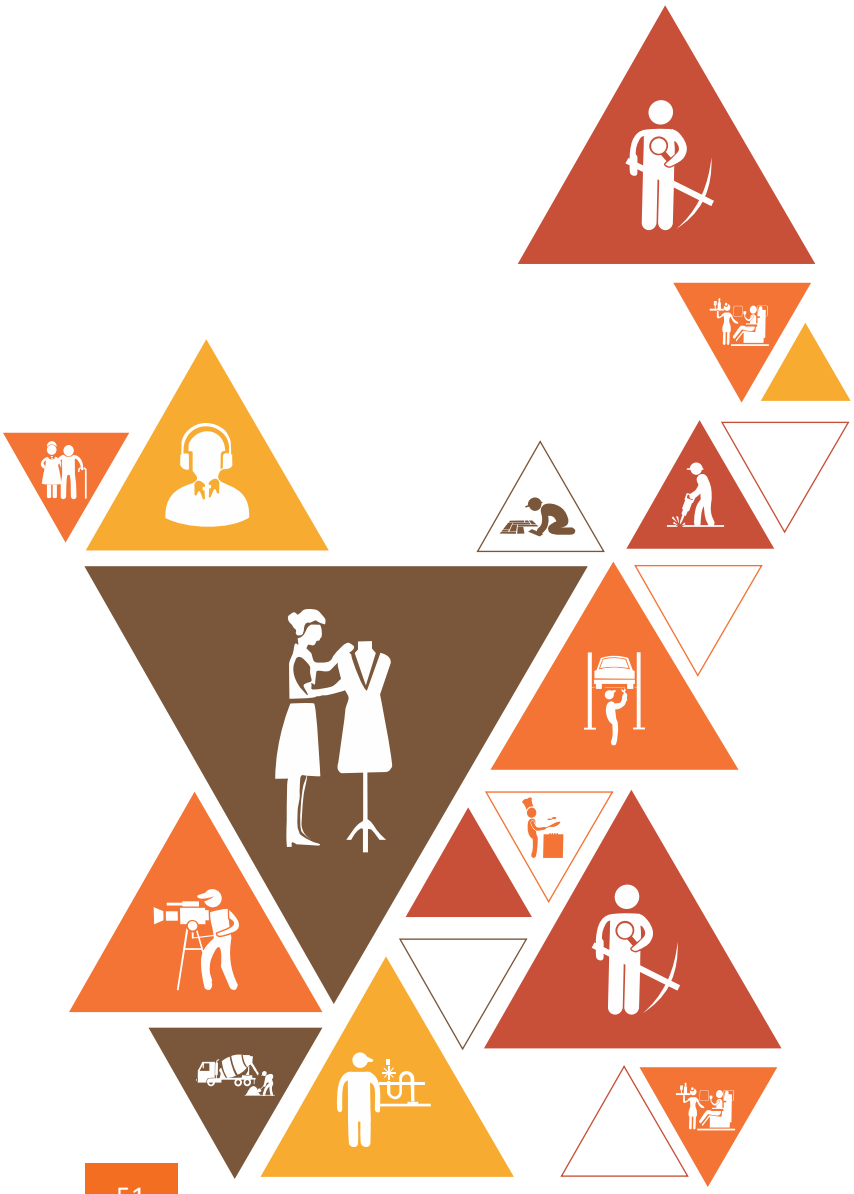
ii. Use a string or guideline to establish layout boundaries.

iii. Create straight lines and geometric shapes by following the guideline.

iv. Lime markings are temporary and can be easily altered or removed as needed for excavation planning.

Tool Description	Tool Image
Hammer	
Wooden Peg	
Wire Nails	
Tri Square	
Spirit level	
Plumb Bob	

Notes



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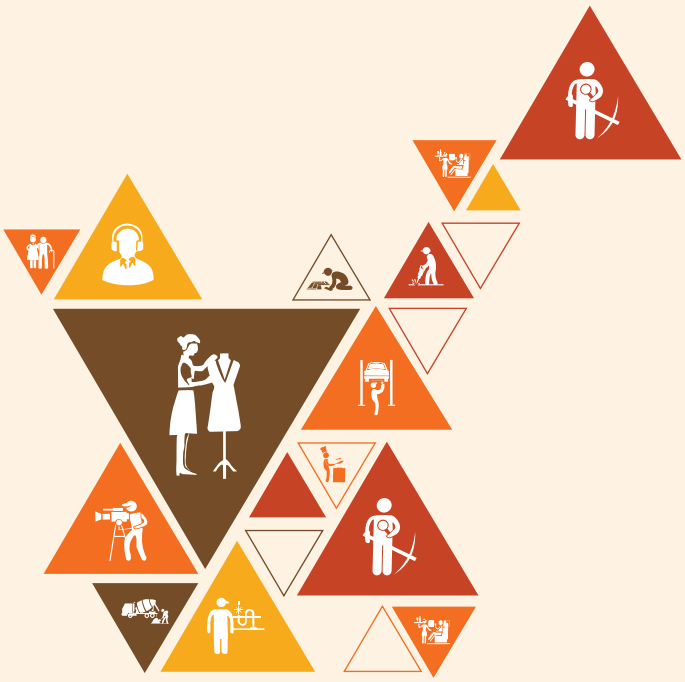
4. Teamwork and Effective Communication at Workplace

Unit 4.1 - Effective Communication and Teamwork

Unit 4.2 - Working Effectively and Maintaining Discipline at Work

Unit 4.3 - Maintaining Social Diversity at Work



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Key Learning Outcomes

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

1. Demonstrate effective communication with co-workers, superiors and sub-ordinates across different teams
2. Provide support to co-workers, superiors and sub-ordinates within the team and across interfacing teams to ensure effective execution of assigned task.
3. Demonstrate practices sensitive to disabilities (physical, mental, intellectual or sensory impairment), cultural diversity and gender neutrality.

Unit 4.1 Effective Communication and Teamwork

Unit Objectives

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

1. Explain the effects and benefits of timely actions relevant to the task at hand with examples.
2. Explain the importance of teamwork and its effects relevant to the task at hand with examples.
3. Explain the importance of proper and effective communication and its adverse effects in case of failure of proper communication.
4. Demonstrate how to pass on work-related information/requirements clearly to the team members.
5. Show how to report any unresolved problem to the supervisor immediately.

Resources to be used

- Available objects such as whiteboard, duster, marker, notepad, pens, participant handbooks, computers, projectors, flipcharts etc.
- PowerPoint slides, pictures/posters depicting effective interaction and communication at the workplace.

Say

In this session, we shall learn about the importance of the effect and benefit of timely actions, the importance of teamwork and its effects, proper and effective communication and its adverse effects, effective communication skills while interacting with various stakeholders, etc.

Demonstrate

Use a projector and show the following link- https://www.youtube.com/watch?v=sEzTXTRo9L4 to participants on how to build effective communication skills.

Ask

- What do you understand by the term “setting out” in the context of construction or surveying?
- Are you familiar with any methods or tools used to mark specific points and layouts accurately in construction or surveying projects?

Notes for facilitation

In this unit, we will discuss the following topics:

- Effective communication
- Teamwork
- Interpersonal Conflicts

Roleplay Activity

- **Purpose:** The purpose of this activity is to help students understand and practice effective communication skills.
- **Resources Required:** Whiteboard, markers, printed scenarios, timer, and notebooks.
- **Tentative Duration:** 60 minutes
- **Procedure:**

1. Introduce the importance of communication.
2. Provide communication scenarios to small 4-5 groups.

Scenario 1: Safety Briefing for New Workers

You are the site supervisor on a construction project, and several new workers have joined the team. The challenge is to conduct a safety briefing for the new workers, ensuring they understand the potential hazards on the site, safety protocols, and the proper use of personal protective equipment (PPE).

Scenario 2: Communicating Changes in the Construction Plan

During a construction project, unexpected challenges arise, leading to changes in the initial plan. As the project manager, you need to communicate these changes to the entire construction team effectively, addressing their concerns and ensuring everyone is on the same page to avoid delays and confusion.

3. Groups discuss and come up with solutions.
4. Groups perform role-plays of scenarios.
5. Provide feedback after each role-play.

Note: Trainer can introduce more similar scenarios

- **Expected outcome:** By the end of this practical activity, students are expected to achieve the following:

1. Improved understanding of effective communication.
2. Application of knowledge in real-life scenarios.

3. Ability to adapt communication style.
4. Enhanced collaboration and teamwork.
5. Increased confidence in communication skills.

Notes for facilitation

- Arrange the relevant handouts and leaflets for a better understanding of the topic.
- Arrange audio-visual aids to make them understand effective communication at the workplace- https://youtu.be/V1RQG1nB4Kg
- Ask the participants if they have any questions.

Notes

Unit 4.2 Working Effectively and Maintaining Discipline at Work

Unit Objectives

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

1. Discuss how to take initiative in resolving issues among co-workers in a given situation.
2. Discuss reporting procedure followed at the workplace.

Resources to be used

- Available objects such as whiteboard, duster, marker, notepad, pens, participant handbooks, computers, projectors, flipcharts etc.
- PowerPoint slides, pictures/posters depicting effective interaction and communication at the workplace.

Say

In this session, we shall learn about working effectively and maintaining discipline at work.

Ask

- Why is creating a healthy and cooperative work environment important within gangs of workers on a construction site?
- Why is adhering to safety standards crucial for co-workers in a construction project? What are the potential consequences of neglecting safety?

Notes for facilitation

- Initiate the session with the participants by discussing the objectives of the module.
- Make the session interactive by asking the participants to share their expectations from the module on the blackboard/whiteboard.
- Introduce the topics to be covered and give some information about them.
- Give the participants a general idea about what will be covered in the module.

Elaborate

- Importance of Healthy Work Environment
- Techniques, Materials, Tools, Safety
- Effective Communication and Impact
- Supporting Co-Workers
- Timely Handover to Interfacing Teams
- Synchronized Work Approach

Activity

- **Topic:** Co-Worker Support Relay
- **Purpose:** This activity is designed to promote teamwork and the importance of supporting co-workers facing challenges in a construction environment.
- **Resources:**
  - Cones or markers.
  - Blindfolds (optional).
  - Various construction-related objects (tools, materials, etc.).
- **Tentative Duration:** 30-45 minutes
- **Procedure:**
  - **Preparation:**
    - Set up a course area with cones or markers to create a clear path.
    - Place different construction-related objects along the path.
  - **Introduction:**
    - Briefly discuss the significance of supporting co-workers in a construction team and how it contributes to smoother operations.
  - **Divide into Teams:**
    - Divide participants into teams of equal size.
  - **Explanation of the Relay:**
    - Explain the relay race concept: Each team member will take turns being blindfolded (if using blindfolds) and guided by their teammates through the course to collect specific objects.

- **Teammate Support:**
    - One team member wears a blindfold (if using blindfolds).
    - Other team members guide the blindfolded teammate using verbal instructions.
    - The objective is to navigate the course and collect designated objects.
- **Rotating Roles:**
    - After completing the course, rotate roles within the team, so each participant gets a chance to be blindfolded and guided.
- **Debrief and Discussion:**
    - Gather participants and discuss the experience.
- **Ask questions:**
    - How did you feel while blindfolded and relying on your team's guidance?
    - How important was effective communication during the activity?
    - How does this activity relate to supporting co-workers in a construction setting?
- **Learning Points:**
    - Emphasize the value of clear communication, trust, and teamwork.
    - Discuss how supporting each other enhances efficiency and prevents errors in real work scenarios.
- **Reflect and Share:**
    - Encourage participants to share their thoughts on how they can apply the lessons learned from the activity to their daily work interactions.
- **Expected Outcome:** This activity will help participants experience the challenges of relying on their teammates' support and reinforce the importance of cooperation and effective communication. It also encourages problem-solving and teamwork, essential skills in a construction environment

Say

Did you find this activity interesting? Can you see how much information you had previously and how much information you have now?

Do

- Jot down the crucial points on the whiteboard as the students speak.
- Share your input and insight to encourage the students and add onto what they talk about.
- Ensure that all students participate in the class.

Notes for facilitation

- Arrange the relevant handouts and leaflets for a better understanding of the topic:
- Arrange audio-visual aids to make them understand
- Ask the participants if they have any questions.
- Encourage every participant to answer those questions and encourage peer learning in the class.

Notes

Unit 4.3: Maintaining Social Diversity at Work

Unit Objectives

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

1. Discuss about gender and its related concept: gender equality, gender equity (group work)
2. Discuss different types of disabilities (physical, mental, intellectual or sensory impairment).
3. Discuss the activities sensitive to the cultural diversity, disabilities and gender neutrality at the workplace.
4. Discuss the basic rules and regulations related to gender sensitivity, disabilities, and cultural diversity, with their impact on operations of a workplace.
5. Demonstrate acceptable interpersonal transactions with individuals having disabilities (physical, mental, intellectual or sensory impairment) or cultural diversity.
6. Demonstrate the process modifications required to make the workplace free from gender biases.

Resources to be used

- Available objects such as whiteboard, duster, marker, notepad, pens, participant handbooks, computers, projectors, flipcharts etc.
- PowerPoint slides, pictures/posters depicting inclusivity practices at workplace.

Say

In this session, we shall learn about concept of gender equality, disability and gender Issues and cultural diversity.

Ask

- Why is creating a healthy and cooperative work environment important within gangs of workers on a construction site?
- Why is adhering to safety standards crucial for co-workers in a construction project? What are the potential consequences of neglecting safety?
- Can you share a personal experience or example where effective teamwork and cooperation led to the successful completion of a construction task?

Notes for facilitation

- Initiate the session with the participants by discussing the objectives of the module.
- Make the session interactive by asking the participants to share their expectations from the module on the blackboard/whiteboard.
- Introduce the topics to be covered and give some information about them.
- Give the participants a general idea about what will be covered in the module.

Elaborate

- Gender Equality
- Disability and Gender Issues
- Cultural Diversity
- Gender-neutral practices
- Organizational policy

Activity

- **Topic:** Diversity Role-Play
- **Purpose:** This activity aims to enhance participants' understanding of gender equality, disability awareness, cultural diversity, and professional behavior through interactive role-play scenarios.
- **Resources:**
  - Scenario cards (prepared in advance) depicting various workplace situations.
  - Props for role-play (optional).
- **Tentative Duration:** 30-45 minutes
- **Procedure:**
  - **Preparation:**
    - Prepare scenario cards that reflect real-life workplace situations related to gender, disability, cultural diversity, and professionalism.
    - Create a diverse range of scenarios that require participants to respond to various challenges.
  - **Introduction:**
    - Start by discussing the importance of sensitivity to gender equality, disability, and

cultural diversity in the workplace.

- Briefly explain the activity and its goals.

- **Group Formation:**
  - Divide participants into small groups.
- **Scenario Role-Play:**
  - Distribute scenario cards to each group. Each scenario should involve challenges related to the topics covered in the learning objectives.
  - Instruct each group to read and discuss the scenario, assigning roles for each group member.
- **Role-Play:**
  - Groups take turns performing their role-plays based on the scenarios assigned.
  - Encourage participants to immerse themselves in their roles and respond authentically.
- **Discussion:**
  - After each role-play, open the floor for a discussion.
- **Ask questions:**
  - How did the group handle the situation?
  - What aspects of gender equality, disability awareness, or cultural diversity were addressed?
  - Were there any challenges or dilemmas faced during the role-play?
- **Alternate Responses:**
  - For each scenario, have different groups present alternative responses to showcase diverse ways of addressing the challenges.
- **Debrief and Reflection:**
  - After all role-plays are performed, facilitate a debriefing session.
  - Discuss insights gained, lessons learned, and potential improvements in handling similar situations.
- **Link to Learning Objectives:**
  - Relate the role-play scenarios to the key learning objectives, highlighting how each scenario reflects real-world challenges.

- **Expected Outcome:** This activity encourages participants to apply their knowledge of gender equality, disability awareness, cultural diversity, and professionalism in practical scenarios. It promotes empathy, critical thinking, and collaborative problem-solving while reinforcing the importance of respectful and inclusive behavior in a diverse workplace.

Say

Did you find this activity interesting? Can you see how much information you had previously and how much information you have now?

Do

- Jot down the crucial points on the whiteboard as the students speak.
- Share your input and insight to encourage the students and add onto what they talk about.
- Ensure that all students participate in the class.

Notes for facilitation

- Arrange the relevant handouts and leaflets for a better understanding of the topic:
- Arrange audio-visual aids to make them understand
- Ask the participants if they have any questions.
- Encourage every participant to answer those questions and encourage peer learning in the class.

Exercise

Answer the following questions:

Key Solutions to PHB Exercise

1. The communication process refers to the steps involved in the exchange of information, ideas, thoughts, or messages between individuals or groups. It is a dynamic process that involves a sender, a receiver, a message, and various channels to convey the information effectively.

2. Scenario: Once miscommunication arose between the client and the painting contractor regarding the choice of paint colors for each room. The client had verbally communicated their preferences, assuming the contractor understood. However, the contractor's interpretation differed, leading to the wrong colors being applied. This resulted in dissatisfaction and delays.

3. To prevent such issues in the future, clear written communication is essential. Both parties should exchange emails or messages specifying the chosen colors, finishes, and any other details. Visual aids like color swatches or digital mock-ups can also help ensure a shared understanding. Regular checkpoints during the project can address any emerging discrepancies before they escalate into problems.

4. Active listening is a critical skill at a construction site as it lays the foundation for effective communication, promotes safety, and fosters a cohesive and productive work environment. Construction projects involve numerous tasks, complex instructions, and potential hazards, making it essential for workers to actively listen and comprehend information accurately.

5.

   a. **PPE (Personal Protective Equipment):** Ensure proper use of safety goggles, respirators, gloves, and coveralls.

   b. **Ventilation:** Maintain good air circulation with open windows, doors, and exhaust fans.

   c. **Training:** Provide comprehensive training on techniques, equipment, and safety protocols.

   d. **Equipment Inspection:** Regularly check and maintain painting tools and equipment.

   e. **Fall Protection:** Use appropriate harnesses and lanyards when working at heights.

   f. **Emergency Procedures:** Establish clear protocols for emergencies and contacts.

   g. **First Aid Kits:** Keep well-equipped first aid kits on-site and train workers in basic first aid.

   h. **Safe Storage:** Properly store paints, chemicals, and flammables.

   i. **Communication:** Encourage open communication between all team members.

   j. **Work Area Organization:** Maintain clean and organized workspaces.

   k. **Risk Assessment:** Conduct thorough pre-project risk assessments.

   l. **Safety Audits:** Regularly review and improve safety measures.

m. Hygiene: Promote proper handwashing and personal hygiene.

n. Hazard Communication: Clearly label hazardous materials and provide MSDS.

o. Fire Safety: Ensure fire extinguishers are accessible and workers understand their use.

p. Personal Accountability: Foster a culture of individual responsibility for safety.

q. Disposal: Follow proper guidelines for waste materials.

r. Regulatory Compliance: Adhere to local safety regulations and guidelines.

5.

To enhance gender equity, one should:

a. Follow gender-neutral practices at all levels at work.

b. Participate together in decision-making.

c. Help in promoting women's participation in different forums.

d. Assist women in getting exposure to relevant skills and practices.

e. Assist women in capacity building by mentoring, coaching or motivating them, as appropriate.

f. Assist in the formation and operation of women support groups.

g. Assist in the implementation of women-centric programmes.

h. Combine technical training with reproductive health and nutrition for coffee farming households.

i. Assist in making a work environment that is healthy, safe, and free from discrimination.

Notes

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Construction Skill Development Council

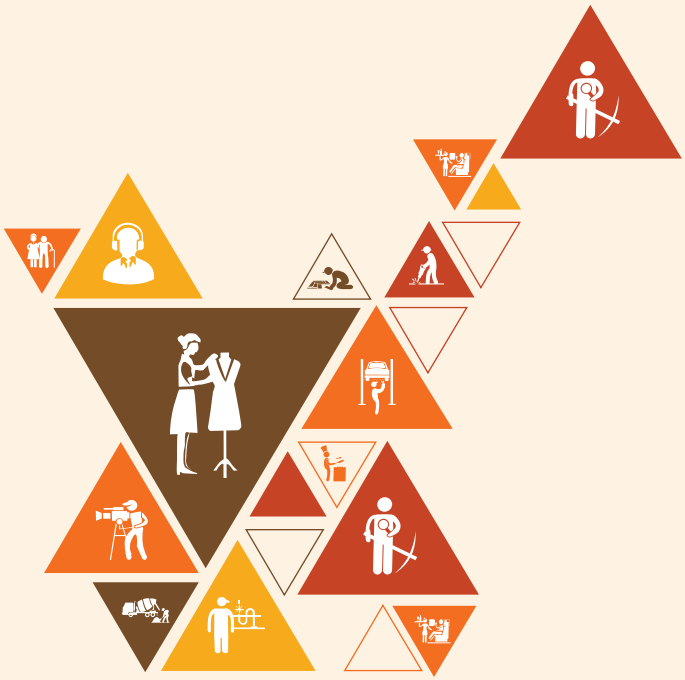
5. Work according to Personal Health, Safety and Environment Protocols at Construction Site

Unit 5.1 - Hazards and Emergency Situations

Unit 5.2 - Safety Drills, PPEs and Fire Safety

Unit 5.3 - Hygiene and Safe Waste Disposal Practices

Unit 5.4 - Infectious Disease and Its Cure



CON/N9001

Key Learning Outcomes

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

1. Identify various hazards at construction site.
2. Use PPE's relevant to surveying task.
3. Perform safe waste disposal at construction site.
4. Demonstrate the activities to check the spread of infection as per medical/ organizational guidelines.

Unit 5.1: Hazards and Emergency Situations

Unit Objectives

After the end of this unit, participants 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 situations.
3. Know the reporting procedure to the concerned authority in case of emergency situations.

Resources to be used

- Available objects such as whiteboard, duster, marker, notepad, pens, participant handbooks, computers, projectors, flipcharts etc.
- PowerPoint slides, pictures/posters depicting the types of hazards at the construction sites, use of PPEs as per work requirements during the construction painting job, etc.

Say

In this session, we shall learn about the importance of the types of hazards at the construction sites and identify the hazards, standard procedure for handling, storing and stacking of material, tools, equipment and accessories, PPEs as per work requirements during construction painting jobs, safety control measures and actions to be taken under an emergency situation, the types and benefits of basic ergonomic principles, etc.

Ask

- Does anyone know the types of hazards at the construction sites?
- Why do you think it is important to use PPEs as per work requirements during construction jobs?

Elaborate

In this unit, we will discuss the following topics:

- Workplace Safety
- Workplace Safety at Construction Site
- Workplace Hazards
- Workplace Hazard at Construction Site

- Hazard Identification and Risk Assessment (HIRA)
- Workplace Warning Signs
- Personal Protective Equipment
- Basic Ergonomic Principles
- Emergency Response Plan for Construction Site

Activity

- **Purpose:** The purpose of this practical activity is to educate students about the importance of Personal Protection Equipment (PPE) used at construction sites.
- **Resources Required:** Various PPE (e.g., hard hat, safety goggles, earplugs, dust masks, reflective vests, gloves, and safety boots), hazard posters, and safety guidelines.
- **Tentative Duration:** 60-90 minutes
- **Procedure:**
  1. Introduction: Discuss workplace safety and PPE's significance.
  2. Hazard Awareness: Identify construction site hazards.
  3. Set up stations with examples of different types of PPE.
  4. Divide the students into groups and assign each group to a station.
  5. Instruct each group to inspect the PPE, discuss its purpose, and identify the types of hazards it protects against.
  6. Allow students to try on the PPE to experience how it fits and functions.
  7. Gather the students for a recap of the key points learned during the activity.
  8. Encourage questions and facilitate a Q&A session to address any remaining doubts.
- **Expected outcome:** The participants will understand PPE's importance, recognize hazards, and know how to use various PPE correctly.

Notes for facilitation

- Arrange the relevant handouts and leaflets for a better understanding of the topics
- Arrange audio-visual aids for a better understanding of the topics.
- Ask the participants if they have any questions.
- Encourage every participant to answer those questions and encourage peer learning in the class.

Notes

Unit 5.2 Safety Drills, PPEs and Fire Safety

Unit Objectives

After the end of this unit, participants 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.

Resources to be used

- Available objects such as whiteboard, duster, marker, notepad, pens, participant handbooks, computers, projectors, flipcharts etc.
- PowerPoint slides, pictures/posters depicting the steps in safety drills, different methods involved in providing First aid to the affected person, safe waste disposal practices followed at construction site, etc.

Say

In this session, we shall learn about the importance of housekeeping works, purpose and importance of vertigo test at construction site, basic medical tests required for working at construction site, different methods involved in providing First aid to the affected person, safe waste disposal practices, etc.

Ask

- Why do you think the safe housekeeping practices are important at construction site?
- Can you tell me how should the construction waste disposed of?

Elaborate

In this unit, we will discuss the following topics:

- Safety, Health and Environment at Work Place
- Good Housekeeping
- Safety Drills at Construction Site
- Medical Examination for Construction Workers
- Vertigo Test
- First Aid
- Treating Minor Cuts and Scrapes
- Waste Management

Activity

- **Purpose: The participant will learn more about the first aid kits in this activity.**
- **Resources Required: Computer, internet.**
- **Tentative Duration: 1 Hour**
- **Process:**
  1. Divide participants into 5 groups and provide them with first aid kit essentials.
  2. Ask them to surf the internet and explain the usage of each item included in the kit.
  3. Alternatively show them a video about the usage and ask them to make notes.
  4. Also, provide them cardboard, paper, scissors, glue stick, and colour pens to make the first aid box.
- **Estimated Outcome:** The participants will have detailed knowledge about first aid kits.

Notes for facilitation

- Arrange the relevant handouts and leaflets for a better understanding of the topics
- Arrange audio-visual aids for a better understanding of the topics.
- Ask the participants if they have any questions.
- Encourage every participant to answer those questions and encourage peer learning in the class.

Notes

Unit 5.3: Hygiene and Safe Waste Disposal Practices

Unit Objectives

After the end of this unit, participants 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

Resources to be used

- Available objects such as whiteboard, duster, marker, notepad, pens, participant handbooks, computers, projectors, flipcharts etc.
- PowerPoint slides, pictures/posters related to prioritization of tasks, strategic planning, Recognition and arrangement of resources.

Say

In this session, students will learn about maintaining hygiene and sanitation, understanding housekeeping's significance, practicing safe waste disposal, and implementing effective site organization for construction safety and efficiency.

Ask

- Why do you think maintaining hygiene and sanitation is crucial on construction sites? What potential risks or challenges can arise from neglecting these practices?

Elaborate

In this unit, we will discuss the following topics:

- Hygiene and Sanitization Practices
- Importance of Housekeeping
- Safe Housekeeping Practices
- Types of Waste at Construction Sites

- Waste Disposal Methods
- Safe Waste Disposal Practices at Construction Sites

Activity

- **Topic:** Waste Sorting and Disposal Simulation
- **Purpose:** Allow students to experience and understand the importance of proper waste disposal methods at construction sites.
- **Resources Required:**
  - Variety of paint colors and types
  - Different types of brushes, rollers, and painting tools
  - Sample walls or surfaces for painting
  - Timer or stopwatch
  - Cost calculation sheets
- **Tentative Duration:** 45 minutes
- **Procedure:**
  - **Introduction**
    - Explain the importance of responsible waste disposal in construction to minimize environmental impact and ensure safety.
    - Briefly discuss different types of waste commonly found at construction sites.
  - **Waste Sorting Challenge**
    - Distribute gloves and masks to each participant.
    - Place the bins labeled with waste categories in a visible area.
    - Provide a mix of waste materials to the participants.
    - Instruct participants to sort the waste materials into the appropriate bins based on their category.
  - **Discussion and Reflection**
    - After sorting, gather the participants and discuss the challenges they faced during the activity.
    - Reflect on the significance of proper waste sorting in terms of recycling, safety, and environmental impact.

- **Waste Disposal Methods**
    - Present different waste disposal methods, such as recycling, reusing, and proper disposal, and their implications.
    - Discuss why following correct disposal methods is crucial in construction projects.
- **Application and Takeaways**
    - Ask participants to share their insights on how the activity relates to real construction site waste management.
    - Emphasize the importance of responsible waste disposal practices in their future careers.

- **Expected outcome:** Participants will gain practical experience in sorting and understanding the various types of waste at construction sites. They will also comprehend the significance of adhering to proper waste disposal methods for safety, environmental preservation, and regulatory compliance. This activity will promote awareness and responsible behavior regarding waste management in construction settings.

Notes for facilitation

- Arrange the relevant handouts and leaflets for a better understanding of the topic.
- Arrange audio-visual aids to make them understand effective communication at the workplace
- Ask the participants if they have any questions.

Notes

Unit 5.4: Infectious Disease and Its Cure

Unit Objectives

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

1. List different types of infectious diseases that can spread/ originate at a construction site
2. Discuss the ways of transmission of various infectious disease.
3. Explain the methods to check the spread of the infectious disease.
4. Describe the symptoms and cure of the various infectious disease.
5. Demonstrate the procedure to report to the concerned authority regarding the outbreak/ hazard of any infectious disease/ pandemic.

Resources to be used

- Available objects such as whiteboard, duster, marker, notepad, pens, participant handbooks, computer, projector, flipcharts etc.
- PowerPoint slides, pictures/ posters depicting various information about the tools and instruments used in surveying.

Say

In this session, we shall learn about infectious diseases in construction sites, including types, transmission, prevention, symptoms, treatments, and reporting procedures.

Ask

- Have you ever used any surveying tools or instruments before? If so, which ones?
- Do you think surveying tools have changed much with advancements in technology? How?

Notes for facilitation

- Initiate the session with the participants by discussing the objectives of the module.
- Make the session interactive by asking the participants to share their expectations from the module on the blackboard/whiteboard.
- Introduce the topics to be covered and give some information about them.
- Give the participants a general idea about what will be covered in the module.

Elaborate

- Types of Infectious Diseases
- Transmission Methods
- Disease Prevention
- Symptoms and Treatment
- Reporting Procedures

Activity

- **Topic:** Infectious Disease Prevention Simulation
- **Objective:** This interactive simulation activity is designed to engage participants in a hands-on experience that reinforces the importance of infectious disease prevention measures at construction sites.
- **Materials Needed:**
    - Mock construction site setup (can be a scaled-down model or simulated site)
    - Simulated infectious disease agent (e.g., harmless colored powder)
    - Hand sanitizers, gloves, masks, and disinfectant wipes
    - Construction safety gear (hard hats, vests, goggles)
    - Information posters on disease prevention
- **Duration:** Approximately 60-90 minutes, depending on the complexity of the simulation.
- **Procedure:**
    - **Introduction (10 minutes):**
        - Begin by explaining the purpose of the activity and its relevance to construction site safety.
        - Briefly discuss the potential risks of infectious diseases in construction.
    - **Simulation Setup (15 minutes):**
        - Set up the mock construction site with various workstations and tools.
        - Introduce the simulated infectious disease agent (e.g., colored powder) as a representation of a contagious substance.
    - **Safety Briefing (10 minutes):**
        - Provide participants with construction safety gear, including hard hats, vests, goggles, gloves, and masks.
        - Emphasize the importance of wearing and using the gear correctly.

- **Simulation (20-30 minutes):**
    - Instruct participants to perform various construction tasks while being exposed to the simulated infectious disease agent.
    - For example, participants might need to move materials, assemble structures, or conduct inspections.
    - During the simulation, introduce scenarios that demonstrate how infectious diseases can spread in a workplace.
- **Hand Hygiene and Safety Measures (10 minutes):**
    - Pause the simulation to emphasize the importance of hand hygiene and other safety measures.
    - Provide hand sanitizers, gloves, masks, and disinfectant wipes.
    - Encourage participants to clean their hands and follow safety protocols.
- **Discussion (10 minutes):**
    - After the simulation, gather participants for a group discussion.
    - Ask them to share their observations and experiences during the exercise.
    - Discuss how the simulated disease spread and how it could have been prevented.
- **Review and Information (5 minutes):**
    - Review key takeaways regarding infectious disease prevention at construction sites.
    - Display information posters with safety guidelines and reminders.
- **Conclusion (5 minutes):**
    - Summarize the main points of the activity and its relevance to real construction site scenarios.
    - Encourage participants to apply what they've learned in their work.
- **Expected Outcomes:** This interactive simulation activity will help participants grasp the importance of infectious disease prevention measures in a construction site context. It promotes hands-on learning, safety awareness, and reinforces the significance of proper hygiene and safety protocols to reduce the risk of disease transmission.

Do

- Summarize the key takeaways from the activity.
- Encourage students to reflect on their experiences and share their insights.
- Discuss the challenges and lessons learned during the activity.
- Conduct a question-and-answer session to address any queries or concerns.

- Jot down the crucial points on the whiteboard as the students speak.
- Share your input and insight to encourage the students and add onto what they talk about.
- Ensure that all students participate in the class.

Notes for facilitation

- Arrange the relevant handouts and leaflets for a better understanding of the topic.
- Arrange audio-visual aids to make them understand
- Ask the participants if they have any questions.
- Encourage every participant to answer those questions and encourage peer learning in the class.

Exercise

Answer the following questions:

Key Solutions to PHB Exercise

1.

a. Physical Hazards

b. Electrical Hazards

c. Fire and Explosion Hazards

d. Vehicle-Related Hazards

e. Chemical Hazards

f. Psychosocial Hazards

2.

a. Assess the Situation

b. Activate the Alarm

c. Call Emergency Services

d. Provide Essential Information

e. Notify On-Site Personnel

f. Follow the Construction Site's Emergency Response Plan

g. Cooperate with Authorities

h. Inform Contractors or Site Management

i. Document the Incident

j. Review and Improve Procedures

3.

The basic principles of first aid involve assessing the situation, ensuring safety, and providing timely assistance to injured or ill individuals. Employees can be trained in administering first aid through certified training programs that cover topics such as CPR, wound care, and handling medical emergencies. These training programs typically include hands-on practice, simulations, and theoretical instruction to equip employees with the skills and knowledge needed to respond effectively in emergency situations.

4.

Fire safety measures at a construction site include maintaining clear pathways, proper storage of flammable materials, and ensuring functional fire alarms. Employees should be trained in using fire extinguishers and understanding evacuation routes. In the event of a fire, swift evacuation to designated assembly points while avoiding elevators and following site-specific emergency protocols is crucial.

5.

Importance of PPE in Construction:

- Safety
- Compliance
- Productivity

Care and Maintenance of PPE:

- Regular Inspection
- Cleaning
- Storage
- Replacement
- Training

6.

Good housekeeping practices be effectively implemented at a construction site by:

i. Clearing walkways.

ii. Regular clean-ups.

iii. Proper waste disposal.

iv. Tool organization.

v. Material segregation.

vi. Accessible emergency points.

vii. Clear signage.

viii. Worker training.

ix. Supervision.

x. Continuous improvement.

7.

Safe waste disposal practices that should be followed in the construction industry are:

a. Segregate waste (hazardous, recyclable, and non-recyclable).

b. Use proper containers.

c. Store waste in designated areas.

d. Follow local regulations and obtain permits.

e. Use authorized waste disposal services for hazardous waste.

f. Maximize recycling of materials like concrete and metals.

g. Maintain disposal records.

h. Educate workers on waste handling.

i. Regularly inspect waste storage areas.

j. Establish emergency response procedures.

Notes

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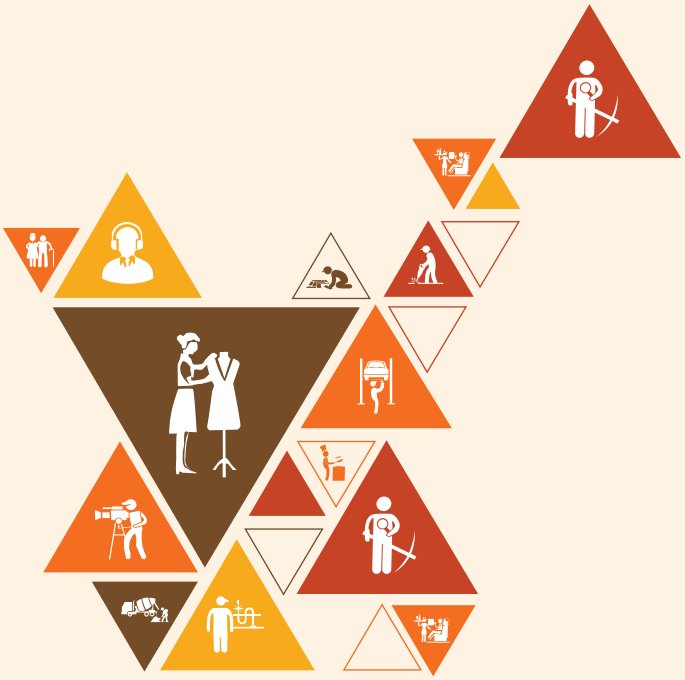
6. Employability Skills (30 Hours)

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

Scan the QR code below to access the ebook



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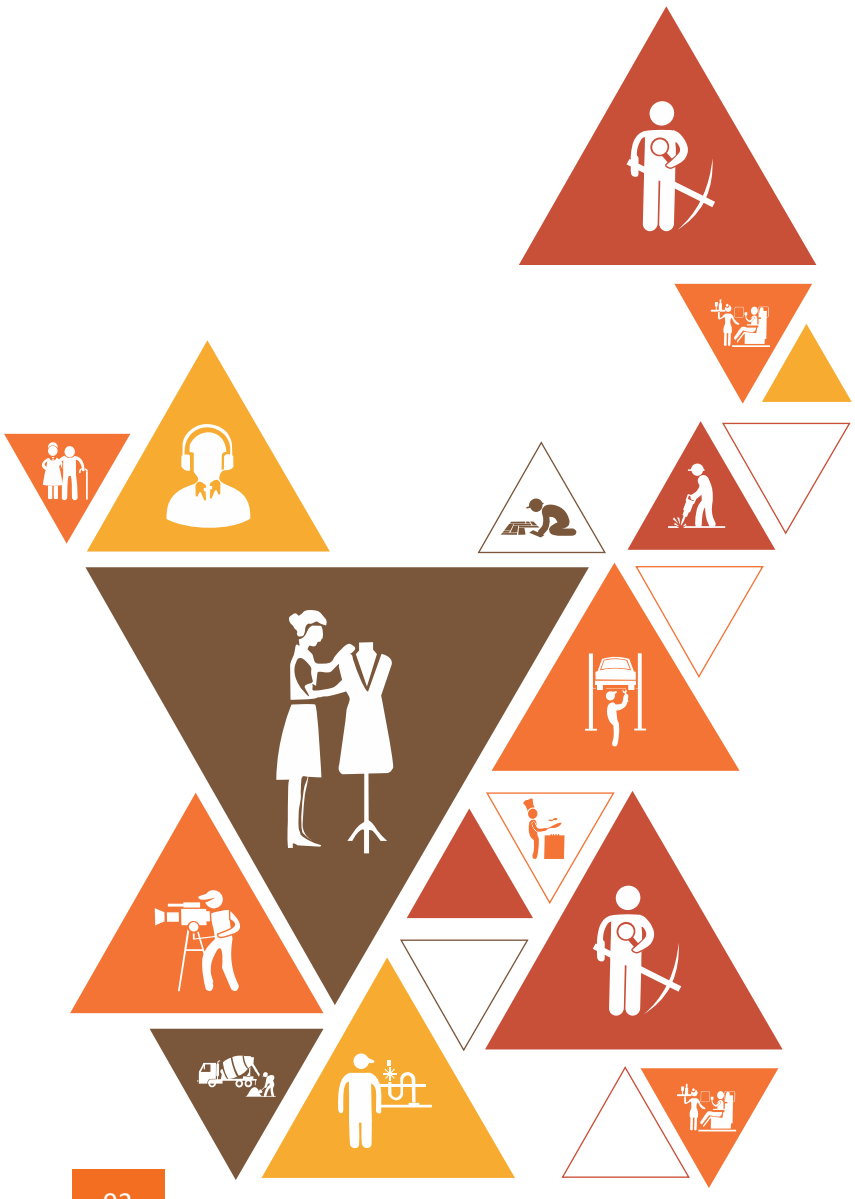

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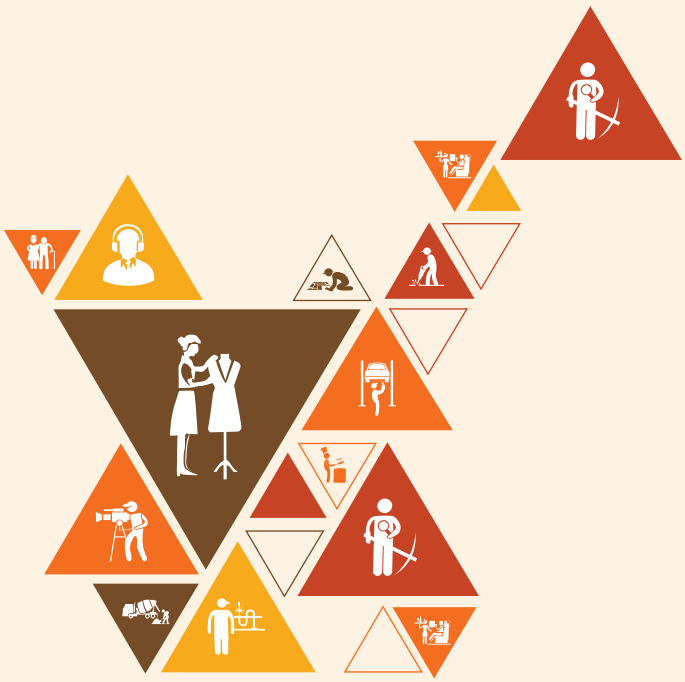
7. Annexures

Annexure I - Training Delivery Plan

Annexure II - Assessment Criteria

Annexure III - QR Codes –Video Links



Annexure I

Training Delivery Plan

Training Delivery Plan			
Program Name:	**Assistant Surveyor**		
Qualification Pack Name & Ref. ID	CON/Q0901		
Version No.	3.0	**Version Update Date**	19/06/2020
Prerequisites to Training (if any)	Minimum Educational Qualification: Ability to read and write		
Training Outcomes	**After completing this program, participants will be able to:** • After completing this program, participants will be able to: • Identify and handle various tools and instruments used in surveying. • Demonstrate handling, storing and stacking of surveying tools, instruments and materials. • Explain the standard procedures of levelling, linear and angular measurements. • Demonstrate placement and fixing of tripod. • Demonstrate initial setup and fixing of staff for angular measurement and levelling. • Demonstrate layout marking for setting out. • Demonstrate effective communication with co-workers, superiors and sub-ordinates across different teams • Provide support to co-workers, superiors and sub-ordinates within the team and across interfacing teams to ensure effective execution of assigned task. • Demonstrate practices sensitive to disabilities (physical, mental, intellectual or sensory impairment), cultural diversity and gender neutrality • Identify various hazards at construction site. • Use PPE's relevant to surveying works. • Perform safe waste disposal at construction site. • Demonstrate the activities to check the spread of infection as per medical/ organizational guidelines		

Sl. No.	Module	Session Name	Session Objectives	NOS Reference	Methodology	Training Tools/ Aids	Duration (hours)
1.	Introduction to the Job Role of a Construction Painter and Decorator T- 08:00 (HH: MM)	1. Introduction to Construction Industry	• Overview of construction industry	Bridge Module	Classroom lecture, games, group participation, group activity	Training Kit- Trainer Guide, Presentations, Whiteboard, Marker, Projector, Laptop	T- 02:00
		2. Role and Responsibilities of Assistant Surveyor	• Explain role and responsibilities of an assistant surveyor. • Explain expected personal attributes required from this job role. • Discuss future possible progression and career options for assistant surveyor.				T- 06:00
2	Handle and store tools and instruments used in surveying work as per the instructions T- 07:00 P- 75:00 (HH: MM)	1. Surveying Tools and Accessories	• Explain various tools and accessories used in chain and compass surveying.	CON/N0901 PC1, PC2, PC3, PC4, PC5, PC6, PC7, PC8, PC9, KU1, KU2, KU3, KU4, KU5, KU6, KU7	Classroom lecture, games, group participation, group activity, field visit, Expert demonstration	Training Kit- Trainer Guide, Presentations, Whiteboard, Marker, Projector, Laptop Tools and Equipment Required: Surveying tools (chains, tapes, offsets, poles, compasses, pegs, leveling staff, arrows, etc.), Display area or tables for arranging the tools, Identification cards or labels for each tool, Safety equipment Surveying	T- 01:00 P- 07:00
		2. Purpose of Linear Measurement Instruments	• Explain the purpose and area of applications of linear measurement instruments.				T- 01:00 P- 07:00
		3. Types of Level and Bearing Measuring Instruments	• Explain the various level and bearing measuring instruments such as dumpy level, auto level, tilting level, .				T- 01:00 P- 07:00
		4. Levelling Accessories and Their Use	• Explain the process and use of levelling accessories such as levelling staff, arrows, and pegs.				T- 02:00 P- 06:00
		5. Level and Angle Measuring Instruments	• List various level and angle measuring instruments like tachometer, theodolite, total station, etc.				T- 02:00 P- 06:00

		6. Standard Handling of Surveying Instruments and Materials	• Explain the standard handling of various surveying instruments and materials used in linear, angular, level, and bearing measurement.			chains and tapes, flags. Surveying equipment (level, theodolite, pegs, etc.), Surveying materials (stakes, flags, notebooks, pencils, etc.), Measuring markers or	T- 02:00 P- 06:00
		7. Classification of Surveying Instruments	• Classify various instrument types of surveying instruments such as linear, level, and bearing measurement instruments.				T- 02:00 P- 06:00
		8. Handling Chains and Tapes for Precise Reading	• Demonstrate handling of chains and tapes for precise reading.				T- 02:00 P- 06:00
		9. Handling Offsets and Surveying Equipment	• Demonstrate handling of offsets, levelling equipment, angles, angle measuring instruments				T- 02:00 P- 06:00
		10. Miscellaneous Surveying Instruments	• Demonstrate handling of miscellaneous instruments				T- 02:00 P- 06:00
		11. Storage and Stacking of Surveying Tools and Materials	• Demonstrate handling, stacking and storing different surveying materials				T- 02:00 P- 05:00

3	Provide support in various surveying works T- 30:00 P- 90:00 (HH: MM)	1. Selection of Tripods	• Explain selection of tripods based upon the instrument to be used.	CON/N0902 PC1, PC2, PC3, PC4, PC5, PC6, PC7, PC8, PC9, PC10, PC11, PC12, PC13, PC14, PC15, PC16, PC17, PC18, PC19, PC20, PC2, KU1, KU2, KU3, KU4, KU5, KU6, KU7, KU8, KU9, KU10, KU11, KU12, KU13, KU14	Classroom lecture, , group participation, group activity, field visit	Training Kit- Trainer Guide, Presentations, Whiteboard, Marker, Projector, Laptop Tools and Equipment Required: Surveying material cards (index cards or printouts), Marker or pen, Timer, Surveying instruments (theodolite, leveling equipment, chains, ranging rods, arrows, measuring tape, etc.), Tripods and other surveying equipment, Surveying tools and materials (lime, hurdles, stakes, flags, etc.), Safety equipment.	T- 02:00 P- 06:00
		2. Proper Tripod Placement	• Describe importance of placing the tripod at the exact location of marking.				T- 02:00 P- 06:00
		3. Linear and Angular Measurements	• Explain standard procedure for linear and angular measurements				T- 02:00 P- 06:00
		4. Types of Surveying Staffs	• List different types of staffs to be used for different types of instruments.				T- 02:00 P- 06:00
		5. Staff Handling Techniques	• Describe different method of holding the staff.				T- 02:00 P- 06:00
		6. Layout Marking Using Paint	• Explain standard procedure for marking various points and symbols for layout, using paint.				T- 02:00 P- 06:00
		7. Setting Out with Hurdles/ Profiles	• Explain the procedure for setting out using hurdles/profiles for layout marking.				T- 02:00 P- 06:00
		8. Installing Hurdles and Profiles for Setting Out	• Explain procedures for installing hurdles and profiles for setting out.				T- 02:00 P- 06:00
		9. Significance of Accurate Setting Out	• • Describe the importance of correct setting out.				T- 02:00 P- 06:00

		10. Layout for Excavation with Lime	• Explain the process of marking the layout for excavation using lime.				T- 02:00 P- 06:00
		11. Shifting of Surveying Tools and Materials	• Demonstrate selection and shifting of tools and materials to the instructed location.				T- 02:00 P- 06:00
		12. Tripod Placement Demonstration	• Demonstrate placing and fixing of tripod on the marked location.				T- 02:00 P- 06:00
		13. Chains Unfolding	• Demonstrate unfolding of the chain as per standard practices.				T- 02:00 P- 06:00
		14. Linear Measurements	• Demonstrate liner measurements of distances using chains, ranging rods and arrows,				T- 02:00 P- 06:00
		15.Angular Measurement and Leveling	• Demonstrate the initial setting up of instruments and fixing of the staff for capturing readings in angular measurement and leveling				T- 02:00 P- 06:00
4	Work effectively in a team to deliver desired results at the workplace T- 07:30 P- 22:30 (HH: MM)	1. Effective communication skills	• Explain the importance of proper and effective communication and its adverse effects in case of failure of proper communication.	CON/N8001 PC1, PC2, PC3, PC4, PC5, PC6, PC7, PC8, KU1, KU2, KU3, KU4, KU5, KU6, KU7, KU8, KU9	Classroom lecture, games, group participation, group activity	Training Kit- Trainer Guide, Presentations, Whiteboard, Marker, Projector, Laptop	T- 01:30 P- 05:30

		2. Team-work	• Explain the importance of teamwork and its effects relevant to the task at hand with examples. • Discuss how to take initiative in resolving issues among co-workers in a given situation.			T- 02:00 P- 05:00
		3. Working Effectively and Main-taining Discipline at Work	• Explain the effects and benefits of timely actions relevant to the task at hand with examples. • Discuss the basic rules and regulations related to gender sensitivity, disabilities, and cultural diversity, with their impact on operations of a workplace. • Discuss reporting procedure followed at the workplace.			T- 02:00 P- 06:00
		4. Inclusivity at work	• Explain the effects and benefits of timely actions relevant to the task at hand with examples. • Discuss the basic rules and regulations related to gender sensitivity, disabilities, and cultural diversity, with their impact on operations of a workplace.			T- 02:00 P- 06:00

			• Discuss reporting procedure followed at the workplace.				
5	Work according to personal health, safety and environment protocol at construction site T- 12:00 P- 24:00 (HH: MM)	1. Construction Site Hazards	• Explain the types of hazards at the construction sites Identify the hazards specific to the painting and decoration work • Recall the safety control measures and actions to be taken under emergency situation	CON/N9001 PC1, PC2, PC3, PC4, PC5, PC6, PC7, PC8, PC9, PC10, PC11, PC12, PC13, PC14 KU1, KU2, KU3, KU4, KU5, KU6, KU7, KU8, KU9, KU10, KU11, KU12, KU14	Classroom lecture, games, group participation, group activity, field visit	Training Kit- Trainer Guide, Presentations, Whiteboard, Marker, Projector, Laptop Tools and Equipment Required: Safety Helmets, Face shield, Overalls, Knee pads, Safety shoes, Safety belts, Safety harness, Safety Gloves, Safety goggles, Particle masks, Ear Plugs, Reflective jackets, Fire Extinguisher, Fire prevention kit, First Aid box, Safety tags, Safety Notice board	T- 01:30 P- 05:30
		2. Worker Safety and Health	• Explain the classes of fire and types of fire extinguishers • Demonstrate the operation of fire extinguisher. • Explain the importance of participation of workers in safety drills. • List out 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.				T- 02:00 P- 05:00

		3. Hygiene and Safe Waste Disposal Practices	• Follow the practices to maintain personal hygiene, workplace hygiene and site/ workplace sanitization • Understand the importance of housekeeping works • Keep an eye on safe housekeeping practices • Understand different types of waste at construction sites and their disposal method • Know safe waste disposal practices followed at construction site				T- 02:00 P- 06:00
		4. Infectious Diseases	• List different types of infectious disease that can spread/ originate at a construction site • Discuss the ways of transmission of the various infectious disease. • Explain the methods to check the spread of the infectious disease. • Describe the symptoms and cure of the various infectious disease.				T- 02:00 P- 06:00
6	Employ-ability Skills (30 hours)	1. Intro-duction to Employabili-ty Skills	• Describe the importance of Employability Skills • Prepare a note on different industries, trends, required skills	DGT/VSQ/ N0101		Whiteboard and Markers Chart paper and sketch pens LCD Projector, Laptop for Presenta-tion, audio	01:00

						visual aids, note pad, paper, pen, computers etc.	
		2. Constitutional values - Citizenship	• Detail the principles of the Constitution of India • Identify the various environmentally sustainable practices				01:00
		3. Becoming a Professional in the 21st Century	• Discuss relevant 21st century skills required for employment. • Practice critical thinking and decision making skill				01:00
		4. Basic English Skills	• Read English text with appropriate articulation. • Practice English words, sentences and punctuation.				02:00
		5. Communication Skills	• Explain the importance of communication at workplace. • Demonstrate effective communication strategies • Demonstrate how to communicate effectively using verbal and nonverbal communication				04:00
		6. Diversity & Inclusion	• Explain the need of diversity at workplace • Identify the various PwD policies applicable at workplace • Discuss the significance of PSH Act				01:00

		7. Financial and Legal Literacy	• Discuss various financial institution, products and services • Explain the common component of salary such as Basic, PF, Allowances (HRA, TA, DA, etc.), Tax			04:00
		8. Essential Digital Skills	• Detail the use and features of various MS Office tools, like MS Word, MS Excel, MS PowerPoint, etc. • Demonstrate how to operate digital devices • Create an email id and follow e- mail etiquette to exchange e -mails • Describe the role of digital technology in day-to- day life and the workplace			03:00
		9. Entrepre-neurship	• Describe the types of entrepreneurship and enterprises • Describe the 4Ps of Marketing- Product, Price, Place and Promotion and apply them as per requirement			07:00
		10. Custom-er Service	• Identify types of customers and how to deal with them • Identify methods to get customer feedback and how to implement them			04:00

			• Explain various tools used to collect customer feedback • Discuss the significance of maintaining hygiene and dressing appropriately				
		11. Apprenticeships and Jobs	• Practice personal grooming strategies • Illustrate the use of online platforms for job hunting • Detail the concept of Apprenticeship • Demonstrate how to enroll for Apprenticeship programs. • Draft a professional Curriculum Vitae (CV) • Role play a mock interview				02:00

Annexure - II

Assessment Guidelines and Assessment Weightage	
Job Role	**Assistant Surveyor**
Qualification Pack	CON/Q0901
Sector Skill Council	Construction Skill Development Council of India

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 theory part will be based on knowledge bank of questions created by the SSC.
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 this criterion
5	The passing percentage for each QP will be 70%. To pass the Qualification Pack, every trainee should score a minimum of 70% 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 their 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 Standards	Theory Marks	Practical Marks	Project Marks	Viva Marks	Total Marks	Weightage
CON/N0901.Handle and store tools and instruments used in surveying work as per the instructions	20	80	-	-	100	25
CON/N0506.Apply paint on metallic / structural steel fabricated assemblies	20	80	-	-	100	45
CON/N8001.Work effectively in a team to deliver desired results at the workplace	30	70	-	-	100	10
CON/N9001.Work according to personal health, safety and environment protocol at construction site	20	80	-	-	100	15
DGT/VSQ/N0101- Employability Skills (30 Hours)	20	30	-	-	50	5
Total	**210**	**520**	**-**	**-**	**750**	**100**

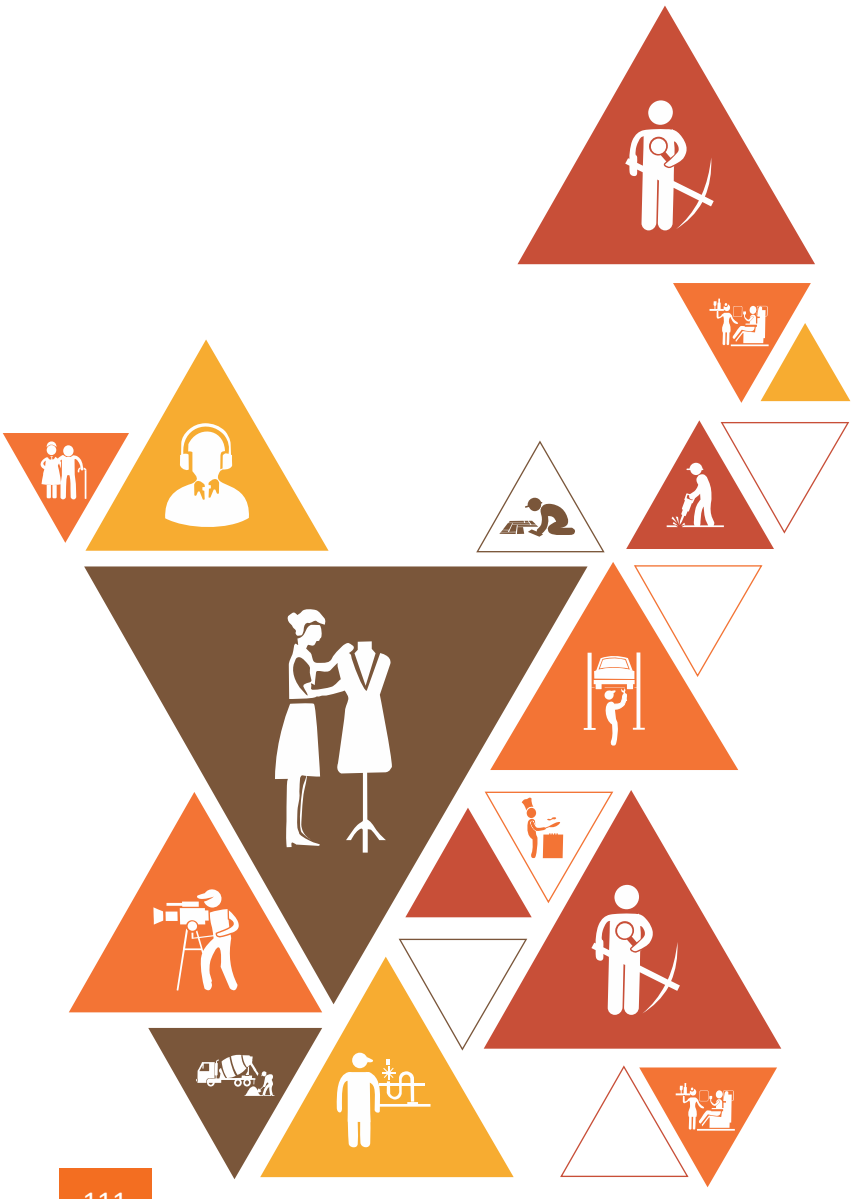
Annexure-III

Annexure of QR Codes for Assistant Surveyor

Chapter Name	Unit Name	Topic Name	URL	QR Code	Video Duration
Chapter 1: Introduction to the Job Role of an Assistant Surveyor	UNIT 1.1: Introduction to Construction Industry	Overview of Construction Sector in India	https://youtu.be/yhjDhav4Pfw	Overview of Construction Sector in India	0:13:24
	UNIT 1.2: Role and Responsibilities of an Assistant Surveyor	Assistant Surveyor Job and their responsibility	https://youtu.be/T0fjjRmZ1DE	Assistant Surveyor Job and their responsibility	0:04:27
		Career In Land Surveying	https://youtu.be/UipJH-JrBf9A	*Career In Land Surveying*	0:21:40
Chapter 2: Handle and Store Surveying Tools and Instruments (CON/N0901)	Unit 2.1: Linear Measurement Instruments	Instruments used in Chain Surveying	https://youtu.be/mcyRThsdi-Q	Instruments used in Chain Surveying	0:23:01
	Unit 2.2: Levelling and Angle Measurement Instruments	Introduction to Leveling	https://youtu.be/j8poe2vvD2Q	Introduction to Leveling	0:14:02

	Unit 2.3: Miscellaneous Survey Tools and Instruments	GPS Surveying	https://youtu.be/78VQvIKjtmU	 GPS Surveying	0:09:52
		Photogrammetry For Mapping & Surveying	https://youtu.be/6WoT5C0nveQ	 Photogrammetry For Mapping & Surveying	0:03:06
Chapter 3: Provide Support in Various Surveying Works (CON/N0902)	Unit 3.1: Preparatory Works Prior to Surveying	How to Setup a Surveying Tripod over a Point	https://youtu.be/YmRcexxCZnA	 How to Setup a Surveying Tripod over a Point	0:06:10
		Surveying Stake Out for Beginners	https://youtu.be/gxtLTIktem4	 Surveying Stake Out for Beginners	0:15:59
	Unit 3.2: Assist in Linear Measurement of Distances and Lengths	Chain Survey, Linear Measurement	https://youtu.be/09nMd_O6Ilc	 Chain Survey, Linear Measurement	0:09:37
		Measurement of Horizontal Angle by Reiteration Method	https://youtu.be/VjX46ArKq54	 Measurement of Horizontal Angle by Reiteration Method	0:01:56

	Unit 3.3: Angular Measurement, Levelling and Setting out	Lay Out A House Foundation On Site With Excavation Plan	https://youtu.be/-HDMz4miUf4	Tools used for Installation of Gypsum Ceiling	0:12:50
		Site Set Out - Understanding Profiles	https://youtu.be/5sZB-0glopR0	How to Install a Suspended Ceiling	0:04:45
		Setting Out a Building	https://youtu.be/rBmTf8wp4xo	How to Install an MF Plasterboard Ceiling	0:21:21



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