

STRUCTURAL DESIGN

UNIT CODE: CON/CU/ARC/CC/07/6/A

Relationship to Occupational Standards

This unit addresses the unit of competency: Apply principles of Structural design

Duration of Unit: 200 hours

Unit Description

This unit describes the competencies required to analyze structural principles, evaluate design materials, design structural elements and select optimal design.

Summary of Learning Outcomes

1. Analyze structural principles
2. Evaluate design materials
3. Design structural elements
4. Select optimal design

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Analyze structural principles	<ul style="list-style-type: none">• Principles of structural Analysis<ul style="list-style-type: none">• Equilibrium• Geometric stability• Strength and rigidity• Relationship between structural form and structural efficiency	<ul style="list-style-type: none">• Observation• Oral questioning• Written tests• Projects• practical Tests
2. Evaluate design materials	<ul style="list-style-type: none">• Structural materials<ul style="list-style-type: none">• Masonry• Timber• Steel• Concrete• Composite materials• Plastic• Glass	<ul style="list-style-type: none">• Observation• Oral questioning• Written tests• Practical Tests

	<ul style="list-style-type: none"> • Material testing. 	
3. Design structural elements	<ul style="list-style-type: none"> • Structural elements and their designs <ul style="list-style-type: none"> • Columns • Beams • Trusses • Plates • Shells • Arches 	<ul style="list-style-type: none"> • Observation • Oral questioning • Written tests • Projects • practical Tests
4. Select optimal design	<ul style="list-style-type: none"> • Critical appraisal of structures • Complexity and efficiency in structural design • Reading a building as a structural object • Mode of failure 	<ul style="list-style-type: none"> • Observation • Oral questioning • Written tests • Projects • practical Tests

Suggested Methods of Instruction

- Demonstration by trainer
- Practical work by trainee
- Demonstration videos
- Projects
- Group discussions
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Recommended Resources

Tools and equipment

- Excavating tools and equipment
- Profile boards
- Wheelbarrows
- Trowels
- Spirit levels
- Mason squares
- Steel floats
- Motor boards
- Plumb bob
- Steel bending and fixing tools/machines

- Concrete mixers
- Spades
- Levelling equipment

Materials and supplies

- Cement
- Water
- Sand
- Ballast
- Reinforcement bars
- Sheets
- Timber
- Steel
- Damp proofing materials
- Stones
- Bricks
- Murram
- Manufactured boards
- Glass
- Plastic
- Composite materials

Personal protective equipment (PPEs)

- Dust coat
- Overall
- Helmet
- Safety boots
- Gloves
- First aid kit
- Goggles
- Dust masks

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