PERFORM STRUCTURAL DESIGN AND ANALYSIS

UNIT CODE: CON/OS/CET/CC/03/6/A

UNIT DESCRIPTION

This Unit describes the competencies required to Perform Structural Design and Analysis. It involves analysing structural designs, designing structural elements, preparing structural drawings interpreting structural drawings and applying structural drawings.

ELEMENTS AND PERFORMANCE CRITERIA

ELEMENT This describes the key outcomes which make up workplace functions	**PERFORMANCE CRITERIA** These are **assessable statements** which specify the required level of performance for each of the elements (to be stated in passive voice) ***Bold and italicized terms are elaborated in the Range***
1. Analyse structural elements	1.1 ***Methods used in analyses*** of structural members are determined according to building codes 1.2 Loadings are worked on according to the structure 1.3 Structural members are sketched as per the drawings and support requirements 1.4 Maximum moments in each section are determined in accordance with appropriate methods 1.5 Shear force and bending moments diagram are drawn according to structural design requirements
2. Design structural elements	2.1 ***Design recourses*** are gathered according to standard design requirements 2.2 Types of structural elements are identified as per building codes 2.3 Different ***methods of designs*** are identified as per the design manuals 2.4 Different types of standard ***design codes*** are identified according to construction materials 2.5 Maximum moments used in design are determined according to standard specification manuals 2.6 Design tools and equipment are identified and gathered according to standard design manuals 2.7 Structural elements are designed as per the design codes 2.8 Schedules for different elements is prepared in accordance with designs

3. Prepare structural drawings	3.1 Drawing resources are identified and gathered according to structural elements designed. 3.2 Methods of drawing for structural members are determined as per the designs 3.3 Standard working structural drawings for various elements are prepared as per designs 3.4 Materials schedules are prepared as per design codes
4. Interpret structural drawings	4.1 Project is identified according to the contract documents 4.2 Structural drawings are identified and obtained as per design manuals 4.3 Steel schedules are obtained, and materials schedules prepared according to construction procedures
5. Apply and use structural drawings	5.1 Construction resources are identified and obtained as per the tender documents 5.2 Statutory documents are gathered as per the project requirements 5.3 Setting out activities are determined according to the approved drawings and standard construction processes 5.4 Foundation is established as per the working drawings and standard construction procedures 5.5 Structural members are prepared in accordance with the working drawings 5.6 Working drawing, steel schedules and materials schedules are developed and adhered according to standard construction processes

RANGE

Variable	Range
1 Methods used in analyses may include but not limited to:	• Determinate • Inter-determinate
2 Design resources may include but not limited to:	• Marking tools • Laptop • Desktop • Graphic software

	• LCD Projectors • Drawing board • Hard drive • Graphic tablet and stylus • Quality sketchpad • Monitor calibrator • Ergonomic chair
3 methods of designs may include but not limited to:	• Elastics • Plastic
4 Design codes may include but not limited to:	• BS 8110 • BS 6399 • CP 110 • EURO Code

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit of competency.

Required skills

The individual needs to demonstrate the following skills:

- Critical thinking
- Creativity and innovation
- Time management
- Typography
- Accuracy
- Arithmetic
- Presentation
- Problem solving
- Sketching
- Teamwork
- Assertion
- Color sense
- Flexibility
- Initiative
- Drawing
- Interpretation
- Analysis and synthesis

- Communication
- Interpersonal
- Multitasking

Required knowledge

The individual needs to demonstrate knowledge of:

- Drawing equipment and materials
- Freehand sketching
- Lettering
- Structural drawing and analyses
- Standard relevant manuals
- Geometrical constructions
- Types of drawings
- Types of lines
- Isometric drawing conventions, features, characteristics, components
- Sketches and drawings of simple patterns

EVIDENCE GUIDE

This provides advice on assessment and must be read in conjunction with the performance criteria, required knowledge and understanding and range.

1 Critical Aspects of Competency	Assessment requires evidence that the candidate: 1.1 Prepared sketches and structural drawings 1.2 Analysed structural designs 1.3 Interpreted structural drawings 1.4 Applied appropriate technical standards, used proper tools and equipment for a given task 1.5 Applied CAD packages in production of drawings 1.6 Demonstrated understanding of structural designs and analysis
2 Resource Implications	Resources the same as that of workplace are advised to be applied. 2.1 Drawing room 2.2 Drawing equipment and materials 2.3 Computers

		2.4 Computer software e.g. CAD packages 2.5 Drawing tools and equipment
3	Methods of Assessment	Competency may be assessed through: 3.1 Oral 3.2 Observation 3.3 Written
4	Context of Assessment	Competency may be assessed individually in the actual workplace or a simulated work place setting
5	Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.