

BASIC PAVEMENT STRUCTURE DESIGN

UNIT CODE: CON/CU/CET/CR/03/6/A

Relationship to Occupational Standards

This unit addresses the Unit of Competency: Design pavement structure

Duration of Unit: 120 Hours

Unit Description

This unit specifies the competencies required to design basic pavement structures. It involves conducting site visit, designing highway drainage and hydraulic structures, designing road geometrics, designing pavement structure, designing pedestrian and cyclist path and designing for road furniture.

Summary of Learning Outcomes

- 1 Conduct site visit
- 2 Design highway, drainage and hydraulic structures
- 3 Design road geometrics
- 4 Design pavement structure
- 5 Design pedestrian and cyclist paths
- 6 Design road furniture

Learning Outcomes, Content and Suggested Assessment Methods

Learning Outcome	Content	Suggested Assessment Methods
1. Conduct site visit	<ul style="list-style-type: none">• Preliminary site visit• Determining of pavement location• Preparation for site visit• Data collection methods• Tools and equipment for data collection• Collection of on-site data	<ul style="list-style-type: none">• Observation• Case studies• Oral• Third party report
2. Design highway drainage and hydraulic structures	<ul style="list-style-type: none">• Contract documents• Survey resources• Statutory requirements	<ul style="list-style-type: none">• Observation• Case studies• Oral• Third party report

	<ul style="list-style-type: none"> • Data collection tools and equipment • Data analysis • Identification of pavement location • Natural characteristics of the drainage site • Hydrology engineering • Geological survey • Establishment of longitudinal section of the river • Determination of water levels and velocity at the river • Location of highway drainage sites • Determination of highway drainage and hydraulic structures for construction • Determination of drainage size • Estimation of rainfall intensity • Types and nature of ground cover • Estimation of surface run-off • Documentation of estimated surface run-off • Hydraulic and hydrology • Soil science • Location of drainage structures • Determination of drainage span • Development of material schedules • Designing highway drainage structures • Production of construction drawings • Documentation of drawings • Standard manuals and designs 	
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	<ul style="list-style-type: none"> • Geometry • Measuring tools and equipment • Types of highway drainages • Determination of Equivalent Standard Axle (ESA), life loads and bridge dead load • Selection of bridge construction resources • Determination of material properties for construction • Designing of bridge components • Geometrics • Foundation engineering • Design manuals • Material science • Basic quantity survey • Preparation of construction drawings • Reporting and documentation • Determination of Equivalent Standard Axle (ESA), life loads and drift dead load • Properties of construction materials • Geometrics • Design manuals • Soil science • Foundation engineering • Selection of drift and/or causeways construction materials • Design of drift and causeway • Preparation of drawings • Documentation of drawings • Preparations for designing 	
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	<ul style="list-style-type: none"> • Determination of retaining wall types for construction • Selection of materials for construction • Geometrics • Determination of nature of load • Soil science • Determination of soil lateral pressure and its line of action • Soil bearing capacity • Foundation engineering • Construction designs and standard manuals • Documentation of drawings • Interpretation of construction drawings • Interpretation of Material schedules • Determination of highway drainage structure for construction • Determination and selection of construction materials • Construction material science • Construction material estimates • Principles of quantity surveying 	
<p>3. Design road geometrics</p>	<ul style="list-style-type: none"> □ Acquisition of resources • Determination of Original Ground Levels (OGL) • Determination of: <ul style="list-style-type: none"> ○ Horizontal alignments ○ Vertical alignments • Determination of road intersections • Preparation of working drawings 	<ul style="list-style-type: none"> • Written tests • Observation • Oral questioning • Third party report

	<ul style="list-style-type: none"> • Preparation and presentation of report. 	
2 Design pavement structure	<ul style="list-style-type: none"> • Introduction to pavements designs • Acquisition of design resources • Types of pavements • Designing of pavement structures • Preparation of pavement structural drawings • Development of materials schedules • Preparation and presentation of detailed report and material specifications 	<ul style="list-style-type: none"> • Written tests • Observation • Oral questions • Third party report
3 Design pedestrian and cyclist paths	<ul style="list-style-type: none"> • Identification and gathering of required resources • Estimation of pedestrian and cyclist traffic • Design manuals • Geometrics • Determination and locating of pedestrian and cyclist path • Designing of pedestrian and cyclist paths • Preparation of drawings • Preparation and presentation of detailed report and specifications 	<ul style="list-style-type: none"> • Written tests • Observation • Oral questions • Third party report
4 Design road furniture	<ul style="list-style-type: none"> • Introduction to road furniture • Gathering of required resources • Determination of road furniture • Location of road furniture • Design manuals • Geometrics • Designing of road furniture 	<ul style="list-style-type: none"> • Written tests • Observation • Oral questions • Third party report

	<ul style="list-style-type: none"> • Production of drawings • Preparation and presentation of detailed report and specifications 	
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Suggested Methods of Instruction

- Direct instruction
- Project
- Case studies
- Field trips/site visits
- Discussions
- Demonstration by trainer
- Practice by the trainee

Recommended Resources:

- Computers
- CAD & GIS Software
- Cameras
- Construction manuals
- Projectors
- Flip charts
- Calculators
- Stationery
- Charts with presentations of data
- Drawing sheets
- Internet
- Relevant videos
- Workstation

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