

13.1.0 CONSTRUCTION PLANT AND EQUIPMENT

13.1.1 Introduction

The module unit is designed to impart knowledge and understanding of the operations of construction plant as well as their importance in the construction industry. It is intended to equip the trainee with knowledge, skills, and attitudes to enable him/her select appropriate construction plant for specific construction operations that are based on plant output, quality of work, economic use of the plant and the nature of work to be done.

13.1.2 General Objectives

By the end of the module unit, the trainee should be able to:

- a) Select plant for various construction works
- b) Make use of different types of plant where several operations are required
- c) Demonstrate knowledge in the requisites for the maintenance of construction plant

13.1.3 Module Unit Summary and Time Allocation

Construction Plant and Equipment

Code	Sub Module Units	Content	Time (Hours)		
			Theory	Practice	Total
13.1.01	Construction Plant	<ul style="list-style-type: none">• Reasons for using construction plant• Classification of construction plant• Evaluation of work	2	4	6
13.1.02	Construction Equipment	<ul style="list-style-type: none">• Types of equipment• Uses of construction equipment	2	4	6
13.1.03	Excavating Plant	<ul style="list-style-type: none">• Description of excavating plant• Excavating plant operations• Safety precautions	2	4	6
13.1.04	Compacting Plant	<ul style="list-style-type: none">• Compaction plant operations• Types of compaction plants• Suitable method for	3	4	7

Code	Sub Module Units	Content	Time (Hours)		
			Theory	Practice	Total
		effective compaction • Safety precautions			
13.1.05	Concreting Plant	• Types of concreting plant • Operations of concreting plants • Safety precautions	4	8	12
13.1.06	Bitumen Laying Plant	• Bitumen laying plant • Bitumen laying plant operations	3	4	7
13.1.07	Transporting Plant	• Types of transporting plant • Operations of transporting plant	3	4	7
13.1.08	Plant Maintenance	• Type of maintenance • Maintenance aspects	3	4	7
13.1.09	Plant Management	• Importance of plant management • Plant management requirements • Plant and equipment for hire	6	2	8
Total			28	38	66

13.1.01 CONSTRUCTION PLANT

13.1.01C Competence

The trainee should have the ability to:

- i) Assess amount of work to be done and need for plant
- ii) Select a suitable plant for a specific task

Theory

13.1.01T0 Specific Objectives

By the end of the sub-module unit, the trainee should be able to:

- a) explain the need for construction plant
- b) describe various types of construction plant
- c) evaluate work to be carried out

Content

13.1.01T1 Reasons for using construction plant

- i) high output
- ii) quality work
- iii) economy
- iv) nature of work

13.1.01T2 Classification of construction plant

- i) excavating plant
- ii) compacting plant
- iii) concreting plant
- iv) bitumen laying plant
- v) transporting plant

- vi) lifting plant
- vii) piling plant and equipment
- viii) drilling plant and equipment

13.1.01T3 Evaluation of work

- i) time
- ii) quantity
- iii) quality

Practice

13.1.01P0 *Specific Objectives*

By the end of the sub-module unit, the trainee should be able to:

- a) identify different types of construction plant
- b) evaluate work to be carried out

Content

13.1.01P1 Classification of construction plant

- i) excavating plant
- ii) compacting plant
- iii) concreting plant
- iv) bitumen laying plant
- v) transporting plant
- vi) lifting plant
- vii) piling plant and equipment
- viii) drilling plant and equipment

13.1.01P2 Evaluation of work

- i) output calculations

Suggested Teaching/Learning Activities

	<ul style="list-style-type: none"> - Discussions - Site visit - Demonstrations <p><i>Suggested Teaching/Learning Resources</i></p> <ul style="list-style-type: none"> - Books - ICT equipment - Realia <p><i>Suggested Assessment Methods</i></p> <ul style="list-style-type: none"> - Oral - Written - Observation - Practical assignments 	<p><i>Content</i></p> <p>13.1.02T1 Types of equipment</p> <ul style="list-style-type: none"> i) piling equipment ii) pumps iii) percussion hammers iv) stone crusher v) concrete compacting equipment <p>13.1.02T2 Uses of construction equipment</p> <p>Practice</p> <p>13.1.02P0 <i>Specific Objectives</i> By the end of the sub-module unit, the trainee should be able to:</p> <ul style="list-style-type: none"> a) identify different types of construction equipment b) evaluate work to be carried out
13.1.02 CONSTRUCTION EQUIPMENT		
13.1.02C Competence	The trainee should have the ability to choose suitable equipment for a given task	
	Theory	
13.1.02T0	<i>Specific Objectives</i> By the end of the sub-module unit, the trainee should be able to:	
	<ul style="list-style-type: none"> a) state types of construction equipment b) explain the use of given construction equipment 	<p><i>Content</i></p> <p>13.1.02P1 types of construction equipment</p> <ul style="list-style-type: none"> i) piling equipment ii) pumping equipment iii) percussion hammers iv) stone crushers v) concrete compacting equipment <p>13.1.01P2 Evaluation of work output calculations</p>

	<i>Suggested Teaching/Learning Activities</i>		c) observe safety precautions
	- Discussion - Site visit		
	<i>Suggested Teaching/Learning Resources</i>		<i>Content</i>
	- Books - ICT facilities - Manuals - Realia	13.1.03T1	Description of excavating plant i) bulldozer ii) scrapper iii) grader iv) backactor v) dragline vi) face shovel vii) skimmer viii) tractor shovel ix) trencher x) clamshell xi) harrow
	<i>Suggested Assessment Methods</i>	13.1.03T2	Excavating plant operations
	- Oral - Written - Observation - Practical assignments	13.1.03T3	Safety precautions i) operational safety ii) safety to persons
13.1.03	EXCAVATING PLANT		Practice
13.1.03C	Competence The trainee should have the ability to select suitable plant for excavation	13.1.03P0	<i>Specific Objective</i> By the end of the sub-module unit, the trainee should be able to select suitable plant for excavation
	Theory		
13.1.03T0	<i>Specific Objectives</i> By the end of the module unit, the trainee should be able to: a) describe various excavating plant b) explain the operations of excavating plant	13.1.03P1	<i>Content</i> Selection of excavating plant <i>Suggested Teaching/Learning Activities</i> - Lecture - Discussion - Observation

Suggested Teaching/Learning Resources

- Books
- Internet
- Plant

Suggested Assessment Methods

- Oral
- Written
- Observation
- Practical assignments

13.1.04 COMPACTING PLANT

13.1.04C Competence

The trainee should have the ability to:

- i) Select suitable compaction plant for a given task
- ii) Control compaction works in field

Theory

13.1.04T0 *Specific Objectives*

By the end of the sub-module unit, the trainee should be able to:

- a) explain the operations of compaction plant
- b) describe the various compaction plant
- c) explain factors to be considered when determining suitable method for

- effective compaction
- d) observe safety precautions

Content

- 13.1.04T1 Compaction plant operations
 - i) vibration
 - ii) rolling
 - iii) ramming
- 13.1.04T2 Types compaction plants
 - i) vibrators
 - poker
 - form
 - beam
 - pan
 - tamper
 - ii) rollers
 - smooth wheeled
 - pneumatic tyred
 - vibrating
 - tamping
 - power rammer
- 13.1.04T3 Factors for effective compaction
 - i) type of plant
 - ii) number of passes
 - iii)moisture content
 - iv)type of material to be compacted
- 13.1.04T4 Safety precautions
 - i) operational safety
 - ii) safety to persons

Practice

- 13.1.04P0 *Specific Objective*
By the end of the sub-module unit, the trainee should be able

to select appropriate compaction plants

Content
13.1.04P1 Selection of appropriate compaction plants

Suggested Teaching/Learning Activities

- Discussion
- Observation

Suggested Teaching/Learning Resources

- Books
- Internet
- Plant

Suggested Assessment Methods

- Oral
- Written
- Observation
- Practical assignments

13.1.05 CONCRETING PLANT

13.1.05C Competence
The trainee should have the ability to select and use suitable construction plant for concreting works

Theory

13.1.05T0 *Specific Objectives*
By the end of the sub-module unit, the trainee should be able to:

- describe various concreting plant
- explain the operations of concreting plant
- observe safety precautions during concreting

Content

13.1.05T1 Types of concreting plant

- weigh batchers
- tilting drum
- non-tilting drum
- pan
- truck mounted
- reversing
- vibrators

13.1.05T2 Operations of concreting plant

- batching
- mixing
- vibrating

13.1.05T3 Safety precautions

- operational safety
- safety to persons

Practice

13.1.05P0 *Specific Objectives*
By the end of the sub-module unit, the trainee should be able to:

- a) estimate quantity of concrete a given plant can produce
- b) select the most economical plant to be used for a particular concreting activity

Content

- 13.1.05P1 Estimating plant output
 - i) drum capacity
 - ii) cycle time
- 13.1.05P2 Plant selection
 - i) size of work
 - ii) quality of concrete

Suggested Teaching/Learning Activities

- Lecture
- Discussion
- Observation

Suggested Teaching/Learning Resources

- Books
- ICT
- Plant

Suggested Assessment Methods

- Oral
- Written
- Observation
- Practical assignments

13.1.06 BITUMEN LAYING PLANT

13.1.06C Competence

The trainee should have the ability to:

- i) Select suitable bitumen laying plant for a given task
- ii) Control bitumen processes being carried out on a site for construction purposes

Theory

13.1.06T0

Specific Objectives

By the end of the sub-module unit, the trainee should be able to:

- a) describe various types of bitumen laying plant
- b) explain the operation of bitumen laying plant

Content

- 13.1.06T1 Describing bitumen laying plant
 - i) boiler
 - ii) bitumen mixer
 - iii) paver
 - iv) sprayer
 - hand
 - truck
 - v) roller

- 13.1.06T2 Explaining bitumen laying plant operations
- i) spreading
 - ii) spraying
 - iii) rolling

Practice

- 13.1.06P0 *Specific Objective*
By the end of the sub-module unit, the trainee should be able to select the right plant to be used for a particular task

Content

- 13.1.06P1 Plant selection
- i) size of work
 - ii) time allowed

Suggested Teaching/Learning Activities

- Discussion
- Observation

Suggested Teaching/Learning Resources

- Books
- ICT facilities
- Plant

Suggested Assessment Methods

- Oral
- Written
- Observation
- Practical assignments

13.1.07 TRANSPORTING PLANT

13.1.07C Competence

The trainee should have the ability to:

- i) Select suitable plant for a specific task
- ii) Control operations involving transportation plant

Theory

13.1.07T0 *Specific Objectives*

By the end of the sub-module unit, the trainee should be able to:

- a) describe the various types of transporting plant
- b) explain the operations of transporting plant

Content

13.1.07T1 Types of transporting plant

- i) dumpers
- ii) conveyors
- iii) wheel barrows
- iv) pumps
- v) lorries and trucks

13.1.07T2 Operations of transporting plant

- i) loading
- ii) hauling
- iii) discharge

Practice

- 13.1.07P0 *Specific Objectives*
By the end of the sub-module unit, the trainee should be able to select suitable plant for a particular task

Content

- 13.1.07P1 Selection criteria of suitable plants
- i) site conditions
 - ii) amount of material to be transported
 - iii) economy

Suggested Teaching/Learning Activities

- Discussion
- Observation
- Demonstration

Suggested Teaching/Learning Resources

- Books
- ICT facilities
- Sample plants

Suggested Assessment Methods

- Oral
- Written
- Observation
- Practical assignments

13.1.08 PLANT MAINTENANCE

13.1.08C Competence

The trainee should have the ability to schedule and perform maintenance work on construction plant

Theory

- 13.1.08T0 *Specific Objectives*
By the end of the sub-module unit, the trainee should be able to:

- a) explain the types of maintenance applied to plant
- b) describe maintenance aspects

Content

- 13.1.08T1 Types of maintenance
- i) corrective
 - ii) planned
 - iii) preventive
- 13.1.08T2 Maintenance aspects
- i) servicing
 - ii) cleaning and lubrication
 - iii) repairs
 - iv) day-to-day need of fleet of equipment
 - v) inspection
 - vi) defects in operation
 - vii) change in adjustments
 - viii) wear and tear
 - ix) cracks

- Practice**
- 13.1.08P0 *Specific Objectives*
By the end of the sub-module unit, the trainee should be able to:
- prepare maintenance schedules
 - perform maintenance on construction plant

- Content*
- 13.1.08P1 Maintenance schedules
- 13.1.08P2 Performing maintenance

Suggested Teaching/Learning Activities

- Discussion
- Observation
- Demonstration

Suggested Teaching/Learning Resources

- Books
- ICT facilities
- Plant
- Manuals

Suggested Assessment Methods

- Oral
- Written
- Observation
- Practical assignments

13.1.09 PLANT MANAGEMENT

- 13.1.09C Competence**
The trainee should have the ability to select and utilize construction plant for different types of construction projects

Theory

- 13.1.09T0 *Specific Objectives*
By the end of the sub-module unit, the trainee should be able to:

- explain the importance of plant management
- outline plant management requirements
- explain ways of acquiring plant for hire

- Content*
- 13.1.09T1 Importance of plant management
- reduce idle time
 - achieve optimum equipments utilization
 - increase production at minimum cost

- 13.1.09T2 Plant management requirements
- equipment planning

- ii) balancing
 - iii) selection of equipment
- 13.1.09T3 Plant and equipment for hire
- i) acquisition
 - ii) business control

Suggested Teaching/Learning Activities

- Lecture
- Discussion
- Observation

Suggested Teaching/Learning Resources

- Books
- Internet
- Plant

Suggested Assessment Methods

- Oral
- Written
- Observation
- Practical assignments

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