



Defence Awarding
Organisation

Qualification Handbook

DAO Level 5 Diploma in Construction
Materials Technology

QN: 603/1010/8

Introduction

About us

The Defence Awarding Organisation is an awarding organisation that understands the specific challenges facing the Armed Forces, enabling us to quality assure learning outcomes that are suited to the needs of this sector.

Customer satisfaction is the cornerstone of our organisation and is delivered through an efficient, customer-led service, providing excellent value for money.

Customer Service Charter

Our Customer Service Charter outlines the minimum level of service that Centres can expect. The Charter will be reviewed annually and revised as necessary in response to customer feedback, changes in legislation, and guidance from the qualifications Regulators.

Centre Support

The Defence Awarding Organisation works in partnership with its customers. For help or advice contact:

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The Qualification

Overall Objective for the Qualifications

This handbook relates to the following qualification:

DAO Level 5 Diploma in Construction Materials Technology

This Level 5 Diploma provides the standards that must be achieved by individuals that are working within the Armed Forces in the role of Class 1 CMT

Pre-entry Requirements

Entry requirements are detailed in the Course prospectus.

Learners who are taking this qualification should undergo an initial assessment process to confirm their suitability for this course of study.

Learners should have been selected for employment in the Military Engineer (CMT) trade and will normally have completed the Class 2 CMT course.

Unit Content and Rules of Combination

This qualification is made up of a total of 9 mandatory units and no optional units. To be awarded this qualification the candidate must achieve a total of 69 credits as shown in the table below.

Unit Number	Unit of assessment	Level	Learning hrs	TQT	Credit value
D/615/4566	Detailed planning and management tasks	5	48	90	9
K/615/4568	Geotechnical Investigation	4	84	150	15
K/615/4571	Geotechnical Drilling	3	96	218	22
T/615/4573	Geotechnical Laboratory Analysis	4	60	106	11
J/615/4576	Evaluation of materials for stabilisation	5	48	85	9
Y/615/4579	Design and specification for stabilisation and strengthening of construction materials	5	48	82	9

Y/615/4582	Design and evaluation of construction materials tasks	5	50	86	9
H/615/4584	Concrete design and quality control	5	78	117	12
K/615/4585	Geotechnical tasks (Bituminous Materials)	5	24	38	4
	TOTAL		536	972	100

Age Restriction

This qualification is available to learners aged 17 years.

Opportunities for Progression

This qualification creates an opportunity to progress to, if selected for, the Clerk of Works (C) course.

Exemption

No exemptions have been identified.

Glossary

For the purposes of this qualification the definitions below apply.

Acknowledges	Recognises as true or pertinent; admits obligation; reports receipt information based on acknowledges receipt of supplies
Advise	Consults with; gives advice to; counsels; gives information or notice to; recommends course of action (particularly applicable to staff and technical fields); advises a course of action
Analyse	Studies parts, elements, or factors of a situation or problem in detail to determine course of action, solution, or outcome
Assess	Determines the importance.
Calculate	Determines by mathematical processes, implies highly intricate processes as against computes, which implies simple arithmetical process and exact results; forecast consequences or results, as in taking risks
Carry out	Takes action on basis of
Classify	Places in categories, as personnel, position, supplies
Collate	Examines and compare critically to verify arrangement, parts, often to arrange in order; collates a summary report prepared in separate portions by several individuals
Communicate	Gets in touch with others through letters, messages or orally
Compare	Examines for likeness or differences; compares performance against established standards, action taken as against regulations

Conduct	Supervises and personally performs work necessary to accomplish the results desired
Define	Determines or sets down the boundaries of, sets down or show the precise outlines of; determines and states the limits and nature of; describes exactly; gives the distinguishing characteristics of; states or explains the meaning of
Describe	Tells or writes about; gives a detailed account of; describes symptoms of a problem
Design	Plans, sketches a pattern or outline for; contrives; designs cards and report forms
Determine	Sets bounds or limits to, comes to a decision concerning, obtains definite and first-hand knowledge
Explain	Makes something clear or intelligible; interprets to assure understanding
Evaluate	Determines value or worth or, appraises, evaluates inspection forms, work orders, and discrepancy reports
Identify	Establishes the identity of, distinguishes or discriminates
Incorporate	Unites with, or introduces into, something already existing; blends, assimilates; combines into a structure or organisation; embodies, includes
Inspects	Looks at carefully, examines critically; examines or reviews officially; examine to test against established standards, usually a physical comparison or measurement.
Interpret	Make out or bring out the meaning of:
List	Make a list of; enter in a list
Manufacture	Makes by hand, machinery, or other agency; works into suitable forms for use; fabricate, manufactures a product
Operate	Puts into or continues in operation or activity; manages, conducts, carries out or through; drives, as to operate a vehicle; operates a radio
Perform	Carries out or executes some action; accomplishes, achieves, effects
Plans	Represents as by a diagram; devises or projects as a method or course of action; prearranges the details of, as to plan a campaign; intends, proposes to do; plans an assignment
Prepare	Make ready or get ready for
Produce	Bring forward for consideration or inspecting etc.; bring into existence; cause or bring about; extend or continue
Quote	Cite or appeal to; in confirmation of some view; repeat or copy out a passage from; state price of
Record	Writes, enters, registers for purpose of evidence or reproduction, records data in a record book
Selects	Takes by preference from among others; picks out or from.
Sets up	Brings into operation or use; institutes, establishes, arranges; puts together; erects
State	Say or express, fully or clearly, in speech or writing
Supervise	Gives directs orders and instructions followed up by personal observation of activities of subordinates.

Qualification Units

URN:	D/615/4566	
Title:	Detailed planning and management tasks	
Level:	5	
Credit value:	9	
GLH	48	
TQT	90	
Learning outcomes	Assessment criteria	
The learner will:	The learner can:	
1. State the Task Manager's responsibilities regarding safety regulations	1.1 State the Health and Safety regulations applicable to a trade task	
2 Utilise in-service planning software	2.1 Use planning software 2.2 Explain how to use printing commands within in-service software 2.3 Explain how to communicate reports 2.4 Carry out a project planning exercise utilising in-service planning software	
3 Plan Ground Investigations	3.1 Assess Ground investigation task 3.2 Analyse and interpret Ground investigation required 3.3 Select equipment for task 3.4 Select appropriate equipment types and quantities 3.5 Produce ground investigation health and safety orders 3.6 Determine the procedure for the promulgation of health and safety orders 3.7 List the range of activities involved in ground investigation 3.8 Analyse and interpret scope of works and directive 3.9 List the details required in a works programme	

	<p>3.10 Produce a ground investigation works programme in an appropriate format</p> <p>3.11 Produce site investigation administrative orders in accordance with organisational standards</p> <p>3.12 Carry out a desktop study</p> <p>3.13 Analyse data researched</p> <p>3.14 Determine the sources of information for desk top studies</p> <p>3.15 Extract relevant information from desk studies</p> <p>3.16 Analyse and interpret information researched</p> <p>3.17 Incorporate information extracted from a desktop study into a detailed reconnaissance brief</p>	
4 Produce scale site profiles	<p>4.1 Use in-service surveyors level</p> <p>4.2 Analyse and interpret ground level</p> <p>4.3 Explain surveying terms</p> <p>4.4 Draw scale site profiles by hand</p> <p>4.5 Analyse and interpret site drawings</p> <p>4.6 Draw scale profiles using in-service computer software</p> <p>4.7 Produce ground investigations profiles using in-service IT equipment and specialist software</p> <p>4.8 Locate points using in-service global positioning system equipment</p>	
5 Apply mathematical knowledge to complete design work	<p>5.1 Explain mathematical terms, techniques and effects</p> <p>5.2 Use in service spreadsheet software</p> <p>5.3 Use in service word processing software</p> <p>5.4 Perform calculations using SI units and physical quantities</p> <p>5.5 Perform calculations using algebraic techniques</p> <p>5.6 Perform calculations to determine forces at a point</p> <p>5.7 Perform calculations to determine areas and volumes for regular and composite shapes</p> <p>5.8 Perform calculations using</p>	

	<p>moments and simply supported beams</p> <p>5.9 Perform calculations using Creation of form, including Formulae and graphing functionality</p> <p>5.10 Perform calculations using transposition and evaluation of formulae</p> <p>5.11 Perform calculations using shear force and bending moment diagrams</p> <p>5.12 Perform calculations using indices, standard form and logarithms</p> <p>5.13 Perform calculations using mechanical properties of materials</p> <p>5.14 Perform calculations using graphs, linear and non-linear</p> <p>5.15 Perform calculations using statistical methods</p> <p>5.16 Perform calculations to determine the effects of forces on materials</p>	
6 Produce ground investigation reports	<p>6.1 Use trade software to produce profiles from data</p> <p>6.2 Draw sub-surface rock data diagrams</p> <p>6.3 Determine the format to be used for ground investigation profiles</p> <p>6.4 Analyse computerised seismic and resistivity data</p>	
7 Plan Quality Control Programmes	<p>7.1 Produce a quality control plan for earthworks</p> <p>7.2 Produce a compliance testing plan for completed structural layers.</p> <p>7.3 Analyse and interpret works required for structural layers</p> <p>7.4 Produce a compliance testing plan based on limited equipment availability</p> <p>7.5 Analyse and interpret equipment availability</p> <p>7.6 Produce a compliance testing plan for processed materials</p> <p>7.7 Analyse and interpret testing required</p> <p>7.8 Produce a compliance testing plan based on expected</p>	

	<p>chronology of work</p> <p>7.9 Analyse and interpret testing required</p>	
8 Communicate findings	<p>8.1 Interpret data</p> <p>8.2 Collate data and communicate observations, recommendations and conclusions by written report</p> <p>8.3 Collate data and communicate observations, recommendations and conclusions by verbal presentation</p>	
9 Work safely when carrying out detailed planning and supervisory tasks	<p>9.1 Comply with applicable Health and Safety regulations</p> <p>9.2 Carry out relevant risk assessments</p> <p>9.3 Complete relevant COSHH Assessments</p> <p>9.4 Supervise others ensuring safe working practice</p>	
Additional information about the unit		
Unit aim(s)	Upon completion of this unit learners will be able to plan detailed and supervisory tasks safely to the relevant national and international standards. Interpreting and communicating findings to a varied audience.	
Unit expiry date	2 Years	
Details of the relationship between the unit and relevant national occupational standards (if appropriate)	<p>This units has some synergy with the following NOS</p> <p>COSBEDMO21 Manage health and safety risks in built environment design development</p> <p>COSBEDMO11 Specify, manage and analyse tests in built environment design management</p> <p>COSVR709 Control work against agreed quality standards</p> <p>SEMLATA4-06 Write scientific or technical reports for workplace activities</p>	
Details of the relationship between the unit and other standards or curricula (if appropriate)	This unit maps to the Military Engineer (Construction Materials Technician) 2-1 Course	
Assessment requirements specified by a sector or regulatory body (if appropriate)	This unit requires the assessment of occupational competence under realistic conditions wherever practicable. For the knowledge and understanding component of the unit, assessment from a learning and development environment is allowed.	
Location of the unit	Building and Construction	

within the subject/sector classification system	
Name of the organisation submitting the unit	Defence Awarding Organisation
Availability for use	Restricted

URN:	K/615/4568	
Title:	Geotechnical Investigation	
Level:	4	
Credit value:	15	
GLH	84	
TQT	150	
Learning outcomes	Assessment criteria	
The learner will:	The learner can:	
1. Assess ground for traffic ability	<ul style="list-style-type: none"> 1.1 Assess ground using the hand held cone penetrometer 1.2 Assess and interpret hand held cone penetrometer results 1.3 Use Terrain Analysis (TA) maps 1.4 Analyse information in terrain analysis maps 1.5 Define the term terrain analysis 1.6 Visually assess a route 1.7 Produce a terrain analysis report in the specified format 1.8 Analyse and interpret route trafficability 	
2 Assess ground for ease of digging	<ul style="list-style-type: none"> 2.1 List the methods of digging 2.2 Determine the factors affecting diggability 2.3 Analyse and interpret data from desk top study and site walkover 2.4 State the relationship between digging methods and the factors affecting diggability 2.5 Assess ground for ease of digging 2.6 Analyse and interpret ground condition 	
3 Assess a location for ground stability	<ul style="list-style-type: none"> 3.1 Determine the possible uses for a site 3.2 Analyse and interpret potential site use 	

	<p>3.3 List the factors affecting ground stability</p> <p>3.4 Determine the relationship between the possible use of a site and the factors affecting ground stability</p> <p>3.5 Assess a location for ground stability</p> <p>3.6 Analyse and interpret ground stability</p>	
4 Carry out field permeability of soil tests	<p>4.1 Explain the reasons for field permeability</p> <p>4.2 Operate and assemble the in-service field permeameter</p> <p>4.3 Analyse and interpret permeability test results</p> <p>4.4 Determine appropriate test frequency from given ground conditions and task directive</p> <p>4.5 Set up field permeameter</p> <p>4.6 Carry out permeameter testing</p> <p>4.7 Analyse and interpret permeameter test results</p> <p>4.8 Record and interpret test results</p>	
5 Carry out permeability testing using borehole soak methods	<p>5.1 Explain the reasons for borehole soak permeability</p> <p>5.2 Determine the appropriate test frequency from given ground conditions and task directive</p> <p>5.3 Analyse and interpret ground conditions for testing</p> <p>5.4 Set up and carry out permeability testing</p> <p>5.5 Analyse and interpret permeability test results</p> <p>5.6 Record and interpret test results</p>	
6 Use topographic agronomical and specialist maps	<p>6.1 List the types of mapping available</p> <p>6.2 List the sources of available mapping</p> <p>6.3 Interpret local features from specialist maps</p> <p>6.4 Record and interpret information within specialist maps</p>	

	<p>6.5 Determine how to assess trafficability</p> <p>6.6 State how to assess ease of digging</p>	
<p>7 Convert geological and agricultural soil descriptions to engineer classification</p>	<p>7.1 Use geological, agricultural and engineering soils classifications</p> <p>7.2 Explain the relationship between engineering geology and construction materials technology</p> <p>7.3 Visually inspect ground features in relation to their mapping representation</p> <p>7.4 Analyse and interpret ground features in relation to their mapping representation</p>	
<p>8 Carry out descriptive classification</p>	<p>8.1 Descriptively classify rock mass characteristics by observation of rock formations</p> <p>8.2 Interpret and record rock mass characteristics</p> <p>8.3 Explain the application of descriptive classification</p> <p>8.4 Define descriptive terminology in relationship to engineering technology</p> <p>8.5 List and define the descriptive terms used</p> <p>8.6 Descriptively classify rock mass characteristics from rock formation observations</p> <p>8.7 Interpret and record rock mass characteristics from rock formations</p> <p>8.8 Record mass classification</p> <p>8.9 Interpret and record mass classification</p> <p>8.10 Descriptively classify rock mass characteristics by interpretation of rock core samples and seismic data</p> <p>8.11 Interpret and record rock mass characteristics</p> <p>8.12 List the information offered by core samples and seismic data</p> <p>8.13 Inspect core samples</p>	

	<p>8.14 Record and analyse core samples</p> <p>8.15 Record and analyse comparisons made</p> <p>8.16 Classify the rock mass characteristics</p> <p>8.17 Interpret and classify rock mass characteristics</p> <p>8.18 Record all classification results</p> <p>8.19 Interpret and record rock classification results</p>	
9 Carry out rock mechanics test	<p>9.1 Determine the suitability of rock cores</p> <p>9.2 Analyse and interpret rock core samples</p> <p>9.3 Explain the reasons for rebound hammer testing</p> <p>9.4 Operate and assemble test equipment</p> <p>9.5 Prepare rock test sample</p> <p>9.6 Conduct rock rebound hammer tests</p> <p>9.7 Analyse and interpret rock rebound tests</p> <p>9.8 Accurately calculate and record test results</p> <p>9.9 Correctly dispose of and/or archive test samples</p> <p>9.10 Explain the reasons for point load testing</p> <p>9.11 Identify and assemble test equipment</p> <p>9.12 Prepare test sample</p> <p>9.13 Analyse and interpret test samples</p> <p>9.14 Carry out point load testing</p> <p>9.15 Analyse and interpret point load tests</p> <p>9.16 Accurately calculate and record test results</p> <p>9.17 Correctly dispose of and/or archive test samples</p>	
10 Install in-situ piezometers	<p>10.1 State the Capabilities of in-situ testing geotechnical monitoring equipment.</p> <p>10.2 State the methods of installation of piezometers</p> <p>10.3 Determine an appropriate method of</p>	

	<p>installation</p> <p>10.4 Install an in-service piezometer</p> <p>10.5 Read and record the piezometer</p> <p>10.6 Analyse and interpret piezometer results</p> <p>10.7 Interpret piezometer results</p>	
11 Install in-situ Inclometers	<p>11.1 State the methods of installing in-situ inclinometers</p> <p>11.2 Explain how to read and record the inclinometer outputs</p> <p>11.3 Interpret inclinometer results</p> <p>11.4 Analyse and interpret test results</p>	
12 Communicate findings	<p>12.1 Interpret ground and site investigation data</p> <p>12.2 Collate data and communicate observations, recommendations and conclusions by written report</p> <p>12.3 Collate data and communicate observations, recommendations and conclusions by verbal presentation</p>	
13 Work safely when carrying out site investigation	<p>13.1 Comply with applicable Health and Safety regulations</p> <p>13.2 Carry out relevant risk assessments</p> <p>13.3 Complete relevant COSHH Assessments</p> <p>13.4 Supervise others ensuring safe working practice</p>	
Additional information about the unit		
Unit aim(s)	Upon completion of this unit learners will be able to carry out ground and site investigation tasks safely to the relevant national and international standards. Interpreting and communicating findings to a varied audience.	
Unit expiry date	2 Years	
Details of the relationship between the unit and relevant	This unit has some synergy with the following NOS	

national occupational standards (if appropriate)	<p>COSVR641 Conform to general workplace health, safety and welfare</p> <p>COSBEDMO21 Manage health and safety risks in built environment design development</p> <p>SEMLABS4_12 Applying basic statistics to the laboratory measurement process</p> <p>PROSMD23 Test and report on physical and geotechnical characteristics</p> <p>SEMLATA4-06 Write scientific or technical reports for workplace activities</p>
Details of the relationship between the unit and other standards or curricula (if appropriate)	This unit maps to the Military Engineer (Construction Materials Technician) 2-1 Course
Assessment requirements specified by a sector or regulatory body (if appropriate)	This unit requires the assessment of occupational competence under realistic conditions wherever practicable. For the knowledge and understanding component of the unit, assessment from a learning and development environment is allowed.
Location of the unit within the subject/sector classification system	Building and Construction
Name of the organisation submitting the unit	Defence Awarding Organisation
Availability for use	Restricted

URN:	K/615/4571
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Title:	Geotechnical Drilling	
Level:	3	
Credit value:	22	
GLH	96	
TQT	218	
Learning outcomes	Assessment criteria	
The learner will:	The learner can:	
1. Drill boreholes by machine	<ul style="list-style-type: none"> 1.1 Comply with the health and safety regulations 1.2 State the specific regulations and factors affecting the transportation of drilling equipment 1.3 Operate and state the capabilities of in-service rock coring equipment 1.4 Lay out a rock drilling site 1.5 Set up machine 1.6 Core rock using in-service equipment 1.7 Analyse and interpret strata from cores taken 1.8 Maintain a driller's log 1.9 Analyse and interpret information in a driller's log 1.10 Reinststate the site 1.11 Carry out rock coring operations 1.12 Analyse and interpret strata from cores taken 1.13 State the capabilities of in-service rotary auguring equipment 1.14 Unload, position and prepare the auger for drilling 1.15 Drill a borehole using the in-service auger 1.16 Record and analyse strata logged from borehole logs 1.17 Use written report and verbal presentation to communicate observations, recommendations and conclusions based on borehole log data 	

	<ul style="list-style-type: none"> 1.18 Mark and protect the borehole 1.19 Recover, clean and maintain auger 1.20 Load the auger for transportation 1.21 List specific health and safety hazards posed by rotary auguring 1.22 Carry out machine powered rotary auguring 1.23 Analyse and interpret strata encountered 1.24 Explain the procedures involved in setting out of drilling/trial pit 1.25 List the information required for setting out the survey 1.26 List the equipment required to set out the survey 	
<p>2 Carry out machine borehole sampling</p>	<ul style="list-style-type: none"> 2.1 State the hazards 2.2 State the safety regulations relevant to boreholing 2.3 Carry out sampling methods from boreholing 2.4 Analyse and interpret strata from samples taken 2.5 Explain the sampling techniques appropriate for stated material types 2.6 Analyse and interpret techniques used for samples taken 2.7 Operate and assemble in-service borehole equipment 2.8 Record and interpret boreholing required to relevant equipment 2.9 Determine the sample requirements for a task 2.10 Explain the methods/techniques of borehole sampling 2.11 Take undisturbed samples from U100 sampling tubes 2.12 Analyse and interpret strata from samples taken 2.13 Wax seal, mark and label an undisturbed sample 2.14 Analyse and interpret undisturbed samples taken 2.15 Take a disturbed sample 	

	<p>2.16 Analyse disturbed samples taken</p> <p>2.17 Complete Borehole log</p> <p>2.18 Analyse and interpret borehole log</p> <p>2.19 Take samples from machine made boreholes</p> <p>2.20 Analyse and interpret samples taken.</p> <p>2.21 Take rock core samples using 75mm core barrels</p> <p>2.22 Analyse core samples taken</p> <p>2.23 Take rock core samples using diamond drilling kit core barrels</p> <p>2.24 Take core samples</p> <p>2.25 Analyse core samples taken</p> <p>2.26 Complete sample log book</p>	
3 Maintain ground investigation equipment	<p>3.1 Carry out equipment checks</p> <p>3.2 Report equipment usage data.</p> <p>3.3 Pack and store equipment in accordance with manufacturer's instructions</p> <p>3.4 Complete user documentation</p>	
4 Complete the Equipment documentation	<p>4.1 Explain the purpose of the equipment documentation</p> <p>4.2 Explain the documentation process</p> <p>4.3 Explain the actions to be taken on completion of the documentation</p>	
5 Carry out the Standard Penetration Test (SPT)	<p>5.1 Operate and assemble the parts and ancillaries of the in-service equipment</p> <p>5.2 State the capabilities of the in-service equipment</p> <p>5.3 Carry out operator checks</p> <p>5.4 Carry out user maintenance</p> <p>5.5 Operate the equipment</p> <p>5.6 Record test results</p> <p>5.7 Recover equipment</p>	
6 Carry out Hire Plant ordering process	<p>6.1 Explain the principles of the vehicle capability</p> <p>6.2 Carry out the raising and confirming demands</p> <p>6.3 Explain the delivery and collection of equipment</p>	
7 Communicate findings	<p>7.1 Interpret drilling data</p> <p>7.2 Collate data and communicate</p>	

	<p>observations, recommendations and conclusions by written report</p> <p>7.3 Collate data and communicate observations, recommendations and conclusions by verbal presentation</p>	
8 Work safely when carrying out borehole drilling	<p>8.1 Comply with applicable Health and Safety regulations</p> <p>8.2 Carry out relevant risk assessments</p> <p>8.3 Complete relevant COSHH Assessments</p> <p>8.4 Supervise others ensuring safe working practice</p>	
Additional information about the unit		
Unit aim(s)	Upon completion of this unit learners will be able to carry out borehole drilling safely to the relevant national and international standards. Interpreting and communicating findings to a varied audience.	
Unit expiry date	2 Years	
Details of the relationship between the unit and relevant national occupational standards (if appropriate)	<p>This unit has some synergy with the following NOS</p> <p>COSVR641 Conform to general workplace health, safety and welfare</p> <p>PRODO04 Set up protection and safety equipment for the drilling area</p> <p>PROSMD23 Test and report on physical and geotechnical characteristics</p> <p>PROMG20 Operate and control drilling-related powered plant and machinery</p> <p>PROMG21 Drill holes to drilling specification</p> <p>PRODOD15 Reinststate the drilling area of operations and complete works</p>	
Details of the relationship between the unit and other standards or curricula (if appropriate)	This unit maps to the Military Engineer (Construction Materials Technician) 2-1 Course	
Assessment requirements specified by a sector or regulatory body (if appropriate)	This unit requires the assessment of occupational competence under realistic conditions wherever practicable. For the knowledge and understanding component of the unit, assessment from a learning and development environment is allowed.	
Location of the unit within the subject/sector classification system	Building and Construction	

Name of the organisation submitting the unit	Defence Awarding Organisation
Availability for use	Restricted

URN:	T/615/4573
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Title:	Geotechnical Laboratory Analysis	
Level:	4	
Credit value:	11	
GLH	60	
TQT	106	
Learning outcomes	Assessment criteria	
The learner will:	The learner can:	
1. Carry out the techniques/ procedures for chemical testing	1.1 Explain the procedures for environmental protection and the disposal of chemicals 1.2 Determine the personal protection requirements when handling chemicals 1.3 Determine the effect of salts in aggregates 1.4 State the acceptable limits of salt content 1.5 Explain the importance of aggregate pH value 1.6 Determine aggregate chemical properties 1.7 List the testing processes which can affect a sample 1.8 List the testing processes which can chemically affect the sample 1.9 List the materials most prone to chemical change 1.10 Determine the results of chemical changes in the characteristics of a material 1.11 Recognise soils and materials prone to chemical change	
2 Carry out chemical tests on soils	2.1 State the reasons for sulphate testing 2.2 Conduct test procedure for sulphates 2.3 Analyse and interpret Sulphates test results 2.4 State the reasons for chloride testing 2.5 Carry out test procedures for chlorides 2.6 Analyse and interpret chlorides	

	<p>test results</p> <p>2.7 Carry out test procedure for organics</p> <p>2.8 Analyse and interpret organics test results</p> <p>2.9 Calculate and record test results</p> <p>2.10 Dispose and/or archive test specimens</p>	
3 Carry out geotechnical laboratory testing	<p>3.1 Carry out Cohesion testing</p> <p>3.2 Analyse and interpret cohesion test results</p> <p>3.3 Define the term 'cohesion'</p> <p>3.4 Explain the reasons for cohesion testing</p> <p>3.5 Carry out internal angle of friction testing</p> <p>3.6 Analyse and interpret internal angle of friction test results</p> <p>3.7 Define the term 'internal angle of friction'</p> <p>3.8 Explain the reasons for internal angle of friction testing</p> <p>3.9 Carry out Shear testing</p> <p>3.10 Analyse and interpret shear test results</p> <p>3.11 Define the term 'Shear'</p> <p>3.12 Explain the reasons for shear testing</p> <p>3.13 Analyse and interpret Pore pressure test results</p> <p>3.14 Define the term 'pore pressure'</p> <p>3.15 Explain the reasons for pore pressure testing</p> <p>3.16 Carry out consolidation and compressibility testing</p> <p>3.17 Analyse and interpret consolidation and compressibility test results</p> <p>3.18 Define the terms 'consolidation and compressibility'</p> <p>3.19 Explain the reasons for consolidation and compressibility testing</p> <p>3.20 Calculate and record test results</p> <p>3.21 Dispose of and/or archive test samples</p>	
4 Carry out laboratory permeability tests	4.1 Explain terms used when carrying out permeability testing	

	<p>4.2 Quote permeability values for any given soil type</p> <p>4.3 Carry out falling head testing</p> <p>4.4 Analyse and interpret falling head test results</p> <p>4.5 State the reasons for falling head testing</p> <p>4.6 Carry out constant head tests</p> <p>4.7 Analyse and interpret constant head test results</p> <p>4.8 State the reasons for constant head test</p> <p>4.9 Dispose of and/or archive test samples</p>	
5 Carry out analysis of computerised geotechnical data	<p>5.1 Use in-service geotechnical testing programmes</p> <p>5.2 Analyse and interpret geotechnical test results</p> <p>5.3 Determine materials analysis results</p> <p>5.4 Analyse computerised geotechnical data</p> <p>5.5 Obtain test results from trade software</p> <p>5.6 Compare test results to expected parameters</p> <p>5.7 Acknowledge erroneous results</p> <p>5.8 Report final (balanced) test results</p> <p>5.9 Analyse computerised test results</p>	
6 Carry out classification of soils	<p>6.1 Assemble and prepare the test equipment</p> <p>6.2 Conduct classification test procedures</p> <p>6.3 Analyse and interpret classification test results</p> <p>6.4 Record and calculate test results</p> <p>6.5 Dispose of and/or archive test specimens</p>	
7 Communicate findings	<p>7.1 Interpret geotechnical data</p> <p>7.2 Collate data and communicate observations, recommendations and conclusions by written report</p> <p>7.3 Collate data and communicate observations, recommendations and conclusions by verbal presentation</p>	
8 Work safely when	8.1 Comply with applicable Health	

carrying out geotechnical testing	and Safety regulations 8.2 Carry out relevant risk assessments 8.3 Complete relevant COSHH Assessments 8.4 Supervise others ensuring safe working practice	
Additional information about the unit		
Unit aim(s)	Upon completion of this unit learners will be able to carry out geotechnical testing safely to the relevant national and international standards. Interpreting and communicating findings to a varied audience.	
Unit expiry date	2 Years	
Details of the relationship between the unit and relevant national occupational standards (if appropriate)	<p>This unit has some synergy with the following NOS</p> <p>SEMLAB2_01 Maintaining health and safety in a laboratory environment</p> <p>SEMLABS4_12 Applying basic statistics to the laboratory measurement process</p> <p>SEMLATA3-12 Measuring, weighing and preparing compounds and solutions for laboratory use</p> <p>PROSMD23 Test and report on physical and geotechnical characteristics</p> <p>SEMLATA4-06 Write scientific or technical reports for workplace activities</p> <p>PROCWP131 Carry out testing operations</p> <p>SEMLATA2-15 Carry out sampling operations for scientific or technical tests</p>	
Details of the relationship between the unit and other standards or curricula (if appropriate)	This unit maps to the Military Engineer (Construction Materials Technician) 2-1 Course	
Assessment requirements specified by a sector or regulatory body (if appropriate)	This unit requires the assessment of occupational competence under realistic conditions wherever practicable. For the knowledge and understanding component of the unit, assessment from a learning and development environment is allowed.	
Location of the unit within the subject/sector classification system	Building and Construction	
Name of the organisation submitting the unit	Defence Awarding Organisation	

Availability for use	Restricted
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URN:	J/615/4576
Title:	Evaluation of materials for stabilisation

Level:	5	
Credit value:	9	
GLH	48	
TQT	85	
Learning outcomes	Assessment criteria	
The learner will:	The learner can:	
1. Assess soils for stabilisation techniques	1.1 Plot curved lines joining particle size distribution percentage passing results 1.2 Design soil combinations to achieve the required specification 1.3 Determine when mechanical stabilisation is used 1.4 Determine the techniques used in mechanical stabilisation 1.5 Determine the tests to be carried out on a material to be mechanically stabilised 1.6 Compare results of material tests with specifications for materials to be mechanically stabilised 1.7 Analyse and assess soils for mechanical stabilisation 1.8 Determine when cement stabilisation is used 1.9 Explain the techniques used in cement stabilisation 1.10 Determine the tests to be carried out on a material to be cement stabilised 1.11 Compare results of material tests with the specifications for materials to cement stabilisation 1.12 Analyse and assess soils for cement stabilisation 1.13 State when Lime stabilisation is used 1.14 Explain the techniques used in Lime stabilisation 1.15 List the tests to be carried out on a material to be lime stabilised 1.16 Compare results of material	

	<p>tests with the specifications for materials to lime stabilisation</p> <p>1.17 Analyse and assess soils for lime stabilisation</p> <p>1.18 Determine how to establish material properties, classification and characteristics</p> <p>1.19 Explain how to establish the availability of material for stabilisation</p> <p>1.20 Establish the purpose of the stabilisation</p> <p>1.21 Produce a specification for non-standard stabilisation based on available materials fit for the purpose required</p> <p>1.22 Analyse and assess soils for non-standard stabilisation</p>	
2 Carry out soil stabilisation laboratory design studies	<p>2.1 Assemble test equipment and materials</p> <p>2.2 Manufacture test specimens</p> <p>2.3 Manufacture stabilised soil specimens</p> <p>2.4 Assemble test equipment.</p> <p>2.5 Conduct stabilisation tests</p> <p>2.6 Analyse and interpret Stabilisation test results</p>	
3 Plan quality control tasks	<p>3.1 Design a projective plan in the form of a written directive</p> <p>3.2 Design a programme of works in an appropriate format</p> <p>3.3 Plan field mechanical stabilisation trials</p> <p>3.4 Plan field lime stabilisation trials</p> <p>3.5 Plan for non-standard stabilisation trials</p>	
4 Communicate findings	<p>4.1 Interpret stabilisation data</p> <p>4.2 Collate data and communicate observations, recommendations and conclusions by written report</p> <p>4.3 Collate data and communicate observations, recommendations and conclusions by verbal presentation</p>	
5 Work safely when producing stabilisation and specification reports	<p>5.1 Comply with applicable Health and Safety regulations</p> <p>5.2 Carry out relevant risk assessments</p> <p>5.3 Complete relevant COSHH</p>	

	Assessments 5.4 Supervise others ensuring safe working practice	
Additional information about the unit		
Unit aim(s)	Upon completion of this unit learners will be able to produce stabilisation and specification reports to the relevant company, national and international standards. Interpreting and communicating findings to a varied audience.	
Unit expiry date	2 Years	
Details of the relationship between the unit and relevant national occupational standards (if appropriate)	<p>This unit has some synergy with the following NOS</p> <p>COSVR641 Conform to general workplace health, safety and welfare</p> <p>COSVR709 Control work against agreed quality standards</p> <p>PROSMD23 Test and report on physical and geotechnical characteristics</p> <p>SEMLABS4_12 Applying basic statistics to the laboratory measurement process</p> <p>SEMLATA3-12 Measuring, weighing and preparing compounds and solutions for laboratory use</p> <p>SEMLATA4-06 Write scientific or technical reports for workplace activities</p>	
Details of the relationship between the unit and other standards or curricula (if appropriate)	This unit maps to the Military Engineer (Construction Materials Technician) 2-1 Course	
Assessment requirements specified by a sector or regulatory body (if appropriate)	This unit requires the assessment of occupational competence under realistic conditions wherever practicable. For the knowledge and understanding component of the unit, assessment from a learning and development environment is allowed	
Location of the unit within the subject/sector classification system	Building and Construction	
Name of the organisation submitting the unit	Defence Awarding Organisation	
Availability for use	Restricted	

URN:	Y/615/4579
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Title:	Design and specification for stabilisation and strengthening of construction materials	
Level:	5	
Credit value:	9	
GLH	48	
TQT	82	
Learning outcomes	Assessment criteria	
The learner will:	The learner can:	
1. Produce a report on stabilisation study results and technique	1.1 Explain the importance of listing all of the appropriate references 1.2 Produce a report in the recognised format	
2 Produce a report on non-standard test procedure and results	2.1 Explain the importance of listing all of the appropriate references 2.2 Produce a report in the recognised format	
3 Produce method specifications	3.1 Determine the materials used to construct road bases 3.2 Explain the methods of constructing road bases 3.3 Acknowledge the situations which require the production of a method statement 3.4 Research and evaluate information to inform a method specification 3.5 Produce construction method specifications for bases 3.6 Determine the materials used to construct road sub-bases 3.7 Explain the method of constructing road sub-bases. 3.8 Produce construction method specifications for sub-bases 3.9 Explain the methods of constructing embankments 3.10 Produce a method specification for earthworks 3.11 Explain the methods used in compaction tasks 3.12 Produce a method specification for compaction 3.13 Explain the methods used in stabilisation tasks 3.14 Produce a method	

	specification for stabilisation	
4 Produce recipe specifications	<p>4.1 Determine the types of situations requiring the production of a recipe specification</p> <p>4.2 Research and evaluate information to inform a recipe specification</p> <p>4.3 Produce a written recipe specifications from given data</p>	
5 Produce end product specifications	<p>5.1 Define the term 'end product' specification</p> <p>5.2 Research and evaluate information to inform an end product specification</p> <p>5.3 Explain the format of an end product specification</p> <p>5.4 Produce end product specifications</p>	
6 Communicate findings	<p>6.1 Interpret data</p> <p>6.2 Collate data and communicate observations, recommendations and conclusions by written report</p> <p>6.3 Collate data and communicate observations, recommendations and conclusions by verbal presentation</p>	
7 Work safely when producing design reports	<p>7.1 Comply with applicable Health and Safety regulations</p> <p>7.2 Carry out relevant risk assessments</p> <p>7.3 Complete relevant COSHH Assessment</p> <p>7.4 Supervise others ensuring safe working practice</p>	
Additional information about the unit		
Unit aim(s)	Upon completion of this unit learners will be able to produce design reports to the relevant company, national and international standards Interpreting and communicating findings to a varied audience	
Unit expiry date	2 Years	
Details of the relationship between the unit and relevant national occupational standards (if appropriate)	<p>This unit has some synergy with the following NOS</p> <p>PROSMD23 Test and report on physical and geotechnical characteristics</p> <p>SEMLATA4-06 Write scientific or technical reports for workplace activities</p> <p>SEMLABS3_04 Encouraging problem solving and innovation in a</p>	

	laboratory team
Details of the relationship between the unit and other standards or curricula (if appropriate)	This unit maps to the Military Engineer (Construction Materials Technician) 2-1 Course
Assessment requirements specified by a sector or regulatory body (if appropriate)	This unit requires the assessment of occupational competence under realistic conditions wherever practicable. For the knowledge and understanding component of the unit, assessment from a learning and development environment is allowed.
Location of the unit within the subject/sector classification system	Building and Construction
Name of the organisation submitting the unit	Defence Awarding Organisation
Availability for use	Restricted

URN:	Y/615/4582
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Title:	Design and evaluation of construction materials tasks	
Level:	5	
Credit value:	9	
GLH	50	
TQT	86	
Learning outcomes	Assessment criteria	
The learner will:	The learner can:	
1. Design surface dressings for roads	1.1 Define the term surface dressing 1.2 Explain the surface dressing construction process 1.3 Determine the information required at the commencement of the design process 1.4 Design surface dressings for roads	
2 State the method of earth reinforcement	2.1 Determine suitable types of earth reinforcement 2.2 Explain the application of earth reinforcement types 2.3 Specify the methods of constructing earth reinforcement	
3 Design recipe asphalt mixes	3.1 Evaluate the advantages and disadvantages of recipe asphalt mixes 3.2 Establish design parameters 3.3 Select recipe mix type to meet specification 3.4 Design recipe asphalt mixes	
4 Determine the modulus of subgrade reaction	4.1 State the reasons for taking modulus of subgrade reaction readings 4.2 Describe the method of testing and recording results 4.3 Calculate and interpret results	
5 Determine dynamic modulus of deformation	5.1 State the reasons for dynamic modulus of deformation readings. 5.2 Describe the methods of testing and recording of results 5.3 Calculate and interpret results	
6 Assist engineers with the design of earthworks	6.1 List the salient design points 6.2 Determine how to present briefing information	

	6.3 Establish design parameters 6.4 Verbally brief a Project / Chartered engineer	
7 Assist engineers with the design of rigid pavements	7.1 List the salient design points 7.2 State the information provided from materials testing	
8 Assist engineers with the design of flexible pavements	8.1 List the salient design points 8.2 State the information provided from materials testing	
9 Design a non-standard test	9.1 Establish the characteristics to be tested 9.2 Devise a method of testing using existing knowledge 9.3 Pilot the new test 9.4 Analyse and interpret non-standard test and its results 9.5 Assess the test results 9.6 Re-assess test procedures as necessary	
10 Use military manuals for design	10.1 Explain the relationship to the references to the stages of the military road design 10.2 Determine the information required to enable the design process to commence 10.3 Design a surfaced road 10.4 Determine the information required to enable the design process to commence	
11 Explain geotextile types and uses	11.1 Explain the purpose of geotextiles 11.2 Explain the various types of geotextiles	
12 Communicate findings	12.1 Interpret data 12.2 Collate data and communicate observations, recommendations and conclusions by written report 12.3 Collate data and communicate observations, recommendations and conclusions by verbal presentation	
13 Work safely when carrying out design and evaluation of tasks	13.1 Comply with applicable Health and Safety regulations 13.2 Carry out relevant risk assessment 13.3 Complete relevant COSHH Assessments 13.4 Supervise others ensuring safe working practice	

Additional information about the unit	
Unit aim(s)	Upon completion of this unit learners will be able to carry out design and evaluation of tasks safely to the relevant national and international standards. Interpreting and communicating findings to a varied audience.
Unit expiry date	2 Years
Details of the relationship between the unit and relevant national occupational standards (if appropriate)	No relevant NOS found
Details of the relationship between the unit and other standards or curricula (if appropriate)	This unit maps to the Military Engineer (Construction Materials Technician) 2-1 Course
Assessment requirements specified by a sector or regulatory body (if appropriate)	This unit requires the assessment of occupational competence under realistic conditions wherever practicable. For the knowledge and understanding component of the unit, assessment from a learning and development environment is allowed
Location of the unit within the subject/sector classification system	Building and Construction
Name of the organisation submitting the unit	Defence Awarding Organisation
Availability for use	Restricted

URN:	H/615/4584
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Title:	Concrete design and quality control	
Level:	5	
Credit value:	12	
GLH	78	
TQT	117	
Learning outcomes	Assessment criteria	
The learner will:	The learner can:	
1. Design pavement quality concrete mixes	<ul style="list-style-type: none"> 1.1 Determine when pavement quality concrete mixes are used 1.2 Explain the format of pavement quality concrete specifications 1.3 Determine the key considerations involved with pavement quality concrete 1.4 Produce a pavement quality concrete mix design 1.5 Analyse and interpret requirements for concrete mix design 1.6 Design pavement quality concrete mixes 	
2 Design structural concrete mixes	<ul style="list-style-type: none"> 2.1 Determine when structural concrete mixes are used 2.2 Explain the format of structural concrete specifications 2.3 Evaluate the key considerations involved with structural concrete. 2.4 Produce a structural concrete mix design 2.5 Analyse and interpret requirements for concrete mix design 2.6 Design structural concrete mixes 	
3 Design reinforced concrete mixes	<ul style="list-style-type: none"> 3.1 Determine when reinforced concrete mixes are used 3.2 Explain the format of reinforced concrete specifications 3.3 Evaluate the key considerations involved with reinforced concrete mixes 3.4 Produce a reinforced concrete mix design 3.5 Analyse and interpret 	

	<p>requirements for concrete mix design</p> <p>3.6 Design reinforced concrete mixes</p>	
4 Design lightweight concrete mixes	<p>4.1 Determine when lightweight concrete mixes are used</p> <p>4.2 Explain the format of lightweight concrete specifications</p> <p>4.3 Evaluate the key considerations involved with lightweight concrete mixes</p> <p>4.4 Produce a lightweight concrete mix design</p> <p>4.5 Analyse and interpret requirements for concrete mix design</p> <p>4.6 Design lightweight concrete mixes</p>	
5 Describe how to design heavyweight concrete mixes	<p>5.1 Determine when heavyweight concrete mixes are used</p> <p>5.2 Explain the format of heavyweight concrete specifications</p> <p>5.3 Evaluate the key considerations in the production, placement and curing of heavyweight concrete mixes</p> <p>5.4 Produce a heavyweight concrete mix design</p>	
6 Design low grade aggregate concrete mixes	<p>6.1 Determine when low grade aggregate concrete mixes are used</p> <p>6.2 Explain the format of low grade aggregate concrete specifications</p> <p>6.3 Evaluate the key considerations in the production, placement and curing of low grade aggregate concrete mixes</p> <p>6.4 Produce a low grade aggregate concrete mix design</p>	
7 Produce a report on a standard mix design	<p>7.1 Define the term 'standard mix'</p> <p>7.2 List the detail required to write the report</p> <p>7.3 Produce a standard mix design</p>	
8 Produce a report on a prescribed mix design	<p>8.1 Define the term 'prescribed' mix design</p> <p>8.2 List the detail required to complete the report</p> <p>8.3 Produce a prescribed mix design</p>	

<p>9 Produce a report on a designated mix design</p>	<p>9.1 Define the term 'designated' mix design 9.2 List the detail required to complete the report 9.3 Produce a designated mix design</p>	
<p>10 Carry out statistical analysis of concrete test results</p>	<p>10.1 Analyse concrete test results using the custom method 10.2 Explain the meaning of the term 'standard deviation' 10.3 Explain the reasons for carrying out a statistical analysis of concrete test results 10.4 Carry out standard deviation calculation, interpretation and reporting</p>	
<p>11 Describe how to design underwater concrete mixes</p>	<p>11.1 State when underwater concrete mixes are used 11.2 Explain the format of underwater concrete specifications 11.3 Explain how underwater concrete mixes are designed 11.4 Evaluate key considerations in the production; placement and curing of underwater concrete mixes</p>	
<p>12 Design Pumped concrete mixes</p>	<p>12.1 Determine when pumped concrete mixes are used 12.2 Explain the format of pumped concrete specifications 12.3 Evaluate key considerations in the production, placement and curing of pumped concrete mixes 12.4 Interpret and analyse requirement to produce a pumped concrete mix design</p>	
<p>13 Plan Quality Control of concrete for structures</p>	<p>13.1 List the types and uses of formwork 13.2 Explain the methods of laying and compacting concrete in lifts 13.3 Sketch vertical and horizontal joint details 13.4 List the types and causes of joint/facing defects 13.5 State the restrictions relating to curing concrete in</p>	

	<p>forms</p> <p>13.6 Specify structural concrete mixes</p> <p>13.7 Produce a quality control plan for concrete production</p>	
14 Plan Quality Control for pavement concrete	<p>14.1 Explain the operations of paving trains</p> <p>14.2 Explain the construction methods for single bays of concrete</p> <p>14.3 Sketch typical concrete pavement joints</p> <p>14.4 Explain the methods of finishing concrete pavements</p> <p>14.5 Explain the methods of curing concrete slabs</p> <p>14.6 List the methods of specifying concrete mixes</p> <p>14.7 Produce a quality control for concrete plan for delivered pre-mixed concrete</p> <p>14.8 Produce a quality control plan for mixing and batching plants</p>	
15 Plan Quality Control programme for delivered pre-mixed concrete	<p>15.1 Establish the quantity rate of supply and composition of the concrete from the project directive</p> <p>15.2 Establish the frequency of testing required at the point of delivery for cube strength, workability and mix condition</p> <p>15.3 Establish suitable frequency for monitoring placement and compaction regimes, including drop heights</p>	
16 Plan Quality Control programme for mixing and batching plants	<p>16.1 Establish the quantity rate of supply and composition of the concrete from the project directive</p> <p>16.2 Establish the frequency of testing required at the point of delivery for cube strength, workability and mix condition</p> <p>16.3 Establish suitable frequency for monitoring placement and compaction regimes, including drop heights</p>	
17 Test hardened concrete cylinder for density	<p>17.1 Identify and assemble test equipment</p> <p>17.2 Prepare samples for testing</p> <p>17.3 Carry out test procedure</p>	

	<p>17.4 Accurately calculate and record test results</p> <p>17.5 Examine split cylinder</p> <p>17.6 Report examination results</p> <p>17.7 Dispose of and/or archive test specimens</p>	
18 Test hardened concrete cylinder for tensile splitting strength	<p>18.1 Identify and assemble test equipment</p> <p>18.2 Prepare samples for testing</p> <p>18.3 Carry out test procedure</p> <p>18.4 Accurately calculate and record test results</p> <p>18.5 Examine split cylinder</p> <p>18.6 Report examination results</p> <p>18.7 Dispose of and/or archive test specimens</p>	
19 Communicate findings	<p>19.1 Interpret concrete data</p> <p>19.2 Collate data and communicate observations, recommendations and conclusions by written report</p> <p>19.3 Collate data and communicate observations, recommendations and conclusions by verbal presentation</p>	
Additional information about the unit		
Unit aim(s)	Upon completion of this unit learners will be able to carry out concrete design and testing tasks safely to the relevant national and international standards. Interpreting and communicating findings to a varied audience.	
Unit expiry date	2 Years	
Details of the relationship between the unit and relevant national occupational standards (if appropriate)	<p>Parts of this unit have some synergy with the following NOS</p> <p>SEMLABS4_12 Applying basic statistics to the laboratory measurement process</p> <p>COSVR709 Control work against agreed quality standards</p>	
Details of the relationship between the unit and other standards or curricula (if appropriate)	This unit maps to the Military Engineer (Construction Materials Technician) 2-1 Course	
Assessment requirements specified by a sector or regulatory body (if appropriate)	This unit requires the assessment of occupational competence under realistic conditions wherever practicable. For the knowledge and understanding component of the unit, assessment from a learning and development environment is allowed	

Location of the unit within the subject/sector classification system	Building and Construction
Name of the organisation submitting the unit	Defence Awarding Organisation
Availability for use	Restricted

URN:	K/615/4585
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Title:	Geotechnical tasks (Bituminous Materials)	
Level:	5	
Credit value:	4	
GLH	24	
TQT	38	
Learning outcomes	Assessment criteria	
The learner will:	The learner can:	
1 Describe the characteristics of bituminous materials	1.1 State the characteristics of bituminous materials 1.2 Describe the use and application of bituminous materials 1.3 Describe the visual identifying characteristics of bituminous mixes	
2 State the tests which can be applied to bituminous materials	2.1 Determine the test(s) for checking the density of in-situ bituminous materials 2.2 Determine the tests to check machine laid bituminous materials 2.3 Determine the tests to check hand laid bituminous materials 2.4 State the tests to carry out laboratory testing of bituminous materials	
3 Carry out quality control for bituminous materials	3.1 Determine density of in-situ bituminous materials 3.2 State how, where and when in-situ bituminous materials densities are determined 3.3 State the methods of checking densities of in-situ bituminous materials 3.4 State the advantages and disadvantages of the methods of density determination 3.5 Determine the frequency of in-situ density testing 3.6 Take a core sample 3.7 Record and analyse core samples taken 3.8 Assemble and carry out density test on unbound, cement bound and bituminous bound	

	<p>materials</p> <p>3.9 Analyse and interpret results from density testing</p> <p>3.10 Calculate and record test results</p> <p>3.11 Carry out control testing on machine laid bituminous mixes</p> <p>3.12 Analyse and interpret results from control testing</p> <p>3.13 Specify where and how bituminous mixes are controlled and tested</p> <p>3.14 State the types of laid and/or delivered bituminous mixes</p> <p>3.15 Explain how to assess and test bituminous mixes on delivery</p> <p>3.16 Explain how to control bituminous mix laying procedure</p> <p>3.17 Explain the compliance tests carried out on machine laid bituminous materials</p> <p>3.18 Carry out control testing of machine laid bituminous mixes</p> <p>3.19 Analyse and interpret results from control testing</p> <p>3.20 Carry out field investigation tests on bituminous binders and emulsions</p>	
<p>4 Analyse bituminous mixes</p>	<p>4.1 Carry out visual inspection of bituminous mixing using core samples</p> <p>4.2 Analyse and interpret bituminous mix used</p> <p>4.3 Identify the types of bituminous mix in cores</p> <p>4.4 Explain the use of bituminous mixes</p> <p>4.5 Descriptively classify bituminous mixes in given core samples</p> <p>4.6 Record findings</p> <p>4.7 Dispose of and/or archive core samples</p> <p>4.8 Carry out visual inspection of bituminous mix samples</p> <p>4.9 Analyse and interpret bituminous mix used</p> <p>4.10 List the visual characteristics of bituminous</p>	

	<p>mixes</p> <p>4.11 Descriptively classify bituminous mixes from given samples</p> <p>4.12 Record findings</p> <p>4.13 Dispose of and/or archive bulk samples</p> <p>4.14 Carry out binder content and grading of mineral aggregate testing</p> <p>4.15 Analyse and interpret results from binder content and grading of mineral aggregate testing</p> <p>4.16 State the reasons for testing</p> <p>4.17 Formulate a testing plan</p> <p>4.18 List accreditation considerations effecting testing</p> <p>4.19 Assemble test equipment</p> <p>4.20 Calibrate test equipment</p> <p>4.21 Prepare specimens for testing</p> <p>4.22 Carry out binder content grading test</p> <p>4.23 Analyse and interpret results from testing</p> <p>4.24 Calculate and record test results</p> <p>4.25 Collate data and communicate observations, recommendations and conclusions by verbal presentation and or in writing as required by the tasking agent</p>	
6 Determine Percentage Refusal Density (PRD) of bituminous materials	<p>6.1 State the reasons for PRD</p> <p>6.2 Formulate testing plan</p> <p>6.3 Assemble and calibrate the PRD test equipment</p> <p>6.4 Prepare specimens for testing</p> <p>6.5 Carry out PRD test</p> <p>6.6 Analyse and interpret results from PRD testing</p> <p>6.7 Calculate and record test results</p>	
7 Operate mobile improvised laboratory during quality control tasks	<p>7.1 Position/locate mobile improvised laboratory</p> <p>7.2 Set up and operate mobile laboratory generator</p> <p>7.3 Set up and operate mobile improvised laboratory</p>	

8	Produce materials for test report	8.1 Record results in the form of laboratory reports 8.2 Design test proforma 8.3 Design summary sheets 8.4 Use trade software to compile results	
9	Maintain quality control testing equipment	9.1 Check equipment 9.2 Register use of equipment with laboratory equipment manager	
10	Communicate findings	10.1 Interpret bituminous materials data 10.2 Collate data and communicate observations, recommendations and conclusions by written report 10.3 Collate data and communicate observations, recommendations and conclusions by verbal presentation	
11	Work safely when carrying out bituminous geotechnical tasks	11.1 Comply with applicable Health and Safety regulations 11.2 Carry out relevant risk assessments 11.3 Complete relevant COSHH Assessments 11.4 Supervise others ensuring safe working practice	
Additional information about the unit			
Unit aim(s)		Upon completion of this unit learners will be able to carry out geotechnical tasks on bituminous materials safely to the relevant national and international standards. Interpreting and communicating findings to a varied audience.	
Unit expiry date		2 Years	
Details of the relationship between the unit and relevant national occupational standards (if appropriate)		<p>This unit has some synergy with the following NOS</p> <p>COSVR641 Conform to general workplace health, safety and welfare</p> <p>SEMLAB2_01 Maintaining health and safety in a laboratory environment</p> <p>COSBEDMO21 Manage health and safety risks in built environment design development</p> <p>SEMLABS3_04 Encouraging problem solving and innovation in a laboratory team</p> <p>SEMETS3-27 Carrying out radiographic testing activities</p> <p>SEMLATA3-12 Measuring, weighing and preparing compounds and solutions for laboratory use</p> <p>PROSMD23 Test and report on physical and geotechnical</p>	

	<p>characteristics</p> <p>SEMLATA4-06 Write scientific or technical reports for workplace activities</p> <p>COSVR709 Control work against agreed quality standards</p>
<p>Details of the relationship between the unit and other standards or curricula (if appropriate)</p>	<p>This unit maps to the Military Engineer (Construction Materials Technician) 0-2 Course</p>
<p>Assessment requirements specified by a sector or regulatory body (if appropriate)</p>	<p>This unit requires the assessment of occupational competence under realistic conditions wherever practicable. For the knowledge and understanding component of the unit, assessment from a learning and development environment is allowed.</p>
<p>Location of the unit within the subject/sector classification system</p>	<p>Building and Construction</p>
<p>Name of the organisation submitting the unit</p>	<p>Defence Awarding Organisation</p>
<p>Availability for use</p>	<p>Restricted</p>