-SQA- SCOTTISH QUALIFICATIONS AUTHORITY

NATIONAL CERTIFICATE MODULE: UNIT SPECIFICATION

GENERAL INFORMATION

-Module Number- **2211133** **-Session-1993-94**

-Superclass- **VG**

-Title- **REPAIRING AND MAINTAINING PLANT AND EQUIPMENT (AUXILIARY SYSTEMS AND COMPONENTS) (x1 1/2)**

-DESCRIPTION-

GENERAL COMPETENCE FOR UNIT: Interpreting instructions, planning, organising and adopting safe working practices in diagnosing faults in auxiliary plant systems including steering, suspension, wheels, tracks and brakes. Removing, preparing and replacing materials, substances, parts and components and the commissioning of plant and equipment for safe use.

OUTCOMES (Elements of Competence)

1. interpret technical information for the repair and maintenance of plant and equipment;

2. initiate faults check for the repair and maintenance of plant and equipment;

3. remove parts and components for the repair and maintenance of plant and equipment;

4. select parts, components, materials and substances for the repair and maintenance of plant and equipment;

5. assemble parts and components in the repair and maintenance of plant and equipment;

6. position and secure parts and components in the repair and maintenance of plant and equipment;

7. commission plant and equipment.

This unit incorporates the standards of the CITB Lead Body.

CREDIT VALUE: 1.5 NC Credits

ACCESS STATEMENT: This module forms part of the level II SVQ in Plant Maintenance, details of which are given in the Support Notes, under Progression. There is no access statement for this module but it is designed to complement the other units in the SVQ and candidates would normally be expected to be receiving complementary industrial experience in a related field.

For further information contact: Committee and Administration Unit, SQA, Hanover House, 24 Douglas Street, Glasgow G2 7NQ.

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NATIONAL CERTIFICATE MODULE: UNIT SPECIFICATION

STATEMENT OF STANDARDS

UNIT NUMBER: 2211133

UNIT TITLE: REPAIRING AND MAINTAINING PLANT AND EQUIPMENT (AUXILIARY SYSTEMS AND COMPONENTS)

Acceptable performance in this unit will be the satisfactory achievement of the standards set out in this part of the specification. All sections of the statement of standards are mandatory and cannot be altered without reference to SQA.

OUTCOME (ELEMENT OF COMPETENCE)

1. INTERPRET TECHNICAL INFORMATION FOR THE REPAIR AND MAINTENANCE OF PLANT AND EQUIPMENT

PERFORMANCE CRITERIA

(a) Accurate and relevant selection and interpretation are made of technical information from given sources in relation to the task.
(b) Instructions given to the candidate are correctly interpreted and implemented.
(c) Instructions and information relayed to others are clear and concise.
(d) Corrective actions are implemented against deviations from technical information.

RANGE STATEMENT

Information sources: simple drawings; exploded views drawings; manufacturers' specifications; workshop manuals; operator's or instruction manual; technical services bulletins; parts manuals; oral or written instructions.

Corrective actions: specifications; manuals; bulletins; amendment procedures.

Calculations: multiplication; division; addition; subtraction; percentages.

EVIDENCE REQUIREMENTS

Performance evidence of competence under working conditions in:

(i) extracting:

- repair and maintenance procedures from manufacturers' technical information;
- specification from manufacturers' technical information;
- calculating, from given information sources, capacities, volumes, area, quantities and linear measurement.

Oral or written evidence of knowledge and understanding of:

(i) types and purpose of information sources;
(ii) methods of checking and reporting inaccuracies in information sources.

All the performance criteria must be met and all items in the range statement covered.

OUTCOME (ELEMENT OF COMPETENCE)

2. INITIATE FAULTS CHECK FOR THE REPAIR AND MAINTENANCE OF PLANT AND EQUIPMENT

PERFORMANCE CRITERIA

(a) Instructions given to the candidate are correctly interpreted and implemented.
(b) Instructions and information relayed to others are clear and concise.
(c) Accurate and relevant selection and interpretation are made of technical information from given sources in relation to the task.
(d) The selection of tools and equipment is appropriate to the work.
(e) Corrective actions are implemented in response to problems with tools and equipment.
(f) The cleanliness of the work area is maintained.
(g) Faults are identified by initiating faults, checks.
(h) Work methods and activities are correct in terms of satisfying current legislation.

RANGE STATEMENT

Information sources: manufacturers' technical information; manufacturers' specifications; parts manuals or lists; oral or written instructions; operator's or instruction manual.

Faults: sensory inspection; identification of source of failure of machinery, equipment and components; systems operation.

Machinery and equipment: static plant; wheeled plant; tracked plant.

Auxiliary systems: steering; suspension; braking; tracks; wire rope equipment.

Tools and equipment: hand tools; diagnostic test equipment.

Safety: personal protection legislation; machine operating procedures.

Location: site; workshop.

EVIDENCE REQUIREMENTS

Performance evidence of competence under working conditions in diagnosing faults in auxiliary systems and components on plant and equipment in the range by:

- visual inspection;
- sensory inspection;
- using diagnostic aids;
- operating machinery and equipment;
- extracting information from operators or end users.

Oral or written evidence of knowledge and understanding of:

(i) types and purpose of information sources in the range;
(ii) procedures for fault diagnosis on auxiliary systems and components on machinery and equipment in the range;
(iii) importance of using measuring instruments and test equipment for diagnostic work;
(iv) interpreting the results of diagnostic and functional tests;
(v) operating and working principles of auxiliary parts and components;
(vi) procedures for reporting malfunctions and faults in auxiliary systems and components in the range;
(vii) types of work required to rectify faults which are diagnosed from the results of examination and testing of auxiliary systems and components;
(viii) responsibilities regarding statutory regulations.

All the performance criteria must be met and all items in the range statement covered.

OUTCOME (ELEMENT OF COMPETENCE)

3. REMOVE PARTS AND COMPONENTS FOR THE REPAIR AND MAINTENANCE OF PLANT AND EQUIPMENT

PERFORMANCE CRITERIA

(a) Instructions given to the candidate are correctly interpreted and implemented.
(b) Instructions and information relayed to others are clear and concise.
(c) Waste materials and substances are removed to conform with safe working practices and effective operation.
(d) The removal of parts and components is carried out to minimise damage.
(e) The removal of parts and components conforms with the specification.
(f) The selection of tools and equipment is appropriate to the work.
(g) The cleanliness of the work area is maintained.
(h) Work methods and activities are correct in terms of satisfying current legislation.
(i) Work is completed to an agreed time schedule.

RANGE STATEMENT

Information sources: manufacturers' technical information; manufacturers' specifications; operator's or instruction handbooks; oral or written instructions; technical service bulletins.

Tools and equipment: hand tools; power tools; specialist servicing tools; fluid drain units or containers; waste containers; lifting equipment.

Machinery and equipment: wheeled plant; tracked plant; static plant.

Parts and components: mechanical and non-mechanical assemblies and sub-assemblies; parts; components; controls; wire ropes; linkages; retaining hardware; pipe network in auxiliary plant systems.

Preparation processes: removing; draining; dismantling; disposing.

Location: site; workshop.

Safety: personal protection legislation; machine operating procedures; materials handling regulations; HASWA (Health and Safety at Work Act); COSHH (Control of Substances Hazardous to Health) Regulations.

EVIDENCE REQUIREMENTS

Performance evidence of competence under working conditions in:

(i) removing parts and components from auxiliary systems on plant and equipment in the range;
(ii) dismantling parts and components on plant and equipment in the range;
(iii) inspecting parts and components in the range.

Oral or written evidence of knowledge and understanding of:

(i) types and purpose of information sources in the range;
(ii) methods of removal and replacement of parts and components;
(iii) purpose of inspecting parts and components when dismantling;
(iv) applications and limitations of hand tools, power tools and specialist tools;
(v) operation and working principles of parts and components in the range;
(vi) use of measuring instruments or aids for inspection;
(vii) reasons for using lifting equipment or aids to remove parts and components;
(viii) handling and storage of parts and components;
(ix) maintenance and repair requirements of auxiliary systems, parts and components in the range;
(x) procedures for draining, flushing and replenishing of fluids and lubricants;
(xi) methods and procedures for carrying out repair and maintenance of auxiliary components;
(xii) responsibilities regarding statutory regulations.

OUTCOME (ELEMENT OF COMPETENCE)

4. SELECT PARTS, COMPONENTS, MATERIALS AND SUBSTANCES FOR THE REPAIR AND MAINTENANCE OF PLANT AND EQUIPMENT

PERFORMANCE CRITERIA

(a) Parts and components are correctly identified for use.
(b) The selection of parts, components, materials and substances complies with the specification in terms of quantity, quality and types.
(c) Corrective actions are implemented to establish utility of parts, components, materials and substances.

RANGE STATEMENT

Information sources: manufacturers' technical information; operator's or instruction handbooks; oral or written instructions; parts lists or handbooks.

Corrective actions: defective, non-match, sub-standard parts, components, materials and substances.

Parts and components: retaining hardware; pipe network; mechanical and non-mechanical parts and components; assemblies and sub-assemblies; wire ropes; gaskets; seals.

Materials and substances: lubricants; fluids; cleaning agents; jointing and sealing compounds and adhesives.

Location: site; workshop.

Safety: personal protection legislation; HASWA (Health and Safety at Work Act); COSHH (Control of Substances Hazardous to Health) Regulations.

EVIDENCE REQUIREMENTS

Performance evidence of competence under working conditions in:

(i) selecting parts and components;
(ii) selecting materials and substances.

Oral or written evidence of knowledge and understanding of:

(i) types and purpose of information sources in the range;
(ii) types and purpose of parts and components in the range;
(iii) replacement procedures for selecting parts and components in the range;
(iv) storing of parts and components;
(v) manual and non-manual stock record systems;
(vi) methods for reporting defects in parts and components;
(vii) characteristics, uses and limitations of the parts and components in the range;
(viii) responsibilities regarding statutory regulations.

OUTCOME (ELEMENT OF COMPETENCE)

5. ASSEMBLE PARTS AND COMPONENTS IN THE REPAIR AND MAINTENANCE OF PLANT AND EQUIPMENT

PERFORMANCE CRITERIA

(a) Instructions given to the candidate are correctly interpreted and implemented.
(b) Instructions and information relayed to others are clear and concise.
(c) Parts and components are assembled to conform with the specification.
(d) Parts and components are secured to conform with the specification.
(e) Accurate and relevant selection and interpretation are made of technical information from given sources in relation to the task.
(f) The selection of tools and equipment is appropriate to the work.

(g) The cleanliness of the work area is maintained.
(h) Records are complete, accurate, clear and accessible.
(i) Work methods and activities satisfy current legislation.
(j) Work is completed to an agreed time schedule.

RANGE STATEMENT

Information sources: manufacturers' technical information; manufacturers' specifications; oral or written instructions; operator's or instruction manuals; technical service bulletins.

Records: company required forms.

Tools and equipment: hand tools; power tools; specialist servicing tools.

Parts and components: mechanical and non-mechanical parts and components; retaining hardware; controls; linkages; pipe network on auxiliary plant systems (steering, supervision and braking).

Preparation processes: cleaning; lubricating; locating; assembling; securing; joining; positioning; dressing; fitting; adjusting.

Location: site; workshop.

Safety: personal protection legislation; machinery operating procedures; HASWA (Health and Safety at Work Act); COSHH (Control of Substances Hazardous to Health) Regulations.

EVIDENCE REQUIREMENTS

Performance evidence of competence under working conditions in:

(i) preparing parts and components in the range;
(ii) reclaiming parts and components in the range;
(iii) assembling parts and components in the range;
(iv) carrying out adjustments to parts and components in the range;
(v) measuring parts and components in the range.

Oral or written evidence of knowledge and understanding of:

(i) types and purpose of information sources in the range;
(ii) methods and procedures for preparing auxiliary systems, parts and components;
(iii) application and suitability of tools and equipment for assembling parts and components;
(iv) methods and procedures for reclamation of parts and components;
(v) reasons for making adjustments prior to, during and after assembly;
(vi) importance of assembling parts and components in accordance with the manufacturers' instructions;
(vii) importance of carrying out adjustments in accordance with the manufacturers' specifications;

(viii) methods and procedures for testing parts and components for serviceability after assembly;
(ix) responsibilities regarding statutory regulations.

OUTCOME (ELEMENT OF COMPETENCE)

6. POSITION AND SECURE PARTS AND COMPONENTS IN THE REPAIR AND MAINTENANCE OF PLANT AND EQUIPMENT

PERFORMANCE CRITERIA

(a) Instructions given to the candidate are correctly interpreted and implemented.
(b) Instructions and information relayed to others are clear and concise.
(c) Parts and components are positioned to conform with the specification.
(d) Parts and components are secured to conform with the specification.
(e) The selection of tools and equipment is appropriate to the work.
(f) The cleanliness of the work area is maintained.
(g) Records are complete, accurate, clear and accessible.
(h) Work methods and activities satisfy current legislation.
(i) Work is completed to an agreed time schedule.

RANGE STATEMENT

Information sources: manufacturer's technical information; oral or written instructions; operator's or instruction manual; technical service bulletins; workshop manuals.

Records: company required forms; statutory regulations forms.

Machinery and equipment: static plant; wheeled plant; tracked plant.

Parts and components: retaining hardware: mechanical and non-mechanical assemblies, sub-assemblies, parts and components; controls; linkages; wire ropes; pipe network.

Tools and equipment: hand tools; specialist servicing tools; lifting equipment.

Preparation processes: locating; securing; positioning; adjusting.

Location: site; workshop.

Safety: personal protection legislation; machinery operating procedures; manual handling regulations; HASWA (Health and Safety at Work Act); COSHH (Control and Substances Hazardous to Health) Regulations.

EVIDENCE REQUIREMENTS

Performance evidence of competence under working conditions in:

(i) positioning and securing parts and components;
(ii) making adjustments to the specification;
(iii) replenishing lubricants and fluids.

Oral or written evidence of knowledge and understanding of:

(i) types and purpose of information sources in the range;
(ii) purpose of assembling parts and components in accordance with the manufacturers' specifications;
(iii) methods of securing parts and components in plant and equipment;
(iv) purpose of positioning and securing parts and components in accordance with the manufacturers' specifications;
(v) purpose of making adjustments to parts and components in accordance with the manufacturers' specifications;
(vi) methods of testing parts and components after securing and positioning them;
(vii) procedures for replenishing lubricants and fluids after positioning and securing components;
(viii) methods of recording servicing and maintenance tasks;
(ix) responsibilities regarding statutory regulations.

OUTCOME (ELEMENT OF COMPETENCE)

7. COMMISSION PLANT AND EQUIPMENT

PERFORMANCE CRITERIA

(a) Instructions given to the candidate are correctly interpreted and implemented.
(b) Instructions and information relayed to others are clear and concise.
(c) Commissioning of plant and equipment conforms with prescribed procedures in terms of:

    (i) safe working practices;
    (ii) effective operation;
    (iii) technical information.

(d) The selection of tools and equipment is appropriate to the work.
(e) Records are complete, accurate, clear and accessible.

RANGE STATEMENT

Information sources: manufacturers' technical information; manufacturers' specifications; oral or written instructions; operator's or instruction manuals; technical service bulletins.

Records: company required forms; statutory regulation forms.

Commissioning processes: systems operation; inspecting; monitoring; listing and adjusting following the repair and maintenance of auxiliary systems and components on construction plant and equipment.

Machinery and equipment: static plant; wheeled plant; tracked plant.

Auxiliary systems: steering; suspensions; braking; tracks; wire rope equipment.

Tools and equipment: test and monitoring equipment; hand tools; specialist servicing tools.

Location: site; workshop.

Safety: personal protection legislation; machinery operating procedures; HASWA (Health and Safety at Work Act); COSHH (Control of Substances Hazardous to Health) Regulations; statutory regulations applicable to the commissioning of auxiliary plant systems in the range.

EVIDENCE REQUIREMENTS

Performance of competences under working conditions in:

(i) commissioning auxiliary plant systems in the range;
(ii) monitoring auxiliary plant systems in the range;
(iii) making adjustments to the specification.

Oral or written evidence of knowledge and understanding of:

(i) types and purpose of information sources in the range;
(ii) importance of carrying out adjustments to the manufacturers' specifications;
(iii) application and suitability of tools and equipment for commissioning purposes;
(iv) interpreting and evaluating the results of functional and diagnostic tests;
(v) procedures for reporting malfunctions and defects on plant and equipment in the range;
(vi) reasons for recording and maintaining information of results of functional and diagnostic tests;
(vii) purpose of recording information for the commissioning of auxiliary plant systems in the range;
(viii) responsibilities regarding statutory regulations.

ASSESSMENT RECORDS

In order to achieve this unit, candidates are required to present sufficient evidence that they have met all the performance criteria for each outcome within the range specified. Details of these requirements are given for each outcome. The assessment instruments used should follow the general guidance offered by the SQA assessment model and an integrative approach to assessment is encouraged. (See references at the end of support notes).

Accurate records should be made of assessment instruments used showing how evidence is generated for each outcome and giving marking schemes and/or checklists, etc. Records of candidates' achievements should be kept. These records will be available for external verification.

SPECIAL NEEDS

In certain cases, modified outcomes and range statements can be proposed for certification. See references at end of Support Notes.

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NATIONAL CERTIFICATE MODULE: UNIT SPECIFICATION

SUPPORT NOTES

UNIT NUMBER 2211133

UNIT TITLE REPAIRING AND MAINTAINING PLANT AND EQUIPMENT (AUXILIARY SYSTEMS AND COMPONENTS)

SUPPORT NOTES: This part of the unit specification is offered as guidance. None of the sections of the support notes is mandatory.

NOTIONAL DESIGN LENGTH: SQA allocates a notional design length to a unit on the basis of time estimated for achievement of the stated standards by a candidate whose starting point is as described in the access statement. The notional design length for this unit is 60 hours. The use of notional design length for programme design and timetabling is advisory only.

PURPOSE This unit is designed to enable the candidate to develop skills and knowledge to repair auxiliary systems and components during the repair and maintenance of a range of construction plant and equipment. It is suitable for operatives working in the construction industry or a services or installation industry related to construction.

SQA publishes summaries of NC units for easy reference, publicity purposes, centre handbooks, etc. The summary statement for this unit is as follows:

This module will help you to acquire skills and knowledge necessary to repair auxiliary systems and components during the repair and maintenance of a range of construction plant and equipment. You will learn how to select, remove, assemble and replace parts and components in compliance with manufacturers' specifications and relevant statutory safety regulations.

CONTENT/CONTEXT The candidate successfully completing this module will require underpinning knowledge and skills relating to the interpretation of technical information in fault finding and repairing auxiliary systems and components in a range of construction plant and equipment.

This unit would be offered to candidates from the construction and related services industries. The skills are transferable within different working environments but the unit is primarily aimed at candidates whose normal place of work would be a site or similar environment.

The range statement is applicable to all areas of construction and other related or similarly structured industries. The competences and underpinning knowledge

gained in successfully completing this unit would be transferable across a range of disciplines within the built environment.

The unit deals with the repair and maintenance of auxiliary systems and is complemented by units dealing with related aspects of work in construction plant maintenance.

It should be delivered as part of a structured programme of training and orientated to the context of the candidate's work and area of responsibility.

APPROACHES TO GENERATING EVIDENCE The achievement of the underpinning knowledge required for this unit would be assisted by the use of slides and videos, and hands-on experience.

Tutors/trainers should demonstrate practical elements step by step until the candidate feels confident enough to attempt them on his/her own, and the safety factors should be thoroughly emphasised.

Supervisors and employers should also play an important part in assisting candidates to generate evidence.

ASSESSMENT PROCEDURES Candidates will be able to provide evidence of performance using a variety of methods. These will include:

- Performance at work (recorded in Candidate's Assessment and Evidence Record or other methods).
- Performance in training (recorded in Candidate's Assessment and Evidence Record or other methods).
- Simulated exercises (skills/progress test results).
- Past achievement/experiences e.g. letters of endorsement; past certificates.

Evidence gathering from the workplace will be the preferred method; however there may be situations where this is inappropriate or the evidence is insufficient. Supplementary evidence will also be required to demonstrate the underpinning knowledge related to the competences in the unit.

For detailed guidance on assessment, reference should be made to the publications listed at the end of the Support Notes and to the Assessment Guidance Notes available for the delivery of the Scottish Vocational Qualification of which this module is a component.

PROGRESSION This unit forms part of the level II SVQ in Plant Maintenance.

Each module is a separate unit and the modules are not necessarily taken in a prescribed order, although there is a logical sequence to the acquisition of the skills and knowledge concerned.

To gain the award, the candidate must successfully complete all of the following modules:

2211063	Servicing and Repairing Plant and Equipment (General Servicing)
2211073	Repairing and Maintaining Plant and Equipment (Thermal Joining and Cutting) (x 1.5)
2211083	Repairing and Maintaining Plant and Equipment (Plant Electrical Systems and Components) (x 1.5)
2211093	Repairing and Maintaining Plant and Equipment (Power Units)
2211103	Repairing and Maintaining Plant and Equipment (Power Trains - Mechanical)
2211113	Repairing and Maintaining Plant and Equipment (Hydraulic Systems and Components)
2211123	Repairing and Maintaining Plant and Equipment (Pneumatic Systems and Components)
2211133	Repairing and Maintaining Plant and Equipment (Auxiliary Systems and Components) (x 1.5)

RECOGNITION Many SQA NC units are recognised for entry/recruitment purposes. For up-to-date information see the SQA guide 'Recognised and Recommended Groupings'.

REFERENCES

1. Guidelines for Module Writers.
2. SQA's National Standards for Assessment and Verification.
3. For a fuller discussion on assessment issues, please refer to SQA's Guide to Assessment.
4. Procedures for special needs statements are set out in SQA's guide 'Students with Special Needs'.

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