-SQA- SCOTTISH QUALIFICATIONS AUTHORITY

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NATIONAL CERTIFICATE MODULE DESCRIPTOR

-Module Number- **4120561** **-Session- 1991-92**
-Superclass- **TG**

-Title- **GENERAL BUILDING OPERATIVES: MIXING, PLACING, COMPACTING AND FINISHING CONCRETE**

-DESCRIPTION-

Purpose

This module is designed to develop the knowledge and skills required to mix, place, compact and finish concrete.

It is aimed at those following a career as a General Building Operative or in similar positions in the Building and Allied Industries.

Preferred Entry Level

4120551 General Building Operatives: Lifting and Handling Skills
4120511 General Building Operatives: Construction Materials
4120591 General Building Operatives: Scaffolding Safety
4120631 General Building Operatives: Use of Hand and Power Tools
4120641 General Building Operatives: Use of Small Construction Plant

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Outcomes

The student should:

1. mix concrete by hand;
2. mix concrete by machine using a site mixer (5/3.5);
3. locate prefabricated steel by means of spacers;
4. compact concrete to a given level;
5. surface finish concrete to a given level;
6. ensure the protection of concrete during the curing process.

Assessment Procedures

Acceptable performance in the module will be satisfactory achievement of all the Performance Criteria specified for each Outcome.

The following abbreviations are used below:

PC Performance Criteria
IA Instrument of Assessment

Note: The Outcomes and PCs are mandatory and cannot be altered. The IA may be altered by arrangement with SQA. (Where a range of performance is indicated, this should be regarded as an extension of the PCs and is therefore mandatory).

OUTCOME 1 **MIX CONCRETE BY HAND**

PCs

(a) The ingredients used are correct in accordance with the given specification.
(b) The ingredients are to the specified proportions.
(c) The mix is uniform both in consistency and colour.
(d) The mix is free from contaminates.
(e) The working practices followed by the student are safe.

IA Practical Exercise

The student will be set a practical exercise to test the knowledge and skills required to mix concrete by hand.

The exercise will consist of a task as follows:

mix a batch of concrete by hand using a gauge box.

For the task the student will be provided with a mixing board, tools and equipment appropriate to the task, concreting aggregates, cement and water.

Satisfactory achievement of the Outcome will be based on the student attaining all the Performance Criteria.

OUTCOME 2 **MIX CONCRETE BY MACHINE USING A SITE MIXER (5/3.5)**

PCs

(a) The ingredients used are as detailed in the given specification.
(b) The ingredients are to the specified proportions.
(c) The mix is uniform both in consistency and colour.
(d) The time taken to achieve the mix is the minimum required to achieve a homogeneous mass.
(e) The mix is free from contaminates.

(f) The working practices followed by the student are safe.

IA Practical Exercise

The student will be set a practical exercise to test the knowledge and skills required to mix concrete by machine using a site mixer (5/3.5).

The exercise will consist of a task as follows:

Mix, using a 5/3.5 mixer, 2 consecutive uniform batches of concrete of not less than 0.25 cubic metres in total, to the given specification.

The student will be provided with a 5/3.5 mixer, concreting aggregates, cement and water and a range of tools and equipment appropriate to the task. A specification will be nominated by the assessor.

The student will require assistance from other students to carry out the exercise. There should not be more students working on one job than would be consistent with normal site practice.

Satisfactory achievement of the Outcome is based on the student attaining all the Performance Criteria.

OUTCOME 3 LOCATE PREFABRICATED STEEL BY MEANS OF SPACERS

PCs

(a) The reinforcement is free from contaminates such as oil and loose rust.
(b) The position of the reinforcement is as specified.
(c) The use of the tools and equipment is appropriate to the task.
(d) The working practices followed by the student are safe.

IA Practical Exercise

The student will be set a practical exercise to test the knowledge and skills required to locate prefabricated steel by means of spacers.

The exercise will consist of a task as follows:

The student will place and locate prefabricated steel reinforcement by means of spacers. (This could be done by utilising the area to be completed in the Instrument of Assessment for Outcome 4).

The student will be presented with the steel cut to specification, spacers and any necessary tools, equipment and other fixings required.

Satisfactory achievement of the Outcome will be based on the student attaining all the Performance Criteria.

OUTCOME 4 COMPACT CONCRETE TO A GIVEN LEVEL

PCs

(a) The procedures used to place the concrete are correct in terms of ensuring no damage to the formwork occurs.
(b) The concrete is to a given depth with proper use of uniform layers where applicable.
(c) The procedures used to consolidate the concrete are correct in terms of its complete compaction whilst avoiding segregation of aggregates.
(d) The working practices followed by the student are safe.

IA Practical Exercise

The student will be set a practical exercise to test the knowledge and skills required to compact concrete to a given level.

The exercise will consist of 2 tasks as follows:

(i) place the concrete by filling a form or void forming a reinforced unit or slab;
(ii) compact the concrete by using a vibrating screed beam or tamp for a slab, or a poker vibrator for a reinforced column or beam.

The volume of the unit must be at least 0.25 of a cubic metre.

The student will be provided with tools and equipment appropriate to the task and sufficient premixed concrete to overfill the form or void slightly, and will be required to place, compact and finish the concrete.

The student will require assistance from others to carry out the exercise. There should not be more students working on one job than there would be under normal site conditions.

Satisfactory achievement of the Outcome is based on the student attaining all the Performance Criteria.

OUTCOME 5 SURFACE FINISH CONCRETE TO A GIVEN LEVEL

PCs

(a) The surface finish is to the given specification.
(b) The time taken to apply the surface finish is the minimum required to achieve a uniform texture.
(c) The working practices followed by the student are safe.

IA Practical Exercise

The student will be set a practical exercise to test the knowledge and skills required to surface finish concrete to a given level.

The exercise will consist of utilising either (a) a form, (b) a void, or (c) a slab no less than 2.400m x 1.200m, to carry out two out of the three following tasks:

(i) finish concrete by use of a wood float;
(ii) finish concrete by use of a steel trowel;
(iii) finish concrete to a non-slip finish (tamped or brushed).

The student will be provided with the necessary tools and equipment appropriate to the task.

Satisfactory achievement of the Outcome will be based on the student attaining all the Performance Criteria.

OUTCOME 6 ENSURE THE PROTECTION OF CONCRETE DURING THE CURING PROCESS

PCs

(a) The procedures used to cure the concrete are correct in terms of:

(i) the curing membrane being applied soon after the initial set;
(ii) hessian or sand being in place as soon as the surface can resist deformation;
(iii) the polythene sheet, if used, being kept clear of the surface;
(iv) the surface being protected from damage by the elements during curing.

(b) The time taken to cure the concrete is at least the minimum specified with allowance made for climatic conditions.
(c) The working practices followed by the student are safe.

IA Practical Exercise

The student will be set a practical exercise to test the knowledge and skills required to ensure the protection of concrete during the curing process.

The exercise will consist of a task as follows:

utilising a method and materials appropriate to a pre-concreted unit or area, apply a system which will result in efficient curing (and protection from the elements) of the unit or area.

The student will be provided with the materials and equipment appropriate to the task.

Students will require assistance from other students to carry out the exercise. However, the number of students working on the job should be consistent with normal site practice.

Satisfactory achievement of the Outcome is based on the student attaining all the Performance Criteria.

The following sections of the descriptor are offered as guidance.
They are not mandatory.

Corresponding to Outcomes 1-6:

CONTENT/CONTEXT

Range of tools and equipment used for concreting operations could include poker and screeding beam vibrators, tilting drum, pan and reversing drum mixers, steel trowels, wooden or plastic floats, edging trowels, tamp beam and brushes.

The range of activities to include those involved in laying a reinforced floor slab and a simple beam or column.

SUGGESTED LEARNING AND TEACHING APPROACHES

This module should be undertaken under actual or simulated site conditions. Students will be expected to gain experience in mixing, placing, compacting and finishing concrete on a range of building operations.

It is preferable that real cement concrete should be used, where possible, but if space restrictions make it necessary to use a simulation situation, lime concrete or a very weak mix can be substituted.

Instruction and demonstration of the various tasks should be followed by student participation.

The safety element should be stressed at all times.

Specifications, drawings and verbal instruction should be given to the student prior to the task being undertaken (where appropriate).