

-SQA-SCOTTISH QUALIFICATIONS AUTHORITY

HIGHER NATIONAL UNIT SPECIFICATION

GENERAL INFORMATION

-Unit number-	4420808
-Unit title-	CONSTRUCTION TECHNOLOGY 3: INDUSTRIAL/COMMERCIAL SUPERSTRUCTURE
-Superclass category-	TE
-Date of publication- (month and year)	AUGUST 1998
-Originating centre for unit-	SQA

-DESCRIPTION-

GENERAL COMPETENCE FOR UNIT: Describing the basic forms of industrial and commercial buildings, producing sketches of the main elements of components of large buildings and evaluating various construction options for each element.

OUTCOMES:

1. sketch and describe common structural forms;
2. describe methods of forming walls to framed structures;
3. describe floor and roof structures.

CREDIT VALUE: 1 HN Credit

ACCESS STATEMENT: Access to this unit is at the discretion of the centre. However it would be beneficial if the candidate had competence relating to the construction of domestic buildings. This may be evidenced by possession of HN Unit Construction Technology 1 and Construction Technology 2 or similar qualifications or experience.

Additional copies of this unit can be obtained from:

The Committee and Administration Unit, SQA, Hanover House, 24 Douglas Street, Glasgow G2 7NQ, (Tel: 0141-242 2168).

At the time of publication the cost is £1.50 per unit (minimum order £5.00).

HIGHER NATIONAL UNIT SPECIFICATION**STATEMENT OF STANDARDS**

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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

1. SKETCH AND DESCRIBE COMMON STRUCTURAL FORMS

PERFORMANCE CRITERIA

- (a) Portal frame construction is sketched and described correctly.
- (b) Main features of steel framed buildings are sketched and described correctly.
- (c) Methods of constructing concrete framed buildings are sketched and described correctly.
- (d) Diaphragm, fin and cross wall construction are sketched and described correctly.
- (e) Items of plant for use in superstructure construction are selected correctly.

RANGE STATEMENT

Portal frames: steel; concrete.

Plant selection: crainage; mechanical handling.

EVIDENCE REQUIREMENTS

Written/oral and graphical evidence will be produced to show the candidate is aware of the alternative methods of constructing large industrial and commercial buildings in concrete and steel. The candidate will describe construction methods and select appropriate mechanical plant for use in the construction process.

All working practices must be in line with current building regulations, codes of practice and relevant health and safety legislation.

OUTCOME**2. DESCRIBE METHODS OF FORMING WALLS TO FRAMED STRUCTURES****PERFORMANCE CRITERIA**

- (a) Functional requirements of walls to framed structures are described correctly.
- (b) Common types of infill panel are described correctly.
- (c) Common types of wall cladding and fixing systems are described correctly.
- (d) Common types of curtain walling and fixing systems are described correct.

RANGE STATEMENT

The range for this outcome is fully expressed within the performance criteria.

EVIDENCE REQUIREMENTS

Written/oral and graphical evidence will be produced to show the candidate is aware of the functional requirements of the building walls and alternative construction methods to achieve the requirements.

All working practices must be in line with current building regulations, codes of practice and relevant health and safety legislation.

OUTCOME**3. DESCRIBE FLOOR AND ROOF STRUCTURES****PERFORMANCE CRITERIA**

- (a) Appropriate floor construction techniques are selected and described correctly.
- (b) The provision of openings in floor construction are described correctly.
- (c) Structural floor finishes to precast and in situ floors are described correctly.
- (d) Roof construction techniques are selected and justified correctly.
- (e) Roof coverings are selected and justified correctly.

RANGE STATEMENT

The range for this outcome is fully expressed within the performance criteria.

EVIDENCE REQUIREMENTS

Written/oral and graphical evidence will be produced to show the candidate is aware of the alternative forms of floor and roof construction.

At least 2 floor construction techniques and 2 roof construction techniques must be covered.

All working practices must be in line with current building regulations, codes of practice and relevant health and safety legislation.

MERIT STATEMENT: To gain a pass in this unit, a candidate must meet the standards set out in the outcomes, performance criteria, range statements and evidence requirements.

To achieve a merit in this unit, a candidate must demonstrate a superior or more sophisticated level of performance. In this unit this might be shown in the following ways:

- (a) comprehensive research into construction methods;
- (b) production of a high level of detail and accuracy in the presentation of graphical communication.

ASSESSMENT

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 Scottish Qualifications Authority (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 the 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

Proposals to modify outcomes, range statements or agreed assessment arrangements should be discussed in the first place with the external verifier.

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HIGHER NATIONAL UNIT SPECIFICATION**SUPPORT NOTES**

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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 40 hours. The use of notional design length for programme design and timetabling is advisory only.

PURPOSE The purpose of this unit is to enable the candidates to gain knowledge and understanding of the construction techniques involved in medium to large commercial and industrial buildings. The candidate will evaluate the different construction materials and methods commonly used in construction projects of this nature in order to develop practicable, cost effective construction of buildings.

CONTENT/CONTEXT Candidates should achieve a level of competence required of technician staff employed in the construction industry.

Candidates should be able to evaluate conditions in order to make informed recommendations on construction methods and details.

Candidates should be able to explain the reasons behind their decisions and communicate the details graphically in order to explain the construction process.

Corresponding to outcomes 1-3:

1. This outcome will introduce the candidate to the common forms of construction used in large industrial/commercial buildings to include: portal frames in steel, concrete and timber – fixed, two pin or three pin frames. The use of single and multi span frames including foundation construction and connections.

Steel framed buildings to include: steel sections, foundation construction, connections and fire protection and safe erection procedures.

Concrete framed buildings.

Precast and cast in situ concrete, advantages and disadvantages, types of reinforcement.

In situ frames, typical beam and column details including position of reinforcement and use of formwork. Principles of formwork, details to beams and columns, foundation, beam to column and column to column connections, concrete placement and safe erection procedures.

Precast concrete frames – connections, foundation beam to column and column to column connections.

Safe erection procedures.

2. This outcome introduces the candidate to wall construction to framed structures.

Infill panels to include masonry, composite or sandwich panels and glazed units, including fixing and damp proofing details.

Cladding to include functions of cladding panels, fixing details and connections for use with concrete cladding panels and metal profile sheeting to both concrete and steel framed structures.

Curtain walling to include requirements for curtain walls as well as typical curtain walling arrangements and construction details for both aluminium and plastic curtain walling. The use of assembly details to structures should be included.

3. Candidates will know the basic requirements floor and roof structures and will study the structural requirements for long span roofs and floors for large buildings.

Roofs in steel timber and concrete basic forms to include pitched trusses northlight, flat roofs, shell roofs, space decks.

Candidates will study construction details for each type of roof to include the various situations they would be used and fixing to the structure as well as any consideration for insulation and movement.

The candidate will study the need for the provision of natural light to large industrial, commercial buildings and the provision of rooflights to the construction. Use of patent glazing, lantern lights and dome lights should be studied including positioning, fixing, damp proofing and ventilation details.

Roof coverings to include construction and fixing details for aluminium, lead, built up felt roofing and asphalt.

Ground floor construction in plain and reinforced cast in situ concrete. Use of strip flooring including thermal movement crack inducement joints and dewatering.

Surface finish of floor screeds use of DPM bonded and unbonded screeds, floating screeds.

Reinforced concrete suspended floors one and two way spanning slabs, ribbed and waffle floors, hollow pot floors, pre-stressed and post tensioned concrete units.

Use of formwork and falsework in floor construction, construction procedures and construction details. Precast concrete floors, solid and hollow concrete floors.

Composite floor construction using prestressed planks and filler blocks or pots, precast concrete channel units, candidates should compare precast and in situ floors stating advantages as well as methods of construction.

Provision of service entry and holes for lifts or stairs in cast in situ and precast concrete floors including support and fire proofing considerations.

Selection of floor finishes for large industrial/commercial buildings, criteria for selecting finishes and the method of application for concrete screeds, tiles, sheet flooring and applied floor finishes.

APPROACHES TO GENERATING EVIDENCE The achievement of this unit will be evidenced by the production of a series of projects of a technical nature in which candidates evaluate the alternative solutions for construction projects and recommend appropriate construction methods. The use of technical data from British and European Standards, CIOB, CCA and other technical and manufacturing sources will provide the basis of information required to fulfill the evidence requirements for this unit.

ASSESSMENT PROCEDURES Centres may use assessment procedures considered to be appropriate by tutors although it is suggested that evidence for all performance criteria would be generated by a single project in which the evidence is generated for each outcome by candidates completing an assignment which fulfils all the performance criteria and the range.

Outcome 1

Closed Book Assessment – The candidate will be presented with a site plan containing structures including a portal frame, steel and concrete framed structures and asked a series of questions to overtake the performance criteria.

Candidates will also be asked to select appropriate plant for use on the project. Performance criteria (d) would be overtaken by a separate question where the candidate would be asked to describe the three types of construction listed in the range.

Outcome 2

Assignment – The candidate will be presented with the plan of a construction project which includes a framed structure, the candidate will be required to describe alternative types of wall construction – infill panel, cladding and curtain walling and evaluate their use in the construction project including appropriate materials and fixing.

Outcome 3

Closed Book Assessment – The candidate will be presented with a project which contains several structures and various types of floor and roof construction, the candidate will be asked to answer a series of questions dealing with specific areas such as erection procedures for cast in situ and precast floors, long span roof and barrel vaults before using the project drawings to recommend appropriate forms of floor and roof construction to be used as well as giving appropriate construction details for the safe erection of the structures.

PROGRESSION This unit forms part of the core programme for HNC and HND in the Built Environment.

REFERENCES

1. Guide to unit writing, SQA, 1993 (Code: A018).
2. Guide to assessment, SQA, 1993 (Code: B005).
3. Guide to certification, SQA, 1996 (Code: F025).
4. Notes for unit writers, SQA, 1995 (Code: A041).

For details of other SQA publications, please contact staff in the Sales and Despatch section (Tel: 0141-242 2168) who can supply you with a copy of the publication list (Code: X037).

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