-SQA-SCOTTISH QUALIFICATIONS AUTHORITY

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NATIONAL CERTIFICATE MODULE DESCRIPTOR

-Module Number- **0065213** **-Session-1986-87**

-Superclass- **TM**

-Title- **STRUCTURAL DRAWING AND DETAILING**

-DESCRIPTION-

Type and Purpose	A specialist module which enables the student to acquire a knowledge of the detailing of components in structural steel and reinforced concrete.
Preferred Entry Level	'O' grade Engineering Drawing or 04806 GRAPHICAL COMMUNICATION
Learning Outcomes	The student should: 1. know typical drawing office practice in civil engineering; 2. prepare general arrangement drawings; 3. prepare detail drawings of structural steel beams and stanchions; 4. prepare details of beam to beam, beam to stanchion, and stanchion to stanchion, connections; 5. prepare detail drawings of reinforced concrete beams, slabs, columns and foundations. 6. prepare Bar Bending Schedules from reinforced concrete detail drawings.
Content/ Context	As much of this module content requires to be carried out in a drawing office/classroom its relevancy to construction processes should be stressed throughout.

Detailing should be in accordance with standard practice and reference should be made when appropriate to the relevant British Standards and standard publications.

Corresponding To The Learning Outcomes

1. (a) The types of drawings produced by civil engineering offices and the relevant scales used, e.g.: site layout, floor plan, sections, details;

   (b) the effect of British Standards and standard publications on the production of drawings e.g. BS 308, BS 1192, BS 499, BS 4466, C&CA/Constrado publications.

2. (a) General arrangement drawings for structural steelwork frames including the use of a referencing system locating:

   (i) floors;
   (ii) stanchions;
   (iii) beams;

   (b) general arrangement drawings for reinforced concrete frames including the use of a referencing system locating:

   (i) floors;
   (ii) column;
   (iii) beams;
   (iv) slabs.

3&4 (a) Use of "Structural Steel Section Tables" to extract:

   (i) details of beams, stanchions, angles and channels;
   (ii) edge distance, end distance, bolt pitch, bolt cross-centres and end projection of cleats;
   (iii) data for end notching of beams.

   (b) scale drawing of fabrication details for:

   (i) universal beams;

   (ii) universal stanchions which are single or two storeys in height and extend from ground level;

(c) detail end connections with welded or bolted shop connections and bolted site connections including the use of:

(i) top and bottom (seating) cleats;
(ii) web and bottom (seating) cleats
(iii) web cleats only
(iv) end plates.

(d) details of typical beam to beam, beam to stanchion, stanchion to stanchion structural details; identifying each connection as shop or site assembled.

5 (a) Scale drawing of simply supported and continuous beams and slabs;

(b) scale drawing of columns:

(i) supporting simply supported beams;
(ii) acting integrally with continuous beams, slabs and foundations;

(c) sections through beams, slabs, columns and foundations showing the arrangement of reinforcement.

6. (a) The extraction of data relating to the number and diameter or diameter and spacing of reinforcing bars from "table of details of reinforcing steel";

(b) the identification of reinforcing bar shapes;

(c) the production of bar bending schedules (prepared in accordance with BS 4466).

Suggested Learning and Teaching Approaches

Where possible learning should take place in a practical environment using examples of existing structures or models, slides, overhead projections as teaching methods. It is envisaged that the teaching approach should be activity based and the learning outcomes should be viewed as integrative.

The teaching approach should be based on a programme of exercises, some of which should integrate more than one learning outcome. Students should be directed to the essential features of structures. Full and part complete examples should be used to accelerate learning but not to the extent that students cannot develop competence in drawing.

Discussions should be used to develop the learning outcomes. Work may be undertaken in small groups to enhance the communication skills between the members of the team.

Assessment Procedures

All learning outcomes must be validly assessed. The student must be informed of the tasks which contribute to summative assessment and, if possible, any unsatisfactory aspects should be discussed with the student as and when they arise (in addition to the normal formative assessment).

Acceptable performance in the module will be satisfactory achievement of the performance criteria for each learning outcome.

LO Learning Outcome
IA Instrument of Assessment
PC Performance Criteria

LO1

IA Short written exercises.

The student correctly identifies:

(i) the types of civil engineering drawing;

(ii) the scales used in civil engineering drawing;

(iii) the British Standards/standard publications, and their use in, and effect on, civil engineering practice.

LO2

IA Drawing exercises.

PC The student correctly draws to scale general arrangement drawings for structural frames in:

(i) structural steelwork;
(ii) reinforced concrete.

LO3

IA Drawing exercises.

PC The student correctly details, in structural steelwork, the following members:

(i) a beam;
(ii) a stanchion

showing appropriate bolting and welding required for site connection.

LO4

IA Drawing exercises.

PC The student correctly details using (a) welding and bolting and (b) bolting only, the following site connections in structural steelwork:

(i) beam to beam;
(ii) beam to stanchion;
(iii) stanchion to stanchion.

LO5

IA Drawing exercises.

PC The student correctly details the following reinforced concrete members:

(i) a beam;
(ii) a slab;
(iii) a column;
(iv) a foundation.

LO6

IA Assignment.

PC The student correctly uses BS 4466 to prepare a bar bending schedule for a structure, complete detailing of which is provided.