

-SQA-SCOTTISH QUALIFICATIONS AUTHORITY

**Hanover House
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NATIONAL CERTIFICATE MODULE DESCRIPTOR

-Module Number- 0095012 -Session-1989-90
-Superclass- TG

**-Title- EXCAVATION AND REINSTATEMENT OF PUBLIC
ROADS AND FOOTWAYS (x¹/₂)**

-DESCRIPTION-

Purpose This module is designed to develop the knowledge and skills required to carry out excavation and reinstatement work on public roads and footways.

It is aimed at those following a career in roadworks and receiving complementary industrial experience.

It may be of particular interest to those employed by public utilities involved in the maintenance of underground plant such as gas, water and cables.

Preferred Entry Level 95014 Roadworks: Traffic Safety and Control (x 1/2)
95015 Roadworks Safety: Detection of Underground Apparatus (x 1/2)

Learning Outcomes The student should:

1. state the requirements of and documentation associated with public utilities legislation and regulations as related to excavation and reinstatement;
2. use appropriate equipment and methods to excavate roads and footways constructed of differing materials;
3. select suitable excavated sub-grade material and suitable excavated pavement for re-use;
4. construct any given layer of pavement structure of flexible road and footway to surface level.

Content/
Context

Safe regulations and safe working practices and procedures should be observed at all times:

Corresponding to Learning Outcomes 1-4:

1. Knowledge of Public Utilities Street Work Act (PUSWA). Road opening limits of authority. Emergency road opening procedures.

1974 Model Agreement reinstatement specification requirements detail pavement structures, pavement layers of dimensions and permissible material.

2. Procedures for the use of pavement saws, pneumatic and hydraulic breaking equipment to cut surfacings and road base layers in a safe and economic manner. The use of hand tools relevant to material handling and excavation activities. Procedures to safeguard pedestrian and traffic throughout the duration of highways work.
3. Sub-grade, sub-base and road base materials recognition checklist, will include the use of a discriminatory materials component list, confirmation to a grading envelope, moisture content control and predictability to compact to a given California Bearing value.
4. Use of a construction schedule for flexible pavement structure of carriageway types 1 - 1V and footpaths of rigid, flexible and slabbed surfaces detailing limits of alternative material usage in relation to layer dimension. Comparative construction details for non-standard carriageways e.g. "made up" and Telford type structures. Construction procedures to be adopted dependent on carriageway life expectancy.

The use of a profile boards to accurately gauge dimension and limit of all layers of pavement structure. Operation governing the use of boning rods, travelling site sticks, spirit level and straight edge to accurately control depths and levels.

Applying a method specification for compaction of differing materials encountered throughout all layers of pavement structure. Construction progressing at optimum layer thickness with compaction being measurable against an end result specification using a field compaction method.

Suggested
Learning and
Teaching
Approaches

By practice and example the student should be encouraged to use all tools, plant and equipment correctly and in a safe manner.

Adequate time should be allocated to theory sessions with every consideration given to the subject being taught in proper subject progression. The use of visual and audio visual aids and material samples would assist the students' understanding of the wide range of topics associated with Highway Engineering Principles and Design.

Practical exercises would benefit from the availability and use of a consumable area of carriageway and footpath of various surfacing types. Adequate time must be given to the practical exercises and the quality of practical demonstrations and supervision throughout all practical sessions must be assured. The desired Learning Outcomes will be best achieved by the careful management of both practical and theoretical sessions.

A reference manual should be available and issued to the student.

The individual student's experience and familiarity with differing types and range of equipment should be noted throughout the practical session where adequate provision should be given for update or new equipment training where appropriate.

Assessment
Procedures

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

The following abbreviations are used below:

LO Learning Outcome

PC Performance Criteria

IA Instrument of Assessment

LO1

STATE THE REQUIREMENTS OF AND DOCUMENTATION ASSOCIATED WITH PUBLIC UTILITIES LEGISLATION AND REGULATIONS AS RELATED TO EXCAVATION AND REINSTATEMENT WORK

PC The student:

- (a) lists the relevant sources of information for excavation and reinstatement of public roads and footways to be consulted;
- (b) outlines clearly the road opening permits requirements for major, minor and emergency works;
- (c) determines from available alternatives given in the documentation the layer dimensions appropriate to flexible pavement structures of roads and footways.

IA Restricted Response

The student will be presented with an exercise consisting of restricted response questions to test the recall of knowledge of documents governing the control of workings upon public highways.

The exercise will consist of 5 questions allocated as follows:

- (a) source documents - 1
- (b) road opening permits - 2
- (c) construction specification - 2

Satisfactory achievement of the Learning Outcome will be based on all performance criteria being met. This will be demonstrated by the student producing one correct response to each of (a), and (c) and two correct responses to (b).

LO2 USE APPROPRIATE EQUIPMENT AND METHODS TO EXCAVATE ROADS AND FOOTWAYS CONSTRUCTED OF DIFFERING MATERIALS

PC The student:

- (a) selects manual and power breaking out equipment appropriate to layer material and stiffness;
- (b) operates pavement saws appropriate to surfacing material bituminous or rigid;
- (c) organises mechanical and manual excavation activities effectively for the excavation of sub-grade and pavement layers of roads and footways;
- (d) separates reusable materials from spoil during excavation activities upon roads, footways and other areas as appropriate to the potential of reusable materials;
- (e) follows safe working practices relevant to the task.

IA Practical Exercises

The student will be set an exercise consisting of a series of practical tasks to test the application of knowledge and skills required to excavate areas of road and footway.

The students may work in pairs for this practical exercise where an individual student will be responsible for the excavation of a given layer of pavement structure.

The exercise will consist of 2 tasks allocated as follows:

- (i) excavate a given layer of road
- (ii) excavate a given layer of footway

For tasks (i) and (ii) the student will be presented with an area of flexible road minimum 0.7m square and footway 0.4m square and a range of tools and equipment appropriate for the completion of the given tasks.

Satisfactory achievement of the Learning Outcome will be based on all the performance criteria being met. This will be demonstrated by the student achieving all the items on the following checklist:

CHECKLIST

1. safe working practices relevant to each task are followed
2. uses manual and hand operated breaking out equipment
3. uses pavement saws appropriate to surfacing material
4. places excavated material appropriate to re-use potential or spoil
5. organises excavation activities on site

LO3 SELECT SUITABLE EXCAVATED SUB-GRADE MATERIAL AND SUITABLE EXCAVATED PAVEMENT FOR RE-USE

PC The student:

- (a) uses basic field identification method appropriate to sub-grade material incorporating plasticity, soil identification grading envelope and moisture content;
- (b) identifies suitable excavated pavement to a given check list of material type and visual conditions comprising grading envelope and moisture content;
- (c) selects suitable reusable materials from spoil.

IA Restricted Response

The student will be presented with an exercise consisting of restricted response questions to test the application of knowledge required to select sub-grade and excavated pavement materials suitable to given layers of pavement structure.

The student should be provided with current working documents specifying tolerances.

The exercise will consist of 11 questions allocated as follows:

(i)	plasticity	2
(ii)	gravel	2
(iii)	sand	1
(iv)	silt	1
(v)	grading envelope	2
(vi)	moisture content	1
(vii)	organic matter	2

Satisfactory achievement of the Learning Outcome will be based on all performance criteria being met. This will be demonstrated by the student producing a correct response to each of (i), (iii), (iv), (v) and (vi) and 2 correct responses to each of (ii) and (vii).

LO4

CONSTRUCT ANY GIVEN LAYER OF PAVEMENT STRUCTURE OF FLEXIBLE ROAD AND FOOTWAY TO SURFACE LEVEL

PC The student:

- interprets a re-construction specification of materials, layer dimensions and target compaction levels appropriate to type I - IV roads and footways;
- uses compaction equipment appropriate to layer of pavement structure position, material and desired compaction level;
- measures achieved field compaction appropriate to target values per layer of pavement structure of roads and footways;
- uses measuring devices, travellers and boning rods effectively for layer dimension control for all layers of pavement structure;
- follows safe working practices relevant to the task.

IA Practical Exercises

The student will be set an exercise consisting of a series of practical tasks to test the application of knowledge and skills required to construct a sub-grade or road base of road and sub-grade or foundation of footway.

The students may work in pairs for this practical exercise where an individual student will be responsible for the construction of a layer of pavement structure.

The student should be provided with current working documents specifying tolerances.

The exercise will consist of 2 tasks allocated as follows:

- (i) construct a given layer of road structure
- (ii) construct a given layer of footway structure

For tasks (i) and (ii) the student will be presented with an area of road opening minimum 0.7m square and an area of footway opening 0.4m minimum, a range of tools, equipment and material appropriate for the completion of the given tasks.

Satisfactory achievement of the Learning Outcome will be based on all the performance criteria being met. This will be demonstrated by the student achieving all the items on the following checklist:

CHECKLIST

1. safe working practices relevant to each task are followed
2. selects correct material for layer of pavement structure
3. controls layer levels, alignments and layer dimensions during construction stage
4. uses compaction equipment effectively
5. achieves adequate compaction