-SQA- SCOTTISH QUALIFICATIONS AUTHORITY

24 Douglas Street
GLASGOW G2 7NQ

-Superclass-	**4250520** **TH**	**-Session- 1990**
-Title-		**- PUMPED AND FIRE**

1/)

-DESCRIPTION-

Purpose

cold water supply systems appropriate for use in high rise buildings and covers the design and installation factors

design and installation requirements of mains and pumped hose reel and dry riser, fire protection systems.

receiving complementary industrial experience.

Preferred Entry Level

4 - Contamination and Systems (x 1/2).

Outcomes

The student should:

outline pumped systems of cold water supply for given situations;

describe causes of noise nuisance in cold water systems and outline appropriate remedial action;

outline hose reel and dry riser fire protection installations for given situations.

Assessment Procedures

satisfact
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 **OUTLINE PUMPED SYSTEMS OF COLD WATER SUPPLY FOR GIVEN SITUATIONS**

PCs

(a) The location of components, pipework and control devices is correct in accordance with system operation.
(b) The identification of components, pipework and control devices is correct in accordance with acceptable terminology.
(c) The described functions of components, pipework and control devices are correct in terms of effective system operation.
(d) The described methods of controlling water pressure are correct in terms of prevention of splashing and water wastage.
(e) The described methods of providing drinking water are correct in terms of the quantity and maintaining the quality of stored water and automatic refilling of storage vessels.

IA Structured Question

The student will be presented with an exercise consisting of one structured question to test comprehension of the layout, operation and functions of components in a pumped cold water supply system.

The question should be structured around a single line unlabelled drawing of a pumped cold water supply system suitable for a high rise building and incorporating a break cistern, storage cistern and drinking water header. The drawing should not incorporate any control devices.

The question will be sub-divided as follows:

(i) completion of drawing using appropriate symbols to show correct location of all necessary control devices;
(ii) naming of all essential components and control devices;

(iii) description of functions of the control devices necessary to provide automatic control of system;

(iv) description of means of controlling water pressure;

(v) description of method of providing drinking water supply.

Satisfactory achievement of the Outcome will be based on all the Performance Criteria being met. This will be demonstrated by the student producing a correct response to each part of the structured question.

OUTCOME 2 **DESCRIBE CAUSES OF NOISE NUISANCE IN COLD WATER SYSTEMS AND OUTLINE APPROPRIATE REMEDIAL ACTION**

PCs

(a) The described cause of noise nuisance is correct in terms of the given symptoms.

(b) The methods outlined to remedy the noise nuisance is appropriate to the identified cause.

(c) The method specified to rectify the noise nuisance is economical in terms of cost and conforms to appropriate regulations.

IA Structured Questions

The student will be presented with an exercise consisting of structured questions to test comprehension of the causes of and remedies for noise nuisance in cold water systems.

The exercise will consist of 3 questions from the following list:

(i) flow noise;
(ii) noise at outlet fittings;
(iii) impulsive noise;
(iv) circulator noise;
(v) float operated valve oscillation;
(vi) splash noise in storage cisterns.

For each question the student will be required to:

(i) state the cause of the noise nuisance;
(ii) outline appropriate remedial action to eliminate or reduce noise nuisance in a cost effective way.

Satisfactory achievement of the Outcome will be based on all Performance Criteria being met. This will be demonstrated by the student producing a correct response to each part of the structured question for 2 questions.

OUTCOME 3 **OUTLINE HOSE REEL AND DRY RISER FIRE PROTECTION INSTALLATIONS FOR GIVEN SITUATIONS**

PCs

(a) The location of components, pipework and controls is correct in accordance with system operation and statutory regulations.
(b) The identification of components, pipework and controls is correct in accordance with acceptable terminology.
(c) The described functions of components, pipework and controls are correct in terms of effective system operation.
(d) The described methods of providing adequate water quantities are correct in terms of pressure and flow requirements.

IA Structured Questions

The student will be presented with an exercise consisting of two structured questions to test comprehension of the installation, operation and functions of components in (1) hose reel and (2) dry riser fire protection installations.

For question (1) the student should be provided with an A4 size sketch of a pumped hose reel installation as could be fitted in an industrial or commercial building. The sketch should contain the following components and control devices which provide:

- water storage
- water pressure
- automatic operation of system
- water jet
- valves related to servicing needs.

This question will be sub-divided as follows:

(i) identification of the above components and control devices;
(ii) description of the above components and control devices;
(iii) description of the requirements for water quantities, pressure and flow.

For question (2) the student should be provided with the description of the requirements for the operation of a typical dry riser installation for a multi-storey building.

This question will be sub-divided as follows:

(i) sketching of a system to meet specified requirements;
(ii) labelling of the pipework, components and controls sketched;

(iii) description of the factors affecting the location and access to inlet and outlet connections;
(iv) stating of pipe sizes to ensure adequate water pressure and quantities.

Satisfactory achievement of the Outcome will be based on all Performance Criteria being met. This will be demonstrated by the student producing a correct response to each part of the structured question for both questions.

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

CONTENT/CONTEXT

Corresponding to Outcomes 1-3:

1. Reasons for use of pump boosted systems of cold water supply. Direct and indirect (including auto pneumatic) pump boosted cold water supply systems. Location, installation, functions and operation of components and control devices required in pump boosted systems (to include float, pipeline, pressure and time delay switches and check valves).

   Sizing and installation of break and storage cisterns. Provision of drinking water in pump boosted systems. Installation and sizing of drinking water headers and cisterns. Automatic filling of header pipes.

   Types of circulators - installation requirements for circulators.

   Problems associated with excessive water pressures. Control of water pressure.

2. Sources of noise nuisance in cold water systems to include: water flow noise; cavitation; noise at terminal fittings; impulsive noise (water hammer); float operated valve oscillation; valve bounce; pump noise; float operated valve noise; impact noise in sanitary fittings.

   Means of reducing or eliminating noise: control of water velocities; flow rates and pressure; installation of appropriate types of control valves; types of washers; pinning of valves; pipework lengths; pipe sizes and fixing of pipework; installation of air vessels and vibration isolators; fitting of backing and baffle plates; circulator vibration isolators; location of plant; resiliant mountings. Types of float operated valves. Location of cisterns.

3. Statutory regulations relating to the installation of fire protection systems. Positioning of hose reels - types of hose reels (fixed, swinging); operation of hose reels (manually operated or automatic). Water discharge from hose reel jets; flow and pressure requirements of hose reels. Pipework components and controls required for mains fed and pumped hose reel installations - functions of components and control. Sketching of hose reel installations. Sizes and positioning of dry riser installations. Components, pipework and controls required for dry riser installations; (i.e. landing valves, fire service breeching point, automatic air vent, drain valve). Functions of components and controls, - location of components. Factors affecting location of breeching points.

SUGGESTED LEARNING AND TEACHING APPROACHES

This module is essentially classroom based but a site visit to examine fully operational pumped cold water systems and fire protection installations would be beneficial.

The student should be encouraged to investigate relevant sections of the IOP Design Guide.

Adequate opportunity should be given to enable students to sketch and identify components and valves from prepared drawings.

Textbooks, handouts, worksheets and OHP transparencies could all be used to advantage.