

-SQA-SCOTTISH QUALIFICATIONS AUTHORITY

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NATIONAL CERTIFICATE MODULE DESCRIPTOR

-Module Number- 0064173 -Session-1986-87
-Superclass- XK
-Title- OVERHEAD LINES

-DESCRIPTION-

Type and Purpose A specialist module which enables the student to acquire a knowledge of the technology of overhead power lines used by the Electricity Supply Industry. It is designed to extend the knowledge of students involved in the study of Electrical Plant.

Preferred Entry Level 04003 Fundamentals of Technology: Electrical

Learning Outcomes The student should:

1. know the constructional features and application of listed components;
2. know the factors to be considered, and methods used in calculating the tension in overhead lines;
3. know the procedures to be adopted and the factors to be considered when installing overhead lines;
4. know the causes and methods of reducing and/or rectifying common faults on overhead lines;
5. know the safety problems and procedures associated with working on overhead lines.

Content/ Context Corresponding to the Learning Outcomes:

1. conductors: methods of connection including bolting, sweating and compression;

supports: wooden poles and steel towers for terminal, intermediate and deviation supports, stays and struts;

insulators: pin, post, stay insulators tension and suspension sets;

protective: guard rings, arcing horns, surge devices, diverts.

2. clearances, sagging, span length, temperature and sag-tension charts, the effects of wind and ice-loading, calculation of tension using $T = \frac{WL}{8S}$
3. statutory consent and notices, routing of lines considering main topographical features and effects on the routes, way-leave procedures including notices, rights granters, access, damage and compensation.

Profiling of line and surveying techniques including vertical and horizontal measurements, type of instrument used.

Methods of erection, foundations, guys and stays, plant used, and spacing of poles and towers.

4. factors to be considered: weather and atmospheric conditions, puncture, flashover, corona, surface leakage and tracking, vibration, galloping conductors and corrosion.

Methods of reducing or rectifying: self cleaning, greasing, washing down of insulators.

Design of conductors, compacted stranding of conductors, clampers, spacers, bimetallic jointing techniques.

5. regulations, application of Health and Safety at Work Act, Electricity Supply Regulations. Working procedures when working on dead overhead line conductors: discharge of conductors, earthing, notices, principles of "permit to work" system. Principles of live line working.

Suggested Learning and Teaching Approaches

This module cannot be conducted in the required practical environment for obvious reasons. Full use should be made of demonstrations, films and visits. Tension in lines can be calculated without the factors of wind speed and ice loading being taken into consideration. Assumptions can be made and the effects of these quantities estimated.

Exercises in work planning, profiling of a line and surveying techniques could assist in developing the concept of student centred learning.

Assessment
Procedures

All learning outcomes must be validly assessed.

The student must be informed of the tasks which contribute to summative assessment. Any unsatisfactory aspects of performance should, if possible, be discussed with the student as and when they arise.

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

The following abbreviations are used below:

LO Learning Outcome
IA Instrument of Assessment
PC Performance Criteria

LO1 IA Written short answer test.

PC Given a series of typical components, the student correctly describes their construction and applications.

LO2 IA Analytical exercise.

PC Given a series of problems in overhead lines, the student correctly calculates the tension in the lines.

LO3 IA Written exercise.

PC Given a practical problem in installation, the student correctly describes the proper procedures to be followed.

LO4 IA Written exercise.

PC Given a series of common faults, the student correctly describes the appropriate procedures for reducing or rectifying them.

LO5 IA Written short answer test.

PC The student displays adequate knowledge of the content.

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