

-SQA- SCOTTISH QUALIFICATIONS AUTHORITY

HIGHER NATIONAL UNIT SPECIFICATION

GENERAL INFORMATION

Unit Number	D3RF 04
Unit Title	VIBRATION ANALYSIS
Superclass Category	RC
Date of Publication (month and year)	
Originating Centre for Unit	Cleveland Open Learning Unit

DESCRIPTION

GENERAL COMPETENCE FOR UNIT:

Applying the principles of vibration analysis to industrial preventive maintenance strategies.

OUTCOMES:

1. explain the general principles of vibration analysis;
2. identify causes of vibration;
3. describe vibration analysis equipment;
4. analyse the characteristics of vibration and noise.

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 student had competence in Mathematics and Engineering Principles. This may be evidenced by the successful completion of modules at National Certificate level or their equivalent.

Additional copies of this unit can be obtained from: The Administrative Services Unit, SQA, Hanover House, 24 Douglas Street, Glasgow G2 7NQ (Tel: 0141-242 2166).

At the time of publication, the cost is £2.50 (minimum order £5.00)

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STATEMENT OF STANDARDS

Unit Number

Unit Title

VIBRATION ANALYSIS

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 the standards are mandatory and cannot be altered without reference to SQA.

OUTCOME

1. EXPLAIN THE GENERAL PRINCIPLES OF VIBRATION ANALYSIS

PERFORMANCE CRITERIA

- (a) Statements of the general principles of vibration analysis are appropriate to specified stages of application.

RANGE STATEMENT

Stages of application: monitoring; analysis; diagnosis; correction.

EVIDENCE REQUIREMENTS

Written evidence of the candidate's ability to state general principles of vibration analysis appropriate to specified stages.

OUTCOME

2. IDENTIFY CAUSES OF VIBRATION

PERFORMANCE CRITERIA

- (a) Descriptions of different causes of vibration are clear.
- (b) Identification of vibration components is correctly associated with specific sources.

RANGE STATEMENT

Causes of vibration: unbalance; misalignment; eccentricity; mechanical looseness.
Sources: journal bearings; ball-races; rolling elements; machine mountings.

EVIDENCE REQUIREMENTS

Written evidence showing ability to describe causes of vibration.
Written evidence and, where appropriate, diagrammatic evidence showing ability to identify vibration components associated with specific sources.

OUTCOME

3. DESCRIBE VIBRATION ANALYSIS EQUIPMENT

PERFORMANCE CRITERIA

- (a) Descriptions of portable vibration analysis equipment are clear.
- (b) Descriptions of continuous monitoring data collection equipment are sufficient to explain their operating principles.

RANGE STATEMENT

Equipment: accelerometer; proximity probe; 'noise' level instrument; weighting networks; recording equipment; signal conditioners; transducer mountings.

EVIDENCE REQUIREMENTS

Written evidence showing ability to describe portable and continuous monitoring data collection vibration analysis equipment.

OUTCOME

4. ANALYSE THE CHARACTERISTICS OF VIBRATION AND NOISE

PERFORMANCE CRITERIA

- (a) Relationships between the characteristics of vibration are clearly explained in terms of their definitions and mathematical expressions.
- (b) Relationships between the characteristics of noise are clearly explained in terms of their definitions and mathematical expressions.
- (c) The employment of a 'vibration severity chart' to assess machine condition is clearly explained.

RANGE STATEMENT

Vibration characteristics: frequency; displacement; amplitude; velocity; acceleration; phase.
Noise characteristics: speed of propagation; frequency.

EVIDENCE REQUIREMENTS

Written and graphical evidence showing ability to explain the relationships between vibration characteristics.

Written evidence showing ability to explain the relationships between noise characteristics.

Written and graphical evidence showing ability to explain the use of a 'vibration severity chart'.

MERIT

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) use of individual performance criteria in a creative way to solve unfamiliar problems.
- (b) depth of further reading or research.

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 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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SUPPORT NOTES

Unit Number

Unit Title

VIBRATION ANALYSIS

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.

REFERENCES

1. Guide to unit writing.
2. For a fuller discussion on assessment issues, please refer to SQA's Guide to Assessment.
3. Information for centres on SQA's operating procedures is contained in SQA's Guide to Procedures.
4. For details of other SQA publications, please consult SQA's publications list.

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