

-SQA- SCOTTISH QUALIFICATIONS AUTHORITY

HIGHER NATIONAL UNIT SPECIFICATION

GENERAL INFORMATION

Unit Number	D3R8 04
Unit Title	SAFETY ENGINEERING
Superclass Category	XA
Date of Publication (month and year)	
Originating Centre for Unit	Cleveland Open Learning Unit

DESCRIPTION

GENERAL COMPETENCE FOR UNIT:

Applying the techniques of safety engineering to industrial processes.

OUTCOMES:

1. analyse a hazardous incident;
2. conduct a HAZOP (hazard and operability) study;
3. quantify risk occurrence;
4. appraise a worksite's emergency procedures and make recommendations where appropriate.
5. outline safety procedures for closed vessel isolation and entry by personnel.

CREDIT VALUE: 1 HN Credit

ACCESS STATEMENT:

Access to this unit is at the discretion of the centre.

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

SAFETY ENGINEERING

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. ANALYSE A HAZARDOUS INCIDENT

PERFORMANCE CRITERIA

- (a) The written report of a hazardous incident is detailed and accurate.
- (b) An accurate record of consequences to equipment, employees and the environment is developed.
- (c) Recommendations made to prevent or reduce the chances of re-occurrence of the initiating events are appropriate to the incident.
- (d) Industrial safety terminology is appropriate.

RANGE STATEMENT

The range is fully expressed within the performance criteria.

EVIDENCE REQUIREMENTS

Written evidence of the candidate's ability to write a report of a hazardous incident, record a list of consequences to equipment, employees and the environment and make recommendations to prevent or reduce the impact of initiating events. Appropriate safety terminology to be used throughout the report.

OUTCOME

2. CONDUCT A HAZOP (HAZARD AND OPERABILITY) STUDY

PERFORMANCE CRITERIA

- (a) Deviations from normal process operating conditions and their consequences are identified correctly.
- (b) Recommendations made to prevent occurrence of deviations are appropriate.
- (c) Industrial safety terminology is appropriate.

RANGE STATEMENT

The range is fully expressed within the performance criteria.

EVIDENCE REQUIREMENTS

Written evidence of one HAZOP study that gives valid causes, predicted consequences and recommended actions to be taken to avoid 'none' and 'more-of' scenarios.

OUTCOME

3. QUANTIFY RISK OCCURENCE

PERFORMANCE CRITERIA

- (a) Risk calculations are accurate.
- (b) Fault trees, probability, frequency rates, combination of events and failure rates are interpreted correctly.
- (c) The relevance of data is justified.
- (d) Recommendations made to reduce the frequency of system failure of the overall system are valid.
- (e) Industrial safety terminology is appropriate.

RANGE STATEMENT

The range is fully expressed within the performance criteria.

EVIDENCE REQUIREMENTS

Written evidence showing the calculation of overall risk of failure for a system given the failure rate frequency for individual components of the system.

OUTCOME

4. APPRAISE A WORKSITE'S EMERGENCY PROCEDURES AND MAKE RECOMMENDATIONS WHERE APPROPRIATE

PERFORMANCE CRITERIA

- (a) A plan of a worksite is drawn to include all essential features.
- (b) Recommended changes to the location of plant safety equipment are appropriate.
- (c) Recommended changes to the location of escape routes and the position of muster points are appropriate.
- (d) Existing emergency procedures are evaluated and changes recommended where appropriate.
- (e) Industrial safety terminology is appropriate.

RANGE STATEMENT

Essential feature: plant safety equipment; muster points; escape routes.

EVIDENCE REQUIREMENTS

Written and diagrammatic evidence of the candidates ability to:

- Draw up a site safety plan showing the position of safety equipment, escape routes and muster points.
- Examine and evaluate existing site emergency procedures and recommend changes where appropriate.

OUTCOME

5. OUTLINE SAFETY PROCEDURES FOR CLOSED VESSEL ISOLATION AND ENTRY BY PERSONNEL

PERFORMANCE CRITERIA

- (a) Safe isolation procedures of a closed vessel prior to vessel entry are described correctly.
- (b) Types of clearance certificates identified are valid for the particular vessel.
- (c) Procedures and practices relating to the issue of clearance certificates are accurately described.
- (d) Personal and environmental protection procedures are identified correctly.

RANGE STATEMENT

The range is fully expressed within the performance criteria.

EVIDENCE REQUIREMENTS

Written and oral evidence that the candidate can describe procedures, practices, legislation and clearance certificate details for vessel isolation and entry.

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) Demonstrating the ability to use different performance criteria in an integrative way.
- (b) A high degree of coherence in the explanations given.

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

SAFETY ENGINEERING

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.

CONTENT/CONTEXT

The following information gives further clarification regarding the context in which the outcomes and performance criteria are to be achieved.

Corresponding to the Outcome:

1. (a), (b), (c) & (d)
Strategy of systematic risk assessment. Accident cost consideration. Standards and codes of practice. Specimen standards of safety performance. The consequences of hazards. Classes of fires and types of explosion. Accident investigation and documentation. Workplace monitoring techniques.
2. (a), (b) & (c)
Need for and purpose of hazards and operability study techniques. Scope of application and HAZOP procedures. Study team structure. Guide word usage and recording of actions.
3. (a), (b) & (c)
Safety assessment methods. Classification of industrial risks. Risk criteria and the assignment of probabilities. Contour plots, F/N and distribution curves. Target setting. FAR criteria and limitations of risk assessment. The use of hazard rating indices. Methodology of risk control.
4. (a), (b), (c), (d) & (e)
Need for and objectives of emergency classifications. Typical site plan structures. Liaison with local emergency services. Criteria of 'Notifiable Installations'. Emergency control centres. Responsibility of personnel. Emergency and rescue teams. Transport planning for emergencies. Flammability zones. Personal safety including correct apparel, emergency. COSHH regulations.

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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