

# Unit 7: Health, Safety, Risk Assessment and Welfare in the Engineering Workplace

**NQF Level 3: BTEC National**

**Guided learning hours: 60**

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## Unit abstract

The welfare of people working or operating within any manufacturing or engineering environment is of prime importance. All workers should expect to be able to carry out their work in a safe manner that has no negative effect on their health and wellbeing. In fact, many organisations not only reduce risks and make improvements to the working environment but try to make their own working environment superior to others, making it a competitive aspect when recruiting staff.

Health and safety in the workplace is about measures designed to protect the health and safety of employees, visitors and the general public who may be affected by workplace activities. Safety measures are concerned with controlling and reducing risks to anyone who might be affected by these activities.

Health and safety is controlled largely by legislation and regulations and the law is continually being revised and updated. It is important that organisations are aware of these changes and keep up to date with developments.

This unit provides an understanding of hazards and risks associated with health, safety and welfare in an engineering workplace. Learners will develop an understanding of the requirements of health, safety and welfare legislation and regulations and of their roles in complying with the related legal obligations. Ideally this unit would form a key component within the programme, as the content is applicable to many engineering situations.

Learners will be required to undertake full risk assessments and to appreciate the significant risks encountered in the workplace and the measures taken to deal with them. They will also study the principles of reporting and recording accidents and incidents, again within a legal context.

## Learning outcomes

**On completion of this unit a learner should:**

- 1 Understand the key features of health and safety legislation and regulations
- 2 Know how to identify and control hazards in the workplace
- 3 Be able to carry out a risk assessment and identify control measures
- 4 Understand the methods used when reporting and recording accidents and incidents.

## Unit content

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### 1 Understand the key features of health and safety legislation and regulations

*Key features of legislation and regulations:* legislation eg Health and Safety at Work Act 1974, Employment Act 2002, Factories Act 1961, Fire Precautions Act 1971; regulations eg Employment Equality (Age) Regulations 2006, Management of Health and Safety at Work Regulations 1999, Provision and Use of Work Equipment Regulations (PUWER) 1998, Control of Substances Hazardous to Health (COSHH) Regulations 2002, Lifting Operations and Lifting Equipment Regulations 1998, Manual Handling Operations Regulations 1992, Personal Protective Equipment at Work Regulations 1992, Confined Spaces Regulations 1997, Electricity at Work Regulations 1989, Control of Noise at Work Regulations 2005, Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR) 1995, Working Time Regulations 1998, Workplace (Health, Safety and Welfare) Regulations 1992, Health and Safety (First Aid) Regulations 1981, Supply of Machinery (Safety) (Amendment) Regulations 2005 (SI 2005/831)

*Roles and responsibilities of those involved:* employers; employees; Health and Safety Executive (HSE) eg span of authority, right of inspection, guidance notes and booklets; others eg management, sub-contractors, public, suppliers, customers, visitors

### 2 Know how to identify and control hazards in the workplace

*Within the workplace:* methods to identify hazards eg statements, analysis of significant risks, prediction of results or outcomes of those risks, use of accident data, careful consideration of work methods

*Working environment:* consideration of the workplace and its potential for harm eg confined spaces, working over water or at heights, electrical hazards, chemicals, noise

*Hazards which become risks:* identification of trivial or significant risk; potential to cause harm; choosing appropriate control measures; electrical safety eg identify and control hazards, cause of injury, effects of electricity on the body, circuit overloading; mechanical safety eg identify and control hazards, cause of injury, rotating equipment, sharp edges; safety devices eg residual current device (RCD), fuses, guards, fail safe, sensors

### 3 Be able to carry out a risk assessment and identify control measures

*Risk assessments:* items/area to be assessed eg machine operation, work area; five steps (principal hazards, who is likely to be injured/harmed, evaluate the risks and decide on adequacy of precautions, recording findings, review assessment)

*Use of control measures:* eg remove need (design out), use of recognised procedures, substances control, guarding, lifting assessments and manual handling assessments, regular inspection, use of Personal Protective Equipment (PPE), training of personnel, other personal procedures for health, safety and welfare

**4 Understand the methods used when reporting and recording accidents and incidents**

*Principles:* why employers keep records of serious accidents, incidents and emergencies; responsibilities of competent persons; cost of accidents eg direct, indirect, human consequences; trends eg major causes, fatal and serious injury, methods of classification, statistics

*Recording and reporting procedures:* regulations on accident recording and reporting eg Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR) 1995, accident book, company procedures; procedures to deal with near misses or dangerous occurrences

## Grading grid

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all of the learning outcomes for the unit. The criteria for a pass grade describe the level of achievement required to pass this unit.

Grading criteria		
To achieve a pass grade the evidence must show that the learner is able to:	To achieve a merit grade the evidence must show that, in addition to the pass criteria, the learner is able to:	To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to:
P1 describe the key features of relevant regulations on health and safety as applied to a working environment in two selected or given engineering organisations	M1 explain the consequences of management not abiding by legislation and regulations and carrying out their roles and responsibilities in a given health and safety situation	D1 justify the methods used to deal with hazards in accordance with workplace policies and legal requirements
P2 describe the roles and responsibilities under current health and safety legislation and regulations, of those involved	M2 explain the importance of carrying out all parts of a risk assessment in a suitable manner	D2 analyse accident trends in the engineering industry and calculate the cost of an accident in the workplace from given data.
P3 describe the methods used to identify hazards in a working environment	M3 describe how control measures are used to prevent accidents.	
P4 describe how hazards which become risks can be controlled		
P5 carry out a risk assessment on a typical item/area of the working environment		

<b>Grading criteria</b>		
<b>To achieve a pass grade the evidence must show that the learner is able to:</b>	<b>To achieve a merit grade the evidence must show that, in addition to the pass criteria, the learner is able to:</b>	<b>To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to:</b>
<p>P6 suggest suitable control measures after a risk assessment has been carried out and state the reasons why they are suitable</p> <p>P7 describe the principles that underpin reporting and recording accidents and incidents</p> <p>P8 describe the procedures used to record and report accidents, dangerous occurrences or near misses.</p>		

## Essential guidance for tutors

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### Delivery

In all engineering units it is necessary to integrate health and safety at an early stage. Case studies/projects could be used for the delivery of this unit in an attempt to focus learners on the relationship between the process, the environment and health, safety and welfare.

Case studies might be based on a site where the learner is working. This will add vocational reality. In this case, learners may need to formulate and agree the scenario and the terms of reference for the case study or project with their tutor.

Alternatively the unit could be taught using case studies that tutors can research from trade union material, the Health and Safety Executive (HSE) or local and national newspapers and radio stations. Indeed, the death of over 600 people every year at work is an illustration of the importance of effective education and training on health and safety. Many local HSEs will be very willing to give guidance and advice on accident prevention, along with statistics on health and safety performance.

The learning outcomes form a natural order for delivery. The full range of legislation and regulations can be made available, but learners could be asked to only research a given area and present their findings to the rest of the group, so that the whole group benefits from the exercise. All the areas of content are likely to be found easily on the internet.

Learning outcome 2 is about knowing how to identify hazards and could be covered through practical visits to workshops, companies or other areas. Before learning outcome 3 is delivered it is appropriate to emphasise the differences between hazards and risks. The ways that risks are controlled could be dealt with in a practical way. Learners should be given opportunities to build their confidence in carrying out a risk assessment by practising this skill over a number of scenarios. This should allow them to achieve when asked to do one as an assessed activity. Photographs and drawings could be used to capture what they have done for future reference.

Learners should be taught about the principles involved when reporting and recording accidents and near misses. The pyramid of deaths to accidents to near misses should be emphasised. It is possible that research from learning outcome 1 might contain useful information regarding the requirements of RIDDOR. Visits to companies to see their procedures will strengthen learners' understanding of this and all other health, safety and welfare aspects.

Note that the use of 'eg' in the content is to give an indication and illustration of the breadth and depth of the area or topic. As such, not all content that follows an 'eg' needs to be taught or assessed.

## Assessment

Evidence of criteria can be collected from case studies, assignments and projects which should enable learners to explore the application of legislation and regulations and hazards and risks in the workplace.

The pass grade specifies the minimum acceptable level required by learners. Assessment will need to cover all the learning outcomes but not necessarily all the topics included in the unit content. Achievement of a merit or a distinction grade will require answers that demonstrate additional depth and/or breadth of treatment.

To achieve a pass, learners must demonstrate an understanding of health, safety and welfare issues as applied to engineering processes and companies. They will need to describe the key features of legislation and regulations and describe a range of roles and responsibilities. They will have an understanding of the connection between hazard identification, risk assessment and accident prevention. Learners will need to carry out a risk assessment, suggest suitable controls and show they understand the principles and procedures for reporting and recording accidents and other occurrences relative to health and safety.

This unit could be assessed through the three assignments. The first assignment could have a series of written tasks. The first task could ask learners to research and then describe the key features of relevant regulations as applied to two separate working environments (P1). It would be expected that at least four regulations should be considered across the two selected or given engineering organisations.

Another task could then ask them to describe the roles and responsibilities of those involved, under current health and safety legislation and regulations (P2). The organisations selected could include learners' places of work, or a training workshop or machine shop environment. A combination of one electrical and one mechanical type would be most appropriate. The assignment should cover legislation and regulations. It is not expected that all the legislation and regulations listed would be covered, just those applicable to the given context.

The roles and responsibilities of those involved should include employers, employees, the Health and Safety Executive and any one from the list of others within the unit content. A further task could then be used asking learners to explain the consequences of management not abiding by legislation and regulations and carrying out their roles and responsibilities in one of these situations (M1). All responses could be in a written format, although for the pass criteria a presentation to the class or annotated poster could be used. In these cases it must be remembered that the presentation skills or poster design skills are not being assessed.

The second assignment could cover P3, P4, P5 and P6 along with the higher criteria M2, M3 and D1. The whole assignment could be based on a practical activity to produce a risk assessment on a typical item or area of a working environment. Again, this working environment could be the learner's workplace or one from the centres own workshops. Whichever item or area is chosen it should have a range of hazards that can be identified, for example a machining operation or electrical assembly/wiring type activity could be used.

Written tasks would have to be set to give learners opportunities to achieve the descriptions required for P3, P4 and M3, the explanation required for M2, and the justification required for D1. P6 could be achieved through an oral question and answer session after carrying out the risk assessment. A standard template can be used to capture the outcomes of the risk assessment as this is what would be found in normal company use. A witness statement/observation record could be used to show learner performance against the requirement of P5.

The final assignment could cover the remaining criteria P7, P8 and D2, with a written task given for each. Learners should be given opportunities to investigate trends in an area they are interested in, which again may be an area similar to their workplace. The assignment should include a range of data given to each learner, some of which may have been researched and collected during the delivery of this part of the unit content.

To achieve a merit, learners must have a sound knowledge and understanding of health, safety and welfare issues and the importance of the role management play in this. They will have a broad awareness of the main underpinning concepts and principles relating to how risk assessments are carried out and the measures used to prevent accidents.

To achieve a distinction, learners must have a comprehensive level of knowledge and understanding of health, safety and welfare issues and of the individual and management responsibilities of the various parties in the engineering process. They will have a good awareness of the main underpinning concepts and principles relating to health, safety and welfare and be able to justify methods deployed in accordance with policies and legal requirements (D1). The best opportunity to assess this may be in the second assignment which concentrates on risks, hazards and controls and is after they have demonstrated they understand key features of health and safety legislation and regulation.

### **Links to National Occupational Standards, other BTEC units, other BTEC qualifications and other relevant units and qualifications**

This unit links with all other units in the qualification and should prepare learners for the workplace.

The unit covers some of the knowledge and understanding associated with the SEMTA Level 3 NVQ in Mechanical Manufacturing Engineering and Level 3 NVQ in Business Improvement Techniques, particularly:

- Unit 1: Complying with Statutory Regulations and Organisational Safety Requirements.

It also covers some of the knowledge and understanding associated with the SEMTA Level 3 NVQ in Engineering Leadership, particularly:

- Unit 1: Maintain a Healthy, Safe and Productive Work Environment.

## Essential resources

Access to a wide range of safety literature is essential and centres should ideally have health and safety legislation and learning material on CD ROM. Access to workplace policies and documentation would help in understanding how health, safety and welfare arrangements can be effectively organised and implemented.

## Indicative reading for learners

### Textbooks

Health and Safety Executive – *A Guide to Risk Assessment Requirements: Common Provisions in Health and Safety Law* (HSE Books, 1996) ISBN 0717612112

Health and Safety Executive – *Essentials of Health and Safety at Work* (HSE Books, 1994) ISBN 071760716X

Health and Safety Executive – *Management of Health and Safety at Work* (HSE Books, 2000) ISBN 0717624889

### Websites

HSE website

[www.hse.gov.uk](http://www.hse.gov.uk)

## Key skills

Achievement of key skills is not a requirement of this qualification but it is encouraged. Suggestions of opportunities for the generation of Level 3 key skill evidence are given here. Tutors should check that learners have produced all the evidence required by part B of the key skills specifications when assessing this evidence. Learners may need to develop additional evidence elsewhere to fully meet the requirements of the key skills specifications.

<b>Communication Level 3</b>	
<b>When learners are:</b>	<b>They should be able to develop the following key skills evidence:</b>
<ul style="list-style-type: none"> <li>describing the principles that underpin and the procedures used for reporting and recording accidents, dangerous occurrences or near misses.</li> </ul>	<p>C3.3 Write <b>two</b> different types of documents, each one giving different information about complex subjects.</p> <p>One document must be at least 1000 words long.</p>
<b>Improving own learning and performance Level 3</b>	
<b>When learners are:</b>	<b>They should be able to develop the following key skills evidence:</b>
<ul style="list-style-type: none"> <li>recognising how control measures are used to reduce risk and prevent accidents.</li> </ul>	<p>LP3.1 Set targets using information from appropriate people and plan how these will be met.</p>
<b>Problem solving Level 3</b>	
<b>When learners are:</b>	<b>They should be able to develop the following key skills evidence:</b>
<ul style="list-style-type: none"> <li>carrying out a typical risk assessment and suggesting suitable control measures.</li> </ul>	<p>PS3.2 Plan and implement at least one way of solving the problem.</p> <p>PS3.3 Check if the problem has been solved and review your approach to problem solving.</p>