Health, safety and welfare in construction and the built environment

Introduction

The health, safety and welfare of the construction workforce are crucial within our industry, which contains many hazards and risks. Falls from height and incidents involving plant and machinery are the primary causes of accidents on construction sites.

In this chapter, you will look at the employer’s and employee’s duties under current health, safety and welfare legislation, along with the identification of the risks and hazards in the workplace. The control of these hazards and risks will be investigated using the risk assessment process. You will learn how to undertake a typical construction risk assessment, using a site visit at your educational establishment or from a construction site visit. You will learn how accidents can be prevented by the use of risk control measures and how to meet legal requirements. Finally, you will look at what happens after an accident, the immediate processes and the legal reporting procedure.

How you will be assessed

This unit is internally assessed by your tutor. A variety of activities are included in this chapter to help you understand all aspects of working safely in the construction industry.

After completing this unit you should be able to achieve the following outcomes:

1. Understand the general and specific responsibilities of both employers and employees under current health, safety and welfare legislation
2. Be able to identify workplace hazards, persons who may be affected by such hazards, and the potential consequences of accidents
3. Know how to use risk assessments in appropriate formats
4. Be able to use workplace health and safety policies to recommend control measures, reduce risk and meet legal requirements
5. Understand own role in accident recording and reporting procedures
Health and safety is present every day of our lives and includes not just our home life but also our working life. The construction of buildings, roads, drainage, schools, factories and houses can be unique and complicated projects, each having different and varied risks and hazards associated with them. Multi-storey, high-rise buildings in major cities are now a normal occurrence and involve the risk of working at height to construct them.

Take a look at a local construction site that is near where you live – make sure you do not enter the site but observe from the outside. What are the hazards associated with this construction work? How are you going to control these hazards? How will you prevent major accidents occurring? As you work through this chapter, you will learn how to answer these vital health and safety questions, many of which require to be answered by law!

Whatever aspect of construction you choose for your future career, be it architecture, civil engineering or building services, health and safety will be of considerable importance, whether you work in a large or a small organisation. It is an aspect of construction that has to be considered daily.

In the UK, the majority of fatal and major accidents occurs within the construction industry. What do you consider is the major cause of these accidents? Can they be prevented with precautions and legislation?
Roles and responsibilities

The employer

Employers have a general duty under the Heath and Safety at Work Act (HASAWA) 1974 to ensure, so far as is reasonably practicable, your health, safety and welfare at work.

Key Term

Employer This is a person who owns the company constructing the building or project; it may be the managing director or a multinational with shareholders and a chief executive officer.

Specific responsibilities

Specific responsibilities are listed in the HASAWA under the general duties to employees and are as follows:

- To ensure the health and safety of all employees.
- To provide safe systems of work, safe handling, storage and transport, information training and supervision, a safe place of work access and egress, and a safe environment.
- To provide a health and safety policy if there are five or more employees.
- To observe the regulations on union appointed safety representatives.
- To consult and cooperate with employees on safety measures.
- To observe the regulations on safety committees.
- Not to charge for anything provided for safety (Health & Safety Executive).

As you can see, this list is quite comprehensive and covers all the vital elements to provide a safe environment for employees.

The employee

Under the HASAWA, employees have the following general duties:

- To act with due care for themselves and others, e.g. to walk rather than run down a corridor.
- To cooperate with the employer, e.g. taking part in tool box talks.
- To use correctly anything provided for health and safety in accordance with any instruction or training, e.g. safety glasses and ear protectors.
- Not to recklessly interfere or misuse anything provided for health and safety, e.g. letting off a fire extinguisher for fun (Health & Safety Executive).

Key Term

Employees Workers who receive wages for their skills from the employer.

Tool box talks Where everyone stops work and discusses a safety aspect of the job they are working on.

The client

The client, whether a landlord, private individual or a company, has many health and safety responsibilities. They must demonstrate an acceptable standard of health and safety. Under the Construction (Design and Management) Regulations 1994 (usually referred to as the CDM Regulations), they have specific responsibilities:

- They have to appoint the planning supervisor.
- They must provide all health and safety information about the workplace where the work is to be carried out.
- They must appoint a competent, resourced, main contractor.
They must ensure that the construction phase health and safety plan has been produced before commencement.

They have to store the health and safety file completion.

They must ensure that any rules set out within the construction phase health and safety plan are passed on to everyone who will be working on the site. They must make sure that the only people allowed on the site have permission to be there. They must ensure that the Health & Safety Executive (HSE) is notified about the works and that the F10 is displayed in a prominent position. They must ensure that they pass on any relevant health and safety information to the planning supervisor.

They prepare the health and safety file. This may be the responsibility of the planning supervisor, but it often falls to the contractor to complete the file and hand it over to the client.

The CDM Regulations are currently under revision and may be changed in 2007. Look up the latest edition on the Office of Public Sector Information website: www.opsi.gov.uk.

Key Term

**Client** The person who will ultimately own the constructed building or project and who pays for the work.

Key Term

**Main contractor** The company constructing the building or project. It may be a large or small organisation.

**F10** The official document that informs the HSE that a company is undertaking a project.

Subcontractors generally work under contract to the main or principal contractor. The principal contractor has to ensure that they are competent, provided with the relevant information, a site safety induction and ensure they provide method statements and risk assessments so that their work can be coordinated safely.

**Subcontractors** Separate companies who work for the main contractor, e.g. a heating engineering company.

**Method statements** These outline in detail how the company is going to undertake the work, what it will use and what precautions it will take.
The Health & Safety Executive (HSE) was set up to regulate and control health and safety in the UK. The HSE has many divisions that cover industries from nuclear power, agriculture, railways to construction. The HSE has a wide role to play in controlling health and safety in construction. Its responsibilities are:

- to advise
- to inspect
- to enforce.

If it wishes, the HSE is empowered to inspect any construction site that has been notified to it under the notification rules associated with the F10. The F10 is the official form that is completed by the contractor and sent to the HSE to advise it that works are about to commence. It contains a brief description of the work, where it is being carried out, for how long and who will be working on it.

The HSE can enforce health and safety legislation in two ways, either by an improvement notice or a prohibition notice. An improvement notice tells the person receiving it that an incident has been found during an inspection that requires correcting within a certain time as it has the potential to cause harm (although is not currently serious enough to cause immediate injury). A prohibition notice is served when there is a serious and imminent danger to persons who might be harmed. Work or activity is stopped immediately and cannot be restarted until the defect is corrected.

The HSE also carries out extensive inspections and investigations following an accident, especially if there has been a fatality. In the last 25 years, nearly 3000 people have been killed within the construction sector. These investigations may often lead to a conviction for failure of duties under the HASAWA, with either a fine or imprisonment or both.

Local authorities’ responsibilities for safety mainly cover environmental health and other general duties such as highways and road safety. The environmental health officer may visit a site on grounds of noise, nuisance or environmental issues, for example if a contractor is disturbing surrounding residents with noise from a compressor, or excessive dust is blowing into people’s homes.
**Key Term**

**Local authority** The elected local council which runs the services within a geographical area.

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**Remember!**

The planning supervisor is given specific roles and responsibilities on planning the health and safety before and after a contract under the Construction (Design and Management) Regulations 1994.

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**Remember!**

Everyone has a **duty of care** in law on a construction site and must act if they see something that would be considered dangerous and may harm a person.

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**The planning supervisor**

The planning supervisor has the following key responsibilities under the CDM Regulations.

- To ensure that the HSE is notified of the project – the F10. The client’s and principal contractor’s names also appear on the form. Indeed, the latter two have to sign it, which is then sent to the HSE.
- To ensure that there is cooperation between designers if there is more than one on the contract, e.g. a structural designer, an architect, an interior designer and a landscape architect. The planning supervisor must ensure that they cooperate with each other. This can be achieved with regular meetings.
- To ensure designers comply with their duties, which are to:
  - make the client aware of their duties
  - assess the risks within the design
  - provide adequate information on the risks (assessments)
  - cooperate with the planning supervisor and other designers.
- To make sure that the pre-tender health and safety plan is prepared.
- To advise the client.
- To check a health and safety file is prepared and handed over to the client (Construction Information Sheets No 40 and No 41).

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**Key Term**

**Duty of care** The duty placed upon everyone by the HASAWA to take care of themselves and others about them.
Case study

Read the following newspaper article on an accident that occurred when a roofing contractor fell through a fragile roof covering. When you have fully read the article, answer the following questions. This is a real accident but the names and places have been changed to protect the anonymity of those involved.

Roofer died after falling 30ft through skylight

Health and safety officials are to consider a criminal prosecution after an experienced roofer fell 30ft through a roof panel to his death on the factory floor.

Graham Cartwright had been asked to check rain leaks on an asbestos roof at Fitted Furniture Ltd. Workers at the factory told an inquest how they reacted in horror as they heard a roof crack. They turned to see Mr Cartwright falling through the air. He hit his head on a wooden pallet before hitting the floor receiving multiple cuts, bruises and fractures including extensive head injuries.

Mr Cartwright was an experienced roofer and had worked at the factory many times over several years for a roofing firm based locally. The inquest heard Fitted Furniture Ltd had a 50-page health and safety manual and would induct subcontractors on safety procedures when they were appointed.

An inspector for the Health & Safety Executive told the inquest that corrosion and brittle sheet roofing cost more than a dozen lives each year. He said: ‘There have a been a whole catalogue of events where these roofs of asbestos sheeting panels have simply shattered into a million pieces. They literally shatter to the touch every few years.’ He confirmed the HSE had made an investigation.

The managing director of Fitted Furniture Ltd told the inquest his firm had subcontracted out the regular repairs on the roof which was part sheeting and part metal. He said each firm and employee was taken through the health and safety manual relevant to their areas of work on the first occasion. He said the firm Mr Cartwright worked for had been known to them for several years. He considered them to be ‘very professional’.

1 Identify and describe the roles and responsibilities of the persons responsible for health, safety and welfare on a construction project.

2 Identify from the case study ‘who was responsible for health and safety in this workplace?’ and describe their roles and responsibilities in this case.

Assessment practice

You have just started the external walls of a building in brickwork and have reached the first-floor level. The scaffolding has just been put into place. The front wall you are currently working on is next to a public footpath in a busy shopping centre To whom do you owe a duty of care?

After you have identified who was responsible for safety on this site, suggest suitable improvements that could be made to the workplace systems at this factory to avoid such a fatal accident again.
The HASAWA 1974 is a very important piece of legislation. It is from this Act that many regulations have been developed. There are numerous sections in the Act that cover where the duty of care lies on a construction site. For example, manufacturers of materials used to construct a building must ensure they are safe; contractors must provide a safe means of access and egress from the place of work such as scaffolding. Legislation on health and safety is there for a reason and that is to protect everyone involved in and around the construction workplace. It also covers people who are not employees, such as delivery drivers and visitors, and places that are not necessarily the employer’s, for example landlords or factory owners where part of the site may be let to another employer.

**Assessment practice**

Identify three main pieces of health, safety and welfare legislation relevant to the construction and built environment sector and describe the legal duties of employees and employers in terms of such legislation.

**Theory into practice**

<table>
<thead>
<tr>
<th>Obligations</th>
<th>Public</th>
<th>Premises</th>
<th>Emissions</th>
<th>Designers</th>
<th>Employee</th>
<th>Interfere</th>
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<td>2</td>
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<tr>
<td>General duties to persons other than employees</td>
<td>General duties of persons concerned with premises</td>
<td>Replaced by the Environmental Protection Act</td>
<td>General Duties of designers, importers, manufacturers and installers of equipment</td>
<td>General duties of employees 1 To act with due care for H&amp;S of 2 To observe 3 To with employer</td>
<td>Duty not or Anything provided in the interests of H&amp;S at work</td>
<td>Duty of the employer Not to for anything needed to meet requirement of the Act</td>
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**General duties of employers to employees**

1. Duty to ensure H&S at work employees
2. Should provide
   - Safe & safe plant
   - Safe handling,
   - Information, supervision
   - Safe place of work, access & egress
   - Safe 
3. Safety Policy
4. Safety Reps
5. Consult and cooperate to develop
6. Safety committees

Figure 1.1 contains a section of the Health and Safety at Work Act. Ask your tutor to print off the resource copy. You will notice that it is divided into several sections: employee’s duties, and so on. The copy shown has several areas missing from it. You will have to undertake research on the Internet in order to complete all the missing sections and duties. Alternatively, you could find an original copy of the legislation within a library resource, or within a health and safety textbook.

**Remember!**

The HSE website has a lot of information that can help you. Visit www.hse.gov.uk for more details.
There has been a considerable amount of health and safety legislation since the HASAWA 1974. Listed below are just some of the primary pieces of legislation that are concerned with the construction industry.

**Thinking points**

An employer has stated in the contract of employment that you will be given two pairs of safety boots each year and will have the cost of these deducted from your wages. Is this legal? What would you do?

**Work at Height Regulations 2005**

These regulations were introduced to try to control the large number of fatalities each year in construction that result from falls from a height. They set out some basic rules that must be followed.

If you can fall off a chair and be injured, then this is classed as ‘working at height’ where there is risk of injury from that height. To control this, the regulations state that you must avoid working at height where an alternative method can be used that does not involve doing this. For example, cleaning first-floor windows to a building can be done using a specialist pole from outside, or if it is a new building, altering the design to install tilt and turn windows which can be cleaned from the inside.

Where there is no alternative and you have to work at height, then: ‘Where work is carried out at height, every employer shall take suitable and sufficient measures to prevent, so far as is reasonably practicable, any person falling a distance liable to cause personal injury’ (Work at Height Regulations, © Crown Copyright 2005). So how can this be achieved? All of the following precautions would help prevent a person falling from height:

- using scaffolding instead of ladders
- mobile elevated platforms
- guard rails, barriers and handrails
- toe boards.

The third major item the regulations cover is to restrict the distance a person can fall. This can be done through the use of:

- **PPE** suspension harnesses to secure a person to a solid structure and restrict the distance they fall through a lanyard

**Remember!**

Health and safety legislation continually evolves and changes. Look for updated laws and regulations.

**Construction (Design and Management) Regulations 1994**

The Construction (Design and Management) Regulations were developed from a European directive that had looked at the principal cause of accidents. The research showed that nearly a third of accidents could be traced back to the design stage of a project. From this, the onus of a risk assessment had now to be undertaken by the designer, so that the contractor and the client were aware of the inherent risks associated with constructing and maintaining a building. The regulations placed duties upon four main parties to the design and construction process:

- the client
- the designer
- the planning supervisor
- the principal contractor.

Specific duties concerning these four are covered later in the chapter.
using netting or airbags to catch a person falling. The Work at Height Regulations also ask employers to check the competency of each individual asked to work at height. To do this, employers may provide suitable training, instruction and supervision and can check that employees are happy and feel confident at the height at which they are being asked to work. The regulations also require that the work is suitably planned and organised and has sufficient supervision. The schedules at the end of the regulations provide details of requirements for working platforms, ladders for risk-assessed, short duration work, access and egress, requirements for PPE and collective means of protection.

**Key Term**

**PPE** Personnel protective equipment. This is equipment provided for the individual to use to protect themselves against certain hazards where there is no alternative method, and it should always be the last resort as you should try to design out its use.

**Key Term**

**Collective means of protection** A system of protection that protects the whole workforce and not just the individual. For example, a scaffold with guardrails, handrails, toe boards and netting protects everyone working or using it.

**Management of Health, Safety and Welfare Regulations 1999**

These were introduced to reinforce the message of risk assessment through the five steps to risk assessment which we will cover later in the chapter. The employer’s duties under these regulations are many. We have picked out some of the regulations that apply to construction work to illustrate the wide range of duties that an employer has under these regulations. The index for the regulations covers:

- health and safety arrangements, e.g. first aid provision.
- the surveillance of employee’s health, e.g. hearing tests.
- informing employees on safety aspects.
- judging the capabilities of employees, e.g. can a person work at height?
- risk assessment processes not to endanger employees.
- the protection of people under 18 years of age.
- provision for expectant mothers.
- temporary workers.

Falling objects must be prevented from falling – by the use of toe boards, netting or a physical barrier.

- The employer must undertake measures with regard to excavations, their support and prevention of people and plant from falling into the excavation.
- Working above water must have special measures in place to prevent an employee drowning.
- The movement of traffic on construction sites, both on and off, must be considered.
- Emergency routes and procedures must be temporarily put into place while the building is incomplete.
- Suitable welfare facilities must be provided for workers.
- Suitable lighting and fresh air must be provided to workplaces.
- To undertake some specific safety inspections, e.g. scaffolds and excavations.

There are no specifically defined duties for employees within these regulations apart from Regulation 4:
- It is the duty of every employee to comply with these regulations.
- Employees should report to a supervisor any defect that could cause harm to themselves or colleagues.
- Every employee has to cooperate regarding health and safety.

The employee’s duties under these regulations are to:
- use any plant or machinery provided in accordance with any training in its use
- to inform their employer of a work situation that poses a serious and imminent danger to employees
- to inform the employer on any safety protection measure or arrangement that may be defective

There are no specifically defined duties for employees within these regulations apart from Regulation 4:
- It is the duty of every employee to comply with these regulations.
- Employees should report to a supervisor any defect that could cause harm to themselves or colleagues.
- Every employee has to cooperate regarding health and safety.

Construction (Health, Safety and Welfare) Regulations 1996

These regulations were introduced in 1996 specifically for the construction industry in order to try to reduce the high level of accidents that were occurring year on year.

The employer’s duties under these regulations include the following:
- That they should ensure that construction workplaces are safe – this is a broad statement that must be adhered to.
- Measures must be in place to prevent operatives falling.

Assessment practice

Identify three main pieces of health, safety and welfare legislation relevant to the construction and built environment sector and describe the legal duties of employees and employers in terms of such legislation.
You have been asked to help set up the construction site for a new shopping complex outside of the city centre. The contracts manager is unsure of the legal requirements that are required, both documentary and physical resources, and asks you to look into this.

With regard to the legislation, identify what is required on site to be provided by the employer – you may find the HSE website useful as it contains summaries in leaflet form of many of the regulations below.

- A construction phase health and safety plan (CDM Regulations)
- Does a F10 have to be filled in? (CDM Regulations)
- Risk assessments required (Management of Health, Safety and Welfare Regulations)
- Checking competency of all workers on site (Management of Health, Safety and Welfare Regulations)
- The use of ladders to reach three storeys (Work at Height Regulations)
- A separate fresh drinking water supply (Construction (Health, Safety and Welfare) Regulations – look at the schedules at the back)

Health and safety plans. Is one required to be in place on site before work commences? (summary of the CDM regulations)

- The parties to CDM
- Regulation 3 in the Management of Health, Safety and Welfare Regulations
- There is a specific regulation that covers capabilities and training. Is this in the Management of Health, Safety and Welfare Regulations?
- Can you use ladders? (Work at Height Regulations – see Regulation 6 and Schedule no. 1) What do the regulations not contain?
- Schedule 6 in the Construction (Health, Safety and Welfare) Regulations.

You can now write on each arrowed line how the team interact with each other on health and safety matters. For example, the client would give the principal contractor any health and safety information on the site they are working on.
1.2 Identifying workplace hazards, people who may be affected by such hazards, and the potential consequences of accidents

Hazards and risks

The difference between hazards and risks

A hazard is something that has the potential to cause harm, for example electricity, hot water, steam, noise. A risk is the potential of that hazard to actually cause someone injury. For example, steam contained within an insulated stainless steel pipe 4 metres in the air has very low potential to cause someone harm.

Identification of hazards

Risk assessments are a vital part of a company’s safety ethos and are a legal requirement. They have to be carried out for a number of reasons:

- Manual handling of loads – the risks with moving loads have to be assessed.
- Control of Substances Hazardous to Health (COSHH) – the risks of using chemicals.
- Personal protective equipment (PPE) – the risks of using PPE.
- Construction (Design and Management) Regulations – the risks and hazards on site.
- Management of Health, Safety and Welfare Regulations – the risks and hazards at work.

Construction work is continually evolving, from modular construction to one-off prestigious building projects. As such, the process and practices on site will be subject to change. This may be daily in some cases. Construction is not like a factory production line where there may be little change to the process each year. Risk assessment is used to identify these changes, and the safe system of work associated with it requires that these are reviewed. Factors might include the following:

- The workplace activity has changed.
- The processes used have changed.
- New materials are being used.
- Inexperienced new operatives.
- A change in safety legislation.

Risk assessments have to be reviewed and signed off with a date of review and any actions to be taken. Any actions instigated and put in place must be clearly recorded.

Risk rating of hazards

The identification of hazards relies on training, knowledge and experience of construction. This is especially so when you have to identify hidden hazards that are not immediately obvious to the eye. For example, asbestos insulation had a hidden hazard – the asbestos fibres. Hazards have to be classified so you can understand which are the most important. To accomplish this, they can be classified high, medium or low.

Part of the risk assessment process asks you to assess the potential harm from the hazard. Risks can be rated by the likelihood that the hazard will cause harm and the severity of that harm were it to occur. The mathematical formula to do this is:

\[ \text{Risk} = \text{Likelihood} \times \text{Severity} \]

Now you can use this to judge the likelihood and the severity of the risk and produce a risk matrix (see Figure 1.3). Employers often use numbers as they are much smaller to squeeze onto a risk assessment form, and have a key to reflect what the numbers mean. This calculation may place the risk rating into a \(4 \times 4 = 16\), which means the likelihood of it occurring is certain and the severity is fatal, so would you continue with this?
You can work out the risk using the following scale:

**Likelihood:**
- 1 = slight
- 2 = possible
- 3 = very likely
- 4 = certainty

**Severity:**
- 1 = no injury
- 2 = minor injury
- 3 = major injury
- 4 = fatal

You have to rate the severity and likelihood from 1 to 4. You then multiply severity and likelihood to work out the potential risk. The table has been coloured from green for okay with existing controls; yellow requires further measures; to red which means that the work being risk assessed is too dangerous to continue with. The more complex the work, the bigger the matrix can become. High ratings must have further control measures placed upon them. These are then reassessed to check that the rating has been reduced to an acceptable level.

**Potential to cause harm**

This refers to the possible dangers from the identified hazard and the likelihood that it may cause an injury. For example, gas contained within a gas pipe serving your home has the potential to explode if ignited and cause a fatal injury.

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**Case study**

Everywhere you look on a construction site, there may be a physical hazard. For example, a reinforcing bar sticking out of the ground has the potential to cause an injury to a worker by impaling them should they fall onto it.

Is it certain or unlikely that a worker could fall on the reinforcing bar? What would be the severity of the injury?

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**Theory into practice**

Look closely at the reinforcing rods sticking out of this slab that is ready to be cast. What do you notice? The rods have caps over them to protect operatives should they fall onto the rods. This is called a ‘control measure’ and is used to reduce the risk to an acceptable level.
Environmental aspects

Hazards and risks in the workplace environment

Different workplaces present different potential dangers.

- **Working within hot and cold environments**

  Hot and cold environments can present many hazards. Hot environments create a drying-out environment which may affect operatives working within them. Individuals may suffer from dehydration, which can lead to unconsciousness and, ultimately, death. Similarly, cold environments cause the body to shiver, followed by hypothermia, eventually lowering the body’s core temperature which may result in death. Obviously, these extremes are only found when working outdoors or within cold stores or boiler rooms. Working alone in any of these environments could be considered dangerous.

Assessment practice

Look at the photo below and list the hazards that you can see. Discuss these with your tutor once you have identified at least three hazards.

Look again at the photo and decide who might be harmed by the construction operations you can see – don’t forget the people you cannot see. What would be the possible consequences for such individuals?
Working over water

Working over water presents difficulties as there is the risk of drowning to be considered. There are additional control measures that must be used for this hazard. Contractors must make sure that anyone working above water has a stable platform with guardrails to work on. Secondly, operatives working above water must be able to swim and wear lifejackets (a suitable PPE). Thirdly, there must be means of rescue – a boat with a trained operative.

Confined spaces

‘A “confined space” is any enclosed space that has restricted natural ventilation and is not intended for continual occupancy by people, and where by virtue of its enclosed nature there is a reasonably foreseeable risk of injury to workers.’ (Confined Spaces Regulations 1997)

In construction, confined spaces might be basements, cellars or under-floor spaces. Manholes are also a confined space with the added hazard of gas. Under-floor ducts for services would also conform to the above definition.

When working in confined spaces, the following must always be considered:

- If there is no alternative and you have to work within the confined space, then you will have to undertake a risk assessment for the work you will carry out.
- A safe system of working. A permit to work system is an example of this, where all the requirements for working in a confined space would be listed so that none are missed.
- Emergency arrangements in the event of an accident in the confined space.
- If rescue is required, the risks to the people who will have to enter the confined space and carry out a rescue must be assessed.
- If unconscious operatives have been removed from the confined space, then trained personnel must be available to carry out resuscitation.

Key Term

A permit to work This is a document that is issued by the person responsible for a particular work area. Such an area is usually one of high and complex activity; they tell the person who is working in that area. They also list any precautions that must be taken and any isolation of any services that may be required.

Access and egress

Construction sites are notoriously difficult to enter and exit as the permanent structure has not yet been completed. Temporary access and egress can be achieved through:

* mobile elevated platforms
* scissor lifts
* scaffolding
* scaffolding stairs
* ladders for short risk-assessed durations
* tower scaffolds
* lifts.

The most common way is by the safe use of scaffold, but stair towers must now be incorporated as it is not safe to use ladders with scaffolding. Access platforms with roll-over guards have to be provided for the safe lifting and placing of materials onto the scaffolding by a rough terrain forklift with telescopic boom.

Assessment practice

You have been asked to provide the access and egress arrangements for a roof repair on a corrugated metal, pitched roof. What would you provide to safely gain access to work on the roof?
Working at height

The photo illustrates a typical scaffold that has protection covering it to prevent materials falling and injuring the general public. Mobile elevated platforms (MEPs) allow you to drive and rotate the guarded cage you work in 360 degrees. They provide a safe and secure means of access. Training to use one of these is essential. The photo above shows two people working on a communications mast on top of a skyscraper. Working at height is inherently dangerous as an accident can often be fatal. Connected with this is the danger of falling objects such as tools, plant and materials which can injure workers at ground level. Access and egress issues with working at height can be solved with MEPs and stair scaffolds. This enables plant and materials to be moved safely to the workplace.

Personnel protective equipment for working at height takes the form of a harness, which is worn by the operative and contains a lanyard. This lanyard slows down the rate of descent should a fall occur. The lanyard must be secured to a physical fixing point that will support a fall. A rescue procedure must be in place because you need to be taken out of the harness within 10 minutes. This is because the harness interrupts the blood flow to the brain and you would gradually become unconscious if left dangling after a fall.

Key Term

Lanyard An attachment that clips between the safety harness and the secure point.

Other prevention measures involve physical barriers. These are horizontal rails set at certain distances as specified in the Working at Height Regulations, so there is no unprotected gap of more than 470 mm that you could fall through. Toe boards must also be provided to stop objects being pushed off the working platform.

As mentioned earlier, the Working at Height Regulations state that you must not work at height unless it is reasonably practical to do so. If no such method can be employed, work at ground level. Examples of this would be external lighting columns where the bulb cluster can be winched down to ground level to maintain the bulbs.
Persons who may be affected by hazards and risks

On a construction site many people may be affected by the harm from a hazard, including:

- employees
- site visitors
- the general public.

The nature of the hazard, for example a gas escape from a site, will determine how many people will be harmed, whereas minor incidents may involve only one person.

**Employees**

The employees are the people who will be directly undertaking the construction of the project. They are the most vulnerable when faced with potential hazards, as the majority are at the ‘sharp end’ of the process and not based within an office where they may be some distance away from the hazards. Employees may be very experienced or very new to the project. Each will require information, instruction and training about the potential site hazards.

**Site visitors**

Visitors to a construction site should report first to the site manager’s office. Here the manager will confirm that the visitor has signed in on a register (in the event of a fire everyone needs accounting for), has been given appropriate personal protective equipment and has been inducted on the site hazards. The visitor may be accompanied on their visit by a supervisor.

**General public**

The main contractor has a duty to protect the general public. This is normally achieved by fencing off the construction site so that people cannot wander onto the site. In addition, signs are put up on the fencing to warn intruders of the inherent dangers of trespass.
Methods of hazard identification on a construction site

Observation of work environment

How can you identify the hazards on a construction site? The most useful method is by direct observation. This technique requires practice to spot the hazards that are not obvious and can be aided by the use of photographs. Taking a photograph enables you to check the image at a later date to identify or confirm a hazard in the workplace.

Remember!
The most useful tool you have is your eyes. Directly observing a site should enable you to spot many potential hazards.

The analysis of risk assessments is another method of hazard identification. By looking through a large number of risk assessments to locate a common hazard, this can be collectively dealt with by global control measures. In effect, you are using this data as a set of fresh eyes to assess the situation and to point out something you may have missed.

Checklists and method statements

Checklists are a standard sheet produced for a particular workplace environment. The hazards are then identified by a safety audit or inspection which involves walking around the environment and ticking off the hazards from the pre-set list. Checklists are useful for complex construction sites where a large number of processes and substances are utilised. When new hazards are identified, these can be added to the existing checklist to build up a more comprehensive checklist.

Method statements are produced as part of the CDM Regulations. They are a statement of the methods to be used to construct a particular item. For example, if you were going to drill through a wall for a toilet connection, the method statement would list how you were going to do this, the equipment you were going to use (hand or machine) and a list of safety precautions. Method statements enable you to analyse the correct and safest way to undertake a task.

Safety inspections and audits

This gets you out the office environment and on to the site! It is a hands-on approach to safety. Inspecting plant and machinery to ensure all test certificates are up to date would be just one item you would check. If operatives know they will be subject to inspection and checking, they will act more appropriately in their work environment. Coupled with this is close supervision by a competent supervisor, who can inspect as the work proceeds ensuring all control measures are in place and used.

Inspections by the HSE will, of course, have the most effect on health and safety on site, but sadly statistically there are just not enough inspectors to cover the tremendous workload the UK construction industry
generates; only the major accidents appear to get investigated. Company-employed health and safety inspectors (appointed in accordance with the MHSW Regulations – see above) are an excellent resource that can be used to visit company construction sites. They provide experience, training and knowledge on all aspects of health and safety and will know the company’s procedures that must be adopted on all sites.

Accident data

**Principal major causes of accidents and fatalities**

The construction industry employs around 2.2 million people each year and still accounts for over 50 fatalities every year. As we have previously seen, the most frequent cause of death is through falling, but there are other reasons why employees are killed while working in construction.

Figure 1.4 shows the four major causes plotted against time:

- Falls from height.
- Struck by a moving vehicle.
- Struck by a falling object.
- Trapped by collapse or overturning.

As you can see, falls from height have steadily decreased.

Figure 1.5 illustrates the current trend in fatalities over the past nine years.

### Assessment practice

You have been asked by the company health and safety officer to assist in compiling a health and safety checklist that will be used for an inspection of the current construction sites. This checklist will obviously cover a wide range of construction activity. List five important items you would include and expect to tick off during an inspection.
Demographics

The HSE publishes statistics that are classified by gender, location or age (see the HSE’s website at www.hse.gov.uk). The demographics of statistics involves looking at the people involved in the accidents and their classification. We could look at the occupations of those involved in major accidents. Why? This would tell us where best to direct any legislation and to provide inspection themes by statutory bodies, for example the HSE. Demographics by gender may lead to removing one sex from a certain industry or occupation because of sharp rises in accident trends. A large number of accidents at age 64 may result in reducing the retirement age to 60. The government uses demographics to shape its policy and procedures through the Department of Environment and through safety legislation.

Key Term

Demographics The characteristics of a population, e.g. age.

UK and European safety statistics

Figure 1.6 illustrates how the UK compares with the rest of Europe. As you can see, the UK has the lowest rate of fatal injury. This may be due to several reasons: the UK may report all of its accidents (see Observable trends below), it may have more inspectors touring the country, it introduces more health and safety legislation, it takes the forefront in safety campaigns.

Figure 1.6 Rate of fatal injuries in the UK and the rest of Europe

Figure 1.7 The number of incidents that occur is represented by the width of the triangle at the base

Observable trends

The UK keeps records of its accidents, which helps to prevent future accidents from occurring. For example, if the number of reported accidents increases in a certain area or location, then this would indicate the need for an investigation into why these are occurring. The accidents could be due to a change in the process or procedure. Accident trends formed at a minor level require acting upon so they do not increase into a major or fatal accident. A large number of trends in this pyramid diagram may cause a larger number of major accidents (see Figure 1.7). The wider the base, the more danger that a fatal accident may occur.
Consequences of accidents

Consequences to humans

The consequences of an accident to the human body can be devastating to both the victims and their families. The disability caused by the fracture, breaking or amputation of a limb may leave an employee with no option but to leave their employment. Victims of workplace accidents may suffer with poor health for many years. Diseases of the lung caused by asbestosis poisoning, for example, is just one long term consequence of dealing with a product that had a hidden hazard.

Financial consequences

If you have had an accident at work, you may have to stay off work as a consequence. Your employer may only have within their conditions of contract two weeks’ sick pay. Should you be off work longer than this period, then you are paid statutory sick pay which is a very small amount each week. Employees who are off work longer may have to endure short-term financial hardship, or have to make a claim against the company for their injury. The company itself may face a large financial fine as a result of a prosecution by the HSE, along with the unrecoverable costs that are explained below.

Case study

John Curtis had been working as a site engineer at a local construction firm. He started this job straight from university. He eventually settled down, married and had two children. His career was fast developing and he was rising quickly up the ranks to senior engineer and, eventually, project manager. One day, John was setting out some road kerb lines for a 250 housing unit development when he looked up from the surveying instrument and received a hot blast of sparks from a saw being used to cut road kerbs. This permanently damaged his eye sight.

What are the human consequences for John and his family?

Moral consequences

A company that has a high accident rate and does nothing to control this will eventually have a demotivated workforce. The causes of accidents need to be brought into the open, not pushed aside. Managing directors and chief executives need to lead from the front. Safety before costs should be the ethical ethos of a business.
All businesses have to carry employer’s and public liability insurance to cover any claims against their business from injury of a worker or a member of the public, but there are exclusions contained within these policies.

The following are the types of insurance cover that may be in place on a construction site and represent insured costs that can be recovered:

- Employer’s liability insurance on its workers to insures against claims.
- Public liability insurance to the general public.
- Motor vehicle insurance to cover company transport.
- Product liability insurance from manufacturers and suppliers to cover defective products.

Uninsured costs cover the following that cannot be claimed back or recovered from an insurance policy:

- Court fines imposed as a result of a prosecution from the HSE.
- The cost of clearing up the accident.
- The loss of reputation.
- The resulting bad publicity and loss of business and sales.
- Loss of production and the damaged product.
- The demotivating effect on employees.
- The cost of the accident investigation.
- Any overtime or additional labour required.

None of these can be accounted for at the time of the initial accident; it is only after that the unaccounted costs become apparent. Several major accidents can have a very detrimental effect on a company’s performance and may put it out of business.

Case study

The managing director of a housing construction company has asked you to calculate the cost of a recent accident from the following data that has been analysed from timesheets and invoices. The accident involved a joiner using a bench saw on site to cut roof timbers to length.

Calculate:

- the total cost of the accident
- which of the costs are insured or uninsured.

<table>
<thead>
<tr>
<th>Accident cost data:</th>
<th>Accident Investigation by C. M. 12 hours at £50 per hour</th>
</tr>
</thead>
<tbody>
<tr>
<td>First aid treatment 1 hour at £30 per hour</td>
<td>In-house meeting with three people 3 hours at £55 per person per hour</td>
</tr>
<tr>
<td>Bandages and miscellaneous items £20</td>
<td>Agency joiner to replace injured worker 6 weeks at £250 per week</td>
</tr>
<tr>
<td>Transportation to hospital by ambulance: NHS cost 2 hours at £23.55 per hour</td>
<td>On-site cleaning by contract company £550</td>
</tr>
<tr>
<td>Loss of immediate staff working hours on site:</td>
<td>Disposal of old saw £120</td>
</tr>
<tr>
<td>Site manager 2 hours at £45 per hour</td>
<td>Purchase of new site bench saw £2500</td>
</tr>
<tr>
<td>General foreman 2 hours at £25 per hour</td>
<td>Hire charges temporary saw 3 weeks at £65.50 per week</td>
</tr>
<tr>
<td>Joiners (2) 2 hours at £18.50 per operative per hour</td>
<td>Staff retraining on portable electric tools (4) 4 hours at 20 per operative per hour</td>
</tr>
<tr>
<td>Bricklayers (5) 2 hours at £18.50 per operative per hour</td>
<td>Sick pay to injured person 12 weeks at £64.66 week</td>
</tr>
<tr>
<td>Labourers (3) 2 hours at £12.50 per operative per hour</td>
<td>HSE prosecution and subsequent fine £35,000</td>
</tr>
<tr>
<td>Store person 2 hours at £10.50 per hour</td>
<td>Insurance premium increase £2500</td>
</tr>
</tbody>
</table>
The principles of risk assessment are set out under Regulation 3 of the Management of Health, Safety and Welfare Regulations 1999, which is summarised as follows:

- Every employer must make an assessment of the risk to their workers and non-employees at work.
- The risk assessment that is undertaken must be reviewed in the light of any changes.
- Specific risk assessments must be carried out on young persons employed at work.
- Where an employer employs five or more people, the assessment must be recorded in writing.

The concept of what is ‘reasonably practicable’

This is an expression that you may see in some of the legislation discussed at the beginning of the chapter. It means that a company should take all reasonable steps to protect workers against risks balanced against the cost and time of doing so. For example, the best solution in removing dust from a workers’ environment may be to provide a mask rather than full-extract ventilation systems, because the dust is harmless. At the end of the day, this is a judgement call based upon knowledge and experience.

The five steps to risk assessment

The procedure to be adopted in spotting hazards is called the risk assessment process and can be broken down into five main steps, as outlined by the HSE:

1. Identify the hazards.
2. Decide who might be harmed.
3. Evaluate the risks and precautions to be taken.
4. Record your findings.
5. Review your assessment and update.

Evaluation of risks

The primary or principal hazards are the ones that you need to be fully aware of, but there may be hidden hazards that you cannot directly observe. During a site observation, everything may appear to be safe, but combine two hazards from two locations and there might be a severe potential hazard. For example, there are electricity pylons running over the site. All appears fine on your visit. The next day a crane is brought on site. Now the hazard is the metal crane arm and the cables carrying electricity and the resultant electrocution. Looking back at the risk assessment matrix (Figure 1.3), a fatal injury means certain death as a result of an accident.

Remember!

Take the first letters of each of the steps – IDERR and use these as a prompt to remember each step.

Remember!

A fatal accident is reportable to the HSE even if the person concerned dies at a later period as a result of their injuries.

Now, the high score from the matrix requires you to look closely at the nature of the risk, and identify the existing control measures that you have in place to establish if they are sufficient to reduce the risk from the hazard to an acceptable level. You could do this by looking at the data sheets from a product construction workers might be using and checking the control measures against the manufacturer’s recommendations. If your evaluation
establishes that further controls are necessary, then you need to identify these and record what action is required until the risk is acceptable.

**Key Term**

**Control measure** A method, system or product to reduce a high risk to an acceptable risk, for example using a fork-lift truck to lift a heavy object rather than trying to lift it by hand.

A risk assessment form should contain the following:

- Where is the work or activity going to be carried out? Undertake the same operation in two different places and the hazards will be different.
- Date of assessment – when did it take place? This will give you an indication of how old the risk assessment is. Does it need reviewing in the light of a change in conditions?
- Identify what the work activity is, e.g. using a pedestal drill to drill holes through some steelwork.
- Identify the hazards – the primary and most important hazards should be listed.
- Who might be harmed in this workplace? For example, visitors, employees, supervisors and members of the general public.
- Evaluation of the risk – what risk is there from the hazards you have identified?
- What are the existing control measures? Look closely and record what you are doing currently to control the risk from the hazards.
- Any further action/controls required – if the existing control measures are not effective, what further action must be taken to reduce the risk from the hazards to an acceptable level?
- Who will make sure additional controls are in place? Who will undertake the work on further controls and when will it be done? An accident could result if you fail to act quickly.
- Signed and dated – you may need to identify the person who undertook the risk assessment especially in an accident investigation.
- A review date – risk assessments will need reviewing periodically with any changes in systems of work, technology and further health and safety legislation.

**Assessment practice**

Look back at the photo on page 00 and the series of hazards that you identified, then describe the main principles and features of a typical risk assessment that would be used to control these hazards. One of these principles is to list the existing control measures you would apply to the hazards.

You have been asked to investigate a blocked manhole that is 4 metres deep. Upon investigation, you have found that it requires some work to its concrete base which has broken away and is causing the obstruction.

Undertake a risk assessment for working within this confined space. Don’t forget the main hazard with sewers is an explosive gas!

What is the definition for working within this type of environment called?

What is the principal hazard in working at the base of this manhole?

Can you work alone on this job?

What control measures will be required during the work?

**Remember!**

The first step to risk assessment – identify the hazards!
Advantages of using a standard risk assessment form

- All the boxes have to be completed, so nothing can be missed during your assessment.
- The risk assessment can be continually reviewed to improve it.
- Health and safety policy can be written into the risk assessment format.
- It can be made as simple or as complex as necessary for the type of work being assessed.

Theory into practice

Find a suitable risk assessment form either from a place of work or ask your tutor. The HSE website contains an example format you could download. If you have undertaken any research on risk assessments, you will find that there are several formats in existence. You should remember that these are all correct in their own right but have been tailored to more complex projects and hazards.

You are now ready to carry out a risk assessment. This can be undertaken on a site visit to a local construction site or within the educational establishment you are enrolled at or at your place of work, be it part time or full time. Locate an area that is a workplace and that contains a great deal of activity so that you have some principal hazards to identify. Fill in your risk assessment form until you have completed all the stages mentioned above. Taking a photograph is always an advantage as you can study this later in your own time.

Assessment practice

Look closely at the risk assessment that you carried out and explain what precautions and control measures you selected. Are they ‘reasonably practicable’? Could more be done, or would this be counter productive?
1.4 Using workplace health and safety policies to recommend control measures, reduce risk and meet legal requirements

Workplace health and safety policies

General workplace health and safety

These are required under the Health and Safety at Work Act 1974 which states that:

‘Except in such cases as may be prescribed, it shall be the duty of every employer to prepare and as often as may be appropriate revise a written statement of his general policy with respect to the health and safety at work of his employees and the organisation and arrangements for the time being in force for carrying out that policy, and to bring the statement and any revision of it to the notice of all of his employees.’

(www.health and safety.co.uk)

Employers now had to write down their health and safety arrangements if they employed five or more people. This is called a health and safety policy and is divided into three main sections:

1 A general statement – this is usually signed by the head of the organisation and dated, as it is an important statement giving a key outline as to how the employer will observe their duties under the Act. Specifically, the statement must:
   • must demonstrate a company’s commitment to health and safety
   • state how the company intends dealing with this
   • specify who is responsible for health and safety
   • contain a paragraph that all necessary resources will be provided in the pursuance of health and safety
   • inform all employees as to the contents of the policy
   • be signed and dated by a prominent person in charge.

2 Who has specific responsibilities, e.g. health and safety representative, employees’ duties.

3 Health and safety administration, e.g. permit to work systems, accident reporting and risk assessment procedures.

Remember!

As an employee, you have responsibilities. You must not ignore any unsafe acts and should bring these to the attention of a manager or supervisor.

Other policies

As well as the health and safety policy that has to be produced as a requirement of the HASAWA 1974, companies may also produce their own safety policies. These cover many aspects such as:

• drugs – how the company will deal with employees if it is found they are under the influence of drugs during their employment
• alcohol – how the company will deal with employees who are clearly under the influence of alcohol
• driving policy – all employees will hold a clean driving licence while using company vehicles
• smoking – a complete ban may be in force in some companies, e.g. hospitals.
Arrangements for implementation

**Thinking points**

Look at a typical non-smoking policy below. Do you think that this smoking policy should apply to all construction sites? Give your reasons.

**COMPANY SMOKING POLICY**

- This company operates a no-smoking policy within the company premises.
- No smoking is allowed within the company’s buildings or construction sites.
- Facilities have been provided to enable you to smoke. These are designated as smoke rooms.
- Non-smokers use them at their risk.
- Any person found not to be utilising this facility will be dealt with under the company’s disciplinary procedure.
- Would all employees please respect this policy.

Arranging implementation of health and safety policies

This section deals with who has the responsibility for the different aspects of the health and safety policy. This may be broken down into main roles and responsibilities for the following key people in a typical organisation:

- directors
- contracts managers
- site supervisors
- health and safety officer
- employees.

Often the roles are displayed on a chart which illustrates the management structure of the organisation from the top down.

Procedures

**Monitoring, review and inspection**

Health and safety must be monitored, checked and reviewed regularly. This is because changes in legislation are frequent and policies will need updating. There should be regular audits and inspections to ensure that employees are complying with the law, are not taking any unnecessary risks to their health and are acting in accordance with any training given. It is when these controls are relaxed and no one is looking that there might be a tendency to take a risk that results in a serious accident.

**Remember!**

Monitoring and reviewing means taking time to look carefully through what has been produced in the past and improving it, often in line with new systems, procedures and legislation.

**Arranging implementation of health and safety policies**

The main part of a company’s health and safety policy is where it states how it is going to carry out and implement the policy, and may contain any of the following:

- dealing with asbestos
- manual handling
- COSHH
- accident reporting procedure
- health surveillance
- permits to work
- lifting operations
- safety committees
- smoking policy.
Use of permits to work

These are documents which are used to safely control any activity on large projects and sites. They may tell a supervisor who is working in one particular area all the people and different trades that are working in the area under their control, so that they can plan safely. Large complex sites may have several levels and floors. For example, if there is one set of workers welding on one floor on some steel stairs, then it is essential to know who is working below them so they cannot be harmed by these workers. Similarly, this is also true of workers working on roofs, confined spaces, and using hot work such as welding, cutting, grinding. Permits make supervisors aware who is working, where they are working, what isolation may be required, when the work will be finished and what safety coordination is required. Permits may be required for the following work:

- working on roofs
- confined space working
- sewer works
- electrical installation works
- gas installation works.

These are all activities that are dangerous and need monitoring closely. Some permits may require that all operatives sign the permit so that supervisors know who is working on the site in the event of an emergency. The permit will list the control measures that will be required to be in place before the permit can be authorised. At the end of the working day the permit must be signed off by all who have been working on it. This can be either uncompleted or complete, so that the supervisor knows that the work is done. On large factory complexes there may be more than one permit station within definable boundaries of the factory. This is done so that adequate supervision can be assigned to each area. Too big an area and you lose control of it. Permits often are not issued without visible proof that a risk assessment and a method statement have been carried out. These will highlight the hazards and the control measures that are being used to reduce the risk to an acceptable level.

Remember!

This section is where many of the company’s policies are placed, so this document must be available for all employees to read and be informed.

Remember!

Some factory construction sites are vast covering many square miles. If a supervisor knows who is working where on their permit, then all employees, visitors and workers can be accounted for should an emergency situation occur.

Method statements

These analyse in detail the appropriate method to use in a work activity. They list whether it will be undertaken by hand or plant, the equipment to be used and the logical sequence that will be adopted during the work. This is good procedure as it makes the person writing the statements think in detail about the hazards and how they will control them.

Induction and training

The induction is an introduction to the construction site on which you are going to be working. It covers several aspects of the site and may include information about the following:

- hazards
- site rules
- transport movements
- first aid
- fire alarm
- evacuation procedures
- site accommodation facilities
- waste removal
- car parking
- site working hours.

An induction is essentially a comprehensive introduction to the rules and regulations of the particular site. All employees, visitors and workers on the site must have the induction. You cannot have
non-informed workers moving around the site. They may cause a hazard in the event of an emergency.

Training is an essential element of health and safety. It helps to determine the competency of employees to undertake specific tasks on site such as driving a dumper truck. Highly qualified employees, who have the correct training and equipment, will result in a lower accident rate than a workforce who has not. Training can quite simply take the form of a tool box talk. This involves employees stopping work and gathering around a common meeting area to discuss the hazards of the day, control measures and any other high risk activity on site. These are very useful for passing on a lot of safety information over to employees.

**Good site management procedures**

These are procedures applied by supervisors and managers of the company. They can be as simple as signing in on a register on site, and then you know how many people are on site. Site meetings are a procedure that helps to control health and safety on site. Setting up site rules and procedures is a vital health and safety tool, but to be effective it must be monitored and maintained, and obeyed by all without exception.

**Control measures**

**Workplace procedures**

These are safe systems of work and should be specifically designed for the workplace, for example separating delivery traffic from operatives on site, clear signage and pedestrian walkways such that neither can come into contact with each other.

Tool box talks are another example of a safe system of work; they identify daily or weekly hazards and keep all employees informed of site dangers. Safe systems of work take time to develop, implement, maintain and review to check that they are working. Advice and input from the workforce via safety committees is a useful third set of eyes that can immediately see any problems with these systems. Corrective action can then be put into place.

**Hazardous substances**

COSHH stands for the Control of Substances Hazardous to Health, and is a set of regulations. They mainly cover the chemicals used in any process such as adhesive glues to stick laminate onto kitchen worktops, or paint thinners in decorating. Every chemical that is used on a construction site has to be risk assessed under the COSHH Regulations for its harm potential. The regulations advise eight steps:

1. Undertake a risk assessment. You will need the manufacturer’s data sheet on the substance.
2. Decide what precautions are needed – this may involve ventilation, PPE or isolation.
3. Prevent or adequately control exposure – gloves, dust masks, air flows.
4. Ensure that control measures are used and maintained.
5. Monitor exposure – this can be by measurement.
6. Carry out appropriate health surveillance – blood tests.
7. Prepare plans and procedures to deal with accidents, incidents and emergencies should a spillage occur of the substance in the workplace.
8. Ensure that employees are properly informed, trained and supervised (Health & Safety Executive).

It is worthwhile building up a COSHH library, where manufacturers’ data sheets can be kept up to date with the necessary precautions for using that particular product. Dangerous chemicals are best substituted for less dangerous ones.

**Remember!**

It is worthwhile substituting a chemical that harms the environment with a ‘greener’ version. Green chemicals also require less control measures as they have little effect on the environment and the person using them.
Lifting and manual handling

There is a limit to how much a person can lift: for a man it is 25 kg close into the body and properly lifted, for a woman it is 16 kg close into the body. However, this is only a guide, and must be subject to a risk assessment which must take into account the weight to be lifted and how far it has to be moved and where is the centre of gravity.

Working at height

This has already been discussed on page 00.

Physical safeguards

Physical safeguards include secure fencing, barriers and guards that can be fitted to plant and machinery to reduce and prevent hands, feet, arm hair and any extremity from becoming entrapped and injured within a moving piece of equipment or plant. Interlocking, where you have to switch off the machine before you can remove the guard, helps to prevent accidents.

Working in excavations

There are several hazards that need controls when working in excavations. They are falling into the excavation, drowning (should it fill with water), gas and collapse of the sides of the excavation. Control measures should include:

- the addition of secure fencing to the perimeter of an excavation
- a pumping system to remove any water that is building up within the excavation
- a physical barrier to prevent plant falling into the excavation
- a gas test to detect the presence of poisonous gas
- a support system for the sides to prevent collapse.

Site traffic and plant

There are a large number of accidents attributable to workers coming into contact with plant and machinery on a construction site. Construction sites can be noisy. Often you will not hear the plant operator in your vicinity. Control measures primarily involve segregation of workers and machinery. Clear traffic routes for each must be established on the site. Traffic lights and footpaths must be used to good effect. Reversing warning lights and pre-recorded voice warnings are very effective. Signage must be displayed to direct one-way traffic on a congested site. Operatives can assist the process in the use of high visibility clothing that reflects light.

Contaminated ground

Construction regularly takes place on ‘brown field sites’. These are development sites that tend to be in inner cities and have been cleared of the existing building structures. However, they are usually old and run-down sites where there has been a lot of work activity and hence soil contamination. Old petrol station sites are good examples. They contain spillages of detergents, petrol and diesel that can ignite and can also cause dermatitis and skin diseases if in contact with the skin. Inhalation of fuel fumes is also unpleasant.

The contamination can be treated in two ways: by removal to a licensed tip or by treatment within the ground. Soils must be tested to see what type of contamination is present.
Look through the following case study and select a control. Taking each of the following in turn, identify a control measure from the list that would reduce the risk to an acceptable level. Discuss each with your tutor and peers.

A bricklayer’s operative is using a diesel cement mixer to mix the ingredients for the bricklaying mortar. This requires that 25 kg bags of cement have to be opened and the correct quantities poured into the mixer by hand using a shovel. It is a windy day and every time the operative places the cement into the mixer, cement dust blows into their eyes. From the following list, pick the control measures you would use to avoid this occurring.

- Leave the task until a calm day.
- Replace the cement with an alternative.
- Provide the correct eye protection to the operative.
- If the contract is large enough, obtain cement in silos with a mortar plant.
- Form a shelter around the mixer.
- Obtain mortar in ready-mixed tubs.

Remember!

The ‘PIGSRISE’ system can be employed when implementing control measures:

1. Remove the hazard – elimination.
2. Prevent exposure to the hazard by substituting it for another or guarding.
3. Provide safe systems of work, e.g. permit to work.
4. The use of PPE – this should always be the last resort.

PIGSRISE stands for the first letters of the following and is taken from HSG65 (Health & Safety Executive). You have to start with the last letter and work backwards.

E is for eliminate.
S is for substitute.
I is for isolate.
R is for reduce.
S is for safe systems of work.
G is for good housekeeping.
I is for information instruction and training.
P is for PPE.

This system can easily be applied to COSHH assessments. You can see the useful stages as you work through them.

Legal issues

Everyone has a duty of care. Negligence claims against individuals are fast becoming a normal event in the UK – no win, no fee. Individuals and employers cannot afford to ignore current health and safety legislation. Workplace policies are there for a reason. They prevent accidents occurring and diseases developing. You cannot just turn your back on an unsafe practice and walk away. The human, moral and legal consequences should outweigh this situation. Thinking ‘It’s not my job’ is not the answer! Health and safety should be top driven by senior management so in itself it becomes the normal process in working safely.
The consequences of non-compliance

**Improvement and prohibition notices**

These are issued by the HSE and can either state a time limit on when a safety defect should be corrected or a prohibition notice, in fact, stops work on site because of a serious and imminent danger to workers.

**Financial penalties**

The severity of an offence will decide which court – crown court or magistrates court – deals with a health and safety prosecution. There are several outcomes to a conviction:

- A £5000 fine at a magistrates court.
- A £20,000 fine or six months’ imprisonment or both at a magistrates court.
- Two years imprisonment or an unlimited fine or both at a crown court. The type of penalty depends upon the scale of the breach.

The charge of corporate manslaughter, where a senior manager or the owner of the company is taken to court and charged with an individual(s) death, has until recently been very difficult to prove and successfully prosecute, but the HSE will still take this line should it be warranted.

**Procedures after an accident or incident**

Under the Reporting of Injuries, Diseases, Dangerous Occurrences Regulations 1995 (RIDDOR), you have a legal duty to report the following to the HSE:

- deaths
- major injuries
- accidents resulting in an over-three-day injury
- diseases
- dangerous occurrences
- gas incidents.

**Key Term**

**Over-three-day injury** An injury which is not major but results in the person being away from work or unable to do the full range of their normal duties for more than three days.

After a serious accident, you might also have to contact the police to inform them of a fatality, as there might be suspicious circumstances to the death that may need to be investigated. The coroner also has to be informed that a death has occurred as they may also wish to hold an inquiry.

**Case study**

Look at the following case study that is based on a real prosecution. This is just one example; there are many actual construction cases that you can view on the HSE website. After you have read the case study, answer the questions.

When XYZ Ltd decided to refurbish its office building in early 2002, it asked Builders Construction Ltd to take part in initial discussions, with a view to appointing the company as the principal contractor. The refurbishment was extensive, and included the removal of an asbestos ceiling. Before starting work, Builders Construction carried out a risk assessment. However, no control measures were put in place to protect workers, and the general public, from the effects of asbestos fibres. Operatives, who had no training in handling asbestos, or the correct PPE, removed the ceiling in a few days. Builders Construction Ltd was taken to court and found guilty of two breaches of the Control of Asbestos at Work Regulations 1987 and one breach of the Health and Safety at Work Act 1974. The company was fined £20,000.

1. What breaches of the health and safety legislation was the defendant prosecuted on?
2. What was the nature of the offence and who was harmed?
Principles – why keep safety records of accidents?

Let’s look at the dangerous occurrences that often are not reported because no one has been injured. If you keep a record of these and find that a pattern is emerging, it is advisable to act on this occurrence. Why? Because soon enough one of these may result in a fatal or serious injury. This is a primary reason for keeping accident statistics. They are a historical record that can be used for future prevention. For example, accident black spots are used on highway safety schemes to locate speed restrictions to prevent further accidents. A second reason for employers keeping accident records is to provide evidence in the event of a claim against the company. Thirdly, all accidents have to be recorded within an accident book, which must be kept secure and the correct procedure followed in filling in the forms.

Recording and reporting

We have already looked at the reporting of fatal injuries under the RIDDOR Regulations. There are additional conditions that require the reporting of fatal or major injuries. If a member of the public is killed or taken to hospital, you must immediately notify the enforcing authority (HSE) by telephone. Within ten days, you must follow this up with a completed accident report form (F2508). Over-three-day injuries must also be reported to the HSE.

The RIDDOR Regulations give some guidance as to the classification of injuries. Major injuries are:

- ‘fracture other than to fingers, thumbs or toes
- amputation
- dislocation of the shoulder, hip, knee or spine
- loss of sight (temporary or permanent)
- chemical or hot metal burn to the eye or any penetrating injury to the eye
- injury resulting from an electric shock or electrical burn leading to unconsciousness or requiring resuscitation or admittance to hospital for more than 24 hours
- any other injury: leading to hypothermia, heat-induced illness or unconsciousness; or requiring resuscitation; or requiring admittance to hospital for more than 24 hours
- unconsciousness caused by asphyxia or exposure to harmful substance or biological agent
- acute illness requiring medical treatment, or loss of consciousness arising from absorption of any substance by inhalation, ingestion or through the skin
- acute illness requiring medical treatment where there is reason to believe that this resulted from exposure to a biological agent or its toxins or infected material’ (RIDDOR 1995).

Minor injuries are those that keep an employee off work for more than three days.

You will need to record the following

- date and time of injury
- a brief description of what happened
- the name and address of the person injured
- the date and method of reporting.

Remember!

If a person is off work from normal duties for a period of over three days (excluding the day of the injury, but including weekends where they might not be at work), then this has to be reported under the regulations.
Reporting dangerous occurrences

The HSE publishes a list of dangerous occurrences. The following are specific to construction:

- collapse, overturning or failure of load-bearing parts of lifts and lifting equipment
- plant or equipment coming into contact with overhead power lines
- electrical short circuit or overload causing fire or explosion
- collapse or partial collapse of a scaffold over 5 metres high, or erected near water where there could be a risk of drowning after a fall.

The casualty’s immediate supervisor must be informed.

The company’s health and safety department must be informed.

The HSE must be informed by phone if it is a fatal accident or within 10 days by filling in the correct form.

A full accident investigation must be carried out.

Remember!

Only qualified first aiders should administer first aid – it could be dangerous for an untrained person to do so.

The accident investigation

This is the process of analysing what went wrong. The process must be thorough and methodical. If the accident is a fatality or major, it may be conducted by the HSE. So why do we have to do this?

- So that the accident may not reoccur in the future injuring another person.
- Because it is a legal requirement under RIDDOR.
- To provide defensive evidence in a civil claim from the injured party.

The process may take the following form:

1. The accident location is photographed to record the area.
2. A statement is taken from the person who had the accident.
3. The accident report form is filled in and sent off if it is reportable under RIDDOR.
4. Witnesses are interviewed to provide further evidence as to the cause of the incident.
5. An analysis of the accident is undertaken to establish the primary cause, as there may be more than one.
6. New control measures are devised to establish if the existing system of working can be revised.
7. Any changes to the system of working or control measures are then implemented.
These changes are then reviewed periodically to see if they are working.

If the changes are not, then the process is reviewed until a successful outcome is established.

The new safe system of working is monitored periodically.

When a hazard cannot be adequately controlled, then the potential for it to cause an accident is raised. Can accidents be completely avoided? Well, no, because we are only human!

If an accident occurs at work, then the correct procedure must be followed to ensure that it is dealt with effectively and efficiently so that any investigation of the accident can ensure that the same occurrence will not happen in the future.

### The importance of collecting accurate accident data

A construction company for many reasons should collect accident data. First, it can be used to prevent future accidents and, secondly, many clients require to see your accident data. Why? Because part of the tendering procedure and applying to work for a client involves the client checking the contractor for competency. This can be done by looking at the number of accidents that a company has had over the last three years.

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**Case study**

So how should you report an accident? You must follow any company procedure that is in place; you will this outlined in the company’s health and safety policy. Now, imagine that a rough terrain fork truck on your construction site has just hit a worker. Write out the procedure you would follow from the point of giving first aid to the casualty.

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**Assessment practice**

The contracts manager has approached you, as the assistant health and safety manager, to report an accident that occurred yesterday on one of the company’s construction sites. The accident involved a collision between an employee and a rough terrain forklift, where the rear wheel ran over the employee’s foot.

What recording and reporting procedure would you undertake as an individual from the point of the accident just occurring to the employee’s return to work?

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1. **Explain how your collection of data could contribute to a reduction of injuries to these workers.**
2. **What could you do to improve this situation?**
3. **How would you monitor improvements?**
Read through some of the construction trade papers or national papers and identify a construction-related accident. After reading the article, identify, either by name or job description, whom you think is responsible for health and safety in this instance. Try to explain their roles and responsibilities in their workplace. If you are having trouble locating a suitable article, ask your tutor to assist you.

Alternatively, visit a construction site on an educational site visit. Interview and ask the site supervisor to identify who is responsible for health and safety on the construction site and what their safety role is.

Identify at least two pieces of health and safety legislation that would be applicable to your job role as a supervisor on a typical construction site. When you have identified two, explain the employees’ roles and responsibilities under one of these pieces of legislation.

Identify some potential hazards that are present in a workplace of your choosing (you could look at the workplace where you have a part-time job or at the educational establishment where you are undertaking your BTEC National course, or from a site visit to a local construction site). When you have identified at least four hazards, evaluate the existing control measures that are present to reduce the harm from the hazard. Identify who might be harmed and to what extent.

You have just started your first trainee position as an assistant site manager on a construction site. You keep hearing the term ‘risk assessment’. Not wanting to appear foolish as you do not totally understand the meaning, you ask a fellow trainee on another site for help. Place yourself in the informed trainee’s shoes and describe to the colleague what are the main principles of a risk assessment? What does it contain?

The following hazards have been identified on a risk assessment on the installation of a drainage sewer connection into a main road:

- Buried services – electric shock.
- Injection – from burst hydraulic pipe on excavator
- Crushing injury from excavation collapse.
- Road traffic accident – collision with road traffic.
- Cuts and scrapes from hand excavation.
- Noise – from road saw.

Classify each of these hazards as low, medium or high risk, and evaluate what control measures you would put in place to reduce the high-risk hazards to an acceptable and legal level.

Your manager has asked you to evaluate the company’s accident reporting and recording procedures. The information you find will be used to develop a training manual for all employees entitled ‘The Company Accident Reporting Procedure’. Highlight what actions will be listed in this manual.

The managing director has asked you to review how well the company implements the values of the Construction (Design and Management) Regulations, namely cooperation and coordination of the safety issues involving the building team. Identify and explain how the building team interacts between each other in terms of their health and safety roles and responsibilities.

The construction project you are working on has just commenced. The current activity on site is the installation of the drainage and, specifically, the concrete manholes. These consist of chamber rings that stack one on top of another. The bottom ring sits on a bed of concrete and has the channel running through it. The chamber has a top with a manhole cover and frame secured to it. The rings are normally covered with poured concrete on the outside and are lifted in by the excavator. Produce in a suitable format a risk assessment for this work.
You have been assigned to the health and safety department of your construction company to gain some experience as a health and safety practitioner. You notice that there is quite a rigorous procedure in place to collect and analyse the company’s accident data and wonder why. You ask the senior health and safety adviser why this is the case? Produce the answer you received.

Look again at the risk assessment you produced for M2 and at the following current year’s accident data obtained from the health and safety department on injuries caused by drainage operations:

- Hand injuries as a result of trapping between chamber rings 5 nr
- Chemical burns from cement 6 nr

Justify the contents of your risk assessment in light of the accident data and say whether you have taken all reasonably practicable steps in your control measures.

You have been handed the following accident report:

**Accident Report**

Date: __________________________________________  
Employee: J Smith  
Location: Construction Site A  

Description of what happened:

At about 4.30 pm on 26 January of this year I was locking up the construction site compound and walking towards the site entrance gate when I fell into an excavation and injured myself on some reinforcing bars. I was on my own and had to wait till the visiting security guard found me and helped me out of the excavation. I was taken by ambulance to the hospital to have a cut to my leg stitched and dressed. I reported for work the next day as normal.

Signed __________________________________________

Suggest improvements to this workplace to avoid a reoccurrence.
Grading tip

‘Justify’ is the key word here. A full reason supported by facts is required. Why is a control measure suitable and reasonably practical in that work situation? You need to state the reasons why, with supporting evidence.

D1

Grading tip

This involves evaluating the accident report, which means assess from the supplied document what could be done to improve the situation? Look through the report and identify with explanation which items you consider are defective or missing and require improvement.

D2

Knowledge check

1. Does the client have to appoint a planning supervisor?
2. Several of your employees are deliberately setting off fire extinguishers in the workplace. Can you prosecute them?
3. Does the main contractor feature in the Construction (Design and Management) Regulations?
4. What is the difference between a hazard and a risk?
5. What precautions must you take for working within a confined space?
6. What is the major cause of fatal accidents?
7. Name four hidden costs of an accident that cannot be recovered from insurances?
8. List the five steps to risk assessment.
9. What four essential items need to be on an accident report?
10. What does RIDDOR stand for?
11. You have had an accident on site and have fractured two fingers. Does this accident require reporting to the safety authorities?
12. The following control measure is being used – the use of a mobile elevated platform to change a light bulb on the ground floor ceiling. Is this reasonably practicable?
13. An accident occurs on a Thursday night and the injured person returns to work on a Monday morning. Is the accident reportable if the person was unfit over the weekend?
14. What four essential items need to be on an accident report?
15. It is 11 days before you report a major accident to the HSE. It is not happy about this – why?