

# UNIT 2001

## Safe working practices in construction

**Health and safety is a vital part of all construction work. All work should be completed in a way that is safe not only for the individual worker, but also for the other workers on the site, people near by and the final users of the building.**

**Every year in the construction industry many people are killed and many more are seriously injured as a result of the work that they do. Therefore, learning as much as you can about health and safety is very important. This unit also supports NVQ Unit VR01 Conform to General Workplace Safety and VR03 Move and Handle Resources.**

**This unit contains material that supports TAP Unit 1: Erect and Dismantle Working Platforms. It also contains material that supports the delivery of the five generic units.**

**This unit will cover the following learning outcomes:**

- Health and safety regulations - roles and responsibilities
- Accident/first aid/emergency procedures and reporting
- Hazards on construction sites
- Health and hygiene
- Safe handling of materials and equipment
- Basic working platforms
- Working with electricity
- Use of appropriate personal protective equipment (PPE)
- Fire and emergency procedures
- Safety signs and notices.

**Key terms**

**Legislation** – a law or set of laws passed by Parliament, often called an Act

**Hazardous** – something or a situation that is dangerous or unsafe

**Employer** – the person or company you work for

**Employee** – the worker

**Key terms**

**Proactive** – acting in advance, before something happens (such as an accident)

**Reactive** – acting after something happens, in response to it

**Key terms**

**Subcontractor** – workers who have been hired by the main contractor to carry out works, usually specialist works, e.g. a general builder may hire a plumber as a subcontractor as none of their staff can do plumbing work

**Supplier** – a company that supplies goods, materials or services

## K1. Health and safety regulations

While at work, whatever your location or the type of work you are doing, there is important **legislation** you must comply with. Health and safety legislation is there not just to protect you – it also states what you must, and must not do, to ensure that no workers are placed in a situation **hazardous** to themselves or others.

There are hundreds of Acts covering all manner of work from hairdressing to construction. Each Act states the duties of the **employer** and **employee** and you should be aware of both. If an employer or employee does something they shouldn't – or doesn't do something they should – they can end up in court and be fined or even imprisoned.

### Approved code of practice, guidance notes and safety policies

As well as Acts, there are two sorts of codes of practice and guidance notes: those produced by the Health and Safety Executive (HSE; see page 4), and those created by companies themselves. Most large construction companies – and many smaller ones – have their own guidance notes, which go further than health and safety law. For example, the law states that everyone must wear safety boots in a hazardous area, but a company's code may state that everyone must wear safety boots at all times. This is called taking a **proactive** approach, rather than a **reactive** one.

### Health and safety legislation you need to be aware of

One phrase that often comes up in the legislation is 'so far as is reasonably practicable'. This means that health and safety must be adhered to at all times, but must take a common sense, practical approach.

#### The Health and Safety at Work Act 1974 (HASAW)

The HASAW applies to all types and places of work and to employers, employees, self-employed people, **subcontractors** and even **suppliers**. The Act is there to protect not only the people at work but also the general public, who may be affected in some way by the work that has been or will be carried out.

The main objectives of the HASAW are to:

- ensure the health, safety and welfare of all persons at work
- protect the general public from all work activities

- control the use, handling, storage and transportation of explosives and highly **flammable** substances
- control the release of noxious or offensive substances into the atmosphere.

To ensure that these objectives are met there are duties for all employers, employees and suppliers.

### *The employer's duties*

Employers must:

- provide safe **access** and **egress** to and within the work area
- provide a safe place to work
- provide and maintain plant and machinery that is safe and without risks to health
- provide information, instruction, training and supervision to ensure the health and safety at work of all employees
- ensure safety and the absence of risks to health in connection with the handling, storage and transportation of articles and substances
- have a written safety policy that must be revised and updated regularly and ensure all employees are aware of it
- involve trade union safety representatives, where appointed, in all matters relating to health and safety
- carry out risk assessments (see page 14) and provide supervision where necessary
- provide and not charge for personal protective equipment (**PPE**).

### *The employee's duties*

Employees must:

- take reasonable care for their own health and safety
- take reasonable care for the health and safety of anyone who may be affected by their acts or **omissions**
- co-operate with their employer or any other person to ensure the legal **obligations** are met
- not misuse or interfere with anything provided for their health and safety
- report hazards and accidents (see page 10)
- use any equipment and safeguards provided by their employer.

### *The supplier's duties*

Persons designing, manufacturing, importing or supplying articles or substances for use at work must ensure that:

#### Key terms

**Flammable** – something that is easily lit and burns rapidly

**Access** – entrance, a way in

**Egress** – exit, a way out

**PPE** – personal protective equipment, such as gloves, a safety harness or goggles

#### Remember

Employers can't charge their employees for anything that has been done or provided for them to ensure that legal requirements on health and safety are met. Self-employed people and subcontractors have the same duties as employees. If they have employees of their own, they must also obey the duties set down for employers

#### Key terms

**Omission** – something that has not been done or has been missed out

**Obligation** – something you have a duty or a responsibility to do

**Did you know?**

The HSE now also includes the Health and Safety Commission (HSC) which was merged with it in 2008

**Did you know?**

Local government bodies can be **enforcing authorities** for several workplaces, including offices, shops, retail and wholesale distribution, hotel and catering establishments, petrol filling stations, residential care homes and the leisure industry

**Key terms****Enforcing authorities**

– an organisation or people who have the authority to enforce certain laws or Acts, as well as providing guidance or advice

**Forensic investigation**

– a branch of science that looks at how things happen

**Inspectors** – someone who is appointed or employed to inspect/ examine something in order to judge its quality or compliance with any laws

- articles are designed and constructed so that they will be safe and without risk to health at all times while they are being used or constructed
- substances will be safe and without risk to health at all times when being used, handled, transported and stored
- tests on articles and substances are carried out as necessary
- adequate information is provided about the use, handling, transporting and storing of articles or substances.

**Health and Safety Executive (HSE)**

The HASAW, like most of the other Acts mentioned, is enforced by the Health and Safety Executive (HSE).

The HSE is the government body responsible for the encouragement, regulation and enforcement of health, safety and welfare in the workplace in the UK. It also has responsibility for research into occupational risks in England, Wales and Scotland. In Northern Ireland the responsibility lies with the Health and Safety Executive for Northern Ireland.

The HSE's duties are to:

- assist and encourage anyone who has any dealings with the objectives of the HASAW
- produce and encourage research, publication, training and information on health and safety at work
- ensure that employers, employees, suppliers and other people are provided with an information and advisory service and are kept informed and advised on any health and safety matters
- propose regulations
- enforce the HASAW.

To aid in these duties the HSE has several resources, including a laboratory used for, among other things, research, development and **forensic investigation** into the causes of accidents.

The enforcement of the HASAW is usually delegated to local government bodies such as county or district councils.

An enforcing authority may appoint **inspectors**, who, under the authority, have the power to:

- enter any premises which she or he has reason to believe it is necessary to enter to enforce the Act, at any reasonable time, or in a dangerous situation
- bring a police constable if there is reasonable cause to fear any serious obstruction in carrying out their duty

- bring any other person authorised by the enforcing authority and any equipment or materials required
- examine and investigate any circumstance that is necessary for the purpose of enforcing the Act
- give orders that the premises, any part of them or anything therein, shall be left undisturbed for so long as is needed for the purpose of any examination or investigation
- take measurements, photographs and make any recordings considered necessary for the purpose of examination or investigation
- take samples of any articles or substances found and of the atmosphere in or in the vicinity of the premises
- have an article or substance which appears to be a danger to health or safety, dismantled, tested or even destroyed if necessary
- take possession of such an article and detain it for so long as is necessary in order to examine it and ensure that it is not tampered with and that it is available for use as evidence in any **prosecution**
- interview any person believed to have information, ask any questions the inspector thinks fit to ask and ensure all statements are signed as a declaration of the truth of the answers
- require the production of, inspect and take copies of, any entry in any book or document which is necessary for the purposes of any examination or investigation
- utilise any other power which is necessary to enforce the Act.

**Key term**

**Prosecution** – accusing someone of committing a crime, which usually results in the accused being taken to court and, if found guilty, being punished

**Contacting the HSE**

Employers, self-employed people or someone in control of work premises have legal duties to record and report to the HSE some work-related accidents. The incidents that must be reported are:

- death, major injury or disease
- dangerous occurrence – an event that may not have caused injury, but could have done so
- over three day injury – an injury at work that results in the worker being away from work for more than three consecutive days.

**Construction (Design and Management) Regulations 2007**

The Construction (Design and Management) Regulations 2007, often referred to as CDM, are important regulations in the construction industry. They were introduced by the HSE's

**Did you know?**

On large projects, a person is appointed as the CDM co-ordinator. This person has overall responsibility for compliance with CDM. There is a general expectation by the HSE that all parties involved in a project will co-operate and co-ordinate with each other

**Did you know?**

Dumper trucks, circular saws, ladders, overhead projectors and chisels are all covered by PUWER, but substances, private cars and structural items are not

Construction Division. The regulations deal mainly with the construction industry and aim to improve safety.

The duties for employers under the regulations are to:

- plan, manage and monitor their own work and that of employees
- check the competence of all their appointees and employees
- train their employees
- provide information to their employees
- comply with the specific requirements in Part 4 of the Regulations, which deals with lighting, excavations, traffic routes, etc.
- ensure there are adequate welfare facilities for their employees.

The duties for employees are to:

- check their own competence
- co-operate with others and co-ordinate work so as to ensure the health and safety of construction workers and others who may be affected by the work
- report obvious risks.

### Provision and Use of Work Equipment Regulations 1998 (PUWER)

These regulations cover all new or existing work equipment – leased, hired or second-hand. They apply in most working environments where the HASAW applies, including all industrial, offshore and service operations. PUWER covers starting, stopping, regular use, transport, repair, modification, servicing and cleaning of equipment.

‘Work equipment’ includes any machinery, appliance, apparatus or tool and any assembly of components that are used in non-domestic premises.

The general duties of the Act require equipment to be:

- suitable for its intended purpose and only to be used in suitable conditions
- maintained in an efficient state and maintenance records kept
- used, repaired and maintained only by a suitably trained person, when that equipment poses a particular risk
- able to be isolated from all its sources of energy
- constructed or adapted to ensure that maintenance can be carried out without risks to health and safety
- fitted with warnings or warning devices as appropriate.

In addition, the Act requires:

- all those who use, supervise or manage work equipment to be suitably trained
- access to any dangerous parts of the machinery to be prevented or controlled
- injury to be prevented from any work equipment that may have a very high or low temperature
- suitable controls to be provided for starting and stopping the work equipment
- suitable emergency stopping systems and braking systems to be fitted to ensure the work equipment is brought to a safe condition as soon as reasonably practicable
- suitable and sufficient lighting to be provided for operating the work equipment.

**Functional skills**

When reading and understanding Government legislation, you are practising several functional skills:  
 FE 1.2.1 – Identifying how the main points and ideas are organised in different texts.  
 FE 1.2.2 – Understanding different texts in detail.  
 FE 1.2.3 – Read different texts and take appropriate action, e.g. respond to advice/instructions.  
 If there are any words or phrases you do not understand, use a dictionary, look them up using the Internet or discuss with your tutor.

**Other pieces of legislation**

Legislation	Content
The Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1995 (RIDDOR)	Employers have a duty to report accidents, diseases or dangerous occurrences. The HSE uses this information to identify where and how risk arises and to investigate serious accidents.
Control of Substances Hazardous to Health Regulations 2002 (COSHH)	States how employees and employers should work with, handle, store, transport and dispose of potentially hazardous substances. This includes substances used and generated during work (e.g. paints or dust), naturally occurring substances (e.g. sand) and biological elements (e.g. bacteria).
The Control of Noise at Work Regulations 2005	Protects employees from consequences of exposure to noise. These state employers must: <ul style="list-style-type: none"> <li>• assess the risks to the employee and make sure legal limits are not exceeded</li> <li>• take action to reduce noise exposure and provide hearing protection</li> <li>• provide information, instruction and training.</li> </ul>
The Electricity at Work Regulations 1989	Covers any work involving electricity or electrical equipment. Employers must keep electrical systems safe and regularly maintained and do everything to reduce the risk of employees coming into contact with live electrical currents.
The Manual Handling Operations Regulations 1992	Covers all work activities involving a person lifting. Where possible, manual handling should be avoided, but where unavoidable a risk assessment must be carried out, focusing on the load, the individual, the task and the environment.

Legislation	Content
The Personal Protective Equipment at Work Regulations 1992 and 2002 (PPER)	<p>Covers all types of personal protective equipment (PPE) which must be checked prior to use by a trained and competent person, in line with manufacturer's instructions. PPE must be provided by the employer free of charge with a suitable and secure storage place.</p> <p>Employers must ensure employees know the risks PPE will avoid, its purpose, how to maintain it and its limitations.</p> <p>Employees must ensure they are trained to use PPE, they use it in line with instructions, return it to storage after use and report any loss or defect.</p>
The Work at Height Regulations 2005	<p>Ensures employers do all they can to reduce the risk of injury or death from working at height. Employers must avoid working at height where possible and use equipment/safeguards that prevent or minimise the danger of falls.</p> <p>Employees must follow any training, report hazards and use any safety equipment provided.</p>

**Remember**

Legislation can change or be updated. New legislation can be created as well – this could even supersede all pieces of legislation

Health and safety is a large and varied subject that changes regularly. The introduction of new regulations or updates to current legislation means it is often hard to remember or keep up-to-date. Your tutor will be able to give you information on current legislation.

Any future employers should also keep you updated on any changes to legislation that will affect you. There are also other sources of information that can be accessed to keep you informed. The main sources of Health and Safety Information are shown in the table below.

<b>The Health and Safety Executive</b>	Wide range of information ranging from actual legislation to helpful guides. The website has videos, leaflets and documents available for free download, with specific sections dedicated to different industries. The construction website is <a href="http://www.hse.gov.uk/construction">www.hse.gov.uk/construction</a> .
<b>Construction Skills</b>	As well as advice on qualifications, they also offer advice on health and safety matters and on sitting the CSCS health and safety test. The website address is <a href="http://www.cskills.org">www.cskills.org</a> .
<b>Royal Society for the Prevention of Accidents (RoSPA)</b>	Provides information, advice, resources and training and are actively involved in the promotion of safety and accident prevention. The website address is <a href="http://www.rosipa.com">www.rosipa.com</a> .
<b>Royal Society for the Promotion of Health (RSPH)</b>	An independent organisation with the goal of promoting and protection of health. Uses advocacy, mediation, knowledge and practice to advise on policy development. Also provides education, training, research, communicates information and provides certification for products, training centres and processes. The website address is <a href="http://www.rsph.org/en/health-promotion">www.rsph.org/en/health-promotion</a> .



## Site inductions

Site inductions are the process that an individual undergoes in order to accelerate their awareness of the potential health and safety hazards and risks they may face in their working environment but excludes job related skills training.

Different site inductions will include different topics depending on the work that is being carried out. The basic information inductions should contain is:

- the scope of operations carried out at the site, project etc.
- the activities that have health and safety hazards and risks
- the control measures, emergency arrangements and welfare arrangements in place
- the local organisation and management structure
- the consultation procedures and resources for health and safety advice
- the process for reporting near misses.

Inductions are also vital for informing all people working on the site of amenities, restricted areas, dress code (PPE) and even evacuation procedures. Inductions must be carried out by a competent person. Records of all inductions must be kept to ensure that all workers have received an induction. Some sites will even hand out cards to those who have been inducted and people without cards will not be admitted to the site.

### Toolbox talks

Toolbox talks are a vital tool used by management, supervisors and employees to deliver basic training and/or to inform all workers of any updates to policy, hazardous activities/areas or other information. They should be delivered by a competent person and a record of all attendees should be kept.

Toolbox talks should be relevant to the people they are being delivered to. The topics can vary from being informative, such as letting everyone know a reclassification of a PPE area, to basic training on the use of a certain tool.

## Construction Skills Certification Scheme (CSCS)

The Construction Skills Certification Scheme (CSCS) was introduced to help improve the quality of work and to reduce accidents. It requires all workers to obtain a CSCS card before they are allowed to carry out work on a building site. There

### Remember

A site induction must take place *before* you start work on that site

### Remember

Visitors to the site who may not be actually doing any work should still receive an induction of sorts as they also need to be aware of amenities, restricted areas and procedures etc.

### Did you know?

Toolbox talks don't need to be formal meetings but can be held in a canteen at break time. However a list of all attendees must be kept to ensure that everyone who needs to receive the talk does so

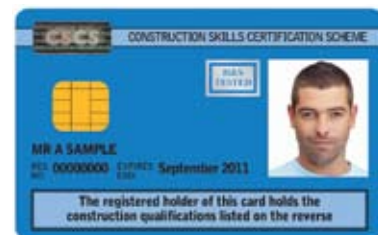


Figure 1.1 CSCS card

**Safety tip**

You should also be aware of any sirens or warning noises that accompany each and every type of emergency such as bomb scares or fire alarms. Some sites may have different variations of sirens or emergency procedures, so it is vital that you pay attention and listen to all instructions. If you are unsure always ask

**Remember**

Most accidents are caused by human error, which means someone has done something they shouldn't have done or, just as importantly, not done something they should have done. Accidents often happen when someone is hurrying, not paying enough attention to what they are doing or they have not received the correct training

**Remember**

An accident that falls under RIDDOR should be reported by the safety officer or site manager and can be reported to the HSE by telephone (0845 300 99 23) or via the RIDDOR website ([www.riddor.gov.uk](http://www.riddor.gov.uk))

are various levels of cards which indicate competence and skill background. This ensures that only skilled and competent tradespeople can carry out the required work on site.

To get a CSCS card all applicants must sit a health and safety test. The aim of the test is to examine knowledge across a wide range of topics in order to improve safety and productivity on site. It is usually taken as a PC-based touch screen test, either at a mobile testing unit or an accredited test centre. The type of card being applied for will determine the level of test that needs to be taken.

As a trainee once you pass the health and safety test you will qualify for a trainee card and once you have achieved a Level 2 qualification you can then upgrade your card to an experienced worker card. Achieving a Level 3 qualification allows you to apply for a gold card. People who make regular visits to site can apply for a visitor card.

## K2. Accident, first aid and emergency procedures and reporting

### Major types of emergency

There are several major types of emergencies that could occur on site. These include not only accidents but also fires, security alerts and bomb alerts. At your site induction, it should be made perfectly clear to you what you should do in the event of an emergency.

### Reporting accidents

All accidents need to be reported and recorded in the accident book and the injured person must report to a trained first aider in order to receive treatment. Serious accidents must be reported under the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1995 (RIDDOR).

The nature and seriousness of the accident will decide who it needs to be reported to. There are several types of documentation used to record accidents and emergencies.

Relevant authorised person	What to do
First aiders	All accidents must be reported to a first aider. If you are unsure who they are or cannot contact them, report it to your supervisor.
Supervisors	Must be informed so they can inform the first aider and their manager, and stop the work if necessary to prevent further accidents.
Safety officers	Will be alerted by your supervisor or site manager and will assess the area to check it is safe, investigate the cause of the accident and prepare a report for HSE (if needed).
HSE	Must be reported to immediately if the accident results in death or major injury and followed up by a written report within ten days. This is done on form F2508.
Managers	Should be informed by the supervisor or safety officer as they may need to report to head office. They will also be tasked with contacting the HSE.
Emergency services	Should be contacted as soon as possible. Usually first aiders contact ambulances and supervisors contact the fire brigade. If in doubt call the emergency services yourself.

### The accident book

The accident book is completed by the person who had the accident or, if this is not possible, someone who is representing the injured person.

The accident book will ask for some basic details, including:

- who was involved
- what happened and where
- the date and time of the accident
- any witnesses to the accident
- the address of the injured person
- what PPE was being worn
- what first aid treatment was given.

### Major and minor accidents

Often an accident will result in an injury which may be minor (e.g. a cut or a bruise) or possibly major (e.g. loss of a limb).

Accidents can also be fatal.

### Near misses

As well as reporting accidents, 'near misses' must also be reported. A 'near miss' is when an accident nearly happened, but did not actually occur. Reporting near misses might identify a problem and can prevent accidents from happening in the future. This allows a company to be proactive rather than reactive.

## Work related injuries in the construction industry

Construction has the largest number of fatal injuries of all the main industry groups. In 2007–2008 there were 72 fatal injuries. This gave a rate of 3.4 people injured per 100,000 workers. The rate of fatal injuries in construction over the past decade has shown a downward trend, although the rate has shown little change in the most recent years.

### Remember

Companies that have a lot of accidents will have a poor company image for health and safety and will find it increasingly difficult to gain future contracts. Unsafe companies with lots of accidents will also see injured people claiming against their insurance which will see their premiums rise. This will eventually make them uninsurable meaning they will not get any work

- From 1999–2000 to 2006–2007 the rate of reported major injuries in construction fell. It is unclear whether the rise in 2007–2008 means an end to this trend. Despite this falling trend, the rate of major injury in construction is the highest of any main industry group (599.2 per 100 000 employees in 2007–2008).
- Compared to other industries, a higher proportion of reported injuries were caused by falls from height, falling objects and contact with moving machinery.
- The THOR-GP surveillance scheme data (2006–2007), indicates a higher rate of work-related illness in construction than across all industries. The rate of self-reported work-related ill health in construction is similar to other industries.

## The cost of accidents

As well as the tragedy, pain and suffering that accidents cause they can also have a negative financial and business impact.

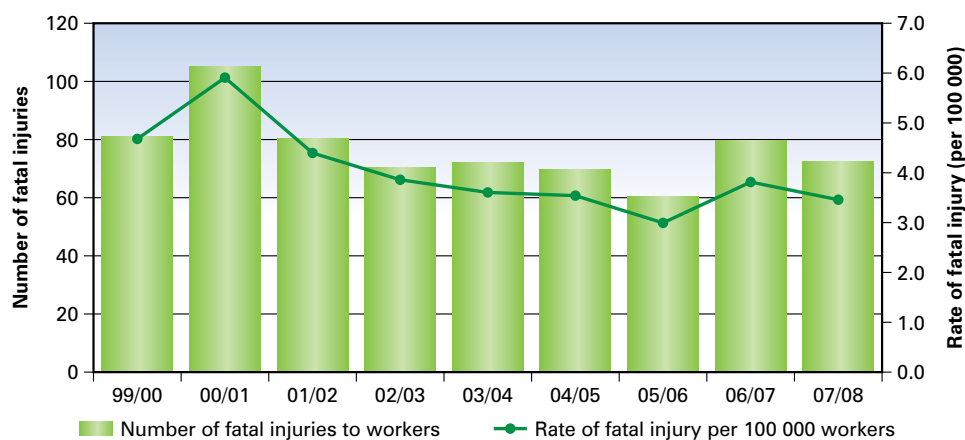


Figure 1.2 Number and rate of fatal injury to workers, 1999–2000 to 2007–2008

Small accidents will affect profits as sick pay may need to be paid. Production may also slow down or stop if the injured person is a specialist. Replacement or temporary workers may need to be used to keep the job going. More serious accidents will see the financial loss rise as the injured person will be off work for longer. This can cause jobs to fall seriously behind and, in extreme cases, may even cause the contractor to lose the job and possibly have to close the site.

## First aid

If there are more than five people on a site, then a qualified first aider must be present at all times. On large building sites there must be several first-aiders. A good first aid box should have plasters, bandages, antiseptic wipes, latex gloves, eye patches, slings, wound dressings and safety pins. Other equipment, such as eye wash stations, must also be available if the work being carried out requires it.

### Actions for an unsafe area

On discovering an accident the first thing to do is to ensure that the victim is in no further danger. This will require you to do tasks such as switching off the electricity supply. Tasks like this must only be done if there is no danger to yourself. You should then contact the first-aiders or emergency services for help.

## K3. Hazards on construction sites

A major part of health and safety at work is being able to identify hazards and to help prevent them in the first place, therefore avoiding the risk of injury.

## Hazards on the building site

The building industry can be a very dangerous place to work and there are certain hazards that all workers need to be aware of. Some of these common hazards are covered later in this unit: falling from height (page 27), electrical (page 34) and fires (page 39).

### Tripping

The main cause of tripping is poor housekeeping. Whether working on scaffolding or on ground level, an untidy workplace is an accident waiting to happen. All workplaces should be kept tidy and free of debris. Not only will this prevent trip hazards, but it

### Remember

Health and safety is everyone's duty. If you receive first aid treatment and notice that there are only two plasters left, you should report it to your line manager



Figure 1.3 A first aid box provides the supplies to deal with minor injuries

### Safety tip

Turning off the electricity is just one possible example. There will be specific safety issues for individual jobs the injured individual may have been working on. However, you should always make sure the area is safe before you continue – otherwise you could become a casualty as well

### Did you know?

Housekeeping is the simple term used for cleaning up after you and ensuring your work area is clear and tidy. Good housekeeping is vital on a construction site as an unclean work area is dangerous. Correct storage is a big part of housekeeping and is covered on pages 23–26



Figure 1.4 An untidy work site can present many trip hazards

### Remember

When a hazardous substance is being used a COSHH or risk assessment will have been made, and it should include a plan for dealing with a spillage

### Key term

**Carry out a risk assessment** – measure the dangers of an activity against the likelihood of accidents taking place

### Functional skills

When completing risk assessments you will be practising the following functional skills: FE 1.3.1 – 1.3.5: Write clearly with a level of detail to suit the purpose.

will also prevent costly clean-up operations at the end of the job and will promote a good professional image.

### Chemical spills

Chemical spillages can range from minor inconvenience to major disaster. Most spillages are small and create minimal or no risk. If the material involved is not hazardous, it can simply be cleaned up. However, some spills may involve a hazardous material, so it is important to know what to do before the spillage happens so that remedial action can be prompt and harmful effects minimised.

### Burns

Burns can occur not only from the obvious source of fire and heat but also from materials containing chemicals such as cement or painter's solvents. Even electricity can cause burns. It is vital when working with materials that you are aware of the hazards they may present and take the necessary precautions.

## Risk assessments

You will have noticed that most of the legislation we have looked at requires risk assessments to be carried out. The Management of Health and Safety at Work Regulations 1999 require every employer to make suitable and sufficient assessment of:

- the risks to the health and safety of their employees to which the employees are exposed while at work
- the risks to the health and safety of persons not in their employment arising out of or in connection with their work activities.

It is vital that you know how to **carry out a risk assessment**. Often you may be in a position where you are given direct responsibility for this and the care and attention you take over it may have a direct impact on the safety of others. You must be aware of the dangers or hazards of any task, and know what can be done to prevent or reduce the risk.

There are five steps in a risk assessment:

- **Step 1** – identify the hazards.
- **Step 2** – identify who is at risk.
- **Step 3** – calculate the risk from the hazard against the likelihood of it taking place.
- **Step 4** – introduce measures to reduce the risk.
- **Step 5** – monitor the risk.

## Method statements

Method statements are a key safety document that takes the information about significant risks from your risk assessment, and combines them with the job specification, to produce a practical and safe working method for the workers to follow for tasks on site.

### Hazard books

The hazard book is a tool used on some sites that identifies hazards within certain tasks and can help to produce risk assessments. The book will list tasks and what hazards are associated with those tasks.

#### Remember

There may be different hazards that are associated with tasks. Different working environments can create different types of hazard so risk assessments must always look at the specific task and not a generic one

## K4. Health and hygiene

As well as keeping an eye out for hazards, you must also make sure that you look after yourself and stay healthy. This is a responsibility that lies with both the employer and the employee.

### Staying healthy

One of the easiest ways to stay healthy is to wash your hands on a regular basis. By washing your hands you are preventing hazardous substances from entering your body through ingestion (swallowing). You should always wash your hands after going to the toilet and before eating or drinking. Personal hygiene is vital to ensure good health.

Remember that some health problems do not show symptoms straight away and what you do now can affect you much later in life.

### Welfare facilities

Welfare facilities are things such as toilets, which must be provided by your employer to ensure a safe and healthy workplace. There are several things that your employer must provide to meet welfare standards and these are:

- toilets
- washing facilities
- drinking water
- storage room for clothes and personal belongings
- lunch areas.



Figure 1.5 Always wash your hands to prevent ingesting hazardous substances

#### Safety tip

When placing clothes in a drying room, do not place them directly on to heaters as this can lead to fire

**Remember**

Prescription drugs can also affect you on site – be sure to follow all instructions closely

**Did you know?**

Noise is measured in decibels (dB). The average person may notice a rise of 3 dB, but with every 3 dB rise, the noise is doubled. What may seem like a small rise is actually very significant

**Remember**

Reducing the risk can be done in a number of ways:

**Remove** – get rid of whatever is creating the noise.

**Move** – locate the noisy equipment away from people.

**Enclose** – surround noisy equipment e.g. with sound proof material.

**Isolation** – move the workers to protected areas.

Even after all of these are considered, PPE may still be required

**Safety tip**

Not all substances are labelled, and sometimes the label may not match the contents. If you are in any doubt, don't use or touch the substance

## Substance abuse

Substance abuse is a general term and mainly covers things such as drinking alcohol and taking drugs. Taking drugs or inhaling solvents at work is not only illegal, but is also highly dangerous to the person taking them and everyone around them as reduced concentration problems can lead to accidents. Drinking alcohol is also dangerous at work. Going to the pub for lunch and having just one drink can lead to slower reflexes and reduced concentration.

## Health effects of noise

Damage to hearing has a range of causes, from ear infections to loud noises. Hearing loss can result from one very loud noise lasting only a few seconds, or from relatively loud noise lasting for hours, such as a drill.

The damage to hearing can be caused by one of two things:

- **Intensity** – you can be hurt in an instant from an explosive or very loud noise which can burst your ear drum.
- **Duration** – noise doesn't have to be deafening to harm you, it can be a quieter noise over a long period e.g. a 12 hour shift.

## Hazardous substances

Hazardous substances are a major health and safety risk on a construction site. To this end, they need to be handled, stored, transported and disposed of in very specific ways.

- **Step 1** – assess the risks to health from hazardous substances used or created by employees' activities.
- **Step 2** – decide what precautions are needed.
- **Step 3** – prevent employees from being exposed to any hazardous substances. If prevention is impossible, the risk must be adequately controlled.
- **Step 4** – ensure control methods are used and maintained properly.
- **Step 5** – monitor the exposure of employees to hazardous substances.
- **Step 6** – carry out health surveillance to ascertain if any health problems are occurring.
- **Step 7** – prepare plans and procedures to deal with accidents such as spillages.
- **Step 8** – ensure all employees are properly informed, trained and supervised.





Figure 1.6 Common safety signs for corrosive, toxic and explosive materials

Identifying a substance that may fall under the COSHH regulations is not always easy, but you can ask the supplier or manufacturer for a COSHH data sheet, outlining the risks involved with a substance. Most substance containers carry a warning sign stating whether the contents are corrosive, harmful, toxic or bad for the environment.

## Waste

Many different types of waste material are produced in construction work. It is your responsibility to identify the type of waste you have created and the best way of disposing it.

There are several pieces of legislation that dictate the disposal of waste materials. They include:

- Environmental Protection Act 1990
- Controlled Waste Regulations 1992
- Waste Management Licensing Regulations 1994.

Several different types of waste are defined by these regulations:

- **household waste** – normal household rubbish
- **commercial waste** – for example, from shops or offices
- **industrial waste** – from factories and industrial sites.

All waste must be handled properly and disposed of safely. The Controlled Waste Regulations state that only those authorised to do so may dispose of waste and that a record should be kept of all waste disposal.

### Hazardous waste

Some types of waste, such as chemicals or material that is toxic or explosive, are too dangerous for normal disposal and must be disposed of with special care. The Hazardous Waste (England and Wales) Regulations cover this disposal. If hazardous material is inside a container the container must be clearly marked and a consignment note completed for its disposal.

#### Remember

If you leave material on site when your work is completed you may be discarding them. You are still responsible for this waste material!

**Key terms**

**Symptoms** – signs of illness or disease (e.g. difficulty breathing, a sore hand or a lump under the skin)

**Leptospirosis** – an infectious disease that affects humans and animals. The human form is commonly called Weil's disease. The disease can cause fever, muscle pain and jaundice. In severe cases it can affect the liver and kidneys. Leptospirosis is a germ that is spread by the urine of the infected person. It can often be caught from contaminated soil or water that has been urinated in

**Dermatitis** – a skin condition where the affected area is red, itchy and sore

**Vibration white finger** – a condition that can be caused by using vibrating machinery (usually for very long periods of time). The blood supply to the fingers is reduced which causes pain, tingling and sometimes spasms (shaking)

**Remember**

Activities on site can also damage your body. You could have eye damage, head injury and burns along with other physical wounds

## Health risks in the workplace

While working in the construction industry, you will be exposed to substances or situations that may be harmful to your health. Some of these health risks may not be noticeable straight away. It may take years for **symptoms** to be noticed and recognised.

Ill-health can result from:

- exposure to dust (such as asbestos), which can cause eye injuries, breathing problems and cancer
- exposure to solvents or chemicals, which can cause **leptospirosis, dermatitis** and other skin problems
- lifting heavy or difficult loads, which can cause back injury and pulled muscles
- exposure to loud noise, which can cause hearing problems and deafness
- exposure to sunlight, which can cause skin cancer
- using vibrating tools, which can cause **vibration white finger** and other problems with the hands
- head injuries, which can lead to blackouts and epilepsy
- cuts, which if infected can lead to disease.

Everyone has a responsibility for health and safety in the construction industry but accidents and health problems still happen too often. Make sure you do what you can to prevent them.

## K5. Safe handling of materials and equipment

### Manual handling

Manual handling means lifting and moving a piece of equipment or material from one place to another without using machinery. Lifting and moving loads by hand is one of the most common causes of injury at work.

Poor manual handling can cause injuries such as muscle strain, pulled ligaments and hernias. The most common injury by far is spinal injury. Spinal injuries are very serious because there is very

little that doctors can do to correct them and, in extreme cases, workers have been left paralysed.

### Lifting correctly (kinetic lifting)

When lifting any load it is important to keep the correct posture and to use the correct technique.

The correct posture before lifting:

- feet shoulder width apart with one foot slightly in front of the other
- knees should be bent
- back must be straight
- arms should be as close to the body as possible
- grip must be firm using the whole hand and not just the finger tips.

The correct technique when lifting:

- approach the load squarely facing the direction of travel
- adopt the correct posture
- place hands under the load and pull the load close to your body
- lift the load using your legs and not your back.

When lowering a load you must also adopt the correct posture and technique:

- bend at the knees, not the back
- adjust the load to avoid trapping fingers
- release the load.

#### Remember

The Manual Handling Operations Regulations 1992 is the key piece of legislation related to manual handling

#### Safety tip

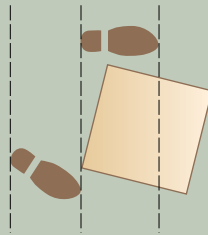
Most injuries caused by manual handling result from years of lifting items that are too heavy, are awkward shapes or sizes, or from using the wrong technique. However, it is also possible to cause a lifetime of back pain with just one single lift

#### Remember

Even light loads can cause back problems so when lifting anything, always take care to avoid twisting or stretching



Think before lifting



Adopt the correct posture before lifting



Get a good grip on the load



Adopt the correct posture when lifting



Move smoothly with the load



Adopt the correct posture and technique when lowering

## Safe handling

Safe manual handling methods are discussed in detail on pages 18–19. When handling any materials or equipment, always think about the health and safety issues involved and remember the manual handling practices explained to you during your induction.

You aren't expected to remember everything but basic common sense will help you to work safely.

- Always wear your safety helmet and boots at work.
- Wear gloves and ear defenders when necessary.
- Keep your work areas free from debris and materials, tools and equipment not being used.
- Wash your hands before eating.
- Use barrier cream before starting work.
- Always use correct lifting techniques.

Ensure you follow instructions given to you at all times when moving any materials or equipment. The main points to remember are:

- Always try to avoid manual handling (or use mechanical means to aid the process).
- Always assess the situation first to decide on the best method of handling the load.
- Always reduce any risks as much as possible (e.g. split a very heavy load, move obstacles from your path before lifting).
- Tell others around you what you are doing.
- If you need help with a load, get it. Don't try to lift something beyond what you can manage.

### Did you know?

In 2004/2005 there were over 50 000 injuries while handling, lifting or carrying in the UK (Source: HSE)

**Remember**

PAT stands for 'portable appliance testing'

## Basic health and safety for power tools

Always treat power tools with respect – they have the potential to cause harm either to the person using them or to others around. All power tools used on site should be regularly tested (PAT tested) by a qualified person. There are several health and safety regulations governing the use of power tools. Make sure that you wear suitable PPE at all times and that power tools are operated safely. In some cases, you must be qualified to use them. Refer to PUWER (Provision and Use of Work Equipment Regulations) 1998 if needed.

On-site transformers are used to reduce the mains voltage from 230 volts to 110 volts. All power tools used should be designed for 110 volts.

As well as the traditional powered tools there are also tools powered by gas or compressed air. Gas powered tools, such as nail guns, also require batteries to operate them. They must be handled carefully similar to other power tools.

Special care should be taken with electrical tools.

**Always:**

- check plugs and connections (make sure you have the correct fuse rating in the plug)
- inspect all leads to ensure there is no damage
- check that the power is off when connecting leads
- unwind extension leads completely from the reel to prevent the cable from overheating.

**Never:**

- use a tool in a way not recommended by the manufacturer
- use a tool with loose, damaged or makeshift parts
- lay a driver down while it is still switched on
- use a drill unless the chuck (the part in which the drill bit is held) is tight
- throw the tool onto the ground
- pass the tool down by its lead
- use a drill where it is difficult to see what you are doing or to hold the tool tightly
- allow leads to trail in water.

**Safety tip**

When using power tools, always read the manufacturer's instructions and safety guidelines before use. This will ensure that they are being operated correctly and for the correct purpose

## Safe storage and handling of tools and equipment

### Tools

All tools need to be stored safely and securely in suitable bags or boxes to protect them from weather and rust. When not in use they should be safely locked away.

### Bricks and blocks

Type	Storage and handling issues
Bricks	<ul style="list-style-type: none"> <li>• Now largely pre-packed and banded using either plastic or metal bands to stop bricks separating until ready for use. Edges are protected by plastic strips to prevent damage during moving. Usually covered in shrink-wrapped plastic to protect from the elements.</li> <li>• Store on level ground close to where they are required and stack no more than two packs high.</li> <li>• Once banding is cut bricks can collapse, so great care must be taken</li> <li>• Bricks should be taken from a minimum of three packs and mixed to stop changes in colour. If bricks are not mixed different colour shades will appear in brickwork – this is called banding.</li> <li>• If unloaded by hand the bricks should be stacked on edge in rows with the ends of stacks bonded and no higher than 1.8 m. All stacks should be covered with tarpaulin or polythene sheets.</li> </ul>
Blocks	Made from concrete and may be dense or lightweight. Storage is the same as bricks.
Paving slabs	<ul style="list-style-type: none"> <li>• Made from concrete or stone in a variety of shapes and sizes.</li> <li>• Normally delivered by lorry in wooden crates, covered in shrink-wrapped plastic, or banded and covered on pallets. Do not stack higher than two packs, to help prevent accidents and weight pressure on slabs which can cause damage.</li> <li>• Store outside and stack on edge to prevent lower slabs being damaged by the weight of the stack. Smaller numbers can be stored flat. Store on firm, level ground with timber bearers below to prevent damage to edges.</li> </ul>

#### Safety tips

- Hand tools with sharp edges should be covered to prevent cuts
- Power tools should be carried by the handle
- Power tools that have gas powered cartridges must be stored in an area that is safe and away from sources of ignition to prevent explosion. Used cartridges must be disposed of safely

#### Remember

Guidance for the storage of power tools will be provided in the manufacturer's manual. Most power tools come with a plastic carry case that can be used for storage

#### Functional skills

To store materials safely and correctly, you will need to be familiar with manufacturers' instructions. In doing this you will be practising the following FE 1.2.3: Reading different texts and taking appropriate action.

#### Safety tip

It is good practice to put an intermediate flat stack in long rows to prevent rows from toppling

**Remember**

Aggregates can be supplied as bagged materials, as can cement and plaster

**Did you know?**

On larger sites some companies use a machine spray system to cover large areas with plaster quickly, using many plasterers to complete the work

### Aggregates

Aggregates are granules or particles that are mixed with cement and water to make mortar and concrete. Aggregates should be hard, durable and should not contain any form of plant life, or anything that can be dissolved in water.

Aggregates are normally delivered in tipper lorries, although nowadays one tonne bags are available and may be crane handled. The aggregates should be stored on a concrete base, with a fall to allow for any water to drain away. In order to protect aggregates from becoming contaminated with leaves and litter, it is a good idea to situate stores away from trees and cover aggregates with a tarpaulin or plastic sheets.

### Cement and plaster

Plaster is made from gypsum, water and cement or lime.

Aggregates can also be added depending on the finish desired. Plaster provides a joint-less, smooth, easily decorated surface for internal walls and ceilings. Cement is made from limestone or chalk and is used in the creation of mortar and concrete.

Both cement and plaster are usually available in 25 kg bags. The bags are made from multi-wall layers of paper with a polythene liner. Care must be taken not to puncture the bags before use. Each bag, if offloaded manually, should be stored in a ventilated, waterproof shed, on a dry floor on pallets. If offloaded by crane they should be transferred to the shed and the same storage method used.

The bags should be kept clear of the walls and piled no higher than five bags.

### Wood and sheet materials

There are various types of wood and sheet materials available, but the most common are as follows:

Type	Storage and handling issues
<b>Carcassing timber</b>	Store outside under a covered framework, on timber bearers clear of ground, which should be vegetation free, to reduce the risk of ground moisture absorption. Use piling sticks between each layer of timber to provide support and allow air circulation.
<b>Joinery grade and Hardwoods</b>	Store under full cover, preferably in a storage shed. Good ventilation is needed to prevent a build-up of moisture. Store on bearers on a well-prepared base.



Type	Storage and handling issues
<b>Plywood and sheet materials</b>	<p>Store in a dry, well-ventilated environment. Specialised covers are available to give added protection, helping to prevent condensation from other types of sheeting. Stack flat on timber cross-bearers, spaced close together to prevent sagging. Where space is short, store on edge in purpose-made racks. There should be sufficient space for easy loading and removal. Do not lean against walls as this makes the wood bow.</p> <p>For sheet materials with faces, these should be placed against each other to minimise the risk of damage. Keep different sizes, grades and qualities of sheet materials separate.</p> <p>Sheet materials are heavy and easy to damage so extra care is needed when moving them.</p>
<b>Joinery components</b>	<p>These can be doors, kitchen units etc. and must be stored safely and securely.</p> <p>Doors, frames etc. should ideally be stored flat on timber bearers under cover to protect from the weather. In limited space they can be stored upright in a rack, but do not lean against a wall.</p> <p>Wall and floor units must be stacked on a flat surface no more than two units high. Store inside, preferably in the room they are to be fitted in. Use protective sheeting to prevent damage and staining.</p>
<b>Plasterboard</b>	<p>Larger sheets can be very awkward to carry, particularly in strong wind. Store in a flat waterproof area and do not lean against a wall.</p>

## Adhesives

Adhesives are substances used to bond (stick) surfaces together. Because of their chemical nature, there are a number of potentially serious risks connected with adhesives if they are not stored, used and handled correctly.

All adhesives should be stored and used in line with the manufacturer's instructions. This usually involves storing them on shelving, with labels facing outward, in a safe, secure area (preferably a lockable store room). It is important to keep the labels facing outwards so that the correct adhesive can be selected.



**Figure 1.7** Adhesives should be stored according to the manufacturer's instructions

### Remember

Heavy materials should be stored at low levels to aid manual handling and should never be stacked more than two levels high

**Key terms**

**Inverted** – tipped and turned upside down

**Skimming** – the formation of a skin which occurs when the top layer dries out

**Paint and decorating equipment**

Type	Storage issues
<b>Oil-based</b>	Store on clearly marked shelves with the labels turned to the front. Always order in date order, with new stock at the back. They should be regularly <b>inverted</b> to prevent settlement or separation of ingredients and kept tightly sealed to prevent <b>skinning</b> . Store at a constant temperature to maintain consistency.
<b>Water based</b>	Store on clearly marked shelves with the labels turned to the front and in date order. Store at a constant temperature and protect from frost to prevent freezing. Use before the use-by-date expires.
<b>Powdered materials</b>	Heavy bags should be stored at ground or platform level. Smaller items can be stored on shelves with loose materials in sealed containers. Protect from frost and moisture and from high humidity. Do not store in the open air.



Figure 1.8 Correct storage of paints

**Key term**

**Volatile** – quick to evaporate (turn to a gas)

**Substances hazardous to health**

Some substances a decorator will work with are potentially hazardous to health, with **volatile** and highly flammable characteristics. The COSHH Regulations apply to such materials and detail how they must be stored and handled.

Decorating materials that might be hazardous to health include spirits (i.e. methylated and white), turpentine (turps), paint thinners and varnish removers. These should be stored out of the way on shelves, preferably in a suitable locker or similar room that meets the requirements of COSHH. The temperatures must be kept below 15°C as a warmer environment may cause storage containers to expand and blow up.

## K6. Basic working platforms

### Fall protection

With any task that involves working at height, the main danger to workers is falling. Although scaffolding, etc. should have edge protection to prevent falls, there are certain tasks where edge protection or scaffolding simply cannot be used.

In these instances some form of fall protection must be in place to prevent the worker falling, keep the fall distance to a minimum or ensure the landing point is cushioned.

### Harnesses and lanyards

Harnesses and lanyards are a type of fall-arrest system, which means that, in the event of a slip or fall, the worker will only fall a few feet at most.

The system works with a harness that is attached to the worker and a lanyard attached to a secure beam/eyebolt. If the worker slips, then they will only fall as far as the length of cord/lanyard and will be left hanging, rather than falling to the ground.

### Safety netting

Safety netting is also a type of fall-arrest system, but is used mainly on the top floor where there is no higher point to attach a lanyard. The nets are attached to the joists/beams and are used to catch any worker who may slip or fall.

### Air bags

An airbag safety system is a form of soft fall-arrest and is comprised of interlinked modular air mattresses that expand together to form a continuous protective safety surface, giving a cushioned soft fall and preventing serious injury.

The system must be kept inflated and should be checked regularly to ensure that it is still functioning. This system is ideal for short fall jobs, but should not be used where a large fall could occur.



Figure 1.9 A harness and lanyard can prevent a worker from falling to the ground



Figure 1.10 Safety netting is used when working at the highest point

## Stepladders and ladders

### Stepladders

A stepladder has a prop, which when folded out allows the ladder to be used without having to lean it against something. Stepladders are one of the most frequently used pieces of access equipment in the construction industry and are often used every day. This means that they are not always treated with the respect they demand.

Stepladders are often misused. They should only be used for work that will take a few minutes to complete. When work is likely to take longer, use a sturdier alternative.

When stepladders are used, the following safety points should be observed:

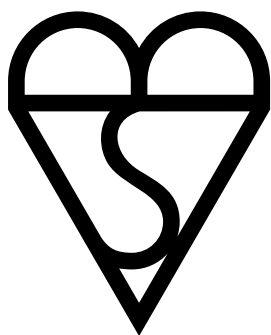


Figure 1.11 British Standards Institution kitemark

- Ensure the ground on which the stepladder is to be placed is firm and level. If the ladder rocks or sinks into the ground it should not be used for the work.
- Always open the steps fully.
- Never work off the top tread of the stepladder.
- Always keep your knees below the top tread.
- Never use stepladders to gain additional height on another working platform.
- Always look for the BSI kite mark (Figure 1.11), which shows that the ladder has been made to BSI standards.

A number of other safety points need to be observed depending on the type of stepladder being used.

### Wooden stepladder

Before using a wooden stepladder, you should check:

- for loose screws, nuts, bolts and hinges
- that the tie ropes between the two sets of **stiles** are in good condition and not frayed
- for splits or cracks in the stiles
- that the treads are not loose or split.

Never paint any part of a wooden stepladder as this can hide defects, which may cause the ladder to fail during use, causing injury.

### Aluminium stepladder

Before using an aluminium stepladder:

- check for damage to stiles and treads to see whether they are twisted, badly dented or loose
- ensure you are not working close to live electricity supplies as aluminium will conduct electricity.

#### Key term

**Stiles** – the side pieces of a stepladder into which the steps are set

### *Fibreglass stepladder*

Before using a fibreglass stepladder, check for damage to stiles and treads. Once damaged, fibreglass stepladders cannot be repaired and must be disposed of.

### **Ladders**

A ladder, unlike a stepladder, does not have a prop and so has to be leant against something in order for it to be used. Together with stepladders, ladders are one of the most common pieces of equipment used to carry out work at height and to gain access to the work area.

Ladders are also made of timber, aluminium or fibreglass and require similar checks to stepladders before use.

### *Erecting and using a ladder*

The following points should be noted when considering the use of a ladder:

- As with stepladders, ladders are not designed for work of long duration. Alternative working platforms (see pages 31–33) should be considered if the work will take longer than a few minutes.
- The work should not require the use of both hands. One hand should be free to hold the ladder.
- You should be able to do the work without stretching.
- You should make sure that the ladder can be adequately secured to prevent it slipping on the surface it is leaning against.

### *Pre-use checks*

Before using a ladder check its general condition. Make sure that:

- no rungs are damaged or missing
- the stiles are not damaged
- no **tie-rods** are missing
- no repairs have been made to the ladder.

In addition, for wooden ladders ensure that:

- they have not been painted, which may hide defects or damage
- there is no decay or rot
- the ladder is not twisted or warped.

#### **Safety tip**

If any faults are revealed when checking a stepladder, it should be taken out of use, reported to the person in charge and a warning notice attached to it to stop anyone using it

#### **Find out**

What are the advantages and disadvantages of each type of stepladder?

#### **Did you know?**

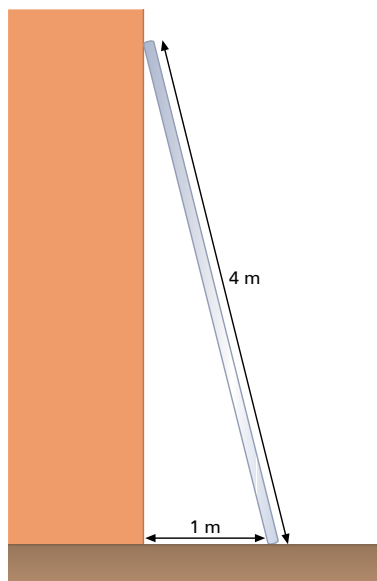
Ladders and stepladders should be stored under cover to protect them from damage such as rust or rotting

#### **Key term**

**Tie-rods** – metal rods underneath the rungs of a ladder that give extra support to the rungs

**Did you know?**

On average in the UK, every year 14 people die at work falling from ladders, and nearly 1200 suffer major injuries (source: HSE)



**Figure 1.12** Correct angle for a ladder

**Remember**

You must carry out a thorough risk assessment before working from a ladder. Ask yourself, 'Would I be safer using an alternative method?'

**Safety tip**

A-frame trestles should never be used as a stepladder as they are not designed for this purpose

**Erecting a ladder**

Observe the following guidelines when erecting a ladder:

- Ensure you have a solid, level base.
- Do not pack anything under either (or both) of the stiles to level it.
- If the ladder is too heavy to put it in position on your own, get someone to help.
- Ensure that there is at least a four rung overlap on each extension section.
- Never rest the ladder on plastic guttering as it may break, causing the ladder to slip and the user to fall.
- Where the base of the ladder is in an exposed position, ensure it is adequately guarded so that no one knocks it or walks into it.
- The ladder should be secured at both the top and bottom. The bottom of the ladder can be secured by a second person. However, this person must not leave the base of the ladder while it is in use.
- The angle of the ladder should be a ratio of 1: 4 (or 75°). This means that the bottom of the ladder is 1 m away from the wall for every 4 m in height (see Figure 1.12).
- The top of the ladder must extend at least 1 m, or five rungs, above its landing point.

**Trestle platforms****Frames****A-frames**

These are most commonly used by carpenters and painters. As the name suggests, the frame is in the shape of a capital A and can be made from timber, aluminium or fibreglass. Two are used together to support a platform (a scaffold or staging board).

When using A-frames:

- they should always be opened fully and, in the same way as stepladders, must be placed on firm, level ground
- the platform width should be no less than 450 mm
- the overhang of the board at each end of the platform should be not more than four times its thickness.

**Steel trestles**

These are sturdier than A-frame trestles and are adjustable in height. They are also capable of providing a wider platform than timber trestles. As with the A-frame type, they must be used only

on firm and level ground but the trestle itself should be placed on a flat scaffold board on top of the ground. Trestles should not be placed more than 1.2 m apart.

## Platforms

### Scaffold boards

To ensure that scaffold boards provide a safe working platform, before using them check that they:

- are not split
- are not twisted or warped
- have no large knots, which cause weakness.

Care should be taken when handling scaffold boards as they can be long and unwieldy. Ideally two people should be used when carrying them. It is important to store scaffold boards correctly, that is flat and level, otherwise they will twist or bow. They also need to be kept covered to prevent damage from rain, which could lead to rot.

### Staging boards

These are designed to span a greater distance than scaffold boards and can offer a 600 mm wide working platform. They are ideal for use with trestles.

### Hop-ups

Also known as step-ups, hop-ups are ideal for reaching low-level work that can be carried out in a relatively short period of time. A hop-up needs to be of sturdy construction and have a base of not less than 600 mm by 500 mm. Hop-ups have the disadvantage that they are heavy and awkward to move around.

## Scaffolding

Tubular scaffold is the most commonly used type of scaffolding within the construction industry. There are two types of tubular scaffold:

- **Independent scaffold** – free-standing scaffold that does not rely on any part of the building to support it (although it must be tied to the building to provide additional stability).
- **Putlog scaffold** – scaffolding that is attached to the building via the entry of some of the poles into holes left in the brickwork by the bricklayer. The poles stay in position until the construction is complete and give the scaffold extra support.

No one other than a qualified **carded scaffolder** is allowed to erect or alter scaffolding. Although you are not allowed to erect or alter this type of scaffold, you must be sure it is safe before you work on it.

### Safety tip

Do not use items as hop-ups that are not designed for the purpose (e.g. milk crates, stools or chairs). They are usually not very sturdy and can't take the weight of someone standing on them. This may result in falls and injury

### Key term

#### Carded scaffolder

– someone who holds a recognised certificate showing competence in scaffold erection

**Remember**

If you have any doubts about the safety of scaffolding, report them. You could very well prevent serious injury or even someone's death

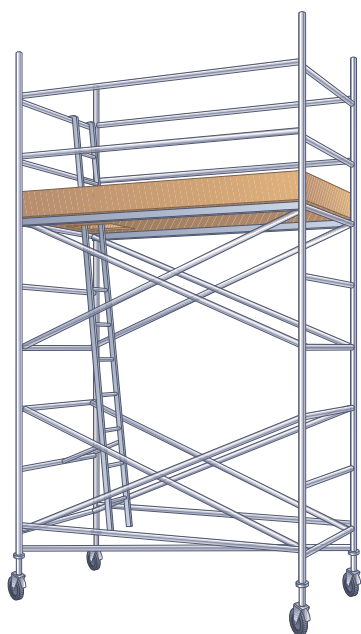


Figure 1.13 Mobile tower scaffold

**Key term**

**Proportionately** – in relation to the size of something else

**Safety tip**

Mobile towers must only be moved when they are free of people, tools and materials

**Mobile tower scaffolds**

Mobile tower scaffolds are so called because they can be moved around without being dismantled. Lockable wheels make this possible and they are used extensively throughout the construction industry by many different trades. A tower can be made from either traditional steel tubes and fittings or aluminium, which is lightweight and easy to move. The aluminium type of tower is normally specially designed and is referred to as a 'proprietary tower'.

A different type of tower scaffold is a 'low tower'. These are designed to be used by one person and have a recommended working height of 2.5 m and a working load of 150 kg. They need no assembly beyond locking in place the platform and handrails, but make sure you follow the manufacturer's instructions to do this.

**Erecting a tower scaffold**

It is essential that tower scaffolds are situated on a firm and level base. The stability of any tower depends on the height in relation to the size of the base:

- for use inside a building, the height should be no more than three-and-a-half times the smallest base length
- for outside use, the height should be no more than three times the smallest base length.

The height of a tower can be increased provided the area of the base is increased **proportionately**. The base area can be increased by fitting outriggers to each corner of the tower.

For mobile towers, the wheels must be in the locked position whilst they are in use and unlocked only when they are being repositioned.

There are several important points you should observe when working from a scaffold tower:

- any working platform above 2 m high must be fitted with guardrails and toe boards; guard rails may also be required at heights of less than 2 m if there is a risk of falling onto potential hazards below, for example reinforcing rods; guardrails must be fitted at a minimum height of 950 mm
- if guardrails and toe boards are needed, they must be positioned on all four sides of the platform
- any tower higher than 9 m must be secured to the structure



- towers must not exceed 12 m in height unless they have been specifically designed for that purpose
- the working platform of any tower must be fully boarded and be at least 600 mm wide
- if the working platform is to be used for materials then the minimum width must be 800 mm
- all towers must have their own access and this should be by an internal ladder.

**Safety tip**

Never climb a scaffold tower on the outside as this can cause it to tip over

## The dangers of working at height

As well as falling from the height there are additional dangers in working at height that are not present when working at ground level.

Although good housekeeping is important while working at ground level to prevent slips and trips, it is *vital* when working at height. Not only are you at added risk, but materials and tools that are left on a working platform can be knocked off the platform onto people working below. There is a risk of causing serious head injuries to those below – and not just the workforce, as in some instances the working platform may be in an area that involves the general public.

When working in a public area the public must be protected from hazards by way of barriers around the work area. You must also ensure that the sides of the working platform are sealed off to prevent any materials or other objects from falling.

**Working life**

Ralph and Vijay are working on the second level of some scaffolding, clearing some debris. Ralph suggests that, to speed up the task, they should throw the debris over the edge of the scaffolding into the skip below. The building Ralph and Vijay are working on is on a main road and the skip is not in a closed off area.

What do you think about Ralph's idea? Ralph seems to have forgotten that working at height poses a risk not only to himself and Vijay, but also to the people below them. What might be the effects of following Ralph's plan? The scaffold should be set up to prevent materials from going over the edge, so to follow the plan will already mean having to make the scaffold less safe for Ralph and Vijay.

What should Ralph and Vijay be doing to clear the debris from the scaffold?

**Did you know?**

Around 30 workers a year die from electricity-related accidents, with over 1000 more being seriously injured (source: HSE)

## K7. Working with electricity

Electricity is a killer. One of the main problems with electricity is that it is invisible. You don't even have to be working with an electric tool to be electrocuted. You can get an electric shock:

- working too close to live overhead cables
- plastering a wall with electric sockets
- carrying out maintenance work on a floor
- drilling into a wall.

### Voltages

There are two main types of voltage in use in the UK. These are 230 V and 110 V. The standard UK power supply is 230 V and this is what all the sockets in your house are.

On construction sites 230 V has been deemed as unsafe so 110 V must be used. The 110 V is identified by a yellow casement and different style plug. It works from a transformer which converts the 230 V to 110 V.

When working within domestic dwellings where 230V is the standard power source ideally a portable transformer should be used.

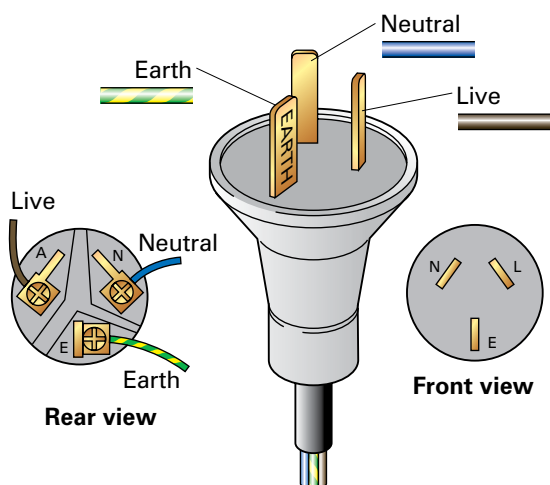


Figure 1.14 Colour coding of the wires in a 230 V plug



Figure 1.15 A 110 V plug

**Safety tip**

The colour coding of the wires has been changed recently to comply with European colours. Some older properties will have the following colours:

- Live – Red
- Neutral – Black
- Earth – Yellow and green

If this is not possible then residual current devices (RCD) should be used.

Contained within the wiring there should be three wires: the live and neutral, which carry the alternating current, and the earth wire, which acts as a safety device. The three wires are colour-coded as follows to make them easy to recognise:

- Live** – Brown
- Neutral** – Blue
- Earth** – Yellow and green

### Precautions to take to prevent electric shocks

**Never:**

- carry electrical equipment by the cable
- remove plugs by pulling on the lead
- allow tools to get wet – if they do, get them checked before use.

**Always:**

- check equipment, leads and plugs before use – if you find a fault don't use the equipment and tell your supervisor immediately
- keep cables off the ground where possible to avoid damage/trips
- avoid damage to the cable by keeping it away from sharp edges
- keep the equipment locked away and labelled to prevent it being used by accident
- use cordless tools where possible
- follow instructions on extension leads.

## Dealing with electric shocks

In helping the victim of an electric shock, the first thing you must do is disconnect the power supply – if it is safe to do and will not take long to find. Touching the power source may put you in danger.

- If the victim is in contact with something portable, such as a drill, attempt to move it away using a non-conductive object such as a wooden broom.
- Time is precious and separating the victim from the source can prove an effective way to speed the process.
- Don't attempt to touch the affected person until they are free and clear of the supplied power. Be especially careful in wet areas, such as bathrooms – most water will conduct electricity and electrocuting yourself is also possible.

People 'hung up' in a live current flow may think they are calling out for help but most likely no sound will be heard from them.

When the muscles contract under household current (most electrocutions happen from house current at home), the person affected will appear in a 'locked-up' state, unable to move or react to you.

- Using a wooden object, swiftly and strongly knock the person free, trying not to injure them, and land them clear of the source.
- The source may also be lifted or removed, if possible, with the same wooden item. This is not recommended on voltages that exceed 500 V.

**Safety tip**

Don't attempt going near a victim of an electric shock without wearing rubber or some form of insulated sole shoes; bare or socked feet will allow the current to flow to ground through your body as well

## K8. Using appropriate PPE

Personal protective equipment (PPE) is the name for clothes and other wearable items that form a line of defence against accidents or injury. PPE is not the only way of preventing accidents or injury. It should be used with all the other methods of staying healthy and safe in the workplace (equipment, training, regulations and laws etc.).

### Maintaining and storing PPE

It is important that PPE is regularly well maintained. The effectiveness of the protection it offers will be affected if the PPE is damaged in any way. Maintenance may include:

- cleaning
- examination
- replacement
- repair and testing.

The wearer may be able to carry out simple maintenance (such as cleaning), but more intricate repairs must only be carried out by a competent person. The costs associated with the maintenance of PPE are the responsibility of the employer.

Where PPE is provided, adequate storage facilities for PPE must also be provided for when it is not in use, unless the employee may take PPE away from the workplace (e.g. footwear or clothing).

Accommodation may be simple (e.g. pegs for waterproof clothing or safety helmets) and it need not be fixed (e.g. a case for safety glasses or a container in a vehicle). Storage should be adequate to protect the PPE from contamination, loss, damage, damp or sunlight. Where PPE may become contaminated during use, storage should be separate from any storage provided for ordinary clothing.

All PPE should be 'CE' marked. This will indicate that it complies with the requirements of the Personal Protective Equipment at Work Regulations 2002 (see page 8). The CE marking shows that the PPE satisfies safety requirements. In some cases it may have been tested and certified by an independent body.

The possible consequences of not using PPE can be serious and cause long-term health problems. The health problems and their consequences are described on pages 37–38.

#### Remember

PPE only works properly if it is being used and used correctly!

The main pieces of legislation that govern the use of PPE are:

- Control of Substances Hazardous to Health 2002
- Provision and Use of Work Equipment Regulations (1992 and 1998)
- Personal Protective Equipment at Work Regulations 1992 and 2002

## Types of PPE

### Head protection

The most common piece of head protection used in construction is the safety helmet (or hard hat). This protects the head from falling objects and knocks and has an adjustable strap to ensure a snug fit.



Figure 1.16 A safety helmet

### Eye protection

Eye protection is used to protect the eyes from dust and flying debris. The three main types are:

- **Safety goggles** – made of a durable plastic and used when there is a danger of dust getting into the eyes or a chance of impact injury.
- **Safety spectacles** – these are also made from a durable plastic but give less protection than goggles. This is because they don't fully enclose the eyes and so only protect from flying debris.
- **Facemasks** – again made of durable plastic, facemasks protect the entire face from flying debris. They do not, however, protect the eyes from dust.



Figure 1.17 Safety goggles

### Foot protection

Safety boots or shoes are used to protect the feet from falling objects and to prevent sharp objects such as nails from injuring the foot. Safety boots should have a steel toe-cap and steel mid-sole.



Figure 1.18 Safety spectacles

### Hearing protection

Hearing protection is used to prevent damage to the ears caused by a very loud noise. The two most common types are ear-plugs and ear defenders.

- **Ear-plugs** – these are small fibre plugs that are inserted into the ear and used when the noise is not too severe.
- **Ear defenders** – these are worn to cover the entire ear to protect from excessive noise and are connected to a band that fits over the top of the head.



Figure 1.19 Safety boots



Figure 1.20 Ear-plugs



Figure 1.21 Ear defenders

**Safety tip**

Dust masks only offer protection from non-toxic dust, so if the worker is to be exposed to toxic dust or fumes, a full respiratory system should be used

**Respiratory protection**

Respiratory protection is used to prevent the worker from breathing in any dust or fumes that may be hazardous. The main type of respiratory protection is the dust mask.

Dust masks are used when working in a dusty environment and are lightweight, comfortable and easy to fit.

**Hand protection**

There are several types of hand protection and the correct type should be used for each task. For example, wearing lightweight rubber gloves to move glass will not offer much protection, so leather gauntlets must be used. Plastic-coated gloves will protect you from certain chemicals and Kevlar® gloves offer cut resistance.

**Skin and sun protection**

Another precaution you can take is ensuring that you wear barrier cream. This is a cream used to protect the skin from damage and infection. Don't forget to ensure that your skin is protected from the sun with a good sunscreen, and make sure your back, arms and legs are covered by suitable clothing.

**Whole body protection**

The rest of the body also needs protecting when working on site. This will usually involve either overalls which protect from dirt and minor cuts, or high-visibility jackets which make the wearer visible at all times.



Figure 1.22 A respiratory system



Figure 1.23 Safety gloves

## K9. Fire and emergency procedures

Fires can start almost anywhere and at any time, but a fire needs all the ingredients of ‘the triangle of fire’ to burn. Remove one side of the triangle and the fire will be extinguished. Fire moves by consuming all these ingredients and burns fuel as it moves.

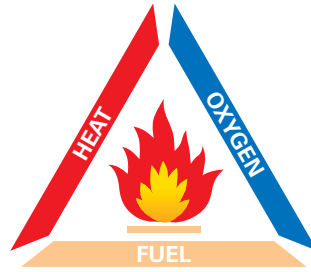


Figure 1.24 The triangle of fire

Fires can be classified according to the type of material that is involved:

- **Class A** – wood, paper, textiles, etc.
- **Class B** – flammable liquids, petrol, oil, etc.
- **Class C** – flammable gases, liquefied petroleum gas (LPG), propane, etc.
- **Class D** – metal, metal powder, etc.
- **Class E** – electrical equipment.

### Fire-fighting equipment

There are several types of fire-fighting equipment, such as fire blankets and fire extinguishers. Each type is designed to be the most effective at putting out a particular class of fire and some should never be used in certain types of fire.

#### Fire extinguishers

A fire extinguisher is a metal canister containing a substance that can put out a fire. There are several different types and it is important that you learn which type should be used on specific classes of fires.

#### Fire blankets

Fire blankets are made of a fireproof material and work by smothering the fire and stopping any more oxygen from getting to it, thus putting it out. A fire blanket can also be used if a person is on fire.

#### What to do in the event of a fire

During your induction to any workplace, you will be made aware of the fire procedure as well as where the fire assembly points (also known as muster points) are and what the alarm sounds like. All muster points should be clearly indicated by signs and a

#### Find out

What fire risks are there in the construction industry? Think about some of the materials (fuel) and heat sources that could make up two sides of ‘the triangle of fire’

#### Remember

- Remove the fuel – without anything to burn, the fire will go out
- Remove the heat and the fire will go out
- Remove the oxygen and the fire will go out – without oxygen, a fire won’t even ignite

#### Safety tip

It is important to remember that when you put out a fire with a fire blanket, you must take extra care as you will have to get quite close to the fire







Figure 1.25 A fire blanket

**Remember**

Fire and smoke can kill in seconds, so think and act clearly, quickly and sensibly

map of their location clearly displayed in the building. On hearing the alarm you must stop what you are doing and make your way calmly to the nearest muster point. This is so that everyone can be accounted for. If you do not go to the muster point or if you leave before someone has taken your name, someone may risk their life to go back into the fire to get you.

Fire extinguisher	Colour Band	Main use	Details
Water fire extinguisher 	Red	Class A fires	Never use it for an electrical or burning fat/oil fire, as water can conduct the electricity back to the person using the extinguisher. Putting water on oil or fat fires will 'explode' the fire, making it worse.
Foam fire extinguisher 	Cream	Class A fires	This can also be used on Class B if no liquid is flowing and on Class C if gas is in liquid form.
Carbon dioxide (CO <sub>2</sub> ) extinguisher 	Black	Class E	Primarily used on electrical fires can also be used in Class A, B and C.
Dry powder extinguisher 	Blue	All classes	Most commonly used on electrical and liquid fires. The powder puts out the fire by smothering the flames.



## K10. Safety signs and notices

There are many different safety signs but each will usually fit into one of four categories:

1. **Prohibition signs** – these tell you that something *must not* be done. They always have a white background and a red circle with a red line through it.
  
2. **Mandatory signs** – these tell you that something *must* be done. They are also circular, but have a white symbol on a blue background.
  
3. **Warning signs** – these signs are there to alert you to a specific hazard. They are triangular and have a yellow background and a black border.
  
4. **Safe condition signs** (often called information signs) – these give you useful information like the location of things (e.g. a first aid point). They can be square or rectangular and are green with a white symbol.



Figure 1.26 A prohibition sign



Figure 1.27 A mandatory sign

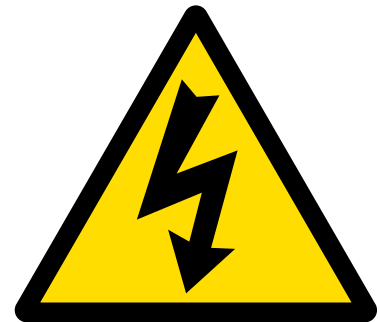


Figure 1.28 A warning sign



Figure 1.29 An information sign

## FAQ

**Am I protected from electrocution if I am working on a wooden stepladder?**

No. If you are working near a live current on a wooden stepladder or if any metal parts of the ladder, such as the tie rods, come into contact with the current, they will conduct the flow of electricity and you may be electrocuted. Take every precaution possible in order to avoid the risk of electrocution – the simplest precaution is turning off the electricity supply.

**What determines the type of scaffolding used on a job?**

As you will have read in this unit, only a carded scaffolder is allowed to erect or alter scaffolding. They will select the scaffolding to be used according to the ground condition at the site, whether or not people will be working on the scaffolding, the types of materials and equipment that will be used on the scaffolding and the height to which access will be needed.

**What happens if there is a delivery of timber but there is no room in the wood store?**

It is probably best to remove some of the old stock from the wood store and either store it flat on timber cross-bearers or on edge in racks. This timber should be used first, and as soon as possible. The new timber can now be stored in the wood store.

**What should I do if I notice a leakage in the LPG store?**

Leaking LPG should be treated as a very dangerous situation. Don't turn on any lights or ignite any naked flames, for example a cigarette lighter. Any kind of spark could ignite the LPG. Report the situation immediately and don't attempt to clear up the spillage yourself.

## Check it out

1. What do COSHH and RIDDOR stand for?
2. Describe what might happen to you or your employer if a health and safety law is broken.
3. Write a method statement stating the actions you can take to avoid injury when lifting and carrying loads using manual handling techniques.
4. Describe the class(es) of fire that can be put out with a carbon dioxide (CO<sub>2</sub>) extinguisher.
5. Describe why it is important to report 'near misses'.
6. State two sources of health and safety information and give a small explanation of what services they provide.
7. Prepare a method statement, describing what should be covered during a site induction.
8. State why the CSCS scheme was introduced.
9. What are the three key health and safety duties when working at height?
10. Explain the 1:4 (or 75°) ratio rule which should be observed when erecting a ladder.

## Getting ready for assessment

The information contained in this unit, as well as continued health and safety good practice throughout your training, will help you with preparing for both your end of unit test and the diploma multiple-choice test. It will also help you to understand the dangers of working in the construction industry. Wherever you work in the construction industry, you will need to understand the dangers of this occupation. You will also need to know the safe working practices for the work required for your synoptic practical assignments.

Your college or training centre should provide you with the opportunity to practise these skills, as part of preparing for the test.

### **You will need to know about and understand the dangers that could arise, and precautions that can be taken, for:**

- the safety rules and regulations
- knowing accident and emergency procedures
- identifying hazards on site
- health and hygiene
- safe handling of materials and equipment
- working at height
- working with electricity
- using personal protective equipment (PPE)
- fire and emergency procedures
- safety signs.

You will need to apply the things you have learnt in this unit to the actual work you will be carrying out in the synoptic test, and in your professional life. For example, with learning outcome six you have seen why basic working platforms are used and the good practice you should use when working on these platforms. You have also seen the different parts of ladders and scaffolding and identified the dangers of working at height. You will now need to use this knowledge yourself when you are working, by using access equipment to the correct legislation and safeguarding your health, through using the correct PPE. You will also need to use your understanding of how PPE should be stored to maintain it in perfect condition.

Before you start work you should always think of a plan of action. You will need to know the clear sequences that materials for the practical are to be constructed to be sure you are not making mistakes as you work and that you are working safely at all times.

Your speed in carrying out these tasks in a practise setting will also help to prepare you for the time set for the test. However you must never rush the test! This is particularly important with health and safety, as you must always make sure you are working safely. Make sure throughout the test that you are wearing appropriate and correct PPE and using tools correctly.

This unit has explained the dangers you may face when working. Understanding these dangers and the precautions that can be taken to help prevent them, will not only aid you in your training but will help you remain safe and healthy throughout your working life.

**Good luck!**

## Knowledge check

- 1** A risk assessment should be done:
  - a)** when the job involves more than 50 people
  - b)** for every job
  - c)** never
  - d)** only when working on a scaffold
- 2** Leptospirosis is also known as
  - a)** Weil's disease
  - b)** dermatitis
  - c)** vibration white finger
  - d)** none of the above
- 3** The most common injury from incorrect manual handling is:
  - a)** broken fingernails
  - b)** spinal injury
  - c)** crushing fingers under item
  - d)** dropping item on toes
- 4** Who is authorised to alter a scaffold?
  - a)** anyone
  - b)** the site agent
  - c)** a health and safety inspector
  - d)** a qualified, carded scaffolder
- 5** What is the first thing to do if you suspect a co-worker is having an electric shock?
  - a)** move them away from the power source
  - b)** switch off the power
  - c)** dial 999
  - d)** start first aid procedure
- 6** With regards to PPE, the employee must:
  - a)** not misuse it
  - b)** wear it when needed
  - c)** report any damage to it
  - d)** do all of the above
- 7** A fire extinguisher with a red coloured band can be used on:
  - a)** class A fires
  - b)** class B fires
  - c)** class C fires
  - d)** class D fires
- 8** Under RIDDOR your employer must report:
  - a)** near misses
  - b)** any accident that results in three consecutive work days lost
  - c)** cut fingers
  - d)** all of the above
- 9** When lifting manually you should:
  - a)** have feet shoulder-width apart
  - b)** have back slightly bent
  - c)** keep load away from body
  - d)** lift using your back muscles
- 10** Which of the following can be the cause of an electric shock?
  - a)** working too close to electric power lines
  - b)** drilling into an internal brick/block wall
  - c)** plastering walls with electric sockets
  - d)** all of the above