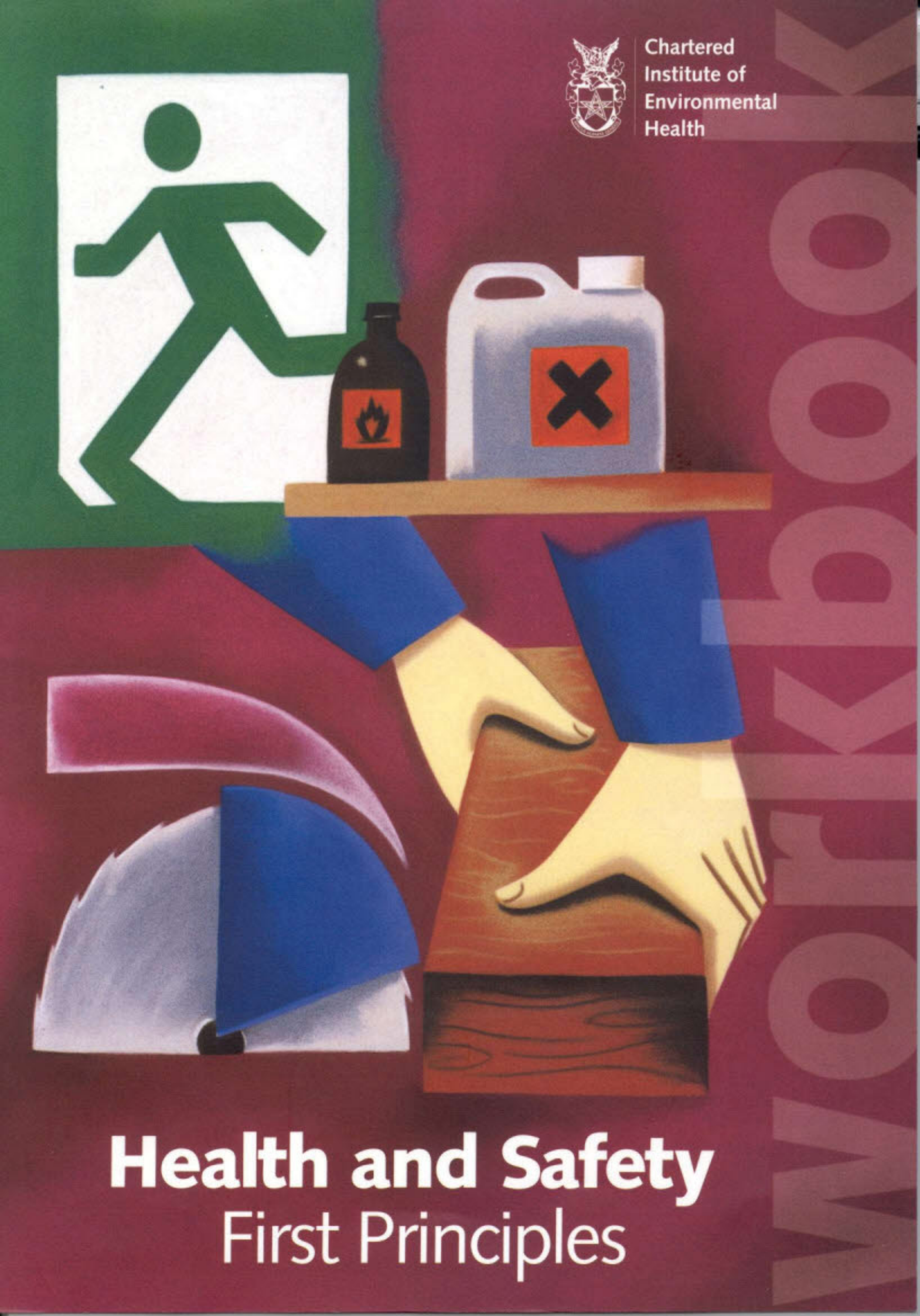

Chartered Institute of Environmental Health

workbook

Health and Safety

First Principles

CONTENTS

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Chartered Institute of Environmental Health

The first principles

This book covers some of the most common health and safety issues in the workplace. Many improvements can be made by taking simple steps to improve the impact upon health and the safety of equipment, the working environment and specific tasks.

Everyone plays an important part in safety at work. This book will help you to carry out your work activities more safely and in a way that protects your health. The book will also help you to understand the principles behind those health and safety issues with which you are not directly involved.

In some circumstances, even the decision-makers for your workplace need additional advice and information. In cases of a technical nature or where severe hazards exist, expert advice from suitably qualified and experienced professionals is required.

Health and Safety – First Principles focuses on good practice and it is not intended as a complete or authoritative guide to the law – employers, managers and the self-employed will require further information. Advice and information can be obtained from the relevant enforcement authority.

activities. The indirect costs caused by the loss of customers and business opportunities, especially for the self-employed or small business proprietor, can also lead to hardship. A study by the Health and Safety Executive (HSE) showed that accidents cost up to 37% of one organisation's profits.

Accidents and ill health can also be expensive for society as a whole – another HSE study estimated an annual cost to society of between £11 and £16 billion including medical costs, lost days' work and sick pay.

While there are certainly some direct costs involved in developing good health and safety standards at work – for example, in providing training and new equipment – there are huge potential long-term savings that can benefit individuals, families, companies and society as a whole.

Costs of poor health and safety standards

- Accidents, illness and stress.
- Deaths.
- Increased sick leave.
- Loss of earnings and increased personal costs.
- Bad publicity and a poor reputation.
- Lowered staff performance and morale.
- Reduced company performance.
- High staff turnover.
- Prosecution, fines and imprisonment.
- Prohibition and closure.
- Compensation claims.
- Increased insurance costs.
- Legal costs.
- Loss of jobs.
- Costs to the health service and society as a whole.

Benefits of good health and safety standards

- Healthy, happy and motivated work teams.
- Reduction in sick leave.
- A good reputation.
- Increased performance and profitability.
- Orderly working environment and procedures.
- Confidence in health and safety standards.
- Increased job security.

The meaning of health and safety at work

Most people spend a significant part of their lives at work and they do not expect their health to be damaged through work-related illness, disease or injury. Health and safety measures are concerned with controlling and reducing risks to the health and safety of anyone who might be affected by work activities.

Health and safety legislation

Most countries have developed legislation to protect the health and safety of people at work. In Britain employers must take reasonable care to protect employees from the risks of injury, disease or death, while employees must take care to protect themselves and others.

Complying with the law

This chapter highlights some of the main issues that are controlled by health and safety legislation, but it does *not* cover every aspect of the law.

It is up to employers, the self-employed and those with specific responsibilities for health and safety to ensure that they are familiar with all the relevant legal obligations affecting their workplace. They must also ensure that they are sufficiently informed, trained and qualified to make decisions aimed at achieving appropriate health and safety standards. This may involve obtaining specialist advice and help.

Some aspects of health and safety might be covered by more than one branch of a country's legal system. In Britain, for instance, this means that a *criminal* court can impose penalties, including fines and imprisonment, when an individual or a company breaks a law. In some cases, it is also possible for claims to be made through *civil* courts for financial compensation for harm, injury or damage.

Work-related legislation

Legislation covers a wide range of health and safety issues. Laws in Britain tend to focus on one of the following:

- particular types of workplace – for example, factories and construction sites
- a specific topic affecting a variety of workplaces and work activities – see list below
- general issues which affect every workplace – such as the management of health and safety.

Among the subjects covered by specific legislation are:

- workplaces
- work equipment
- safety signs
- electricity
- fire
- highly flammable liquids

key words

Legislation – a general term for laws including acts, regulations, orders and directives.

Reasonably practicable – a legal expression allowing the costs of making improvements to be balanced against the benefits.

Directive – instructions from the European Union for member states to pass laws specifying certain standards.

Welfare – issues concerning the wellbeing of employees, such as the provision of toilets.

Environmental health officers (EHOs) – enforcement officers from local authorities.

Local authority – the local council.

Enforcement authority – the organisation responsible for enforcing health and safety legislation.

Enforcement officers – environmental health officers, health and safety inspectors and others who are responsible for enforcing legislation.

Laws governing health and safety standards in Britain are made by acts of parliament, regulations and orders. Some legislation originates in directives made by the European Union.

Duties of the self-employed

Self-employed people have the legal duty not to put other people at risk by the way they work.

Duties of designers, manufacturers, suppliers and installers

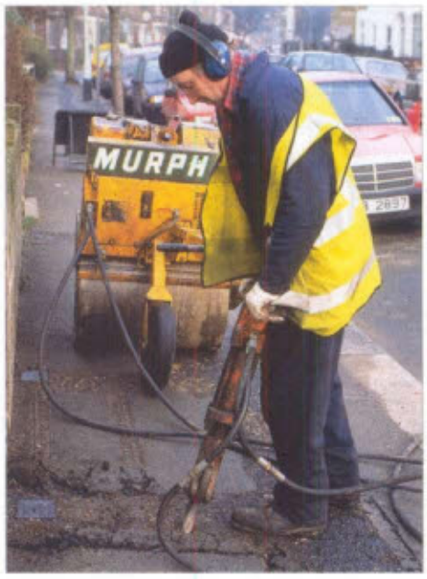
These groups have legal responsibilities for the design and construction of articles, the use of substances, and the testing and installation of their work. They must provide adequate information, such as instructions for the safe use of a machine.

The management of health and safety at work

The Management of Health and Safety at Work Regulations 1992 (in England, Wales and Scotland) and The Management of Health and Safety at Work Regulations (Northern Ireland) 1992 (in Northern Ireland) have had a major impact on the way companies control health and safety standards.

Employers must undertake a range of tasks including:

- carrying out risk assessments
- making arrangements for the planning, organisation, control, monitoring and review of health and safety measures
- appointing a competent person or persons to assist with health and safety
- establishing emergency procedures
- providing health and safety information and training.



Everyone at work has responsibilities for safety.

Enforcement

Enforcement officers help to ensure compliance with the law. The Health and Safety Executive (HSE) is the enforcement authority for premises such as factories in England, Scotland and Wales. In most of the service sector – such as shops, offices and wholesale and catering premises – enforcement is carried out by environmental health officers (EHOs) or technical officers from the local authority. Until the formation of the Health and Safety Executive for Northern Ireland in 1999, enforcement in the province was undertaken by the Health and Safety Inspectorate and the Health and Safety Agency.

Enforcement officers have wide-ranging powers to help them to do their job. They can:

- enter premises
- conduct investigations
- take samples and photographs
- ask questions
- give advice
- issue instructions – improvement notices and prohibition notices (see page 8) – that must be carried out by law
- initiate a prosecution.

Accidents and ill health

Prevention of accidents and ill health

An accident is an unplanned, uncontrolled event which may cause major or minor injury, disease, illness, death, damage or other loss, such as delays incurring overtime costs.

key words

Accident – an unplanned, uncontrolled event with the potential to cause injury, damage or other loss.

Control or **control measure** – an item or action designed to remove a hazard or reduce the risk from it.

Reportable accident – one that must be reported to the appropriate enforcement authority.

Accident prevention

There are always reasons why accidents occur – they do not just happen. It is therefore essential to:

- examine the workplace and all its activities to assess what could go wrong
- select safety controls to prevent accidents from happening
- implement health and safety measures and check them regularly to ensure that they remain effective.

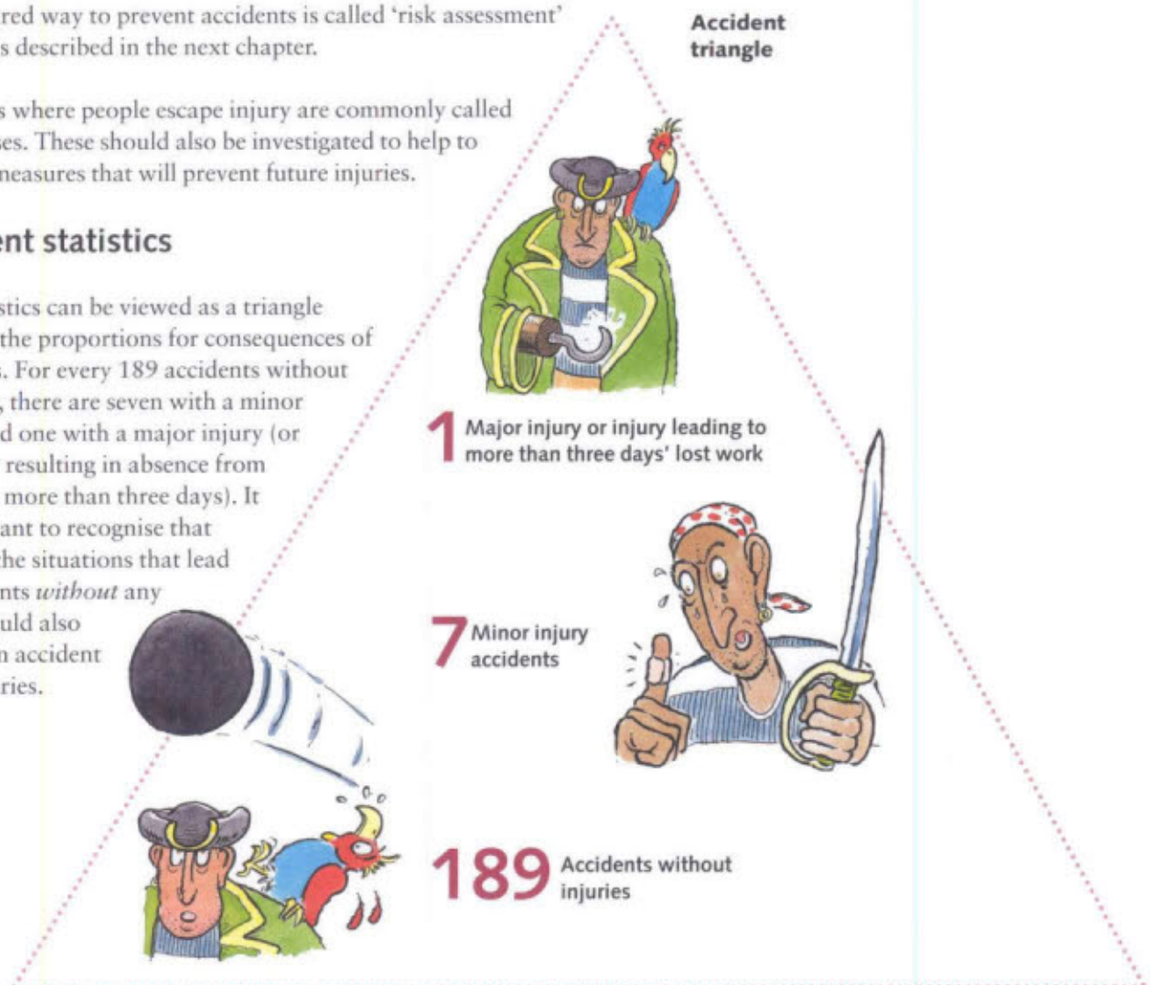
A structured way to prevent accidents is called 'risk assessment' and this is described in the next chapter.

Accidents where people escape injury are commonly called near-misses. These should also be investigated to help to develop measures that will prevent future injuries.

Accident statistics

The statistics can be viewed as a triangle showing the proportions for consequences of accidents. For every 189 accidents without an injury, there are seven with a minor injury and one with a major injury (or an injury resulting in absence from work for more than three days). It is important to recognise that some of the situations that lead to accidents *without* any injury could also lead to an accident *with* injuries.

Accident triangle



Some general issues can affect health and safety in all workplaces – for example stress, the use of alcohol and drugs, passive smoking and the threat of, or actual, violence.

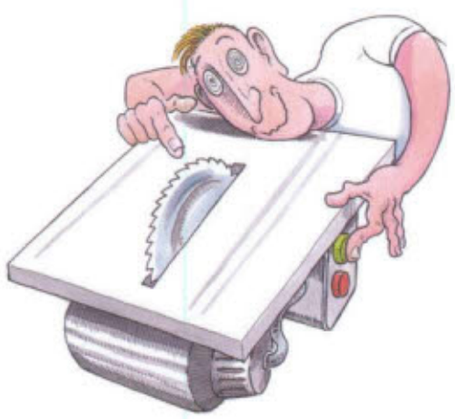
Stress

Stress involves the production of hormones in the body which have physical effects. A certain amount of stress may help us to perform tasks to the best of our abilities but excessive stress for long periods can cause tiredness, anxiety and various physical symptoms. Health problems that have been linked to stress include stomach and skin conditions, heart disease and depression.

Various factors have been shown to increase stress levels, such as working in poor or cramped conditions, lack of communication with managers, overworking, concern about the risk of injury or illness, and lack of job security.

Employers can help to reduce stress levels by considering the causes and taking appropriate action such as re-designing a job, improving working conditions, improving communication and providing support. Individuals may be able to help to decrease their stress levels by modifying their lifestyles and improving their fitness, while others may find relaxation techniques helpful.

Alcohol



Alcohol increases the time taken to react to a situation, affects behaviour and reduces performance on jobs such as driving or operating dangerous machinery.

Many employers have strict policies on alcohol and drugs – for instance, staff may be banned from drinking at work, during breaks and before starting work. The policy may be supported by testing for alcohol with the employee's consent. It is important to remember that levels of alcohol in the body may still be high in the morning after drinking the previous evening.

Excessive alcohol consumption is normally viewed as a condition that can be treated, with the individual's co-operation, and employers may encourage people with a drink problem to seek professional help. However, as a last resort, employers may have to take disciplinary action, possibly even dismissing someone, to protect the drinker and others whose safety may be put at risk.

Drugs

Substance abuse, the use of illegal drugs or the misuse of prescription drugs may cause health problems and can cause safety risks in the workplace. Many drugs are particularly dangerous because they can change people's moods and perceptions. It is important to check that prescribed drugs will not affect performance at work. If there is an increased risk to

Employers, the self-employed and others with the responsibility for reporting incidents should familiarise themselves with the relevant reporting requirements.

Co-operation and communication

The management of health and safety standards and the behaviour of everyone in a company both play crucial parts in preventing accidents and ill health. It is important that managers make health and safety one of their priorities and take the lead on establishing good practices. However, high standards cannot be achieved unless everyone in an organisation takes health and safety seriously. Everyone at work must therefore follow health and safety instructions and training and report any defects or problems – you all rely on each other for your safety and wellbeing.

Some staff, such as safety representatives, are given additional safety responsibilities. Good communication between staff and management is essential and there are legal requirements for consultation and safety committees. Managers should consult staff during risk assessments and when plans are made for changes, such as re-designing the workplace.

Organisations with good health and safety records often use a variety of techniques to involve staff in health and safety issues. These include formal communications through a safety committee and informal day-to-day discussions.

Everyone in a company plays a crucial role in preventing accidents and ill health.

? Activity

Think of an accident or near-miss you have been involved in, witnessed or heard about and list the improvements or actions that could have prevented the problem.

How would you explain to a new colleague why even near-misses should be reported?

Carrying out risk assessments

Everyone carries out *informal* risk assessments every day. For example, before crossing a road, we stop and look. We estimate the speed of the traffic and consider factors such as bad weather and poor visibility. On occasions we may decide that it is too dangerous to cross at that place at that time and we may move to a pedestrian crossing where risks, such as traffic speed and visibility problems, may be reduced.

Formal risk assessments must be carried out in every workplace. The assessors are usually specially trained, competent managers and supervisors who are familiar with the task or issue being assessed and suitable safety controls. They must also be up to date with relevant legal requirements.

The assessment process involves analysing tasks carefully to estimate the nature and level of hazards and risks. Staff are often asked to become involved in the process.

There are a number of stages to carrying out a risk assessment and the people involved need to find answers to the following questions.

What are the hazards?

The workplace and activities must be carefully examined. Some hazards will be obvious – for instance, cables trailing across a gangway. Others may be hidden – such as access to dangerous parts of machinery during cleaning.

Who is at risk?

Everybody or only certain people in an area may be at risk. For example, a loud noise may affect everyone or only those working on a specific machine. Some groups of people may need special safety consideration as they may be more vulnerable to certain hazards – for example, pregnant women may be particularly at risk when lifting heavy objects, while young people may not be aware of all the workplace hazards and the need to follow safe procedures.

How big is the risk?

Two questions are necessary here:

- *What are the consequences of injury or harm?*

  The consequences could range from a scratch to a death. The most severe hazards need the most urgent attention.

- *What is the likelihood of injury or harm?*

  Something that is very likely will need remedying before something that is unlikely.

First aid at work

First aid is the first help given to someone to prevent injury or illness from becoming worse. First aid can save lives, so there must be enough suitable equipment, facilities and designated personnel in every workplace to deal with cases of injury or illness.

key words

Appointed person – someone with specific duties relating to first aid, but not necessarily trained in first aid.

First aider – someone trained to a recognised standard to administer first aid.

First aid provision

Risk assessments must be carried out to show the level of first aid provision needed. The minimum provision is a suitably stocked first aid kit and an 'appointed person' (see page 18). Various factors affect the level of risk and the requirements for first aid, for example:

- work with hazardous substances or dangerous equipment
- the number of people
- people with special needs or inexperienced workers
- work in remote areas
- work that involves regular travel
- lone or shift work
- interaction with staff from another company or organisation, or the presence of members of the public.

In some workplaces and circumstances it may be necessary to provide more than the required minimum. This could involve training additional first aiders or providing extra first aid kits, mobile telephones or a first aid room. It may also be necessary to liaise with the emergency services, for instance to discuss special hazards.

Everyone at work must be made aware of the first aid arrangements, for example by instruction and notices.

Self-employed people must also make sure that adequate and suitable provision is made for first aid at work.

First aid kits

The contents of a first aid kit should be linked to the risks at the site. Additional items may be needed where there are specific hazards – for instance, eye washing facilities may be needed where certain chemicals are handled. Medicines or tablets must never be kept in first aid kits because only qualified medical personnel are allowed to dispense them.

Personal protective equipment

Personal protective equipment is an essential last resort in circumstances where hazards cannot be controlled in other ways. There are various types including safety glasses and goggles, helmets, clothing, gloves, footwear, masks, breathing apparatus, ear defenders and ear plugs.

key words

Personal protective equipment (PPE) – clothes and other items worn to protect the wearer against hazards.

Respiratory protective equipment – personal protective equipment designed to protect the airways.

CE mark – an indication that equipment complies with European standards for design and manufacture.

Provision of PPE

If hazards cannot be controlled in other ways, PPE may provide necessary protection, for example when handling dangerous but essential chemicals. Personal protective equipment should be used only as a last resort or as additional back up to other health and safety measures. As the hazard remains when PPE is in use, there could be severe consequences for health if the equipment does not function correctly, is put on incorrectly or is poorly maintained.

Risk assessments help employers and the self-employed to identify when they need to provide PPE.

Protective clothing

Special protective clothing can be used to protect the body from physical damage, chemicals, radiation and high and low temperatures. Examples are:

- safety helmets for head protection
- various types of clothing designed to protect against particular hazards – for example, wet weather garments, high visibility clothing, chemical resistant garments, groin protectors and anti-static clothing
- gloves to help to protect against cuts, hot and cold temperatures, chemicals, electricity and other hazards
- footwear – possibly with special features such as anti-static materials or steel toe caps.

Respiratory protection

There are two main types of equipment for respiratory protection:

- masks and respirators – these filter contaminants, such as dust, from the air before they are inhaled
- breathing apparatus connected to a source of clean air – to supply air which is not contaminated by the immediate environment.

Safety in the workplace

Health, safety and welfare

There are numerous types of workplace including offices, shops, factories, hotels, catering establishments, places of entertainment, hospitals and educational establishments. Even though these premises vary, there are certain features and issues that need to be considered in every workplace to ensure the health, safety and welfare of the people who work there and anyone else affected by the work activities. While some people have specific responsibilities for buildings, everyone has a duty to keep the workplace in a safe condition.

Design, layout and space

A good design and effective layout are essential in every workplace and the design should take into account the likely hazards of the work activities.

There must be enough space for people to be able to do their jobs safely. Cramped conditions can result in accidents, particularly if people are working with sharp tools or chemicals, or if they are involved in other hazardous activities.

There should also be enough space for people and vehicles to move around easily. Wherever possible pedestrians and vehicles (such as fork-lift trucks, lorries and cars) should be separated to prevent collisions and injuries. Where separation is impossible, additional precautions, such as signs, barriers and one-way systems, improve safety. People must also be protected from other hazards such as exhaust fumes and falling loads.

Appropriate safety precautions must be provided wherever there are hazardous areas such as loading bays, pits, ladders, platforms and roofs. Falls and crushes may result in severe injury or death. Wherever possible they should be prevented by physical means, such as rails and guards.

Structure

Buildings must be solid, secure and constructed from materials that are appropriate to the work activities and their hazards – for example, damp atmospheres, hazardous chemicals and the need for fire resistance. Fixtures and materials must be suitable and secure.

- 16°C for office work and similar non-physical activities
- 13°C where there is physical work.

Where it is not possible to achieve a suitable overall air temperature, organisations should consider:

- insulating hot equipment
- increasing ventilation levels
- providing local heating or cooling equipment
- providing suitable clothing
- reducing the time that people spend in hot or cold conditions – for instance, by job rotation or more frequent breaks
- providing those who are working in hot conditions with easy access to drinking water and changes of clothes
- providing information, instruction, training and supervision to ensure that necessary precautions are taken.

Organisations must also take into account, and minimise the risks from, the hazards associated with heating and cooling systems. These could include burns from hot surfaces, fire from overheated equipment and legionnaires' disease associated with wet air conditioning systems.

Lighting

Poor lighting is likely to increase the risk from other hazards such as trailing cables. Adequate levels of lighting must be achieved everywhere, with care taken to consider areas such as stairways, gangways, entrances and exits. Emergency lighting should be provided where necessary.

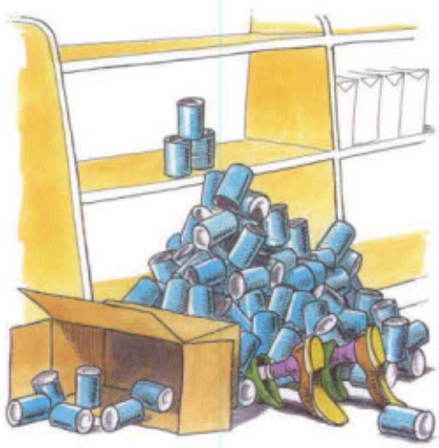
Workstations and seats

Workstations and seats must be suited to the task and the person using them. Seats must give good back support and footrests should be provided where needed. (See also pages 43 to 45.)

Maintenance and housekeeping

Buildings, facilities and equipment must be regularly and thoroughly checked and maintained to ensure that they remain safe.

All working environments must be kept safe on a continual basis. Rubbish and waste materials must not be allowed to accumulate. They should be kept in appropriate containers and removed regularly. The workplace must be kept clean and tidy, without any obstructions or blockages of walkways, particularly fire evacuation routes.



Storage and stacking

Many accidents result from unsafe storing, racking and stacking, so various safety measures must be taken. For example, there must be an appropriate design and construction using suitable

Employers must explain the meaning of signs and ensure that everyone understands what action should be taken.

Procedures, training and supervision

Safe working procedures must be established. They are particularly important where the hazards are severe and the risks are great, for instance in roof work or when using vehicles in the workplace. Staff must be given information, instruction, training and supervision appropriate to the hazards and safety procedures of the workplace.

first principles

- Everybody has a responsibility for keeping the workplace in a safe condition.
- Workplaces must be designed with safety in mind.
- People should have enough space to work comfortably, without being unnecessarily at risk.
- Buildings must be made from suitable materials, with good ventilation, lighting and temperature control.
- Areas such as stairs and gangways must not be overlooked for safety. Particular care must be taken where they are part of a fire evacuation route.
- Buildings must be well maintained and kept clean and tidy. Rubbish must be removed regularly, walkways must not be blocked and stock must be stored safely.
- Safety signs must be displayed where appropriate and staff must follow the instructions or heed the warning displayed.

Warning sign.

Prohibition sign.

Mandatory sign.

Safe condition sign.

? Activity

Describe five features of the design, structure or provision of services in your workplace that are provided in the interests of safety, health and welfare.

Designed for safety

Good design and construction should:
- ensure the safety of machines by providing suitable operating controls which are easy to see and use
- provide operating controls which prevent equipment from being turned on accidentally
- incorporate a suitable emergency stop control
- ensure that a machine will 'fail to safety' so, for example, it will not operate if there is a fault
- provide, where necessary, a means of disconnecting a machine from a power source
- minimise risks during maintenance and cleaning as well as during normal operation.

Effective design should incorporate easy-to-see and easy-to-use operating controls and emergency stop controls.

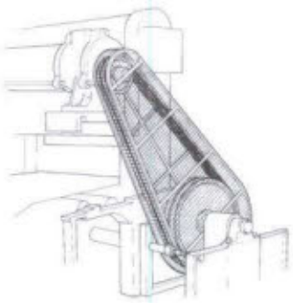
Guarding

Where hazards cannot be avoided, guards must be provided to prevent people getting close to any dangerous parts. There are different types of guard including:
- guards fixed over dangerous parts
- guards which will not allow the machine to operate unless they are in place
- barriers to prevent people getting near dangerous machines
- devices which ensure that the operator's hands are away from danger.

Guards vary in their effectiveness and the people they protect, so they must be chosen with care.

Selecting and purchasing equipment

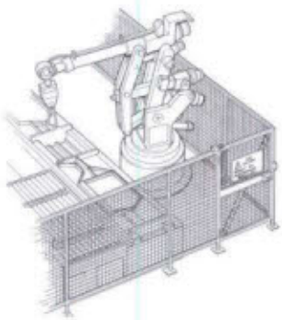
It is important to select the safest possible option for any particular activity. Purchasing new machinery that is well designed and constructed is often a way of reducing the risk of injuries. If you are involved in the selection and purchase of equipment, it is important to:
- ask technical questions and compare the information provided by different suppliers
- check that the machine has a CE mark
- satisfy yourself that you have obtained all the relevant safety information
- ensure that there will be adequate training provision.



A fixed guard encloses the moving parts of this machine.

The work environment

To make work equipment safer to use, other issues must also be considered such as lighting levels and the condition of the surrounding environment. Installation must be carried out carefully to ensure stability and safe operation.



Perimeter fencing restricts access to this machine.

Risk assessments

Before any equipment is installed or used, a risk assessment must be carried out. It should cover all the issues mentioned in this chapter and any others relevant to the work being carried out.

Maintenance, inspection and testing

Equipment, guards and safety devices must be checked regularly to ensure that they are in good working order. Only competent, qualified and, where necessary, registered personnel must be permitted to inspect, test and maintain specific pieces of equipment. The recommendations of specialists about the safety of equipment must be followed.

A risk assessment must be carried out before new equipment is used.

? Activity

Choose a piece of equipment that you use in your work and list the procedures for using it safely.

Describe the part you play in ensuring that all work equipment in your workplace is used safely.

key words

Electric shock – a current of electricity that passes through the body's organs, muscles and nerves and may affect their function, for example by stopping the heart.

Warning sign for electricity.

Electricity

Electricity can cause electric shock, burns, fires and death. The fatality rate from injuries caused by electricity is high. It is therefore essential that electrical systems and equipment are designed, constructed, selected, maintained and used with care. Electricity is used in virtually every workplace – and even our safety systems may involve the use of electricity – so everyone must use electricity in the safest possible way.

Reducing the risks from electricity

It may be possible to *remove* an electrical hazard by using a manual tool. If it is not feasible to avoid the hazard or *substitute* equipment, it is important to find appropriate *controls* to improve electrical safety. Such controls could involve:

- insulation – to protect people against direct contact with electricity
- earthing – to provide a connection to earth, so protecting against contact with electricity
- fuses – protective strips of metal which melt and break if overheating occurs, stopping the supply of electricity and preventing overheating and fire
- circuit breakers – to detect excess flow of electrical current and stop the electricity supply to the circuit, provided that they are of the correct type and rating
- residual current circuit breakers – to protect against electric shock
- voltage reduction – so that the lowest possible voltage is used.

In addition, all cables, plugs and sockets must be suitable for their use.

Electrical equipment must be correctly installed and tested and maintained regularly.

Design, construction and selection

If you are involved in selecting and purchasing electrical equipment, you should consider the following points:

- the design and construction should suit the purpose required, especially the likely degree of wear and tear
- the item should be designed to suit the environment in which it will be used – for example, specially designed and constructed equipment is needed in wet or explosive conditions
- whether it complies with legal requirements
- possible additional risks from second-hand equipment
- the need to avoid adapters and trailing cables when the item is installed or in use.

Use of competent personnel

It is essential that systems are installed, checked regularly and maintained by competent, suitably qualified electricians or electrical engineers. You should never tamper with electrical equipment, attempt to repair it or to remedy an electrical problem unless you have had specific training and have been authorised to do so. Qualified electricians must follow special procedures to prevent danger to themselves or to others.

Testing and maintenance

Equipment and systems that use electricity must be tested regularly and maintained thoroughly by competent personnel. The frequency of testing depends on a number of factors such as the degree of wear and tear. Portable tools require extra attention.

Using electrical equipment

Organisations should establish safe working procedures, and you should always follow them. Your employer should ensure that you receive full information, training and instruction on using electrical equipment safely and that you are supervised appropriately.

Always ensure that the power supply is turned off:
- when equipment is not in use (unless you have been instructed to leave it switched on)
- before opening, dismantling, maintaining or cleaning it
- when a fault, such as overheating, is evident or suspected
- before inserting a plug into a socket or removing it.

As water conducts electricity, you must ensure that you never:
- use electrical equipment in wet conditions (unless the equipment is specifically designed for the purpose)
- touch electrical equipment, switches, plugs or other electrical items with wet hands.

Reporting defects

Everyone who uses electrical equipment or works in an area where electricity is used must look out for problems and report them immediately. Some signs of a problem include:
- damaged sockets, plugs or cables
- evidence of overheating, such as burning smells or blackened sockets
- frequently blown fuses or electrical shocks.

Qualified and experienced personnel must then examine the equipment and make any necessary repairs or improvements.

first principles

- Electricity can cause electric shock, burns, fires and death.
- The safety of electrical systems and equipment is improved by using insulation, earthing, fuses, circuit breakers, residual current circuit beakers and voltage reduction.
- Equipment must be well designed and constructed and appropriate for its use. It must be installed safely and maintained and tested regularly.
- General precautions include:
  - keeping the power supply disconnected when it is not required
  - keeping water and electricity apart
  - checking equipment before use and reporting defects immediately
  - using appropriate equipment for the task
  - using equipment according to the safety procedures of the workplace
  - using electrical equipment only if you have been trained and authorised to use it.

Dealing with an emergency

A person who has received an electric shock may not be breathing and the heart may have stopped pumping blood around the body. The skin may be burned or look pale or bluish and there may not be a pulse.

- Seek help. One person can ring for the emergency services while another assists the casualty.
- Do not put yourself in a position where you could be electrocuted. Do not touch the casualty, but try to switch the current off. If you cannot break the current, stand on dry insulating material and move the person away from the electrical source using material that does not conduct electricity such as wood, plastic or wads of paper. However, do not attempt this if high voltage supplies, such as underground or overhead power lines, are involved.
- If you are a qualified and competent first aider, follow your training for dealing with electric shock. If you are not qualified, carry out any instructions given by the first aider and ensure that any other people in the vicinity do not put themselves in danger.
- Obtain emergency medical assistance for the casualty.

Legal requirements

There are legal requirements and official guidelines for the prevention of injury from electricity and the treatment of electric shock. Employers and the self-employed have a duty to assess what they need to do to comply with the requirements. Additional precautions may be needed for some activities and in some environments.

Employees have a legal duty to follow instructions and co-operate with their employer.

Activity

List several pieces of electrical equipment in your workplace and outline the safety procedures for using them.

What advice would you give to a new colleague about the action to take if another colleague received an electric shock?

Fire prevention

Fire prevention is an important obligation for all businesses. Not only are people at work at risk from fire, but visitors, contractors, fire fighters, neighbours and anyone else in the vicinity may be affected.

key words

Fuel – anything that can be burned in a fire such as paper, wood, furnishings and flammable chemicals.

Evacuation route – the designated way out of a building in case of fire or other emergency.

Fire hazards and the causes of fires

The key hazards associated with fire are:
- flames and heat
- smoke and toxic fumes
- reduced oxygen
- collapse of buildings.

They may result in injury and death, possibly with many fatalities.

Fires may be caused in a variety of ways:
- sparks from electrical equipment
- overheated equipment
- hot surfaces, such as lighting and heating equipment
- tools or equipment with a naked flame
- hot liquids, such as fat in fryers
- smoking
- arson.

Fire prevention

Fire prevention and control depend on managing three factors, commonly referred to as the 'fire triangle' – fuel, oxygen and heat energy. Fires need the right combination of these three to burn.

Once a fire has started it may spread very quickly, producing smoke and toxic fumes. The emphasis must always be on preventing a fire from starting, rather than on putting it out. Fire risk assessments help employers to consider how to prevent fires.

Control of fuel

Material which could become fuel, either intentionally or by accident, must be kept to a minimum – for example, waste and rubbish should be removed regularly, the storage of flammable substances should be avoided or kept to the minimum and dusty atmospheres must be well ventilated. Fuel must be kept well away, and protected, from sources of ignition – for example, flammable substances must be kept in properly designed and selected fireproof stores or enclosures. Sources of ignition should be kept away from fuels – for example, smoking should be banned in paper stores and near stores of liquefied petroleum gas.

Control of oxygen

It is not usually possible to control the oxygen in the air, but fires can be put out by smothering them – this restricts the supply of oxygen that a fire needs to continue burning.

Control of heat

Excessive heat and naked flames may start fires. These may be produced by friction in machines, hot surfaces, smoking, gas cookers and open fires.

Detectors and alarms

Detection systems are available which, when linked to a warning device, give early warning of a fire. The systems may detect high temperatures, smoke, radiation or certain gases produced by a fire. Manual or automatic fire alarms normally give the warning of danger by a loud sound, such as a ringing bell. Fire alarms must be checked regularly to make sure that they are working properly and everybody can hear them. Employees and regular users of a building should be made familiar with the sound of the fire alarm and the alarm signal should be explained to other people on their arrival.

Evacuation routes and procedures

All buildings must have a safe exit in case of fire. Emergency exits enable people to get out of a building in the opposite direction from a fire. Escape routes in large buildings need to be planned carefully so that they do not become too complicated.

Additional fire safety measures need to be installed in some buildings to protect the escape routes – these may include fire doors, emergency exits and fire resisting stair cases. Emergency exit doors must open outward to outdoors. They must not be locked unless strictly necessary – if so, then there must be a safe emergency opening system which is labelled and explained.

There must be permanent signposting that clearly shows the way out in an emergency. Escape routes and fire doors must be kept clear at all times. Internal fire doors must be kept closed as they help to prevent flames and smoke from spreading and limit the air supply to the fire.

There should also be an emergency lighting system which is checked regularly and maintained. Lifts must not be used as part of an evacuation route or during a fire because of the risk of people becoming trapped.

Managers need to know who is in a building, so staff, visitors and others should be asked to sign in and out. A register should be taken after evacuation to ensure that everybody has escaped.

Once evacuated, everyone should remain at the designated assembly point until told by someone in authority, such as a fire officer or senior manager, that it is safe to re-enter the building. Anyone who has to leave a building in an emergency should follow the instructions of the people in authority.

Training and information

Everyone who uses a workplace should be trained what to do in case of a fire, explosion or other emergency. Where it is not possible to train people, such as visitors and contractors, a safety briefing should be given on their arrival.

Notices should be displayed at strategic points to give guidance on what to do in case of fire. Notices should describe the sound of the fire alarm, what to do when it sounds, what action to take on discovering a fire and where to assemble after leaving the building. Directions and diagrams should be provided in buildings where people may be unfamiliar with the layout, while translations into other languages may also be appropriate in some buildings such as hotels.

Some staff may be nominated as fire wardens and given the responsibility for checking that everyone has been evacuated. They may be given extra training – for example, in fire fighting. In some premises, *all* staff must be trained in fire fighting because of the risk of fire or explosion.

Fire drills

Regular fire drills should be carried out to check that the facilities and procedures are effective and that everyone understands what they should do. Remedial action must be taken if evacuation has been slow or incomplete.

Fire fighting

It is more important to evacuate people from a building than to stop and fight a fire. However, there are occasions when simple fire fighting techniques can eliminate a fire before it takes hold – for instance, when dealing with burning fat in a pan.

Fire fighting techniques, which may be automatic or manual, eliminate one of the factors in the 'fire triangle' – for instance, by:

- starving the fire of fuel
- restricting oxygen – such as by using a fire blanket to smother a pan of burning fat
- cooling the heat.

Sprinkler systems

These automatically detect and control a fire at an early stage. They need to be permanently connected to a water supply and must be properly designed and maintained.

first principles

- Fire can cause damage, injury and death.
- It is essential to maintain systems for fire prevention:
  - control sources of ignition
  - control fuels
  - avoid sources of ignition and fuels coming together.
- Detection, warning and evacuation systems, routes and procedures must be carefully designed and maintained.
- All staff should be trained in fire procedures and other people should be briefed.
- Escape routes must be kept clear and be properly signposted.
- Fire doors should be kept closed.
- After evacuation everybody should go to the designated assembly point where attendance should be checked. Nobody must re-enter a building until they have been told it is safe to do so.

All new fire extinguishers in Britain are red, whatever they contain, to conform to European standards. They must be labelled with their contents – such as water or foam – and instructions for safe use. Extinguishers made before January 1997 may be different colours – such as black for carbon dioxide (CO_2) gas and blue for dry powder. They may be used until they are discharged or fail a test. They must then be replaced by a new, red, labelled extinguisher.

Hose reels

These are normally provided for use by the fire brigade. They must be easily accessible and no one should tamper with them.

Portable fire extinguishers

It is important that any fire extinguisher used is of the correct type. Extinguishers contain one of a number of substances that can put out fires. When operated, pressure releases the substance which can be directed onto the fire.

It is dangerous to attempt to tackle a fire unless you have been trained how to use an extinguisher and have made sure that you can get out of the building.

Portable fire extinguishers should be fixed in suitable, accessible positions – usually by doors along exit routes – and must be clearly indicated by specific safety signs. There should be enough of them for the type of premises and risks involved in the work activities. Extinguishers must be regularly checked and maintained.

Legal requirements

Various laws cover fire precautions and in Britain some premises must hold a fire certificate. Employers, the self-employed and those in charge of buildings must familiarise themselves with the requirements which affect them. Advice can be obtained from enforcement authorities, in particular the local fire authority.

? Activity

Describe the fire prevention measures taken in your workplace.

Describe how you would leave your workplace in case of a fire. Include a note about your priorities.

List the precautions you can take in your daily work to help to prevent fires from starting.

Occupational health

Health hazards

Some dangers, such as trapping a hand in moving machinery, are easy to spot, but many health problems develop gradually. For example, staff may breathe in dangerous substances that eventually cause respiratory problems or they may strain their arms or back from working at a badly arranged workstation. As many occupational health problems are irreversible, it is important to consider the possibility of hazards in order to prevent them from causing illness and disease.

key words

Occupational health – the activity of predicting and preventing work-related ill health. Also, health issues associated with work.

Health hazard – anything with the potential to cause ill health.

Exposure – contact with a health hazard.

Acute – an effect on the body which occurs rapidly after a short exposure to a health hazard.

Chronic – an effect on the body which occurs after a long period of exposure, or after repeated exposure.

Carcinogen – a substance that can cause cancer in humans.

Hierarchy of controls – control measures listed in order of priority.

Health hazards

There are various types of health hazard:

- chemical – such as harmful dusts and liquids
- biological – such as infectious diseases
- physical – such as noise, heat and radiation
- ergonomic – such as badly designed tasks, areas and equipment.

Effects on health

The effects of occupational health hazards may be acute – occurring shortly after exposure to a hazard – or they may be chronic – occurring after a long period of exposure or after repeated exposure. Harmful effects include:

- skin diseases, such as dermatitis
- respiratory diseases, such as silicosis
- suffocation, for instance, because of carbon monoxide poisoning
- cancer due to contact with a carcinogen such as asbestos
- disorders of the central nervous system
- damage to body organs
- blood poisoning
- birth defects as a result of contact with certain substances that damage human genes.

Harmful substances can get into the body by breathing, absorption through the skin or by ingestion via the mouth. The human body has many defences to prevent the entry of harmful

substances. These include the skin and linings of the airways and gut. There are also defence mechanisms, such as coughing, sneezing, diarrhoea and vomiting, to expel harmful substances, while mucus and tears can trap particles or wash them away. Nonetheless, highly toxic substances, or high, long or repeated exposure, may cause illness and disease.

Preventing ill health from workplace hazards

It is important to identify occupational health hazards and to prevent them whenever possible. Good practice involves:

- identifying and avoiding health hazards
- measuring and assessing the hazards and risks
- applying control measures, such as good design, safe working procedures and/or the use of personal protective equipment
- regular reviews to check for changes.

Health hazards must be identified whether they are within the workplace or associated with work activities. If possible, hazards should be avoided altogether. Where this is not reasonably practicable, managers or proprietors must measure the extent of the hazard and risks. This may involve complex techniques and comparisons. In certain cases, government-set levels must not be exceeded.

Appropriately qualified and experienced professionals may need to be consulted for advice.

Control measures

If the hazard cannot be avoided, control measures must be put in place to minimise the likelihood of harmful effects and their consequences.

Some types of control measure are more effective than others. For example, a first measure might be to substitute a less hazardous cleaning chemical for a highly toxic one, but it may still be necessary to use gloves, goggles and other personal protective equipment. Nonetheless, this is better than continuing to use the original chemical while relying on personal protective equipment.

The list below shows various types of control measure. They are listed in order of priority and are sometimes referred to as the 'hierarchy of controls'.

- Substitution – providing a safer alternative.
- Isolation – moving a process to another area.
- Enclosure – physically separating a process.
- Local ventilation – removing the hazard directly from the process.
- General ventilation – using normal room ventilation to reduce the hazard.
- Good housekeeping – reducing risks from spills, dust and debris.
- Exposure time reduction – reducing the time that people spend in contact with the hazard.

- Training – to help individuals to reduce risks.
- Personal protective equipment – to protect people on an individual basis (see pages 19 and 20).
- Welfare facilities – to assist in minimising the risk, for instance, washing facilities.

Health surveillance and medical testing may also be necessary to detect early signs of ill health and to identify anyone who is particularly susceptible to a hazard and may need special consideration. Surveillance and testing can help to indicate the effectiveness of the control measures but should not be relied on as proper safety controls because they can only detect, not prevent, ill health.

First aid and emergency facilities must be provided. Again, these should not be relied upon as safety controls, although early treatment of symptoms will help to reduce harmful effects.

Staff should be given training in work-based hazards and risks and in the measures necessary to protect themselves and others. They also need to know about the possible harmful effects of their activities and to understand that they must report the first symptoms immediately.

Other management practices, such as regular inspections, supervision, good communication, maintenance and the identification of changes in the workplace or work tasks, must also be carried out to ensure that the control measures continue to reduce hazards and risks to an acceptable level.

first principles

- Health hazards can be chemical, biological, physical or ergonomic.
- Health hazards may cause a variety of effects including diseases of the skin and lungs, bodily damage and disorders.
- Substances can enter the body by inhalation, absorption or ingestion.
- Control measures must be applied where health hazards cannot be avoided.
- Controls and associated measures may include:
  - substitution
  - isolation and enclosure
  - ventilation
  - good housekeeping
  - exposure reduction
  - training
  - personal protective equipment
  - welfare facilities
  - health surveillance
  - first aid facilities.

Activity

Outline any occupational health hazard associated with your work activities and describe its effects.

Choose one occupational health hazard in any workplace and make a list of the control measures that could be put in place to minimise the risks. Organise your suggestions in the priority order of the 'hierarchy of controls'.

key words

Hazardous substance – any material or substance with the potential to cause illness or injury to the people who come into contact with it.

Hazardous substances

Hazardous substances are used in many workplaces and may lead to a range of conditions including dermatitis, asthma and infectious diseases. Visitors and the general public may be at risk from hazardous substances, as well as the person using them.

Types of hazardous substance

Hazardous substances include anything that could cause ill health to people in contact with them. There are many reasons why a substance may be hazardous – for example, it may be:

- explosive or inflammable
- associated with a dangerous chemical reaction
- toxic, corrosive, harmful or irritating to parts of the human body
- the cause of diseases or allergies.

Hazardous substances come in many forms including:

- liquid, such as cleaning chemicals
- dust, such as lead and asbestos
- fumes, such as from industrial chemicals
- gases, such as carbon monoxide
- living organisms, such as fungal spores.

Prevention of accidents and ill health

The best method of preventing accidents and ill health from hazardous substances is to avoid using or storing them altogether. Where this is not possible, an assessment must be carried out and appropriate control measures must be put in place to reduce the risks to an acceptable level.

Identifying hazardous substances

It is important to identify substances that could cause harm. Purchased substances must be in their original containers and have safety labels and safety information. If dangerous chemicals have to be decanted before use, they should be poured into containers approved by the manufacturer and labelled appropriately.

Other sources of information, such as government literature, may also need to be consulted.

Assessing the risks

Companies must assess the risks from all hazardous substances used or created. The person carrying out the assessment must have the necessary legal and technical knowledge as well as access to the correct information. In some cases this may mean obtaining specialist expertise.

The assessor should read the suppliers' safety data sheets and consider various issues, such as:

- how hazardous the substance is
- how much is used
- how often it is used
- whether levels exceed government limits.

When an assessment is thorough, a range of details is considered, covering all eventualities. Assessments should be reviewed at regular intervals or when updating is needed – for example, when changes are made to processes or materials used.

Preventing exposure

Exposure should be prevented whenever possible by avoiding the need for, or production of, hazardous substances. Safer substances should be substituted.

Controlling exposure

Various techniques can be used to reduce risks even where hazardous substances are used, for example:

- enclosing a process
- using local and general ventilation
- using safe systems of work and good housekeeping to minimise spills and leaks
- reducing the number of people and time for which people are exposed
- using suitable personal protective equipment.

The controls chosen must be checked on a regular basis to make sure they are performing efficiently. In some cases the levels of hazardous substances in the air must be monitored. Staff must report any defects in control measures to managers immediately.

Overalls and gloves are needed to control the painter's exposure to this weatherproofing paint which is labelled with the hazard symbol for an irritant or harmful substance.

Health surveillance

Staff working with some hazardous substances need regular health checks – for example, to check the skin for dermatitis or the functioning of the lungs.

Information and training procedures

All employees should be given information, instruction and training to ensure that they are aware of hazards and the risks

first principles

- Hazardous substances can cause a wide range of health problems such as dermatitis and asthma. They may also cause other problems such as explosions or fires.
- The best method of preventing accidents and ill health is to avoid using, storing and creating hazardous substances altogether.
- Where hazardous substances have to be used, a full assessment must be carried out.
- Prevention or control measures must be used to minimise the risks of injury or ill health.
- People working with hazardous substances must be properly informed and trained in how to use substances safely.
- Staff should report any health problems or defects to control measures or personal protective equipment immediately.
- Always follow the safety rules of *your* workplace.

and know which precautions to take. In particular, staff must know how to operate the control measures, use personal protective equipment and take appropriate action in an emergency.

It is important for safe working procedures to be established and followed carefully. Quite often, simple procedures can prevent injury and illness:

Never
- mix different chemicals together
- decant chemicals to unlabelled or incorrectly labelled containers
- never use chemicals you are not trained and authorised to use.

Always
- use the correct PPE
- report any defects or operational problems such as poor ventilation
- keep your workplace clean and tidy
- avoid blocking walkways, to prevent tripping while handling chemicals
- store chemicals in a secure area
- report any symptoms of ill health immediately.

Supply, transport and large scale storage

Additional stringent safety measures are necessary in these cases to ensure the health and safety of users and the general public. For example, suppliers must label goods and provide appropriate information, while haulage companies must consider the additional risks posed by the *movement* of dangerous substances.

Explosive material.

Toxic material.

Corrosive material.

Oxidant material.

Harmful or irritant material.

Activity

Choose one or more hazardous substances with which you work and describe the measures that should be taken to minimise the risks of injury and ill health.

Ergonomics and workstation design

Ergonomics is concerned with the interaction between people, equipment and their environment. Ergonomics should be considered when a new workplace is being designed, when new equipment is being selected and installed or when jobs and procedures are being considered. As employers become more aware of the human and financial costs associated with poorly designed workplaces and tasks, so the application of ergonomic principles increases.

key words

Ergonomics – the interaction between people, equipment and their environment.

Workstation – the arrangement of equipment, such as desks and production lines, at which people work.

Musculoskeletal disorders – conditions, often affecting the back, involving symptoms such as aches, pains, swelling and restricted movement.

WRULDs – work-related upper limb disorders affecting the neck, shoulders, arms and hands.

Display screen equipment – equipment, such as a computer, with a visual display or monitor.

Design

It is a general principle of ergonomics that each workstation should be designed to suit the individual worker to improve his or her safety, comfort and productivity. However, as people range in height, shape and ability, it is normally uneconomic to design and create an individual workstation. Design must therefore reach a compromise and, wherever possible, should include adjustable features such as seat height adjustment and adjustable platforms.

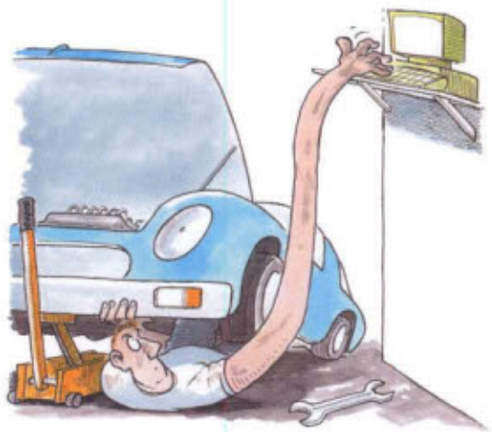
Musculoskeletal disorders

Poorly designed workstations and tasks may lead to musculoskeletal disorders causing aches, pain, swelling and poor performance. The back and arms are most commonly affected. Back problems may also be caused by lifting and carrying – see pages 46 to 49 for more information.

People may also be at risk from upper limb disorders – a variety of conditions affecting the arms, hands and upper body. Where problems are linked to tasks at work, they are called work-related upper limb disorders (WRULDs). People are more likely to have such problems if they:

- carry out a particular action repetitively
- use force
- maintain an awkward posture
- have inadequate rest periods.

People may be at risk in a variety of jobs, for example repetitive factory, office or agricultural work. Where there are risks, employers should carry out a risk assessment of the tasks and seek expert advice if necessary.



Any repetitive work could cause musculoskeletal disorders, so employers must carry out a risk assessment.

Typical measures to help to prevent WRULDs include:

- re-designing workstations to reduce the risks caused by stooping, overreaching and similar actions
- reducing repetitive movements, for instance by automation or job rotation
- reducing the force needed to carry out a task
- reducing stress levels which may contribute to poor posture
- training staff in correct posture and safety precautions associated with the task
- making environmental improvements where possible, for example, providing heating in cold areas.

Display screen equipment

Various ill effects, such as eyestrain, headaches and upper limb disorders, have been associated with jobs involving the use of display screens. Some of the methods that employers can take to prevent problems are:

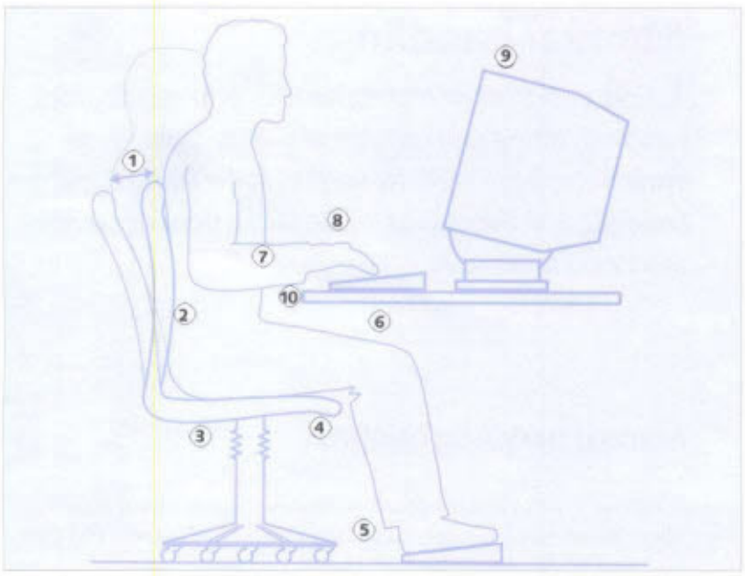
- carrying out an assessment of the equipment and task and making any necessary improvements
- providing height-adjustable seats, with back rests and foot rests if needed
- allowing plenty of room for movement
- maintaining and selecting equipment, software and screen options to minimise flicker and reduce eye strain
- planning work to allow for breaks
- reducing stress levels
- reducing noise distractions
- providing appropriate training and information
- arranging for eye tests for certain staff.

Staff can also help to prevent health problems by, for example:

- sitting comfortably at the correct height with forearms parallel to the surface of the desktop and eyes level with the top of the screen
- maintaining a good posture
- avoiding repetitive and awkward movements by using a copy holder and keeping frequently used items within easy reach
- changing position regularly
- using a good keyboard and mouse technique with wrists straight and not using excessive force
- making sure there are no reflections or glare on screens by carefully positioning them in relation to sources of light
- adjusting the screen controls to prevent eye strain
- keeping the screen clean
- reporting to their manager any problems associated with use of the equipment.

Other uses for ergonomics

Ergonomics can assist with other issues such as the layout of control panels on machines. Various aspects need to be considered, for example, the ability to reach emergency stop buttons and the clarity of controls and instructions.



Seating and posture for typical office tasks

1. Seat back adjustability.
2. Good lumbar support.
3. Seat height adjustability.
4. No excess pressure on underside of thighs and backs of knees.
5. Foot support if needed.
6. Space for postural change, no obstacles under desk.
7. Forearms approximately horizontal.
8. Minimal extension, flexion or deviation of wrists.
9. Screen height and angle should allow comfortable head position.
10. Space in front of keyboard to support hands/wrists during pauses in keying.

first principles

- Health problems may result from carrying out repetitive movements. These should be assessed and specific improvements made to prevent ill effects.
- Ergonomics can help to prevent a range of work-related complaints.
- Common techniques for preventing ill health involve reducing repetitive movements and the force required to do the task. Adequate breaks and rotation between jobs may also help.
- Everybody should be trained in how to do their job. This should include information on how to reduce the risks, such as by workstation layout.
- Specific recommendations exist for those providing and using display screen equipment.
- Staff suffering from work-related aches and pains should report them to their employer for early attention.

? Activity

Select one task in a particular workplace and describe what could be done to reduce the risk of occupational health problems for the person carrying out the task.

Suggest improvements that could be made to a workstation in the interests of occupational health.

key words

Manual handling – using the body to lift, carry, push or pull a load.

Load – an object or consignment to be moved, held or positioned.

Reportable accident – one that must be reported to the appropriate enforcement authority.

Manual handling

Almost one-third of reportable accidents results from handling, lifting and carrying activities. Virtually all workplaces have staff involved in some form of manual handling and the cost of injuries from poor or careless practice is enormous.

Manual handling injuries

A variety of injuries may result from poor manual handling. These are most commonly to the back, but hands, arms and feet may also be damaged. Typical injuries include:

- ruptured discs
- sprained ligaments
- sprained and inflamed tendons
- muscular injuries
- trapped nerves
- hernias
- fractures
- cuts and crushing to parts of the body (for example, when a load is dropped onto fingers or feet).

Some injuries occur immediately, but many develop gradually. Most cause significant pain and result in absence from work.

Preventing injuries

As with other health and safety issues, the most effective method of prevention is to eliminate the hazard – in this case, to remove the need to carry out hazardous manual handling. For example, it may be possible to re-design the workplace so that items do not need to be moved from one area to another. Alternatively, it may be possible to provide mechanical means, such as a conveyor belt, to move items. Any alternative means of moving objects must also be assessed and controlled to ensure they do not cause injuries or other health problems.

Where manual handling tasks cannot be avoided, they must be assessed. This involves examining the tasks and deciding what the risks associated with them are, and how these can be removed or reduced by adding control measures.

As part of a manual handling assessment the following should be considered:

- the task to be carried out
- the load to be moved
- the environment in which handling takes place
- the capability of the individual involved in the manual handling.

A number of factors increase the risk of manual handling injuries, and these should be considered and controlled. The following paragraphs offer a number of suggestions.

The task

- Carry loads close to the body because lifting and carrying with the load at arm's length increase the risk of injury.
- Avoid awkward movements such as stooping, reaching or twisting.
- Ensure that the task is well designed and that procedures are followed.
- Try never to have to lift from the floor or to above shoulder height. Limit the distances for carrying. Mechanical aids may assist in reducing the force needed to move a load. These do not have to be complicated – a simple sack truck may help, but such aids must be used properly.
- Minimise repetitive actions by re-designing and rotating tasks. Ensure that there are adequate rest periods and breaks between tasks.
- Plan ahead – use team work where the load is too heavy for one person.

Mechanical aids can help to reduce the force needed to move a load.

The load

- Reduce the size and weight of loads to make handling easier. This could involve suppliers in packing items into smaller consignments before delivery.
- Make loads easier to grasp and increase the stability of loads which may move suddenly and unpredictably.
- Control harmful loads – for instance, by covering sharp edges or by insulating hot containers.
- Wear suitable personal protective equipment, such as non-slip gloves, safety footwear or overalls.

The environment

- Ensure that the surroundings are safe – flooring should be even and not slippery, lighting should be adequate, and the temperature and humidity should be suitable.
- Remove obstructions and ensure that the correct equipment is available.

The individual

- Never attempt manual handling unless you have been trained and given permission to do so.
- Ensure that you are capable of undertaking the task – people with health problems and pregnant women may be particularly at risk of injury.

Good handling techniques

As it is not possible to eliminate manual handling altogether, correct handling techniques must be followed to minimise the risks of injury. The techniques outlined below should be followed at home as well as at work.

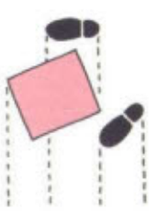
Correct lifting procedure

1. Planning and preparation

Think about the task to be performed and plan the lift.

- Consider what you will be lifting, where you will put it and how you are going to get there.
- Assess the weight and centre of gravity of the load.
- Assess the size of the load to make sure that you can grip it safely and see where you are going.
- Assess whether you can lift the load safely without help. If not, get help. Bear in mind that it may be too dangerous to attempt to lift some loads, such as an office safe, even with a team.
- If more than one person is involved, plan the lift first and agree who will lead and give instructions.
- Plan your route and remove any obstructions. Check for any hazards such as uneven flooring.
- Avoid lifting unsafe loads, such as damaged glass or badly packed chemicals.
- Check whether you need any PPE and obtain the necessary items, if appropriate. Check the equipment before use and check that it fits you.
- Ensure that you will be able to maintain a firm grip.
- Ensure that you are wearing the correct clothing, avoiding tight clothing and unsuitable footwear.
- Remove any unnecessary packaging, if this will make the task safer.
- Consider a resting stage before moving a heavy load or carrying something any distance.

2. Position



Stand with your feet apart and your leading leg forward. Your weight should be even over both feet. Position yourself (or turn the load around) so that the heaviest part is next to you. If the load is too far away, move toward it or bring it nearer before starting the lift.

first principles

- Manual handling should be avoided wherever possible. Where it cannot be avoided, an assessment must be carried out and the handling task made safer by suitable control measures.
- Typical injuries are back sprains and strains, cuts, bruises, crushing, fractures, hernias and trapped nerves.
- The effects of poor manual handling may not show immediately, so follow good procedures all the time to prevent a health problem developing.

3. Lift

Always lift using the correct posture.

- Bend the knees slowly, keeping the back straight.
- Tuck the chin in on the way down.
- Lean slightly forward if necessary and get a good grip.
- Keep the shoulders level, without twisting or turning from the hips.
- Try to grip with the hands around the base of the load.
- Bring the load to waist height, keeping the lift as smooth as possible.

4. Move the load

- Move the feet, keeping the load close to the body.
- Proceed carefully, making sure that you can see where you are going.

5. Lower the load

- Lower the load, reversing the procedure for lifting.
- Avoid crushing fingers or toes as you put the load down.
- Position and secure the load after putting it down.

Dealing with problems

Report any problems immediately – for example, strains and sprains. Where there are changes, for example to the activity or the load, the task must be reassessed.

? Activity

Describe all the considerations and stages involved in one manual handling task you carry out at work or at home.

List the key improvements you could make to improve the way you lift and move objects.

key words

Sound – vibration in the air made by a source and received by the hearer.

Noise – unwanted sound, often loud.

Tinnitus – a medical condition involving ringing in the ears.

Noise

Exposure to excessive noise can cause hearing damage and even loss – the effects may be cumulative and irreversible. Noise also interferes with communication and may therefore compromise safety. Designers, importers, suppliers, manufacturers, employers, employees and the self-employed all have obligations towards noise control and the protection of hearing.

Sources of noise

Noise is produced by people and many types of equipment including printers, vehicles, radios and motors. It can cause a nuisance or stress. Where noise is very loud, it may cause hearing damage or loss of hearing. The likelihood of damage is linked to the amount of sound energy to which the ear is exposed.

Controls

Surveys are carried out to assess the risks from noisy environments. The surveys must be carried out by suitably qualified and experienced personnel.

The risks from exposure to noise must be reduced as far as is reasonably practicable and a number of control measures can be considered.

Everyone has responsibilities for noise although the individual responsible for each control varies.The controls include:

- design and layout that takes into account the source of noise and the relative position of people
- purchasing quieter equipment or using quieter processes or silencers
- enclosing the source of the noise with sound absorbing materials
- screening noisy processes
- lagging noisy pipework
- providing acoustic wall or ceiling panels
- isolating staff in noise-protected areas
- controlling the time that individuals are exposed to noise
- providing hearing protection (ear defenders or plugs).

The best controls are those which reduce the amount of noise being produced, followed by enclosure and noise proofing. As a last resort, hearing protection may need to be worn.

Personal protective equipment

Hearing protection prevents some of the sound energy reaching the ear and should be used when noise cannot be reduced by other measures. Ear defenders and plugs must be:

- selected carefully – expert advice may be required
- fitted correctly
- compatible with other forms of PPE , such as bump hats and goggles
- properly looked after
- worn whenever it is appropriate.

There should be signs to indicate areas where hearing protection is needed. Staff who are affected must be appropriately informed, instructed, trained and supervised.

first principles

- Excessive noise can cause hearing loss and damage and can impair general communication.
- In noisy environments, assessments need to be carried out by suitably qualified personnel and the noise controlled to reduce risks.
- Training and supervision must be provided for staff working in noisy areas or carrying out noisy activities.
- Personal protective equipment designed to protect hearing must be selected carefully and looked after with care.
- Ear defenders or plugs must always be worn in designated noisy areas.

Activity

Imagine that you work in a very noisy workplace. Discuss the difficulties this might cause you at work and in your home life.

Make a list of the actions you can take to protect:

a) your hearing

b) the hearing of colleagues.

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PICTURE CREDITS

Abbreviations to indicate the position of a photograph on a page: T=top; M=middle; B=bottom; L=left; R=right.

DiverseyLever – 1TR, 24, 28; Colin Hyett – 5, 13, 19B, 20, 22T, 22B, 27, 29, 30, 36, 41, 47; Still Pictures – 1M, 7, 19T; The Stock Market – 1TL, 1BL, 1BR, 44.

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