

Health and Safety Legislation

This handbook is designed to provide you with basic information on current Health and Safety Legislation. It covers the main points of various acts and requirements but it is not designed to be an in-depth source of information. For specialist requirements or a broader range of publications refer to the HSE website www.hse.gov.uk

Additional References Required

This is not a stand alone document and must be read in conjunction with **company standard operating procedures and relevant risk assessments.**

Rationale

This document provides an overview of health and safety training, detailing the main points that the shop floor should be aware of to maintain safe day-to-day operations.

The following points are covered:

- Health and Safety at work Act 1974
- Control Of Substances Hazardous to Health 1999 (COSHH).
- Provision and Use of Work Equipment Regulations 1998 (PUWER).
- Reporting Injuries Diseases and Dangerous Occurrences Regulations 1995 (RIDDOR).
- Lifting Operations and Lifting Equipment Regulation (LOLER).
- Personal Protective Equipment (PPE)
- Carriage of Dangerous Goods by Road and Rail (Classification, Packaging and labelling) Regulations 1994.
- Safety Signs & Signals Regulations 1994
- The Fire Precautions (Workplace) Regulations 1997.
- The Noise at Work Regulations 1989
- Manual Handling Operations Regulations 1992
- The Electricity at Work Regulations 1989
- Apply Safe Working Practice in an industrial Environment

1. Health and Safety at work Act 1974

Employers and employees have a duty to the safety of themselves and others. This is called 'TORT' liability. This means that you must take reasonable care not to put yourself and others at risk that could result in injury. If this was the case it can be claimed as negligence and you are liable under law to be prosecuted.

The objectives of HSWA

- To secure the health, safety and welfare of all people at work.
- To protect others from the risks arising from workplace activities.
- To control the obtaining, keeping and use of explosive or highly flammable substances.
- To control emissions into the atmosphere of noxious or offensive substances

The HSWA is an Act of Parliament. It is an enabling Act that enables other legislation to be made. It created the Health and Safety Commission (HSC) and the Health and Safety Executive (HSE) and it is the basis for all current health and safety legislation.

The Health and Safety Commission's main role is to propose new regulations to the government. The Health and Safety Executive's main role is to enforce the law using inspectors with a wide range of powers.

2. Control Of Substances Hazardous to Health 1999 (COSHH).

The regulation and various Approved Codes of Practice (ACOPS) (which support this regulation) cover four main areas:

- Gain and share information and knowledge about hazardous substances
- The assessment of risk to health associated with use, handling, storage, etc. of substances at work
- Elimination or control of health risks by the use of appropriate engineering applications, operating procedures and personal protection
- Monitoring the effectiveness of the measures taken

Application of Regulations:

- Gain and share information and knowledge about hazardous substances.

This means that the employer has a duty to gather and release information about hazardous substances.

- The assessment of risk to health associated with use, handling, storage, etc. of substances at work

An employer shall not carry on any work, which is liable to expose any employees to any substances hazardous to health unless he has made a suitable and sufficient assessment of the risks created by that work and taken the necessary steps that are required to meet the regulations.

- Elimination or control of health risks by the use of appropriate engineering applications, operating procedures and personal protection.

The employer shall ensure that the exposure of his employees to hazardous substances to health is either prevented or, where this is not reasonably practicable, adequately controlled (enclosure, minimise generation, suppress, contain, limit persons to a minimum, forbid eating, drinking & smoking, hygiene, warning signs, safe storage/handling and disposal).

- Monitoring the effectiveness of the measurements taken – the employer shall keep a suitable record of any monitoring carried out for the purpose of the regulation and that records shall be available.

3. Provision and Use of Work Equipment Regulations 1998 (PUWER).

This covers the use of work equipment, by workers at work, and are intended:

- To implement the Machinery Safety Directive
- To simplify and clarify existing laws on the provision and use of work equipment by reforming older legislation
- To form a coherent, single set of key health and safety requirements concerning the provision and use of work equipment

The regulations are supported by an approved code of practice and guidance notes prepared by the Health & Safety Executive (HSE)

Suitability - The employer shall ensure that work equipment is suitable for the purpose that it was provided for and that it is used only for those operations it is suitable for.

Maintenance - The employer shall ensure that work equipment is maintained in an efficient state, in efficient working order and in good repair.

Where any machinery or equipment has a maintenance log, the log is to be kept up to date.

Inspection – The employer must ensure that inspection is carried out.

This may be after installation, before being put into service for the first time, after assembly at a new site or location or where conditions cause deterioration.

The inspection must be at suitable intervals and or where exceptional conditions may have cast doubt on the safety of the equipment.

Results of inspection must be recorded and kept until the next inspection.

4. Reporting Injuries Diseases and Dangerous Occurrences Regulations 1995 (RIDDOR).

These regulations cover the need to report certain injuries and diseases sustained by people at work along with specific dangerous occurrences and gas instances to the appropriate enforcing authority.

In most cases this is the HSE but may be the local authority (environmental health officer).

In the event of the following cases the responsible person must notify the relevant authority:

- The death of a person as a result of an accident arising out of or in connection with work
- Any person at work suffering a specific major injury as a result of an accident arising out of or in connection with work and where that person is taken from the site of the accident to a hospital for treatment in respect of that injury
- Any person who is not at work suffering a major injury as a result of an accident arising out of or in connection with work
- Where there is a dangerous occurrence

The responsible person must notify the appropriate authority, by the quickest means, where a person at work is incapacitated for work which he might reasonably be expected to do, in the normal course of his work. If this is for more than 3 consecutive days (excluding the day of the accident and including any days that would normally have been worked). Note: the injured person may not necessarily be away from work but perhaps, undertaking light duties).

A report must follow within 10 days of the accident or occurrence.

Company Information:

Identify the appropriate qualified first-aider.

Location of first-aid facilities.

Identify procedures to be followed in the event of injury to self and others.

5. Lifting Operations and Lifting Equipment Regulation (LOLER).

LOLER applies over and above the general requirements of PUWER and deals with specific hazards and risks associated with lifting equipment and lifting operations. Under LOLER there is an absolute duty on employers and others to undertake lifting operations safely.

Lifting equipment means work equipment for lifting or lowering loads and includes its attachments used in anchoring, fixing and supporting it.

The employer shall ensure that:

- Lifting equipment is of adequate strength and stability for each load, having regard in particular to the stress induced at its mounting or fixing points
- Every part or load and anything attached to it and used in lifting it is of adequate strength
- The risk of crushing, trapping or falling are prevented
- That the equipment is positioned in such a way as to reduce the risk of a person being; struck by the equipment or load, that the equipment can not drift, fall freely or be released unintentionally
- Equipment shall be clearly marked or details kept with the equipment (machine, hoist, chain etc) to indicate the safe working load (SWL)
- Examination of equipment for defects and correct installation before it is first used
- Examination thereafter every 12 months or after exceptional circumstances
- Provide report on the examination including any defects found
- The employer shall ensure that equipment is not used if they have been informed of a defect which could become dangerous
- The defect is rectified or where the defect is not yet dangerous, after the time specified that it will become dangerous
- Information regarding examination is kept for inspection purposes for a period of 2 years or the life of the machine if this depends upon installation condition

6. Personal Protective Equipment (PPE) at work Regulations 1992

People at work use a wide range of PPE including safety boots, aprons, wellingtons, eye protectors and ear protection amongst others.

Under regulation 4 every employer shall ensure that 'suitable' PPE is provide to their employees who may be exposed to a risk to their health and safety while at work unless the risk is being controlled by other means that are equally or more effective.

- Is appropriate for the risk or risks involved and the condition at the place where exposure to the risk may occur
- Take account for function and comfort (ergonomics) and the state of health and safety of the person or people who wear it
- Is capable of fitting the wearer correctly, if necessary after adjustments have been made within the range for which it is designed
- 'So far as practicable' is effective in preventing or adequately controlling the risk or risks involved without increasing the overall risk

The employers shall ensure that equipment is maintained in an efficient state, in efficient working order, in good repair and storage for PPE is supplied when not in use. (Maintenance includes replacement or cleaning).

The employee shall ensure they use the PPE in accordance with both any training and instruction received and that any concerns/problems regarding condition are reported.

7. Carriage of Dangerous Goods by Road and Rail (Classification, Packaging and labelling) Regulations 1994.

The objective of these regulations is to ensure that the rules in the UK meet UN Recommendations of transport of Dangerous Goods (except explosives, radioactive materials and other items listed under regulation 3). Duties under these regulations are placed on the transport firm of dangerous goods who must classify package and label dangerous goods in accordance with the requirements set out in the regulations.

8. Safety Signs & Signals Regulations 1994

These regulations require that employers use safety signs where there is a significant risk and that these signs conform to a standard system with regard to colour and shape.

Stop or Prohibition Signs – These are to be circular with a red band enclosing a crossed-out symbol on a white background.

Warning or Caution Signs – These signs are to be triangular with a yellow background and black borders, symbol and text.

Mandatory Signs – These are to be circular with a blue mandatory symbol and text in white.

Safe Condition Signs – These are to be indicated by a green square or rectangle with symbol and text in white.

Signs should also be used for marking obstacles and dangerous locations. These should be black & yellow or red & white stripes.

9. The Fire Precautions (Workplace) Regulations 1997.

- Where necessary in order to safeguard the safety of the employees in case of fire, workplaces must be equipped with appropriate fire-fighting equipment, detectors and alarms.
- Equipment must be easily accessible, simple to use and indicated by signs.
- If the nature of activities is such that fire fighting is specifically called for, the employer must nominate employees to implement these procedures. The number of nominees, training and equipment available must be adequate, taking into account the size, hazard and workplace.
- Nominate a sufficient number of competent people to implement procedures to evacuate the premises.
- Arrange the necessary contacts with external emergency services.
- Emergency exits must be kept clear at all times.
- Emergency routes and exits shall lead as directly as possible to a place of safety.
- Evacuation must be in a quick and safe manner.
- The number and location of emergency routes and exits are adequate to the workplace use and maximum number of persons present at any one time.
- Emergency doors must open in the direction of escape.
- Sliding and revolving doors shall not be used for exits.
- Emergency doors shall not be locked or fastened that they cannot be easily and immediately opened by any person who may require to use them in an emergency
- Emergency routes and exits must be indicated by signs.
- Emergency routes and exits requiring illumination shall be provided with emergency lighting e.g. night shift, poor daylight.
- Equipment and devices provided shall be maintained in an efficient state, in efficient working order and in good repair.

Company instructions:

Organisational procedures in the event of fire & evacuation of premises

Identify procedures to be followed in the event of dangerous occurrences or hazardous malfunctions.

10. The Noise at Work Regulations 1989

The regulations bring in the concept of 'daily personal noise exposure and action levels'.

Every employer shall ensure that a competent person makes a noise assessment that is adequate for the purpose when:

- Any of its employees is likely to be exposed **to or above** the following:
- First action level – means a daily personal noise exposure of 85 decibels
- Peak action level – means a level of peak sound pressure of 200 pascals
- Second action level - means a daily personal noise exposure of 90 decibels

This assessment should:

- Identify which employees are exposed
- Provide employees with information about the noise

Every employer shall:

- Reduce the risk to the lowest level reasonably practicable
- Provide employees with suitable and sufficient personal ear protection

11. Manual Handling Operations Regulations 1992

The employer shall so far as is reasonably practicable, avoid the need for their employees to undertake any manual handling operations at work that involve a risk of them being injured.

Where it is not reasonably practicable to avoid such a need the employer shall:

- Make a suitable and sufficient assessment of all such manual handling operations to be undertaken by them
- Take appropriate steps to reduce the risk of injury to these employees to the lowest level reasonably practicable
- Take appropriate steps to provide employees with general indications (where it is reasonably practicable) of precise information on:
 - The weight of the load
 - The heaviest side of the load
 - The centre of gravity
- Review when no longer valid or significant change in the manual handling operations

These regulations apply an ergonomic approach to the prevention of injury.

- Know your limits
- Stop, think and assess:
 - What is the load?
 - How far is it to be moved?
 - Will I need specialist equipment or protection?
 - How will the environment effect the task?

DO:

- Push rather than pull.
- Take regular breaks, give your body time to recover.
- Use handling aids as much as possible where suitable for the job.
- Plan and assess before lifting.
- Work within safe limits.

- Know your own physical abilities.
- Use the safest, shortest route.

DON'T:

- Don't act about when handling loads.
- Don't pull when you can push.
- Don't struggle and strain to lift a load.
- Don't take shortcuts.
- Don't suffer in silence.

12. The Electricity at Work Regulations 1989

These regulations apply to all work associated with electricity. The purpose of the regulations is to take precautions against the risk of death or personal injury from electricity when it is involved in work activities.

Systems, work activities and protective equipment (regulation 4)

So far as is reasonably practicable:

- All systems shall, at all times, be of such construction as to prevent danger,
- All systems shall be maintained so as to prevent danger
- Every work activity (operation, use and maintenance) shall be carried out in such a manner as not to give rise to danger
- Any equipment provided to protect those that work on or near electrical equipment shall be suitable for the purpose and shall be maintained

Under electricity at work numerous regulations are to be followed. These are:

- Reg 5 Strength and capacity of electrical equipment – strength & capacity may be exceeded
- Reg 6 Adverse or hazardous environments – weather, flammable or explosive substances etc
- Reg 7 Insulation, protection and placing of conductors – eg. covering with insulating material
- Reg 8 Earthing or suitable precautions
- Reg 9 Integrity of referenced conductors
- Reg 10 Connections – mechanical and electrical suitable for use (not broken)
- Reg 11 The means of protecting from excess current
- Reg 12 The means for cutting off the supply and for isolation – wall isolators
- Reg 13 Precautions for work on equipment made dead – Lock-off Procedure
- Reg 14 Work on or near live conductors
- Reg 15 Working space, access and lighting
- Reg 16 People to be competent to prevent danger and injury – Training, knowledge, experience, Supervision

13. Apply Safe Working Practice in an industrial Environment

- Maintain a tidy workplace
- Exits and gangways free from obstructions
- Use tools and equipment safety and only for the purpose intended
- Observe organisational safety rules, signs and hazard warnings
- Take measures to protect others from harm by any work you are carrying out

Risk Assessment Handbook

Risk Assessments are integral to all health and safety issues, and must be completed for all jobs within the workplace. They are often overlooked by a lot of companies, however a strong system of risk assessment and updating procedures is key to reducing injuries. In addition, if you can understand the principles of Risk Assessment as far as H&S is concerned, you can implement these principles for Environmental awareness and product design issues.

A few Definitions and Pointers:

A Hazard is **'something with the potential to cause harm'**, for instance electrical flexes or air lines can potentially be tripped over.

A 'Dangerous Occurrence' is when **an incident happens but no-one is injured**.

An 'Accident' is when a **dangerous occurrence happens and someone is injured**.

'Risk' can be defined as **'the likelihood that harm will occur'**.

Note :- there is a difference between risk and a hazard

'Risk Assessments' are designed to **identify and reduce dangers in the workplace**.

Risk Assessments must be completed for all jobs, however they only need to be recorded if there are 5 or more employees.

A 'Control Measure' is a method to **'remove or reduce risks'**.

You must report anything that you consider a risk. To not do this may result in someone being injured or killed.

The Purpose of Risk Assessment

A risk assessment has 3 purposes:

1. identify all the things which **may cause harm** to employees and others
2. consider the chance of that harm actually occurring to anyone in each particular case, and the possible consequences which could come from it (the RISKS).
3. enable employers to plan, introduce and monitor preventative measures to ensure that risks are continually controlled. Without effective assessment there can seldom be effective control.

The assumption on the above is that so far, nothing has been done already about complying with existing law. This assumption is incorrect because risks will have been identified in the past (though probably not all!) and will be being controlled in conformity with existing requirements. At best, therefore, the formal exercise of risk assessment will confirm that the Company's hazards are identified and already adequately controlled. At worst, assessment will identify potential hazards and the risk they present in time for effective action to be taken to correct them before any incident takes place.

Key Points About Assessment.....

...from the Management of Health and Safety at Work Regulations:

1. Assessments must be adequate. They must be sufficient to guide employers' judgements about the measures they should take to fulfil their legal obligations.

2. Assessments must cover all the risks to the health and safety of employees to which they are exposed at work.
3. Assessments should cover risks to non-employees who may be affected by what the employer does (e.g. contractors, visitors).
4. Wherever new or changed risks are encountered the employer must revise his original assessment. A regular review is advised as part of good management practice.
5. Where employers employ 5 or more employees the assessment must be in writing.
6. Where groups of employees are especially at risk, the groups must be identified as part of the assessment (e.g. new starters, handicapped workers).
7. How far an assessment proceeds beyond a **common sense estimate** of particular hazards and situations will depend on the complexity of the undertaking and the degree of risks present e.g. a petrochemical plant may warrant more detailed assessment than a warehouse.

'Five Steps to Risk Assessment', available from the Health and Safety Executive, suggests a protocol for assessment. The Management of Health and Safety at Work Regulations 1999 make it a legal requirement for employers to carry out suitable and sufficient risk assessments of any work activities that could put people at risk, and this includes:

- i. Carry out suitable and sufficient risk assessments of any work activities that may put people at risk.
- ii. Employ a systematic approach when carrying out risk assessments.
- iii. Implement arrangements for effective planning, organisation, control, monitoring, and review of the precautions taken.
- iv. Record the arrangements where there are more than five employees.
- v. Provide health surveillance to employees where necessary.
- vi. Have access to competent health and safety advice.
- vii. Inform employees of dangers and risks that exist in the workplace and be aware of communication issues such as language difficulties.
- viii. Establish procedures for contacting emergency services and inform employees
- ix. Co-operate about health and safety issues with other employers who share the same premises.
- x. Ensure adequate training of employees.
- xi. Employ competent people to carry out work duties.

In order to minimise the occurrence and affects of accidents in the workplace, the manager not only needs to be aware of legislation, but also the steps needed to prevent accidents. This involves an examination of hazards within the workplace, and the assessment of the probability of any accidental event occurring i.e. a risk assessment. Once this is conducted, potential hazards are identified and the manager can chose various options to minimise the likelihood of the event occurring. This may include appropriate signage, training, protective equipment, and/ or emergency procedures.

A manager must carry out and maintain regular risk assessments under health and safety law whether you are a big business, a small business or just a one-person operation. A properly conducted risk assessment aims to minimise the possibility of your business harming the environment or those who work in, or visit, your business.

All hazards need to be considered in risk assessments. A hazard is anything that could cause harm. A risk is the chance that someone, or the environment, could be harmed by a hazard.

The first stage of a risk assessment is to look for hazards. A hazard can be something easily seen, such as a trailing cable, a worn carpet or exposed wiring. Or it can be something less obvious - a slippery surface, for example. It can be something general, such as poor lighting. Or it can be something specific to your business, such as the particular hazardous substances

you use. A hazard can be something directly affecting your employees, such as exposure to bacteria - or something affecting the environment in general, such as your waste materials.

You should distinguish between:

- i. workplace hazards, such as a workshop's layout
- ii. activity hazards, such as using grinding machinery in your workshop
- iii. environmental hazards, such as the dust created when using grinding machinery

When looking for hazards it can be helpful to:

- i. walk around your business
- ii. talk to employees who may be more aware of hazards than you are
- iii. look at safety data sheets and manufacturers' instructions to identify potential problem areas
- iv. examine accident and health records to identify existing problem areas

The aim of risk assessments is always to eliminate hazards completely. However, if this cannot be done, actions have to be taken to reduce the risks as much as possible.

Risk assessments are required to be carried out for all operations within the organisation, however they only have to be recorded if there are 5 or more employees – this includes job roles such as company directors who may not be directly involved in the day to day operations of the organisation.

Any fewer than five employees is considered

- i. a small enough amount of people to get together and discuss the relevant hazards
- ii. a financial and organisational burden on smaller businesses, for instance window cleaners

There are five clear steps involved in Risk Assessment analysis:

- i. Look for hazards
- ii. Decide who might be harmed and how
- iii. Consider the risk and decide whether the existing precautions are adequate or not
- iv. Document your findings
- v. Review the assessment and revise it if necessary

I will go into detail on these:

Look for Hazards

This can be accomplished through:

- i. Safety inspections / safety surveys
- ii. Examination of work activities / safety audits
- iii. Examination of significant hazards / safety sampling
- iv. Obtain feedback from employees about what they think are hazards
- v. Examine accident, ill health and 'near miss' reports
- vi. Examine manufacturers' instructions and data sheets

Each of the above has distinct advantages and disadvantages:

Method	<i>Advantage</i>	Disadvantage
(i) Safety inspections / safety surveys	<i>Either: entails an inspection of the whole work area; or, gives an overall picture</i>	Less detailed than other methods
(ii) Examine work activities / safety audits	Either: very detailed attempt to identify all types of hazards; or, can be used to give a numerical score to measure the 'health' of the workplace	Can be very time consuming
(iii) Examination of significant hazards / safety sampling	Concentrates on one specific aspect of health and safety	Either: needs to be part of a series to cover different aspects; or, may miss some aspects out
(iv) Obtain feedback from employees about what they think are the hazards	Employees are best placed to know what is hazardous	Employees may be reluctant to report hazards in case they are blamed for something
(v) Examine accident, ill-health, and 'near miss' reports	Either: can reveal hazard 'hot spots' that other methods don't; or, will show cases of previous accidents and lead to a fresh look at the causes	Accident reporting may not be effective enough to cover all incidents
(vi) Examine manufacturers' instructions and data sheets	Either: will give advance warning of potential hazards; or, manufacturers are helpful in assisting with safety issues about their product, or, manufacturers have a legal duty to supply safety information about their product	Only covers machines, substances and equipment

Decide who might be harmed and how

There are numerous groups of people to consider when looking for hazards in your workplace, and this is not confined to company employees only:

Colleagues, vulnerable members of the team such as younger, inexperienced workers, trainees, lone workers who may work in isolation, colleagues with disabilities, contractors, part-time staff, members of the public, suppliers, visitors/sales reps, clients, service users, customers, maintenance personnel.

The 'How' aspect comes down to a specific analysis of the work activities and this should be completed pro-actively, however in practice it is usually completed once the operation is actually up and running. This is particularly relevant in industry where there is a lack of knowledge in general as to health and safety requirements.

Consider the risk and decide whether the existing precautions are adequate or not

Once again there are standard H&S procedures to be followed towards meeting this step:

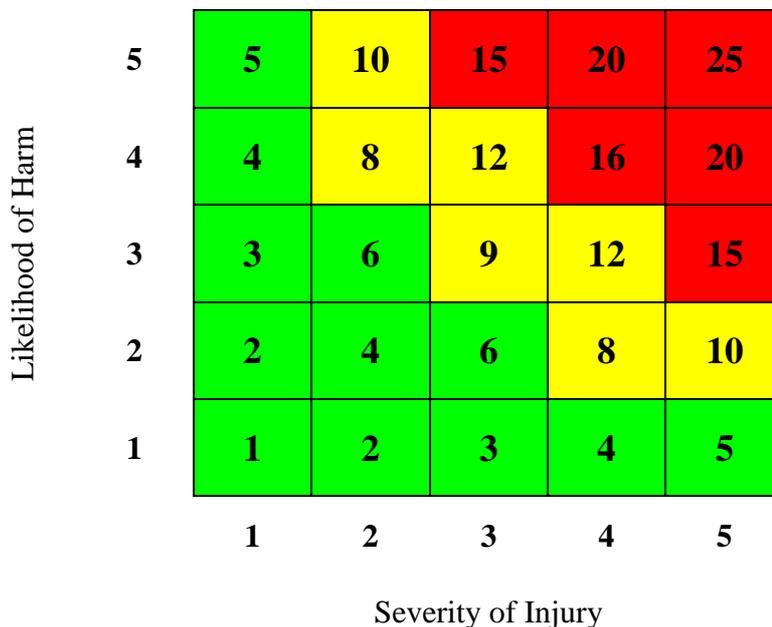
- i. Look at safety data sheets and suppliers' instructions to see the extent of the hazard.
- ii. Work out how many people are exposed to the hazard.
- iii. Estimate how long they are exposed to it.

- iv. Estimate the likelihood of any harm occurring.
- v. Estimate the severity of any injury that might result.

The likelihood and severity are usually graded from 1 through to 5, with 1 being the lowest, for instance:

Likelihood Of Harm	Severity of Injury
5 = Certainty	5 = Fatality
4 = Probable	4 = Major
3 = Possible	3 = Minor
2 = Remote	2 = Negligible
1 = Improbable	1 = None

At this stage a small graph may be beneficial in ordering the priority:



This can then be used to pinpoint the issues that must be tackled, and offers some guidance in this.

1-7 Low Risk, 8-14 Medium Risk and 15-25 High Risk

From here we need to ask whether the precautions already taken:

- i. Meet the requirements of the regulations
- ii. Reflect the standards for the industry
- iii. Represent good practice
- iv. Reduce risks as far as possible.

There are standard procedures for tackling these issues:

- i. Substitute a less hazardous material, procedure, machine.
- ii. Enclosure (separate the people from the hazard, put guards on dangerous parts.)
- iii. Devise safer ways of working, providing written instructions on safe practice.
- iv. Ensure adequate supervision.
- v. implement health and safety training, better working practices and systems
- vi. provide information (warning signs)

AND FINALLY

vii. provide PPE where necessary.

This should only be considered as a last resort.

Document your findings (If there are more than 5 employees this is a legal requirement.)

The groups of people at risk mentioned above need to be made aware of the risks and the methods taken to control them, otherwise there is no point in carrying out the analysis in the first place.

From here you can start to implement them, however documentation is also required:

- i. to show to an inspector if required
- ii. in case of action for civil liability
- iii. to provide information about hazards to aid future decisions about health and safety
- iv. because it is a legal requirement to do so.

Review the assessment and revise it if necessary

- i. If the review date is 'up'. A good risk assessment will have some sort of statement on it such as '*this document is only valid until dd/mm/yy*'. It then needs to be reviewed.
- ii. To ensure that the precautions are still effective (particularly for hazardous substances such as asbestos etc).
- iii. Because there is reason to suspect that the previous assessment is no longer valid because of information from accident reports etc.
- iv. when new machinery, procedures or substances are used.
- v. If a serious accident has occurred a review should be carried out to find why that accident occurred.

Fire Extinguishers

Fire is extremely dangerous.

Never play with fires or anything that can trigger a fire.

You could put your life in danger and risk the lives of other people.

Never play with fire-fighting equipment like fire extinguishers. They're designed to save lives in emergencies, not to set off like toys.

If you want to try out a fire extinguisher, go visit your local fire department or arrange for them to come to your company. They'll often be happy to oblige.

Fire is one of humankind's oldest discoveries; it's also one of our biggest threats. A fire can destroy in a matter of minutes a home or business that has taken decades to establish. That's why methods of putting out fires are so important. Most buildings these days are equipped with fire extinguishers, but why are there so many different kinds? What do they do to a fire? And how exactly do they work?

What is fire?

Ask most people what a fire is and they'll tell you it's something frightening and destructive involving flames. But to a scientist, a fire is something much more precise. A fire is actually a chemical reaction called **combustion**. When combustion happens, substances like wood, paper, oil, or coal (all of which are made from chemicals, even if you don't immediately think of them that way) combine with oxygen in the air to produce water, carbon dioxide, waste gases—and an awful lot of heat. Combustion doesn't normally happen all by itself: things don't burst into flames

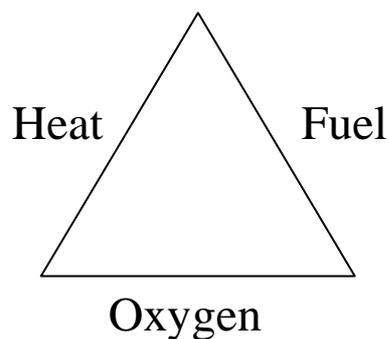
without help. It usually takes some **activation energy** (provided by a spark or a match) to kick off the reaction. Once combustion is underway, the fire seems to continue all by itself.

The fire triangle

Fire needs three things to sustain it:

1. heat.
2. fuel - something to burn such as wood or coal
3. oxygen - usually from the air

A fire can burn when all these things are present; it will stop when at least one of them is removed. As any fire-fighter will tell you, putting out a fire involves breaking the **fire triangle**—which means removing either the fuel, the heat, or the oxygen.



Suppose a fire breaks out in a pan on top of your cooker, the first thing you normally do is switch off the heat. If that doesn't work, you might soak a towel with water and place it very carefully over the pan. The towel is designed to block off the supply of oxygen to the fire (the water stops the towel from catching fire and making things worse). Every fire-fighting technique you can think of involves removing heat, oxygen, or fuel—sometimes more than one of those things at the same time.

5 main hazards produced by fire

- oxygen depletion
- flame/heat
- smoke
- gaseous combustion products
- structural failure

Different types of fire are given a 'Class' designation, as follows:

Class A

Solid materials, organic, glowing embers.

Wood, paper, Coal

Class B

Liquids or liquefiable solids

Class B1

Liquids soluble in water

Methanol

Class B2

Liquids not soluble in water

Petrol, oil

Class C

Gases or liquefied gases resulting from leak or spillage
Methane, Butane.

Class D

Metals

Aluminium, magnesium

This requires a Special Dry Powder extinguisher, containing graphite or talc.

Electricity is a *cause* of fire, not a *type* of fire, therefore these are usually taken to mean ‘a piece of electrical equipment that is on fire’, for instance a computer or printer.

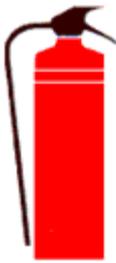
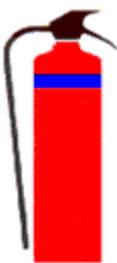
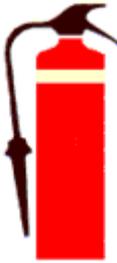
Fire Extinguishers

Portable fire extinguishers in the U.K. have in the past been manufactured to BS 5423:1987 which gave several options for the colour.

However, a harmonised European Standard was published on 15 May 1996. This standard, BS EN3: 1996 allows only one option. That is that all fire extinguishers should be red in colour but a zone of up to 5% of the external area may be coloured to indicate the type of extinguishing medium.

The fire extinguisher colours may be in “accordance with National Specifications”. In the U.K. this allows the existing colour scheme to be used for the 5% indication area. The BS EN will apply to the manufacture of new fire extinguishers and the old BS 5423 will be withdrawn at the end of 1996. Existing equipment will not need to be changed until they are replaced when they become unserviceable.

The colours currently used on fire extinguishers in the U.K are as follows:

RED (Water)	BLUE (Dry Powder)	CREAM (Foam)	BLACK (Carbon Dioxide)
			
Use on A type only	Use on A, B, C and Electrical	Use on A and B	Use on B and Electrical
For wood, paper, textile and solid material fires	For natural solids, liquid, liquid gases and electrical fires	For use on solids and liquid fires	For small, contained liquid and electrical fires
Do not use on liquid, electrical or metal fires	Do not use on metal fires	Do not use on electrical or metal fires	Do not use on Metal Fires

How fire extinguishers work

A fire extinguisher is quite like a giant aerosol can, often with two different substances inside. One of them is a solid, liquid, or gas substance for fighting the fire. The other one is called a propellant and is a pressurized chemical that makes the fire-fighting substance come out when you press the extinguisher handle. Next time you see a fire extinguisher, take a good look. Have you noticed that fire extinguishers are always really strong metal canisters? That's because the propellant is stored inside at a high pressure. Strong canisters are needed to stop the extinguishers exploding!

What type of fire extinguishers do I need?

It's important always to use the right extinguisher for the fire. Using the wrong extinguisher can put your life in danger and make the fire worse. For example, you must never use water extinguishers on electrical fires because you could electrocute yourself and the people nearby. If you're in the slightest doubt about tackling a fire, leave it alone and get yourself to safety.

There are four main types of extinguisher and they work in slightly different ways:

Water extinguishers, which are the most common, are essentially tanks full of water with compressed (tightly squeezed) air as the propellant to make them come out. Water extinguishers work by removing heat from the fire.

Best for:

Wood, Cloth, Paper, Plastics, Coal, etc.

Dry Powder extinguishers are tanks of dry powder with compressed nitrogen as the propellant. They work by smothering the fire: when you put a layer of powder on the fire, you cut the fuel off from the oxygen around it, and the fire goes out.

Best for:

Wood, Cloth, Paper, Plastics, Coal and solids, etc.
Liquids such as grease, fats, oil, paint, petrol etc.

Foam extinguishers (AFFF) are tanks of foam with compressed nitrogen as the propellant. They work by smothering the fire: when you put a layer of foam on the fire, you cut the fuel off from the oxygen around it, and the fire goes out.

Best for:

Wood, Cloth, Paper, Plastics, Coal and solids, etc.
Liquids such as grease, fats, oil, paint, petrol, etc

Carbon dioxide (CO₂) extinguishers contain a mixture of liquid and gaseous carbon dioxide (a non-flammable gas). CO₂ is normally a gas at room temperature and pressure. It has to be stored under high pressure to make it a liquid. When you release the pressure, the gas expands enormously and cools to make a huge white jet. CO₂ attacks the fire triangle in two ways: it smothers the oxygen and, because it's so cold, it also removes heat.

Best for:

Electrical apparatus and electronic equipment
Liquids such as grease, fats, oil, paint, petrol, etc.

Test it!

Keep your fire extinguishers in good working order by following the manufacturers' instructions and checking their condition once a week and arranging an annual maintenance check with a reputable Fire Engineer.

Why COSHH matters

Using chemicals or other hazardous substances at work can put people's health at risk, so the law requires employers to control exposure to hazardous substances to prevent ill health. They have to protect both employees and others who may be exposed by complying with the Control of Substances Hazardous to Health Regulations 2002 (COSHH).

COSHH is a useful tool of good management which sets eight basic measures that employers, and sometimes employees, must take. These are set out in this leaflet with a simple step-by-step approach which will help you to assess risks, implement any measures needed to control exposure and establish good working practices.

If you as an employer fail to adequately control hazardous substances, your employees or others may become ill. Effects from hazardous substances range from mild eye irritation to chronic lung disease or, on occasions, death. This may:

- result in lost productivity to your business;
- leave you liable to enforcement action, including prosecution under the COSHH Regulations;
- result in civil claims from your employees.

There can be positive benefits to your business from carefully following through the requirements of COSHH:

- improved productivity as a result of using more effective controls (eg less use of raw material);
- improved employee morale;
- better employee understanding and compliance with health and safety requirements.

Hazardous substances include:

- substances used directly in work activities (eg adhesives, paints, cleaning agents);
- substances generated during work activities (eg fumes from soldering and welding);
- naturally occurring substances (eg grain dust);
- biological agents such as bacteria and other micro-organisms.

Where are hazardous substances found? In nearly all work environments, for example:

- factories;
- shops;
- mines;
- farms;
- laboratories;
- offices.

Effects of hazardous substances: Examples of the effects of hazardous substances include:

- skin irritation or dermatitis as a result of skin contact;
- asthma as a result of developing allergy to substances used at work;
- losing consciousness as a result of being overcome by toxic fumes;
- cancer, which may appear long after the exposure to the chemical that caused it;
- infection from bacteria and other micro-organisms (biological agents).

What COSHH requires: To comply with COSHH you need to follow these eight steps:

Step 1 Assess the risks Assess the risks to health from hazardous substances used in or created by your workplace activities.

Step 2 Decide what precautions are needed You must not carry out work which could expose your employees to hazardous substances without first considering the risks and the necessary precautions, and what else you need to do to comply with COSHH.

Step 3 Prevent or adequately control exposure You must prevent your employees being exposed to hazardous substances. Where preventing exposure is not reasonably practicable, then you must adequately control it. The advice in this leaflet, and in the other guidance it refers to, will help you to make correct assessments and to put the appropriate controls into place.

Step 4 Ensure that control measures are used and maintained Ensure that control measures are used and maintained properly and that safety procedures are followed.

Step 5 Monitor the exposure Monitor the exposure of employees to hazardous substances, if necessary.

Step 6 Carry out appropriate health surveillance Carry out appropriate health surveillance where your assessment has shown this is necessary or where COSHH sets specific requirements.

Step 7 Prepare plans and procedures to deal with accidents, incidents and emergencies

Prepare plans and procedures to deal with accidents, incidents and emergencies involving hazardous substances, where necessary.

Step 8 Ensure employees are properly informed, trained and supervised You should provide your employees with suitable and sufficient information, instruction and training.

What *is* a substance hazardous to health under COSHH?

Under COSHH there are a range of substances regarded as hazardous to health:

- Substances or mixtures of substances classified as dangerous to health under the Chemicals (Hazard Information and Packaging for Supply) Regulations 2002 (CHIP). These can be identified by their warning label and the supplier must provide a safety data sheet for them. Many commonly used dangerous substances are listed in the HSE publication *Approved Supply List. Information approved for the classification and labelling of substances and preparations dangerous for supply*, as part of the CHIP package. Suppliers must decide if preparations and substances that are not in the *Approved Supply List* are dangerous, and if so, label them accordingly.
- Substances with workplace exposure limits are listed in the HSE publication *EH40/2005 Workplace exposure limits*.
- Biological agents (bacteria and other micro-organisms), if they are directly connected with the work, such as with farming, sewage treatment, or healthcare, or if the exposure is incidental to the work (eg exposure to bacteria from an air-conditioning system that is not properly maintained).
- Any kind of dust if its average concentration in the air exceeds the levels specified in COSHH.
- Any other substance which creates a risk to health, but which for technical reasons may not be specifically covered by CHIP including: asphyxiants (ie gases such as argon and helium, which, while not dangerous in themselves, can endanger life by reducing the amount of oxygen available to breathe), pesticides, medicines, cosmetics or substances produced in chemical processes.

What is *not* a substance hazardous to health under COSHH?

COSHH applies to virtually all substances hazardous to health except:

- asbestos and lead, which have their own regulations;

- substances which are hazardous only because they are:
- radioactive;
- at high pressure;
- at extreme temperatures;
- have explosive or flammable properties (other regulations apply to these risks);
- biological agents that are outside the employer's control, eg catching an infection from a workmate. (If in doubt, please contact HSE for advice.)

For the vast majority of commercial chemicals, the presence (or not) of a warning label will indicate whether COSHH is relevant. For example, there is no warning label on ordinary household washing-up liquid, so if it's used at work you do not have to worry about COSHH; but there is a warning label on bleach, and so COSHH does apply to its use in the workplace.

Manual Handling

Lifting and carrying is a common cause of injury at work. Good manual handling techniques can significantly reduce the risk of injury.

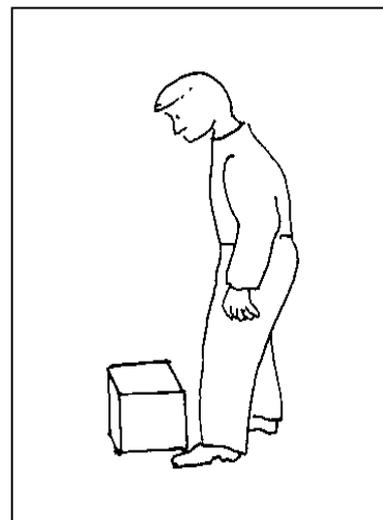
Almost all people at some time get involved in manual handling: this might even be carrying a pile of books, shifting a computer or moving equipment in an office or laboratory.

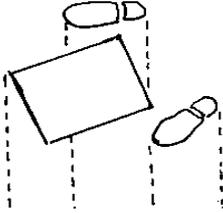
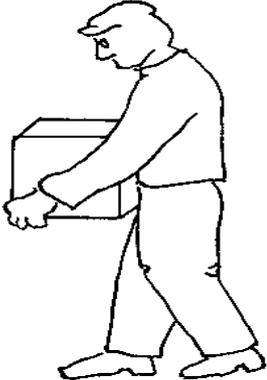
This guidance describes the basic techniques of good lifting practice to help you avoid unnecessary injury

Principles of safe lifting practice

Before You Start

- Think about the job
 - Does it need carrying, or can a trolley or other equipment be used instead
- Think about what you are going to do before you do it:
 - Where is the load going?
 - Does it need more than one person to lift it safely?
 - Is there enough room?
 - How can you avoid having to twist when lifting or putting the load down?
- Think about you
 - Are you dressed for the job? Tight clothing can restrict movement. High heels are never suitable.
 - Do you have a health problem that might make you vulnerable to injury
- If you are not sure of how heavy a load is, test it out before you try to lift it. Gently rock the load to test the weight and its distribution
- If you have not been trained, you should not



<p>lift >15Kg without advice from your local Manual Handling Assessor</p> <ul style="list-style-type: none"> • Remove any obstructions/tripping hazards from the route • Work out where and how to take a rest if moving a heavy load over a long distance • Are there any sharp edges? If so, then you may need to wear gloves to protect yourself • If load is too bulky, look at ways in which to break it down 	
<p>Lifting Technique</p>  	<ul style="list-style-type: none"> • Place your feet apart to make a stable base for lifting • Placing one leg forward in front of the other will help improve balance and control • If you have to reach out to the load, try sliding it towards you before attempting to lift it <p>If lifting from a low height, bend your knees, NOT your back</p> <ul style="list-style-type: none"> • Stand correctly, keeping your back straight and your chin tucked in • Keep your shoulders level and facing the same direction as your hips • Lift smoothly, avoiding jerking movements • Lift your head first – your back then straightens automatically • Grip the load with your palms, rather than just your fingers – If you need to change your grip, rest the load first. • Keep your arms close to your body to help support the load <p>Do not allow the load to obstruct your view – seek assistance if it is too large.</p>
<p>Moving the load</p> <ul style="list-style-type: none"> • When carrying, keep the load as close to the body as possible • Keep the heaviest side of the load closest to your body • When pulling or pushing, use your body weight to move the load – if possible, let the momentum of the load do some of the work e.g. when pushing trolleys • When pulling, keep your back straight and your arms as close to your body centre line as possible • Avoid twisting your body when turning 	

Organisational Policy

All organisations should have a specific safety policy on safe manual handling.

Any heavy lifting or carrying tasks which cannot be avoided by, for example, using lifting or transport equipment should have a risk assessment completed before it is carried out. The person in charge is responsible for this.

You should always follow instructions given on how to carry out a manual handling task in accordance with its risk assessment

If you are expected to lift or move loads in your work or studies, but are unsure whether the task is within your capabilities, speak with your manager/supervisor before trying.

If you have recently strained a muscle, or have a history of back problems, or there are other personal circumstances e.g. you are pregnant, which you think means a task is outside of your capabilities and/or requires a risk assessment, speak with your manager or supervisor.

Injuries or accidents

You must always report any injuries, accidents or near misses involving manual handling to your manager or supervisor.

What is pushing and pulling ?

Although you may think that the Manual Handling Operations Regulations only apply to the lifting, lowering and carrying of loads, they also apply to pushing and pulling. This "pushing and pulling" guide should help you comply with the regulations.

Pushing and pulling of loads is a way to avoid manual lifting and carrying of objects such as by putting the load on a trolley.

However, when people push and pull, for example trollies, there may be risk of other musculoskeletal disorders (MSDs), which you need to consider and eliminate or reduce.

Statistics on pushing and pulling from RIDDOR

Statistics can be seen below that give you an idea of how important it is to eliminate or reduce pushing and pulling risk factors.

- 11% of manual handling - related RIDDOR accidents investigated by HSE involved pushing and pulling.
- The most frequently reported site of injury was the back (44%).
- Followed by the upper limbs (shoulder, arms, wrist and hand) accounted for 28.6%.
- 12% more accidents involved pulling than pushing (where the activity could be identified within the reports).
- 61% of accidents involved pushing and pulling objects that were not supported on wheels (e.g. bales, desks etc.)
- 35% of pushing and pulling accidents involved wheeled objects.

Manual Handling Operations - Specific Risk Assessment

Department: Area & Location: Assessor(s):	Manual handling task(s):	
Can any aspects of the manual handling task be avoided or eliminated YES / NO ? If so how?		
Hazards to consider:	If YES Tick ✓	Action required to reduce risk of injury (if YES)
THE TASKS - do they involve <ul style="list-style-type: none"> • twisting the trunk? • holding loads away from the trunk? • stooping or reaching upwards? • long carrying distances? • strenuous pushing or pulling? • unpredictable movement of loads? • repetitive handling? • handling while seated? • insufficient rest or recovery time? • a work rate imposed by a process? 		
THE LOADS - are they <ul style="list-style-type: none"> • heavy (see weight guide)? • bulky or unwieldy? • difficult to grasp? • unstable or unpredictable? • harmful, e.g. sharp, rough or hot? 		
WORKING ENVIRONMENT- are there <ul style="list-style-type: none"> • constraints on posture? • poor floor surfaces? • variations in floor levels? • hot/cold/humid conditions? • strong air movement? • poor lighting conditions? • restrictions on movement or posture from clothes or PPE? • other hazards - obstructions, noise, chemicals 		
INDIVIDUAL CAPABILITY - does task <ul style="list-style-type: none"> • require unusual strength, reach? • endanger staff with a health problem? • endanger pregnant women? • call for special info, training or PPE? 		
Persons who are not permitted to carry out these tasks:		
Has a safe system of work been drawn up for this task?		YES / NO
Have all manual handlers been suitably instructed and trained?		YES / NO

Mechanical Handling

The use of pallet trucks and similar mechanical handling aids is becoming more and more common as risk assessments are used to reduce the incidents of manual handling injuries. (The best way to move something manually is to use a mechanical aid.) Some pallet trucks may have a Safe Working Limit weight capacity of three metric tonnes (3000kg) and as they might travel at a fast walking pace, a lot of damage can result if they run into or over someone.

Any piece of mechanical equipment that is used to aid manual handling is covered by the **Lifting Operations and Lifting Equipment Regulations 1998 (LOLER)**.

What equipment is covered by the Regulations?

Lifting equipment includes **any equipment used at work for lifting or lowering loads**, including attachments used for anchoring, fixing or supporting it. The Regulations cover a wide range of equipment including cranes, fork-lift trucks, lifts, hoists, mobile elevating work platforms (“cherry pickers”) and the vehicle inspection platform hoists you commonly find in garages.

The definition also includes lifting accessories such as chains, slings, eyebolts etc.

LOLER **does not** apply to escalators as these are covered by more specific legislation, i.e. the Workplace (Health, Safety and Welfare) Regulations 1992. If employees provide their own lifting equipment, then this too is covered by the Regulations.

What do the Regulations require me to do?

You need to ensure that in using any lifting equipment the requirements of LOLER are met. For example, you should ensure that all lifting equipment is:

- sufficiently **strong, stable and suitable** for the proposed use. Similarly, the load and anything attached (e.g. timber pallets, lifting points) must be suitable
- **positioned or installed to prevent the risk of injury**, e.g. from the equipment or the load falling or striking people
- subject to ongoing thorough examination and, where appropriate, inspection by competent people.
- **visibly marked** with any appropriate information to be taken into account for its safe use, e.g. safe working limits (SWL) must be clearly marked on the equipment. This takes many forms but may be a metal plate riveted in place, a large sticker placed on the handle or sides of a pallet truck or a stencilled set of information painted on somewhere. Accessories such as slings, clamps etc. should be similarly marked.

Additionally, you must ensure that lifting operations are planned, supervised and carried out in a safe manner by people who are **competent**.

A basic aspect of this is to check that the equipment is working correctly, and for pallet trucks this could be:

- a) Visual check for damage – are the tines parallel, are they damaged (crimped), are all of the wheels present, are they running free, are they cracked or chipped, are there any obvious signs of nuts or bolts missing or loose, are there oil leaks?
- b) Test the hydraulics work by raising and then lowering the forks without a load on them.

Before moving a pallet truck, sack barrow or similar equipment it is important to be aware of the following:

1. You have not exceeded the Safe Working Limits
2. The load is stable and not likely to move or slide off the pallet
3. The load is not so high that you can not see where you are going
4. The equipment has been checked for damage
5. You have a route planned – the safest shortest route that does not effect other people
6. The load is secured – wrapped or stacked so as to reduce the chances of items falling off

Whilst moving the load it is important to be aware of:

1. The load has not moved due to vibrations
2. The ground conditions – look for holes, uneven drain covers, cracks etc.
3. You remain in control –
 - do not push the load in front of you and then catch it up
 - you do not travel at such a speed that you can not stop if required
 - you do not corner at speeds that might make the load unstable
4. You remain uphill of the load when going up slight slopes – for instance from an outside yard into a building
5. Other people, either on foot or on fork lift trucks

If conditions are such that you have to stop quickly – someone has walked in your way – there are two basic methods for stopping a pallet truck:

1. Turn the handle **quickly** to the side, allowing the main rear wheel to act as an anchor
2. Release the load so it drops to the ground

As with all equipment, pallet trucks must be stored correctly between jobs, and they should be returned to a designated place after use, such as an area that has been clearly marked out for them on the floor.

If one is not available they should be left on a level surface, not block walkways, emergency exits, fire fighting equipment, electrical control boxes or gas valves that may need to be accessed if there is a fire or emergency.

They should be left with the forks down, to reduce the chances of people tripping over them, with the handle turned through 90^o to prevent it running off on its own if nudged.

Any damage must be reported to an appropriate person and other potential users informed.