OSHAssociation UK

Occupational Safety and Health Training

International Professional Certificate in Occupational Safety and Health

COURSE 101 GUIDE

FOUNDATION IN OCCUPATIONAL SAFETY AND HEALTH

Course 101 Guide

Foundation in Occupational Safety and Health

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Revision Question.

Many people are killed or severely injured while carrying out their everyday work activities. Others have to endure long term ill-health which came about merely because they were working in a particular place.

There is a well-established legislation and many tried and tested procedures designed to protect the workforce from unnecessary risks to their personal safety, health and general well-being. Even so, many people around the world still have to carry out their work in the presence of avoidable hazards and face high risk of injury and poor health.

Most workplace health and safety problems can, in fact, be avoided or the risk from them can be minimized to levels that are acceptable for the well-being of the people carrying out the work and for others such as customers, who may be affected by the work. To understand the whole subject better, let us consider some key words and phrases.

Key Words and Phrases

Control measures - the arrangements made or precautions taken to reduce risk.

Safety - freedom from danger.

Health - a state of complete physical mental and social well-being, not merely the absence of disease or infirmity.

Welfare – in the context of health and safety, the promotion of employee well-being and comfort by the provision of facilities such as those for personal hygiene, eating and resting.

Environmental Protection - a measure used to prevent harm to the environment.

Occupational health - a person's physical, mental and social well-being as a consequence of his or her work activities and environment.

Risk - a measure or scale of the likelihood that harm will arise from a particular hazard and the severity of the consequence of the hazards.

Hazard - a source of danger, anything, condition or circumstance that could cause harm to people or damage to property.

Well-being – a person's general good health, safety, comfort and contentment.

Work – activities that people carry out specifically in the course of their occupation.

Workplace – any place, or places, where employees, or the self-employed, are likely to work or where they have to go in the course of their employment.

Specific Meanings of Health and Safety

Everyone has a general idea of what is involved in the phrase health and safety at work, but it is important to understand the specific ways in which the words are used.

What Is Health?

Health can be defined as the soundness of the body. The World Health Organization defines it as the state of complete physical, mental and social well-being, and not merely the absence of disease or infirmity.
When considering health and safety at work, the word health is associated with

- The provision of such things as ventilation and lighting
- Conditions such as cleanliness, overcrowding and temperature levels
- Everyday practices in a particular workplace such as handling chemicals
- Procedures to deal with hazards, such as the exposures to dust fumes and biological agents

The lack of control of a work place or a work procedure involving health risk can lead directly to ill health or can give rise to conditions that, in turn, lead to ill-health.

What Is Safety?

Safety means freedom from danger or the risk of danger. The word is usually associated with injury and matters such as the:

- Construction, design, guarding and use of machinery and work equipment
- Handling of dangerous substances such as hot metals
- Construction, design and operations of lifting equipment
- Condition of the structure of workplace, such as floors, passages and stairs
- Means of access to a workplace and places within the workplace
- Employment of young people doing certain hazardous tasks
- Training of employees
- Provision of personal protective equipment

The lack of control of a workplace or work procedure can result in injury.

Environmental Protection?

The term “Environmental Protection” relates to the measures that are specifically focused on maintaining the general environment.

What Does Work Mean?

The word **work** covers the activities that people carry out specifically in the course of their occupation. The health and safety at work etc. Act 1974 says that work means work as an employee or as a self-employed person.

An employee can be described as an individual who works under a contract of employment. A contract of employment covers employment and apprenticeship and the contract may be spoken or written, specific or implied. A self-employed person can be described as someone who works for gain or reward on his or her own behalf, rather than under a contract of employment. A self-employed person may employ others.

The Act makes it clear that an employee is at work throughout the time that He or She is in the course of employment, but not otherwise. So employees are not at work when they are not engaged in activities that are within the course of their specific employment.

For example, if a factory worker is driving to work from home, he is not at work until he arrives at the factory and clocks in. However, if a sales representative has to visit clients away from the factory she could be regarded as being at work as soon as she leaves home on the journey to the client's base. The precise definition of when an individual is at work depends largely on his or her contract of employment.

Voluntary workers and those on work experience are also regarded as being employees as far as health and safety at work is concerned.

The Act explains that a self-employed person is at work throughout the time that he or she devotes to the work as a self-employed person.

Other Essential Terms

You will come across several other terms and phrases when you consider any aspect of health and safety at work. These include workplace, welfare, well-being, occupational health, hazard and risk. The next few paragraphs look at all these words one after the other.

What Is a Workplace?

A **workplace** is any place, or places where employees or the self-employed are likely to work or have to go in the course of their employment. (The definition is found in the safety representatives and safety committees' regulations 1977 and can be used to apply to other legislation.)

What Do Welfare and Well-Being Mean?

Although the word **welfare** is not defined in legislation, it is generally understood to refer to a person's comfort and well-being at work in relation t o s u c h t h i n g s a s temperature, lighting, air

quality, and personal hygiene provision all of which could become health issues. Welfare facilities covered by legislation include such things as the provision of drinking water, toilets, sanitary disposals and first aid equipment and facilities for washing, changing and storing clothing, eating and resting.

The phrase **well-being** (or wellbeing) is an everyday, rather wide-ranging, term indicating a person's general good health, safety, comfort and contentment.

What Is Occupational Health?

Occupational health covers the overall state of a people's physical, mental and social well-being at work as a consequence of their work. A wide range of workplace conditions and practices are usually associated with occupational health. They include air

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There are many examples of hazardous substances, objects, processes and procedures, some of which are covered in detail later in this course. Examples include work machinery and equipment, flammable substances; work at heights and lifting heavy objects. Some hazards, such as the use of harmful chemicals, have the potentials to cause long-term health consequences.

What is risk?

Risk is a measure or scale of the likelihood that harm will occur from a particular hazard and with severe consequences, which could be death, major injury, disease, minor injury, no injury or damage to property.

This means that risk cannot usually be measured in scientific terms. It is a matter of judgement in each circumstance whether something is a high risk or not.

As most circumstances are changeable, the skill is to take into account all the factors that can contribute to the degree of risk involved. This enables you to decide whether the risk is low, medium or high.

If the risk is low, then bad consequences are unlikely.

If something is a medium risk, then harm is more likely to arise- even so, it will probably not occur if reasonable precautions are taken.

If the risk is high, then the person making the assessment has to decide whether it is wise to carry out an activity in those circumstances or to introduce more controls to reduce the risk to a level that is acceptable.

Severity

The **severity** of the harm that could result from a hazard should always be considered when assessing risk. The severity of injury can include death, major injury, or disease, minor injury or disease and no injury or illness at all.

Distinguishing hazard and risk

Hazards exist all around us but many are extremely low risk so most of us get through most days without too much harm. Even so, there is no such thing as no risk and no such thing as complete safety. There is a risk in everything we do.

Take for example, using a pair of scissors. The hazards are the sharp blades and pointed ends. Most of the time, people use scissors without causing any sort of injury and most people will regard a pair of scissors as presenting a low risk. If they are not used correctly however, they could cause death - for example, sharp scissors could cut an artery and the person could bleed to death.

Even so, particularly hazardous and risky activities can be done with an acceptable risk. Take, for example, walking across Niagara Falls. Blondin did it in the nineteenth century. He would have accessed the risk by considering the weather conditions; wet or cold conditions would increase the risk of falling. He would have considered his skill as a light rope walker, the pole he used for balance and the specially designed clothes. He did this risk assessment to such a decree that he was successful several times. In other words, he had minimized the risk as far as he could.

Who is at risk?

If you were to walk around any high street shop, office or residential care home, you could identify most of the people who could be at risk from activities in those workplaces. The following examples show that there is a wide variety of group of peoples who are at risk from work activities.

In a shop, employees could be at risk when lifting boxes or working on ladders while cleaning light units. Customers could also be at some risk of being injured- by, for example, slipping on a liquid spilled from a bottle of soft drink. Children could be at risk from using play equipment or from climbing the steps to the toy department.

In an insurance office, employees operating the computers are at risk from eyestrain, backache and repetitive strain injury unless control measures are in place. Delivery drivers, who deliver copier papers and other office materials maybe unfamiliar with the layout of the delivery area, while employees could trip on the corner of the lowered tailgate of the delivery lorry. Just imagine that some rooms were being refurbished: the contractors could be at risk of cutting wall panels with power saws and they and the employees could be at risk if asbestos were stripped from the old heating pipes without the appropriate legal safety controls.

In a residential care home, residents may be at risk because they are frail and cannot walk very well. They could trip on a rucked carpet or a vacuum cleaner cable. They may also be at risk of scalding if the temperature of bath water is not thermostatically controlled and checked before the residents get into the bath.

Finally, there are occasional visitors to a workplace, such as electricity meter readers. VAT officers, Inland Revenue officers, health and safety inspectors or financial auditors. The degree of risk to which they are exposed to clearly depends on where they go in the workplace. If they visit only the offices, the risk is lower than when they visit a warehouse where fork lifting trucks are operating. Similarly, it is far riskier to read an electricity meter that involves going down steep steps to a basement than to read one in a well-lit entrance hall.

Other group of people may also be at risk. They include the self-employed, casual workers, agency workers, temporary staff, sales representative, delivery personnel, passengers in a train, patients in hospitals, prisoners in secure accommodation, pupils in schools and students in the universities.

What does health and safety at work involve?

Health and safety involve the prevention of injury and ill-health resulting from work. It involves the assessment and control of risk. The standard we apply depends on the degree of risk that is currently considered acceptable.

Some hazards can be eliminated, but there are many hazards that cannot be eliminated, so we must introduce controls that limit those risks. In fact, the main emphasis of contemporary health and safety control is to limit risk. Control measures are the arrangements made, or precautions taken, to reduce risk.

So, if we evaluate risk, we are then in a position to reduce it to an acceptable level for human health, safety and well-being whenever someone has something hazardous to do at work.

Who is involved in health and safety at work?

Everyone at work has the right to work in a healthy and safe environment. This is paramount to health and safety legislation. Everyone has a part to play in making work places safe and healthy.

The government set the framework for good health and safety in the workplace through legislation, guidance, enforcement, information, and education.

Employers (and their boards of directors) and the self-employed have obligations to provide a safe and healthy workplace by complying with legislations following guidance and providing information and training for employees about health and safety. Even the company is a sole trader without any employees; there are still legal duties to ensure that the company does not create health and safety problems for customers and the general public. Manufacturers and suppliers have obligations to produce and sell goods that will not harm those who distribute and use them.

Employees have a duty to follow health and safety rules and regulations to protect their own and other people's health and safety at work. Enforcing authorities and enforcement officers check that employers, employees, manufacturers and suppliers are abiding by the law.

So health and safety is essentially a working partnership- everyone working together with one aim. That aim is fewer injuries and less ill-health from work activities. In the end, safety in workplace is also critical to the success of running a business, no matter what size it is. Knowing and understanding how to implement health and safety legislation will help you to avoid the unnecessary cost and damage to a company caused by work-related injuries and illnesses.

Occupational health is the term used to describe the way that work can affect your health. According to the World Health Organization and the International Labour Organization, Occupational health is the promotion and the maintenance of the highest degree of physical, mental and social well-being of workers in all occupations. It involves preventing ill health, controlling risks and adaptation of work to people, and people to their jobs.

Key Words and Phrases

Acute health effects – rapid onset of severe symptoms of ill health, usually after a single short-term exposure to a harmful substance.

Aerosol – airborne droplet.

Bacteria – a very large group of microscopic single-celled organisms (independent life forms)

which may be essential, beneficial or harmful to human health. A small number of types of bacteria can cause diseases such as food poisoning and tetanus.

Carcinogen – a substance that can cause cancer

Carcinogenic – a description of something that can cause cancer.

Chronic health effects – symptoms of illness that may take a considerable time to develop, usually after prolonged or repeated low-level exposure over a long period.

Ergonomics – the study of the interaction between people and their work.

Fume – microscopic airborne particles produced when, for example, metals are heated during welding or as a result of certain chemical processes. A fume may smell foul and may be

irritating or toxic.

Gas – an air-like substance that expands freely to fill any space available, irrespective of its quantity.

Musculoskeletal disorders (MSDs) – conditions affecting the muscles, nerves, tendons, ligaments, joints, cartilage or spinal discs.

Occupational health – a person's physical, mental and social well-being as a consequence of

his or her work activities and environment.

Sensitisation – a process by which the body becomes sensitive to a substance after it has entered or touched the body.

Vapour – a gaseous form of a substance that is normally a liquid at room temperature.

Virus – an exceptionally small microscopic particle that can infect the cells of a host organism,

such as humans, and cause diseases, such as flu.

Identifying the problems

Occupational health is usually associated with illness and disease caused by work and workplaces. The causes of ill health and disease are sometimes difficult to understand and eliminate, and some illnesses associated with work take years to develop to a stage where they are recognized, even though there is much research being done to reduce occupational risks.

The management and supervision of occupational health involves:

- Controlling hazards that affect the body over a long period – for example, breathing in asbestos, fibres or sustaining a back injury from frequently lifting loads
- The surveillance of the factors in working practices that may affect employees' health – for example, exposure to noise or vibration.

Sources of Illness and Injury

Every day we handle articles and substances that can affect our health either in the short term or, in some cases, many years after being exposed to the substance.

Many people use chemicals in their workplaces. For example, in a school science laboratory, teachers, technicians and children use chemicals that may affect their health either immediately or much later. In offices, employees can be exposed to chemicals in printers or to cleaning materials that may cause skin problems. In a hairdressing salon, stylists may experience skin rashes from working with hair dyes and other treatments.

There are many other examples of potentially harmful aspects of work that can cause respiratory illnesses. Engineering workers can be exposed to fumes produced during metal welding, dust from cutting insulation materials or gases from an industrial process. Mechanics in a garage can be exposed to harmful paint sprays or damage to their hands as a result of regular contact with oil and other fluids used in vehicles. Maintenance staff can be exposed to asbestos when repairing a boiler in an old factory or in a house under renovation. Farmers can be exposed to dust and micro-organisms when handling hay and straw.

Other examples of a wide range of sources of ill health in the workplace are given in part 6 where particular hazards are described.

It is important to understand how these substances can enter the body and cause health problems, so that the routes and causes of ill health can be identified and safe systems of work designed.

The Effect on the Body

Chemicals and other harmful substances can enter the body very easily. They can do so in various forms, including:

- Aerosols
- Fumes
- Dust
- Fibres
- Liquids
- Vapours
- Gases

The ease with which this can happen depends on the substance's physical and chemical properties. For instance, the size of a fibre is important: the smaller it is, the deeper it can be breathed into the lungs. If a chemical is soluble in water (in other words, if it can dissolve), then it can react with the body's fluids.

The effects on health can be acute or chronic. **Acute** effects on health usually involve sudden and severe exposure and rapid absorption of a substance. These effects are often reversible – for example, carbon monoxide poisoning can be treated if the dose is not lethal.

Chronic health effects usually involve prolonged or repeated exposure over a long period. Depending on the substance involved, this could be days, months or years. Symptoms may take a long time to appear and might not be reversible – for example, benzene can cause cancer.

How do harmful substances enter the body?

Harmful substances enter the body in four main ways, by:

- Inhalation (breathing in)
- Absorption (through the skin or eyes)
- Ingestion (eating or drinking)
- Injection (puncturing the skin).

Inhalation

Breathing is the most common way that chemicals and other harmful substances get into the body. The nasal hairs filter large fibres and particles of dust, but smaller ones can be breathed deep into the lungs and can even find their way into the blood via the lungs.

When **vapours, gases, fumes** and **aerosols** are inhaled, they can easily find their way into the lungs and into the blood. Some particles of dust and fibre that are breathed in can become trapped in the mouth and throat. They may be dislodged and removed as a result of coughing, but they can be swallowed.

Absorption

Some solvents can be absorbed through the skin or through cuts and abrasions. Dust, fumes, aerosols, vapours and gases can affect the eyes. The fluids surrounding the eyes can react with the chemical, either causing an allergic reaction, or absorbing the chemical into the blood. Even simple skin contact by brushing against something can also result in a substance either being absorbed by the skin or affecting the surface layers of skin – touching some plants can cause rashes or blisters, for example.

Ingestion

Chemicals can get into the digestive tract via contaminated hands, foods or drinks. Particles of dust and fibre and traces of chemicals can be ingested by swallowing contaminated mucous that has come into the mouth from the lungs as a result of coughing.

Injection

Wood splinters and metal swarf are among the harmful materials that can puncture the skin and cause injury. Bacterial and viral illnesses can also result from needlestick injuries.

The Reaction to Harmful Substances

As the body responds to harmful substances, people experience the symptoms of illness.

The symptoms or effects can be described as:

- Irritation
- Toxic
- Sensitization
- Carcinogenic (causing cancer)

Irritation

The respiratory system reacts in different ways. The nose reacts to some harmful substances by sneezing, the throat by coughing; and the lungs by becoming inflamed, possibly resulting in bronchitis.

The skin can develop a rash or, in severe circumstances, dermatitis (inflammation of the skin). If a strong acid gets onto the skin, this can result in chemical 'burns' where the acid reacts with the body fluids and the skin itself is badly damaged. Chemicals, dust and fibres that get into the eyes can cause damage, ranging from severe irritation to blindness. People who work with plants – for example in horticulture, flower arranging, farming and forestry – may be affected by skin contact with plant sap which can cause a burning sensation and blistering after exposure to sunlight, and may lead to long-lasting skin discoloration.

Toxic

Some plants and fungi (mushrooms/toadstools) can cause food poisoning or death in extreme cases. Some chemicals, such as pesticides, are so toxic that they can poison the whole body if ingested in sufficient quantity.

Sensitisation

Exposure to some harmful chemicals, other substances and plants can cause sensitization. Although there may be no immediate signs of a problem after the first exposure to the substance, the body is prompted into an adverse reaction after subsequent exposures. Skin rashes, asthma, 'farmer's lung' coughing and sneezing are among the typical symptoms.

Some plants and foods contain chemicals, known as allergens that are harmless for most people who eat the food, but can prompt severe or even life-threatening reactions in few individuals.

Carcinogenic

Some chemicals and other materials, described as carcinogens, can alter the way cells grow in the body and can lead to cancer. For example, exposure to ethylene oxide – a colourless and odourless gas used in the production of solvents, and freeze, textiles, detergents, adhesives, polyurethane foam and pharmaceutical products – can cause leukaemia or other cancers.

The exposure to carcinogens is usually over a long period, and the symptoms of illness may not appear for a number of years.

Occupational Health Hazards

Occupational health problems can be categorized in various ways. They can, for example, be grouped as:

- Chemical – such as dust and gas
- Physical – such as noise and heat
- Ergonomic – such as stress
- Biological – such as tetanus and Legionnaires' disease.

The main hazards in the work place that can be regarded as occupational health problems, as opposed to those that can cause physical injury, are:

- Noise and vibration
- Ionising radiation
- Hazardous substances
- Biological hazards
- Drugs and alcohol
- Violence at work
- Work-related upper limb disorders and back problems
- Stress
- Passive smoking

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Noise and vibration

Excessive noise – either as short burst of loud noise or as longer-term exposure to lower level of noise – can lead to permanent noise-induced hearing loss or even total deafness. As well as any safety problems the impairment may cause, the loss of hearing may be extremely distressing physically and socially. Shipbuilding is an extremely noisy activity, it is an industry where hearing impairment has been a particular problem.

Machines such as road drills cause severe vibrations. The worker who has to operate one is exposed to that vibration, and this can cause back problems, damage to joints and circulation problems in the fingers known as 'white finger'.

Ionising radiation

Ionising radiation is used in nuclear reactors for electricity generation and in hospitals for radiography. Particles and rays are emitted in the form of alpha particles, electrons and x-rays, for example. They produce electrically charged ions in the substances they hit – a process known as ionization. If uncontrolled, the process can harm living things and humans especially by causing cell changes that lead to ill health, such as cancer, and mutations in unborn children.

Hazardous substances

Many substances commonly used in the work place can be hazardous to human health. As we have seen above, they can enter the body and react with it, leading to rapid poisoning or to a gradual increase in the concentration in the body, causing illness or even death.

Biological hazards

Some employees are exposed to a range of biological hazards that could cause them harm.

Viruses, bacteria and some plants and animals are included in this category. For example, sewer workers and water sports instructors are sometimes exposed to rats' urine, which may contain a bacterium that causes leptospirosis, a form of which is commonly known as Weil's disease. The hepatitis B virus, which can cause liver disease, is transmitted via human blood or other bodily fluids, so it is a danger to emergency workers and hospital staff including nurses, doctors, laboratory technicians, cleaners and porters.

Zoonosis are diseases that can be transmitted from animals to humans, such as bovine tuberculosis.

Drugs and alcohol

Drugs, alcohol and other substances misused at work can increase the risk of accidents, damage health, cause absenteeism and reduce productivity.

Drinking alcohol in moderation may have some positive benefits, but drinking excessively or in inappropriate circumstances can cause accidents and near-miss incidents. Drugs and other substance misuse (such as solvent abuse) at work has severe social and economic consequences for crime and for absenteeism and sickness, costing in excess of £20 billion a year.

Violence at work

Verbal abuse and physical attacks on employees can be a significant problem. People who deal directly with the public could have to face aggressive or violent behaviours, particularly if they work alone. They might be sworn at, threatened or even attacked. This can result in damage to employees' health through distress, anxiety, stress, pain and even disability or death. Business operations can also suffer – through low staff morale and high staff turnover.

Musculoskeletal disorders and back injury

Many types of work involve physical activity. Some require lifting and carrying loads that can cause damage to the back, strained ligaments and tendons, hernias and trapped nerves – **musculoskeletal disorders.**

Staff in occupations requiring repetitive work, such as keyboard operators and supermarket checkout cashiers, can be subject to repetitive strain injury. This type of injury is caused by repeated movements of the upper limbs and torso that can result in continuous pain from the joints, muscles, ligaments or tendons.

Stress

Stress at work can have a damaging effect on the mental and physical health of staff. The work environment, job design, relationship with employer and contractual conditions can all have an impact on an individual staff member. The symptoms of stress may range from loss of appetite, loss of weight, headache and backache, sleeping problems and indecision. These can lead, in turn, to ulcers and heart disease.

Passive smoking

In some countries employees are exposed to other people's cigarette smoke while they are at work. Bar, restaurant and office staff are just some of the people who breathe in the products of other people's cigarette-smoking. The effects of passive smoking are the same as those from actual smoking. Non-smokers who are exposed to smoke in the work place can also suffer heart disease, lung disease and circulation problems even though they themselves don't smoke. The ban on smoking in workplace in the UK, Ireland and other countries will prevent many workers from becoming ill.

How Can Work Affect Your Safety?

Every year hundreds of people in the UK lose their lives because of their activities at work, and thousands more suffer injuries of some kind. Yet accidents can be prevented indeed, the aim of the law is to prevent them.

In general terms, the purpose of safety in the workplace is to reduce the number and outcomes of accidents.

To be successful in preventing accidents in your own workplace, you need to understand the most common causes of accident, the apparent reasons why they happen and the underlying causes. First of all however, it is worth taking a quick look at what exactly an accident is.

Key Words and Phrases

Accidents – any unplanned events that results or could have resulted in personal injury or ill health, damage to or loss of property, plant or materials; or loss of business opportunities.

Ergonomic principles – the degree to which a particular job is designed to fit a person, usually by a combination of the management of job design, work station design, job rotation, training and so on.

Health and Safety Culture - the integration of health and safety awareness and control into day to day organizational management practices.

Incidence (near-miss or near-miss accidents) – an unplanned event that does not result in personal injury, death or damage but has the potential to do so.

Intervention programme – a series of actions designed to improve workplace health and safety standards and to reduce the risks of health and safety hazards.

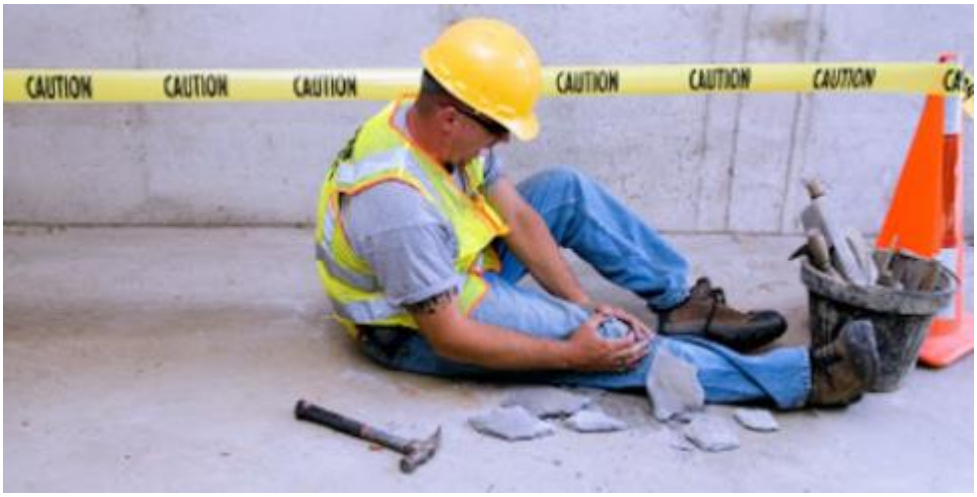
What Is an Accident?

Case law – the development and interpretation of law as a result of court decisions – has described an accident as an unlooked-for mishap or untoward event which is not expected, it is also an unexpected loss or hurt. What is clear is that an accident is an:

- Unplanned and uncontrolled event
- Event that causes injury, damage or loss
- Event that could lead to a near-miss accident or could result to no loss or damage at all.

Accidents do not just happen. They arise from uncontrolled events, usually from a chain of uncontrolled events.

For example, if a hair dresser is electrocuted by a hair dryer, a number of events and factors may have led to the electrocution. The hair dryer may have been poorly designed or poorly manufactured for example, it may have been used regularly for the last four years without being maintained, serviced or inspected, or because of its regular and intensive use, the securing screw to a live connection to the plug may have worked loose.



An important part of your job is to ensure that everything possible is done to prevent a loss of control that allows a chain of uncontrolled events to occur.

This takes planning, implementation and monitoring – actions we will discuss later in the book.

Outcome of an Accident

The outcome of an accident could be one or several of the following

- Death
- Personal injury
- Long-term health problems
- Damage to, or loss of, property and premises
- Damage to the environment
- No injury or damage at all

Studies of accidents show a pattern to the outcomes and most accidents do not result in injury or damage. These accidents are sometimes referred to as **incidents, near-misses,** or **near-miss accidents.**

In this book we use the word accidents for events that result to death, injury or damage, and we use the word incident or near-miss for events that result to low injury or damage.

The following two examples indicate the variety outcomes that are possible. Example 1 – water on kitchen floor

If someone slipped on a kitchen floor because water has leaked from a freezer that was being defrosted, the outcome could range from wet clothing and injured pride, to a fatal injury. The leaking water in combination with electricity could cause the freezer to break down, electrocute someone or lead to an electrical fire.

Employees could slip in the water and break a leg or burn themselves by catching a hot equipment or food. As the outcome of an accident may be difficult to predict, it is essential to deal with the underlying causes. In this example, it is important to control the defrosting of the freezer, so that water does not leak, it would prevent a wide range of potential outcomes.

Example 2 – falling load from crane

A metal beam is being installed in a building on an overhead crane. The securing chains holding the beam breaks. There are several possible outcomes:

- The beam hits the ground which is dry and absorbs the impact of the fall with no damage or injury occurring.
- The beam lands on a parked lorry – the driver is in the construction site office dealing with paper work and escapes injury but there is no considerable damage to the lorry and its load
- The beam lands on a pile of gravel, producing flying debris that causes cuts and bruises to people working close by
- The beam falls on a construction worker killing him outrightly.

The examples above show how difficult it is to predict the outcome of an accident. As you can see, you need to be concerned about all accidents and incidents, whether they result in injury or not.

All the above examples are necessary in other to use the information to identify the reasons why the accidents occurred and can then introduce control measures to prevent other similar accidents.

Why Accidents Occur

Two of the examples above indicate that most accidents and injuries happen because of the failure to control an activity. The control of activities is usually affected by:

- Occupational Factors
- Environmental Factors
- Human Factors
- Organizational Factors

Accidents and illnesses may result from the combination of any of the factors above, but the organisational factors give you the chance to influence the other three types of factors.

Ideally, tasks should be designed using ergonomic principles, so that employees can do their work without risk to their health and safety.

For example, a computer workstation, should be designed so that the operator is not subject to musculoskeletal disorder such as repetitive strain injury. The closer the task is designed to the individual, the lower the risk of an accident or injury.

Effective communication at all levels of the company hierarchy reduces the risk that an accident will occur. Effective control of working conditions also plays a significant part in reducing risk.

Occupational factors

These are issues most closely related to the specific work that an individual carries out. A machine operator, for example, may risk damaging his ability to hear, an abattoir worker may risk having a cut and a computer operator may risk having an eye strain.

The risks from specific tasks undertaken are likely to depend upon the:

- Degree to which a particular job is designed to fit the person doing it – ergonomic principles.
- Specific safety standards applied to work equipment used

Environmental factors

The conditions in which people's work can affect the level of risk to which they are exposed. For example, poor lighting can make it difficult to carry out many types of work and to spot hazards, while the air quality, temperature and humidity may affect the level and duration of someone's concentration.

The space available for carrying out particular tasks can also help staff to work easily and safely. Slips and trips
are examples of the type of accidents that could involve environmental factors.
The time available to do a job and the way in which it is done can also affect the degree of risk to the worker.

For example, if there is severe pressure to meet deadlines and the design of the work procedures is unrealistic for meeting those deadlines, there will be a very high risk that an accident will occur.

Human factors

Certain personal characteristics may have an influence on the level of risk a person is exposed to when at work. They include:

- General health and fitness, including physical capabilities, such as strength, suppleness, and co-ordination.
- Mental capabilities, such as general intelligence and the ability to recognize hazards.
- Skill level
- General attitude towards safety and general awareness on safety
- Inexperience of work or the workplace or both.
- The influence of drugs or alcohol
- Fatigue

Day dreaming can be a factor leading to an accident. If your mind is wondering or you are thinking about things other than what you are doing, you may not notice things around you, and you may bump into something and hurt yourself.

Organisational factors

Organisational factors which may influence the risk that an accident will occur include the:

- Safety standards, precautions and procedures that are enforced and encouraged by an employer.
- Effectiveness of communication between the employers and employees
- Effectiveness of communication between individual employees and group of employees

- Level of training, advice and supervision.

Safety standards are often set by managers on behalf of employers. Good communication system needs to be set up by managers of safety representatives for the use and benefit of all. Training and advice is determined by managers and supervisors with inputs from safety representatives. These matters are often implemented by supervisors of safety representatives.

The four types of factors mentioned above (occupational, environmental, human and Organisational) help to explain what lies behind the failure to control an activity.

The factors can be analysed so that changes can be made to reduce the likelihood of an accident. In practice, you need to identify the actual events and the chain of events that led to an accident, so that you can prevent such circumstances from recurring.

Accidents happen in many ways, but their typical causes can be divided into three groups:

- Unsafe acts
- Unsafe conditions
- A combination of unsafe acts and unsafe conditions.

Unsafe Acts

Examples of unsafe acts include:

- Using work equipment incorrectly
- Operating equipment or using hazardous chemicals without being trained and authorised to do so
- Operating dangerous machines without guards in place
- Using damaged or defective work equipment
- Lifting loads in an unsafe manner
- Failing to use personal protective equipment where it is provided and necessary
- Using dangerous chemicals without taking proper precautions
- Loitering around or deliberately misusing safety equipment, such as fire extinguishers
- Taking drugs or drinking alcohol

Unsafe Conditions

Examples of unsafe conditions include:

- Inadequate maintenance of work equipment
- Poor environmental conditions, such as high or low workplace temperature, high humidity, dust or other reasons for poor air quality, noise or low level of lighting or glare from lighting, and poorly designed buildings for the type of work being carried out.
- An untidy workplace
- Broken or unsuitable machine guards
- Poor construction and designs of machinery
- System of work that fails to take safety sufficiently into account
- Loose or unsuitable clothing
- Poor fire warning systems
- Exposure to radiation

Combination of Unsafe Acts and Unsafe Conditions

There is a much higher risk that accidents will happen if unsafe acts and unsafe conditions occur at the same time. For example:

- Using a machine with a broken guard in a poorly lit work room
- Using a damaged electric drill with a loose live connection in wet conditions
- Using a pallet-truck to lift boxes in a crowded and untidy store room where a carton of milk has been spilt

Underlying Reasons for Accidents

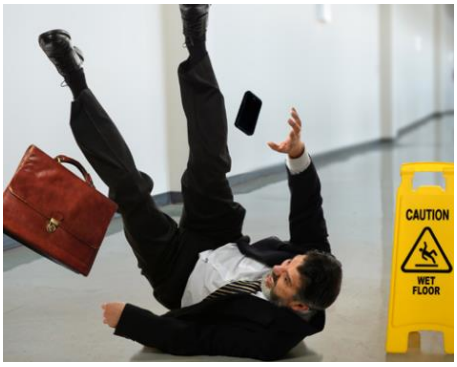
The factors and events, or chain of events, mentioned above are the tangible signs of why accidents happen. There are however, less visible, underlying causes of accidents that are mainly due to failure of health and safety management systems.

Where there is a poor health and safety culture in a workplace, safety is regarded as a low priority
– for example, where there is no health and safety policy, no organisation or arrangement for health and safety, no training policy, no health and safety procedure and no one is given a responsibility for health and safety matters. Poorly controlled work activities and bad attitude towards health and safety among the work force are likely to lead to more accidents that will occur in a workplace.

There is a low risk of accident in an organisation with a strong health and safety structure, for example, where there is a clear and genuine management commitment to good health and safety standards and there are records kept of training activities, eye testing, risk assessment, display screen equipment assessment and accidents and near-misses. This can be described as a living health and safety system.

In contrast, in a blame culture an individual is made a scape goat for an accident, but it is rare for someone to intend to cause an accident and the real blame usually lies with underlying causes – mostly, the Organisational poor management of the workplace.

What is the Cost of Accidents and ill Health at Work?



Accidents and ill health at work can have a substantial effect on individuals and the organisations they work for – lives are lost, people are injured or become ill, money is wasted, machinery is damaged, products are rejected and reputations are lost.

About 2.3 million people a year suffer from ill health caused by work, and more than 1 million people are injured at work. More than 7 million working days are lost every year when people take time off because of work-related illnesses and injuries.

Key Words and Phrases

Accident – any unplanned event that results or could have resulted in personal injury or ill health, damage to or loss of property, plant or materials, damage to environment, or loss of business opportunities.

Musculoskeletal disorder (MSDs) – conditions affecting the muscles, nerves, tendons, ligaments, joints, cartilage or spinal disk.

The Cost of Accidents and Ill Health

The cost of **accidents** and ill health may be counted in hard cash and in non-financial terms. Basil Butler, a former managing director of BP Plc, summed it up when he said, prevention is not only better but also cheaper than cure….. Profit and safety are not in competition. The health and safety executive personnel was even more succinct when he coined the slogan "good safety is good business".

The next few paragraphs look at the cost of workplace accidents and ill health to employees, their families and close friends, members of the general public and employers

Cost of injuries and illnesses to employees

The cost of workplace injury and illness to employees include:

- Personal injury or death
- Pain and suffering
- Loss of earnings
- Loss of quality of life

Cost to employees' close friends and families

The people closest to employees who suffer a workplace injury or illness may experience:

- Distress and grief
- Anxiety
- Loss of earnings while they look after the sick or injured person
- Loss of quality of life

Cost to the general public

The costs to members of the public involved in an accident connected to work activities include:

- Personal injury or death
- Pain and suffering
- Loss of earnings
- Loss of quality of life
- Medical cost

There are also social costs to the public because of NHS costs, sickness, injury and unemployment benefits, and increased cost of goods and services.

Cost to employers

The cost to employers can be considered as direct and indirect cost

Direct cost

The direct cost of accidents and ill health to an employer include:

- Damage and repairs to building, vehicles, machineries or stock
- Legal cost
- Fines (criminal court case)
- Compensation (civil court case or agreed compensation)
- Loss of product
- Sick pay
- Overtime payment
- Employee medical cost
- Claims on employers liability and public liability insurance
- Increased insurance premiums

Indirect cost

The indirect cost of accidents and ill health can spread far beyond the immediate obvious cost and may include:

- Business interruption – for example, loss of output and contract penalties for delays
- Product liability payments
- Unbudgeted time and money spent because of the accident and occupational health investigations
- Loss of goodwill between employees and management
- Loss of consumer confidence
- Damage to corporate reputation
- The hiring and training of replacement staff
- Loss of expertise
- Clean-up cost

Research indicates that back pain is a problem for nearly two-third (63 percent) of small businesses. One in five people working in small firms have back strain. The average small firm are said to be losing 22 days of work a year from employee back strain.

A woman tripped over a delivery ramp and injured her shoulder so that she needed two weeks off work. Her employer calculated the cost of the accident to be about £15,000

Working out losses due to accidents and ill health

You can work out the cost of accident and ill health to your organisation by looking at the cost of each accident or incident in your workplace under some of the headings given below. They are not comprehensive and you may see that there are other costs to be considered.

Budget headings

You may need to account for the payment of the ill or injured employee who is off work and for the cost of employing replacement workers. Overtime payment to recover lost production may need to be included as well as any penalty for a failure to meet contracted deadlines.
The investigation of the accident in itself incurs cost, such as the time of the people carrying out the investigation and meeting with enforcement officers.

There may be cost involved in restarting stopped work – for example rescheduling work programs, redesigning work procedures, cleaning up the site of the accident or incident, repair cost and the cost of hiring work equipment to replace any that was damaged. There may also be the cost of dealing with prosecution by the enforcing authorities. These may include legal fees, fines and the staff time to deal with the case. There may also be compensation cost in the case of a civil claim.

Types of injury or ill health

In addition, or as an alternative, you could look at the cost of a particular type of injury, such as the number of people who suffer back pain in your organisation or the number of people affected by wood dust in a wood working company. You could look at the causes of back pain or the reasons why the concentration of the dust in the air is excessive and the cost of it to your organisation. You could then look at how you can reduce the cost of injuries or ill health by introducing appropriate control measures.

The Bigger Picture

Good health and safety standards are legal requirements, and most people would say that they are ethically desirable. In addition, high standard of health and safety can help reduce cost to an organisation, particularly if the health and safety system is part of the comprehensive management control system. In contrast, poor health and safety can lead to excessive cost and could even result to the failure of business.

Reducing these losses can be achieved by developing and promoting a health and safety culture.

Watch out this accident scenario and the solution

Simple Controls

Effective controls need not be complicated or even costly. For example, a study of accidents in one factory recorded 6 major injuries, 31 requiring first aid and 888 non-injury accidents. These led to substantial financial losses, which were 1.4 percent of operating costs.

The study found that a large number of the accidents occurred around the start of the shift at six o'clock in the morning when repair staff, such as electricians and mechanics were not available. In fact, the repair staff did not have to report for work until 8 o'clock. Operations continued despite repairs being necessary. The lack of repair made the operations more dangerous.

The simple control measure was to train a number of machine operators in preventive maintenance they could do themselves. This made the operation safer. The number of accidents dropped significantly because these staff were able to carry out small repairs which would previously have waited until the repair staff came in.

Revision Question

Do the following quiz to evaluate your performance of study and review with your course tutor.
Good starting for you:-)

1.Differentiate between an accident from an incident?

2a. What are the possible causes of accidents in a workplace?

2b. What are the solutions?

3. Define the following terms:

Safety:

Health:

Environmental Protection:

Welfare:

4. List four (4) ways harmful substances enters the body