International Health and Safety at Work

Unit IG1 - Management of health and safety

Unit IG2 - Risk assessment

SAMPLE MATERIAL

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RMS PUBLISHING

1.1 MORALS AND MONEY

GENERAL ARGUMENT

The main reasons why organisations should manage workplace health and safety are:

Moral and financial reasons provide a strong motivation to promote good health and safety standards.

CASE STUDY

Effect of a serious accident/incident at work

A 32 year-old engineer fell 5 metres from a ladder while doing maintenance work on a building. He suffered major injuries to his head, arm and back when he hit the ground. He was taken to hospital where he remained unconscious for 24 hours and had surgery to repair the fractures he had suffered. He spent many days in hospital receiving treatment for his injuries.

The engineer's manager had to tell his family that he had been injured and was in hospital as a result of the fall at work. His manager said "It was really difficult to tell his family knowing that he was one of my workers. I knew his family well and felt that I had let them down by letting him get injured. It was hard to tell his wife and although his three young children did not understand I could see they were very upset to know he was in hospital."

His wife spent all her available time at the hospital with him. She shared the pain and emotional stress of his injuries. His condition affected everyone in the family. His wife said "One of his sons did not recognise him because of his injuries. I think it was very hard for them to see him like that."

The engineer used to bicycle to work every day. Although he had received treatment for his injuries and a long programme of exercises to improve his mobility the damage to his spine meant that he had difficulty in walking. He could no longer use a bicycle and would not be able to walk without a walking stick. This meant he could not return to his previous job.

The engineer said "I was once fit and healthy, now look at me, all because I didn't have the right equipment to work at height safely."

CONSIDER

Consider the case study and identify three human effects or consequences that came from the incident.

MORAL EXPECTATIONS OF GOOD STANDARDS OF HEALTH AND SAFETY

SUMMARY

Workplace injuries and ill-health can result in a great deal of pain and suffering for those affected. A worker should not have to expect that, by coming to work, their life is at risk. They should also not expect to be affected by hazardous substances that could shorten their life or cause long-term harm. Nor should others be adversely affected by work activities. Ensuring good health and safety standards at work may therefore be seen as the right way for organisations to conduct themselves and harming people through work activities as the wrong way.

Taking care not to harm people through work activities is a widely accepted custom of conduct and the right thing to do. This is reflected in many of the world's religions and cultures. This moral reason to prevent harm is usually further reinforced by societal expectations of behaviour, which requires the consideration of others that may be affected by interaction with them. In particular this includes work activities and how they may harm those involved or affected by the activity. This societal expectation is often expressed in both civil law and criminal law as, without the potential for litigation or regulatory action, many employers would not act upon their moral obligation to provide protection. In many countries, it is a specific legal requirement to safeguard the health and safety of workers and others that might be affected by an employer's work activities.

DISCUSSION

The moral reason for achieving good standards of health and safety in work activities is founded on the desire to prevent harm to those that may be affected by the work activities. This is a very important reason as, globally, so much harm is regularly caused to workers and others. The size of the health and safety problem internationally is difficult to fully quantify in terms of deaths, injuries and incidence of work related ill-health as data is reported in different ways in different countries. The ILO has estimated that globally there are 2.3 million work-related deaths or diseases each year. Men suffer two thirds of those deaths. In addition, it is reported that there are 340 million accidents/incidents at work each year. The ILO estimates that 160 million people are suffering from work-related illnesses. The biggest groups of work-related dis-

No.	Hazard identification	Associated risks	Persons at risk	Existing controls	Likelihood	Severity	Current risk rating	Comments and actions

Figure 3-49: Risk assessment form. Source: RMS

with a high-risk rating, may require a more detailed explanation or there may be a series of alternative actions. Information on risk assessments and any controls must be brought to the attention of those assigned the task of work. Risk assessment information should be included in lesson plans to ensure items are not missed when staff are trained or retrained.

CONSIDER

Step 4: Record your findings and implement them.

Putting the results of your risk assessment in to practice will make a difference.

Writing down the results and sharing them with your workers will encourage you all to make a difference.

Remember, prioritise and tackle the most important things first. As you complete each action, tick it off your plan.

REASONS FOR REVIEW

The risk assessment should be periodically reviewed and updated. In addition, a review of risk assessments should be carried out following any significant changes to a workplace. Examples of circumstances that would require the review of the validity of a risk assessment are:

Internal to the organisation

- When the results of monitoring, for example, routine analysis of accident and ill-health reports, damage accident reports, and 'near-miss' reports are adverse and not as expected.
- Following the findings of an accident investigation.
- Following consultation with workers.
- Following internal health and safety audits.

Internal changes

- A change in process, work methods (introduction of shifts) or materials.
- Changes in personnel.
- The introduction of new plant or technology.

External to the organisation

- Changes in legislation, for example, work exposure limits.
- New information becoming available from research, for example, identification of new asthma sensitisers.
- Following enforcement action that called into question the health and safety of a process.
- Third party health and safety audits.

Periodic review

As time passes the risk assessment should be periodically reviewed and updated. The validity of risk assessment should be monitored through a combination of monitoring techniques such as:

- Preventive maintenance inspections.
- Health and safety representative/committee inspections.
- Statutory and maintenance scheme inspections, tests and examinations.
- Health and safety tours and inspections.
- Occupational health surveys.
- Air monitoring.

CONSIDER

Step 5: Review and update your assessment

Few workplaces stay the same. New equipment, substances and procedures could lead to new hazards. Review should be carried out at least annually.

Look at your risk assessment again. Have there been any changes? Are there any improvements you need to make?

Have your workers spotted a problem?

Have you taken account of any accidents or near misses?

APPLICATION OF RISK ASSESSMENT FOR SPECIFIC TYPES OF RISK AND SPECIAL CASES

EXAMPLES OF WHEN SPECIFIC RISK ASSESSMENT METHODOLOGIES ARE REQUIRED

The general approach to risk assessment described previously is likely to be adequate for the identification and assessment of general risk in a workplace. However, some specific types of risk and special cases may require an enhanced approach where by specific factors are considered. For example, it is generally accepted

Figure 4-9 (a) Accident. Source: UK HSE, HSG45

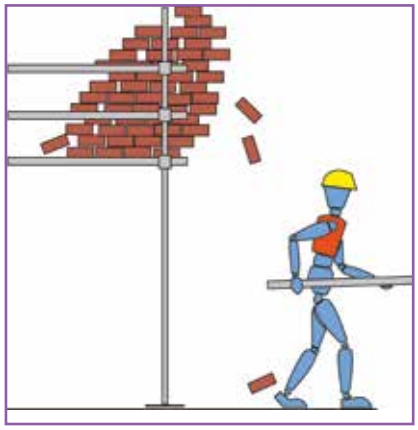

Figure 4-9 (b) Near-miss. Source: UK HSE, HSG45

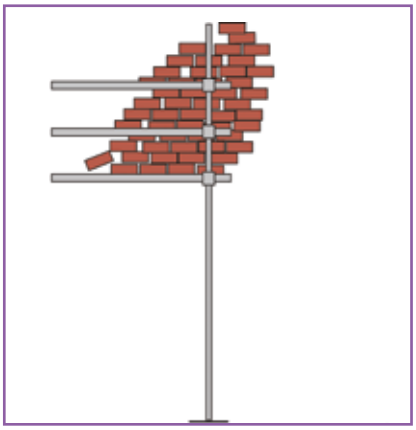

Figure 4-9 (c) Unsafe condition Source: UK HSE, HSG45

REACTIVE MONITORING METHODS

These methods are deemed to be after the incident and are therefore reactive monitoring measures:

- Identification.
- Reporting.
- Investigation.
- Collation of data and statistics, on the undesired events.

These reactive monitoring methods are nearly always limited to measurement of the extent of failure of health and safety management arrangements and procedures (if we ignore unforeseeable events which may affect the business, for example, severe weather, flooding, fire spread from a third party). For example, historical records to show:

- Accidents/incidents, for example, resulting in lost time, physical injury.
- Dangerous occurrences, for example, significant damage to plant, equipment or facilities.
- Near-misses, for example, accidents/incidents with no measurable loss.
- Ill-health, for example, resulting from exposure to substances or repetitive actions.
- Complaints by workforce, or contractors, for example, headaches, acne, blanched fingers.
- Worker absence statistics.
- Worker accident/incident and injury statistics compared with national averages for the same sector of employment
- The extent of lost profits arising from damaged goods, lost production time and reduced output following a health and safety failure.
- Enforcement action, for example, issue of verbal instructions or written notices by an enforcement agency.

It is important to identify, in each case, why performance was substandard. Trends and common features may be identified, such as when, where and how these events occur. This provides an opportunity to learn and put into place improvements to the overall management system and to specific risk controls.

INCIDENT STATISTICS

Many organisations spend considerable time developing data on their health and safety performance based on a variety of incidents, including accidents, dangerous occurrences, near-misses and ill-health information. Whilst there is value in doing so it has the limitation of being after the incident. Incidents must occur to get the data, thus tending to influence effort to prevent a recurrence rather than action to prevent the event.

A low incident rate is not a guarantee that risks are being effectively controlled. In some cases, this might be a matter of good fortune, or the fact that incidents are not being reported, rather than effective management.

If organisations wait until an incident occurs to determine where health and safety effort is required then some sort of loss will usually have occurred. In order to gain sufficient management attention this could be an incident

discussed earlier, a single very intense or explosive noise can damage the ear by dislocation of a bone or rupturing the ear drum. This is known as acoustic trauma. Background noise can also cause those with normal hearing ability to fail to hear warnings such as alarms, moving-vehicle warning horns, shouted warnings or instructions and other alarms that may sound.

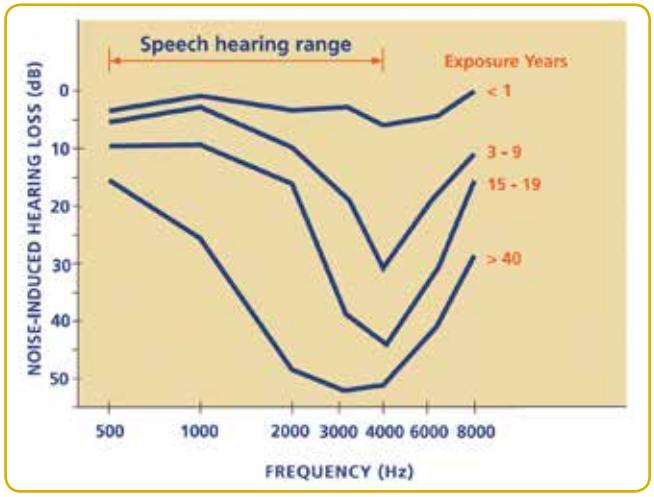

Figure 5-4: Effects of high levels of noise.
Source: Australia, SafeWork SA.

Psychological effects of noise

Noise is often linked with adverse psychological effects such as stress, sleep disturbance or aggressive behaviour. It is frequently cited as the cause of conflict between workers, particularly in a noisy office environment where some individuals may need to concentrate on complex issues, but they find this difficult or impossible because of background noise levels.

In addition, the loss of hearing in the speech hearing range leads to a feeling of isolation as the person affected cannot contribute so easily to conversations, and pastimes may become affected, for example, listening to music, radio and television.

REVIEW

1) **Describe** the possible effects on hearing from exposure to noise.
2) **Give** a definition of Temporary Threshold Shift.
3) **Outline** the causes of noise-induced hearing loss.

THE MEANING OF COMMON SOUND MEASUREMENT TERMS

Sound power and pressure

For noise to occur power must be available. It is the sound power of a source (measured in watts) that causes the sound pressure (measured in pascals, Pa) to occur at a specific point.

Intensity and frequency

The *amplitude* of a sound wave represents the *intensity* of the sound pressure. When measuring the ***amplitude*** of sound there are two main parameters of interest ***(as shown in figure 5-5)***. One is related to the energy in the sound pressure wave and is known as the 'root mean square' (rms) value, and the other is the 'peak' level.

We use the 'rms' sound pressure for the majority of noise measurements, apart from some impulsive types of noise when the peak value is also measured.

A sound can have a ***'frequency'*** or ***'pitch'***, which is measured in cycles per second (Hz). Frequency in this context represents the number of times in a given time period that the sound wave repeats itself.

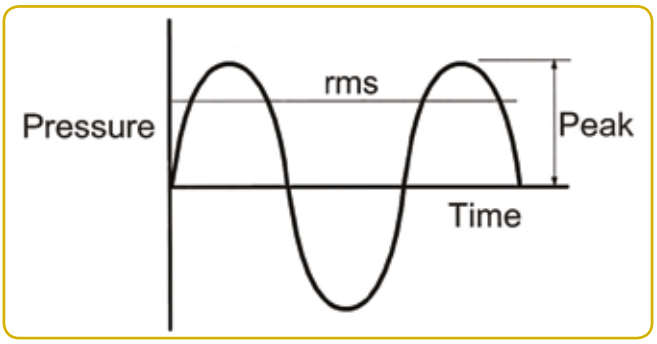

Figure 5-5: Rms and peak levels of a sound wave.
Source: RMS.

The decibel scale

Sound intensity or pressure is measured in a unit known as a pascal (Pa). The ear can detect pressures over a very wide range, from 20 µPa - 20 Pa. To measure in pascals therefore requires a very large range to exist and this is often inconvenient. A more helpful way of measuring sound is to use the decibel range. A decibel (dB) is a unit of sound pressure (intensity) measured on a logarithmic scale from a base level taken to be the threshold of hearing (0 dB). Typical noise levels are listed in ***figure 5-6***.

SOURCE	dB
CHAINSAW	120
SMOKE DETECTOR AT 1 METRE	105
MACHINE SHOP	90
RADIO IN AVERAGE ROOM	70
LIBRARY	30
THRESHOLD OF HEARING	0

Some typical noise levels for equipment used on construction sites are

Figure 7-2: Mould - Aspergillus. Source: National Geographic.

Figure 7-2 shows Aspergillus with its characteristic chains of spores emerging from the head. Moulds from the same family can cause ringworm and athlete's foot.

Bacteria

Bacteria are single-cell organisms. Most bacteria are harmless to humans and many are beneficial. The bacteria that can cause disease are called pathogens. Examples of harmful bacteria are leptospira (causing Weil's disease), bacillus anthracis (causing anthrax), and legionella pneumophila (causing Legionnaires' disease).

Figure 7-3: Bacteria - legionella pneumophila Source: European Hospital.

Viruses

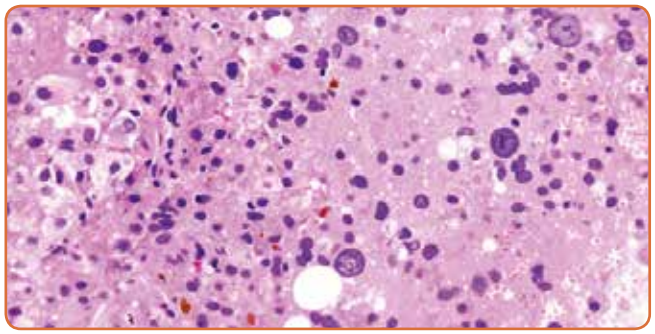

Figure 7-4: Virus - hepatitis C. Source: National Public Radio.

Viruses are the smallest known type of infectious agent. They invade the cells of other organisms, which they take over and where they make copies of themselves, and while not all cause disease many of them do. Examples of viruses are hepatitis, which can cause liver damage, and the human immunodeficiency virus (HIV), which causes acquired immune deficiency syndrome (AIDS).

DIFFERENCE BETWEEN ACUTE AND CHRONIC HEALTH EFFECTS

The effect of a substance on the body depends not only on the substance, but also on the dose and the susceptibility of the individual. No substance can be considered non-toxic; there are only differences in degree of effect.

Acute effect

An acute effect is an immediate or rapidly produced adverse effect following a single or short-term exposure to an offending agent, which is usually reversible (the obvious exception being death). Examples of acute effects are those from exposure to solvents, which affects the central nervous system, causing dizziness and lack of coordination, or carbon monoxide, which affects the level of oxygen in the blood, causing fainting.

Chronic effect

A chronic effect is an adverse health effect produced as a result of prolonged or repeated exposure to an agent. The gradual or latent effect develops over time and is often irreversible. The effect may go unrecognised for a number of years. Examples of chronic effects are lead or mercury poisoning, cancer and asthma.

Other common terms used in the context of occupational health are:

Toxicology

The study of the body's responses to substances. In order to interpret toxicological data and information, the meaning of the following terms should be understood.

Toxicity

The ability of a chemical substance to produce injury once it reaches a susceptible site in or on the body. A poisonous substance (for example, organic lead) causes harm to biological systems and interferes with the normal functions of the body. The effects may be acute or chronic, local or systemic.

Dose

The level of environmental contamination multiplied by the length of time (duration) of exposure to the contaminant.

Local effect

Usually confined to the initial point of contact. Possible sites affected include the skin, mucous membranes or the eyes, nose or throat. Examples are burns to the skin by corrosive substances (acids and alkalis), or dermatitis caused by solvents.

Systemic effect

Occurs in parts of the body other than at the point of initial contact. Frequently the circulatory system provides a means to distribute the substance round the body to a target organ/system.

The photographs ***(see Figures 10-24 and 10-25),*** show some of the damage caused by the Buncefield oil storage depot disaster in the UK in December 2005. The plume of smoke was so large it could be seen from space.

Figure 10-25: Buncefield oil storage depot disaster.
Source: Royal Chiltern Air Support Unit.

REVIEW

1) **Identify** the key components of the 'fire triangle'.

2) **Explain** how a machine that has not been properly maintained may cause a fire.

3) **Outline TWO** common causes of fire in a workplace.

10.2 Preventing fire and fire spread

CONTROL MEASURES TO MINIMISE THE RISK OF FIRE STARTING IN THE WORKPLACE

Elimination and reduction of flammable and combustible materials

Where possible, employers should seek to ***eliminate*** the use of flammable materials in the workplace, for example, replacing adhesives that have a flammable content with those that are water based or to ***substitute*** the highly flammable with less flammable substances. Where this is not possible, the amount used should be ***reduced*** and kept to the minimum. Flammable and combustible materials in the workplace must be stored in suitable containers and minimum quantities for immediate work needs. Flammable materials not in use should be removed to a purpose-designed store in a well-ventilated area, preferably outside the building but in a secure location. Lids should be kept on containers at all times when they are not in use. Any waste containers, contaminated tools or materials in the workplace should be treated in the same way and removed to a store in fresh air until they can be dealt with.

It is important to reduce the presence of flammable and combustible materials by preventing an accumulation of waste. Waste in work areas should be removed to suitable collection points and then removed to controlled areas ready for recycling or off-site disposal. The efficient handling of waste should ensure that materials are minimised at each stage of handling – in the work area, waste points or controlled waste-handling areas. It is important to remember that containers and contaminated materials also need to be disposed of in a controlled manner so that they do not present a risk of fire. Care has to be taken to control the delivery and therefore the storage of flammable and combustible materials to site. Where possible, deliveries should be staggered to reflect the rate of use in order to minimise the amount stored on site.

Control of ignition sources

Hot work

'Hot work' is any process that can be a source of ignition, including welding, cutting, grinding, brazing and soldering processes. Hot work has been responsible for causing many fires.

One of the most tragic fires caused by hot work was Düsseldorf airport fire in 1996. The fire was started by welding on an open roadway and resulted in damage in excess of €339 million, several hundred injuries and 17 deaths. It is imperative that good safe working practices are in place. Combustible materials must be removed from the area or covered over. Consideration must be given to the effects of heat on the surrounding structure, and to where sparks, flames, hot residue or heat will travel.

Suitable fire extinguishers need to be immediately available and operatives must know how to use them. The work area must be checked thoroughly for some time after the completion of work to ensure there are no smouldering fires. A person should be appointed as a 'fire watcher' to ensure no fires result from hot work while the work is taking place and for some time after. Strong consideration should be given to the use of work permits to control hot work.

Welding and brazing

Welding and brazing activities represent a significant ignition source from the naked flame of an oxy-acetylene torch or electric arc welder and from the hot materials created by the process, for example, recently welded material that remains hot for some time, or from sparks created in the process. In addition, the equipment can represent an explosion risk if it is used incorrectly or not fitted with proper protective devices.