UNIT-3 COSHH Risk Assessment

Learning Outcomes
By the end of this unit the learner will be able to:
• Confidently conduct a COSHH risk assessment • Discuss each of the five main stages in the COSHH risk assessment process • Determine what should be done about the risks and threats discovered during the course of the assessment

Unit 3

COSHH Risk Assessment

The Assessment Process

A COSHH assessment helps you to identify the hazards and risks from hazardous substances in your workplace. Simply put, it's a thorough risk assessment that concentrates on your workplace's exposure to hazardous substances. You only need to carry out a COSHH assessment if hazardous substances are likely to be present in your workplace.

There are 5 Steps to a COSHH Assessment:

1. Gathering information about the substances, the work and the working practices (or finding out what the problems are).
2. Evaluating the risks to health (or looking at the problems that are found).
3. Deciding on the necessary measures to comply with regulations 7-13 of COSHH.
4. Recording the assessment.
5. When the assessment needs to be reviewed.

Figure 1: *The essential structure of COSHH assessment*

Note *Bold figures refer to paragraph numbers*

Gathering Information about the Substances, the Work and the Working Practices

Decide Who Will Carry out The Assessment

It is important to involve employees in the assessment process. They have the most direct knowledge of how work is carried out. Their information is vital to an employer to ensure assessment that reflects work as it really happens, rather than as it should. It also promotes the commitment of employees to precautions established by the assessment.

Identify the Substances Present or Likely to be

Think what hazardous substances might be present in the workplace

Substances hazardous to health include: gases, vapours, liquids, fumes, dusts and solids and can be part of a mixture of materials. Consider also what micro- organisms may be present (including the microscopic eggs and larval stages of some larger parasites).

- Find out what substances are coming into the business and where they are used, worked on, handled or stored; all should be accounted for. Check stock lists.
- Think what substances might be produced during any process as intermediates, by-products or finished products or what might be given off as wastes, residues, fumes, dusts etc.
- Think what might be transported, collected, poured, weighed, packed, discharged or disposed of.
- Remember that substances are used in, or arise from maintenance, cleaning, repair work, research or testing laboratories etc. They can also arise from work on the structure of the building, eg removal of insulating materials or sandblasting during facade cleaning.

How can Hazardous Substances be recognised?

Examples of hazardous substances associated with certain work activities

Office Work

Photocopier toner and developer fluids
Domestic cleaning materials:
- Bleach
- Toilet cleaner
- Window cleaner
- Furniture polishes
- Floor cleaners

Substances found in maintenance departments:
- Paints
- Solvents
- Biocides
- Lubricating oils

Ozone generation from photocopiers
Flysprays, mouse poisons and other pest control substances

Boat Building

Wood dust
Paints
Fibreglass resin (fumes and resin)
Glass resin
Welding fume
Solvents
Diesel and diesel fumes
Varnishes
Adhesives
Pesticides (anti-fouling paints, timber preservatives etc)
The disease leptospirosis
All the substances found in offices

Identify How the Substances are Hazardous

Think whether each substance is in a form in which it could be:

- Inhaled;
- Swallowed (either directly or from settling on food etc or from eating food with contaminated fingers);
- Absorbed or introduced through the skin or via the eyes (either directly or from contact with contaminated surfaces or clothing);
- Injected into the body by high pressure equipment or contaminated sharp objects.

Pesticides

These substances can enter the body through most routes and there is ample opportunity for them to do so.

- Ingestion - smoking/eating/drinking with contaminated hands or face.
- Inhalation - operator's (and other people's) exposure to spray drift or vapour during spraying, mixing, adjusting etc.
- Absorption - splashes on unprotected skin, especially during tank mixing or filling.
- Contact with contaminated clothing, surfaces or recently treated areas.
- Swallowing - blowing out blocked nozzles.

Hydrogen Sulphide

This gas occurs in many confined spaces in potentially lethal concentrations. It poses a significant risk through inhalation, but is a negligible hazard via other routes. Assessment therefore requires minimal, if any, consideration of those other routes.

Check out all forms in which the substance may be present. Some substances can be virtually harmless in some forms (eg as a block of metal) while very hazardous in others (eg the same metal as a dust or fume).

What Effects Could They Have?

For each route of entry or contact identified, find out what sort of harm could result.

- Could serious effects or death, either immediate or delayed, occur from single exposures to the substances (ie the effects of acute exposure)?

Inhaling dangerous concentrations of cadmium fumes (eg when cutting or burning off cadmium coated steel) can result in severe short-term effects. A few hours after the initial exposure, increasingly severe respiratory and fever symptoms can follow and have been fatal in previous cases.

- Could adverse effects or death result from repeated, even low level, exposures over a period of time (ie the chronic exposures)?

Longer term exposure to cadmium fume and to a lesser extent dust (eg during cadmium battery or pigment manufacture) can adversely affect both the lungs and kidneys. Kidney damage is likely to appear first, but continued exposure can result in emphysema-like symptoms.

- Could there be both long-term and short-term effects? Some substances may have only acute effects and some chronic but, as the previous two examples show, others may have both.
- Could cancers occur?

It is not only in large, specialised chemical plants that carcinogens may be found. Used engine oils and cutting fluids from engineering processes are considered capable of causing cancer, normally due to skin contact. Consequently there is scope for exposure to carcinogens during vehicle repair and at machining operations.

- Could the substance cause sensitisation, allergic reactions or asthma?

Metalworking fluids and cutting oils used in engineering can cause dermatitis as can a number of the solutions used in hairdressing salons.

- Could the substance cause dermatitis?

Glutaraldehyde has been used as a sterilant in hospitals. It is a powerful irritant and those effects are immediately apparent to those exposed to it. It is also a respiratory sensitiser, but the onset of sensitisation is a more subtle process. Those who have been sensitised to it will suffer severe effects on exposure to minute concentrations, much smaller than those necessary to cause irritation. Exposure to glutaraldehyde can also cause asthma, as can a number of other substances, such as isocyanates used in paint spraying, flour dust and grain dust, wood dust, latex, colophony/soldering fume, laboratory animals, glues and resins.

- Could the substance be harmful to the human reproductive process?

Pregnant ewes are known to be carriers of a micro-organism known as Chlamydia psittaci. It can cause abortion in pregnant women.

- In the case of micro-organisms, could they cause infection or could an infected individual infect others?

Many people working with animals are at risk of infection with zoonotic diseases such as leptospirosis or Q fever. The risk of infected people passing those diseases to others is fairly small.

On the other hand, in hospitals clinical staff may come into contact with extremely dangerous micro-organisms such as hepatitis B. In this case the risk of an exposed individual spreading infection through the workplace is serious. In the same circumstances other diseases such as rubella or chicken pox may not be so immediately life-threatening, but the potential for spread of infection is high.

(These examples all affect the types of precautions which will need to be taken.)

Check the sources of information for indications of any enhanced harmful effects arising from work involving exposure to mixtures of substances. These can occur if people come into contact with two or more substances, either at the same time or successively. It may be

necessary to ask a competent toxicology or health adviser for further details.

Some hand cleansing gels can remove fats and natural oils from the skin. This increases the risk of absorption of hazardous substances through the skin. Gels may be suitable for use at the end of shifts, but they should not be used during them.

Find Out who could be Exposed and How

This can be organised in either one of two ways:

- Take different work activities and look at all the exposures in each; or
- Take different substances and see where exposure to them occurs across different activities.

For simpler cases, the latter substance-based approach may be successful, especially where few substances are involved, but it can be very wasteful in more complicated situations. For instance, automatically looking for a particular substance across many activities is pointless if the substance only occurs in half of them.

Divide the Work Up Into Manageable Chunks

Careful thought at this stage can save much effort in producing a satisfactory assessment. Hasty assessment will almost certainly result in unnecessary and wasted effort. Some forethought will enable similar types of risk to be identified, and conclusions drawn for one area are often, with minor amendment, applicable to others as well. Initial thinking will also make the relative priorities for assessment clearer. Obviously some matters will require more urgent consideration than others.

Divide the work into logical units in relation to the substances that are being worked with, eg departments, processes, different groups of people, different locations. Look at each of the units on its own. Walking through the workplace and looking at floor or process plans should help with this division.

A school could be divided into the following categories for COSHH assessment:

Maintenance	- grounds	- chemical application (including pesticides) - exposure to leptispira
	- buildings	- water treatment/heating - painting - woodworking - construction - cleaning - supplying and installing substances - swimming pool (chlorine system) - pesticide storage - pest control
Teaching	- technical subjects	- science - design and technology
	- non-technical	- general classroom (minimal concern)
Administration	- general office procedures	

If the work involves large numbers of substances, e.g. research laboratories, group substances on the basis of their properties and the way they are used or handled. It will often be unnecessary to assess each individual chemical in its own right as opposed to

In a laboratory:

- Acids and bases could be considered in terms of pH banding;
- Solvents and other generic classes could be grouped into different label descriptions, eg toxic, very toxic;
- Substances stored in large quantities require their own handling procedures and could be treated separately from smaller stocks;
- Treating all substances within a group in the same way as the most hazardous one is usually a valid approach.

assessment of a category. (Identification, through COSHH assessment, of what actually is on the premises, can generate large financial savings by drawing attention to wasteful purchasing policies.)

On a fruit farm a particularly wide range of pesticides may be used;

- Herbicides, insecticides and fungicides could be treated separately;
- Powder, granular and liquid formulations are easily identifiable and pose different handling problems;
- Different chemicals may be applied in different ways, eg knapsack sprayer, ground application, foliar application.

Find out who is doing what and what does and could really happen

Think of all groups of people, from among:

- Production employees;
- Ancillary or support-services employees;
- (Note: Cleaners and maintenance staff are often exposed not only to substances from their own activities, but to those from production activities as well.)
- Contractors on site;
- Visitors;
- Supervisors and managers;
- Students;
- Office workers;
- People outside.

Retail garden centre with a small facility for manufacturing garden furniture

Full-time workers could be exposed to the following:

- spillage during handling of garden chemicals;
- wood dust, paints, solvents, preservatives and adhesives in the furniture workshop;
- forklift diesel fumes in storage buildings;
- Dipping bulbs with organophosporous pesticide. Ancillary workers could be exposed to the following:
- cleaners mopping up spillages;
- cleaners using hazardous cleaning materials, eg bleach;
- Maintenance workers repairing contaminated racking.

Contractors and visitors (including the public), could be exposed to a variety of hazards, especially where there is little supervision or control of access to various parts of the premises.

Supervisors and managers are likely to be exposed to all the circumstances listed, although it will usually be of greatly reduced length and intensity.

Students and other casual workers might be employed to stack shelves. There is some scope for them to come into contact with spillages of hazardous substances in this work. They may also find themselves helping out in other areas when there is a temporary need for an 'extra hand'.

Office workers will be exposed to the normal range of substances found in offices. They may also have incidental contact with other work activities on the site. For instance, do they regularly have to pass through the woodworking shop to get to the office?
There will usually be little scope for effects on people outside the premises, but instances where there is might include:

- Spray drift from pesticide treatment of outside plants;
- Disposal of spent bulb treatment solution;
- Fumigation of on-site production (as opposed to display) glasshouses.

Note any Differences between People in a Group

Consider separately anyone whose working habits, size, working posture or personal hygiene practices (eg washing, eating) are significantly different. This also applies to anyone who might possibly have increased susceptibility to the effects of substances, eg new or expectant mothers, young people, those known to be sensitised to specific substances, those with chronic bronchitis.

Evaluating the Risks to Health

Decide Whether You Will Evaluate Risks to Groups or Individuals

COSHH requires precautions to be taken for the protection of every employee.
However, in many cases, the risks to each individual can be reliably determined by considering groups with the same or similar working characteristics and concentrating on a few people who are representative and typical of each group.

Working out the risk involves combining the answers to the following questions:

- What is the potential of a substance or the combined potential of two or more substances to cause harm (ie the hazard)?
- What is the chance of exposure occurring?
- How often is exposure liable to occur?
- What levels are people exposed to and for how long?

What is the Potential of a Substance for Causing Harm?

What is the chance of the exposure occurring?

People can come into contact with a substance in various ways.

- Do they work with it directly?
- Are they near where it is handled, transported, used, worked upon, collected, packed, stored, disposed of, discharged or given off etc, or is it simply present in the environment?
- Are they in the vicinity of an accidental release or spillage?
- Could they enter an enclosed space where it might be present?
- Could they disturb deposits of the substance on surfaces (eg during cleaning) and make them airborne?
- Could they wear previously contaminated clothing or protective equipment?
- Could they come into contact with contaminated surfaces?
- Could the substance be passed on to them from someone else, eg from other people's contaminated clothing or from personal contact?

How often is Exposure Liable to Occur?

Consider, in particular, people and activities where exposure is routinely very frequent (eg virtually daily exposure).Consider the consequences of any non-routine work, production of one-off items or isolated batches, trials, maintenance, repair operations, spillages etc.

What Levels are People Exposed to and for how long?

It is especially important to know precisely about the amount or concentration and length of time of exposure when:

- Exposure occurs very frequently;
- A high level of exposure can be foreseen at any time;
- A substance has a maximum exposure limit or an occupational exposure standard, or has been assigned an in-house occupational exposure limit or can cause cancer, asthma or respiratory sensitisation or is otherwise known to be particularly hazardous.

Draw Conclusions about the Risks to Health

When might there be grounds for concluding exposure is not a risk to health?

Sometimes, even without taking measurements, there are reasonable grounds for reaching this conclusion, as the following examples show.

- Quantities or rate of use of the substance are too small to constitute a risk under foreseeable circumstances of use, even if controls broke down.
- Operations are strictly in accordance with well-documented information provided about the process and operating conditions by the suppliers of the plant, in which they give a

valid assurance that the operation will not give rise to risks to health.
- Previous measurements have been taken of the process, in-house or elsewhere, including 'worst-case' situations, which confirm that exposure is not a risk to health at any time, and conditions now are demonstrably still the same.

When might Exposure Constitute a Risk to Health?

The following are examples of immediate indicators where exposure is very likely to constitute a risk to health and to require investigation and remedial action.

- Is there any evidence of fine deposits on people or surfaces?
- Are fumes or particles visible in the air (eg in light beams)?
- Are control measures broken, clearly defective or badly maintained?
- Is there an absence of, or departure from, recognised good practice? Such poor performance is as likely to be a result of poor management supervision as it is employee intransigence.
- Have there been any complaints of discomfort or excessive odour? These are often channelled through employee representatives and should be taken seriously, especially in situations where management staff have less direct contact with the shop floor.
- Has ill health linked to exposure been reported or detected during health surveillance? Health surveillance can vary from simple questions from trained supervisors to full-blown medical supervision. It is important that equal importance is attached to adverse reports from all types of health surveillance.

The following are examples of exposures that could present increased future risks to health and they are all reasonably foreseeable.

- Could there be any undetected deterioration in performance of control measures?
- What is the possibility of plant or system failure?
- Is there any evidence of failure to use control measures properly?
- What is the likelihood of human error, through lack of awareness?
- Have there been any changes in methods of work?

Maintaining Control Measures

Subsequent maintenance commitments should also influence your choice of methods. Do not select any controls if you do not have enough resources or expertise to keep them going properly.

A large rural local authority employs numerous grass and hedge cutter operators to maintain roadside verges. The employees are widely dispersed, working in small teams from several workshop premises. Machinery repairs, for which there is a frequent need, are carried out by machine operators in the outlying workshops. A widespread exposure to welding fumes has been identified.

Reliable operation of ventilated welding booths across all the workshops would be difficult to guarantee. The operators are principally machine drivers and are less competent as maintenance staff. More rather than less supervision is necessary with regard to welding, but this is difficult to achieve for a widely dispersed workforce.

Instead of installing booths at each workshop and attempting to train and supervise, the local authority decides to employ, train and equip a mobile fitter.

Personal protective equipment, especially respiratory protection, needs a big back-up in training, supervision and maintenance etc. if it is to provide theintended level of protection. Incorrect choice, fitting or insufficient use can render it ineffective. In particular, respiratory protective equipment with a tight fitting facepiece must correctly fit the wearer. Therefore, employers should be aware of the requirements in the COSHH ACOP for the fit testing of facepieces.

Making Sure Control Measures Are Used

The following measures are essential in virtually every case.

- Have you made arrangements to ensure that all control measures are properly and fully used? The clear allocation of managerial responsibilities and accountabilities is particularly important in this respect.

> The job description for a steel rolling mill production manager specifies that at monthly intervals he reports to the general manager on the state of compliance with control measures specified in the COSHH assessment. This supplements the minimum requirements of the Regulations for 14-monthly testing and examination of ventilation equipment.

> The design of some control measures can be arranged to encourage their use. For instance, a movable exhaust hood for welding is more likely to be used closer to the work, if the lighting necessary is attached to it. If turning the light on automatically turns on the fan that too will promote more consistent use of the ventilation.

- Are there periodic checks and arrangements to make sure that any defects in control measures are reported and put right promptly?
- Are there arrangements for maintenance of all measures, which includes timetables and schedules for periodic examination and test of engineering controls and items of respiratory protective equipment? It is one thing for somebody to realise that something is or may go wrong, it is another for action to be taken to repair or prevent the problem occurring.
- Do you have systems for keeping records of examinations and tests? COSHH requires that these are kept for at least five years. The aim is not to produce records' for records sake. They demonstrate that legal requirements have been carried out, but they also have a useful role to play in examining the effectiveness of control measures; especially during assessment review.

Plan for Emergencies

The assessment may conclude that the work activity would not cause an accident, incident or emergency in normal day-to-day work (even if there are small and unimportant emissions). If it could cause such an event, you should improve the process controls. If this has been done, and there is still a risk of a rare and more severe exposure to one or more hazardous substances, or if the work activity involves the use of:

- A carcinogen; or
- A mutagen; or
- A biological agent

you must draw up procedures/make arrangements to deal with any accident, incident or emergency that may occur involving the hazardous substances present at the workplace.

The purpose of the procedures/arrangements is to mitigate the effects of the incident, restore the situation to normal as soon as possible, while limiting the extent of any risks to health. To deal with any potential emergency situation, the arrangements should:

- Establish emergency procedures that include the regular testing of safety drills;
- Make information available to safety representatives and employees, including details of work hazards and specific hazards likely to arise in the event of an accident, incident or emergency involving hazardous substances;
- Provide suitable warning and communication systems;
- Provide additional, specific first-aid facilities and training on the emergency procedures;
- Ensure that only those people who are essential to carry out necessary repairs are permitted into the affected area;
- Provide sufficient suitable personal protective equipment, any specialised safety equipment and plant so that repairs can be made and the situation returned to normal as soon as possible;
- Devise safe methods for disposal of the substance and contaminated clothing etc;
- Provide suitable hygiene facilities for decontaminating skin and facilities for cleaning personal protective equipment.

The employer should also contact the local fire service and offer to make available:

- A copy of the emergency procedures; and
- Details of the specific hazards likely to arise in the event of an accident, incident or emergency involving a substance hazardous to health at the workplace.

The following are examples of the arrangements or procedures that employers may make to deal with an accident, incident or emergency likely to involve a substance hazardous to health.

Monitoring Exposure

Monitoring the exposure of employees to hazardous substances will be required in certain cases and the need for this must be considered in assessment.
In essence, monitoring is generally required when any of the following circumstances apply:

- When failure or deterioration of the control measures could result in a serious health effect, either because of the toxicity of the substance or because of the extent of potential exposure, or both;
- When any change occurs in the conditions affecting employees' exposure which could mean that adequate control of exposure is no longer being maintained, eg an increase in the quantity of substances used or changing systems of work or introducing new plant.

Monitoring should not be done purely for monitoring's sake.

Information, Instruction and Training for Employees

A properly informed and trained workforce is also better able to carry out COSHH action on its own initiative, allowing some of the load to be removed from management and supervisory staff.

COSHH requires that employees know:

- The names of the substances to which they are liable to be exposed and the risks to health created by exposure;
- Any relevant occupational exposure standard, maximum exposure limit or similar self-imposed (in-house) work standard that applies to the substance;
- The information on any safety data sheet that relates to the substances;
- The significant findings of the risk assessment;
- The precautions they should take to protect themselves and their fellow employees;
- The results of any monitoring of exposure, and especially if these exceed any MEL;
- The collective results of any health surveillance.

The aim is to provide employees with information that is in a form most appropriate to their immediate needs.

Recording the Assessment

Make a Record of the Assessment

If you have five or more employees you must record the significant findings of the assessment. If you have fewer than five employees, you do not have a legal duty to create a record but HSE strongly advises you to do so as a matter of good practice.
Record sufficient information to include at least the appropriate items from the list provided in the COSHH ACOP

Show why decisions about risks and precautions have been arrived at.

When to Record the Assessment

The significant findings of the assessment should be recorded when the assessment is made or as soon as is practicable afterwards.

When the Assessment Needs To Be Reviewed

Think if and When the Assessment needs to be reviewed

The assessment must in any case be reviewed at regular intervals and immediately if:

- There is any reason to suppose that the original assessment is no longer valid, eg evidence from the results of examining and testing engineering controls, reports from supervisors about defects in control systems; or
- Any of the circumstances of the work should change significantly and especially one which may have affected employees' exposure to a hazardous substance.

Further Reading:

- ✓ *Tolley's Practical Risk Assessment Handbook 5th Edition, Kindle Edition by Mike Bateman*
- ✓ *Professional Coaching: Principles and Practice 1st Edition by Susan English OSB EdD MCC (Editor), Janice Sabatine PhD PCC (Editor), Philip Brownell MDiv PsyD PCC (Editor),2018*