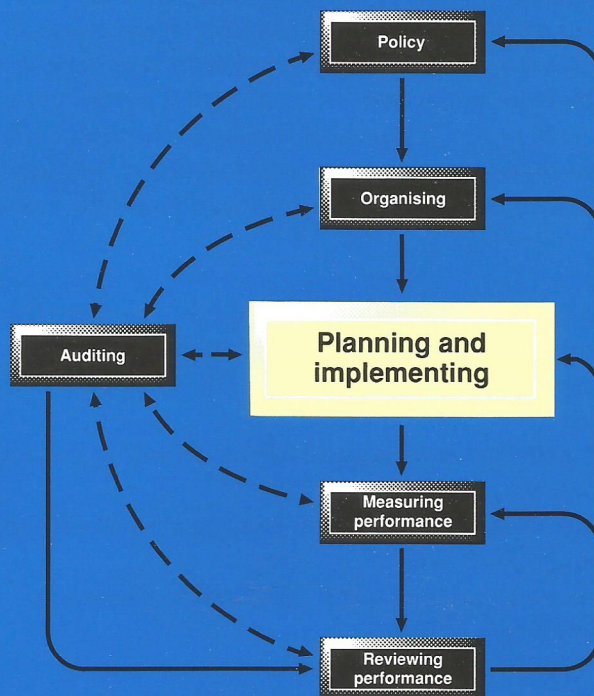


4

PLANNING FOR HEALTH AND SAFETY



Synopsis

Planning is essential for the effective implementation of health and safety policies. Adequate control can only be achieved by co-ordinated action of all members of the organisation. This chapter examines the planning required to establish and maintain an effective system of health and safety management and, in particular:

- the setting of health and safety objectives; and
- how performance standards are devised and implemented to promote a positive health and safety culture and to control hazards and risks.

PLANNING FOR HEALTH AND SAFETY

The results of successful health and safety management are often expressed as a series of negative outcomes, such as an absence of injuries, ill health, incidents or losses. However, since it is often a matter of chance whether dangerous events cause injury or loss, effective planning is concerned with prevention through the identification, elimination and control of hazards and risks. Moreover, the message from the accident analysis studies referred to in Inset 1 is that effective health and safety planning must cover all situations which have the potential to cause injury, ill health or loss.

The aim of planning for health and safety is to identify the inputs necessary to achieve effective risk control. The process includes:

- identifying objectives which support the aim, and setting targets for their achievement;
- establishing performance standards by which to measure and assess the inputs needed to:
 - develop, maintain and improve an organisational culture which supports the control of risks; and
 - maintain direct control over the risks generated by the activities of the organisation.

Setting objectives

An organisation's immediate health and safety objectives depend on the conditions and standards which currently exist and the first step must be an assessment of these. All organisations, however, need to set objectives for each of the following stages:

- 1 defining, developing and maintaining the health and safety policy;
- 2 developing and maintaining organisational arrangements;
- 3 developing and maintaining performance standards and systems of control.

The balance of activity in each area will be determined by need and, where an organisation is doing little to manage health and safety, the first priority would be on stage 1.

In organisations where health and safety management is more developed, the initial concentration might be more on stages 2 or 3 but in every organisation all three stages must be the subject of regular review. At all stages objectives should be accompanied by specific, measurable, attainable targets including the timescales for their achievement. Personal objectives can then be agreed with individuals to secure the attainment of the general objectives.

In an organisation which is doing little to manage health and safety, the immediate objective would be to review and revise the health and safety policy (within, say, one to three months). This would involve the aspects described in chapter 2 and would include:

- re-defining the corporate commitment to health and safety;
- drafting a new statement of policy;
- establishing new approaches to top level decision making so that health and safety is a factor in all business decisions.

These activities usually take place against a background of a new awareness

of the importance of health and safety, health and safety training for managers and often, the injection of outside expertise.

As a new direction on health and safety is established the emphasis should shift to setting objectives of an organisational kind (to be attained within, say, three to six months). Such objectives relate to the issues described in chapter 3 and include:

- establishing or developing the structure, systems and activities for promoting a positive culture, including the role of senior managers;
- assigning responsibilities for key tasks such as planning, the setting of performance standards, measuring performance, and reviewing and auditing;
- establishing or developing the information systems needed for control purposes, such as those for measuring performance, including those for accident, ill health and incident reporting, investigation and analysis;
- identifying the competences needed to implement the policy and specifying the systems that ensure competence at all levels;
- reviewing and developing communications and consultative procedures.

As the new policy and organisational arrangements become established the emphasis shifts to systems of control. Such objectives include:

- training for all employees on the revised policy and the new approach to health and safety management;
- devising performance standards for organisational aspects (such as control, co-operation, competence and communication) and for risk control;
- providing the physical controls needed to meet the requirements of the performance standards ('hardware' controls);
- implementing the new systems and procedures required by the performance standards, together with appropriate training for managers, supervisors and other employees ('software' controls);
- establishing maintenance systems for both the 'hardware' and 'software' controls;
- establishing and developing, measuring, reviewing and auditing systems to monitor the achievement of the performance standards.

Securing these objectives usually requires progress to be made in a number of areas simultaneously. These areas are mutually dependent and the emphasis given to each will change over time. As an organisation develops its health and safety management systems there will be less emphasis on the mechanics of achieving results, as effective monitoring, reviewing and auditing procedures should automatically feed back into improvement and development. The need to maintain the systems, to provide motivation and to promote improvements by setting further objectives will, however, always be present.

As an organisation's health and safety management system becomes more developed, objectives should include raising performance standards above the legal minimum and reducing the number of accidents, ill health and incidents. Successful organisations often also devise performance indicators which act as objectives against which their health and safety performance as a whole can be measured. This is discussed further in chapter 6.

When determining short and long-term objectives (including personal objectives) it is vital that effective consultation takes place involving managers, supervisors and other employees. Everyone involved must believe that the objectives and

A FRAMEWORK FOR SETTING

Diagram 6 outlines a conceptual framework for identifying and establishing control and measuring performance. The diagram shows the flow of physical resources, human resources and information (on the left); work activities within the organisation such as products and services, by-products

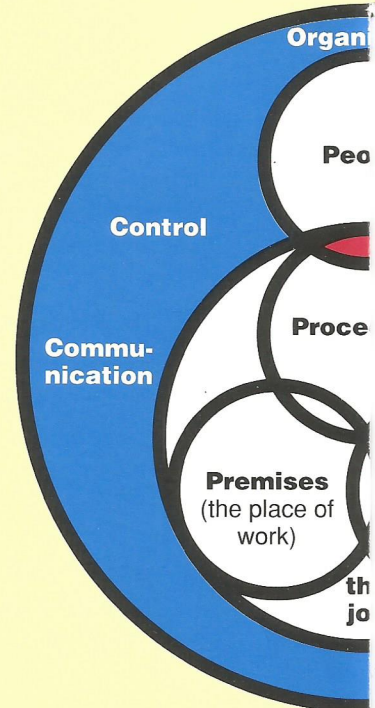
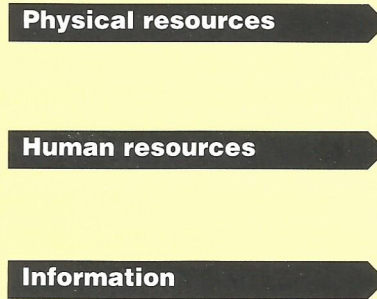
Performance standards are required to control the flows of resources and information through the organisation. At the **input stage** (the left hand side of the diagram) the objective is to eliminate and minimise hazards and risks entering the organisation. Here performance standards should cover:

- **physical resources** including:
 - the design, selection, purchase and construction of workplaces;
 - the design, selection, purchase and installation of plant and substances used by the organisation;
 - the plant and substances used by others, such as contractors at work on site;
 - the acquisition of new businesses;
- **human resources** including:
 - the recruitment and selection of all employees;
 - the selection of contracting organisations;
- **information** including:
 - information relating directly to health and safety, such as standards, guidance and aspects of the law;
 - other technical and management information relating to risk control and the development of a positive health and safety culture.

Diagram 6 A framework for setting performance standards. Performance standards are required for each stage of the throughput of resources and information

First stage controls

Control of inputs-
Objective:
To minimise hazards entering the organisation



Second stage controls

Control of work activities-
Objectives:
To eliminate and minimise risks inside the organisation
To create a supportive organisational culture

At the **internal activity stage** (the middle part of the diagram), risks are created where people interact with their jobs - signified by the red area in the diagram - and the objective is to eliminate or minimise risks arising inside the organisation. Here performance standards should cover:

- the four elements involved in creating a positive health and safety culture:
control, communication, co-operation and competence;
- the four elements concerned with work activities and risk creation namely:
premises - including the place of work, entrances and exits, the general working environment, welfare facilities, and all plant and facilities which are part of the fixed structure,

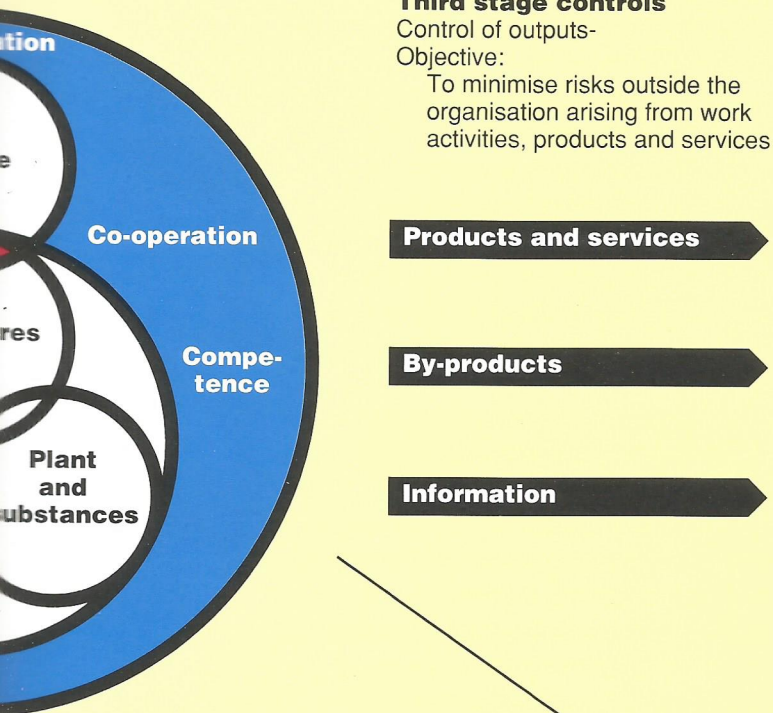
- such as permanent electrical installations;
- plant and substances** - including the arrangements for their handling, transport, storage and use;
- procedures** - including the design of jobs and work procedures and all aspects of the way the work is done;
- people** - including the placement of employees, their competence for the job and any health surveillance which may be required.

When specifying internal activity performance standards it is necessary in each case to consider:

- the operation of the production system in the 'steady state', including routine and non-routine activities;
- the production system in the 'steady state' during

PERFORMANCE STANDARDS

Areas for which performance standards are necessary to cover three stages: inputs to the organisation such as physical resources within the organisation (in the middle); and outputs from the organisation (on the right).



Third stage controls

Control of outputs-

Objective:

To minimise risks outside the organisation arising from work activities, products and services

Products and services

By-products

Information

At the **output stage** (the right hand side of the diagram) the objective is to minimise the risks to people outside the organisation whether from work activities themselves or from the products or services supplied. Here performance standards should cover:

- products and services, and include consideration of:
 - design and research on the health and safety and safe use of products and services, including surveillance of users to identify evidence of harm;
 - the delivery and transport of products including packaging, labelling and intermediate storage;
 - the installation, setting up, cleaning and maintenance of products undertaken by either employees or contractors;
- by-products of the work activities, such as:
 - offsite risks which might arise from the organisation's work activities both at fixed or transient sites;
 - outputs to the environment - particularly wastes and atmospheric emissions;
 - the disposal of plant, equipment and substances (including wastes);
- information, for example:
 - the health and safety information provided to those transporting, handling, storing, purchasing, using or disposing of products;
 - the information provided to those who may be affected by work activities, such as members of the public, other employers and their employees, the emergency services and planning authorities.

maintenance, including the maintenance activity itself, whether undertaken by contractors or on site staff;

- planned changes from the 'steady state', arising from any change in premises, plant, substances, procedures, people or information;
- foreseeable emergencies, such as fire, injuries, ill health, incidents or the failure of control equipment (including first aid, emergency planning and procedures for the management of emergencies);
- decommissioning, dismantling and removal of facilities, plant, equipment or substances.

Appendix 3 provides further guidance on setting performance standards by outlining the minimum objectives for performance standards in each of the areas outlined here.

A FRAMEWORK FOR SETTING PERFORMANCE STANDARDS

Diagram 6 outlines a conceptual framework for identifying key areas for which performance standards are necessary to establish control and measure performance. The diagram shows three stages: inputs to the organisation such as physical and human resources and information (on the left); work activities within the organisation (in the middle); and outputs from the organisation such as products and services, by-products and information (on the right).

Diagram 6 A framework for setting performance standards
Performance standards are required for each stage of the throughput of resources and information

First stage controls

Control of inputs-

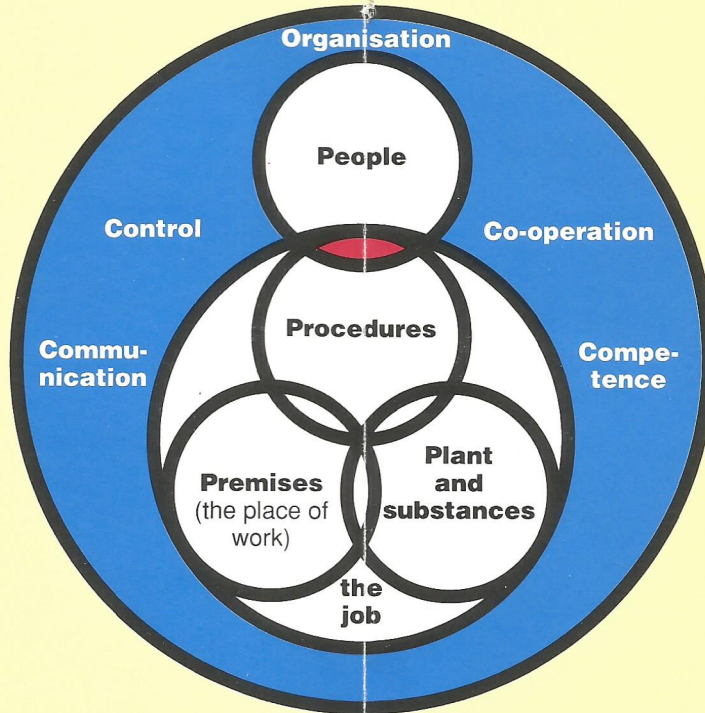
Objective:

To minimise hazards entering the organisation

Physical resources

Human resources

Information



Third stage controls

Control of outputs-

Objective:

To minimise risks outside the organisation arising from work activities, products and services

Products and services

By-products

Information

Second stage controls

Control of work activities-

Objectives:

To eliminate and minimise risks inside the organisation
To create a supportive organisational culture

such as permanent electrical installations;

plant and substances - including the arrangements for their handling, transport, storage and use;

procedures - including the design of jobs and work procedures and all aspects of the way the work is done;

people - including the placement of employees, their competence for the job and any health surveillance which may be required.

When specifying internal activity performance standards it is necessary in each case to consider:

- the operation of the production system in the 'steady state', including routine and non-routine activities;
- the production system in the 'steady state' during

maintenance, including the maintenance activity itself, whether undertaken by contractors or on site staff;

- planned changes from the 'steady state', arising from any change in premises, plant, substances, procedures, people or information;
- foreseeable emergencies, such as fire, injuries, ill health, incidents or the failure of control equipment (including first aid, emergency planning and procedures for the management of emergencies);
- decommissioning, dismantling and removal of facilities, plant, equipment or substances.

timescales are realistic for commitment and 'ownership' to be secured.

Decisions about priorities and the allocation of resources should reflect the fact that the ultimate aim is to minimise risks within the organisation while the immediate objective may be to achieve a level of performance which complies with the relevant legal requirements. The timescales for improvements should reflect the levels of risk involved and the costs of the remedial measures. Where fundamental changes cannot be made right away or within a reasonable time, short-term measures should be taken to minimise the risks in the meantime. The process of assessing risks is discussed later in this chapter.

SETTING PERFORMANCE STANDARDS

Performance standards need to be established progressively after a thorough analysis of the needs of the organisation and of existing, and possible future, risks. Performance standards should cover both organisational procedures and the control of specific risks.

Inset 10 provides a framework for identifying the main areas for which performance standards are needed. Appendix 3 provides further guidance on setting performance standards by outlining minimum objectives for the standards necessary in each area.

Organisational performance standards

The objectives of organisational performance standards are to ensure:

- the consistent implementation of plans and performance standards;
- the effective communication of the corporate belief in the importance of health and safety and the creation of a positive health and safety culture;
- improved understanding and control of risks.

Control

Performance standards for control are intended to secure the effective operation of the management system and continued improvement in risk control through the development and maintenance of a positive culture. They should therefore establish the nature and frequency of, for example:

- policy formulation and development;
- organisational development;
- planning, measuring and reviewing organisational and individual performance;
- auditing the whole health and safety management system.

Co-operation

In this area, performance standards should establish the nature and frequency of, for example:

- health and safety committee meetings and similar formal consultative meetings;
- the preparation of the minutes of health and safety committees and similar meetings together with action points;
- problem solving meetings or 'safety circle meetings'.

Communication

Performance standards for communication should establish the nature and frequency of, for example:

- the collection of information from external sources;
- senior management involvement in formal consultative arrangements, safety tours, etc;
- senior and other management involvement in accident, ill health and incident investigation;
- the involvement of senior and other management in planning, monitoring, auditing and reviewing performance;
- discussion of health and safety matters at management meetings;
- systems for cascading information;
- 'tool-box' talks;
- documentation of policy statements, organisation statements, performance standards, rules and procedures;
- use of posters, bulletins, newspapers and other similar means of communication;
- the preparation and dissemination of information to outside organisations and individuals.

Competence

Performance standards for arrangements to secure the competence of employees should, amongst other things, cover:

- recruitment and placement procedures;
- the provision of information and training;
- arrangements for supervised on-the-job experience;
- the availability of competent cover for staff absences;
- general health promotion and surveillance.

Performance standards for the control of hazards and risks

Performance standards are necessary to control the risks arising from activities, products and services, and are required for at least those areas outlined in Inset 10. They are necessary to control the complete cycle of activities ranging from the selection of resources and information, the design and operation of working systems, the design and delivery of product and services, and the control and disposal of waste. The control of risks is necessary to secure compliance with the requirements of the Health and Safety at Work etc Act 1974 and the relevant statutory provisions made under that Act and earlier legislation.

Setting performance standards involves four stages:

- **hazard identification** - identifying hazards which are the potential causes of harm;
- **risk assessment** - assessing the risk which may arise from hazards;
- **risk control** - deciding on suitable measures to eliminate or control risk;
- **implementing and maintaining control measures** - implementing standards and ensuring that they are effective.

These four stages form the fundamental principles of occupational health and safety and of making decisions about the control of risks. This approach is applicable both to the control of health risks and safety risks. (Health risks do however present distinctive features which require a particular approach - Inset 11 provides further details.) These principles are now increasingly incorporated into legislation which aims to improve the management of health and safety, eg the Control of Substances

CONTROLLING HEALTH RISKS

The principles of controlling both safety and health risks are the same.

The application of the principles to health risks requires a particular approach because of the inherent features of the risk.

The distinctive features of health risks include:

- Ill health which often results not from immediate injury but from complex biological processes such as the repair of repeated damage (irritant dermatitis), immune responses (asthma), or abnormal cell behaviour (cancers). There is individual variation in response.
- These processes may take place over a long period (eg asbestos related diseases). Hence hazards may only become apparent after many people have been put at risk. Cases of disease may continue for decades after exposure has been controlled.
- The same disease may have both occupational and non-occupational causes (eg, asthma, back pain, lung cancer). The link with occupation can sometimes be established in an individual but confirmation of an occupational cause usually comes from studies comparing frequency of disease in exposed and non-exposed groups.
- Exposure to disease risks is not always apparent. Measurement of risk factors is often required. The probability of disease occurring often depends on the level of exposure over

a long period. The severity of many diseases, but not all (eg cancers) also depends on the level of exposure.

Implications for successful health risk control:

- The complexity of many health risks means that the identification of health hazards and health risk assessments will generally require greater input of appropriate in-house or external consultant expertise than that required for many safety assessments.
- The assessment of health risks often requires the measurement of exposure, calling for specific monitoring and assessment techniques and the competence to use them.
- While health risks arising from the use of substances can be controlled by physical control measures, systems of work and personal protective equipment, the operation of which can be measured, confirmation of the adequacy of control will often require measurements of the working environment to check that exposures are within pre-set limits. Sometimes surveillance of those at risk to detect excessive uptake of a substance (biological monitoring) or early signs of harm (health surveillance), may also be necessary. These techniques require occupational hygiene and clinical skills and those at risk expect that individual results will need to be handled within a framework of medical confidentiality.

Hazardous to Health Regulations 1988 (COSHH).

In practice many decisions in these four areas are taken as a whole, eg where the identification stage reveals a well known hazard which involves a known risk and demands well tried and tested methods of control and consequent maintenance. For example, stairs present an established risk of slipping, tripping and falling and require traditional methods of control such as good construction, the use of hand rails and the provision of non-slip surfaces along with the need to keep stairs free of obstructions. In other more complex situations decisions are necessary at each stage and the nature of these are outlined below.

Hazard Identification

Seeking out and identifying hazards is an essential first step in risk control. Adequate information is necessary and reference should be made to relevant sources such as:

- legislation and supporting approved codes of practice which give practical guidance and include basic minimum requirements;
- Health and Safety Executive guidance;

- product information provided under Section 6 of the Health and Safety at Work etc Act 1974;
- relevant British and international standards;
- industry or trade association guidance;
- the personal knowledge and experience of managers and employees;
- accident, ill health and incident data from within the organisation, from other organisations or from central sources;
- expert advice and opinion.

The identification of hazards should involve a critical appraisal of all activities to take account of hazards to employees, others affected by activities (eg members of the public and contractors) and to those using products and services. Adequate hazard identification requires a complete understanding of the working situation. Employee and safety representative participation can make a useful contribution to this process.

In the simplest cases hazards can be identified by observation, comparing the circumstances with the relevant information. For example, single storey premises will not present the hazards associated with stairs. In more complex cases measurements such as air sampling or examining the methods of machine operation may be necessary to identify the presence of hazards presented by chemicals or machinery. In the most complex or high risk cases (for example, in the chemical or nuclear industry) special techniques and systems may be required such as hazard and operability studies (HAZOPS) and hazard analysis systems such as event or fault tree analysis. Specialist advice may be necessary in choosing and applying the most appropriate techniques.

Risk assessment

Assessing risks is necessary in order to identify their relative importance and to obtain information about their extent and nature. This will help in deciding on methods of control. Knowledge of both areas is necessary in order to identify where to place the major effort in prevention and control, and in order to make decisions on the adequacy of control measures.

Determining the relative importance of risks involves deciding on the severity of the hazard and the likelihood of occurrence. There is no general formula for rating risks in relative importance but a number of techniques have been developed to assist in decision making and these are described in Inset 12. As a general guide the emphasis should be given to risks which present the greatest severity. Risks which could create catastrophic consequences, albeit infrequently, should be given greater priority than those risks which create only small losses. The likelihood of occurrence (expressed as a frequency or a probability) however, cannot be ignored eg, where two risks have the same severity the one most likely to occur should take precedence.

Assessing risks to help determine control measures can be undertaken qualitatively or quantitatively. In the simplest case risks may be assessed by reference to clear cut legal limits, for example, people are liable to fall a distance of two metres from an open edge or they are not. In more complex situations qualitative judgements may be necessary within a framework set by legal standards and guidance. The Control of Substances Hazardous to Health Regulations 1988 (COSHH) and the accompanying approved codes of practice establish a decision making framework where hazardous substances are used.

ASSESSING THE RELATIVE IMPORTANCE OF HEALTH AND SAFETY RISKS

Determining the relative importance of risks is an important element in risk assessment so as to identify high risk areas which will demand a greater proportion of resources, both in the level of risk control, and in the level of maintenance control measures. Rating or ranking risks in relative importance can contribute to establishing risk control priorities.

While there is no general formula for rating risks a number of techniques have been developed to assist in decision making. These should be distinguished from the detailed risk assessments needed to establish the levels of risk control to satisfy legal standards. They involve only a means of ranking hazards and risks. Some systems rank hazards, others rank risks. Assessing relative risk involves some means of estimating the likelihood of occurrence and the severity of a hazard. A simple form of risk estimation is described below to illustrate the general principles.

Simple risk estimation

Hazards - the potential to cause harm will vary in severity. The effect of a hazard may, for example be rated:

3 - MAJOR

*for example, death or major injury
(as defined in RIDDOR);*

2 - SERIOUS

*for example, injuries where people may be off work for
more than three days;*

1 - SLIGHT

*for example, all other injuries including those where
people are off for periods of up to three days.*

Harm may not arise from exposure to a hazard in every case and in practice the likelihood of harm will be affected by the organisation of the work, how effectively the hazard is controlled and, the extent and nature of exposure to it. In the case of health risks the latent effects and the susceptibility of individuals will also be relevant. Judgements about likelihood will also be affected by experience of working with a hazard, for example the analysis of accident, ill health and incident data may provide a clue. The likelihood of harm may be rated:

3 - HIGH

where it is certain or near certain that harm will occur;

2 - MEDIUM

where harm will occur frequently;

1 - LOW

where harm will seldom occur.

In this case risk can be defined as the combination of the severity of the hazard with the likelihood of its occurrence, or:

$$\text{RISK} = \text{HAZARD SEVERITY} \times \text{LIKELIHOOD OF OCCURRENCE}$$

By multiplying together those numbers which represent the severity of a hazard and the likelihood of occurrence, a single figure is obtained which allows risks to be compared. Where hazards affect more than one person the resulting multiple could perhaps be multiplied by the number of people exposed to obtain a better comparison.

This example presents the most simplified method of estimating relative risk. In practice organisations need to devise systems suited to their own needs. Hazard rating systems have been developed by Dow (reference 1) and ICI (the Mond Index - reference 2). Simplified relative risk assessment systems have been developed by amongst others Rowe (reference 3), by the International Loss Control Institute (reference 4) and by other independent consultants (reference 5).

Systems of assessing relative risk can contribute not only to establishing risk control priorities but also assist in prioritising other activities. Questions of importance and urgency arise at several other stages in the implementation of a preventive health and safety policy, for example:

- when deciding health and safety objectives;
- when identifying high risk areas which require more detailed maintenance and monitoring;
- when deciding priorities for training and improving levels of competence;
- when deciding what, if any, immediate action is necessary to prevent further injury following an accident;
- when deciding what, if any, immediate action is necessary to prevent injury following an incident or the discovery of a hazard;
- when reviewing the results of monitoring activities and the results of injury, ill health and incident investigations;
- when deciding the extent of the resources required and the speed of the response which should be made following a particular accident or incident.

British Standard 5304:1988, *Code of practice for safety of machinery*, establishes a framework for decisions about machinery guarding. Quantitative risk assessment (QRA) techniques may be used as a basis for making decisions in more complex industries.

Assessing risks will demand a thorough knowledge of all activities and working practices and again the knowledge of the employees and safety representatives involved will prove valuable. Risk assessments should be carried out by competent people, and professional health and safety advice may be necessary in some cases, especially in the choice of appropriate QRA techniques and the interpretation of results.

Risk control

When risks have been analysed and assessed decisions can be made about control measures.

All final decisions about risk control measures must take into account the relevant legal requirements which establish minimum levels of risk prevention or control. Some of the duties imposed by the Health and Safety at Work etc Act 1974 and the relevant statutory provisions are absolute and must be complied with, for example, the requirements within the Factories Act 1961 which prescribes that all dangerous machinery should be adequately guarded. Many requirements are, however, qualified by the words, 'so far as is reasonably practicable', or 'so far as is practicable'. Other duties require the use of 'best practicable means' - often used in the context of controlling sources of environmental pollution such as emissions to the atmosphere. Further guidance on the meaning of these three expressions is provided in Inset 13.

Where legal requirements demand an assessment of cost, information about the relative costs, effectiveness and reliability of different control measures will be necessary so that decisions about acceptable levels of control can be made.

Decisions about the reliability of controls can be guided by reference to the preferred hierarchy of controls which have now been incorporated into new regulations such as COSHH and the European Community's Framework Directive (89/391/EEC). The following is a summary of the preferred hierarchy of risk control principles:

- 1 Eliminate risks by substituting the dangerous by the less dangerous, eg:
 - by using a less hazardous substance;
 - by substituting a type of machine which is better guarded to achieve the same product;
 - by avoiding the use of certain processes, eg by buying from subcontractors;
- 2 Combating risks at source by engineering controls and giving collective protective measures priority, eg:
 - separating the operator from the risk of exposure to a known hazardous substance by enclosing the process;
 - by protecting the dangerous parts of a machine by guarding;
 - designing process machinery and work activities to minimise the release, suppress or contain air borne hazards;
 - by designing machinery which is remotely operated and to which materials are fed automatically thus separating the operator from danger areas.

**‘SO FAR AS IS REASONABLY PRACTICABLE’,
‘SO FAR AS IS PRACTICABLE’,
and ‘BEST PRACTICABLE MEANS’**

Although none of these expressions are defined in the Health and Safety at Work etc Act 1974, they have acquired meanings through many interpretations by the courts and it is the courts which, in the final analysis, decide their application in particular cases.

To carry out a duty ***so far as is reasonably practicable*** means that the degree of risk in a particular activity or environment can be balanced against the time, trouble, cost and physical difficulty of taking measures to avoid the risk. If these are so disproportionate to the risk that it would be unreasonable for the persons concerned to have to incur them to prevent it, they are not obliged to do so. The greater the risk, the more likely it is that it is reasonable to go to very substantial expense, trouble and invention to reduce it. But if the consequences and the extent of a risk are small, insistence on great expense would not be considered reasonable. It is important to remember that the judgement is an objective one and the size or financial position of the employer are immaterial.

So far as is practicable, without the qualifying word ‘reasonably’, implies a stricter standard. This term generally embraces whatever is technically possible in the light of current knowledge, which the person concerned had or ought to have had at the time. The cost, time and trouble involved are not to be taken into account.

The meaning of ***best practicable means*** can vary depending on its context and ultimately it is for the courts to decide. Where the law prescribes that ‘best practicable means’ should be employed, it is usual for the regulating authority to indicate its view of what is practicable in notes or even agreements with particular firms or industries. Both these notes or agreements and the views likely to be taken by a court will be influenced by considerations of cost and technical practicability. But the view generally adopted by HSE inspectors is that an element of reasonableness is involved in considering whether the best practicable means had been used in a particular situation.

- 3 Minimising risk by the design of suitable systems of working.
- 4 Minimising risk by the use of personal protective clothing and equipment, which should only be used as a last resort.

The hierarchy reflects that risk elimination and risk control by the use of physical engineering controls and safeguards can be more reliably maintained than those which rely solely on people.

Where a range of control measures are available, it will be necessary to weigh up the relative costs of each against the degree of control each provides, both in the short and long term. Some control measures, such as eliminating a risk by choosing a safer alternative substance or machine, provide a high degree of control and are reliable. Physical safeguards such as guarding a machine or enclosing a hazardous process need to be maintained. In making decisions about risk control, it will therefore be necessary to consider the degree

of control and the reliability of the control measures along with the costs of both providing **and** maintaining the measure.

The design of all control measures should take account of the human factors aspects which were outlined in Inset 2. In successful organisations the design of risk controls is fully integrated into plant and work design procedures so that specifications simultaneously satisfy output, quality, and health and safety requirements.

Implementing and maintaining risk control measures

The practical implementation of control measures is assisted by their good design. The full implementation of adequate control measures may take time, and at each stage where full controls cannot be achieved, adequate steps should be taken in the interim to minimise the risks. The techniques for assessing relative risks outlined in Inset 12 can be used to identify the most important risks which should be dealt with first.

Control measures should be recorded as a means of ensuring their consistent implementation. Recording assessments and control measures is a specific requirement under some sets of regulations including COSHH and the Control of Industrial Major Accident Hazard Regulations 1984 (CIMAH). The COSHH Regulations require that the evaluation of risk, the specification and implementation of control measures and the date of further reviews should be recorded. Under the CIMAH Regulations a safety report is required which documents, amongst other specific things, the description of the hazards presented by the dangerous substances on site, a description of the potential sources of major accidents and a description of the measures to prevent, control or minimise the consequences of any major accident.

Performance standards for risk control should be documented to a level of detail which reflects the degree of risk. The control of relatively minor risks affecting all employees, such as ensuring free passageways and gangways, can be dealt with by a number of simply stated general rules. The control of more specific risks may require specific standards and control procedures. The control of high risk activities may require detailed performance standards and procedures which need to be strictly followed, for example, a permit-to-work system which ensures close supervision during implementation.

Maintaining risk control measures requires adequate inspection, maintenance and monitoring procedures to secure continued operation. This will include review procedures to examine risk assessment and control measures in the light of changes and technological developments. The type of maintenance, its frequency and depth will reflect the extent and nature of the risk revealed by the risk assessment process. The balance of resources devoted to the various control measures will also reflect the relative importance of the risks.

Part of the maintenance and monitoring arrangements will include ensuring that people comply with health and safety procedures. Even where risk control measures are well developed and take full account of human limitations and fallibilities, there remains the challenge of ensuring that they are complied with consistently. The main way of achieving this is by means of measuring and rewarding the extent of compliance according to the maxim, "what gets rewarded gets done".

Some organisations have applied performance management techniques to strengthen their health and safety system. Others have sought to motivate employees by using behaviour modification techniques designed to promote and reward safe behaviour and reduce unsafe behaviour. Behaviour modification techniques are now being recognised by successful companies as important techniques in motivating and sustaining positive behaviour, and in promoting consistently good safety performance. Chapter 5 examines in more detail the whole area of measuring health and safety performance.

SUMMARY

Organisations achieving success in health and safety minimise risks in their operation by drawing up plans and setting performance standards with the aim of eliminating and controlling risks. They establish, operate and maintain planning systems which:

- identify objectives and targets for their achievement within a specific period;
- set performance standards for management actions designed to initiate, develop, maintain and improve a positive health and safety culture in the four key areas - control, competence, communication and co-operation;
- set performance standards for the control of risks which are based on hazard identification and risk assessment, which take legal requirements as the minimum acceptable standard of performance and which emphasise:
 - the elimination of risks by the substitution of safer premises, plant or substances and, where this is not reasonably practicable,
 - the control of risks by physical safeguards which minimise the need for employees to follow detailed systems of work or to use protective equipment;
- establish priorities for the provision and maintenance of control measures by the use of risk assessment techniques, giving priority to high risk areas and adopting temporary control measures to minimise risks where satisfactory control cannot be achieved immediately;
- set performance standards for the control of risks both to employees and to others who may be affected by the organisation's activities, products and services;
- ensure the adequate documentation of all performance standards - the detail of documentation reflecting the degree of risk.

FURTHER READING

- 1 *Fire and explosion index hazard classification guide* American Institute of Chemical Engineers 6th ed New York 1987 ISBN 0 81690 438 3
- 2 *The Mond index: (How to identify, assess and minimise potential hazards on chemical plant units for new and existing processes)* ICI plc 2nd ed 1985 Ref No IC 07707 Available from ICI Report Centre Research and Technology Department, Runcorn Heath PO Box 13 Tel: 0928 513309
- 3 *Setting safety priorities: A technical and social process* Rowe G *Journal of Occupational Accidents* 1990 Vol 12 31-40
- 4 *Practical loss control leadership* (chapters 6 & 7) Bird Jnr FE and Germain GL International Loss Control Institute 1986 ISBN 0 88061 054 9
- 5 *Risk estimation* Steel C *Safety Practitioner* June 1990 Vol 8 No 6 20-21
- 6 *Quantified risk assessment: Its input to decision making* HSE 1989 HMSO ISBN 0 11 885499 2
- 7 *COSHH assessments: A step-by-step guide to assessment and the skills needed for it* HSE 1988 HMSO ISBN 0 11 885470 4
- 8 *The behaviour-based safety process: Managing involvement for an injury free culture* Krause TR, Hidley JH, Hodson SJ Van Nostrand Reinhold 1990 ISBN 0 442 00227 0
- 9 *The modification of occupational safety behaviour* Sulzer-Azaroff B *Journal of Occupational Accidents* Nov 1987 Vol 9 No 3 177-197
- 10 *Performance management: The Cambridgeshire experience* Investing in People II - Management Development Series Training Agency Ref: ATL 121 PP51/8349/690/24
- 11 *Loss prevention: Practical risk assessment: students workbook* The Institution of Chemical Engineers Rugby 1989 ISBN 0 852 95245 7