

**A Guide to**

# **Safety Management**

This guide book is prepared by the  
Occupational Safety and Health Branch  
Labour Department

---

First Edition

October 1999

This guide book is issued free of charge and can be obtained from offices of the Occupational Safety and Health Branch. Addresses and telephone numbers of the offices can be found in the booklet "The Labour Department Offers You its Services" or by telephone 2559 2297.

# Contents

<b>Chapter</b>	<b>Page</b>
<b>1. Introduction</b>	<b>1</b>
<b>2. Developing, implementing and maintaining a safety management system</b>	<b>2</b>
2.1 What is a safety management system?.....	2
2.2 How to develop a safety management system?.....	4
2.3 How to implement a safety management system?.....	10
2.4 How to maintain a safety management system?.....	12
2.5 Application of the management model to individual elements of a safety management system .....	15
2.6 Application of the management model to safety audits .....	16
<b>3. The 14 elements of a safety management system</b>	<b>18</b>
3.1 A safety policy which states the commitment of the proprietor or contractor to safety and health at work.....	20
3.2 A structure to assure implementation of the commitment to safety and health at work.....	24
3.3 Training to equip personnel with knowledge to work safely and without risk to health .....	30
3.4 In-house safety rules to provide instruction for achieving safety management objectives .....	35
3.5 A programme of inspection to identify hazardous conditions and for the rectification of any such conditions at regular intervals or as appropriate	37
3.6 A programme to identify hazardous exposure or the risk of such	

exposure to the workers and to provide suitable personal protective equipment as a last resort where engineering control methods are not feasible .....	41
3.7 Investigation of accidents or incidents to find out the cause of any accident or incident and to develop prompt arrangement to prevent recurrence .....	47
3.8 Emergency preparedness to develop, communicate and execute plans prescribing the effective management of emergency situations .....	52
3.9 Evaluation, selection and control of sub-contractors to ensure that sub-contractors are fully aware of their safety obligations and are in fact meeting them .....	55
3.10 Safety Committees to identify, recommend and keep under review measures to improve the safety and health at work.....	61
3.11 Evaluation of job related hazards or potential hazards and development of safety procedures.....	68
3.12 Promotion, development and maintenance of safety and health awareness in a workplace.....	76
3.13 A programme for accident control and elimination of hazards before exposing workers to any adverse work environment.....	81
3.14 A programme to protect workers from occupational health hazards....	87
<b>4. Safety audit</b>	<b>94</b>
4.1 What is a "safety audit"? .....	94
4.2 The appointment of a safety auditor .....	100
4.3 What should the proprietor or contractor do to facilitate the safety audit?	101
4.4 What should the proprietor or contractor do after receiving the audit report? .....	105
<b>References</b>	<b>108</b>

# 1. Introduction

In 1995, the Government conducted a comprehensive review of industrial safety with a view to mapping out Hong Kong's long-term safety strategies. The *Review* concluded that for Hong Kong to achieve high standards of safety and health at work, enterprises must embrace self-regulation and safety management. The *Review* recommended that the Government should provide a framework within which self-regulation was to be achieved through a company system of safety management.

Against this background, the Government has introduced a safety management system consisting of 14 elements. It has been promoting the system through launching pilot schemes, publishing an Occupational Safety Charter and organising seminars and promotional visits. The Administration is now in the process of introducing legislation making the adoption of the safety management system mandatory.

In a further effort to promote the system and to prepare enterprises for the forthcoming legislation, we have prepared this Guide for wide circulation.

This Guide tells enterprises how to develop, implement and maintain a safety management system and sets out in detail the 14 elements which constitute the safety management system. The scope and complexity of these elements may vary significantly for different enterprises, depending on the size and nature of their business. This could be a simple exercise for some but they should nonetheless take conscious steps to tackle each and every element in the process.

The Guide also provides advice on how to audit the safety management system to ensure its effectiveness.

## 2. Developing, implementing and maintaining a safety management system

### 2.1 What is a safety management system?

In this Guide,

*"safety management"* means the management functions connected with the carrying on of an enterprise that relate to the safety of personnel in the enterprise, including –

- (a) the planning, developing, organising and implementing of a safety policy;
- (b) the measuring or auditing of the performance of those functions;

*"safety management system"* means a system which provides safety management in an enterprise.

This chapter introduces the basic principle and methodology in the ***development, implementation and maintenance*** of a safety management system which contains the following 14 elements :

1. A safety policy which states the commitment of the enterprise to safety and health at work
2. A structure to assure implementation of the commitment to safety and health at work
3. Training to equip personnel with knowledge to work safely and

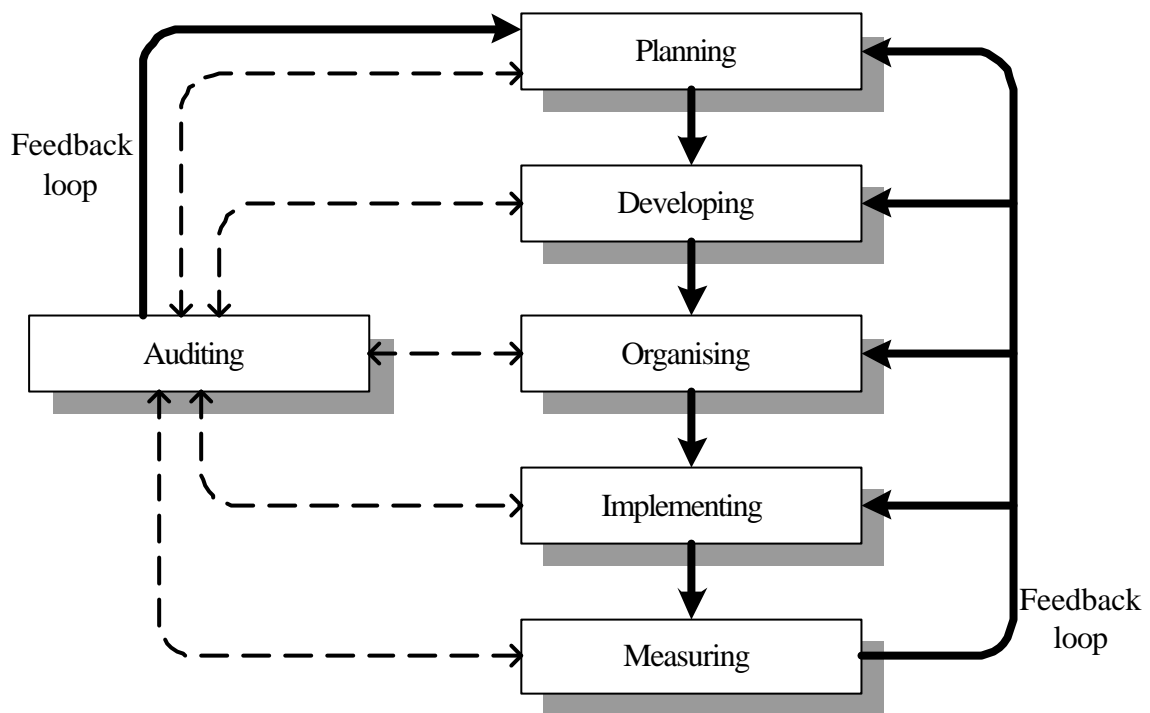
without risk to health

4. In-house safety rules to provide instruction for achieving safety management objectives
5. A programme of inspection to identify hazardous conditions and for the rectification of any such conditions at regular intervals or as appropriate
6. A programme to identify hazardous exposure or the risk of such exposure to the workers and to provide suitable personal protective equipment as a last resort where engineering control methods are not feasible
7. Investigation of accidents or incidents to find out the cause of any accident or incident and to develop prompt arrangements to prevent recurrence
8. Emergency preparedness to develop, communicate and execute plans prescribing the effective management of emergency situations
9. Evaluation, selection and control of sub-contractors to ensure that sub-contractors are fully aware of their safety obligations and are in fact meeting them
10. Safety committees to identify, recommend and keep under review measures to improve the safety and health at work
11. Evaluation of job related hazards or potential hazards and development of safety procedures
12. Promotion, development and maintenance of safety and health awareness in a workplace
13. A programme for accident control and elimination of hazards before exposing workers to any adverse work environment
14. A programme to protect workers from occupational health hazards

While practical guidance in respect of each of these 14 elements is detailed in Chapter 3, a model for the ***development, implementation and maintenance*** of a safety management system containing these 14 elements is graphically illustrated as follows.

### **Management model**

to develop, implement and maintain a safety management system



Legends

- ← - - - - - → Information link
- Control link

The above model should be adopted not only in the development, implementation and maintenance of a safety management system, but also in the development, implementation and maintenance of each and every element constituting the system.

## 2.2 How to develop a safety management system?

The development of a safety management system involves the finer aspects of *planning* and *developing*.

### **2.2.1 Planning**

Planning is the process of determining in advance what should be accomplished. The planning stage answers the questions “Where are we now?” and “Where do we want to be?”.

- (a) At this stage, the proprietor or contractor of an enterprise is required:
  - (i) to identify in advance what safety and health objectives should be accomplished by a safety management system;
  - (ii) to spell out a clear policy enshrining those safety and health objectives and setting out their priorities and the ways and means to achieve them; and
  - (iii) to estimate the financial and other resource implications arising from the accomplishment of these safety and health objectives.
  
- (b) To achieve the identified safety and health objectives, the proprietor or contractor should:
  - (i) conduct an initial status analysis to identify the existing arrangement for managing safety and health;
  - (ii) carry out risk assessments to decide on priorities and set objectives for hazard elimination and risk control and identify actions needed to eliminate and control the identified risks;
  - (iii) establish measurable performance standards for monitoring performance; and
  - (iv) conduct periodic status analysis for the safety management system in operation.
  
- (c) It is important for an enterprise to conduct initial status analysis, periodic status analysis and risk assessment in the development of the

safety management system. Guidance on how they should be done are as follows -

(i) Initial status analysis

In identifying the occupational safety and health objectives for the first time, an enterprise should consider carrying out an initial status analysis of existing arrangements for managing occupational safety and health. This analysis should be made in order to provide information that will influence top management's decisions on the scope, adequacy and implementation of the current system as well as providing a baseline from which progress can be measured. This initial status analysis should answer the question "Where are we now?" in respect of the particular element of the safety management system.

The initial status analysis should compare the existing arrangements with:

- the requirements of relevant legislation dealing with safety and health at work;
- the existing guidelines on safety management available within the enterprise;
- the best trade practice and trade performance;
- the efficiency and effectiveness of existing resources devoted to safety management.

(ii) Periodic status analysis

After the initial status analysis, the proprietor or contractor should ensure that a similar status analysis of the safety management system in operation is conducted periodically to facilitate continual improvement. The scope and frequency of the periodic status analysis should be defined, based on the needs of the enterprise. In particular, the following items should be considered:

- the overall performance of the safety management system;
- the performance of individual elements of the safety management system;
- the findings/recommendations of safety audits;
- the internal and external influences including the changes in organisational structure, legislation and the introduction of new technology;

The analysis should also identify what action is necessary to remedy any deficiencies in the system.

(iii) Risk assessment

Risk assessment should be carried out by a competent person with practical knowledge of the work activities, yet with objectivity. He should tackle the assessment with an open mind and a critical approach. Basic steps in risk assessment should include the following:

- to classify work activities: i.e. to prepare a list of work activities covering premises, plant, people and procedures, and gather information about them;
- to identify hazards: i.e. to identify all significant hazards relating to each work activity and consider who might be harmed and how;
- to determine risk: i.e. to make a subjective estimation of risk associated with each hazard assuming that planned or existing controls are in place, and also to consider the effectiveness of the controls and the consequences of their failure;
- to decide if risk is tolerable, which means that the risk has been reduced to the lowest level that is reasonably practicable: i.e. to judge whether or not existing safety precautions (if any) are sufficient to keep the hazard under control and meet legal requirements;
- to prepare risk elimination or control measures for risk that is intolerable and/or has no existing risk control measures.

It is generally not necessary to make precise numerical calculations of risk. Normally complex methods for quantified risk assessment should be required where the consequences of failure could be catastrophic. In general, simpler subjective methods would be appropriate.

### **2.2.2 Developing**

Developing is the process of determining how the objectives should be realized. The developing stage needs to answer "How do we get there?".

- (a) At this stage, the proprietor or contractor is required:
  - (i) to define, document and endorse the policy, and ensure that the policy includes a commitment to:
    - provide adequate and appropriate resources to implement the policy;
    - place occupational safety and health as one of the prime responsibilities of line management, from the most senior executive to the first-line supervisory level;
    - ensure its understanding, implementation and maintenance at all levels in the organisation;
    - ensure employee involvement and consultation to gain commitment to the policy and its implementation;
    - ensure carrying out periodic review of the policy and the management system;
    - ensure that employees at all levels receive appropriate training and are competent to carry out their duties and responsibilities.
  - (ii) to prepare an effective safety plan which states in specific terms to:
    - set out a clear direction and devise a series of actions for the enterprise to follow so as to achieve the policy, in particular, the safety and health objectives and to establish and

maintain a particular element of the safety management system;

- provide clear guidance for managers and workers to accomplish the occupational safety and health objectives.

(b) To achieve the targets as stated above, the proprietor or contractor should:

- (i) develop an effective safety policy (details of which are discussed in Chapter 3.1);
- (ii) develop an effective safety plan as follows:

#### An effective safety plan

“Safety plan” means the plan for (a) the system of allocation of responsibilities for the carrying out a safety policy and (b) the arrangements as to how the responsibilities are to be executed. An effective safety plan should set out what is to be achieved in what time-scale and include :

- a list of safety responsibilities for managing safety and health by everyone involved in the work activity;
- a list of risks and the risk assessment results;
- the precautionary measures and the safety method statements to be adopted to eliminate or control the risks and the procedures for monitoring the compliance;
- the contingency plans for foreseeable emergencies;
- training of staff to carry out the actions for the enterprise to follow so as to achieve the safety and health objectives; and
- the procedures for monitoring and assessing the implementation of these actions, etc.

The scope and complexity of the plan depend on the complexity of the work activity. It may range from a simple statement from the proprietor or contractor identifying who is responsible for coordinating the various safety activities, to a detailed document covering the integration of the legislative and contractual responsibilities of many work sites and sub-contractors. The

safety plan should be modified, if necessary, as work activity proceeds according to experience and information received in the implementation of the plan.

The safety plan should be established by senior management and should have line management involved in a systematic and formal way, with the advice and assistance of safety and health personnel. All levels of management, supervisors and employees should have input into the development of the plan. Specific details and objectives should be provided to identify what will be done, who will do it, when will it be done, and what follow-up systems will be used to ensure the success of the plan. All managers, supervisors and employees should know the plan and the role they play in its implementation. Establishing an effective communication system within the organisation should help this.

## **2.3 How to implement a safety management system?**

The implementation of a safety management system involves the finer aspects of *organising and implementing*.

### **2.3.1 Organising**

Organising is the process of prescribing formal relationships among people and resources in the organisation to accomplish objectives. In this organising stage, the proprietor or contractor is required:

- (a) to ensure that occupational safety and health is fully integrated across

the enterprise and into all its activities, whatever the size or nature of its work;

- (b) to set aside an adequate budget commensurate with the enterprise' s size and nature for implementing the policy and to properly establish and maintain the elements of the safety management system;
- (c) to structure and properly operate the enterprise to put the policy into practice effectively;
- (d) to define the allocation of safety responsibilities and accountabilities in the management structure;
- (e) to arrange organisational activities such as the formation and operation of a safety committee, a safety department/unit/group and the appointment of a safety officer/advisor/director, etc.;
- (f) to ensure that all employees have the necessary authority to carry out their responsibilities;
- (g) to allocate a person at the most senior management level particular responsibility for ensuring that the safety management system is properly implemented and performing to requirements in all locations and spheres of operation within the enterprise;
- (h) to encourage senior management to demonstrate, by example, their commitment by being actively involved in the continual improvement of occupational safety and health performance;
- (i) to make arrangements for the effective and, where appropriate, open communication of occupational safety and health information;
- (j) to make effective arrangements for the provision of specialist advice and services on occupational safety and health;
- (k) to make effective arrangements for employee involvement at all levels, and consultation where appropriate; and
- (l) to identify the competencies required for the employees at all levels within the enterprise and arrange to organize any necessary training.

### 2.3.2 Implementing

Implementing means a process of carrying out or putting into practice the plans to achieve the desired objectives, with appropriate and adequate control to ensure proper performance in accordance with the plans. In this implementing stage, the proprietor or contractor is required:

- (a) to determine and execute operation plans to control the risks identified and to meet the legal requirements as well as other requirements to which it subscribes to in safety management;
- (b) to execute contingency plans for foreseeable emergencies and mitigate their effects;
- (c) to arrange safety audits and periodic status analysis as an independent check to the efficiency, effectiveness, and reliability of the safety management system, and carry out the required corrective actions;
- (d) to motivate all employees by a combination of rewards and sanctions and stress on the reinforcement of the positive behaviour contributing to risk control and the promotion of a positive safety culture;
- (e) to provide adequate and effective supervision to ensure that the policies and the plans are effectively implemented; and
- (f) to prepare and maintain sufficient documentation to record and monitor the progress of policy and plan implementation.

## 2.4 How to maintain a safety management system?

Maintenance of a safety management system involves the finer aspects of *measuring* and *auditing*, through which an enterprise knows whether its safety management system is working well or needs improvement, thereby maintaining the system in an efficient and effective state.

### **2.4.1 Measuring**

Measuring is the process of checking the performance against agreed standards to reveal when and where improvement is needed, and a means of monitoring the extent to which policies and objectives are being met. The measuring stage provides a “feedback loop” to the stages of development and implementation of a safety management system and help in reinforcing and maintaining its ability to reduce risks to the fullest extent and to ensure the continued efficiency, effectiveness and reliability of the safety management system. In this measuring stage, the proprietor or contractor is required:

- (a) to carry out the proactive monitoring of performance by, for example, surveillance and inspections of both hardware (i.e. premises, plant and substances) and software (i.e. people, procedures and systems of work), and monitor the degree of compliance with the safety and health arrangements of the enterprise, which are made to achieve the policies and the safety and health objectives;
- (b) to use the safety performance of an individual as a determinant in career advancement and personal development assessments in the enterprise by closely monitoring the safety and health performance of individuals, particularly managers and supervisors (i.e. to reward positive behaviour according to the maxim of “What gets rewarded gets done”);
- (c) to carry out reactive monitoring to assess the failures of risk control systems by, for example, the monitoring of accidents/incidents, near misses, ill-health and other deficiencies in safety and health performance;
- (d) to determine the immediate causes of deficient or sub-standard performance and identify the underlying causes and the implications for the design and operation of the safety management system; and make recommendations to rectify any deficient or sub-standard situations in both (a) and (c) above;
- (e) to establish and execute valid and meaningful measuring tools for

carrying out the proactive and reactive measuring of performance;

- (f) to continuously feed back information collected from (a), (c) and (d) above to the stages of development and implementation so as to improve the safety management system in operation, such as arranging urgent action that needs to be taken for immediate and imminent risk which becomes apparent during proactive monitoring.

### **2.4.2 Auditing**

Auditing is carried out to assess performance in addition to the routine monitoring of occupational safety and health performance referred to in Section 2.4.1 above. Auditing constitutes the “feedback loop” to the planning stage which enables the enterprise to reinforce, maintain and develop its ability to reduce risks to the fullest extent and to ensure the continued efficiency, effectiveness and reliability of the safety management system. In addition, there should be information flowing between the development, implementation and maintenance stages and the auditing stage so as to ensure the correct operation of the safety management system. In the auditing stage, the proprietor or contractor is required:

- (a) to appoint a safety auditor to periodically conduct a safety audit;
- (b) to provide facilities, etc to the safety auditor for the purpose of the safety audit;
- (c) to take necessary actions on the safety audit report submitted, including drawing up a plan for improvements to the safety management system and implementing the plan;
- (d) to continuously feed back information on the conclusions of the safety audit to the stages of development and implementation to improve the safety management system in operation.

## **2.5 Application of the management model to individual elements of a safety management system**

The management model as described in Section 2.1 should be used to develop, implement and maintain each and every elements of the safety management system. The proprietor or contractor of an enterprise should apply the model to all elements of the safety management system applicable to his enterprise so as to exercise effective management of occupational safety and health in his organisation.

For example, in order to develop, implement and maintain the element: “in-house safety rules to provide instruction for achieving safety management objectives” of a safety management system, the proprietor or contractor should have a policy on the preparation, implementation, monitoring and reviewing of the “in-house safety rules” for his enterprise. He should first develop the policy, devise a plan and put it into practice. Also, he should indicate his support by providing adequate resources (both human and financial) to implement the plan. Furthermore, he should set standards of performance regarding the implementation of the in-house safety rules for employees at all levels, monitoring the compliance with in-house safety rules and measuring the performance according to the set standards. Last but not least, he should ensure a safety audit conducted periodically to check the effectiveness, efficiency and reliability of the policy, as appropriate, regarding this particular element. With the results of the measuring or auditing stage being fed back to the development and implementation stages, the overall performance of this particular element of the safety management system in operation can be improved. The proprietor or contractor should document all information relating to the implementation and monitoring of the in-house rules and regulations for monitor or review purpose.

To further illustrate the application of the management model, let us look at another example showing the development, implementation and maintenance of the element of a safety management: “training to equip personnel with knowledge

to work safely and without risk to health". The proprietor or contractor should first prepare a safety training policy to decide if training is necessary, and formulate training objectives and methods if the type and extent of training needs are identified. He should devise a plan to implement the policy and to arrange for employees to receive the necessary training. In addition, he should determine standards of performance regarding the implementation of the plan on safety training. He should monitor and review the implementation progress of the plan and the effectiveness of training provided to the employees in accordance with set standards. He should also ensure a safety audit is conducted periodically to check the effectiveness, efficiency and reliability of the policy, as appropriate, regarding this particular element. With the results of the measuring or auditing stage being fed back to the development and implementation stages, the overall performance of this particular element of the safety management system in operation can be improved. In order to facilitate the monitoring and review of the training plan, adequate documentation about the training records and the evaluation of training effectiveness, etc. should be prepared by the proprietor or contractor.

## **2.6 Application of the management model to safety audits**

The management model as described in Section 2.1 above should also be used as a framework for assessing the overall performance of a safety management system by way of conducting safety audits.

Safety audit should assess whether or not the processes as described in the management model have been successfully and effectively followed by the proprietor or contractor to develop, implement and maintain a safety management system, including each of its elements. Besides, safety audit should assess whether or not a safety management system, including each of its elements, has been developed, implemented and maintained in a way conforms to the guidance set out in Chapter 3 of this Guide.

In general, the following questions can be answered after the safety audit:

- (a) “Has the proprietor or contractor carried out effectively and efficiently the processes of planning, developing, organising, implementing and measuring when the safety management system is developed, implemented and maintained as described in this Guide?”
- (b) “Has the proprietor or contractor developed, implemented and maintained the safety management system in an adequate and effective manner by conforming to the guidance set out in Chapter 3 of this Guide?” .

If the answers to the above 2 questions are not satisfactory or negative, further improvements to the safety management system in operation is necessary.

## **3. The 14 elements of a safety management system**

### **The elements of a safety management**

The 14 elements of a safety management system are as follows :

1. A safety policy which states the commitment of the proprietor or contractor to safety and health at work
2. A structure to assure implementation of the commitment to safety and health at work
3. Training to equip personnel with knowledge to work safely and without risk to health
4. In-house safety rules to provide instruction for achieving safety management objectives
5. A programme of inspection to identify hazardous conditions and for the rectification of any such conditions at regular intervals or as appropriate
6. A programme to identify hazardous exposure or the risk of such exposure to the workers and to provide suitable personal protective equipment as a last resort where engineering control methods are not feasible
7. Investigation of accidents or incidents to find out the cause of any accident or incident and to develop prompt arrangements to prevent recurrence
8. Emergency preparedness to develop, communicate and execute plans prescribing the effective management of emergency situations
9. Evaluation, selection and control of sub-contractors to ensure that

sub-contractors are fully aware of their safety obligations and are in fact meeting them

10. Safety committees to identify, recommend and keep under review measures to improve the safety and health at work
11. Evaluation of job related hazards or potential hazards and development of safety procedures
12. Promotion, development and maintenance of safety and health awareness in a workplace
13. A programme for accident control and elimination of hazards before exposing workers to any adverse work environment
14. A programme to protect workers from occupational health hazards

Practical guidance in respect of these elements is given in the following pages.

## **3.1 A safety policy which states the commitment of the proprietor or contractor to safety and health at work**

### **3.1.1 Safety policy**

“Policy”, in broad terms, refers to the general intentions, approach and objectives of an organisation together with the criteria and principles on which actions and responses are based.

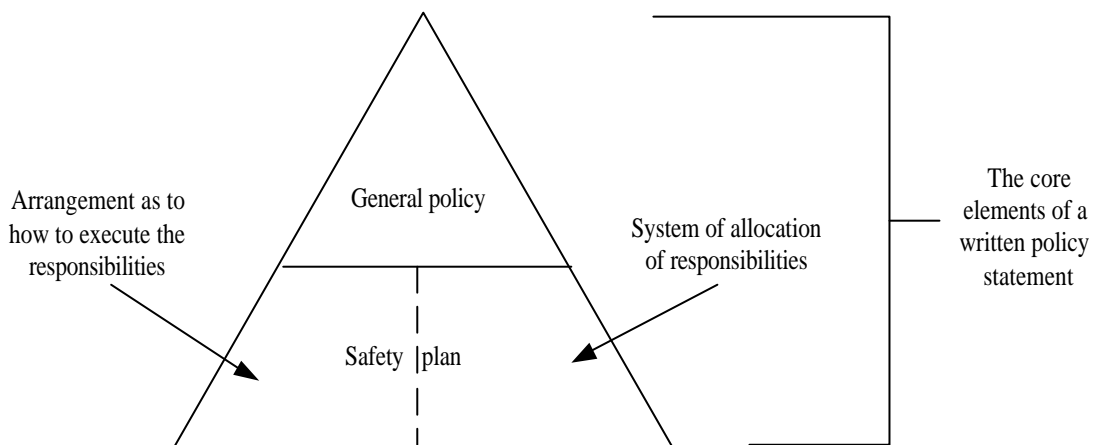
An effective safety policy sets clear direction for the organisation to follow. It contributes to all aspects of business performance as part of a demonstrable commitment to continuous improvement. The objective of defining an enterprise’s safety policy is to set down in clear and unambiguous terms its management’s approach and commitment to safety and health at work. The organisation’s most senior management should define, document and endorse its safety policy. The proprietor or contractor of an enterprise should ensure that the policy includes a commitment to:

- (a) recognize safety and health at work as an integral part of its business performance;
- (b) achieve a high level of industrial safety and health performance, with compliance with legal requirements as the minimum;
- (c) provide adequate and appropriate resources to implement the policy;
- (d) place the management of safety and health as one of the prime responsibilities of line management, from the most senior executives down to the first-line supervisory level;
- (e) ensure its understanding, implementation and maintenance at all levels in the organisation;

- (f) secure employee involvement and consultation to gain commitment to the policy and its implementation;
- (g) ensure periodic review of the policy, the management system and audit of compliance to policy;
- (h) ensure that employees at all levels have received appropriate training and are competent to carry out their duties and responsibilities.

The safety policy should be specific and relevant to the nature of the work undertaken at the enterprise. It should be able to convey (a) the general intentions, approach and objectives of the enterprise, and (b) the criteria and principles on which its actions and responses are based.

The composition of an effective safety policy is illustrated by the following diagram:



### 3.1.2 Written policy statement

The proprietor or contractor of an enterprise should prepare and revise as often as necessary a written policy statement, which should include: (a) a statement of the proprietor's or contractor's general policy with regard to the safety and health of workers in the enterprise; (b) a system of allocation of responsibilities for the carrying out of the policy; and (c) arrangements as to how the responsibilities are to be executed. They are referred to as "the

core elements” of a written policy statement.

It is important to realize that the responsibility for safety and health rests on the proprietor or the contractor of an enterprise. Many of the duties arising from that responsibility may however be delegated to managers and supervisors. The written policy statement should show clearly how these duties are allocated. Whilst the overall responsibility for safety and health rests at the highest management level, all individuals at every level will have to accept certain degrees of responsibility for carrying out the policy. Whenever possible, key individuals should be named and their responsibilities defined.

It is equally important that employees of all levels in the enterprise should be able to see from the statement how they fit into the system, and, for example, what their own duties and whom they should go for advice, to report an accident or a hazard, or to obtain first aid or other help.

There is no rule about the appropriate length of a written policy statement. A smaller firm whose activities are not especially hazardous would have a shorter written policy statement than that of a larger firm with complicated and hazardous processes. However, one possible approach is to set out its safety policy in the written policy statement in a fairly general terms, and to refer the readers to other documents for full details, such as in-house safety rules, safety checklists, safety training programmes, and emergency instructions.

The proprietor or contractor of an enterprise should keep a copy of the written policy statement (including its revisions), signed by top management (e.g. the managing director) and dated, bring the policy statement itself and its revisions, if any, to the notice of all workers in his enterprise by, for example, posting on notice boards where every employee can see or by internal circulation down to every employee, and make it available for inspection upon request by an occupational safety officer.

An effective safety management system has the mechanism of

self-regulating and self-improving. This is effected by reviewing the safety policy from time to time with (a) performance measurement and (b) safety audits. The proprietor or contractor of an enterprise should review the safety policy –

- (a) at least once every two years from the date on which the written policy statement and any its revisions were brought to the notice of the workers in the enterprise; and
- (b) as soon as is practicable when there is a change of particulars in the policy statement, including the core elements mentioned above, for example, change in organisational structure. A review may also be prompted by changes of particulars due to internal or external factors such as changes in technology, legislation or standards.

“Practicable” embraces whatever is technically possible in the light of current knowledge, which the person concerned has or ought to have had at the time. The cost, time and trouble involved are not to be taken into account. For example, in simple cases, the safety policy should be reviewed within a week after a change in the particulars of the written policy statement.

## **3.2 A structure to assure implementation of the commitment to safety and health at work**

Safety organisation involves a structure where people in the company work together in a coordinated manner, based on their knowledge, training and responsibilities, to achieve the safety and health objectives set by the top management. Within the organisation, responsibilities and relationship should be established to promote a positive safety and health culture and secure the implementation and continued development of the safety policy. To properly establish such an organisation, there should be a process of prescribing formal relationships among people and resources in the company to accomplish the safety and health objectives. With the setting up of such an organisation, the general safety policy together with the safety plan can thus be effectively and efficiently implemented.

### **3.2.1 Line organisation**

In most of the successful stories of managing safety and health in Hong Kong, the line organisation which has direct and vertical relationship between different levels within the company and is mainly responsible for all aspects of the production is found to be an effective and efficient organisational structure for ensuring the achievement of safety and health objectives. It should be noted that someone accountable for safety and responsibilities must be clearly defined for all levels of employees. The formal safety and health responsibilities for the top management, directors, department/division/section heads, safety personnel, supervisors and employees should be clearly allocated in the line organisation. The proprietor or contractor should ensure that every person in the line organisation has an important safety and health role and that the person

should be held accountable for the allocated responsibilities. In this sense, safety should be a line function and others, such as people from safety, personnel, finance, materials and engineering, etc., should only play a supportive role.

### **3.2.2 Safety office or safety department**

A safety office or safety department or similar set-up should be established to coordinate the implementation of safety plans or programmes by the line management. Its primary role is to advise the line management on safety and health practices, requirements and standards. It should not play a “line” role to implement the safety plans and programmes and certainly should not be held accountable for the consequences of the lack of control on the shop floor or at the site.

The safety office or safety department should have the following main roles:

- (a) To serve as a resource person and in-house safety consultant.
- (b) To plan and prepare safety programmes.
- (c) To advise top management and line management on safety and health matters.
- (d) To coordinate the implementation of safety plans and programmes.
- (e) To monitor compliance and implementation of safety plans and programmes.
- (f) To track corrective actions and verify the effectiveness of safety matters.
- (g) To serve as a trainer in safety matters.

### **3.2.3 Allocation of responsibilities for safety and health**

It is important that responsibilities for safety and health should be identified and allocated properly in a clear and logical way. Each member of the enterprise to which the responsibilities are allocated should know what he is responsible for and to whom he is responsible regarding safety and health matters. The allocation of responsibilities should be recorded in document and it should be clearly stated that the final responsibility and accountability for safety and health rest with the top management. The top management must accept the responsibility for ensuring safety and health is incorporated into the running of the business. A relevant person at the top management should be designated to take up this final responsibility and accountability. Lastly, the document for allocation of responsibilities for safety and health should be signed and dated by the above person and be reviewed and revised periodically to maintain its validity and effectiveness.

### **3.2.4 Main safety and health responsibilities for different levels of staff in the organisation**

The following are the main safety and health responsibilities for different levels of staff in the enterprise:

- (a) Senior management
  - To provide a safe and healthy working environment.
  - To provide adequate resources (including financial), information and training.
  - To provide a system of monitoring compliance with the safety policy.
  - To ensure that relevant safety and health laws are complied with.

- To provide and maintain contact with internal and external safety advice from in-house safety advisor or safety officer, outside safety consultant, government departments, the Occupational Safety and Health Council and other professional bodies.
- To provide and maintain a system responding to safety initiatives from safety advisor/safety officer, safety supervisor or other employees and to the safety advice from government officers.
- To provide an effective, efficient and on-going safety and health promotion programme.
- To establish a system to identify, assess and eliminate hazards and control risks at work.
- To ensure that workplace safety rules, procedures and methods are developed, maintained and revised.

(b) Line management (including managers and supervisors)

- To assist in the implementation of policies and procedures.
- To assist in the identification, assessment and elimination of hazards and the control of risks.
- To supervise employees to ensure safe and correct working procedures.
- To ensure that effective consultation on safety and health matters occurs.
- To investigate accidents and incidents at work.
- To participate in induction and on-going safety training programmes for employees.
- To respond to safety initiatives of safety advisor/safety officer, safety supervisor or other employees and to the safety advice from government officers.
- To communicate effectively the hazards to employees and keep abreast of current safety and health legislation and information.
- To submit periodically to senior management statistics and reports concerning safety and health performance.

(c) Employee

- To conduct work activities in compliance with legal requirements.
- To closely follow safe work practices, procedures, instructions and rules, and to perform all duties in a manner which ensures the safety and health at work of himself and others in the workplace.
- To provide feedback on the effectiveness of safety measures implemented on the shop floor.
- To contribute ideas for safety improvement.
- To report hazards to supervisor and warn colleagues of hazards.
- To report any injury, accident or incident at work to supervisor.
- To participate in toolbox meetings and other safety activities and to attend safety training.

(d) Safety advisor or safety officer

An in-house safety advisor or safety officer should have the responsibility to assist the top management and senior management in promoting the safety and health of employees in the enterprise. His main duties should include the following:

- To identify and assess the hazards at work.
- To work with senior management or line management to eliminate or control these hazards by advising them as to measures to be taken, and, with their endorsement, implement such measures.
- To resolve shop floor safety and health issues.
- To conduct safety and health inspections to check the safety performance and recommend corrective action to senior management or line management.
- To investigate industrial accidents and incidents and recommend remedial measures to prevent recurrence.
- To be well informed about workplace safety performance.
- To consult with senior management, line management and employees about changes in the workplace which would likely

affect the safety and health at work of employees.

- To report regularly to the top management and senior management about the safety and health performance in the enterprise.

(e) Safety supervisor

The responsibility of a safety supervisor should be to assist the top management, senior management and the in-house safety advisor or safety officer in promoting the safety and health of employees in the enterprise. His main duties should include the following:

- To assist the in-house safety advisor or safety officer in carrying out his duties.
- To supervise employees' observance of the safety standards.
- To advise the senior management or line management as to the observance by employees of safety standards.
- To promote the safe carrying out of work in the workplace.
- To report regularly to the in-house safety consultant or safety officer on safety and health performance in the workplace.

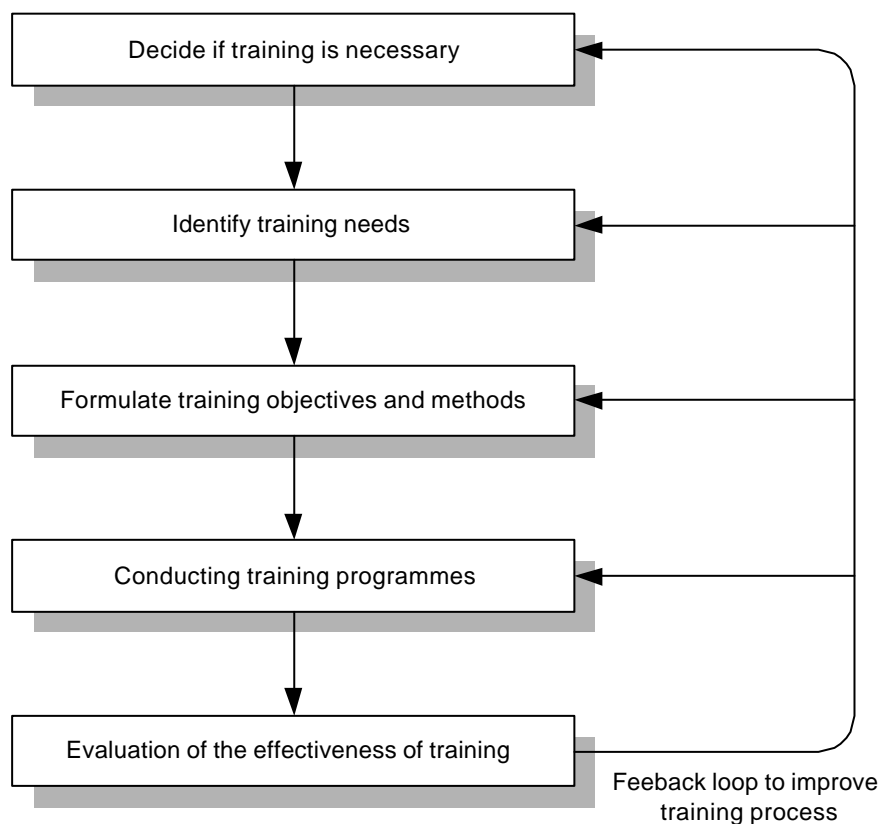
### **3.2.5 Safety committee**

A "safety committee" is a very important element of a safety management system. The details of setting up a safety committee are described in Section 3.10 of this Guide.

### 3.3 Training to equip personnel with knowledge to work safely and without risk to health

Training helps people acquire the skills, knowledge and attitudes to make them competent in the safety and health aspects of their work. It includes formal off-the-job training, instruction to individuals and groups, and on-the-job coaching and counselling. It is helpful to integrate the safety and health requirements of each job into the individual job specifications.

An enterprise should devise and refine or adjust its training policy systematically, as in the self-improving cycle shown below:



### **3.3.1 To decide if training is necessary**

Training should not be a substitute for proper risk control, for example to compensate for ineffectively guarded machinery. The key to effective training is to understand job requirements and individual abilities.

### **3.3.2 To identify training needs**

To equip his workers with knowledge on work safety and health, the proprietor or contractor of an enterprise must first identify what their safety and health training needs are. These needs are best established as part of an overall training needs analysis. For existing jobs, he can do the following things:

- (1) Consult job-specific accident, ill-health and incident records to see what caused losses of control and how can they be prevented;
- (2) Gather information from employees about how the work is done;
- (3) Observe and question workers when they are working, to understand what they are doing and why. This may be particularly relevant in complex process plants where any analysis has to take account of all the possible consequences of human error.
- (4) Consult risk assessment for the work.

There are three main types of training need: organisational, job-related and individual.

#### **(1) Organisational training needs**

A proprietor or a contractor should let his workers know:

- (a) the organisation's safety policy and the philosophy underlying it;
- (b) the structure and systems for delivering the policy.

Moreover, he should also let them know which parts of the systems are relevant to them, to understand the major risks in the enterprise's activities and how they are controlled.

(2) Job-related training needs

These fall into two main types: management needs and non-management needs.

(a) Management needs include:

- (i) leadership skills;
- (ii) communication skills;
- (iii) techniques of safety management;
- (iv) training, instruction, coaching and problem-solving skills relevant to safety and health;
- (v) understanding of the risks within a manager's area of responsibility;
- (vi) knowledge of relevant legislation and appropriate methods of control including risk management;
- (vii) knowledge of the organisation's planning, measuring, and auditing arrangements.

Some managers in key positions may have particular needs – for example, those who devise and develop the safety management system, investigate accidents or incidents, take part in audit activities or have to implement emergency procedures.

(b) Non-management needs include:

- (i) an overview of safety and health principles;
- (ii) detailed knowledge of the safety and health arrangements relevant to an individual's job;
- (iii) communication and problem-solving skills to encourage effective participation in safety and health activities.

(3) Individual training needs

Individual needs are generally identified through performance appraisal. They may also arise for the reason that an individual has not absorbed formal job training or information provided as part of his induction. Training needs vary over time, and assessments should cover:

- (a) induction of new starters, including part-time, temporary and imported workers;
- (b) maintaining or updating the performance of established employees (especially if they may be involved in critical emergency procedures);
- (c) job changes, promotion or when someone has to deputise;
- (d) introduction of new equipment or technology;
- (e) follow-up action after an accident/incident investigation.

### **3.3.3 Formulation of training objectives and methods**

Based on job analysis and risk assessment, an enterprise can set objectives and priorities for training. These can be used as the basis for measuring the effectiveness of training and for determining whether the workers have attained the desired level of proficiency. From these objectives, the appropriate training methods to suit the objectives should be devised.

### **3.3.4 Conducting training programmes**

Training can be conducted at the time, at a level of cost and expertise determined by the proprietor or contractor. However, in no circumstances should the cost of training be at the expense of his workers.

### **3.3.5 Evaluation of the effectiveness of training**

It is necessary to measure the effectiveness of training. Pre-testing determines the needs for the programme; post-testing quantifies what has been learned. It is important to assess whether the training programme has effectively corrected the previously identified lack of safety knowledge. It is also vital to obtain the study feedback on the training programme.

### **3.3.6 Maintenance of record of training**

Monitoring involves keeping track of who has been trained in what. Accurate records should be maintained for all safety and health training activities. Such records should identify the following data:

- (1) Training date and time
- (2) Training location
- (3) Length of training
- (4) Subject of training
- (5) Contents of training
- (6) Trainers and their expertise
- (7) Attendees
- (8) Test results of the attendees, if any.

### **3.4 In-house safety rules to provide instruction for achieving safety management objectives**

The ultimate objective of any safety management system is to prevent injury and ill health in the workplace. To accomplish this it is necessary for an enterprise to devise in-house safety rules.

In-house safety rules cover general rules, specialized work rules, specialized work permits and procedures. Examples of safety rules may include clear instructions to personnel in each of the following general areas:

- (1) safe operation of plant, machinery and equipment;
- (2) maintenance of plant, machinery and equipment;
- (3) proper and safe procedures for each production process, in the form of method statements;
- (4) rules and instructions on various risk control systems including the permit-to-work system;
- (5) provision, use and maintenance of personal protective equipment;
- (6) rules for the provision, use and maintenance of safe access and egress and for traffic and plant movement;
- (7) fire precautionary measures;
- (8) safe handling and movement of materials;
- (9) safety procedures for chemical processes and for the handling, transporting and storage of chemicals;
- (10) safety procedures for emergency;
- (11) duties and procedures for reporting hazards;
- (12) duties and procedures for reporting incidents, accidents and ill-health;  
and

- (13) good housekeeping in the workplace.

There should be a system for the identification and establishment of specialized in-house safety rules. Proprietors and contractors of enterprises should make reference to the following:

- (1) relevant legislation dealing with safety and health at work, which sets the minimum standard to follow;
- (2) Codes of practice and guidance materials issued by the Labour Department on safety and health at work;
- (3) International standards;
- (4) the best trade practice and trade performance.

In devising in-house safety rules, the proprietor or contractor of an enterprise is encouraged to have prior consultation with his employees. If there is a safety committee, the details of the safety rules should be discussed in the safety committee. Work rules and procedures should be documented and communicated to all appropriate personnel in the enterprise.

It may be that not all employees will need to know all of the detailed in-house rules but the proprietor or contractor of an enterprise should ensure that every worker in the enterprise is clearly instructed (and trained if necessary) of the rules relevant to him.

To ensure compliance with these in-house rules, the proprietor or contractor of an enterprise should exercise due diligence in the supervision of his employees and in regular inspections of his workplace. Moreover, there should be a written disciplinary policy addressing violation of rules with details of how verbal warnings, written reprimands, suspensions, demotions and, where necessary, termination might be applied. The policy may also include positive recognition (such as safety awards or incentive schemes for the purpose of positive reinforcement of those good safety performances).

### **3.5 A programme of inspection to identify hazardous conditions and for the rectification of any such conditions at regular intervals or as appropriate**

#### **3.5.1 Inspection as an active monitoring programme**

Measuring the safety and health performance of an enterprise against predetermined plans and standards exposes the need for remedial action. Monitoring activities signalise management commitment to safety and health objectives in general. They are an essential part of developing a positive safety and health culture. There are two types of monitoring systems:

- (1) active systems which monitor the achievement of objectives and the extent of compliance with pre-set standards.
- (2) reactive systems which monitor accidents, ill health, incidents and other evidence of deficient safety and health performance.

Inspection is an active monitoring programme.

#### **3.5.2 Goals of inspection**

A programme for the inspection of hazardous conditions is an essential part of any active monitoring programme. It is one of the best tools available to find problems and assess their risks before accidents and other losses occur. An enterprise should develop, implement and regularly review the inspection programme so as to achieve the following goals:

- (1) to identify potential problems that are not anticipated during the design or planning stage;
- (2) to identify equipment deficiencies, such as problems caused by normal wear and tear and abuse or misuse of equipment;
- (3) to identify improper employee actions, malpractices, etc.;
- (4) to identify changes in processes or materials which may have deterrent effect on the safety and health of employees;
- (5) to identify inadequacies in remedial actions;
- (6) to provide management self-appraisal information; and
- (7) to demonstrate management commitment.

### **3.5.3 The programme of inspection**

A system for inspecting workplace precautions is important in any active monitoring programme. It can form part of the arrangements for the preventive maintenance of plant and equipment which may also be covered by legal requirements. Equipment in this category includes lifts, cranes, chains, ropes, lifting tackles, power presses, electrical tools and equipment, scaffolds, trench supports, suspended working platforms and local exhaust ventilation, etc. But inspections should include other workplace precautions, such as those covering the use of premises, other places of work and systems of work.

A suitable inspection programme will take all risks into account but should be properly targeted, and it should be proportional to the hazard profile of the enterprise. Inspection should concentrate on areas where it is likely to produce the greatest benefit and lead to the greatest control of risk. Key risk control systems and related workplace precautions should therefore be monitored in more detail or more often (or both) than low-risk systems or management arrangements. For example, low risks might be dealt with by general inspections every month or two covering a wide range of workplace precautions such as the condition of premises, floors, passages, stairs, lighting, welfare facilities and first aid. Higher risks need more frequent and

detailed inspections, perhaps weekly or even, in extreme cases, daily or before use (for example, pre-use check on plant and machinery).

The inspection programme should satisfy any specific legal requirements and reflect the enterprise's risk priorities. Suitable schedules and performance standards for the frequency and contents of inspection can help. The schedules can be supplemented with inspection forms or checklists, both to ensure consistency in approach and to provide records for follow-up action. Inspection should be done by people who are competent to identify the relevant hazards and risks and who can properly assess the conditions found.

A properly thought-out approach to inspection will include:

- (1) a well-designed inspection form to help plan and initiate remedial action by requiring those doing the inspection to rank any deficiencies in order of importance;
- (2) summary lists of remedial action with names and deadlines to track progress on implementing improvements;
- (3) periodic analysis of inspection forms to identify common features or trends which might reveal underlying weaknesses in the system;
- (4) information to aid judgements about any changes required in the frequency or nature of the inspection programme.

An enterprise should keep full records of each inspection with details of both positive and negative findings. Such reports should be analyzed to identify repeated substandard situations and their underlying causes.

The results of inspections should be brought to the attention of senior management having responsibility in the area concerned. Information from safety inspections should be evaluated promptly to identify immediate risks and to ensure that appropriate remedial action is taken without delay. Any corrective action should be implemented as quickly as reasonably practicable. The inspection system should have a way of checking that remedial action is taken and monitored by senior management. The

persons carrying out the inspections should have received appropriate safety training.

An effective inspection programme should have a quality check built in to assess how well line management is carrying out the monitoring function. The safety inspection programme should be regularly reviewed to check for deficiencies and possible areas for improvement.

### **3.6 A programme to identify hazardous exposure or the risk of such exposure to the workers and to provide suitable personal protective equipment as a last resort where engineering control methods are not feasible**

#### **3.6.1 Identification of hazardous exposure or the risk of such exposure to the workers**

This element of safety management system is a pro-active one which should promote continual improvement and ensure that hazards are identified so that risks could be subsequently assessed and controlled before anyone (or anything) could be adversely affected.

In order to identify risk, the proprietor or contractor of an enterprise should in the first place prepare a list of work activities covering premises, plant, people and procedures, and gather information about them. Information required might include:

- (a) tasks being carried out, their duration and frequency;
- (b) location(s) where the work is carried out;
- (c) who normally/occasionally carries out the tasks;
- (d) others who may be affected by the work (e.g. visitors, contractors, the public);

- (e) training that personnel have received about the tasks;
- (f) written systems of work and/or permit-to-work procedures prepared for the tasks;
- (g) plant and machinery that may be used;
- (h) powered hand tools that may be used;
- (i) manufacturers' or suppliers' instructions for the operation and maintenance of plant, machinery and powered hand tools;
- (j) size, shape, surface character and weight of materials that might be handled;
- (k) distances and heights that materials have to be moved by hand;
- (l) services used (e.g. compressed air, electric supply);
- (m) substances used or encountered during the work;
- (n) physical form of substances used or encountered (fume, gas, vapour, liquid, dust/powder, solid);
- (o) contents and recommendations of hazard data sheets relating to substances used or encountered;
- (p) requirement of relevant regulations and standards relevant to the work being done, the plant and machinery used, and the substances used or encountered;
- (q) control measures believed to be in place;
- (r) reactive monitoring data (incident, accident and ill-health experience associated with the work being done, equipment and substances used gained as a result of information from within and outside the organisation);
- (s) findings of any existing assessments relating to the work activity.

Details of risk assessment, evaluation and development of safety procedures are given in Section 3.11

### **3.6.2 Provision of suitable personal protective equipment as a last resort where engineering control methods are not feasible**

Upon identification of the hazardous exposure or the risk of such exposure to the workers of an enterprise, the proprietor or contractor should find out whether planned or existing safety precautions (if any) are sufficient to keep the hazard under control and meet legal requirements. If the findings are on the contrary, he should take steps using engineering methods (for examples, adopting a safer production process, enclosure of a noisy machine, removal at source of the hazardous substances, etc.) to control the risks so that they are reduced to the lowest level that is reasonably practicable.

If –

- (1) the hazardous exposure or the risk of such exposure to the workers in the enterprise, after the aforesaid engineering methods of control are taken, is still not acceptable in that workers in the enterprise:
  - (a) are still liable to the risk in safety and health, or
  - (b) have uncertain potential of risk in safety and health,

or

- (2) there was no immediately feasible way to control the hazard,

the proprietor or the contractor of an enterprise should carry out a programme to provide suitable personal protective equipment to the workers in question.

Personal protective equipment (PPE) includes the following, when they are worn for protection of safety and health:

- (a) protective clothing such as aprons, protective clothing for adverse weather conditions, gloves, safety footwear, safety helmets, high

visibility waistcoats, etc.; and

- (b) protective equipment such as eye protectors, hearing protectors, life-jackets, respirators, breathing apparatus including those used underwater, and safety harness.

In the hierarchy of control measures, PPE should always be regarded as the “last resort” to protect against risks to safety and health. Engineering controls and safe systems of work should always be considered first. It may be possible to do the job by another method which will not require the use of PPE or, if that is not possible, to adopt other more effective safeguards. For example, fixed screens could be provided rather than individual eye protection to protect against swarf thrown off a lathe. However, in some circumstances PPE will still be needed to control the risk adequately.

There are a number of reasons for this approach. First, PPE protects only the person wearing it, whereas measures controlling the risk at source can protect everyone in the workplace. Second, theoretical maximum levels of protection are seldom achieved with PPE in practice, and the actual level of protection is difficult to assess. Effective protection is only achieved by suitable PPE, correctly fitted and maintained and properly used. Third, PPE may restrict the wearer to some extent by limiting mobility or visibility, or by requiring additional weight to be carried. Other means of protection should therefore be used whenever reasonably practicable.

Nevertheless, proprietors or contractors should provide appropriate PPE and training in its usage to their workers wherever there is a risk to safety and health that cannot be adequately controlled by other means.

The programme to provide PPE should include but is not necessarily limited to:

- (1) Conducting PPE risk assessment

If it is necessary to provide PPE an enterprise should conduct an assessment. The purpose of the assessment is to ensure the correct

PPE is chosen for the particular risk. Except in the simplest and most obvious cases which can be repeated and explained at any time, the assessment will need to be recorded and kept readily accessible by those who need to know the results.

(2) Proper selection of PPE

The proprietor or contractor of an enterprise should determine what type of PPE is required, taking into consideration of the legal requirements for specific situations, the intended use of the PPE, the manufacturer's product standards, ergonomics of design of the PPE, acceptability of the PPE to its wearer and user, and, if used in conjunction with other PPE, compatibility with that PPE in question, etc.

(3) Steps to ensure adequate supply of PPE, including replacement supply and spare parts.

(4) Steps to ensure the correct use, maintenance and storage of PPE, plus adequate training, information and instruction to workers on the safe and proper use and maintenance of PPE.

Maintenance should include, where appropriate, cleaning, disinfection, examination, replacement, repair and testing. The responsibility for carrying out maintenance should be clearly laid down, together with the details of the procedures to be followed and their frequency. Where appropriate, records of tests and examinations should also be kept.

Training, information and instruction should include:

- (a) an explanation of the risks present and why PPE is needed;
- (b) the operation, performance and limitations of the PPE;
- (c) instructions on the selection, use and storage of PPE;
- (d) factors affecting the protection provided by the PPE;
- (e) recognising defects in the PPE and arrangements for reporting loss or defects;
- (f) hands-on practice in putting on, wearing, removing, inspection, testing and maintenance of PPE

(5) Monitoring the use of PPE.

This includes the steps to monitor the effectiveness of the PPE during

use by observing the actual protection provided by the PPE. The results of monitoring would be very useful in providing information for reviewing the selection of the PPE.

### **3.7 Investigation of accidents or incidents to find out the case of any accident or incident and to develop prompt arrangement to prevent recurrence**

The investigation of accidents or incidents forms part of a reactive monitoring system which is triggered after an event and includes identifying and reporting:

- (1) injuries and cases of ill health;
- (2) other losses, such as damage to property;
- (3) incidents, including those with the potential to cause injury, ill health or loss;
- (4) hazards; and
- (5) weaknesses or omissions in performance standards.

Each of the above provides opportunities for an enterprise to check safety performance, learn from mistakes, and improve the safety management system and risk control. Information gathered from investigations is useful in reinforcing key safety and health messages.

There is value in investigating both actual and potential losses to learn how to prevent more serious events. Accurate reporting can be promoted by:

- (1) providing training which clarifies the underlying objectives and reasons for identifying such events;
- (2) creating a culture which emphasizes an observant and responsible approach and the importance of having systems of control in place before harm occurs;

- (3) providing open, honest communication in a just environment, rather than providing a tendency merely to allocate “blame”;
- (4) cross-referencing and checking first-aid treatments, health records, maintenance or fire reports and insurance claims to identify any otherwise unreported events.

### **3.7.1 Level and nature of investigation**

Not all events need to be investigated to the same extent or depth. The proprietor or contractor needs to assess each event (for instance, using a simple risk-based approach) to identify where the most benefit can be obtained. The greatest effort should be focused on significant events where there have been serious injury, ill health or loss as well as those which have the potential to cause widespread or serious injury or loss. Investigations should:

- (1) identify reasons for any substandard performance;
- (2) identify underlying failures in the safety management system;
- (3) learn from events;
- (4) prevent recurrences;
- (5) satisfy legal and reporting requirements.

Investigations should be led by someone with the status and knowledge to make authoritative recommendations. Usually, this will be a line manager or a safety officer. A safety and health consultant/advisor, a medical or nursing advisor, technical staff or equipment suppliers may need to provide assistance and senior managers may need to be involved if events have serious or potentially serious consequences. Adequate training in relevant techniques should also be provided.

A good investigation is prompt and thorough. It recommends and assigns remedial actions as soon as practicable after the event.

Investigation consists of 4 ingredients:

- (1) The collection of evidence about what happened;
- (2) Assembling and considering the evidence;
- (3) Comparing the findings with the appropriate legal, industry and company standards, drawing conclusions on the causes and recommending measures to prevent recurrence;
- (4) Implementing the recommendations and tracking progress.

Standard report forms can usefully guide people through the investigation processes outlined above and help the managers responsible for authorising necessary follow-up actions to set priorities. The recording system should:

- (1) collect information accurately and present it in a consistent form;
- (2) enable analysis to identify common causes, features and trends which may not be apparent from the investigation of an individual event;
- (3) record information which might foreseeably be needed in future or which may also be useful for management purposes, including a record of the time taken to carry out the investigation and the related costs;
- (4) alert others to the learning points from a single event or a series of events.

### **3.7.2 Key data to be covered in accident, ill health and incident reports**

- (1) Details of any injured person, including age, sex, experience, training, etc.;
- (2) A description of the circumstances, including the place, time of day and

conditions;

- (3) The direct causes of any injuries, ill health or other loss;
- (4) The immediate causes of the event;
- (5) The underlying causes – for example, failures in workplace precautions, risk control systems or management arrangements;
- (6) Details of the outcome, including in particular:
  - (a) the nature of the outcome – for example, injuries, or ill health to workers; damage to property, process disruptions; creation of hazards;
  - (b) the severity of the harm caused, including injuries, ill health and losses;
  - (c) the immediate management response to the situation and its effectiveness. This involves the consideration of the following questions:
    - (i) Was it dealt with promptly?
    - (ii) Were continuing risks dealt with promptly and adequately?
    - (iii) Was the first-aid response adequate?
    - (iv) Were emergency procedures followed properly?
  - (d) Recommendations to prevent the recurrence of the accident or incident.

### **3.7.3 Follow up the progress of the implementation of recommendations to prevent recurrence**

The proprietor or contractor of an enterprise should ensure there is mechanism for implementation, with priorities, of the aforesaid recommendations to prevent recurrence of accidents/incidents.

### **3.7.4 Statistical analysis**

It is essential that an enterprise should perform statistical analysis based on the information collected and recorded from the investigation of accidents and incidents. The analysis should enable management to identify common causes, features and trends which may not be apparent from the investigation of an individual event. This in turn provides valuable information for the management in considering adjustments to the safety plan and corresponding action programmes.

### **3.8 Emergency preparedness to develop, communicate and execute plans prescribing the effective management of emergency situations**

Emergency preparedness is vital because, when an emergency does occur, a quick and correct response is necessary to reduce injuries, illnesses, property damage, environmental harm and public concern. Management should identify the types of emergencies the organisation needs to plan, organize, practise and prepare for.

#### **3.8.1 Emergency planning**

An emergency planning committee or a similar set-up should be formed to identify and list out possible emergencies, identify their effects and impact, prioritise and review the list of possible emergencies. To get a complete picture and to consider all possible scenarios, the committee should include representatives from all departments/sections in the enterprise. A list of potential emergency situations such as fire, electric shock, flood, explosion, hazardous chemical spills or releases, internal/external leaks of explosive or flammable gas, personal injuries and illnesses, natural disasters, electrical outage, town gas supply interruption and critical damages to facility/equipment, etc. should be drawn up, with priority properly accorded.

### **3.8.2 Emergency response plan**

A working committee or similar set-up should be formed to work on the details of an emergency response plan for each of the possible emergencies on the list. The members of the working committee should consist of representatives from the departments/sections involved in each of the possible emergency situations. The emergency response plan, including procedures on what can and should be done, what equipment is necessary and what people are needed, should then be developed for responding to each emergency situation. The emergency response plan should be written and communicated to all employees. It should be posted throughout the company and the work site and be properly maintained to allow ready access and use by managers, supervisors and employees. The details of such plan should include:

- (a) an alarm system and the procedures for reporting, declaring emergency, and clearing off emergencies;
- (b) a control centre – its location and resources (such as radio, records, engineering drawings, a list of supporting personnel required, etc.);
- (c) emergency organisation – duties and responsibilities of officers;
- (d) employee accountability;
- (e) procedures to be followed by employees who must remain at work to perform critical operations before they evacuate;
- (f) special teams for medical attention, salvage, rescue, fire fighting and others, if necessary, and their duties;
- (g) training of team members, workers and staff;
- (h) improved facilities and equipment to meet the needs of emergencies (such as communication equipment for use during emergencies, emergency power supply to the main switchboard, sensors and alarm system, exit signs/lights, fire hoses, fire extinguishers, spill containment materials, breathing apparatus, masks and special suits, and first aid boxes, etc.);
- (i) evacuation route map and safe assembly point;

- (j) schedule for emergency drills to test readiness;
- (k) post-event business recovery plan which should include lists of important contacts, suppliers and vendors, and where vital records are stored; and
- (l) procedures for public relation.

When an emergency response plan is put together, it should be kept in the emergency manual. The manual should contain all information necessary to respond to various emergencies and should include such information as building floor plans and layout plans showing utility lines, emergency egress, fire-fighting equipment, diagrams of vital chemical systems, utility systems and special (if any)/regular fire extinguishing systems, telephone numbers of key company personnel and police, fire and services, and a list of outside contractors that are qualified to assist with special problems, etc. The emergency manual should be kept in a secure area which is easily accessible to emergency personnel.

### **3.8.3 Post-event business recovery plan**

The post-event business recovery plan is an essential element of an emergency response plan. The recovery plan should be designed to get the company back into operation as soon as possible after an emergency. The following are some of key elements that should be included in the recovery plan:

- (a) sources of temporary replacement equipment;
- (b) a list of manufacturers who can supply replacements quickly, and can provide and install temporary utilities;
- (c) a list of consultants/advisors on engineering and safety problems.

### **3.9 Evaluation, selection and control of sub-contractors to ensure that sub-contractors are fully aware of their safety obligations and are in fact meeting them**

#### **3.9.1 Evaluation and selection strategy**

The evaluation and selection strategy should clearly aim at ensuring that sub-contractors with knowledge of good safety standards and a good record of putting them into practice would be selected for the work. A practicable approach to evaluate and select suitable sub-contractor is set out below:

- (a) Identification of suitable bidders (potential sub-contractors)
  - (i) Each sub-contractor wishing to qualify as a bidder should be asked to provide a safety policy which would be vetted to assess its adequacy.
  - (ii) The sub-contractor should also be required to submit the safety organisation and details of responsibility, track records in safety, working experience with clients of high safety standards, safe systems of work/safety programmes in place, current safety management system and training standards. These should also be vetted to assess adequacy.
  - (iii) A sub-contractor will become a qualified bidder if he passes the adequacy tests for items (i) and (ii) above.

- (b) Identification of suitable sub-contractor
- (i) Pre-bid briefing should be provided to all qualified bidders. They should be invited in writing to attend the briefing and their attendance should be recorded.
  - (ii) Safety requirements, standards and specifications, the consequences of non-compliance and the relevant safety provisions in the contract, as well as the local safety laws that apply, should be clearly communicated to bidders in the briefing.
  - (iii) Bidders should identify all of the safety and health hazards within the specifications. To help them do this, a checklist on all the common safety and health problems which may arise during the work should be provided/communicated to them in the specifications before the bid is made. Some topics that may be included in the checklist are:
    - Access to and egress from the worksite and the places of work within the worksite
    - Working at height
    - Lifting appliances operation
    - Fire prevention
    - Electrical requirement
    - Underground and overhead services
    - Lighting requirements
    - Manual handling operation
    - Special hazards such as confined space or asbestos work, etc.
    - Occupational health risks such as noise and toxic fumes, etc.
    - Storage of flammable substances and chemicals
    - Personal protective equipment
    - Emergency rescue/first-aid
    - Welfare amenities such as toilets and drinking water facilities

- Training requirements for the employees
- (iv) The bids submitted by the potential sub-contractors should be checked against the potential safety and health problems to ensure that all the safety and health hazards that may arise during the work have been clearly identified by them and that proper provisions have been made for the control of the risks assessed. Each potential sub-contractor should also be required to submit an outline safety plan for the implementation of the risk control measures. The outline safety plan should set out in summary form the sub-contractor's proposed means of complying with his obligations in relation to safety and health at work.
- (v) The contract should go to the sub-contractor who is able to identify all the safety and health hazards that may arise during the work, can assure that the most proper and adequate provisions have been made for the control of the risks, and has the best outline safety plan compared to other bidders.

### **3.9.2 Control Strategy**

The control strategy should aim at monitoring the safety performance of the sub-contractor and keeping him on the right track with regard to the achievement of the client's safety and health objectives during the execution of the contract. A practicable control approach should include the following:

(a) *Special terms and conditions in the contract*

All safety rules and provisions should be set down in detail in the contract for the sub-contractor to follow and implement. One of such provisions should be that the sub-contractor agrees to abide by all the provisions of the client's safety policy which may affect his employees

or the work, including compliance with workplace safety rules. In case that the sub-contractor further sub-contracts all or part of his work to other sub-sub-contractors, the sub-contractor should ensure the sub-sub-contractors are fully aware of the safety policy and safety rules of the sub-contractor's client. The following special conditions should therefore be attached to the contract for the sub-contractor to undertake:

- to inform any sub-sub-contractor of all safety requirements;
- to incorporate observance of all safety requirements as a requirement of any future sub-contract;
- to require the sub-sub-contractor to do similarly if he in turn sub-contracts any work.

Another provision in the contract should be that the sub-contractor is required to submit a detailed and comprehensive safety plan based on the outline safety plan, indicating how he and the sub-sub-contractors (if any) are going to implement the safety measures for risk control during the work. The safety plan should include detailed policies, procedures, rules, safety and health obligations and responsibilities of the sub-contractor which, when being implemented, should ensure compliance with all safety rules set out in detail in the contract. The sub-contractor should adhere to the safety plan in carrying out his obligations under the contract and should ensure that his own sub-contractors of any tier (if any) receive copies of the safety plan and comply with its requirements as well.

In addition, a sub-contractor's participation in on-site safety committees should also be a condition of the contract.

(b) *Risk assessment by the sub-contractor before the commencement of the work*

The sub-contractor should be requested to conduct a risk assessment before the work commences and recommend a safe system of work for the work. The safe system of work should include safety precautions, work methods, tools and equipment to be used and how the

sub-contractor organizes his work to reduce risks to employees' safety and health. The sub-contractor should be required to submit the risk assessment report together with the organisation chart and expected workforce, list of the sub-sub-contractors and their key personnel, safe working procedures, list of tools and equipment, and the preventive maintenance schedule, etc.

(c) *Control of sub-contractor on site*

The following are some of the approaches for controlling the safety performance of a sub-contractor on site:

- The sub-contractor should be required to appoint/nominate a person or a team to co-ordinate all aspects of the contract, including safety and health matters on site. In addition, the sub-contractor should develop communication paths to pass on all relevant safety information to those in the shop floor level.
- The sub-contractor should be required to attend a pre-contract commencement meeting with the client to review all safety aspects of the work.
- The sub-contractor should be required to attend regular progress meetings between all parties, where safety and health should be the first item on the agenda.
- The proprietor or contractor should carry out regular safety inspections, at least at weekly intervals, to check on a sub-contractor's activities.
- The sub-contractor should be required to provide written method statements in advance of undertaking any special work such as demolition, confined space work, working with asbestos, work on energised electrical installations, erection of falsework or temporary support structures, erection of steel and any work which involves disruption or alteration to main services or other facilities of the client's activities. It should be noted that in the event of a need to deviate from the method statement, further progress of work should be withheld until agreement has been reached in writing between the client and the sub-contractor on the work method to be followed under the new circumstances.

- The sub-contractor should be required to report to the client all lost-time accidents and dangerous occurrences, including those of sub-sub-contractors.
- The sub-contractor's safety and health training programme should be regularly monitored by the client to ensure that all employees are properly and effectively trained in safety and health matters in connection with the progress of work.

## **3.10 Safety Committees to identify, recommend and keep under review measures to improve the safety and health at work**

### **3.10.1 Setting up of safety committees**

An enterprise should establish one or more than one safety committees to carry out the functions of identifying, recommending and keeping under review measures to improve the safety and health of the workers in the enterprise.

In general, it should be unnecessary for an enterprise to have two or more committees for the same workplace, e.g. representing different levels of staff. Safety committees are most likely to prove effective when their work is related to a single establishment rather than a collection of geographically distinct places.

Therefore, if the proprietor or contractor is running a business consisting of two or more establishments in different locations, he should have two or more safety committees. Examples are:

- (i) A large factory with workplaces in distinct districts.
- (ii) A construction company operating different construction sites.

In these examples, there should be a safety committee at each locality (i.e. the workplace level) as well as at the enterprise level.

### **3.10.2 Functions of safety committees**

The functions of the safety committees (i.e. identifying, recommending and keeping under review measures to improve the safety and health of workers

in an enterprise) include:

- (i) monitoring the safety policy – determining whether it is adequate and how well it is being implemented;
- (ii) on-going evaluation of hazards and arrangements to implement safety measures;
- (iii) establishment of arrangements to deal promptly with dangerous working conditions, including those coming to light in disputes arising from workers refusing to work on grounds of imminent danger;
- (iv) discussion and establishment of a mechanism to resolve disputes when workers refuse work on the grounds of imminent danger;
- (v) assistance in the development of safe work procedures and safe system of work;
- (vi) a study of accident/incident statistics and trends, so that reports can be made to top management on unsafe and unhealthy conditions and practices, together with recommendations for corrective action;
- (vii) an examination of safety audit reports on a similar basis to (vi);
- (viii) a scrutiny of safety reports and direction on appropriate actions;
- (ix) a watch on the adequacy and effectiveness of employee safety training;
- (x) a watch on the adequacy of safety and health communication and publicity in the workplace;
- (xi) organisation of safety promotion activities such as safety competitions, exhibitions, film shows, safety incentive schemes and safety suggestions; and
- (xii) a provision of links with external sources for safety advice.

In certain instances, the safety committee may consider useful to carry out inspections which help members assess the effectiveness of the safe system of work as well as the adequacy of safety training.

### **3.10.3 Implementation of measures recommended**

The proprietor or contractor should implement, so far as is reasonably practicable, the measures recommended by the safety committee. A

mechanism should be established whereby decisions and actions recommended by the safety committee can be effectively communicated to those persons responsible for their implementation. Where necessary, monitoring arrangements should be set up by the safety committee to follow through the implementation of its recommendations.

### **3.10.4 Composition of the safety committee**

A safety committee should have a wide representation adequately covering the interests of management and all employees, yet its size should be kept as reasonably compact as possible. The number of members representing workers in the enterprise shall not be less than that representing the proprietor or contractor. Members of the safety committee can be appointed by nomination or by election. In practice, it is preferable to have management representatives nominated by the proprietor or contractor, while the members representing the workers elected by the workers themselves. Management membership should come from as many levels as practicable, with senior management well represented and a careful mix of line management and functional management. The aim is to ensure:

- (a) adequate authority to give proper consideration to views and recommendations; and
- (b) necessary knowledge and expertise to provide accurate information to the committee on company policy, production needs and technical matters in relation to premises, processes, plants, machinery and equipment.

Supervisors are key men in regard to safety as well as production and their active cooperation are therefore essential. It is most important that the supervisors should be kept continuously abreast of the safety committee's work. The supervisory level should also be represented in the safety committee.

In enterprises where company doctors, industrial hygienists or safety

officers/advisors are employed, they should be ex-officio members of the safety committee. Other specialists of the enterprise, such as project engineers, chemists, organisation and methods personnel and training officers might be co-opted for particular meetings when subjects on which they have expertise are to be discussed.

The proprietor or contractor should ensure that the safety committee is provided with a written statement setting out the rules governing its membership.

It should be the practice for the membership of a safety committee to be regarded as part of an individual's normal work. As a consequence he or she should suffer no loss of pay through attendance at meetings of safety committee or at other agreed activities such as inspections undertaken by, or on behalf of, such committees.

The role of two of the key members, namely the chair and the secretary / safety advisor, in a safety committee is as follows:

*Chair*            The success of a safety committee is governed by the commitment and the support given to it by the top management. This is best expressed by the appointment of a senior management representative as the chair. The senior management whose name appears on the safety policy document would be most appropriate.

The chair should not be an empty title : the chair should regard it as one of his priority engagements to attend committee meetings, thus demonstrating management's real and practical interest in accident prevention.

*Secretary / Safety advisor*            The position of the safety advisor in relation to the committee is a special one. His participation is extremely valuable by virtue of his expertise. At the same time, his job demands impartiality, so his advice should be available equally to management and employees on the committee.

It should be the greatest advantage to the committee to have the safety advisor as its permanent secretary. A second responsible person should act as minute-taker so that the safety advisor is free to participate in discussions and give advice and information where needed. The chairman should arrange for secretarial services for the committee.

It should be the safety advisor's duty as the committee secretary to see that the committee's resolutions are put into effect or otherwise properly dealt with and that the person instructed to take action makes a report at the next meeting. As a secretary, the safety advisor should always see that a detailed agenda is prepared. It will help improving efficiency of the meetings if he takes some time to go over the agenda with the chairman beforehand so that the latter has the background information on each item.

*Size*            Regarding the size of the safety committee, a balance should be struck between a wide representation and a reasonable size. A safety committee should not be too large. Fifteen members is a desirable maximum. The larger the committee the more difficult it will be to get full attendance, the less will be the participation from the more timid members, the longer will be the discussions and the fewer the decisions taken.

### **3.10.5 Proceedings of meetings, etc.**

(a) *Written statements and formality*

In addition to the rules of membership as mentioned in Section 3.10.2, an enterprise should also ensure that the safety committee is provided with a written statement setting out rules governing its terms of reference and meeting procedures.

It may be necessary to draw up additional rules for the conduct of meetings, which could include procedures by which the committee reaches decisions.

A certain amount of formality is essential to uphold the authority of the chair, to keep discussions to the point, and to emphasize the importance of the meeting and the fact that decisions are to be made. Formality should not, however, go so far as to result in an atmosphere of constraint.

(b) *Matters to be discussed*

Meetings must be planned beforehand, with the matters to be discussed listed on an agenda. Agenda stating the contents of the meetings should be issued in advance (for example, not less than a week before the meeting).

Only matters relating to safety and health at work of the workers in the enterprises should be discussed in the meetings of the safety committee.

(c) *Frequency of meetings*

In general, the frequency of meetings of a safety committee depends upon the volume of work to be handled and the complexity and nature of hazards in the workplace. Nevertheless, in any case, it should meet at least once every three months.

Monthly meetings are usually found to be satisfactory. If sub-committees are formed for particular tasks, it will normally be necessary for them to meet more often because their aim is to produce a specified result within a time limit.

The safety committee's programme should be arranged well in advance and notices of the dates of meetings published to let all employees know.

(d) *Records of meetings*

The proprietor or contractor should ensure that proper records on safety committee meetings are kept to provide a progress report on decisions made, recommendations put forward and actions taken.

These records should be —

- (i) kept for not less than 5 years counted from the date of the meeting to which the record concerned relates; and
- (ii) made available for inspection upon request by an occupational safety officer.

(e) *Decisions and recommendations*

The decisions and recommendations of a safety committee should be brought to the notice of employees. The relevant documents should be displayed or made available by other convenient means.

### **3.10.6 Protection of safety committee members**

A safety committee has the function of keeping under review the measures taken to ensure the safety and health of employees in workplaces. To make the safety committee a success in performing this function, a proprietor, a contractor or an employer, as the case may be, of the enterprise should encourage his employees to participate actively in the safety committee. No discriminating action (including terminating or threatening to terminate employment) should be taken against any worker because the worker has performed his function as a member of a safety committee.

### **3.11 Evaluation of job related hazards or potential hazards and development of safety procedures**

This refers to the carrying out hazard analysis for jobs. The objective of hazard analysis should be to provide a means whereby job hazards or potential hazards are identified, evaluated and managed in a way that eliminates or reduces them to an acceptable level. Safe working procedures and safety precautions that are to be taken to prevent the hazards and to control the risks should be developed after the hazard analysis.

#### **3.11.1 Programme for hazard analysis**

The enterprise should establish and maintain a programme for the identification and assessment of job hazards and risks, the formulation, implementation and maintenance of risk control measures and the review. The programme should aim at recording known hazards/risks, identifying new hazards or assessment of the risks, evaluation of the hazards/risks, analysis of the effects or the potential effects resulting from these hazards/risks, and development and implementation of means to eliminate the hazards/risks or to manage them to an acceptably low level. Hazard identification or risk assessment should form part of the safety inspections referred to in Section 3.5; or should be a function of the safety committee covered by Section 3.10; or should be a major component in the programme to protect workers from occupational health hazards covered by Section 3.14 of this Guide. The proprietor or contractor should ensure that persons responsible for the analysis of hazards or assessment of risks and

for determining the means of eliminating or reducing any hazards/risks are competent and given the necessary support so that they can effectively perform their duties.

### **3.11.2 Main stages in hazard analysis**

There are five stages in hazard analysis, namely:

- (a) hazard identification;
- (b) risk rating;
- (c) designing risk control measures;
- (d) implementing and maintaining risk control measures; and
- (e) reviewing.

The above stages can also be called "risk assessment".

### **3.11.3 Hazard identification**

Hazard identification is the process of identifying all situations or events that could give rise to the potential for injury, illness or damage to plant or property. Hazard identification should take into account how things are being done, where they are done and who is doing them, and should also consider how many people are exposed to each hazard identified and for how long. The following should be accorded top priority in the hazard identification process:

- *High frequency of accidents or near misses*

Jobs or works with a high frequency of accidents or near misses pose a significant threat to the safety and health of employees at work.

- *History of serious accidents causing fatalities*  
Jobs or works that have already produced fatalities, disabling injuries or illnesses, regardless of the frequency, should have a high priority in the hazard identification process.
- *Existence of a potential for serious harm*  
Jobs or works that have the potential to cause serious injury or harm should be analyzed by the hazard identification process, even if they have never produced an injury or illness.
- *Introduction of new jobs or work*  
Whenever a new job or work is introduced, a hazard identification process should be conducted before any employee is assigned to it.
- *Recent changes in procedures, standards or legislation*  
Jobs or work that have undergone a change in procedure, equipment or materials, and jobs or work whose operation may have been affected by new regulations or standards should require the carrying out of hazard identification process.

On the other hand, there are numerous other sources of information on hazards identified in the jobs/work which the proprietor or contractor of an enterprise should pay attention to. These include direct reports from employees or visitors, accident and incident reports from the job/work in the trade, industry information such as industry and trade association guidance, safety committee and safety officer/advisors, safety inspections, legislation and codes of practice, guidance from authorities, and local and international standards which are applicable.

The main method of hazard identification should include the following:

- *Direct observation method*  
An experienced worker of good safety awareness should be observed for carrying out the job/work several times. The job steps or work processes/activities and the hazards in each of these should be recorded.

- *Recall method*

This should be done for jobs/works that are rarely performed. Job steps or work processes/activities should be listed out and asked for hazards during a brainstorming session with a team of experienced employees including the designers, engineers and supervisors carrying out the job or work. During the brainstorming session, the subjects that should be looked into include materials, machines or equipment used, technical specifications, people employed at each stage of work, any sub-contractor, and proposed work method.

### 3.11.4 Risk rating

The risk associated with a hazard should be a reflection of the likelihood that the hazard will cause harm and the severity of that harm. The two elements of risk, i.e. likelihood and severity, should be independent of each other. The vast majority of hazards are relatively straightforward and requiring only a simple method of risk rating. The method incorporates a judgement as to whether or not a risk is acceptable. Such a method is illustrated as follows:

- (a) For each hazard identified for each job step or work process/activity, ask the question “what if?”. Realistically what is the worst likely outcome (i.e. the severity)? Is it a fatality, major injury/permanent disability including permanent ill health, a minor injury, or no injury and only plant damage?
- (b) Make a judgement of the probability or likelihood of harm occurring based on the following table:

<b>Probability/likelihood</b>	<b>Description</b>
Likely/frequent	Occurs repeatedly/event only to be

	expected
Probable	No surprise Will occur several times
Possible	Could occur sometime
Remote	Unlikely, though conceivable
Improbable	So unlikely that probability is close to zero

If the judgement is “improbable”, this needs to be subject to particularly rigorous scrutiny as, in reality, this is a relatively rare situation. Decisions as to whether or not action is needed can then be made by reference to the matrix formed by probability/likelihood and the worse likely outcome (i.e. severity). Items from the first rank would be prioritized first, followed by those from the second rank and then those from the third rank and so on. Alternatively, numerical rating can be applied to both likelihood and severity; the risk of a hazard can then be determined by multiplying its likelihood rating by its severity rating. The higher the score, the higher the risk and the higher the hazard’s priority for control measures.

There are a number of techniques available for formal assessing of risk of major or complex hazards. For example, the “hazard and operability study” which is an examination of the full process or those parts determined as “relevant” by hazard identification, the “failure mode and effect analysis” which examines systematically the components or parts of a system and questions on how it might fail and what the effects of failures on other parts or on the system will be, etc., and the “fault tree analysis” which identifies an event tree and traces out the sequence of failures preceding the event by assigning numerical values (failure rates) to each of the events and to estimate the ultimate failure rate of occurrence.

### 3.11.5 Designing risk control measures

Risk control is the measure, or measures, put into place to reduce risk to an acceptable level. What constitutes an acceptable level is arguable but the proprietor or contractor of an enterprise should be able to show that he has taken all relevant factors into account including, if appropriate, the costs of different types of control measures. This will normally require documentary evidence to show this has been done.

When deciding on risk control measures, the list below should be considered, in the order given. Risk control measures from lower down the list should only be used if it can be shown that using a measure higher up the list is not possible or, in the circumstances, would be too costly.

### **List of risk control measures**

- (a) Eliminating hazard at source: for example, using a non-hazardous substance instead of a hazardous one, stop using a noisy machine.
- (b) Reducing hazard at source: for example, using a substance less hazardous than the one used at present, replacing a noisy machine with a quieter one.
- (c) Removing employees from hazard: for example, paint spraying by unattended robots, not allowing employees to work near noisy machines.
- (d) Containing hazard by enclosure: for example, all paint spraying work to do be done in a proper and enclosed paint spraying booth, installing soundproof enclosure for a noisy machine.
- (e) Reducing employee exposure: for example, reducing exposure to hazardous substance or noise by arranging to have four employees exposed for two hours each instead of one employee for eight hours.
- (f) Using personal protective equipment as the last resort: for example, using proper gloves and goggles for employees working with hazardous substances and hearing protectors for employees operating noisy machines.

In selecting appropriate risk control measures, it should be vital to start at the top and work down the list, selecting the highest method which is reasonably practicable in the circumstances.

### **3.11.6 Implementing and maintaining risk control measures**

For a risk control measure to be implemented effectively and efficiently, it should be as far as practicable developed at the workplace by involving all levels of staff and getting their support. Feedback from the people implementing the risk control measure should be encouraged so that improvement to the measure can be made.

An important aid to implementation should be good design of risk control measures. Where it requires time to implement well-designed control measures and the situation demands it, interim arrangements should be in place. For example, where engineering measures are being installed to reduce exposure to hazardous substances, other control measures such as work methods and the use of suitable personal protective equipment should be used in the interim.

Maintaining risk control measures should require scheduled inspections and scheduled maintenance for, as an example, engineering control measures. It should also involve ensuring that people continue to comply with safety and health procedures that are part of the control measures by rewarding compliance and imposing sanctions when there is non-compliance.

### **3.11.7 Reviewing**

Whatever control measure is used, the assessment should be reviewed to ensure its effectiveness and efficiency if there is reason to suspect that it is no longer valid, or if there has been a significant change in the matters to which it relates. For example:

- (a) When information is obtained about a previously unknown design or manufacturing fault, or about a previously unidentified hazard.

- (b) When the design is revised or modified.
- (c) When the system of work associated with the plant is changed.
- (d) When the plant is moved.
- (e) When the ownership of the plant changes.
- (f) When there is a change to the workplace environment.
- (g) When there is any other change that makes the existing method of assessing risk irrelevant.

## **3.12 Promotion, development and maintenance of safety and health awareness in a workplace**

The objective of safety promotion is to develop and maintain awareness among all personnel, of the organisation's commitment to safety and health, and of the individual employee's responsibility to support that commitment. The proprietor or contractor of an enterprise should recognise that the promotion of safety and health is a valuable way of advancing the culture of safety and health in the workplace and of reinforcing the concept that safety and production are inseparable. Through continuous safety promotion, the proprietor or contractor can increase the awareness, interest and willingness of employees to act in ways that would increase their personal safety and that of co-workers, and that would support the organisation's stated safety objectives.

### **3.12.1 The need for a safety promotion programme**

In general, safety promotion programmes should be developed and maintained by the proprietor or contractor of an enterprise in order to put into practice the promotion of safety and health. The safety and health programmes should clearly demonstrate the commitment of the proprietor or contractor to establishing an effective safety management system that will provide and maintain a safe and healthy working environment. The programmes should have clearly defined objectives and should require very careful thought and consideration if the maximum benefit is to be obtained. Safety promotion programmes should take place during working hours to demonstrate the top management's commitment to safety and health. The use of gifts and other tangible rewards for effort and performance exhibited in the safety promotion programme can, if correctly implemented, also play a

part in encouraging the workforce to be more involved. The proprietor or contractor should, as part of a safety promotion programme, develop a procedure to recognize and acknowledge good safety performance either by individuals, teams, sections, departments or the organisation. The proprietor or contractor should appoint a coordinator for such programme who will help making the programme more effective and will plan and co-ordinate implementation in the workplace.

### **3.12.2 Safety promotion approaches**

A safety promotion programme should have a combination of the following approaches in safety promotion:

(a) *Promotion of safety in meetings*

A meeting can provide a good opportunity for promoting safety. Meetings suitable for promoting safety include orientation meetings for new comers, training meetings, problem-solving meetings such as quality management meetings, information meetings such as tool-box meetings and regular safety meetings. Safety and health films/videos of relevant subjects should be selected and screened for the benefit of those in the meetings and time should be allowed for the discussion of the subject after the viewing.

(b) *Promotion of safety with individuals*

This should be done by the line manager to promote safety directly to all subordinate staff during the normal course of their work. For an enterprise that hires contractors, every contractor should be treated as an individual for safety promotion by the organisation. Provisions in the contract for promoting safety by the contractor should be laid down.

(c) *Promotion of safety in print*

- (i) Safety handbooks and brochures  
Up-to-date safety handbooks and brochures should be issued to increase safety awareness and as part of the safety training for staff.
- (ii) Safety bulletins and newsletters  
Safety bulletins and newsletters should be published by the enterprise to promote safety. They should contain interesting articles including stories about accidents, pictorial presentations of safety rules, safety procedures and safe systems of work, a staff suggestion scheme and a quiz competition to encourage readership.
- (iii) Safety magazines  
Safety magazines, written in appropriate level and language, issued by reputable safety and health professional bodies should be circulated to all members of the organisation to promote safety.
- (iv) Safety notice boards  
The boards should be used to post safety policy, rules, news, suggestions, accident reports, accident reporting procedures, emergency procedures, circulars, memos, notice of safety video shows and drills, etc.
- (v) Safety billboards  
Vital statistics (such as up-to-date safety performance statistics of the enterprise and the individual work site including up-to-date accident-free days, no-loss days or number of accidents) should be posted at the main entrance to the workplace or a conspicuous position within the workplace (such as the site office entrance).
- (vi) Safety posters  
Safety posters should be posted at strategic locations in the workplace (such as the main entrance and the production line). They should be weatherproof, relevant, up-to-date, clear and attractive.

(vii) Statistical reports

Statistical reports on safety performance or their summaries should be circulated to all members of the enterprise to promote awareness of safety and health at work. The report should include progressive data on the disabling injury incidence rate (including occupational diseases) and minor injuries. All disabling and minor injuries should be tabulated by type and by department/section, etc. of the enterprise.

(d) *Promotion of safety with awards and recognition*

Competitions between departments, sections or different workplaces of the enterprise should be held with some tangible or intangible rewards for the winners at the end of the competitions. The purpose of safety awards is to recognise and promote safe work practices and reinforce positive attitudes towards safety. The most important award an employee or a group of employees can receive is recognition of a contribution to safety. An award does not have to be large but it should be meaningful and appropriate for the occasion and the employee or a group of employees. Awards can be luncheons, cash bonuses, gifts or even a trophy. Employees should be involved in the development process of safety competitions.

### **3.12.3 Successful safety promotion programmes**

Attributes for a successful safety promotion programme should include the following:

- (a) Critical safety problems should be properly identified.
- (b) Focus and safety slogan for the programme should be clearly determined.
- (c) Objectives of the safety promotion programme such as raising awareness or increasing knowledge should be clearly established.
- (d) Activities in support of the main theme or slogan of the programme should be organised.
- (e) Programme should be related to accidents or practices in the workplaces.
- (f) Visuals and videos should be used to attract attention and interests.
- (g) Incentives for participation in the programme should be provided.
- (h) Programme activities should be coordinated with other elements of the safety management system, but there should be no overlapping of activities.

### **3.13 A programme for accident control and elimination of hazards before exposing workers to any adverse work environment**

This element refers to a process control programme which aims at identifying occupational safety and health risks and properly planning the work process to control those risks. The process control programme can be applied to all processes, from construction of bridges/building complex or building of ships to more specific process such as the manufacturing of highly hazardous substances, etc. An effective process control programme requires a systematic approach to evaluating the whole process. Using this approach, the process design and technology, operational and maintenance activities and procedures, emergency preparedness plans and procedures, training programmes, and other elements which impact on the process are all considered in the evaluation. The various lines of defence incorporated into the design and operation of the process to abate or reduce the safety and health risks need to be evaluated and strengthened to assure their effectiveness at each level. The following stipulates some of the main components of a process control programme.

#### **3.13.1 Provision of process safety information**

Complete and accurate written information concerning process materials/chemicals, technology and equipment is essential to an effective process control programme and to a process hazard analysis as described in Section 3.13.2. The compiled information should be a necessary resource to a variety of users including the people who will perform the process

hazard analysis, those developing the training programme and the operating procedures, and the contractors whose employees will be working with the process, if any. Besides, process technology information should be a part of the process safety information package and it should include appropriate diagrams (such as block flow diagrams, process flow diagrams and piping and instrument diagrams, etc.) of the process to be carried out. Other information may also be required, such as: the established criteria for maximum inventory levels for process materials/chemicals; limits beyond which would be considered upset conditions; and a qualitative estimate of the consequences or results of deviation that could occur if operating beyond the established process limits.

The information pertaining to process equipment design and the codes and standards relied on to establish good engineering practice should be documented. For existing equipment designed and constructed many years ago in accordance with the codes and standards available at that time and no longer in general use today, the proprietor or contractor of the enterprise should as far as reasonably practicable document which codes and standards were used and that the design and construction along with the testing, inspection and operation are still suitable for the intended use. Where the process technology requires a design which departs from applicable codes and standards, the organisation should as far as reasonably practicable document that the design and construction is suitable for the intended purpose.

### **3.13.2 Process hazard analysis**

A process hazard analysis is similar to the risk assessment method as described in Section 3.11. It should be an organised and systematic effort to identify and analyse the significance of potential hazards associated with the carrying out of a specific process in the enterprise. It should provide information to assist the top management in making decisions for improving safety and health standards in the process. A process hazard analysis should be directed towards analysing the potential causes and

consequences of the occurrence of accidents with injuries, fires, explosions and releases of toxic or flammable substances. It should focus on equipment, instrumentation, utilities and human actions that might impact on the process. These considerations would assist in determining the hazards and potential failure points or failure modes in a process.

The selection of a technique to carry out a process hazard analysis would be influenced by many factors including the level of existing knowledge about the process. For example, is it a process that has been operated for a long period of time with little or no innovation and extensive experience has been gained from its use? Or, is it a new process or one which has been changed frequently by the inclusion of innovative features? Also, the size and complexity of the process would influence the decision as to the appropriate technique to be used. The simple checklist methodology works well when the process is very stable and no changes have been made, but it is not as effective when the process has undergone extensive change.

The techniques commonly available for formal assessment of major or complex hazards as described in Section 3.11.4 can be used to carry out the process hazard analysis.

### **3.13.3 Operating procedures and practices**

Operating procedures should describe tasks to be performed, data to be recorded, operating conditions to be maintained, samples to be collected, and safety and health precautions to be taken. The procedures need to be technically accurate, understandable to employees involved and revised periodically to ensure that they reflect current operations. Operating procedures should be reviewed by engineering staff and operating personnel, together with the safety officer/advisor to ensure they are accurate and provide practical instructions on how to carry out job duties safely.

Operating procedures should include specific instructions or details on what steps are to be taken or followed in carrying out the stated procedures. Operating instructions for each procedure should include the applicable safety precautions and should contain appropriate information on safety implications. Computerised process control systems would add complexity to operating instructions. These operating instructions should describe the logic of the software as well as the relationship between the equipment and the control system. All control room personnel (if any) and operating staff should have a full understanding of operating procedures which are also called standard operating practices for operations. Besides, operating procedures should be changed when there is a change in the process. The consequences of operating procedure changes should be fully evaluated and the information conveyed to the relevant personnel.

### **3.13.4 Employee training**

Besides those referred to in Section 3.3, all employees involved, including maintenance and contractor employees (if any), should fully understand the safety and health hazards of the processes they work with for the protection of both themselves and their fellow employees. Also, additional training in subjects such as operating procedures and safety work practices, emergency evacuation and response, safety procedures and other areas pertinent to process safety and health should be covered in the training programme.

Hands-on training where employees are able to use their senses beyond merely listening will enhance learning and should be provided. Other training techniques using videos or on-the-job training should also be considered. The proprietor or contractor of the enterprise should periodically evaluate the training programme to see if the necessary skills, knowledge, and routines are being properly understood and implemented by their trained employees. In addition, careful consideration should be given to ensure that employees, including maintenance and sub-contractor's employees (if any), have received current and updated training.

### **3.13.5 Sub-contractors working with the process**

There should be a system to evaluate, select and control sub-contractors (if any) working with the process. See Section 3.9 for details.

### **3.13.6 Mechanical integrity**

The proprietor or contractor of an enterprise should review their maintenance programmes and schedules to see if there are areas where “breakdown” maintenance is used rather than an on-going mechanical integrity programme. Equipment used should be designed, constructed, installed and maintained to minimize the risk at work. A mechanical integrity programme should be in place to ensure the continued integrity of process equipment. Elements of a mechanical integrity programme should include identification and categorisation of equipment and instrumentation, inspections and tests, testing and inspection frequencies, development of maintenance procedures, training of maintenance personnel, the establishment of criteria for acceptable test results, documentation of test and inspection results, and documentation of manufacturer’s recommendations as to meantime to failure for equipment and instrumentation.

### **3.13.7 Investigation of accidents/incidents**

Besides those referred to in Section 3.7, the proprietor or contractor of an

enterprise should develop in-house capability to investigate accidents/incidents that occur in the facilities. For serious or alarming accidents/incidents, the enterprise should as far as reasonably practicable assemble a team trained in the techniques of investigation including how to conduct interviews with witnesses, how to secure necessary documentation and how to write reports. It is preferable to have a multi-disciplinary team to gather the facts of the event, to analyse them and to develop plausible scenarios as to what happened, and why. Team members should be selected on the basis of their training, knowledge and ability to contribute to a team effort to fully investigate the accident/incident. Employees in the process area where the accident/incident occurred should be consulted or interviewed.

### **3.13.8 Emergency preparedness**

An enterprise should be well prepared for all reasonably foreseeable emergency situations in its workplaces. See Section 3.8 for details.

### **3.14 A programme to protect workers from occupational health hazards**

It is the duty of the proprietor or contractor of an enterprise to ensure the safety and health of their workers. The principles for protecting workers from occupational health hazards through controlling risks are almost the same as those for safety. They consist of five basic stages:

- (1) Hazard identification – identifying hazards which could cause harm;
- (2) Risk assessment – assessing the risk which may arise from the hazards;
- (3) Risk control – deciding on suitable measures to eliminate or control risk;
- (4) Implementing and maintaining risk control measures; and
- (5) Reviewing.

The nature of health risks can make the link between work activities and employee ill health less apparent than in the case of injury from an accident. Since health may be irreversibly damaged before the risk is apparent, it is essential to develop a preventive strategy to identify and control risks before anyone is exposed to them. Failure to do so can lead to workers' disability and loss of livelihood. It can also mean financial losses for the enterprise through sickness absence, lost production, compensation and increased insurance premiums.

#### **3.14.1 Hazard identification**

This is the essential first step. The objective is to find out whether there exists any health hazard in the workplace. Relevant sources of information should include:

- (1) legislation and supporting codes of practice approved by the Commissioner for Labour which give practical guidance and include basic minimum requirements;
- (2) process information; information and advice from suppliers of equipment, chemicals and other materials used at work;
- (3) relevant international standards;
- (4) industry or trade association guidance;
- (5) the personal knowledge and experience of managers and workers;
- (6) accident, ill health and incident data from within the enterprise or from other enterprises;
- (7) expert advice and opinion and relevant research.

Besides, the hazard identification process should take into account the following health hazards from work activities –

- (1) *Hazardous chemicals*
  - if inhaled can cause asthma, bronchitis or cancer;
  - if swallowed can cause poisoning;
  - if spilt onto the skin or splashed into the eyes can cause dermatitis or severe irritation
- (2) *Sprains, strains and pains*
  - can be caused by manual lifting of heavy loads;
  - upper limb disorders, so called repetitive strain injury, can happen if the workstation is poorly designed so that people have to adopt awkward body position during their work. Upper limb disorders can also occur as a result of repetitive or fast movements, poor posture and high forces during work.
- (3) *Noise*
  - noise levels which are too high can lead to hearing problem such as tinnitus (ringing in the ears), or noise induced hearing loss.

(4) *Vibration*

- too much vibration, e.g. from pneumatic concrete breakers, can lead to hand-arm vibration syndrome, with circulation problems such as “white finger”, where the fingers become numb and lose sense of touch.

(5) *Radiation*

- Radiation such as infra-red and ultra-violet radiation and lasers can all damage the eyes and skin. Microwaves can cause excessive heating of exposed parts of the body.

(6) *Extremes of temperature, pressure and humidity*

- can affect people’s ability to work safely and can cause harmful changes within their bodies, such as heat stress and ‘the bends’ (decompression sickness).

(7) *Stress*

- can affect all employees, not just managers. Stress is often behind a lot of sickness absences. It can contribute to coronary heart disease and illness caused by high blood pressure.

There should be a critical appraisal of all routine and non-routine business activities. In the simplest cases, hazards can be identified by observation and by comparing the circumstance with the relevant information. In more complex cases, measurements such as air sampling may be necessary to identify the presence of health hazards. In the most complex or high risk cases (for example, in the chemical industry), special techniques and systems may be needed such as hazard and operability studies and hazard analysis techniques such as fault tree analysis. Specialist advice may be needed to choose and apply the most appropriate method.

Although specialist help may be needed to control risks to health, the proprietors or contractors of the enterprises themselves remain responsible for managing work activities in a way that will prevent their workers being made ill by their work.

### **3.14.2 Risk assessment**

Risk assessment helps to decide which health risks should be given priority. The aim is to identify what steps need to be taken to control risk. Risk assessments should be done by competent persons.

A full description of risk assessment is detailed at Section 3.11

### **3.14.3 Risk control**

When risks have been analysed and assessed, decisions about the precautions against occupational health hazards can be made. All final decisions about risk control methods should take into account the relevant legal requirements which establish minimum levels of risk prevention or control.

The following is a summary of the preferred hierarchy of risk control principles:

- (1) To eliminate risks by substituting the dangerous by the inherently less dangerous. For example: use less hazardous substances; adopt a less health hazardous process.
- (2) To combat risks at source by engineering controls and giving collective protective measures priority, for example:
  - (a) To separate the operator from the risk of exposure to a known hazardous substance by enclosing the process;
  - (b) To design process machinery and work activities to minimise the release of, or to contain, airborne hazards.
- (3) To minimise risk by:
  - (a) designing suitable systems of work, such as a permit-to-work system;

- (b) using personal protective clothing and equipment; and this should only be used as a last resort.

Although in complicated cases specialist help may be needed to control risks to health, much can be done to prevent or control risks to health by taking straight-forward measures such as:

- (1) consulting the workforce on the design of workstations;
- (2) consulting the suppliers of substances, plant and equipment about minimising exposure;
- (3) enclosing machinery to cut down noise;
- (4) exploring the feasibility of using less hazardous materials;
- (5) ensuring that workers are trained in the safe handling of all the substances and materials with which they come into contact.

In devising risk control measures, the involvement of affected workers and consultation encourage solutions which are relevant and practical for those who have to implement them. The details of the control measures should be discussed in the safety committee.

#### **3.14.4 Implementing and maintaining risk control measures**

Same as that described in Section 3.11.6.

#### **3.14.5 Reviewing**

Same as that described in Section 3.11.7

### **3.14.6 Health surveillance**

The primary objective as well as the benefit of health surveillance should be to detect adverse health effects at an early stage, thereby enabling further harm to be prevented. In addition, the results of health surveillance can provide a means of:

- (a) checking the effectiveness of control measures;
- (b) providing feedback on the accuracy of the risk assessment;
- (c) identifying and protecting individuals from increased risk.

Regarding health surveillance requirements, the following substances and agents are covered by relevant regulations under the Factories and Industrial Undertakings Ordinance:

- (1) Carcinogenic substances, with the meaning as defined in the Factories and Industrial Undertakings (Carcinogenic Substances) Regulations;
- (2) Asbestos, with the meaning as defined in the Factories and Industrial Undertakings (Asbestos) Regulation; and
- (3) Compressed air, with the meaning as defined in the Factories and Industrial Undertakings (Work in Compressed Air) Regulations.

The proprietor or contractor of an industrial undertaking with any worker exposed to any aforesaid substance or agent shall ensure that the worker is provided with medical surveillance in accordance with the relevant regulation.

For other substances or agents that may cause serious irreversible health problems (e.g. silicosis, chrome ulceration, systemic toxicity, occupational asthma, severe dermatitis, cancers etc.), and if the risk assessment shows that medical surveillance under the supervision of a medical practitioner is required, the proprietor or the contractor of an enterprise should ensure that the workers affected are provided with such surveillance as is appropriate having regard to the risks to their health identified by the risk assessment.

The frequency of health surveillance depends on the requirements of individual regulations and, in addition to that, should be determined either on the basis of suitable general guidance or on the advice of a qualified practitioner.

Whenever health surveillance is required, the proprietor or the contractor in question should keep a health record for each of the workers who is subject to the surveillance (a) in accordance with specific regulations, or (b) when no specific regulation is applicable, for a minimum of 5 years.

If there is any case or suspected cases of ill-health related to exposure occur at work, it is important that the proprietor or contractor must investigate them immediately and take necessary action to prevent or control exposure, since they may well indicate that existing controls are not adequate.

## 4. Safety audit

The remaining topic in the safety management model is the safety audit, which is an essential tool to maintain the performance of the safety management system. It constitutes the “feedback loop” which enables the organisation to reinforce, maintain and develop its ability to reduce risks to the fullest extent and to ensure the continued effectiveness of the safety management system. Organisations should carry out a safety audit of their existing arrangements for the safety management system.

### 4.1 What is a “safety audit”?

In this Guide,

“*safety audit*” means an arrangement for –

- (a) collecting, assessing and verifying information on the efficiency, effectiveness and reliability of a safety management system; and
- (b) considering improvements to the system.

A safety audit is a systematic examination to provide an independent assessment of the validity and reliability of the management planning and control systems. Auditing supports monitoring by providing managers with information on the implementation and effectiveness of plans and performance standards. It also provides a check on the reliability, efficiency and effectiveness of the arrangements for policy making, organising, planning implementing, measuring and reviewing performance. Auditing needs to be comprehensive and examine over time all the components of the health and safety management systems

---

outlined in earlier chapters.

Safety audit involves a series of examination, assessment and verification processes to determine whether activities and related results conform to planned arrangements and whether these arrangements are implemented effectively and are suitable to achieve the organisation's safety policy and objectives. In order to maximise the benefits of a safety audit, suitable arrangements for the auditing processes of (1) collection of information, (2) assessment and verification of information and (3) consideration of improvements should be made.

#### **4.1.1 Arrangement for collecting information**

##### *(a) Interviewing individuals*

Individuals should be interviewed to gain information about the operation of the safety management system and the perceptions, knowledge, understanding, management practices, skill and competence of managers and employees at various levels in the organisation.

In general, key personnel in the enterprise to be audited, as well as those organisations such as the sub-contractors connected with the operation of the safety management system in that enterprise, should be required to provide relevant information to the safety auditor. It may be necessary to utilize pro-forma questionnaires to ensure that interviews are carried out in a structured manner and that all the information required is obtained efficiently and with the minimum of inconvenience to the parties involved. Key personnel usually include the proprietor or contractor of the enterprise, and the directors/managers and persons with specific responsibilities for safety and health such as the safety officer/safety advisors or similar post, or for instance those responsible for the control of permits to work and the experienced employees, etc. Other representative personnel at all

levels should also be interviewed to establish whether or not procedures are known, understood and followed. Information gathered through interviews should be verified by supporting information from independent sources, such as that acquired by carrying out visual observations of work activities/processes and physical conditions of workplaces and examination of records concerning the operation of the safety management system in place. Non-verifiable statements from interviews should be identified as such.

(b) *Examining documents*

Examining documents and assessing records on risk control systems, performance standards, procedures and instructions for completeness, accuracy and reliability together with the implications for competence and understanding should be carried out.

In practice, these may need to be reviewed when preparing the safety audit to identify issues to follow up and people to interview. Documentation appropriate for examination and assessment should indicate the evidence of the implementation and maintenance of the key elements of the safety management system and should include:

- the safety policy and the statement of supporting safety organisation and arrangements;
- risk assessments;
- previous safety audit records;
- safety and health manuals and emergency procedures;
- safety and health risk control arrangements;
- safety committee/safety group or unit meeting minutes;
- safety inspections, accident, incident and ill-health reports and statistics;
- occupational hygiene records. For example personal monitoring records;
- reports by the enforcing authorities;
- safety training records;

- 
- in-house safety rules and regulations and records of their compliance;
  - the agreements with sub-contractors (if applicable);
  - records of safety promotion programmes;
  - statutory registers, forms and certificates; and
  - safety and health suggestions.

(c) *Visual observations*

The aim of visual observations of physical conditions and work activities within a safety audit is to examine compliance with legal requirements, verify the implementation and effectiveness of workplace safety precautions and risk control systems, and confirm the information gathered during interviews and examination of documentation. Observations should include simple visual observations of work and behaviour and visual checking of premises, plant and equipment, and should either involve a total examination of a particular operation or activity or be undertaken on the basis of a limited sample.

Collection of information about the safety management system requires decisions on the level and detail of an audit. All audits involve sampling and a key question is always: "How much sampling needs to be done to make a reliable assessment?" The nature and complexity of an audit should therefore vary according to its objectives and scope; the size, sophistication and complexity of the enterprise; and the maturity of the existing safety management system.

The information so collected in a safety audit should be able to provide a check on the adequacy and effectiveness of the safety management system in place. Therefore, information concerned with answering the following questions should be collected:

- (a) Is the safety management system adequate, working well and without waste of resources? (i.e. is it doing the right things?)
- (b) Is the safety management system working as intended and to

the desired effect? (i.e. is it doing thing right?)

- (c) Does the safety management system fit to be trusted upon? (i.e. can it ensure that all requirements regarding safety and health are complied with consistently and can it secure continued effective operation?)

#### **4.1.2 Arrangements for assessing and verifying information**

- (a) The adequacy of a safety management system is judged by making a comparison between what is found against a relevant “standard” or benchmark (i.e. the audit criteria). Legal standards, codes of practice/guidance notes, applicable industry standards and international standards should be used to make audit judgments.
- (b) Sufficient evidence should be collected to determine whether the enterprise’s safety management system conforms to audit criteria. The evidence obtained should form the basis of objective findings about the audit rather than subjective judgments about performance. Evidence is typically based on interviews, examination of documents, visual observation of activities and conditions, existing results of measurements and tests, or other means within the scope of the audit. Indications of non-conformity to the audit criteria for the safety management system should be recorded.
- (c) Evidence should generally take the form of both qualitative and quantitative data. The use of correctly designed audit aids such as checklists and interview questions, etc. should simplify the analysis of the data. In some cases, it would be helpful to score audit findings so that changes in performance can be measured from one audit to the next. Where such an approach is adopted, it should be based on auditing methods that ensure consistency in scoring.

- (d) The value of a safety audit is dependent upon the experience and knowledge of the safety auditor, his ability to interpret and use the audit findings, and the implementation of the recommendations of the safety audit report. It is also dependent upon the integrity of all the parties involved. Therefore, checks should be built into the system to help to avoid the misrepresentation or misapplication of safety audit results.
  
- (e) The safety auditor should review all of his audit evidence to determine where the safety management system does not conform to the safety management system audit criteria. He should then ensure that audit findings of non-conformity are documented in a clear, concise manner and supported by audit evidence. In this Guide, "audit finding" means results of the evaluation of the collected audit evidence compared with the agreed audit criteria. Lastly, audit findings should be reviewed with the manager responsible for a particular work activity, area or function of the enterprise with a view to obtaining acknowledgement of the factual basis of all findings of non-conformity. If contention is raised by the responsible manager, it should be clarified before the audit findings are brought to the proprietor or contractor of the enterprise.

#### **4.1.3 Arrangements for consideration of improvements**

- (a) Based on the audit findings and with reference to supporting evidence, the overall performance of the safety management system should be assessed. If there are inadequacies/non-conformities identified about the existing safety management system of the enterprise, recommendations on action for improvement to the system should be made. The audit findings should also identify the observed strengths and suggest how they can be built on.

- (b) A plan based on the audit findings for improvements to the safety management system should be developed and drawn up. This plan should consist of necessary remedial measures/actions to rectify the inadequacies/non-conformities and should be drawn up together with responsibilities, completion dates and reporting requirements. Follow-up monitoring arrangements should be established to ensure satisfactory implementation of the plan for improvements.

## **4.2 The appointment of a safety auditor**

- (a) The proprietor or contractor should appoint a safety auditor to conduct the safety audit. The safety auditor should be independent of the activity that is to be audited. This may involve one person, a team of managers, specialists and non-management employees or external consultants. Factors that should be considered by the proprietor or contractor should include the availability of the auditor for the length of time necessary to undertake the audit; the availability of an auditor with the necessary skills; the level of audit experience required; the requirement for specialist knowledge or technical expertise; the danger of an internal auditor being over-familiar or satisfied with the enterprise's arrangements, compared with the benefits of the fresh eyes and a possibly more questioning approach of an external auditor; and the danger of unfamiliarity or lack of understanding, particularly where complex technical issues or processes are involved. The proprietor or contractor should consider the following basic criteria when appointing a safety auditor –
  - The auditor should understand his task and be competent to carry it out.
  - The auditor should be familiar with the industry and the processes being carried out in the enterprise.
  - The auditor should have a good knowledge of safety management practices for the industry.
  - The auditor needs to have the status, experience and knowledge of the relevant standards/systems he is auditing against to enable him to

---

evaluate performance and to identify deficiencies.

- (b) The appointment of a safety auditor should preferably be done in writing by the proprietor or contractor so that there is documentation to show the appointment.

### **4.3 What should the proprietor or contractor do to facilitate the safety audit?**

Auditing is an essential element of a safety management system, not a substitute for it. For safety and health auditing to be of value, senior management should be fully committed to the concept of auditing and to its effective implementation within the organisation. It should also be noted that safety auditing cannot be a success without the full support of staff at all levels. Cooperation from the shop-floor up to the management level is needed. The management of an enterprise should therefore provide all necessary assistance, facilities and information to enhance the progress of the safety audit.

- (a) What "assistance" shall be provided?

- (i) *Full co-operation with the safety auditor*

The proprietor or contractor should ensure that staff at all levels in the enterprise are made aware of the objectives of conducting safety audit and its benefits so that they would not see the audit as a threat. All staff should be required to be open and to co-operate wholeheartedly with the safety auditor, and to respond to any questions and request for information/data frankly and efficiently during the audit.

- (ii) *Determination of the scope of the safety audit*

The scope of the audit should be determined by the proprietor or contractor in consultation with the safety auditor prior to the audit. The scope of the safety audit should describe the extent and boundaries of the audit in terms of factors such as physical location and organisational activities as well as the manner of reporting. All employees, including the management staff, should be informed about the audit scope by the proprietor or contractor, who should ensure that the resources committed to the audit should be sufficient to meet its intended scope.

(iii) *Assisting in the establishment of the audit criteria and audit plan*

The proprietor or contractor should participate fully in the making up of the safety audit criteria with the safety auditor. The safety audit criteria should include policies, practices, procedures or requirements against which the safety auditor compares collected audit evidence about the standards of the elements of the safety management system and their associated activities. Requirements should include but not be limited to standards, codes of practice/guidance notes, guidelines, specified organisational requirements and legislative requirements.

In addition, the proprietor or contractor should take part in the making up of the safety audit plan to be prepared by the safety auditor. The proprietor or contractor should fully understand the audit plan which should be communicated to all relevant staff of the enterprise who will be affected by the audit. The proprietor or contractor should also take part in the review of the plan carried out by the safety auditor during the audit process. The plan should in particular include:

- the safety audit objectives and scope;
- the safety audit criteria;
- identification of the organisational and functional units to be audited;
- identification of the functions and/or individuals within the enterprise having significant direct responsibilities regarding the safety management system;
- the procedures for conducting safety audit to the elements of the

- 
- safety management system as appropriate for the enterprise;
  - the working and reporting languages of the safety audit;
  - identification of reference documents;
  - the expected time and duration for major safety audit activities;
  - the dates and places where the safety audit is to be conducted;
  - the schedule of meetings to be held with the management of the enterprise;
  - the confidentiality requirements;
  - the contents and format of the safety audit report, the expected date of issue and distribution of the report; and
  - document retention requirements.

Besides, the proprietor or contractor should make agreements with the safety auditor about the suitable commencement and completion dates for the safety audit, and the date by which the audit report is to be completed by the safety auditor.

(iv) *Provision of appropriate authority and resources*

Appropriate authority such as the power of entry into the workplace, access to confidential information and the inspection of reports, records or statutory forms relating to safety and health matters, etc. should be provided to the safety auditor during the audit. In addition, adequate resources in terms of financial and human resources should be provided to the safety auditor to ensure that the safety audit can be carried out in an effective and efficient way.

(v) *Appointment of senior staff to accompany the safety audit*

Responsible and competent senior staff should be appointed to accompany the safety auditor and to act as guides to the work site and the processes and to ensure the auditor is fully aware of safety and other appropriate requirements implemented in the enterprise.

(b) What “facilities” shall be provided?

*Provision of on-site facilities*

The proprietor or contractor of the enterprise should provide the auditor adequate interview/meeting place (such as interview room) to conduct interviews with relevant working personnel on site, as well as a desk and chair. The proprietor or contractor should also provide suitable personal protective equipment for the use of the auditor during the audit process. The proprietor or contractor should also provide adequate technical and secretarial support (such as photocopying and e-mail services; the use of video recorder/camera, personal computer and communication equipment, etc.) for the auditor when conducting the safety audit. In addition, appropriate testing and measuring equipment should be made readily available during the audit. Transportation for the auditor to go from one work location to another distant work location should also be provided by the proprietor or contractor. Lastly, welfare facilities such as toilet and drinking water should be made available in the work sites where the audit is to be carried out.

(c) What “information” shall be provided ?

*Tendering all documentation relating to safety and health matters for safety audit*

The proprietor or contractor of the enterprise should fully co-operate with the safety auditor and tender all the necessary documentation for inspection and checking by the safety auditor. Document should include organisational chart, safety committee/safety working group meeting minutes, investigation reports of accidents and incidents, production flow charts, work specifications and procedures, permit-to-work procedures, material safety data sheets, statutory forms/certificates, safety and health manuals, risk assessment reports, method statements, previous safety audit reports and records/document required to confirm that the work activities meet the safety and health standards.

---

## **4.4 What should the proprietor or contractor do after receiving the audit report?**

Upon receiving the safety audit report submitted by the safety auditor after the completion of the safety audit, the proprietor or contractor shall as soon as practicable (i.e. within one to two working days in general) thoroughly read the report with a view to understanding its major contents. He should countersign the report and record the date of his countersignature.

Before countersigning the safety audit report, however, the audit findings/conclusions and the recommendations for improvements to the safety management system should be seriously considered by the proprietor or contractor and also by the appropriate levels of the management (including those affected by the findings of the report). The proprietor or contractor should also communicate the substance of the audit report and the recommendations for improvements to the safety management system, if any, to appropriate personnel (such as management staff of appropriate levels or workers of the enterprise or its sub-contractors, if applicable) who would be affected by or involved in the recommendations for improvements.

If the safety audit report contains recommendations for improvements to the safety management system, the proprietor or contractor shall draw up a plan, preferably in written form and with remedial measures, responsibilities, completion dates and reporting requirements, etc, for the implementation of the improvements as soon as possible. In general, a plan for improvements should include the following essential components :

(a) Present situation

The present situation about the effectiveness, efficiency and reliability of the safety management system in operation in the enterprise should be defined as specifically as possible in order to compare it with the desired situation. This should be based on the audit findings of the existing safety management system revealed in the safety audit report submitted to the proprietor or contractor of the enterprise.

(b) Desired situation

The desired situation regarding the effectiveness, efficiency and reliability of the safety management system of the enterprise should be defined as specifically as possible in order to measure accomplishment. This should be based on the recommendations for improvements to the existing safety management system of the enterprise.

(c) Needs for change

The needs for change should define exactly what should be accomplished in order to move from the present situation to the desired situation. It should include remedial measures to improve the overall effectiveness, efficiency and reliability of the safety management system in the enterprise.

(d) Action plan

The action plan should be the “how-to” with specific steps, time-lines and accountabilities/responsibilities. It should be specific enough to be measurable and should lead logically towards the desired situation regarding the effectiveness, efficiency and reliability of the safety management system. In general, the action plan should answer the questions of “what”, “who” and “when to do” for improvements to the safety management system. Monitoring arrangements should be laid down in the plan to ensure its effective and efficient implementation.

The proprietor or contractor shall as soon as is practicable implement the plan drawn up to rectify the shortcomings that exist in the safety management system. For simple and straightforward remedial measures such as slight modifications of

in-house safety rules, the plan should be implemented within a week's time after it is drawn up. However, for more complex issues such as re-designing of the programme for accident control or the elimination of hazards for high risk processes, implementing should begin in 2 to 4 weeks' time after the plan is drawn up. The completion date for the implementation of the plan should be affixed closely to the date proposed in the plan as far as possible.

The proprietor or contractor shall also keep a copy of the report and the plan, if any, in a register for future reference. Follow-up monitoring arrangements should be established by the proprietor or contractor to ensure satisfactory implementation of the plan for the improvements to the efficiency, effectiveness and reliability of the safety management system.

## References

Reference has been made to the following materials during the preparation of this Guide:

1. Successful Implementation of Works Bureau and Housing Authority Health and Safety Management Systems, 1998, Occupational Safety and Health Council, Hong Kong
2. Course materials for safety auditor course, 1997, YHL International, Singapore
3. Code for the establishment of shipyard safety management system, 1995, Association of Singapore Marine Industries, Singapore
4. Course materials for Basic Safety Auditing Course, 1996, DNV Industry Pte. Ltd., 1995, Singapore
5. Guidelines for the Establishment of Safety Management System at Construction Worksites, 1995, Singapore Contractors Association Ltd., Singapore
6. Course notes of Construction CHASE Auditor' s course, Health and Safety Technology And Management Ltd., 1995, United Kingdom
7. Risk assessment- A Practical Guide, 1993, Institution of Occupational Safety and Health, United Kingdom

8. Course notes of Safety Auditors Training Scheme, 1997, Hong Kong Polytechnic University, Hong Kong
9. BS8800:1996 Guide to occupational health and safety management systems, 1996, British Standards Institution, United Kingdom
10. HSC6: Writing a safety policy statement: advice to employers, 1990 Edition, Health and Safety Commission
11. Successful health and safety management, 1997 Second Edition, Health and Safety Executive, United Kingdom
12. Health risk management: a practical guide for managers in small and medium-sized enterprises, 1995 Edition, Health and Safety Executive, United Kingdom
13. Five steps to information, instruction and training, 1996 Edition, Health and Safety Executive, United Kingdom
14. Management of health and safety at work: approved code of practice: Management of Health and Safety at Work Regulations 1992, Health and Safety Executive, United Kingdom
15. Personal protective equipment at work: guidance on regulations: Personal Protective Equipment at Work Regulations 1992, Health and Safety Executive, United Kingdom
16. Safety representatives and safety committees, Third Edition, 1996, Health and Safety Executive, United Kingdom

17. AS/NZS4360:1995 Australian/New Zealand Standard on Risk Management, 1995, Australia
18. ISO 14001:1996 Environmental Management Systems – Specification with Guidance for Use, 1996, International Organisation for Standardisation
19. ISO 14004:1996 Environmental Management Systems – General Guidelines on Principles, Systems and Supporting Techniques, 1996, International Organisation for Standardisation
20. ISO 14010:1996 Guidelines for Environmental Auditing – General Principles, 1996, International Organisation for Standardisation
21. ISO 14011:1996 Guidelines for Environmental Auditing – Audit procedures – Auditing of Environmental Management Systems, 1996, International Organisation for Standardisation
22. ISO 14012:1996 Guidelines for Environmental Auditing – Qualification Criteria for Environmental Auditors, 1996, International Organisation for Standardisation
23. OHSAS 18001:1999 Occupational health and safety management systems – Specification
24. OHSAS 18002:1999 Occupational health and safety management systems – Guidelines for the implementation of OHSAS 18001
25. OSHA Regulations (Standards – 29CFR), Compliance Guidelines and Recommendations for Process Safety Management – 1926.64 App C, 1993, Occupational Safety and Health Administration, United States of America
26. Management Systems for Safety, Jeremy Stranks, 1994, Pitman Publishing

27. Industrial Safety and Health Management, C. Ray Asfahl, Third Edition, 1995, Prentice Hall
28. Safety Engineering, James CoVan, 1995, John Wiley & Sons, Inc.
29. Safety Auditing – A Management Tool, Donald W. Kase/Kay J. Wiese, 1990, Van Nostrand Reinhold
30. Safety Management Systems, Alan Waring, 1996, Chapman & Hall
31. Analyzing Safety System Effectiveness, Dan Petersen, Third Edition, 1996, Van Nostrand Reinhold
32. Managing Occupational Health and Safety in Australia – A Multidisciplinary Approach, Micheal Quinlan/Philip Bohle, 1991, MacMillan Education Australia Pty. Ltd.
33. Construction Safety Management, Raymond Elliot Levitt/Nancy Morse Samelson, Second Edition, 1993, John Wiley & Sons, Inc.

## Useful Information

If you wish to enquire about this Guide or require advice on occupational safety and health, you can contact the Occupational Safety and Health Branch through :

Telephone	:	2559 2297 (auto-recording after office hour)
Fax	:	2915 1410
E-mail	:	laboureq@labour.gcn.gov.hk

Information on the services offered by the Labour Department and on major labour legislation can also be found by visiting our Home Page on the Internet. Address of our Home Page is <http://www.info.gov.hk/labour>.