BRITISH STANDARD

BS 8800 : 1996

Guide to

Occupational health and safety management systems

ICS 13.100

BS 8800 : 1996

Committees responsible for this British Standard

The preparation of this British Standard was entrusted to Technical Committee HS/1, Occupational health and safety management, upon which the following bodies were represented:

AEA Technology
Association of British Certification Bodies
Association of British Insurers
Association of Consulting Engineers
BEAMA Ltd.
British Cable Makers Confederation
British Gas plc
British Iron & Steel Producers Association
British Railways Board
British Retail Consortium
British Safety Council
British Safety Industry Federation
Building Employers Confederation
Chartered Institute of Environmental Health
Chemical Industries Association
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Electricity Association
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Royal Society for the Prevention of Accidents
Society of Motor Manufacturers and Traders Ltd.
Society of Occupational Medicine
Trades Union Congress
United Kingdom Accreditation Service
United Kingdom Petroleum Industry Association
University of Aston in Birmingham

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Guide to
Occupational health and safety
management systems

These guidelines are based on the general principles of good management and are designed to enable the integration of occupational health and safety management (OH&S) within an overall management system. Various approaches could well be adopted, two of which are presented in detail and a third in outline. The first detailed approach, based on the HSE guidance *Successful Health and Safety Management* HS(G)65 [2], is designed for organizations wishing to base their OH&S management system on this approach. An alternative detailed approach has been designed for those organizations wishing to base their OH&S management systems on BS EN ISO 14001, the environmental systems standard, and as such identifies the common areas in both management systems. The guidance presented in each approach is essentially the same, the only significant difference being the order of presentation and either approach may be used to integrate OH&S management within the overall management system. Annex A outlines the links between this guide and BS EN ISO 9001 to assist those organizations operating or planning to operate to the international "Quality Management" systems standard to integrate OH&S into their existing/planned management system.

How to use this guide

While this guide presents two detailed approaches, reference to the contents page shows that the guide contains common clauses 1, 2 and 3 covering: scope, references and definitions and common annexes, tables and figures. But the guide contains two clauses 4 - one covering the **HS(G)65** approach on the first set of pages numbered 5 - 8 and the other covering the **BS EN ISO 14001** approach on the second set of pages numbered 5 - 8. These clauses 4 are preceded by the following two models:
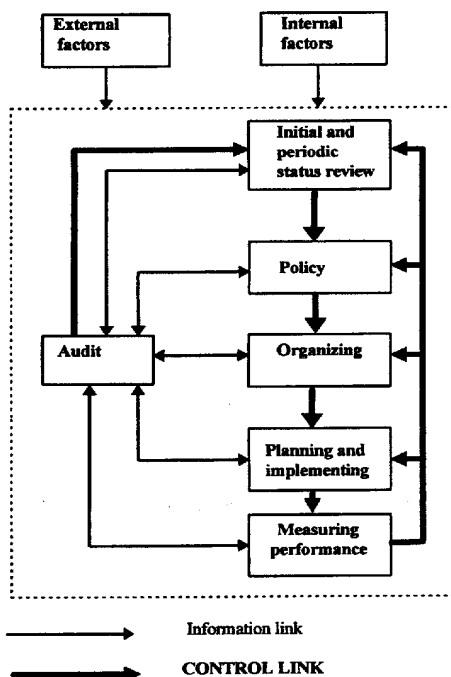
Based on the HS(G)65 approach   **Based on BS EN ISO 14001 approach**
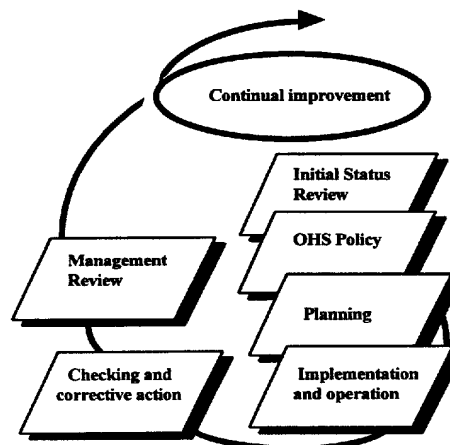
**Readers should decide which approach to adopt and retain the relevant clause 4 pages.
Then remove the unwanted clause 4 pages and either file them separately or discard.**

Contents

* BS EN ISO 14001 is in preparation - publication is expected later in 1996 or during 1997.

Foreword

This British Standard has been prepared by Technical Committee HS/1, under the direction of the Management Systems Sector Board. It gives guidance on occupational health and safety (OH&S) management systems for assisting compliance with stated OH&S policies and objectives and on how OH&S should be integrated within the organization's overall management system.

This publication contains guidance and recommendations. It should not be quoted as if it were a specification and should not be used for certification purposes.

Official statistics of work related accidents and ill-health that are published each year do not represent the full extent of pain and suffering that each event brings to its victims, their families, colleagues and friends. In addition to the human cost, occupational accidents and ill-health impose financial costs to individuals, employers and society at large.

Studies by the Health and Safety Executive indicate that the overall cost to employers of personal injury work accidents, work related ill-health and avoidable non-injury accidents is estimated to be equivalent to around 5% to 10% of all UK companies' gross trading profits. One study showed that, in the organizations studied, uninsured costs from accidental loss were between 8 and 36 times greater than the cost of insurance premiums. There are, therefore, sound economic reasons for reducing work related accidents and ill-health, as well as ethical and regulatory reasons. Besides reducing costs, effective OH&S management promotes business efficiency.

A comprehensive legal framework already exists for occupational health and safety, requiring organizations to manage their activities in such a way as to anticipate and prevent circumstances that may result in occupational injury or ill-health. This standard seeks to improve the occupational health and safety performance of organizations by providing guidance on how the management of OH&S may be integrated with the management of other aspects of business performance, in order to:

> **a) minimize risk to employees and others;**

> **b) improve business performance; and**

> **c) assist organizations to establish a responsible image within the marketplace.**

This standard shares common management system principles with the BS EN ISO 9000 'Quality management' series and the BS EN ISO 14000 series/BS 7750 'Environmental management' standards, but these are **NOT** prerequisites for operation to this guide.

This standard is compatible with:

- The Health & Safety Commission's Approved Code of Practice: *Management of health and safety at work* [1];

- The Health & Safety Executive's booklet HS(G)65: *Successful health and safety management* [2];

- BS EN ISO 14001: *Environmental Management Systems*

- HSC/HSE OH&S management guidance in specific sectors.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

2

[Guide to OH&S systems]

Guide

Introduction

Organizations do not operate in a vacuum; several parties that can have a legitimate interest in an organization's approach to OH&S include: employees; customers/clients/suppliers; the community; shareholders; contractors; insurers; as well as the enforcement agencies. These interests need to be recognized. The importance of managing OH&S has been highlighted in recent official reports of major accidents and has received increasing emphasis in OH&S legislation.

Good health and safety performance is no accident. Organizations should attach the same importance to achievement of high standards of OH&S management as they do to other key aspects of their business activities. This demands the adoption of a structured approach to the identification of hazards and evaluation and control of work related risks.

This guide is intended to assist organizations to develop an approach to management of OH&S in such a way as to protect employees and others whose health and safety may be affected by the organization's activities. Many of the features of effective OH&S management are indistinguishable from the sound management practices advocated by proponents of quality and business excellence. These guidelines are based on the general principles of good management and are designed to enable the integration of OH&S management within an overall management system. Various approaches could equally well be adopted, two of which are presented in this guide. One approach based on HSE guidance *Successful Health and Safety Management* HS(G)65 [2] is designed for organizations wishing to base their OH&S management systems on this approach. An alternative approach has been designed for those organizations wishing to base their OH&S management systems on BS EN ISO 14001, the environmental management systems standard and as such identifies the common areas in both management systems. The guidance presented in each approach is essentially the same, the only significant difference being the order of presentation and either approach may be used to integrate OH&S management within the overall management system.

TO USE THIS GUIDE

Clauses **1**, **2** and **3** and the annexes are common to both approaches in this guide. Organizations wishing to use the HS(G)65 approach should use the clause **4** on pages 5 to 8 carrying the HEADER **'Based on the HS(G)65 approach'**. Organizations wishing to use the BS EN ISO 14001 approach should use the clause **4** on pages 5 to 8 carrying the

HEADER **'Based on the BS EN ISO 14001 approach'**.

The elements covered in this guide are all essential for an effective OH&S management system. Human factors including the culture, politics, etc. within organizations can make or break the effectiveness of any management system and need to be considered very carefully when implementing this guide.

By following the stages shown in figure 1, organizations will be able to establish procedures to set OH&S policy and objectives and establish procedures for their implementation and to demonstrate achievement against criteria which they have defined.

All the stages in figure 1 form part of a cycle for continual improvement of OH&S management and its integration within the overall management system.

Annex A indicates the links between this guide and BS EN ISO 9001 to assist those organizations operating or planning to operate to the international 'Quality Management' systems standard to integrate OH&S into their existing/planned management system.

Further annexes provide guidance on **organizing** (annex B); **planning and implementing** (annex C); **risk assessment** (annex D), **measuring performance** (annex E) and **audit** (annex F) that are needed for an effective occupational health and safety management system.

Small organizations need to appreciate that, while the general principles discussed in the annexes apply to all organizations, they will have to be selective as to the aspects that apply immediately to them. Small organizations first need to ensure that they meet legal requirements before aiming for continual improvement over time.

NOTE. Lists provided in this guide are not intended to be definitive or exhaustive.

1. Scope

This British Standard gives guidance on:

a) the development of occupational health and safety (OH&S) management systems;

b) the links with other management systems standards.

The guide is designed for use by organizations of all sizes and regardless of the nature of their activities. It is intended that its application will be proportional to the circumstances and needs of the particular organization.

[Guide to OH&S systems]

This British Standard does not itself lay down OH&S performance criteria, nor does it seek to give detailed guidance on general management systems design.

2. Informative references

This British Standard refers to other publications that provide information or guidance. Editions of these publications current at the time of issue of this standard are listed on the inside back cover, but reference should be made to the latest editions.

3. Definitions

For the purposes of this British Standard the following definitions apply.

3.1 accident

Unplanned event giving rise to death, *ill-health (see 3.8)*, injury, damage or other loss.

3.2 audit

A systematic and, wherever possible, independent examination to determine whether activities and related results conform to planned arrangements and whether these arrangements are implemented effectively and are suitable to achieve the organization's policy and *objectives (see 3.6)*.

NOTE. The word 'independent' here does not necessarily mean external to the organization.

3.3 external factors

Forces outside the control of the organization that impinge on health and safety issues and need to be taken account of within an appropriate time frame, e.g. regulations, industry standards.

3.4 hazard

A source or a situation with a potential for harm in terms of human injury or *ill-health (see 3.8)*, damage to property, damage to the environment, or a combination of these.

3.5 hazard identification

The process of recognising that a *hazard (see 3.4)* exists and defining its characteristics.

3.6 health and safety objectives

The goals, in terms of OH&S performance, that an organization sets itself to achieve and which should be quantified wherever practicable.

3.7 health surveillance

Monitoring the health of people to detect signs or symptoms of work related *ill-health (see 3.8)* so

that steps can be taken to eliminate, or reduce, the probability of further damage.

3.8 ill-health (occupational ill-health)

Ill-health that is judged to have been caused by or made worse by a person's work activity or environment.

3.9 incident

Unplanned event which has the potential to lead to *accident (see 3.1)*.

3.10 internal factors

Forces within the organization that may affect its ability to deliver the health and safety policy, e.g. internal re-organization, culture.

3.11 management system

A composite, at any level of complexity, of personnel, resources, policies and procedures, the components of which interact in an organized way to ensure a given task is performed, or to achieve or maintain a specified outcome.

3.12 organization

A company, operation, firm, enterprise, institution, or association, or part thereof, whether incorporated or not, public or private, that has its own functions and administration. For organizations with more than one operating unit, a single operating unit may be defined as an organization.

3.13 risk

The combination of the likelihood and consequence of a specified hazardous event occurring.

3.14 risk assessment

The overall process of estimating the magnitude of risk and deciding whether or not the risk is tolerable or acceptable.
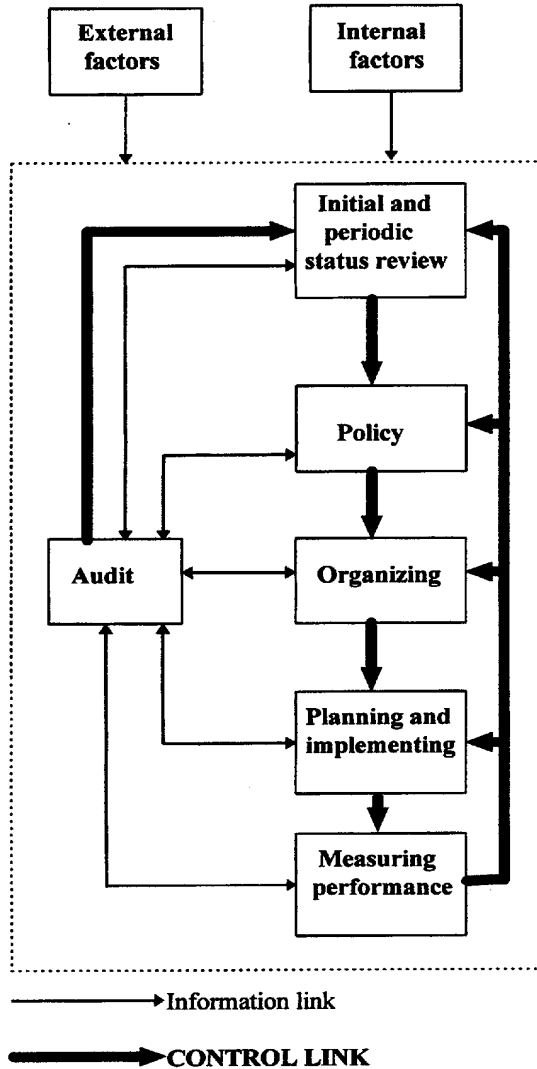
3.15 status review

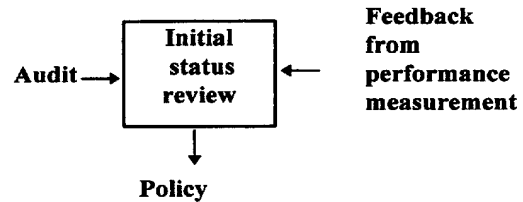The formal evaluation of the OH&S management system.

3.16 target

A detailed performance requirement, quantified wherever practicable, pertaining to the organization, that arises from the *health and safety objectives (see 3.6)* and that needs to be met in order to achieve those objectives.

Based on the HS(G)65 approach

4. OH&S management system elements

4.0 Introduction

4.0.1 *General*

All the elements of the guide should be incorporated into the OH&S management system, but the manner and extent to which individual elements should be applied will depend on such factors as the size of the organization, the nature of its activities, the hazards and the conditions in which it operates.

4.0.2 *Initial status review*

Figure 1. Elements of successful health and safety management based on the approach in HS(G)65

Organizations should consider carrying out an initial review of their existing arrangements for managing OH&S. This review should be made in order to provide information that will influence decisions on the scope, adequacy and implementation of the current system as well as providing a baseline from which progress can be measured. Initial status reviews should answer the question 'where are we now?'.

The review should compare the existing arrangements with:

a) requirements of relevant legislation dealing with OH&S management issues;

b) existing guidance on OH&S management available within the organization;

c) best practice and performance in the organization's employment sector and other appropriate sectors (e.g. from relevant HSC industry advisory committees and trade association guidelines);

d) efficiency and effectiveness of existing resources devoted to OH&S management.

A useful starting point would be to review the existing system against these guidelines. The annexes provide information to help organizations ensure coverage of key activities. The information from the initial status review may be used in the planning process.

5

Based on the HS(G)65 approach

4.1 OH&S policy

The organization's most senior management should define, document and endorse its OH&S policy. Management should ensure that the policy includes a commitment to:

a) recognizing OH&S as an integral part of its business performance;

b) achieving a high level of OH&S performance, with compliance to legal requirements as the minimum, and to continual cost-effective improvement in performance;

c) provide adequate and appropriate resources to implement the policy;

d) the setting and publishing of OH&S objectives, even if only by internal notification;

e) place the management of OH&S as a prime responsibility of line management, from most senior executive to first-line supervisory level;

f) ensure its understanding, implementation and maintenance at all levels in the organization;

g) employee involvement and consultation to gain commitment to the policy and its implementation;

h) periodic review of the policy, the management system and audit of compliance to policy;

i) ensure that employees at all levels receive appropriate training and are competent to carry out their duties and responsibilities.

4.2 Organizing
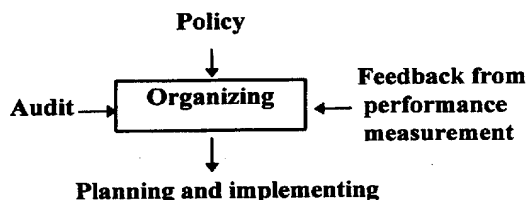
Based on the HS(G)65 approach

4.2.1 *Responsibilities*

Ultimate responsibility for occupational health and safety rests with top management. Here, best practice is to allocate to a person at the most senior management level (e.g. in a large organization, a Board or executive committee member) particular responsibility for ensuring that the OH&S management system is properly implemented and performing to requirements in all locations and spheres of operation within the organization.

At all levels of the organization, people need to be:

a) responsible for the health and safety of those they manage, themselves and others with whom they work;

b) aware of their responsibility for the health and safety of people who may be affected by the activities they control, e.g. contractors and public;

c) aware of the influence that their action or inaction can have on the effectiveness of the OH&S management system.

Senior management should demonstrate, by example, their commitment by being actively involved in the continual improvement of occupational health and safety performance.

4.2.2 *Organizational arrangements*

It is important that OH&S, in its broadest sense, is fully integrated across the organization and into all its activities, whatever the size or nature of its work (see annex B). In organizing for the implementation of the policy and the effective management of OH&S, the organization should:

a) have or have access to sufficient OH&S knowledge, skills and experience to manage its activities safely and in accordance with legal requirements;

b) define the allocation of responsibilities and accountabilities in the management structure;

c) ensure people have the necessary authority to carry out their responsibilities;

d) allocate adequate resources commensurate with its size and nature;

e) identify the competencies required, at all levels within the organization, and organize any necessary training;

6

[Guide to OH&S systems]

Based on the HS(G)65 approach

f) make arrangements for the effective and, where appropriate, open communication of OH&S information;

g) make effective arrangements for the provision of specialist advice and services;

h) make effective arrangements for employee involvement, and consultation where appropriate.

4.2.3 *OH&S documentation*

Documentation is a key element in enabling an organization to implement a successful management system. It is also important in assembling and retaining OH&S knowledge. But it is important that documentation is kept to the minimum required for effectiveness and efficiency.

The organization should maintain any records necessary to demonstrate compliance with legal and other requirements.

Organizations should ensure that sufficient documentation is available to enable OH&S plans to be fully implemented and is proportional to their needs (see **B.6.2**).

Organizations should make arrangements to ensure that documents are up to date and applicable to the purpose for which they are intended.

4.3 Planning and implementing

Organizing

Audit ⟶ | Planning and implementing | ⟵ Feedback from performance measurement

Measuring performance
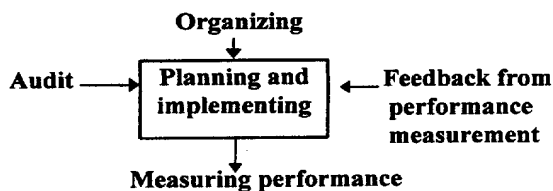
4.3.1 *General*

It is important that success or failure of the planned activity can be clearly seen. This involves identifying OH&S requirements, setting clear performance criteria defining what is to be done, who is responsible, when it is to be done and the desired outcome.

While it is recognized that, in practice, organizing, planning and implementing functions will overlap, nevertheless, the following key areas need to be addressed (see annex C).

Based on the HS(G)65 approach

4.3.2 *Risk assessment*

The organization should carry out risk assessment including identification of hazards (see Annex D).

4.3.3 *Legal and other requirements*

The organization should identify the legal requirements, in addition to the risk assessment, applicable to it and also any other requirements to which it subscribes applicable to OH&S management.

4.3.4 *OH&S management arrangements*

The organization should make arrangements to cover the following key areas:

a) overall plans and objectives, including personnel and resources, for the organization to implement its policy;

b) operational plans to implement arrangements to control the risks identified in **4.3.2** and to meet the requirements identified in **4.3.3**;

c) contingency plans for foreseeable emergencies and to mitigate their effects;

d) planning for organizational activities covered in **4.2.2**;

e) planning for measuring performance, audits and status reviews (see **4.4, 4.5** and **4.6**);

f) implementing corrective actions shown to be necessary.

4.4 Measuring performance
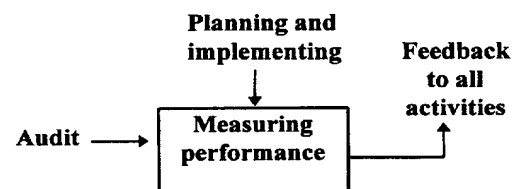
Planning and implementing

Audit ⟶ | Measuring performance | ⟶ Feedback to all activities

Performance measurement is a key way to provide information on the effectiveness of the OH&S management system. Both qualitative and quantitative measures should be considered where appropriate and should be tailored to the needs of the organization (see annex E).

Performance measurement is a means of monitoring the extent to which policy and objectives are being met and includes both:

[Guide to OH&S systems]

Based on the HS(G)65 approach

a) proactive measures of performance that monitor compliance, e.g. by surveillance and inspections, with the organization's health and safety arrangements, for example safe systems of work, permits to work, etc.;

b) reactive measures of performance that monitor accidents, near misses, ill-health, incidents and other historical evidence of deficient health and safety performance.
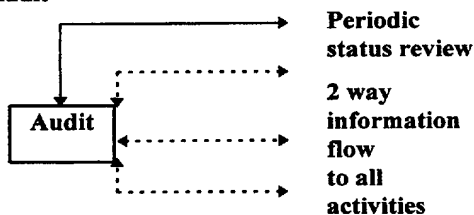
Where deficiencies are found, root causes should be identified and corrective action taken.

4.5 Audit

In addition to routine monitoring of occupational health and safety performance, there will be a need for periodic audits that enable a deeper and more critical appraisal of all the elements of the OH&S management system (covered in figure 1). Audits should be conducted by persons who are competent and as independent as possible from the activity that is being audited, but may be drawn from within the organization (see annex F).

While audits need to be thorough, their approach should be tailored to the size of the organization and the nature of its hazards.

At different times and for different reasons, audits will need to cover the following questions:

a) is the organization's overall OH&S management system capable of achieving the required standards of OH&S performance?

b) is the organization fulfilling all its obligations with regard to OH&S?

c) what are the strengths and weaknesses of the OH&S management system?

d) is the organization (or part of it) actually doing and achieving what it claims to do?

Audits may be comprehensive or address selected topics according to circumstance. The results of audits should be communicated to all relevant personnel and corrective action taken as required.

Based on the HS(G)65 approach

4.6 Periodic status review
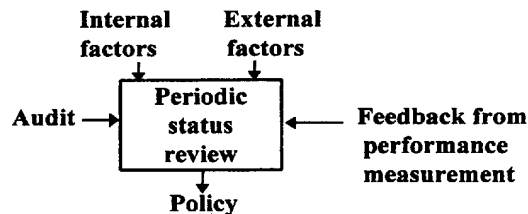
The organization should define the frequency and scope of periodic reviews of the OH&S management system according to its needs. The periodic status review should consider:

a) the overall performance of the OH&S management system;

b) the performance of individual elements of the system;

c) the findings of audits;

d) internal and external factors, such as changes in organizational structure, legislation pending, introduction of new technology, etc.,

and identify what action is necessary to remedy any deficiencies.

The OH&S management system should be designed to accommodate or adapt to internal and external factors. The periodic status review also provides an opportunity to take a forward look. The information in (a) to (d) above can be used by the organization to improve the organization's pro-active approach to minimizing risk, and improve business performance.

8

[Guide to OH&S systems]

Based on the BS EN ISO 140001 approach

4 OH&S management system elements

4.0 Introduction

4.0.1 *General*

All the elements of the guide should be incorporated into the OH&S management system, but the manner and extent to which individual elements should be applied will depend on such factors as the size of the organization, the nature of its activities, the hazards and the conditions in which it operates.

4.0.2 *Initial status review*

Figure 1. Elements of successful health & safety management based on the approach in BS EN ISO 14001

Organizations should consider carrying out an initial review of their existing arrangements for managing OH&S. This review should be made in order to provide information that will influence decisions on the scope, adequacy and implementation of the current system as well as providing a baseline from which progress can be measured. Initial status reviews should answer the question "where are we now?".

The review should compare the existing arrangements with:

a) requirements of relevant legislation dealing with OH&S management issues;

b) existing guidance on OH&S management available within the organization;

c) best practice and performance in the organization's employment sector and other appropriate sectors (e.g. from relevant HSC industry advisory committees and trade association guidelines);

d) efficiency and effectiveness of existing resources devoted to OH&S management.

A useful starting point would be to review the existing system against these guidelines. The annexes provide information to help organizations ensure coverage of key activities. The information from the initial status review may be used in the planning process.

[Guide to OH&S systems]

Based on the BS EN ISO 140001 approach

4.1 OH&S policy

The organization's most senior management should define, document and endorse its OH&S policy. Management should ensure that the policy includes a commitment to:

a) recognizing OH&S as an integral part of its business performance;

b) achieving a high level of OH&S performance, with compliance to legal requirements as the minimum, and to continual cost-effective improvement in performance;

c) provide adequate and appropriate resources to implement the policy;

d) the setting and publishing of OH&S objectives, even if only by internal notification;

e) place the management of OH&S as a prime responsibility of line management, from most senior executive to first-line supervisory level;

f) ensure its understanding, implementation and maintenance at all levels in the organization;

g) employee involvement and consultation to gain commitment to the policy and its implementation;

h) periodic review of the policy, the management system and audit of compliance to policy;

i) ensure that employees at all levels receive appropriate training and are competent to carry out their duties and responsibilities.

4.2 Planning
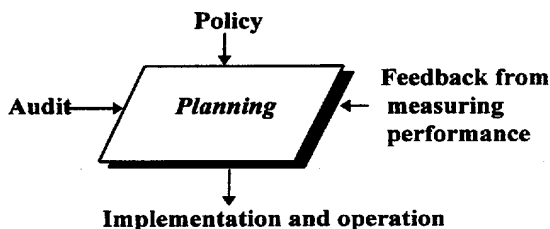
4.2.1 *General*

It is important that success or failure of the planned activity can be clearly seen. This involves identifying OH&S requirements, setting clear performance criteria defining what is to be done, who is responsible, when it is to be done and the desired outcome.

While it is recognized that, in practice, organizing, planning and implementing functions will overlap, nevertheless, the following key areas need to be addressed (see annex C).

4.2.2 *Risk assessment*

The organization should carry out risk assessment including identification of hazards (see Annex D).

4.2.3 *Legal and other requirements*

The organization should identify the legal requirements, in addition to the risk assessment, applicable to it and also any other requirements to which it subscribes applicable to OH&S management.

4.2.4 *OH&S management arrangements*

The organization should make arrangements to cover the following key areas:

a) overall plans and objectives, including personnel and resources, for the organization to achieve its policy;

b) have or have access to sufficient OH&S knowledge, skills and experience to manage its activities safely and in accordance with legal requirements;

c) operational plans to implement arrangements to control risks identified in **4.2.2** and to meet the requirements identified in **4.2.3**;

d) planning for operational control activities covered in **4.3.6**;

e) planning for performance measurement, corrective action, audits and management reviews (see **4.4.1, 4.4.2, 4.4.4** and **4.5**);

f) implementing corrective actions shown to be necessary.

6

[Guide to OH&S systems]

Based on the BS EN ISO 140001 approach

4.3 Implementation and operation

Planning

Audit → Implementation and operation ← Measuring performance

Checking and corrective action
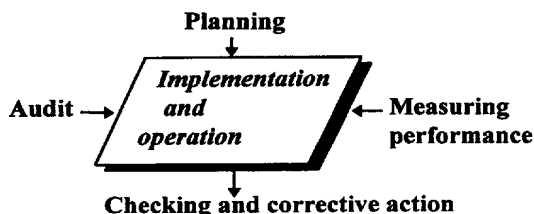
4.3.1 *Structure and responsibility*

Ultimate responsibility for occupational health and safety rests with top management. Here, best practice is to allocate to a person at the most senior management level (e.g. in a large organization, a Board or executive committee member) particular responsibility for ensuring that the OH&S management system is properly implemented and performing to requirements in all locations and spheres of operation within the organization.

At all levels of the organization, people need to be:

a) responsible for the health and safety of those they manage, themselves and others with whom they work;

b) aware of their responsibility for the health and safety of people who may be affected by the activities they control, e.g. contractors, public;

c) aware of the influence that their action or inaction can have on the effectiveness of the OH&S management system.

Senior management should demonstrate, by example, their commitment by being actively involved in the continual improvement of OH&S performance.

4.3.2 *Training, awareness and competence*

The organization should make arrangements to identify the competencies required, at all levels within the organization, and organize any necessary training.

4.3.3 *Communications*

The organization should establish and maintain arrangements, where appropriate, for:

a) the effective and, open communication of OH&S information;

b) the provision of specialist advice and services;

c) employee involvement and consultation.

Based on the BS EN ISO 140001 approach

4.3.4 *OH&S management system documentation*

Documentation is an important element in enabling an organization to implement a successful OH&S management system. It is also important in assembling and retaining OH&S knowledge. But it is important that documentation is kept to the minimum required for effectiveness and efficiency.

Organizations should ensure that sufficient documentation is available to enable OH&S plans to be fully implemented and is proportional to their needs.

4.3.5 *Document control*

Organizations should make arrangements to ensure that documents are up to date and applicable to the purpose for which they are intended.

4.3.6 *Operational control*

It is important that OH&S, in its broadest sense, is fully integrated across the organization and into all its activities, whatever the size or nature of its work (see annex B). In organizing for the implementation of the policy and the effective management of OH&S, the organization should make arrangements to ensure that activities are carried out safely and in accordance with arrangements defined in **4.2.4** and should:

a) define the allocation of responsibilities and accountabilities in the management structure;

b) ensure people have the necessary authority to carry out their responsibilities;

c) allocate adequate resources commensurate with its size and nature;

4.3.7 *Emergency preparedness and response*

An organization should make arrangements to establish contingency plans for foreseeable emergencies and to mitigate their effects.

7

[Guide to OH&S systems]

Based on the BS EN ISO 140001 approach

4.4 Checking and corrective action

Implementing and operation

Audit → *Checking and corrective action* ← Feedback from measuring performance

Management review
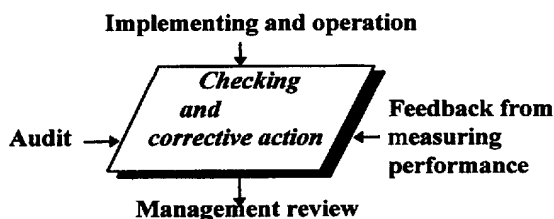
4.4.1 *Monitoring and measurement*

Performance measurement is a key way to provide information on the effectiveness of the OH&S management system. Both qualitative and quantitative measures should be considered where appropriate and should be tailored to the needs of the organization (see annex E).

Performance measurement is a means of monitoring the extent to which policy and objectives are being met and includes both:

a) proactive measures of performance that monitor compliance, for example through surveillance and inspections, with the OH&S arrangements, for example safe systems of work, permits to work, etc.;

b) reactive measures of performance that monitor accidents, near misses, ill-health, incidents and other historical evidence of deficient health and safety performance.

4.4.2 *Corrective action*

Where deficiencies are found, root causes should be identified and corrective action taken.

4.4.3 *Records*

The organization should maintain any records necessary to demonstrate compliance with legal and other requirements.

4.4.4 *Audit*

In addition to routine monitoring of occupational health and safety performance, there will be a need for periodic audits that enable a deeper and more critical appraisal of all the elements of the OH&S management system (covered in figure 1). Audits should be conducted by persons who are competent and as independent as possible from the activity that is being audited, but may be drawn from within the organization (see annex F).

While audits need to be thorough, their approach should be tailored to the size of the organization and the nature of its hazards.

Based on the BS EN ISO 140001 approach

At different times and for different reasons, audits will need to cover the following questions:

a) is the organization's overall OH&S management system capable of achieving the required standards of OH&S performance?

b) is the organization fulfilling all its obligations with regard to OH&S?

c) what are the strengths and weaknesses of the OH&S management system?

d) is the organization (or part of it) actually doing and achieving what it claims to do?

Audits may be comprehensive or address selected topics according to circumstance. The results of audits should be communicated to all relevant personnel and corrective action taken as required.

4.5 Management review
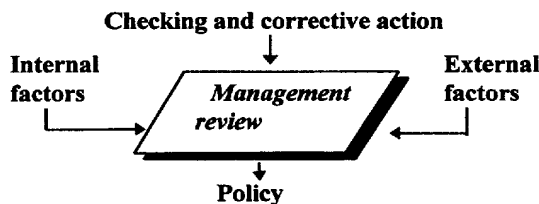
Checking and corrective action

Internal factors → *Management review* ← External factors

Policy

The organization should define the frequency and scope of periodic reviews of the OH&S management system according to its needs. These reviews should consider:

a) the overall performance of the OH&S management system;

b) the performance of individual elements of the system;

c) the findings of audits;

d) internal and external factors, such as changes in organizational structure, legislation pending, the introduction of new technology, etc.,

and identify what action is necessary to remedy any deficiencies.

The health and safety management system should be designed to accommodate or adapt to internal and external factors. The management review also provides an opportunity to take a forward look. The information in (a) to (d) above can be used by the organization to improve the organization's pro-active approach to minimizing risk, and improve business performance.

8

[Guide to OH&S systems]

Annexes

Annex A (informative)
Links to BS EN ISO 9001 : 1994 *Quality management systems*

The basic principles of management are common irrespective of the activity being managed, be it quality, environment, health and safety or other organizational activities. Some organizations may see benefits in having an integrated management system, whereas others may prefer to adopt different systems based on the same management principles. Table A.1 shows, in matrix form, the links between this guide and BS EN ISO 9001 for those operating or planning to operate to the international quality management system standard and who wish to integrate occupational health and safety into their overall management system. The links are illustrated for information only as this guide has not been produced for the purpose of certification.

Table A.1 Links to BS EN ISO 9001 : 1994 (superseded BS 5750-1 : 1987)

BS EN ISO 9001 subclause   **Subclause in this guide**

BS EN ISO 9001 subclause	4	4.0.2	4.1	4.2.1	4.2.2	4.2.3	4.3	4.4	4.5	4.6
HS(G)65 approach	4	4.0.2	4.1	4.2.1	4.2.2	4.2.3	4.3	4.4	4.5	4.6
BS EN ISO 14001 approach	4	4.0.2	4.1	4.3.1	4.3.2	4.3.5	4.2	4.4	4.4.4	4.5
4.1 Management responsibility	*	/	*	*	*					*
4.2 Quality system	*	/			*	*	*			
4.3 Contract review		/								*
4.4 Design control		/					*			
4.5 Document and data control		/				*				
4.6 Purchasing		/					*			
4.7 Control of customer-supplied product		/					*			
4.8 Product identification and traceability		/					*			
4.9 Process control		/					*			
4.10 Inspection & testing		/						*		
4.11 Control of inspection etc. equipment		/					*			
4.12 Inspection and test status		/					*			
4.13 Control of non-conforming product		/					*			
4.14 Corrective and preventive action		/					*	*		
4.15 Handling,storing,packaging,preservation & delivery		/					*			
4.16 Control of quality records		/						*		
4.17 Internal quality audits		/							*	
4.18 Training		/	*							
4.19 Servicing		/					*			
4.20 Statistical techniques		/						*		

NOTE: * represents a connection between the relevant sub-clauses of the 2 standards; / represents a subclause having no counterpart in BS EN ISO 9001.

[Guide to OH&S systems]

Annex B (informative)
Organizing

B.1 Introduction

This annex provides guidance on the allocation of responsibilities and the organization of people, resources, communications and documentation to define and implement policy and effectively manage OH&S.

B.2 Integration and co-operation

B.2.1 Organizations vary greatly in their complexity and the terms used to describe different activities all of which have an active part to play within the overall OH&S management system. However, significant differences often exist between the different parts of the organization in terms of:

a) work carried out;

b) management system;

c) technology used;

d) hazards encountered;

e) staff competence;

f) resources;

g) past experience of OH&S issues;

h) OH&S expertise;

i) attitudes to risk;

j) attitudes to OH&S co-operation with other functions.

B.2.2 As a result of potential differences, listed in **B.2.1**, it is important for management to ensure OH&S activity, in its broadest sense, is embraced both within and between functions so that:

a) common OH&S needs are addressed;

b) wide variations in OH&S performance are avoided;

c) duplication of effort and waste of resources are avoided;

d) OH&S responsibilities are appropriate, clear and agreed, e.g. for shared equipment, workplaces and staff;

e) different employers sharing a workplace co-operate;

f) artificial barriers and unnecessary conflicts are avoided;

g) any decisions made take into account the knock-on OH&S effects on other activities;

h) OH&S objectives, measures of performance, OH&S plans and performance targets for each activity are consistent with those relating to its business objectives, plans and performance.

B.2.3 Approaches and techniques that encourage co-operation include:

a) OH&S project teams/task groups comprising people from and working with different parts of the organization;

b) managers, OH&S specialists, safety representatives and safety committees addressing problems common to different parts of the organization;

c) OH&S audits;

d) OH&S reviews.

B.3 Responsibility and accountability

B.3.1 *General*

At every level of the organization, people need to be aware of their responsibilities, to whom they are accountable and the influence that their action or inaction can have on the effectiveness of the OH&S management system.

Responsibility and accountability for OH&S should reflect the responsibilities within the management structure.

B.3.2 *Individual responsibilities*

Individual responsibilities for the implementation of OH&S policy should be clearly allocated. To achieve this, the following aspects should be addressed:

a) individual OH&S responsibilities should be clearly defined. Where job descriptions are used it may be appropriate to include such responsibilities;

b) all personnel should be given the authority and resources (including time) necessary to carry out their responsibilities;

c) appropriate arrangements should exist whereby people are held accountable for discharging their responsibilities;

d) reporting relationships should be clear and unambiguous;

e) where personal appraisal systems exist,

10

[Guide to OH&S systems]

OH&S performance should be included in the appraisal system.

In addition to any allocated responsibilities, all employees have a general responsibility for their own and others' safety.

B.4 Employee involvement

It should be recognized that effective management of OH&S requires the support and commitment of the employees, and that the knowledge and experience of the workforce can be a valuable resource in the development and operation of the OH&S management system.

The organization should have effective means for consultation and representation. In many organizations, OH&S consultation and representation can be successfully accommodated within the existing general management framework. Some organizations may need to formalize their arrangements. OH&S committees provide one method of involving the workforce, but the aim should be to promote the active involvement of the workforce in all aspects of the OH&S management system. Employees should be encouraged to report shortcomings in the OH&S arrangements and be involved, where appropriate, in the development of OH&S arrangements and procedures.

B.5 Competency and training

B.5.1 *General*

The organization's OH&S management system should ensure that people at all levels are competent to carry out the duties and responsibilities assigned to them and that they receive training where necessary.

B.5.2 *OH&S management system training requirements*

The OH&S management system should include:

a) systematic identification of the competencies required by each member of staff and the training needed to remedy any shortfalls;

b) provision of any training identified as being necessary in a timely and systematic manner;

c) assessment of individuals to ensure that they have acquired and maintain the knowledge and skills necessary for the level of competence required;

d) the maintenance of appropriate training/skills records.

B.5.3 *Elements in organizational training programmes*

All organizations should ensure that the following elements are included in training programmes:

a) an understanding of the organization's OH&S arrangements and the individual's specific roles and responsibilities for them;

b) a systematic programme of induction and on-going training for employees and those who transfer between divisions, sites, departments, areas, jobs or tasks in the organization. The training should include the local OH&S arrangements; the hazards, risks, precautions and procedures of work to be undertaken, before work commences;

c) a means to ensure that the training has been effective;

d) training for all individuals who manage staff, contractors and others, e.g. temporary workers, in their responsibilities. They should subsequently understand the hazards and risks of the operations for which they are responsible, the competencies necessary to carry out the activities safely and the need to ensure that safe working procedures are followed by personnel under their control;

e) training in risk assessment and control techniques for designers, maintenance personnel and those responsible for the development of the process or working methods;

f) the roles and responsibilities of directors and senior managers for ensuring that the OH&S management system functions as necessary to control risks and minimize ill-health, injury and other losses to the organization.

Contractors, temporary workers and visitors should be included in the training programme according to the level of risks to which they may be exposed or could cause.

B.6 Communications and documentation

B.6.1 *Effective communications*

Effective communications are an essential element of the OH&S management system. Organizations need to ensure that they have effective arrangements for:

11

[Guide to OH&S systems]

a) identifying and receiving relevant OH&S information from outside the organization including:

   1) new, or amendments to, legislation;

   2) information necessary for the identification of hazards and evaluation and control of risks;

   3) information and developments in health and safety management practice;

b) ensuring that pertinent OH&S information is communicated to all people in the organization who need it. This requires arrangements to:

   1) determine information needs;

   2) ensure that these needs are met, bearing in mind the legal requirement that relevant information has to be provided in a form and manner that is comprehensible to the person receiving it;

   3) ensure that information does not just flow from 'the top down', but also from 'the bottom up' and across the various parts of the organization;

   4) avoid restricting OH&S items to dedicated OH&S meetings by including them on the agenda of a variety of meetings wherever appropriate;

   5) report hazards and shortcomings in OH&S arrangements;

   6) ensure that lessons are learnt from accidents and incidents to avoid recurrence;

c) ensuring that relevant information is communicated to people outside the organization who require it;

d) encouraging feed-back and suggestions from employees on OH&S matters.

B.6.2 *Documentation*

Documentation is a key part of any communication system and should be tailored to the needs of the organization. The complexity of the organization and the risks that have to be controlled will normally dictate the detail of documentation required, although it has to be recognized that legal requirements demand some documentation and records, e.g. organizations with five or more

employees are required to have a written statement of OH&S policy and a record of the significant findings of any risk assessment. Documentation should support the health and safety management system, not drive it. Key documents, such as working procedures, records and instructions, should be accessible at the point of use. It is necessary to ensure that people who need to refer to any of the documents or data as part of their job have correct and up-to-date versions available to them. How changes to documents and data are to be made and who has the authority to make changes should also be defined.

B.7 Specialist advice and services

Organizations should have access to sufficient OH&S knowledge, skills or experience to identify and manage OH&S risks effectively, and to set appropriate OH&S objectives. This may be achieved by one or more of the following:

a) training managers to a sufficient level of competence to be able to manage their activities safely and keep up-to-date with developments in OH&S;

b) employing appropriate OH&S professionals as part of the management team;

c) engaging external specialist support where in-house expertise and/or resources are insufficient to meet the organization's needs.

Whichever method or combination of methods is chosen, there should be adequate provision of information, resources and co-operation to ensure specialist advisers are able to discharge their duties effectively. Specific tasks and responsibilities of parties need to be clearly understood.

NOTE. It should be noted that an employer is required by law, with limited exceptions, to appoint one or more competent persons, from within or outside the organization, to help in applying the provisions of occupational health and safety law. However, the employment of an OH&S adviser does not relieve the management of the organization of their legal responsibilities.

12

[Guide to OH&S systems]

Annex C (informative)
Planning and implementing

C.1 Introduction

This annex describes a planning procedure that organizations could use to develop any aspect of their OH&S management system, e.g. in conjunction with an initial or periodic status review. Typically, the procedure can be used to plan and implement OH&S organizational change, risk assessment, risk control and performance measurement. The procedure may also be used to prepare plans for quality and environment and to meet other business objectives.

The annex also considers:

a) the relationship between business and OH&S planning;

b) pro-active OH&S planning;

c) limitations of reactive OH&S management.

For small and medium-sized enterprises (SMEs) general principles of planning and implementing for OH&S will be the same as for any organization. However, when considering this annex, managers within SMEs should note that planning and implementing OH&S may well be carried out by a single individual or a small number of people in their organization. The approach adopted should be tailored to their needs.

C.2 Business and OH&S planning

The methods adopted to plan and implement OH&S programmes should be the same as those used to plan and implement changes in any aspect of an organization's activities. Organizations may wish to consider integrating OH&S, environment and quality planning. Key requirements are that:

a) the organization's objectives should be clearly defined, prioritized and quantified where possible;

b) suitable measurement criteria should be chosen to confirm that objectives are achieved. These criteria should be defined before moving to the next stage;

c) a plan should be prepared to achieve each objective. The plan should be developed first in broad terms and then in detail; specific targets should be agreed, namely the tasks that have to be carried out by

designated people or teams to implement the plan;

d) adequate financial and other resources should be made available;

e) the implementation of plans and their effectiveness in achieving objectives should be measured and reviewed.

C.3 Pro-active planning and responding reactively

C.3.1 *Pro-active OH&S planning*

OH&S planning requires a comprehensive approach which emphasizes prevention. Some organizations may have difficulties in evaluating their OH&S system, assessing risks and setting priorities for improvements. The procedure set out in this annex is designed to help overcome such difficulties.

Pro-active OH&S management systems should promote continual improvement and ensure that:

a) appropriate arrangements are in place that are adequately resourced with competent personnel who have defined responsibilities, and that incorporate effective channels of communication (see **C.6**);

b) procedures are adopted to set objectives, devise and implement plans to meet objectives, and to monitor both the implementation and effectiveness of plans;

c) hazards are identified and risks assessed and controlled before anyone (or anything) could be adversely affected (see annex D);

d) OH&S performance is measured with a range of techniques, and an absence of hazardous events is not seen as conclusive evidence that all is well (see annex E).

A vital part of pro-active OH&S planning is the management of change. Changes that may affect OH&S include:

1) changes in staffing;

2) proposals for new products, plant, processes or services;

3) changes in working procedures;

4) process modifications;

5) software modifications.

External changes that among others may affect OH&S include:

13

[Guide to OH&S systems]

i) new legislation;

ii) developments in OH&S knowledge and technology.

As part of the review cycle, organizations should evaluate the impact of such changes and take appropriate steps to control risks prior to the introduction of change.

C.3.2 *Limitations of reactive OH&S management*

In their status reviews, organizations should consider whether the operation of their OH&S management system:

a) depends unduly on reactive monitoring data - limitations of accident and ill-health data as performance indicators are discussed in **E.4.3**;

b) is based upon mistaken beliefs that action is only necessary in the aftermath of a serious hazardous event or the appearance of symptoms of occupational ill-health and that preventive action is only required to prevent a repetition of the particular event;

c) often relies on superficial hazardous event investigations. Hazardous events usually have many causes. An investigation limited to a study of unsafe acts by personnel at the 'sharp end' may not reveal weaknesses in systems of work and physical safeguards, and shortcomings in the OH&S management system (see **E.6**).

Hazardous event and occupational ill-health prevention require a balanced package of technical and procedural controls supported by training. But rules and safeguards devised in the aftermath of accidents or occupational ill-health may:

1) be over-zealous (as perceived some time after the event);

2) conflict with the need to get the job done;

3) conflict with controls adopted for other hazards;

4) fail to keep pace with changes at the workplace and with technical developments generally.

A reactive approach may be simple to apply. OH&S management is reduced to solution of apparently self-contained problems with self-contained remedies. However, an OH&S management system founded on reactive

measurements and superficial investigations is neither a secure nor a cost-effective basis for controlling risks.

C.4 Planning and implementing in practice

Figure C.1 A procedure for OH&S planning and implementing
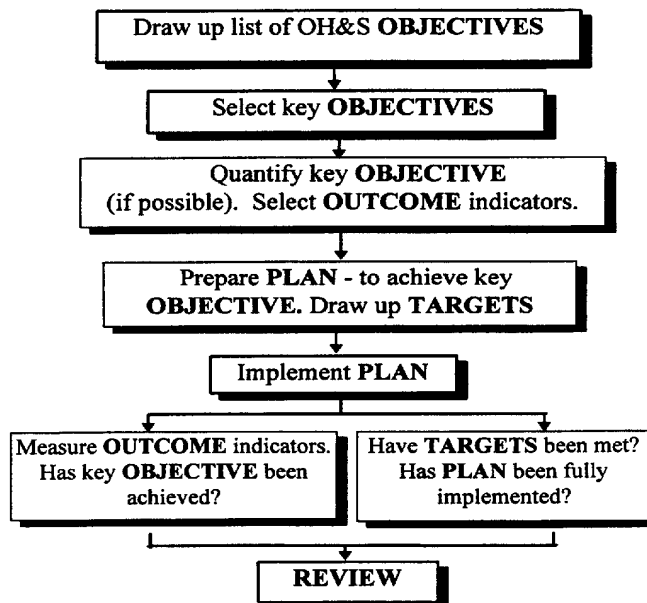
C.4.1 *General*

Organizations might find it useful to draw upon the experience of a number of individuals to plan and implement improvements in their OH&S system. Large organizations may establish a number of teams working in different parts and at different levels in the organization. Organizations should use systematic procedures when planning and implementing:

a) changes shown to be necessary by status/management reviews;

b) risk control action plans (see **D.6.2**);

c) emergency arrangements.

C.4.2 *Overall procedure for planning and implementing*

Figure C.1 illustrates a step-by-step procedure for OH&S planning. The next subclauses describe how the procedure is used. Figure C.2 shows an example of how the procedure can be used to plan a programme to increase usage of hearing protection. Figure C.3 is a check procedure in a planning and implementing review. Figure C.4

14

[Guide to OH&S systems]

applies the procedure to the control of site transport risks at warehouse premises.

Some objectives can be simply implemented, and also their effectiveness is self-evident, making the formal use of this procedure unnecessary.

For simplicity, the procedure is explained in the context of a planning team seeking to select and achieve one key objective. In practice, organizations are likely to use the procedure to develop plans to attain several objectives at the same time.

The procedure involves:

a) drawing up a list of objectives; and selecting key (top priority) objectives from the list;

b) quantifying, if possible, one key objective and choosing outcome indicators that can be used later to determine whether the key objective has been achieved: that is whether the plan has been **effective**;

c) developing a plan to achieve the key objective. Planning targets should be drawn up. The targets can be used later to check whether the plan has been fully **implemented**.

d) implementing the plan;

e) measuring separately and reviewing the implementation and effectiveness of the plan.

The various steps in the procedure may need to be re-visited several times before the key objective or the plan itself is finalized.

Moreover many plans will be on-going, for example to maintain specific controls for particular risks such as housekeeping to control slips and trips, guards for dangerous parts of machines and control of work of contractors. Here there will be no formal end point to the implementation process shown in figure C.1. Measurement and review would occur at defined intervals, leading to a re-evaluation of the key objective and the plan itself.

C.5 Where are we now, and where should we be?

> ## Draw up list of OH&S **OBJECTIVES**

Organizations should use status reviews and risk assessments to compare their existing arrangements and risk controls with:

a) requirements of OH&S law;

b) existing guidance on OH&S management and risk controls within the organization;

c) good practice in relevant employment sectors;

d) efficiency and effectiveness of existing resources devoted to OH&S management and risk control.

A helpful technique is to compile a list of objectives from a variety of sources, e.g. audit reports, risk assessment, accident and incident data, legislative requirements. Time spent at this stage pays dividends later. The following guide words can be used to produce the list. The guide words relate to matters that the organization wishes to:

1) **increase/improve:**
   e.g., near miss reporting; machinery safeguards; training; usage of personal protective equipment; communications; employees' perceptions or risks;

2) **maintain/continue:**
   e.g., workplace inspections; supervisor training; accident reporting;

3) **reduce:**
   e.g., hazardous events; specific hazardous events relating to slips, trips and falls; exposure to hazardous substances;

4) **introduce:**
   e.g., risk assessment; an emergency plan; a system for active monitoring; strategic OH&S training for senior managers; permit-to-work systems for specified tasks;

5) **eliminate:**
   e.g., all hazardous events; usage of specified hazardous substances; use of damaged equipment.

C.6 Selecting and prioritizing objectives

C.6.1 *Selecting objectives*

A list of prospective objectives should then be selected. These form the basis for decisions about improvements in an organization's OH&S management system and in specific risk controls. Wherever possible objectives should be:

a) specific;

b) measurable;

c) achievable;

d) relevant;

e) timely.

15

[Guide to OH&S systems]

C.6.2 *Prioritizing objectives*

Draw up list of OH&S objectives

↓

| Select key **OBJECTIVES** |

The next task is to reduce the list to the point where key objectives emerge that match the organization's needs. Priority should be given to objectives relating to specific legal requirements. Early attention should also be given to objectives that can be achieved relatively easily and cheaply. Key objectives to begin with are likely to relate to:

a)　information gathering;

b)　risk assessment;

c)　maintenance of existing risk controls;

d)　remedies to specific and obvious shortcomings in existing controls such as the failure of personnel to use protective equipment.

Complex plans to meet long term objectives that may be difficult to measure are the most difficult to plan and implement successfully.

The next steps in figure C.1 illustrate the stages to fulfil each objective. Planning to achieve lower priority or consequential objectives should follow the same procedure.

C.6.3 *Quantifying objectives and selecting outcome indicators*

Draw up list of OH&S objectives

↓

Select key objectives

↓

| Quantify key **OBJECTIVE** (if possible). Select **OUTCOME** indicators |

Quantification here means that:

a)　objectives to increase or reduce something should specify a numerical figure (e.g., reduce handling accidents by 20%) **and** a date for the achievement of the objective;

b)　objectives to introduce or eliminate something should be achieved by a specified date;

c)　objectives to maintain or continue something should specify the existing level of activity (e.g., supervisors will continue to inspect their sections once per week).

In some cases it may not be possible to quantify an objective, e.g. the effectiveness of communications in a safety committee. What is vital here is to select appropriate outcome indicators to confirm whether the objective has been achieved. The best outcome indicators should be quantitative, but qualitative indicators may be useful.

Note that the outcome indicator for the objective: 'implement a risk assessment programme' is simply a date. However, a more searching and useful objective would be to 'implement an **effective** risk assessment programme'. Here, additional outcome indicators are required to determine whether the risk assessment programme is more than a paper exercise. Annex E reviews the range and suitability of outcome indicators that may be appropriate.

Where relevant, it is important to measure the 'baseline': the situation prior to the implementation of a plan. For example, if an objective is to reduce the time taken to take action on staff OH&S suggestions, the organization should find out how long it takes at present.

C.7　Possible routes to get there; assigning responsibilities and allocating resources

Draw up list of OH&S objectives

↓

Select key objective

↓

Quantify key objective (if possible). Select outcome indicators

↓

| Prepare **PLAN** - to achieve key **OBJECTIVE**. Draw up **TARGETS** |

This part of the planning process involves first developing the broad content of the plan. For example, introducing a risk assessment programme requires, among other things, (see **D.3.2**) communication and consultation arrangements; risk assessment training; work activity classification and information gathering.

Targets are the detailed performance requirements that should be achieved by designated persons or teams in order to implement the plan. The plan should specify **who** is to do **what**, by **when** and with what **result**. For example, in the hearing protection plan (see figure C.2), a person should be designated to rewrite conditions of service on the basis of appropriate consultations with personnel and their representatives.

Performance targets should be clearly drafted so that designated persons/teams know exactly what they have to do. Personnel who are to be allocated targets should be consulted about their practicality and become competent about undertaking them.

16

The targets' documentation can later be used to check whether the plan has been implemented. The performance targets may be listed as a series of questions (see figures C.2 and C.4).

The resource implications of the plan should also be considered. The programme should be costed and adequate financial resources should be made available. The plan should have the full support of senior management.

C.8 Moving from planning to implementing

Draw up list of OH&S objectives
↓
Select key objective
↓
Quantify key objective (if possible). Select outcome indicators
↓
Prepare plan to achieve key objective. Draw up targets
↓
Implement **PLAN**
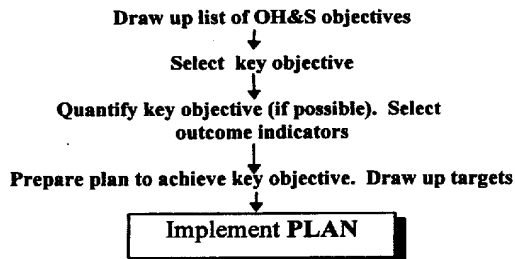
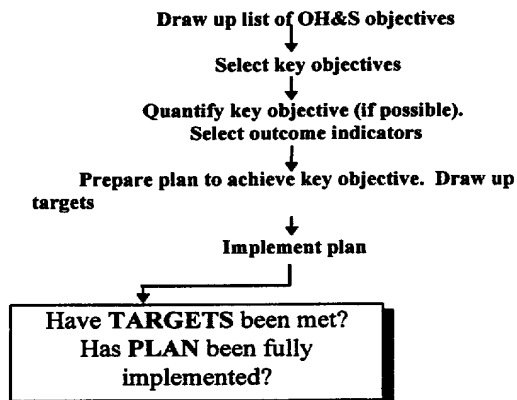The plan should be implemented in accordance with the targets' specifications. However, the plan should not be cast in tablets of stone. Adjustments may be necessary in response to early evidence of failures to meet targets, or information that outcome indicators are not moving in the desired direction.

C.9 Measuring and reviewing progress

C.9.1 *Measure targets met; has plan been fully implemented?*

Draw up list of OH&S objectives
↓
Select key objectives
↓
Quantify key objective (if possible). Select outcome indicators
↓
Prepare plan to achieve key objective. Draw up targets
↓
Implement plan
↓
Have **TARGETS** been met?
Has **PLAN** been fully implemented?

Figure C.2 Planning improved usage of hearing protection

Quantified key objective
Increase usage rate of hearing protection in designated hearing protection zones from the present (measured) value of 20% to 100% within one year.

Outcome indicator
Records of hearing protector usage observed in designated zones.

Prepare plan - to achieve key objective
The broad elements of a plan to improve usage of hearing protection might involve:

a) gaining top management commitment;
b) giving personnel choice in the protection they wear;
c) training to demonstrate effects of occupational deafness and importance of wearing protection at all times in designated areas;
d) changes in conditions of employment;
e) periodic checks that hearing protection is being worn;
f) ensuring that hearing protection is cleaned, maintained and replaced as necessary.

Draw up targets
Targets should be drawn up to deal with each of the broad elements of the plan. For example, the targets for changing conditions of employment might be listed as follows.

1) Has a person been made responsible for amending the conditions of service making it obligatory to wear approved hearing protection in designated hearing protection zones?
2) Have all personnel affected been consulted on the change?
3) Has the organization's disciplinary procedure been amended to take account of the revision?
4) Has a date been set for the change in the conditions of service?
5) Have all personnel affected signed a statement that they have received a copy of their revised conditions of service, and have understood the meaning of the change?

The completion of targets should be continually monitored throughout the period of the plan's lifetime. This monitoring is a key part of measuring performance dealt with in annex E.

Evidence that targets have been completed should be used to judge the organization's success in fully implementing the plan.

[Guide to OH&S systems]

BS 8800 : 1996

C.9.2 *Measure outcome indicators; has key objective been achieved?*

Draw up list of OH&S objectives

↓

Select key objective

↓

Quantify key objective (if possible). Select outcome indicators

↓

Prepare plan to achieve key objective. Draw up targets

↓

Implement plan

Have targets been met?
Plan fully implemented?

Measure **OUTCOME** indicators.
Has key **OBJECTIVE** been achieved?
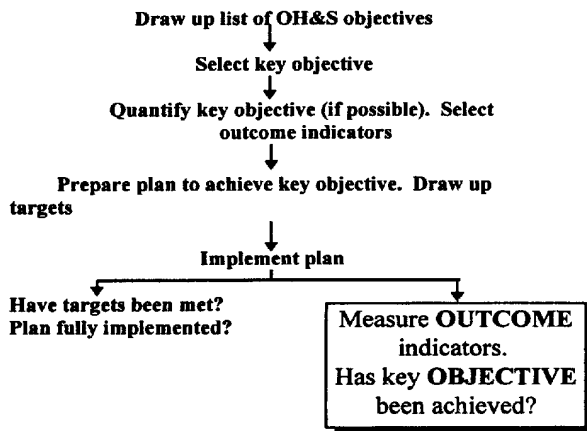
Trends in the outcome indicators should be continually monitored throughout the period of the plan's lifetime, and beyond if necessary.

Evidence from the outcome indicators should be used to judge the organization's success in achieving the key objective.
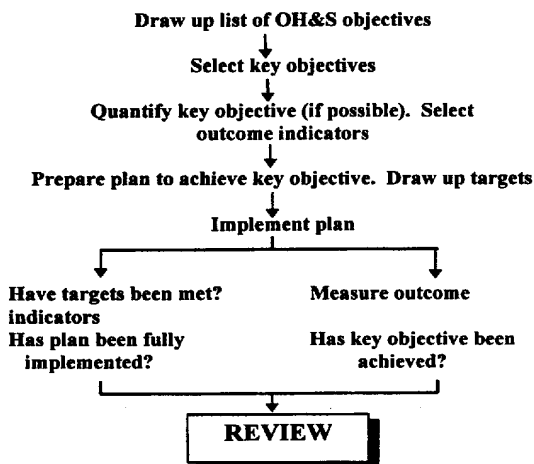
C.9.3 *Review*

Draw up list of OH&S objectives

↓

Select key objectives

↓

Quantify key objective (if possible). Select outcome indicators

↓

Prepare plan to achieve key objective. Draw up targets

↓

Implement plan

Have targets been met? indicators
Has plan been fully implemented?

Measure outcome
Has key objective been achieved?

REVIEW

Figure C.3 raises two basic questions and shows the four basic outcomes of a plan, essentially asking:

a) have we implemented our plan?
   And if so:

b) was it the right plan?

c) for a continuing programme, is the objective and plan still relevant?

Figure C.3 draws attention to the possibility that an objective may be achieved despite a failure to implement the plan. This may occur typically when the objective is to reduce accidents. For example, as described in **E.4**, a reduction in the number of accidents may be a statistical fluke or result from a reduction in work-place activity.

Figure C.3   Planning and implementing review

		PLAN IMPLEMENTED?	
		YES	**NO**
OBJECTIVE ACHIEVED?	**YES**	No corrective action required, but continue to monitor.	Plan was not relevant. Find out what has led to the achievement of objective.
	NO	Plan is not relevant, therefore prepare a new plan.	Make renewed effort to implement plan; continue to measure outcome indicators.

Figure C.4 paints a black and white picture: total success and total failure. In practice plans may be partially effective, in which case consideration should be given to the need to revise the plan.

Organizations should also review the cost-effectiveness of their objectives and plans. It may be that not all the elements of the plan contributed to its success. For example, in the hearing protection case (see figure C.2), it may not have been necessary to make hearing protection a condition of employment.

Finally, organizations should consider whether the objective is still relevant. For example, the use of personal hearing protection may no longer be necessary following the introduction of new, quieter machinery.

The review should be carried out not only to improve the outcome of the specific plan under review, but also to improve the quality of organizational decision-making generally.

18
[Guide to OH&S systems]

Figure C.4   Case study: planning and implementing site transport risk controls in a cash-and-carry warehouse

1 *Findings of risk assessment*

Risk assessment revealed that controls of site transport were inadequate. The main problems that led to the unfavourable assessment were:

a) customers', suppliers' and company vehicles were required to manoeuvre in congested areas;
b) warehouse racking systems were not protected from lift truck impact;
c) warehouse vehicle routes were narrow with blind corners;
d) pedestrians had access to vehicle manoeuvring areas and warehouse vehicle routes;
e) rider-operated lift truck drivers were not trained;
f) lift trucks were not inspected and maintained on a regular basis.

2 *Key objectives*

The organization's quantified key objective was to:

plan and implement an action plan to reduce site transport risks to a level that is as low as reasonably practicable within six months.

The plan specified improvements in outcome indicators that would demonstrate a site transport risk that was as low as reasonably practicable and that could be sustained over time.

3 *Outcome indicators*

Outcome indicators were:
a) compliance with relevant regulations;
b) numbers of transport-related unsafe acts and conditions observed by planned observations;
c) relevant comments by employees, customers, and drivers of suppliers' vehicles;
d) evidence of lift truck impacts with storage racks/protective bollards;
e) reported near-misses;
f) transport accidents.
Baseline information was obtained as part of risk assessment.

4 *Prepare plan - to achieve objective*

The broad content of the action plan to achieve the key objective, within an agreed budget, was finalized after consultation with interested parties and a review of the plan's adequacy:

a) introduce one-way traffic systems;
b) segregate where possible pedestrians and vehicles using, as appropriate, road markings and barriers;
c) install pedestrian crossings;
d) install bollards to protect storage racks;
e) fit mirrors to improve vision at blind corners in warehouse;
f) introduce daily, weekly and annual inspections of lift trucks;
g) send all drivers of lift trucks on a course which meets the requirements of the current Approved Code of Practice;
h) introduce on-site training and a drivers' competency test.

5 *Draw up targets*

A detailed plan showing who would be required to do what by when was drawn up as a set of targets for each part of the risk control action plan. For example the training targets were:

Has [a designated person] within defined time-scales:
a) prepared a schedule for releasing drivers to attend an external course that ensures that sufficient drivers are still at work;
b) booked places for all drivers on the course;
c) consulted approved guidance on site training and competency certification;
d) prepared an on-site training and testing schedule;
e) completed on-site training and certification;
f) made arrangements, as appropriate, for training and certification of new drivers?

6 *Measure targets met and fully implemented?*

The targets for training and the targets prepared for each of the other parts of the plan provided a checklist that was used to determine whether targets had been met and the plan implemented.

7 *Measure outcome indicators; key objective achieved?*

Following implementation of the plan, the outcome indicators were used to test whether the plan had been effective.

8 *Review*

The review revealed that targets were met and the objective achieved. The organization made arrangements to continue monitoring site transport safety, and to review the continuing success of the plan in a year's time.

NOTE. The purpose of this case study is to illustrate the methodology and is not meant to be comprehensive or to be used as a guide to risk control in warehouse activities.

[Guide to OH&S systems]

Annex D (informative)
Risk assessment

D.1 Introduction

D.1.1 *Objectives*

This annex explains the principles and practice of OH&S risk assessment and why it is necessary. Organizations should tailor the approach described here to match their own needs, taking into account the nature of their work and the seriousness and complexity of their risks.

Planning and implementing risk assessment and risk control programmes is covered in annex C.

D.1.2 *Key terms*

The key terms are:

a) **a hazard** is a source of potential harm or damage or a situation with potential for harm or damage;

b) **risk** is the combination of the likelihood and the consequences of a specified hazardous event (accident or incident). A risk, then, always has two elements:

    1) the likelihood that a hazard may occur;

    2) the consequences of the hazardous event.

D.1.3 *When to use the risk assessment procedure*

All employers and self employed people have a legal duty to assess the risks from their work activities. The risk assessment procedure described in this annex is intended to be used:

a) for situations where hazards appear to pose a significant threat and it is uncertain whether existing or planned controls are adequate in principle or in practice;

b) by organizations seeking continuous improvement in their OH&S management systems, in excess of minimum legal requirements.

The full procedure described in this annex is NOT necessary or cost-effective when it is quite clear from preliminary study that risks are trivial, or a previous assessment has shown that existing or planned controls:

    1) conform to well-established legal requirements or standards;

    2) are appropriate for the tasks;

    3) are, or will be, understood and used by everyone concerned.

Here no further action is required other than to ensure, where appropriate, that controls continue to be used. Small, low risk organizations in particular should be highly selective in the risks that they choose to assess in detail.

Effort devoted to assessment of trivial risks or to evaluation of standard controls will lead to collection of more information than can possibly be used, and to situations where important facts are lost in a mass of spurious documentation.

D.2 What is OH&S risk assessment and why do it?

D.2.1 *Basic steps*

Risk assessment involves three basic steps:

a) identify hazards;

b) estimate the risk from each hazard - the likelihood and severity of harm;

c) decide if the risk is tolerable.

D.2.2 *Why is risk assessment important?*

Employers are legally obliged to carry out OH&S risk assessments (see *Management of health and safety at work*, HSC [1]). Their main purpose is to determine whether planned or existing controls are adequate. The intention is that risks should be controlled before harm could occur.

For many years OH&S risk assessments have been carried out usually on an informal basis. It is now recognised that risk assessments are a key foundation for pro-active OH&S management and that systematic procedures are necessary to ensure their success.

A risk assessment based on a participative approach provides an opportunity for management and the work force to agree that an organization's OH&S procedures:

20

[Guide to OH&S systems]

a) are based on shared perceptions of hazards and risks;

b) are necessary and workable;

c) will succeed in preventing accidents.

D.2.3 *Pitfalls and solutions*

Poorly-planned assessments, carried out in the belief that they are bureaucratic impositions, will waste time and change nothing. Moreover, organizations may get bogged down in detail, where completion of assessment pro-formas becomes an end in itself. Risk assessment should provide **an inventory for action** and form the basis for implementing control measures.

Potential risk assessors may have become complacent. People who are too close to situations may no longer 'see' hazards, or perhaps judge risks as trivial because to their knowledge no one has been harmed. The aim should be that everyone tackles risk assessments with a fresh pair of eyes and a questioning approach.

Risk assessment should be carried out by competent people with practical knowledge of the work activities, preferably with colleagues from another part of the organization who may have greater objectivity. A worthwhile approach, whenever possible, is to train small teams to carry out assessments.

Ideally, everyone should contribute to assessments that relate to them. For example, they should tell assessors what they think about the need for and practicality of particular risk controls. In larger organizations a competent person, usually from within the organization, should co-ordinate and guide the assessors' work. Specialist advice may need to be sought.

D.3 The process of risk assessment

D.3.1 *Basic steps in risk assessment*

Figure D.1 shows the basic steps in risk assessment. The steps are outlined below and described fully in **D.4**, **D.5** and **D.6**.

Figure D.1 The process of risk assessment
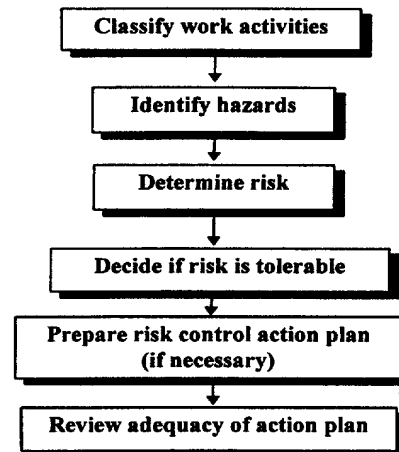
The following criteria are necessary for organizations to carry out effective risk assessment:

a) classify work activities: prepare a list of work activities covering premises, plant, people and procedures, and gather information about them;

b) identify hazards: identify all significant hazards relating to each work activity. Consider **who** might be harmed and **how**;

c) determine risk: make a subjective estimate of risk associated with each hazard assuming that planned or existing controls are in place. Assessors should also consider the effectiveness of the controls and the consequences of their failure;

d) decide if risk is tolerable: judge whether planned or existing OH&S precautions (if any) are sufficient to keep the hazard under control and meet legal requirements;

e) prepare risk control action plan (if necessary): prepare a plan to deal with any issues found by the assessment to require attention. Organizations should ensure that new and existing controls remain in place and are effective;

f) Review adequacy of action plan: re-assess risks on the basis of the revised controls and check that risks will be tolerable.

NOTE. The word 'tolerable' here means that risk has been reduced to the lowest level that is reasonably practicable.

[Guide to OH&S systems]

21

D.3.2 *Risk assessment requirements*

If risk assessment is to be useful in practice, organizations should:

a) appoint a senior member of the organization to promote and manage the activity;

b) consult with everyone concerned; discuss what is planned to be done and obtain their comments and commitment;

c) determine risk assessment training needs for assessment personnel/teams and implement a suitable training programme;

d) review adequacy of assessment: determine whether the assessment is suitable and sufficient; that is to say, adequately detailed and rigorous;

e) document administrative details and significant findings of the assessment.

It is generally not necessary to make precise numerical calculations of risk. Complex methods for quantified risk assessment are normally only required where the consequences of failure could be catastrophic. Risk assessment in major hazard industries is related to the approach required in other workplaces, but in most organizations much simpler subjective methods are appropriate.

The assessment of risks to health associated with exposure to toxic substances and harmful energies may require, for example, measurements of airborne dust concentrations or noise exposure.

D.4 Risk assessment in practice

D.4.1 *General*

This subclause describes the factors that an organization should consider when planning for risk assessment. Attention is drawn to the need to refer to relevant regulations and guidance to ensure that specific legal requirements are met.

The risk assessment process described here covers all OH&S hazards. It is better to integrate assessments for all hazards, and not carry out separate assessments for health hazards, manual handling, machinery hazards and so on. If assessments are carried out separately, using different methods, ranking risk control priorities is

more difficult. Separate assessments may also lead to needless duplication.

The following aspects of risk assessment need to be considered carefully at the outset:

a) design of a simple risk assessment pro-forma (see **D.4.3**);

b) criteria for classifying work activities and information needed about each work activity (see **D.4.4** and **D.4.5**);

c) methods to identify and categorize hazards (see **D.5.1**);

d) procedures for making an informed determination of risk (see **D.5.2**);

e) words to describe estimated risk levels (see tables D.1 and D.2);

f) criteria for deciding whether risks are tolerable: whether planned or existing control measures are adequate (see **D.6.1**);

g) time scales for implementing remedial action (where necessary) (see table D.2);

h) preferred methods for risk control (see **D.6.2**);

i) criteria for reviewing adequacy of action plan (see **D.6.3**).

D.4.3 *Risk assessment pro-forma*

Organizations should prepare a simple pro-forma that can be used to record the findings of an assessment, typically covering:

a) work activity;

b) hazard(s);

c) controls in place;

d) personnel at risk;

e) likelihood of harm;

f) severity of harm;

g) risk levels;

h) action to be taken following the assessment;

22

[Guide to OH&S systems]

i) administrative details, e.g. name of
assessor, date, etc.

Organizations should develop their overall risk
assessment procedure and may need to carry out
trials and continually review the system.

D.4.4 *Classify work activities*

Classify work activities

A necessary preliminary to risk assessment is to
prepare a list of work activities, to group them in a
rational and manageable way, and to gather
necessary information about them. It is vital to
include, for example, infrequent maintenance tasks,
as well as day-to-day production work. Possible
ways of classifying work activities include:

a) geographical areas within/outside the
organization's premises;

b) stages in the production process, or in
the provision of a service;

c) planned and reactive work;

d) defined tasks (e.g. driving).

D.4.5 *Work activity information requirements*

Information required for each work activity might
include items from the following:

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
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);

m) substances used or encountered during the work;

n) physical form of substances used or
encountered (fume, gas, vapour, liquid,
dust/powder, solid);

o) content and recommendations of hazard data
sheets relating to substances used or
encountered;

p) requirement of relevant acts, 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 organization;

s) findings of any existing assessments relating
to the work activity.

D.5 Analysing risk

D.5.1 *Identify hazards*

D.5.1.1 *General*

Classify work activities

Identify hazards

Three questions enable hazard identification:

a) is there a source of harm?

b) who (or what) could be harmed?

c) how could harm occur?

[Guide to OH&S systems]

Hazards that clearly possess negligible potential for harm should not be documented or given further consideration.

D.5.1.2 *Broad categories of hazard*

To help with the process of identifying hazards it is useful to categorize hazards in different ways, for example by topic, e.g.:

a) mechanical;

b) electrical;

c) radiation;

d) substances;

e) fire and explosion.

D.5.1.3 *Hazards prompt-list*

A complementary approach is to develop a prompt-list of questions such as:

During work activities could the following hazards exist?

a) slips/falls on the level;

b) falls of persons from heights;

c) falls of tools, materials, etc., from heights;

d) inadequate headroom;

e) hazards associated with manual lifting/handling of tools, materials, etc.;

f) hazards from plant and machinery associated with assembly, commissioning, operation, maintenance, modification, repair and dismantling;

g) vehicle hazards, covering both site transport, and travel by road;

h) fire and explosion;

i) violence to staff;

j) substances that may be inhaled;

k) substances or agents that may damage the eye;

l) substances that may cause harm by coming

into contact with, or being absorbed through, the skin;

m) substances that may cause harm by being ingested (i.e., entering the body via the mouth);

n) harmful energies (e.g., electricity, radiation, noise, vibration);

o) work-related upper limb disorders resulting from frequently repeated tasks;

p) inadequate thermal environment, e.g. too hot;

q) lighting levels;

r) slippery, uneven ground/surfaces;

s) inadequate guard rails or hand rails on stairs;

t) contractors' activities.

The above list is NOT exhaustive. Organizations should develop their own hazard 'prompt-list' taking into account the character of their work activities and locations where work is carried out.

D.5.2 *Determine risk*

D.5.2.1 *General*

Classify work activities

↓

Identify hazards

↓

Determine risk

The risk from the hazard should be determined by estimating the potential severity of harm and the likelihood that harm will occur.

D.5.2.2 *Severity of harm*

Information obtained about work activities (see **D.4.4**) is a vital input to risk assessment. When seeking to establish potential **severity of harm**, the following should also be considered:

a) part(s) of the body likely to be affected;

b) nature of the harm, ranging from slightly to extremely harmful:
   1) slightly harmful, e.g.:

24
[Guide to OH&S systems]

- superficial injuries; minor cuts and
bruises; eye irritation from dust;

- nuisance and irritation (e.g.
headaches); ill-health leading
to temporary discomfort;

2) harmful, e.g.:

- lacerations; burns;
concussion; serious sprains;
minor fractures;

- deafness; dermatitis; asthma;
work related upper limb
disorders; ill-health leading to
permanent minor disability;

3) extremely harmful, e.g.:

- amputations; major fractures;
poisonings; multiple injuries;
fatal injuries;

- occupational cancer; other
severely life shortening diseases;
acute fatal diseases.

D.5.2.3 *Likelihood of harm*

When seeking to establish likelihood of harm the
adequacy of control measures already implemented
and complied with needs to be considered. Here
legal requirements and codes of practice are good
guides covering controls of specific hazards. The
following issues should then typically be
considered in addition to the work activity
information given in **D.4.4**:

a) number of personnel exposed;

b) frequency and duration of exposure to the
hazard;

c) failure of services e.g. electricity and water;

d) failure of plant and machinery components and
safety devices;

e) exposure to the elements;

f) protection afforded by personal protective
equipment and usage rate of personal
protective equipment;

g) unsafe acts (unintended errors or
intentional violations of procedures) by
persons, for example, who:

1) may not know what the hazards are;

2) may not have the knowledge, physical
capacity, or skills to do the work;

3) underestimate risks to which they are
exposed;

4) underestimate the practicality and
utility of safe working methods.

It is important to take into account the
consequences of unplanned events.

These subjective risk estimations should normally
take into account all the people exposed to a
hazard. Thus any given hazard is more serious if it
affects a greater number of people. But some of
the larger risks may be associated with an
occasional task carried out just by one person, for
example maintenance of inaccessible parts of
lifting equipment.

D.6 Evaluation of risk: deciding if risk is tolerable and action on results

D.6.1 Decide if risk is tolerable

Classify work

↓

Identify hazards

↓

Determine risk

↓
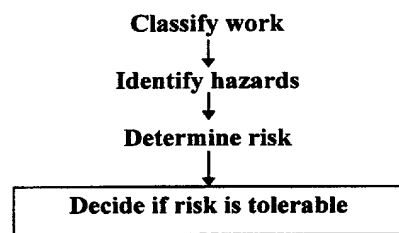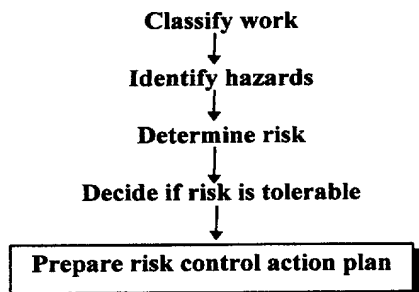
Decide if risk is tolerable

Table D.1 shows one simple method for estimating
risk levels and for deciding whether risks are
tolerable. Risks are classified according to their
estimated likelihood and potential severity of harm.
Some organizations may wish to develop more
sophisticated approaches, but this method is a
reasonable starting point. Numbers may be used to
describe risks, instead of the terms 'moderate risk',
'substantial risk', etc. Using numbers does not
confer any greater accuracy to these estimates.

[Guide to OH&S systems]　　　　　　　　　　　　　　　　　　25

D.6.2 *Prepare risk control action plan*

Classify work
↓
Identify hazards
↓
Determine risk
↓
Decide if risk is tolerable
↓

Prepare risk control action plan

Risk categories shown for example in table D.1 form the basis for deciding whether improved controls are required and the timescale for action. An approach, again suggested as a starting point, is shown in table D.2. Table D.2 shows that control effort and urgency should be proportional to risk.
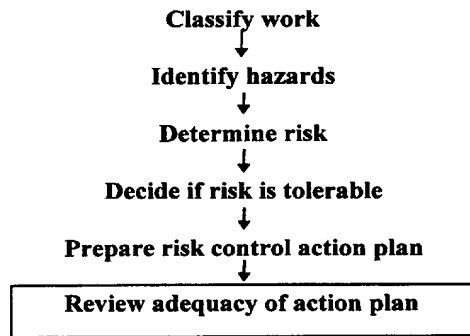
The outcome of a risk assessment should be an inventory of actions, in priority order, to devise, maintain or improve controls. A procedure for planning the implementation of necessary changes following risk assessment is described in annex C.

Controls should be chosen taking into account the following:

a) if possible, eliminate hazards altogether, or combat risks at source e.g., use a safe substance instead of a dangerous one;

b) if elimination is not possible, try to reduce the risk e.g. by using a low voltage electrical appliance;

c) where possible adapt work to the individual, e.g. to take account of individual mental and physical capabilities;

d) take advantage of technical progress to improve controls;

e) measures that protect everyone;

f) a blend of technical and procedural controls is usually necessary;

g) the need to introduce planned maintenance of, for example, machinery safeguards;

h) adopt personal protective equipment only as a last resort, after all other control options have been considered;

i) the need for emergency arrangements;

j) pro-active measurement indicators are necessary to monitor compliance with the controls (see annex E).

Consideration also needs to be given to the development of emergency and evacuation plans, and provision of emergency equipment relevant to the organization's hazards.

D.6.3 *Review adequacy of action plan*

Classify work
↓
Identify hazards
↓
Determine risk
↓
Decide if risk is tolerable
↓
Prepare risk control action plan
↓

Review adequacy of action plan

The action plan should be reviewed before implementation, typically by asking:

a) will the revised controls lead to tolerable risk levels?

b) are new hazards created?

c) has the most cost-effective solution been chosen?

d) what do people affected think about the need for, and practicality of, the revised preventive measures?

e) will the revised controls be used in practice, and not ignored in the face of, for example, pressures to get the job done?

D.6.4 *Changing conditions and revising*

Risk assessment should be seen as a continuing process. Thus, the adequacy of control measures should be subject to continual review and revised if necessary. Similarly, if conditions change to the extent that hazards and risks are significantly affected then risk assessments should also be reviewed.

26
[Guide to OH&S systems]

Table D.1 A simple risk level estimator

	Slightly harmful	Harmful	Extremely harmful
Highly unlikely	TRIVIAL RISK	TOLERABLE RISK	MODERATE RISK
Unlikely	TOLERABLE RISK	MODERATE RISK	SUBSTANTIAL RISK
Likely	MODERATE RISK	SUBSTANTIAL RISK	INTOLERABLE RISK

NOTE. Tolerable here means that risk has been reduced to the lowest level that is reasonably practicable.

Table D.2 A simple risk-based control plan

RISK LEVEL	ACTION AND TIMESCALE
TRIVIAL	No action is required and no documentary records need to be kept.
TOLERABLE	No additional controls are required. Consideration may be given to a more cost-effective solution or improvement that imposes no additional cost burden. Monitoring is required to ensure that the controls are maintained.
MODERATE	Efforts should be made to reduce the risk, but the costs of prevention should be carefully measured and limited. Risk reduction measures should be implemented within a defined time period. Where the moderate risk is associated with extremely harmful consequences, further assessment may be necessary to establish more precisely the likelihood of harm as a basis for determining the need for improved control measures.
SUBSTANTIAL	Work should not be started until the risk has been reduced. Considerable resources may have to be allocated to reduce the risk. Where the risk involves work in progress, urgent action should be taken.
INTOLERABLE	Work should not be *started or continued* until the risk has been reduced. If it is not possible to reduce risk even with unlimited resources, work has to remain prohibited.

NOTE. Tolerable here means that risk has been reduced to the lowest level that is reasonably practicable.

27

Annex E (informative)
Measuring performance

E.1 Introduction

E.1.1 *Responsibilities and competence*

This annex explains why performance measurement in OH&S is necessary and various approaches that can be adopted. Attention should be paid throughout to the key role of line management in measuring OH&S performance. Also important is the need to ensure that those responsible for carrying out performance measurement in OH&S are competent to do so.

E.1.2 *Purposes of measuring performance*

Performance measurement is an essential part of an OH&S management system. Key purposes of performance measurement are to:

a) determine whether OH&S plans have been implemented and objectives achieved;

b) check that risk controls have been implemented and are effective;

c) learn from OH&S management system failures, including hazardous events (accidents and incidents);

d) promote implementation of plans and risk controls by providing feedback to all parties;

e) provide information that can be used to review and, where necessary, improve aspects of an OH&S management system.

E.1.3 *Annex objectives*

The objectives are to describe:

a) pro-active and reactive monitoring;

b) selection of outcome indicators;

c) principles of performance measurement;

d) measurement techniques;

e) hazardous event investigation.

E.2 Pro-active and reactive monitoring

E.2.1 *Scope of pro-active and reactive monitoring*

An organization's performance measurement system should incorporate both pro-active and reactive monitoring as follows:

a) pro-active monitoring should be used to check compliance with the organization's OH&S activities, for example to confirm that recently-appointed staff have attended an induction course;

b) reactive monitoring should be used to investigate, analyse and record OH&S management system failures - including accidents and incidents (see **E.6**);

c) it is often necessary to use both pro-active and reactive monitoring data as outcome indicators. Outcome indicators are used to determine whether objectives are achieved (see **E.3**, and **C.6.3**).

E.2.2 *Pro-active and reactive monitoring in the assessment and control of specific risks*

Pro-active and reactive monitoring play complementary roles in risk assessment and control.

Pro-active data (e.g. from workplace and documentation inspections) are used to monitor compliance with risk controls. They should also be used in subsequent risk assessments.

Pro-active monitoring of risk controls should be part of the control plan. For example if control of on-site welding involves a permit-to-work system, pro-active monitoring should check that the terms of the permit are being adhered to and that documentation is properly completed.

Evidence from pro-active monitoring (and operational experience generally) should be fed back and used to review and, if necessary, improve implementation of controls.

Reactive monitoring data (e.g. hazardous event investigation reports) help risk assessors to:

a) make subjective estimates of likelihood and consequences of hazardous events;

28
[Guide to OH&S systems]

b) select appropriate risk controls.

Following an initial risk assessment, reactive data should be used on a continuing basis to monitor the sustained effectiveness of controls.

E.3 Selecting outcome indicators

E.3.1 *General*

This section lists examples of performance measures that an organization could adopt to monitor OH&S performance. However, organizations should develop a range of measures relevant to their particular circumstances.

Information needs vary at different levels and in different parts of an organization. For example, senior staff need key performance indicators to confirm that the OH&S system is working effectively. At operational level many performance indicators may be necessary to monitor implementation and effectiveness of risk controls. Large organizations should develop a system where measurement summaries are reported upwards to senior staff.

Selecting appropriate outcome indicators depends on the chosen objectives. The following are examples of pro-active and reactive outcome indicators relevant to a range of objectives. The lists include examples of both quantitative and qualitative monitoring data.

E.3.2 *Examples of pro-active monitoring data*

Examples of pro-active monitoring data include:

a) the extent to which plans and objectives have been set and achieved;

b) staff perceptions of management commitment to OH&S;

c) whether a director for OH&S has been appointed;

d) whether OH&S specialist staff have been appointed;

e) the extent of influence of OH&S specialists;

f) whether a safety policy has been published;

g) whether a safety policy has been adequately communicated;

h) the numbers trained in OH&S;

i) effectiveness of OH&S training;

j) number of risk assessments completed as a proportion of those required;

k) extent of compliance with risk controls;

l) extent of compliance with statutory requirements;

m) number and effectiveness of senior managers' OH&S tours;

n) number of staff suggestions for OH&S improvements;

o) staff attitudes to risks and risk controls;

p) staff understanding of risks and risk controls;

q) frequency of OH&S audits;

r) time to implement OH&S audit recommendations;

s) frequency and effectiveness of OH&S committee meetings;

t) frequency and effectiveness of staff OH&S briefings;

u) OH&S specialist reports;

v) time to implement action on complaints or suggestions;

w) health surveillance reports;

x) personal exposure sampling reports;

y) workplace exposure levels (e.g. noise, dust, fumes);

z) personal protective equipment use.

E.3.3 *Examples of reactive monitoring data*

Examples of reactive monitoring data include:

a) unsafe acts;

b) unsafe conditions;

c) near misses;

[Guide to OH&S systems]

29

d) damage only accidents;

e) reportable dangerous occurrences;

f) lost-time accidents - when at least one work shift (or other time period) is lost by a person as a result of an accident injury;

g) reportable accidents involving absence from work for more than three days;

h) reportable major injuries;

i) sickness absences - employee absences due to illness (occupationally-related or non-occupationally-related);

j) complaints made, e.g. by members of the public;

k) criticisms made by regulatory agency staff;

l) regulatory agency enforcement action.

E.4 Principle of performance measurement

E.4.1 Introduction

This section deals with:

a) direct indicators of OH&S performance;

b) cautions in using accident and ill-health data as OH&S performance indicators;

c) performance measures - objective and subjective; quantitative and qualitative.

E.4.2 Direct indicators of OH&S performance

Some performance measures, in particular accident data, are direct indicators of OH&S performance. However, time has to elapse before they can be used as a reliable guide that an OH&S plan has succeeded (see E.4.3). Accident data should never be used as the sole measure of OH&S performance.

Other indicators (for example, house-keeping standards, personal protective equipment use) may be used to predict OH&S performance. Such indicators are useful in that they provide early evidence of success or failure, although their link with long-term key performance may not be perfect. For example, an increase in the indicator: *number of persons trained in the safe operation of*

internal transport will not necessarily lead to a reduction in site transport accidents.

Consequently, organizations should select a combination of indicators as OH&S performance measures.

E.4.3 Cautions in using accident and ill-health data as OH&S performance indicators

Accident data are vital as they are a direct indicator of OH&S performance. However, there are cautions relating to their use e.g.:

a) most organizations have too few injury accidents to distinguish real trends from random effects;

b) if more work is done by the same number of people in the same time, increased workload alone may account for an increase in accident rates;

c) the length of absence from work attributed to injury or ill-health may be influenced by factors other than the severity of injury or occupational ill-health - such as poor morale, monotonous work and poor management - employee relations;

d) accidents are often under-reported (and occasionally over-reported). Levels of reporting can change. They may improve as a result of increased workforce awareness and better reporting and recording systems;

e) a time delay will occur between OH&S management failures and any harmful effects. Moreover many occupational diseases have long latent periods. It is not desirable to wait for harm to occur before judging whether OH&S systems are working (see **C.3.2**).

E.4.4 Performance measures - objective and subjective; quantitative and qualitative:

Performance measures include:

a) objective measures that are detached from an assessor's personal judgement (e.g. reading a calibrated noise meter; number of personnel using hearing protection; whether an OH&S specialist is in post). However, they may not be the most important things to measure;

b) subjective measures that may be influenced by those doing the measuring. Examples are

30
[Guide to OH&S systems]

measures of the adequacy of housekeeping or a safe system of work where no defined standard has been laid down. These measures can be very useful but need to be treated with caution. For example, two people may report different findings about the adequacy of workplace controls;

c) quantitative measures that can be described in terms of numbers and recorded on a scale. Where possible, it is desirable to quantify performance measures so that comparisons can be made over time. However, such measures may give an unjustified impression of precision;

d) qualitative measures that are descriptions of conditions or situations that cannot be recorded numerically, for example a commentary on the deliberations of an OH&S committee. While qualitative indicators may be very important they may be difficult to relate to other performance measures.

Organizations should adopt a well formulated combination of all four types of measure in an OH&S programme. This allows a much better overall assessment of OH&S performance than reliance on any single measure.

Attention should be given to the level of competence required of those responsible for devising, carrying out and analysing data from all performance measures.

E.5 Measurement techniques

The following are examples of methods that can be used to measure OH&S performance:

a) systematic workplace inspections using checklists;

b) safety tours - for example on a 'walk through' basis;

c) inspections of specific machinery and plant to check that safety-related parts are fitted and in good condition;

d) safety sampling - examining specific aspects of OH&S;

e) environmental sampling - measuring exposure to substances or energies and comparing with

recognized standards;

f) behaviour sampling - assessing workers' behaviour to identify unsafe work practices that might require correction, for example by work design improvements or through training;

g) attitude surveys of personnel at all levels;

h) analysis of documentation and records;

j) benchmarking against good OH&S practices in other organizations.

Organizations need to decide how often monitoring should take place on the basis of the level of risk. Frequency of plant and machinery inspections are in some cases defined by regulations.

E.6 Hazardous event investigation

E.6.1 *Investigation procedure*

Organizations should have effective procedures for reporting and investigating hazardous events. The prime purpose of the investigation procedure is to prevent further hazardous events. The occurrence of a hazardous event is usually evidence of OH&S management system failures. Therefore, to find out why an accident or incident happened, shortcomings in the OH&S system and 'sharp end' failures should both be investigated. Hazardous event investigation should address questions of what happened and why it happened.

The procedure should include:

a) type of events to be investigated (e.g. 'near misses' that could have led to serious harm);

b) where appropriate, co-ordination with emergency plans and procedures;

c) the purpose of investigations;

d) the scale of investigative effort in relation to the potential or actual harm;

e) who is to investigate, their authority, required competencies and associated training needs (including line management);

f) arrangements and location for witness interviews;

g) practical issues, such as availability of

[Guide to OH&S systems]

cameras and storage of evidence;

h) investigation reporting arrangements, including statutory reporting requirements.

Investigation personnel should begin their preliminary analyses of the facts while further information is collected. Data collection and analysis should continue until an adequate and sufficiently comprehensive explanation is obtained.

E.6.2 *Sources of information*

Those investigating hazardous events should consider critically:

a) reactive monitoring data;

b) results of risk assessments and choice of controls;

c) implementation of controls as determined by pro-active monitoring data.

E.6.3 *Possible OH&S shortcomings*

Investigators should consider whether the hazardous event was associated with one or more of the following:

a) risk controls selected on the basis of an unsuitable or insufficient risk assessment;

b) poor implementation of controls;

c) failures of pro-active monitoring to detect poor implementation of controls;

d) controls implemented but ineffective;

e) failures of reactive monitoring to detect near misses that would have revealed ineffective controls;

f) controls not reviewed or improved in the light of evidence of pro-active and/or reactive monitoring;

g) failure to manage change effectively.

E.6.4   *Learning from and communicating results of investigations*

The organization should learn from the investigation, which should:

a) identify root causes in the OH&S and general management of the organization;

b) communicate findings to all relevant parties;

c) include relevant findings from investigations in the continuing OH&S review process.

Implementation of remedial controls should be monitored to ensure timely and effective change.

32
[Guide to OH&S systems]

Annex F (informative)
Audit

F.1 Introduction

This annex provides guidance on how to set up and operate a health and safety audit system. It defines the key decisions and issues and how to address them. It does not provide a ready-to-implement system as it will in general be necessary to tailor any system to the needs and size of the organization.

F.2 Commitment to auditing

F.2.1 *Senior management commitment*

Auditing is an essential element of a health and safety management system, not a substitute for it. For health and safety auditing to be of value senior management should be fully committed to the concept of auditing and to its effective implementation within the organization. This includes a commitment not to reject audit findings and recommendations without good reason and to take appropriate action within a reasonable time, according to the level of risk identified. They should recognize that once they have agreed that an audit should be carried out it should be completed without interference and without any attempt to influence or coerce the auditors.

F.2.2 *Co-operation with auditors*

Often staff at all levels see audits as a threat. They should be made aware of the purposes of auditing and the benefits. They should be required to be open and to co-operate fully with the auditors, and to respond to their questions honestly. This can be assisted by ensuring that audits are seen as part of a continual improvement process and not just a means of identifying problems.

F.3 Developing an audit system

F.3.1 *Audit policy*

In developing an auditing policy a number of key issues have to be considered, including:

a) the objectives and purpose of auditing;

b) the procedures, standards and aids to be used;

[Guide to OH&S systems]

c) who is competent to undertake audits;

d) the arrangements for the management of auditing, including budget provision;

e) the audit programme;

f) the format of audit reports and arrangements for responding to them;

g) performance standards for planning and implementation of the audit programme and arrangements for its monitoring;

h) the arrangements for the review of the auditing policy and its implementation and for revision as necessary.

When these issues have been considered the decision will have to be made whether to use a proprietary 'off-the-shelf' system or to develop a unique audit system. In making this decision the time it would take, the costs involved and the availability of the necessary skills and expertise should be taken into account, together with the suitability of the system.

F.3.2 *Preparation of audit procedures and aids*

Once senior management is fully committed to auditing and the overall objectives have been agreed, a procedure should be prepared to ensure that they can be achieved. In developing the initial concept of the auditing procedure, the following should be considered:

a) the elements of the audit process, preparation, on-site work and follow-up;

b) the key elements of the health and safety management system and other key topics that the audit programme will address and the criteria against which performance will be judged;

c) means for ensuring that the audit includes a representative sample of activities to be included;

d) how key questions should be framed;

e) the need for auditing aids, e.g. aides-mémoires, check lists, inspection procedures.

33

The final form of the audit system should be based on current best practice and should be appropriate to the nature and complexity of the organization.

F.4 Planning and managing audits

F.4.1 *Audit management*

A senior person should have the responsibility for:

a) preparing and overseeing the audit programme;

b) costing and making appropriate budgetary provision;

c) obtaining any necessary approvals for the proposed programme and anticipated expenditure.

F.4.2 *Audit programme*

A programme of auditing should be prepared, over an appropriate time scale, to examine and provide a comprehensive assessment of all the elements of the health and safety management system. In determining a suitable frequency of auditing some of the factors that may need to be taken into account include:

a) the nature of the hazards;

b) the level of risk;

c) an adverse audit or incident record;

d) any regulatory requirements;

e) previous experience or adequate sampling of small low risk facilities.

The policy adopted in respect of the audit programme should be sufficiently flexible to allow for unexpected changes in priorities and should be supported by senior management.

F.5 Arranging an audit

F.5.1 *Nature of the audit*

The nature and extent of the audit to be undertaken should be determined. This involves answering such questions as:

a) will the audit look at the whole or just part of the organization, or focus on a specific activity, location or issue?

b) will the audit look solely at the OH&S management system or will it involve technical matters concerning plant, equipment and processes?

c) is the audit intended to establish the effectiveness or otherwise of the OH&S management system (validation audit), or to verify whether the organization is complying with its own standards and procedures (compliance audit), or both?

d) should the audit be carried out by internal or external auditors?

e) will the audit as proposed require any special skills of the auditors?

F.5.2 *Terms of reference*

The terms of reference of the audit should be agreed and made known to both auditors and the manager of the activities to be audited and include:

a) the objectives and scope of the audit;

b) the form in which the report on the findings of the audit is to be provided;

c) who should receive copies of the audit report.

F.5.3 *Timetable*

Suitable start and completion dates for the audit should be agreed with the auditors and those to be audited and the date by which the audit report is to be completed. To minimize inconvenience, where appropriate, a timetable of planned interviews and inspections should be prepared and issued to those persons who need to know.

F.6 Auditors, selection and training

F.6.1 *Auditors*

Audits may be undertaken by one or more persons. A team approach, involving managers, safety representatives and employees may widen the involvement and improve co-operation. The people chosen as auditors should be competent. Wherever possible, they should be independent of the part of the organization or the activity that is to

34
[Guide to OH&S systems]

be audited. The nature and extent of the audit strongly influence the decision whether it should be undertaken by people from another part of the organization or by external auditors. Other factors that should be taken into consideration include:

a) the availability of auditors for the length of time necessary to undertake the audit;

b) the availability of auditors with the necessary skills;

c) the level of audit experience required;

d) the requirement for specialist knowledge or technical expertise;

e) any requirement for training;

f) the cost differential between using internal or external auditors;

g) the danger of an internal auditor being over familiar or satisfied with the organization's arrangements, compared with the benefits of the fresh eyes and a possibly more questioning approach of an external auditor;

h) the danger of unfamiliarity or lack of understanding, particularly where complex technical issues or processes are involved.

F.6.2 *Selection criteria*

Auditors have to understand their task and be competent to carry it out. They need to have the status, experience and knowledge of the relevant standards/systems they are auditing against to enable them to evaluate performance and to identify deficiencies.

F.6.3 *Composition of audit teams*

Where an audit team is to be used, as opposed to an individual auditor, the composition of the team will depend on the nature and scope of the audit and also whether:

a) in-house, external or a combination of both are used;

b) specialist knowledge, experience, skills or technical expertise will be required;

c) agreements have been reached about the involvement of employee representatives.

F.6.4 *Training*

Where external auditors are used they should be selected on the basis of their ability and competence to undertake the task. Where in-house personnel are utilized, training should be provided as necessary to ensure that those selected as auditors are competent to undertake the task.

F.7 Data collection and interpretation

F.7.1 *General*

The techniques and aids used in the collection of the information that is required will depend on the nature of the audit being undertaken and the organization being audited. The aim should be to obtain evidence that can form the basis of objective findings rather than subjective judgements about performance. The audit should, therefore, ensure that a sufficiently representative sample of key activities is included in the process of the audit.

F.7.2 *Auditing aids*

The auditor or audit team should select the auditing aids to be used and confirm that they are appropriate for the audit that is to be undertaken, making any changes that are identified as necessary. The auditor or audit team should also consider the need for equipment to record their findings more efficiently, such as computer notebooks, audio recorders, cameras and video recorders. Recorded visual evidence is often more readily accepted than the written word and can serve as a permanent record of the conditions at the time of the audit.

NOTE. Any equipment to be used in audits should be used only in accordance with local rules on safety, security, etc. which may be applicable.

F.7.3 *Interviews*

Key personnel should provide relevant information to the audit team. 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 will usually include directors, managers, persons with specific responsibilities for health and safety such as safety advisers or, for example, those responsible for the control of permits to work, trade union appointed safety representatives and employee representatives. Other personnel at all levels

should be interviewed to establish whether procedures are known, understood and followed.

F.7.4 *Documentation*

Relevant documentation should be examined. Ideally OH&S instructions should form an integral part of normal procedures and working instructions. Typically, documentation that could be appropriate for examination may include:

a) the OH&S Policy and the statement of the supporting organization and arrangements;

b) risk assessments;

c) previous audit records;

d) OH&S manuals and emergency procedures;

e) OH&S risk control arrangements;

f) health and safety committee minutes;

g) safety inspections, accident, incident and ill-health reports and statistics;

h) occupational hygiene records, e.g. personal monitoring records;

j) reports by the enforcing authorities;

k) statutory registers and certificates;

l) health and safety suggestions.

F.7.5 *Inspections*

The aim of inspections within an audit is to confirm (or otherwise) the information gathered during interviews and examination of documentation. They could include simple observations of work and behaviour through to systematic inspections of premises, plant and equipment, and could either involve a total examination of a particular operation or activity or be undertaken on the basis of a limited sample.

F.7.6 *Data analysis*

Audit findings generally take the form of both qualitative and quantitative data. The use of correctly designed audit aids should simplify the analysis of the data and, in some cases, it may 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 has to be based on auditing methods that ensure that there is a consistency in scoring.

F.7.7 *Interpretation*

The value of an audit is dependent upon the experience and knowledge of the auditors and their ability to interpret and use the findings. It is also dependent upon the integrity of all the parties involved. Wherever possible, checks should be built into the system to help to avoid misrepresentation or misapplication of audit results.

F.8 Carrying out audits

F.8.1 *Managing time and resources*

The auditors should make the most effective and most efficient use of the time and resources available to them by ensuring that they keep to their remit and by not allowing themselves to be side-tracked.

F.8.2 *Maintaining adequate records*

In order to ensure that any queries, that may arise concerning the audit or its findings, can be answered, the auditors should ensure that adequate records are kept of what was done, what was said and by whom, and what was found.

F.8.3 *Coping with stress*

Audits can prove stressful both to those being audited, who often see them as a threat and critical of their efforts, and to the auditors, who may be confronted by people who may be unreceptive, uncooperative, obstructive or even aggressive. Every effort should be made by the auditors to defuse such situations by emphasising that the audit has the full support and commitment of senior management. They should explain that it will benefit both the organization and the individual by identifying potential problems and weaknesses in the health and safety management system, and that the audit is not concerned with recrimination or the allocation of blame. Where the problem cannot be resolved with the individual concerned the auditors should report the situation to the audit manager.

F.8.4 *Coping with the unexpected*

Auditors have to be able to recognize the limitations of their own abilities. Inevitably there

36
[Guide to OH&S systems]

will be occasions when auditors will be confronted by situations or issues that they may not be competent to deal with, or that are outside their remit but which are recognized to be of serious concern. They need to ensure that any such matters are brought to the attention of the audit manager so that they can receive appropriate action.

F.9 Reporting

F.9.1 *Accuracy and confidentiality*

An audit will be of little value unless it is carried out with integrity and reported accurately.

An audit report is prepared in the first instance for the management who commissioned the report. The content of the report and any other information learnt by the auditors during the course of the audit should be treated as confidential and should not be divulged except with the agreement of the management who commissioned the report or where the auditors are legally obliged to disclose the information.

F.9.2 *Initial feedback*

At the end of the data collection phase the auditor or audit team should summarize and feedback their initial findings to local senior management and, in particular, draw attention to any issues that are of such significance as to necessitate immediate attention.

F.9.3 *Draft report*

The audit report should be submitted to local management in draft form to enable factual accuracy to be checked and to ensure that the report is understood.

F.9.4 *Final report*

The final report should assess the overall performance, identify any inadequacies and may make recommendations on action for improvement. Alternatively, it may be left to local management to develop a suitable action plan based on the audit findings (see **F.10.2**). It should also identify the observed strengths and suggest how they can be built on. The report should be concise, written in plain English and free from jargon with appropriate illustrations where they will enhance the understanding and acceptance of the report. A summary including principal findings and recommendations may be useful.

F.10 Acting on audit results

F.10.1 *Dissemination of final report*

The final report should be considered by the appropriate levels of management. This will usually be those who have commissioned the audit and those affected by the findings, including the employees' representatives. It is important to communicate the substance of the audit report and the agreed recommendations for action to appropriate personnel.

F.10.2 *Action plan*

An action plan of agreed remedial measures should be drawn up together with responsibilities, completion dates and reporting requirements. It is essential that line management clearly demonstrates ownership of the audit and subsequent action plan.

F.10.3 *Monitoring progress*

If the necessary actions identified in the action plan are not carried out expeditiously the entire auditing exercise may be worthless. Follow up monitoring arrangements have to be established to ensure satisfactory implementation of the action plan.

37

[Guide to OH&S systems]

List of references (see clause 2)

Informative references

BSI standards publications
BRITISH STANDARDS INSTITUTION, LONDON

BS EN ISO 9000 :	*Quality systems*
BS EN ISO 9001 : 1994	*Specification for design/development, production, installation and servicing*

BS EN 30011 :	*Guide to quality systems auditing*
BS EN 30011 - 1 : 1993	*Auditing*
BS EN 30011 - 2 : 1993	*Qualification criteria for auditors*
BS EN 30011 - 3 : 1993	*Managing an audit programme*

BS EN ISO 14000 :	*Environmental management systems*
BS EN ISO 14001 : 1996	*Environmental management systems - Specification with guidance for use*

BS 7750 : 1994	*Specification for environmental management systems*

Health and Safety Commission/Executive publications:

[1] Health and Safety Commission *Management of health and safety at work:* HMSO, ISBN 0 11 886330 4, 1992.

[2] Health and Safety Executive *Successful health and safety management:* HS(G) 65, HMSO, ISBN 0 7176 0425 X, 1993.

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