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Managing safety

A review of the role of management in occupational health and safety
by the Accident Prevention Advisory Unit
of HM Factory Inspectorate



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Foreword

Over the past five years the Accident Prevention Advisory Unit (APAU) of the Health and Safety Executive has examined a range of industrial and service organisations and seen how they have come to terms with the general requirements of the Health and Safety at Work etc Act 1974 positively to promote safety. The key requirement is to develop a safety policy and the necessary organisation and arrangements for its application. This calls for a commitment to safety at a senior level and the deliberate application of management skills.

Earlier publications* have summarised the experience of APAU and identified characteristics of those organisations which are successful in developing and applying effective policies for the promotion of safety and health. This review also draws on APAU experience, and seeks to assist managers in industry, public undertakings and commerce to understand their responsibilities and how they may be discharged. It does not present ready-made answers; it offers a distillation of ideas which have been found to be successful in practice. I hope that the information in this booklet will stimulate management to recognise and assess health and safety problems in the workplaces for which they have responsibility, and to develop and apply effective solutions.

In order to avoid repetition the word 'safety' should be taken to include health and extended to include employees not directly involved with the work activity giving rise to a hazard, and the public who may be endangered by that work activity.

Introduction

The Health and Safety at Work etc Act (HSW Act) which came into force in 1975 extended both the scope of health and safety legislation to virtually the whole of the workforce in Great Britain and the responsibilities of an employer to safeguard those not in his employment including the general public who may be affected by his work.

The Act recognised that it was no longer possible to continue the approach adopted by the early reformers who specified the legislative safeguards for particular hazards in factories, mines and latterly offices, shops and railway premises. Accordingly, its requirements, phrased in terms sufficiently general as to be applicable to all who may be endangered, imposed responsibilities on those who create risk and work with it for its elimination or control. Legislation now recognises that safety and health are integral parts of the work processes and managers and work-people are expected to achieve appropriate standards. These standards vary from the very exacting as in the nuclear or chemical industries to the adoption and implementation of simple common-sense procedures in low risk industries. Managerial competence in health and safety must be commensurate with the risks inherent in the undertaking and be at least as good as that required to operate the business successfully.

There is an important difference between commercial success and failure and that in health and safety: failure in business activities may have serious financial consequences and managers expect to be held accountable to their organisation. In occupational safety and health a manager is also accountable to an inspection authority which has the power not only to require remedies to be applied but also to institute legal proceedings against the undertaking and its managers.

Summary

The Accident Prevention Advisory Unit of the Health and Safety Executive has, over the last five years, examined the standards of occupational safety in a wide range of industrial and service

organisations, and noted the organisational features and management characteristics of those enterprises which have been demonstrably successful in promoting consistently high standards of safety, or improving standards when they were not adequate. This publication summarises the views of the inspectors who carried out the work.

Hazards to safety and health are not confined to industrial premises but are inherent in a wide range of activities. Whilst it is essential that safety hardware should be of a high standard, technical excellence is not enough and will not, on its own, ensure a consistently safe place of work. Even in industries generally associated with high technology underlying causes of accidents are often organisational rather than technical.

High standards of safety should be a management objective pursued in the same way and with as commensurate vigour as other management objectives. Managers need effective information systems which will assist them in the identification and assessment of hazards so that resources can be earmarked and priorities allocated to control or eliminate them.

Successful managements set understandable and practical goals for safety, motivate and obtain commitment from their workforces, provide realistic resources, instil a need to accept personal responsibility for safety in their employees, and evaluate standards of achievement in ways that clearly mark approval or disapproval of individual and group performances.

Measurement of safety performance requires an assessment of the extent to which the hazards inherent in work activities are eliminated or controlled. Such measurement requires a quantitative and qualitative view of the standards of compliance with pre-determined standards (especially those set out in legislation or codes of practice), the accident and ill-health record, the operation of the safety policy and progress towards long term objectives.

The report concludes with a short series of case study examples describing what can be achieved by committed managements using some of the lessons outlined in this publication.

The authors acknowledge with gratitude the debt that they owe to all directors, managers, employees and safety professionals who in the course of many projects and conversations have helped to develop and test the ideas expressed here.

Newback - show that numbers

1 The importance of safety in management

1 This report is about the manager and his responsibility for occupational safety and health, the risks that are run by people in various work activities and the risks that those activities pose to other workers and members of the public. It aims to demonstrate that the elimination or control of risks not only calls for expertise and the deployment of specialist skills and services, but is also an essential part of the job of every manager. The word 'manager' in this context should be taken to include everyone who operates in a management capacity — that is first line supervisor and upwards.

2 Occupational safety and health had its origins in Great Britain in the industrial revolution but the risks are not confined to manufacturing industries: they are increasingly spread over a wide range of activities including public undertakings, education, and health care services. A feature of modern undertakings is their tendency to increase in size in order to benefit from economies of scale and the strength that comes from diversity of operations.

3 The effectiveness of a large organisation lies in part in the way in which it is able to co-ordinate the activities of its employees towards a common objective which they could not attain as individuals or small groups. Co-ordination is achieved by management and the success or failure of an organisation is largely determined by the quality of management effort. This applies just as much to safety as to any other objective. The very size of large undertakings creates the possibility of organisational blind spots which can exist in spite of personal commitments to safety. The achievement and maintenance of high standards of safety is a management function not entirely dependent on the attitudes and performance of individuals. Thoroughly safety conscious individuals will still have accidents if their environment and work activities are not properly managed. This point needs to be understood because there remains a tendency among some managers to blame a poor safety record on the collective failures of individuals to be safety conscious.

4 Whilst some traditional occupational safety problems have now largely disappeared, many new technologies and the materials used are potentially more dangerous than those of the past. The standardisation of design techniques and practices without

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thought for individual applications means that a single basic error can be multiplied in its effects. The manufacture and distribution of many goods and services is now often controlled either by the state or by very large, sometimes multi-national, companies and an error made at the centre of operations, can have very wide implications. The trend towards centralised control has gone further in the United Kingdom than many other western countries.

5 Serious risks are not confined to manufacturing industry but occur in transport, hospitals, entertainment and a range of local authority services. This is confirmed by an examination of the major accident reports published in Great Britain in the last 15 years. This can be seen from the Hixon Level Crossing accident¹ and the Coldharbour Hospital² and the Fairfield Home³ fires. In addition accidents such as the Aberfan tip slide⁴, the RTZ Avonmouth lead poisonings⁵, the Flixborough explosion⁶, the HMS Glasgow fire⁷, the falsework collapse at the River Loddon Viaduct⁸ and mining disasters, at Markham⁹ and Lofthouse Collieries¹⁰ have occurred across a wide spectrum of activity.

Management is open to scrutiny not only from superiors but also from the workforce, from competitors, from governmental and regulatory agencies and not least from the public, from special interest groups and from the communications media. People expect to be safe and one of the quickest ways to attract public criticism is to be held responsible, or to be thought to be responsible, for a failure which results in personal injury or risk to members of the community. In many areas of activity it is not sufficient for those in charge of an undertaking to have run it safely in the past: they must also demonstrate regular and systematic concern. Failure to do so may damage the undertaking's reputation and jeopardise its future. Pressures for the operation to cease may arise from a loss of confidence by the public, or from suppliers or those faced with similar responsibilities who do not wish to suffer guilt by association. The nuclear industry and parts of the chemicals industry are examples where future programmes may be dependent upon managers being able to give convincing assurances that the risks are adequately controlled.

6 Safety is subject to wide ranging constraints. Enforcing authorities have powers to stop work or to require it to be done in a particular way to prevent hazard. The strongest legal requirements affecting industrial democracy apply to safety. The Safety Representatives and Safety Committees Regulations¹¹ give workers'

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representatives appointed by recognised trades unions the right to receive information about hazards and to make representations about them on behalf of their members.

Technical excellence is not enough

7 To prevent accidents to people and damage to plant and the environment one needs to ask how management should be involved. Management's responsibility is to control work — both its human and physical elements — and accidents are caused by failures of control. They are not, as is so often believed, the result of straightforward failures of technology: social, organisational and technical problems interact to produce them.

8 Emphasis upon the technical 'explanations' of accidents has been a feature of investigations into public accidents and has certain attractions. The public respond to media coverage of the scientific sleuth discovering an unusual explanation of why a particular component failed, and the glamour of the technology distracts them from a consideration of the relevance of the findings. The technical explanation is awarded the status of 'cause'. But accident investigators, operators of the undertaking and enforcing authorities need to establish why the technical failure was permitted to occur. Thorough accident investigation should answer questions like what went wrong, who was responsible, who is going to stop it happening again, and how? Few accidents have a single immediate cause. Most are the result of a progression of causes. The Commission reporting upon the Summerland fire in the Isle of Man found, for example, that the underlying factors were: 'Many human errors and failures, and it was the accumulation of these, too much reliance on the "old boy" network and some very ill-defined and poor communications led to the disaster'.¹² Yet media coverage after the incident was almost entirely concerned with the flammable properties of Oroglas which formed the cladding of the building.

9 High technology demands high technical competence in controlling risk, but even the highest technical competence will not on its own ensure a consistently safe place of work. There is a great deal more to safety and health at work than providing the right physical safeguards. There is the whole question of effective and imaginative organisation for safety.

10 This point was sharply brought out in the discussions and enquiries which followed the Three Mile Island¹³ nuclear incident in the United States. The report pointed out that popular discussions of nuclear power plants tend to concentrate on questions of equipment safety but added that as the evidence accumulated, it became clear that the fundamental problems were 'people-related problems' and not equipment problems.

11 Similar issues were raised by the Norwegian Royal Commission in their report into the oil and gas blow-out on the Ekofisk Bravo oil platform in April 1977¹⁴. The Commission found that the accident to a large degree was due to human errors. Certain technical weaknesses were present but were only of peripheral significance. The underlying cause was that the organisational and administrative systems were inadequate to ensure safe operations.

12 These examples are not given to show the possible shortcomings of the nuclear energy industry in the United States or the North Sea oil companies. They are given to point out that even in industries where the physical safeguards must be complex and sophisticated, there is an overriding need for a safety organisation which takes into account the way human beings actually behave in the situations in which advanced technology places them.

13 Very often it is found that accidents occur in activities ancillary to the main purpose of the organisation, and these activities can be sadly neglected. At the Aberfan Enquiry for example, it emerged that although much attention had for years been devoted to the safety of mining, the safety of waste tips had not been adequately considered.

14 'Tips are a necessary and inevitable adjunct to a coal-mine... but miners devote certainly no more attention to rubbish tips than householders do to dustbins.'

15 Studies by the Accident Prevention Advisory Unit have shown that only a minority of fatal accidents in, for example, the steel industry are the result of the primary steelmaking process. The majority are associated with transport and handling activities. A study of a firm which had severe problems of industrial hygiene upon which they concentrated their resources showed that they had overlooked problems of mechanical safety resulting in a large number of severe injuries. Safety cannot be left entirely to the

technical experts. In addition the whole work activity needs to be co-ordinated towards the elimination of human error.

2 Safety as a management objective

16 Promotion of acceptable standards of safety is a management function and managers' health and safety objectives need to be defined. These objectives include responsibility for the protection from harm of people, plant, premises and the environment. It is sometimes suggested that these responsibilities can be pursued separately but the view that all are part of a coherent whole is now gaining increasing acceptance. There is, however, an important practical distinction between them in that only people can actively participate in their own protection, and to act or react for or against controls. Individuals and groups, are able to decide to some extent dependent upon their knowledge how far they are prepared to accept exposure to risks, and how far they are prepared to take precautions against them.

17 Risks will always exist. It is not possible to construct a working environment entirely free from risk. Hazards may be reduced, but rarely eliminated entirely, at the design stage. Design is not an exact science and for any given problem there may be no ideal and entirely reliable solution. Examination of accidents indicates, not only that design parameters are often inexact due to lack of information and foresight, but also that the ways in which the design is realised are subject to human error. Accordingly there will always be some possibility of failure. This is not to deny the contribution made to safety by designers but is a recognition that their contribution is finite. Factors of safety built into projects are a tacit admission of the limits of design knowledge and manufacturing capability.

The need for knowledge

18 Most people, given sufficient knowledge of a serious hazard — not just that a risk exists, but where, when and with what ferocity it will manifest itself — would take steps to remove themselves from the area of danger if they could. Similarly when confronted by more modest risks, individuals or groups, given adequate knowledge of the risk, generally take steps to avoid it, to

eliminate it or, more usually, to reduce it and its effects upon themselves. The key element is knowledge. The distribution and effective use of knowledge is a major management contribution to safety. If information, instruction and training were adequate then a large proportion of industrial accidents, could be avoided.

19 The dilemma faced by managers is how to create consciousness of the need for safety without causing undue anxiety. In this respect the key feature appears to be the direct personal relevance of the information provided. Properly presented, relevant information produces security in the individual because it assures him that the hazards have been assessed, provides the means for him to cope with them, and eliminates areas of uncertainty. People do not take general warnings, for example from poster campaigns, too seriously. A sense of personal safety is necessary for most people if they are to go about their work without constant worry.

Allocation of resources

20 An objective of safety management is to provide a working system within which the balance between the provision of safe environment and the capabilities of the majority of people to cope with failures in that environment is maintained at a socially acceptable level. It is not just a question of a certain level of risk being acceptable to society, because there are wide sub-divisions within society which have differential risk. In Great Britain, for example, differential risks of death and injury exist between construction workers and those engaged in manufacturing industry. Risks from driving on roads are in excess of those at some work activities. These levels of acceptable risk have often been influenced by political, ethical and emotional factors as much as by rational allocation of preventative resources.

21 There have been a number of attempts to allocate resources on the basis of rational values, the most common being cost benefit analysis. But cost benefit analysis of safety is still in its infancy and suffers from two main weaknesses. The first is the inability to cost in accountancy terms the 'benefits' likely to accrue from any given level of expenditure, and the second is a genuine belief amongst large sections of the public that matters affecting life or death should not be made on the basis of financial accounting procedures. This latter belief is strengthened by the fact that the cost and benefit elements of the equation are rarely borne by the same persons or groups. In purely financial terms the

interests of particular groups of employees, employees generally, managers, shareholders (and their analogues in the public service) do not coincide. The first weakness is essentially one of definition. Whilst it is possible to assess with reasonable accuracy the costs as represented by 'expenditure' upon a given project including materials, labour, training, maintenance and running expenses only limited attempts, for example on the costs of safety helmets, have been made to evaluate the benefits which accrue in terms of incidents prevented, or improvements in health and the working environment.

22 Cost benefit analysis is often carried out on behalf of groups having common geography, employment or other social interest. Other individuals or groups frequently have different interests from those on whose behalf an analysis is made and they are sometimes able to demonstrate that their sectional interest must be taken into account by society as a whole. Not all safety precautions which are adopted in modern society can be justified in terms of their financial benefit to society as a whole; but civilised society is not prepared for individuals or small groups to be subjected to disproportionate discomfiture, pain and suffering and to pay a high price for benefits which may accrue to the community. Nonetheless cost benefit analysis can assist in the allocation of priorities and this application appears likely to develop.

Assessment of hazards

23 The management of every undertaking needs to be aware of the possible hazards inherent in its activities, to evaluate them and to take and maintain precautions appropriate to the risks. Although many groups have legitimate interests in general standards of safety their sectional interests differ. In addition their ability to arrive at proper judgments is limited because they are unlikely to identify or to have access to all the components of safety performance.

24 Accident investigators or assessors will obtain slightly different pictures of the circumstances which admit varying interpretation and emphasis. Interpretations of evidence can vary with the purpose for which investigations are carried out. They may, for example, be carried out to obtain compensation for the injured, to defend the organisation against compensation claims, to obtain planning permission for a new plant, to establish whether or not

the law has been broken or to provide material for an academic thesis. In addition there is the difficulty of various professional disciplines trying to understand and give appropriate emphasis to each other's findings. Given such conflicts of interest the only source of information on risk identification and assessment which is likely to be comprehensive is that which emanates from within an organisation itself. Outsiders, even if they have legal powers to examine performance or if they have the co-operation of the organisation in providing information, can never develop the same insights into the workings of an organisation as those who form a part of it. Basic information about the identification of risks, assessment of their potential, and the measures needed to control them must be assembled by the organisation. Outsiders may advise, challenge or stimulate re-assessment in particular areas of activity, but rely upon the framework first being provided by the organisation. This is not to say that organisations have carte-blanche when it comes to risk identification and assessment because patently they do not.

25 Health and safety cannot be separated from the political, social and economic standards of society at large.

26 The HSW Act acknowledges wide variations in management styles and systems and permits to managements freedom of action, subject to certain minimum limits, provided that hazards to health and safety are successfully controlled. Such freedom poses, however, a severe test for managers. If they fail to rise to the challenge and public opinion concludes that health and safety matters are not being adequately safeguarded then a more regulatory approach may be called for.

3 Organising for safety

27 The APAU has examined the organisation and arrangements for safety in a range of industrial and public service undertakings. Many have demonstrated wide variations in the physical standards of safety, accident rates, enforcement experience and the attitudes of employees to safety across the range of their activities. This chapter is a summary of the qualities which make an organisation successful in the control of its safety problems.

28 Organisations which are demonstrably successful have displayed the following characteristics:

- (a) They have set worthwhile and understandable practical goals for safety at varying levels within the organisation. Strategic goals have been set by the main or managing board whilst successive operating levels have identified and promulgated their own aims within the overall strategy.
- (b) They have motivated and obtained commitment from all their employees to recognise that the achievement of the agreed standards of safety depends upon team effort.
- (c) They have provided on a businesslike basis, the physical resources and encouragement to enable all employees to meet their targets in safety.
- (d) They have convinced all their employees to accept responsibility for safety insofar as they control it or need to contribute to group performance.
- (e) They have developed ways and means of evaluating standards and marking approval or disapproval of the standard of safety achieved at each workplace. These means have varied from the use of incentive and reward schemes to more subtle integration of safety performance into the mainstream merits and promotion systems.

Setting worthwhile goals

29 The need to specify goals and to have policy objectives is implicit in Section 2(3) of the HSW Act which states that 'It shall be the duty of every employer to prepare and as often as necessary revise a written statement of his general policy with respect to the health and safety at work of his employees and the organisation and arrangements for the time being in force for carrying out that policy* and to bring the statement and any revision of it to the notice of employees'. The preparation of such a plan of action is an important first step. It becomes both a management target against which the actual level of performance is judged and a framework within which resources are allocated.

* This requirement applies to all employers of five or more persons. A review of safety policies is contained in 'Effective Policies for Health and Safety', HMSO 1980 (Ref 17).

30 In successful undertakings objectives are not limited solely to the protection of employees, but include provision for ensuring the health and safety of other persons who may be affected by the work (for example visitors or members of the public subject to hazardous emissions to the atmosphere), and for complying, where they are applicable, with their statutory duties as designers, manufacturers, importers and suppliers of articles and substances for use at work. They must also keep an eye on potential future risks.

31 It is important that the specific goals are relevant and within the capabilities of the management level and group to which they apply in order to elicit a positive response. Generalised goals such as the 'avoidance of accidents' are not easily translated into action. The aims should be practical and be accompanied by precise means by which safety is to be achieved. Such means will vary at different levels in the organisation and will be dependent upon whether an individual is in a line or functional role. Senior levels of line management, for example, will be primarily concerned with overall monitoring of standards and the allocation of resources. Lower levels will be required in more limited terms to maintain specified standards of machinery guarding, fire protection or housekeeping together with a more local approach to monitoring. Those in a functional role will be required to provide a defined standard of service.

Promoting commitment

32 It is not enough to declare certain safety goals. People have to be convinced of their importance and that the organisation intends to achieve them. The cue will be taken from the top. Senior management has the influence, power and resources to take initiatives and to set standards. This is demonstrated where the positive attitudes of directors and senior managers are reflected in a high degree of safety awareness at all levels throughout the undertaking. If management at the highest level demonstrates its interest in and commitment to the provision of satisfactory standards of health, safety and welfare then subordinates are much more likely to know what is expected of them, know that they will be held accountable, and give priority to this subject.

33 Although managers at all levels have a significant part to play in promoting commitment those at the highest and lowest levels have particularly decisive influence. The director or manager in

charge determines the relative importance that the undertaking gives to health and safety. If his interest and commitment to satisfactory standards is clearly established, by supporting the professional safety staff, conducting occasional surveys and discussing deficiencies with the managers concerned, or regularly discussing safety performance at meetings with other managers, then the general level of safety consciousness will be increased. At the junior level the supervisor is the management representative in the place that many hazards are created. Many of the potential hazards that occur can be readily eliminated if sufficient attention is paid to the maintenance of established standards of machinery maintenance, systems of work and housekeeping. It is at his discretion whether such situations are neglected or rectified. If a senior manager fails to comment adversely on failure to meet agreed standards then his subordinates may reduce their own standards to the new lower level which he seems to accept.

34 Why should senior managers bother themselves with safety and health? — basically because in the long run it is good business. The work of the APAU has pointed to the interaction between efficient production and safe production and possible relationships between high absenteeism, high labour turnover and high accident rates.¹⁶ Additionally lack of demonstrable interest in safety may influence workers' attitudes to employers which tends to polarise between good and bad with very little qualification. The expression of determined concern for their safety is one way of influencing workers' opinions of their employer and through him of work in general.

35 Good communication is important. Employees need to know not only what is to be achieved, but also how it is to be achieved. Additionally they need to be motivated and to understand why a particular course of action is necessary. This is particularly important when tedious and demanding precautions are required to deal with an insidious and invisible health hazard, or a serious physical hazard which has never caused an accident in their experience. Communication chains need to be broken only once to be rendered ineffective.

36 One of the most useful ways of communicating with and promoting commitment from the workforce is via the appointed safety representatives. An inspector can ensure that the guards and other physical safeguards required by the law are provided at

the time of his visit and can be satisfied that the statutory inspections and examinations have been carried out. But much more remains to be done, whether the inspector calls or not. Every place of work is different, and may change from hour to hour. The best people to ensure that dangers are anticipated and contained, are those who are intimately concerned with the place of work, — managers, supervisors and workers. Accordingly, safety committees should not be devoted entirely to putting over management policy but should allow for contributions via the safety representatives to the decision-making process. Ideas and experience of what is likely to be practicable from the workforce contribute to safe working. There is some evidence in the work of the APAU to indicate that organisation-wide committees are less effective than departmental safety committees. The former can dissipate a great deal of time on matters which lack relevance to a proportion of the members and in which their experience, and the contribution they can make, is limited. Committees with a smaller remit have heightened impact because of the directly relevant experience of their members and the immediacy of the subject matter with which they deal. The size of the committee is also relevant. Large committees limit participation. One cannot lay down hard and fast rules but the Accident Prevention Advisory Unit's experience suggests a maximum number of about a dozen members, and certainly the efficiency of a committee in excess of 15 members is questionable. In large organisations a tiered system of committees may need to be adopted with representation from subsidiary committees to a main forum. The same principles relating to numbers continue to apply.

Acceptance of responsibility

37 When they have specified the organisation's aims in safety and demonstrated the need for commitment, managers must then consider how the various duties necessary to achieve those aims should be allocated. It is equally important to ensure that the individuals involved feel responsible for their efficient discharge.

38 Just as policy objectives need to be clear so does the allocation of responsibilities within the management structure. The APAU studies have revealed many instances where managers were aware of general health and safety responsibilities but did not know how they were supposed to discharge them. In those organisations which had high standards of safety, the primary

responsibility for ensuring safe working rested with line management. Each line manager should, as an integral part of his work, be responsible and accountable for the health and safety of the staff who work for him. There should be a clear line of responsibility and command to accountable individuals at the main or managing board level. Line managers must feel themselves as responsible for safety as they do for their other functions, and should see poor health and safety performance as a reflection on their ability to manage.

39 A problem that has faced a number of the undertakings studied by APAAU has been how to develop satisfactory safety attitudes in middle managers and to motivate them to accept change. Some middle managers, already heavily laden with responsibilities, simply see increased attention to safety as an additional burden. If they are to accept safety as an integral part of their duties then their training will have to take this into account.

Provision of resources

40 Safety aims, however modest, can never be achieved without the necessary resources which have to be allocated on a practical and sensible basis. The level of resource requirement will depend upon the size of the organisation and risks inherent in it. In a small, low risk enterprise the proprietor's own commitment to safe and healthy working conditions is the key to achieving satisfactory standards. But safety is only one of the many responsibilities that confront managers of small businesses in their day to day work. Many of the pressures and difficulties facing them are more obvious or immediate and unless they specifically concentrate on safety it may be overlooked.

41 As an undertaking grows so does the need for systematic arrangements for the allocation of resources. Hazards need to be identified and analysed and precautions devised and implemented. Consultants and some trade associations can provide advice on particular issues. Enforcing authorities are also prepared to give advice on legal compliance. But eventually a point is reached when managers need regular access to advice of professional quality from a person who is familiar with the work and the people doing it. It is impossible to be specific about when this occurs. It depends not only upon size but also upon the nature of the hazards, their variability and the means for controlling them. In construction work the employment of more than 20 persons

requires the appointment of a safety supervisor, whilst in shipyards the figure is 500. The Pottery Regulations and Ionising Radiations Regulations require the appointment of a 'competent person' irrespective of numbers employed.

42 A safety adviser should, because of his specialist training, experience and technical knowledge be able to provide line managers with professional advice to help them meet their responsibilities for controlling risks to employees and promoting good standards of safety. He should have the same relationship with line management as other specialists.

43 In developing undertakings, especially those operating from several locations, a safety adviser has the following advantages:

- (a) He can keep abreast of health and safety developments and changes in legislation and can provide line managers with such information as is relevant to their needs.
- (b) Training effort can be concentrated and specialist experience widened by seeing a range of problems.
- (c) He can advise whether the safety policy is being consistently implemented throughout the organisation's premises — particularly important in large undertakings such as local authorities or conglomerates having multiple premises.
- (d) Co-ordination of safety effort is simplified. He can avoid the duplication of effort that inevitably results from each location, or department, trying to resolve its own problems in isolation.

44 The choices relating to resource allocation are far from simple, even when the benefit of specialist functional advice is taken into account. There is a core of safety effort which has to be made in order to stay in business and to minimise accidental loss. Machinery and pressure vessels must be properly designed and maintained, fire precautions observed and structural stability assured. In addition one has to comply with the general obligation to do what is 'reasonably practicable' to ensure safety. The interpretation of this phrase requires consideration of the costs of prevention in relation to the risks encountered; managers should not only refer to existing standards but should also evaluate hazards and the need for new standards which may arise from new or changed processes.

45 Middle managers are often faced even in those undertakings which are ostensibly committed to safety with a conflict of interest between what they perceive as long term aims in safety, and the more pressing short term needs for economies to meet financial targets. Such conflicts may be presented as stark alternatives — 'If the undertaking is to survive today safety must be left until tomorrow'. Whilst it has to be recognised that the claims of safety for scarce resources need to be justified effectively, the vulnerability of safety programmes does need special consideration. If senior management do not accord a proper priority to their long term programmes for safety, and so far as is reasonably practicable protect those programmes in times of economic stringency then there is a danger that their good intentions and policy declarations will not survive a crisis. The erosion of safety systems and procedures and reduction in physical control standards by a succession of economy measures is illustrated in the report into the 50-death oil tanker disaster at Bantry Bay in 1979¹⁵.

Recognising success — eliminating failure

46 Interest and enthusiasm for safety cannot be maintained if both success and failure elicit the same response. Those managers with successful safety records need to be encouraged and those who fail, must be made aware of the reasons for their failure, and encouraged to improve. Managers should know that failure to improve may involve the normal disciplinary procedures within the organisation. It has been the experience of the APAU that many companies, because they have failed to understand the contribution that can be made by efficient management to health and safety, only react to it when there has been a failure. Such a view disregards the level of risk inherent in the activity and the amount of management effort needed to control that risk.

47 All employees need to be aware that there are legal sanctions for personal failure to meet statutory duties. The legal duty to comply with safety legislation rests mainly with the 'employer' but there are provisions in the HSW Act which place duties upon individuals. Sections 7 and 8 require every employee (a definition which includes most managers) to take reasonable care of his own health and safety and that of other persons who may be affected by his work, and to co-operate with his employer in meeting statutory duties. In addition it is an offence for anyone intentionally

or recklessly to interfere with or misuse anything provided under law in the interests of safety health or welfare.

48 Sections 36 and 37 allow for the prosecution of the person primarily responsible for an alleged breach of the Act and, where an offence can be shown to be attributable to any neglect on the part of any director, manager, secretary or other similar officer of a corporate body, then he as an individual may be prosecuted, in addition to or instead of the corporate body. It should be noted by those working for the Crown or Crown contracts that although the Crown as employer cannot be prosecuted under the Health and Safety at Work etc Act, individuals working for it can (HSW Act s.48).

4 Measuring safety performance

49 It is a characteristic of many of the organisations surveyed by the Accident Prevention Advisory Unit that the commitment to health and safety, expressed by top management was not being actively pursued by the organisation as a whole. The main reason for this was that there was no attempt to measure performance. Without such measurement there was no motivation to improve. Few companies or public authorities have a systematic and comprehensive approach to the measurement of safety performance, and even those who do collect information which is of doubtful value, such as accident statistics which are only one part of safety performance — the number of failures in a given year.

50 It is increasingly recognised that 'any simple measure of performance in terms of accident frequency rate or accident incidence rate is not a reliable guide to the safety performance of an undertaking. There is no clear correlation between such measurements and the work conditions, the injury potential, or the severity of the injuries, that have occurred'. The Health and Safety at Work etc Act has part of its origins in the view, expressed in the Robens Report¹⁸, that the primary responsibility for doing something about the present levels of occupational accidents and disease lies with those who create the risks and those who work with them. Discharging this responsibility involves the purposeful creation and maintenance of standards of safety commensurate with the risks inherent in the undertaking and cannot succeed

* 'Success and Failure in Accident Prevention', page 3

without establishing what levels of safety and health are being attained.

51 The primary aim of measurement is to ensure that the standards achieved at the workplace conform as closely as possible to the objectives of the safety policy. The secondary aim is to provide information to justify either a change of course, or a revision of the original goals. These aims are achieved by setting standards, comparing actual results with those originally hoped for, and where necessary taking corrective action.

52 The absence or incidence of accidents alone does not by itself give a full measure of safety performance: it is also necessary to assess the extent to which the hazards inherent in work activities are eliminated or controlled within an acceptable working environment. Measurement of safety performance therefore needs to be continuous and planned and managers need to have information about four main areas of activity, which form the main components of the safety performance equation:

- (a) The elimination of hazards by compliance with predetermined standards in legislation and codes of practice;
- (b) The accident and ill-health record;
- (c) The operation of the safety policy; and
- (d) Progress towards long term objectives.

Elimination of hazards

53 Historical data about what has gone wrong in terms of accidents and damage is too negative as a measure of performance. A measuring system needs to identify hazards, establish why they occur, both in terms of physical and organisational causes, and to place them into priorities for elimination. All preventable accidents start with a hazard which could have been recognised. Good fortune and the instinct for self-preservation mean that in practice many of the hazards which may cause an accident do not in fact do so.

54 Top management must pursue the policy and everything that is reasonably practicable must be done to eliminate hazards. Accordingly middle managers need to be confident about the extent to which agreed standards to control hazards are being met

and must use this information to anticipate possible future hazards.

55 Great Britain is fortunate in having a range of general, specific and quasi-legal standards which have evolved over the years as a response to demonstrable need and proven remedies. The bulk of the legal requirements remain 'relevant statutory provisions' under the HSW Act and the extent to which they, together with codes of practice, are being complied with is a measure of performance. The knowledge that machines are guarded, that flammable materials are properly used or the exhaust equipment is working is as essential in assessing performance as the recorded incidence of accidents, fires or industrial diseases. In collecting data on hazards there is no substitute for regular and systematic inspection by competent staff.

Accidents as a measure of performance

56 The traditional approach to the safety of an undertaking is to ask how dangerous it has been. What injuries to people and what damage to plant have resulted from work activity?

57 Most 'tables of accident statistics' are in fact statistics of injuries that have resulted from accidents. This distinction is relevant when causes are being analysed. If remedial measures are to be recommended it must be clearly understood whether these are applicable to the cause of the injury or the cause of the incident.

58 When analysing the causes of personal injury it is important to establish thresholds of severity. The most common threshold is the duration of absence and, incidents causing absence from work for more than three days are notifiable to the HSE¹⁹. In a large proportion of cases an individual's decision as to whether or not to be absent from work for more than three days is not determined by the severity of the accident. In order to obtain coherent accident picture it is therefore useful to categorise injuries by reference to levels of severity — those requiring first aid only, lost time, notifiable and serious so that the factors affecting each can be more easily identified. Apart from there being obvious distinctions in the way that people react to different gradations of accident, it is also important to make these qualifications when attempting to ascertain causes. The pattern of causation of accidents differs in each category of severity. Machinery, for example, accounts for

about ten per cent of all injuries but in some trades is the cause of some 60% of serious injuries.

59 There is considerable value to be obtained from spreading accident review periods over several years in order to improve statistical reliability and to establish real trends — not merely variations between one year and the next. Accidents usually have several causes, and those having quite different physical causes may have the same underlying organisational cause. Successful accident prevention requires that both are identified.

60 Several indices of accident assessment are currently used. The figures produced by such indices have no intrinsic meaning but are useful as a means of comparison. The most commonly used indices are:

- (1) The simple annual account of
- (a) first aid treatments/lost time accidents
- (b) reportable accidents
- (c) serious injury accidents*
- (d) fatal accidents

(2) The accident incidence rate per thousand persons employed. This is represented by the formula:

$$\frac{\text{Number of reportable accidents}}{\text{Number of persons at risk}} \times 1000$$

The serious accidents incidence rate uses the same formula substituting serious for reportable accidents.

(3) The accident frequency rate. This formula is:

$$\text{FR} = \frac{\text{Lost time accidents}}{\text{Man hours worked}} \times 100\ 000$$

(4) Accident severity rate. The formula is:

$$\text{ASR} = \frac{\text{Man hours lost}}{\text{Man hours worked}} \times 100\ 000$$

* See Appendix 2

There are three main methods by which comparisons can be made:

- (a) comparison with a perfect or nil norm;
- (b) comparison with others engaged in like activity; e.g. the tables published annually by HSE or other establishments in the group;
- (c) comparison with one's own past record.

Each method has strengths and weaknesses and it is best to consider all three to obtain a balanced assessment.

61 If a change in accident collecting and recording systems at the workplace is envisaged one of the first effects may be to increase the number of incidents recorded. This is due to the increased awareness of the reportability criteria, the knowledge that senior staff have an interest in the subject and greater accuracy of definition of the various categories. Those who suffer from this apparent setback should not be discouraged but should take heart from having identified and eliminated deficiencies in the former system.

62 There are many ways in which damage to plant can be assessed but so far as the APAU is aware, however, none of the schemes for assessing it is attracting widespread support. Although individual organisations or groups find such figures of past performance valuable for their own purposes the scope for comparison is limited.

Effect of the safety policy as a measure of performance

63 The third area of measurement concerns the safety policy itself together with the organisation and arrangements for putting it into effect. Does the policy specify realistic objectives? Are they being met? Is the organisation actually working? Do the workforce understand and accept their duties and carry them out? Do the systems and procedures laid down find acceptance with the workforce and are they used? It is in this area of measuring performance that much positive information on safety will be collected. It is an area which has often been neglected. Many undertakings are so obsessed by recording past failures that they are unable to see what they are doing well, and consequently, fail to identify and build upon their own strengths. A discussion of

ways and means of testing the effectiveness of a safety policy is contained in 'Effective Policies for Health and Safety'.¹⁷

Long term objectives

64 Safety standards must respond to the changes in process technology, nature and scale of the risks, and the expectations of society. The remedies for safety problems increasingly require a planned and co-ordinated approach over a period of years rather than a set of short term decisions. It is incumbent therefore on senior managers to have a long term strategy for safety and the extent to which long term plans are being met is another measure of success or failure.

65 These are the components which give a practical measure of safety performance. They are, however, not exhaustive and some may wish to add other elements such as financial loss. Where the problems specifically relate to health risks then information about environmental and biological monitoring will also be relevant.

Interpreting the data — some problems

66 Collection of information on performance yields a great deal of data which has to be processed. The efforts expended on information collection should be commensurate with the benefits to be derived from the identification and removal of hazards. Valid information can be obtained by sampling, and where large quantities of data require to be processed the calculator and the computer may be used. A number of leading firms and public undertakings are already computerising performance data about accidents, machinery maintenance and environmental controls.

67 There are three main aspects to measurement: quantitative, qualitative and context measurement. Quantitative measurement means the assessment of the number of observed hazards, dangerous incidents, accidents, incidence of ill-health and inclinat systems of prediction of risks based upon past performance.

Qualitative assessment gives meaning to the numbers and makes judgements about successes and failures and their relative importance. Context measurement involves placing safety performance in the overall aims and objectives of the undertaking. Safety is an aspect of human activity which must be measured in human terms and cannot entirely be reduced to a series of mathematical formulae or cost benefit equations.

68 When measuring the extent to which the policy, organisation and arrangements are working, one has to establish not only what people do but how well they do it. It is not very helpful to say that a given number of safety inspections were carried out unless one has some idea of the quality of those inspections. It is meaningless to talk about the number of training courses attended unless one has some idea of their quality and relevance. It is important to ensure that decisions are made at the right level within an organisation and that high quality staff are not making low level decisions and vice versa. There is no credit in senior managers or directors spending a great deal of their time on health and safety if most of that time is spent making decisions which should have been dealt with by a foreman or supervisor.

69 The quality of compliance with pre-determined standards is also important and should include the extent to which the undertaking has been found to be meeting prescribed standards by H M inspectors, insurance company surveyors or its own staff. Large organisations often find it salutary to examine how often the same lessons need to be learned and re-learned at various sites across the country.

70 Qualitative analysis of safety performance can identify sections or individuals within an organisation who are playing the 'numbers racket'. For this reason qualitative measurement is disliked by some who are keen to label it as subjective, and find fault by pointing out differences in the assessments made by different assessors. Dispassionate examination of such assessments reveals, however, that it is not the differences but the similarities which are significant. Physical examination and evaluation of conditions at the workplace are a vital means of ensuring that the information provided by the paperwork systems is properly understood.

71 The efficient measurement of safety performance is not simple. Complex organisations may require complex control measures. The most frequently encountered difficulty in applying measuring schemes is for a manager to separate his own performance as an individual, from that of his team. The way in which this problem is resolved depends on the corporate ethic within the management as a whole but if it is not resolved, may lead to lack of co-operation from both managers and workforce. When this distinction is made, the manager will not be blamed for

faults which are not his, but due to the system. Failure to make such distinctions will draw the measurement system into disrepute.

Who should measure performance?

72 In the most successful organisations safety performance measuring is done by those who have the responsibility for health and safety. A system produces accurate results, and enjoys the confidence of those for whose benefit it is instituted, if there is active participation in it by those being measured. It is important for all those affected to know how the scheme works, how it is being applied to them and how they are performing. Not all employees see health and safety as an important objective.

73 When measurement of performance is carried out by line management, safety professionals continue to have an important role:

- (a) To develop the scheme and advise on the quality of the measuring;
- (b) To promote organisational consistency;
- (c) Occasionally to measure the measurers; and
- (d) To ensure that the measuring scheme is updated when required.

74 It is sometimes suggested that managers will not give an honest assessment of safety performance in their own areas because they are reluctant to unearth or admit to any deficiencies for which they could be held responsible. This objection is more apparent than real. Most line managers already provide information on performance in such areas as production, sales, cost control and defend their own role and contribution. This objection is valid only if the measurement of performance is purely negative and the extent of a manager's participation is merely to explain why there were more accidents this month than last. A scheme which gives credit for positive action and allows a manager to demonstrate his skill in managing safety can have the same degree of accuracy as is achieved in other productive parts of the enterprise.

75 It should be remembered that measurement is not an end in itself. It is merely the basis upon which decisions are taken to affect

subsequent performance. The whole exercise is futile if managers take no action. If low performance becomes acceptable then a great deal of measurement effort has been wasted.

76 H M inspectors increasingly want to know that undertakings measure their own performance and act on the results of the measurement. They are now concentrating on this aspect of inspection rather than on the nuts and bolts of safety although of course they still wish to assure themselves that the measuring system which is adopted accurately reflects the reality of the situation at the workplace.

5 What can be achieved?

77 The previous chapters summarise the most important lessons relating to the management of safety derived by APAPU during its fieldwork. This chapter illustrates what some managers have been able to achieve. These remedies worked for the undertakings examined. It is not suggested that they have universal application but that they illustrate the sort of success that can be achieved if safety is positively promoted within an organisation. Each reader can decide how far the lessons learned may be applied to his own situation. The importance of applying the correct prescription for safety problems cannot be too strongly emphasised. It should be noted that although the measures adopted were sometimes simple the real breakthrough was in the organisational change which caused problems to be identified and motivated change.

Improved compliance with the law

78 Legal compliance is important for several reasons. The detailed legislation, particularly that included in the Factories Acts and associated regulations, has been developed as a response to a demonstrable need and sets standards to control hazards which have led to accidents or disease. Legal compliance therefore reflects the extent to which a range of specified hazards have been eliminated. It is difficult for an employer whose undertaking has a series of convictions under health and safety legislation to convince his colleagues, customers and workforce that he is running a safe business. Legal compliance can be quickly achieved by a determined and systematic approach.

79 When the directors of a large foundries company were made aware that their organisation had been prosecuted under health and safety legislation on no less than thirteen separate occasions in the previous three years, resulting in 22 separate convictions, they made a conscious decision that compliance with the Factories Act and its associated regulations would become an important part of the remit of certain key managers. High standards of compliance were sought by systematic inspection of workplaces by both line management and safety staff. In addition personnel were appointed and trained to monitor health hazards from toxic substances to ensure that minimum legal requirements were both provided and maintained. Senior managers were detailed to take a personal interest in the results of self-inspection and environmental evaluations. In the two years that followed only one prosecution was brought against the company.

80 Another company, in heavy engineering, prosecuted eleven times in four years reduced that figure to one in the next two years using broadly the same techniques. A third, food manufacturing company, which had a poor prosecution record involving breaches of the machinery guarding sections of the Factories Act detailed a senior engineer to visit all its sites to ensure that the guarding met the requirements of Sections 12-14 of the Factories Act and that all reasonably practicable precautions including the use of permit to work systems, were taken when cleaning. These standards have been maintained and the company has not been prosecuted in the three years since this action was taken.

Reducing accidents — providing better working conditions

81 A factory employing around 500 people in food processing had very high reportable accident incidence rates. A new works manager was appointed to improve the overall efficiency of the unit. As a part of this task he made a determined effort to improve the health and safety performance. Within two years, although there were no significant changes in process technology, the incidence rate had been halved and working conditions at the factory were better. The factory was part of a large multi-national company and though the improvements were a result of the works manager's initiative, he had received encouragement and support from the higher levels in the group.

82 The influence of effective management upon standards of safety is further illustrated by the experience of a group of

companies in mineral processing which operated eleven factories in two separate parts of the country. Each area had its own management team and employed similar numbers in similar processes. There was, however, a distinct difference in the approach to health and safety in the two areas. One area made determined and systematic efforts to evaluate and control risks, which resulted in much higher standards, both in safety and in environmental conditions than where the same degree of safety management was not exercised.

83 Another company engaged in the manufacture of leisure goods employed 700 people in above average working conditions despite limitations imposed by old buildings. There was a high standard of compliance with legal requirements and a low accident incidence rate. This had been the case for a number of years and was ascribed to the interest and commitment of the individuals at all levels in the organisation. Supervisors and line managers regarded safety as an integral part of their jobs and were concerned to maintain high standards. Safety representatives were constructive and positive and both they and the line management were encouraged and supported by a safety officer, a technical manager and the other functional managers. This team effort appeared to be the only reason for their better than expected performance.

Reducing severe injuries

84 Safety and health problems often suffer from lack of definition in the minds of managers. They are aware that problems exist but fail to find out exactly what they are and how great they are. Accordingly the right prescriptions are rarely dispensed although a great deal of time, effort and expense may be devoted to general matters of safety. This is illustrated by a company which had failed to identify and define the nature and extent of physical injuries at its works because of its preoccupation with matters of health and hygiene. It suffered like many companies from a proportion of injuries such as strains and sprains which were regarded by managers with doubt and suspicion, and by most employees, including safety representatives, as inevitable hazards of the job. Examination revealed, however, that some 25% of reported accidents were in the severe category, and that the physical causes of these severe injuries were clearly identifiable. The company then concentrated its accident prevention efforts on eliminating

severe injury. Within 12 months severe injuries dropped by 50% whilst less severe injuries fell by some 5%. The reduction in severe injuries was a signal achievement for the company both in eliminating substantial suffering and also in maintaining the efficiency of its skilled workforce and reducing the costs of accident claims.

85 The prescriptions for eliminating severe injury can sometimes be very simple. A firm in the felt roofing industry, where falls are usually regarded as the major risk, was persuaded to analyse all their accidents and to identify the causes of severe injury. They found that some 80% of severe injuries were bitumen burns on the hand and forearm. A modified version of gloves affording protection to the wrists and forearms caused the severe injury rate to fall by some 50%. The significance of such a reduction lies not only in reduced injury and absence claims but in the potential for increased output.

Eliminating 'hazards of the trade'

86 Some types of accidents are regarded by both management and workforce alike as the inherent and intractable 'hazards of the trade' — tests of a worker's mettle. Such accidents are tolerated by many organisations but they are not tolerable to the individuals involved. Routine job hazards can produce severe injury, for example the amputation of joiners' fingers, hot metal burns to foundrymen and lacerations to glasscutters. The first step in eliminating such injuries involves re-thinking what can realistically be achieved. Managers and workpeople alike must be convinced that there is a safer way and that such accidents need not be part of the price paid for the product — as the following examples show:

- A company making compressed gas cylinders reduced its 'strains and sprains' accidents by re-organising its production so that components were manhandled less frequently.
- A company reduced its strained back accidents when mechanical handling of large components was introduced.
- A glass fabrication company reduced the number of lacerations to employees' hands and forearms by installing semi-automatic glass handling equipment and reducing the number of operations carried out on newly cut glassware.

87 The reduction of such accidents not only prevents injury and suffering but can also be good business. Because the hazards of the trade are an accepted part of working life, are rarely dramatic and rarely attract publicity, their cumulative effect often goes unnoticed. Multiple minor injuries, however, represent a significant loss of productive capacity.

Reduction in acute health hazards

88 A small company handling scrap metals which had been recording about 20 cases of notifiable poisonings every year was able within four years to eliminate poisonings altogether and has maintained this standard ever since. This remarkable achievement was largely to the credit of managers in co-operation with the workforce who made the imaginative step of regarding the elimination of poisonings as a realistic goal and then pursued it with vigour and determination. Their approach was inevitably complex and is presented below in checklist form. Although this company was working with toxic metals there is no reason to suppose that the approach adopted by them would not be equally successful with other industrial poisons or hygiene problems. The fact that the company has since managed to maintain the improvement shows that these results can be sustained. It is interesting that the changes which were originally resisted, are now regarded as essential to the production process.

Management programme to eliminate poisoning

- (1) Identify the nature and scope of the problem by:
 - (a) finding out who is being poisoned;
 - (b) how often, how badly;
 - (c) what is the source of contamination?
- (2) Evaluate the means of monitoring and assessment by means of expert advice on:
 - (a) biological monitoring;
 - (b) environmental monitoring;
 - (c) effectiveness and reliability of monitoring techniques.
- (3) Decide on short, medium and long term objectives.

(4) Re-think the process:

(a) Does the contaminant have to be used? Is there a substitute? Can it be used in alternative form which is less of a risk? Paste instead of powder?

(b) Is the process currently used the best available? Would process changes or new machinery reduce the risk?

(c) How can the risk be controlled in the process?

(5) Re-think the way the work is done:

(a) Is the way the work is done putting people at risk? Can it be altered?

(b) What practical precautions can be taken by employees to minimise the risk to themselves?

(6) Training

(a) Of managers in what is to be done and how to do it.

(b) Of operatives in what is to be done and how to do it.

(7) Motivation

Information about the objective and why it is desirable.

(8) Monitoring:

(a) environmental monitoring leading to action to comply with TLVs;

(b) biological monitoring to confirm the adequacy of control measures and the safety of operatives;

(c) an open door policy on access to the results of the monitoring, leading to a discussion of the actions to be taken and to agreement as to their implementation.

89 The motivation for many changes can come not so much from a desire to improve safety standards but from a desire to improve the process technically in order to increase productivity. Safety and efficiency are not always in competition with each other: they are often integral aspects of the same need for efficient production.

90 One of the purposes of this publication is to stimulate thought amongst managers about the levels of risk in their activities and

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the adequacy of the controls for containing risk. Appendix 1 comprises a short checklist which the reader is invited to consider and to use as a starting point for a re-examination of safety and health at his own workplace.

Appendix 1

Key questions for managers

The essential question for any manager is how does my department/organisation perform in health and safety? Experience suggests that in order to answer this question satisfactorily he must consider the following:

1 Do we have a safety policy?

2 Is it up to date?

3 Do the subsidiary parts of our organisation have a policy?

4 Who is in charge of health and safety?

5 Are the technical problems of safety being handled by competent persons?

6 Do we have a system to measure safety performance?

7 What is the worst disaster that could happen?

8 If the worst happened could we cope?

9 Would our workforce know how to react in an emergency?

10 What do our employees think of our safety standards?

11 What are we trying to achieve?

12 How much effort are we putting into safety?

13 Is the effort directed to the right place?

14 Is there an efficient system of checking that the duties are being carried out efficiently?

15 What are our long term objectives?

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Appendix 2

The notification of Accidents and Dangerous Occurrences Regulations 1980 (SI 1980:804) came into force on 1 January 1981 and amongst other things introduced a new definition of serious personal injury. This definition is as follows:

- (a) Fracture of the skull, spine, pelvis or a major bone in the arm or leg.
- (b) Amputation of a hand or foot.
- (c) Loss of sight of an eye; or
- (d) Any injury which results in the person being admitted into hospital as an in-patient.

Appendix 3

Selected references

- 1 Report of the Public Inquiry into the Accident at Hixon Level Crossing on 6 January 1968
1968 Cmnd 3706 (London: HMSO)
- 2 Report of the Committee of Inquiry into the Fire at Coldharbour Hospital, Sherbourne on 5 July 1972
1972 Cmnd 5170 (London: HMSO)
- 3 Report of the Committee of Inquiry into the Fire at Fairfield Home, Edwalton, Nottinghamshire on 15 December 1974
1975 Cmd 6149 (London: HMSO)
- 4 Report by the Tribunal of Inquiry (Aberfan)
1966-67 HC 553 (London: HMSO)
- 5 Lead Poisonings at the RTZ Smelter at Avonmouth
1972 Cmd 5042 (London: HMSO)
- 6 The Flixborough Disaster: Report of the Court of Inquiry
1975 Department of Employment (London: HMSO)
- 7 The fire on HMS Glasgow 1976: HMSO 1978

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- 8 Report by HM Factory Inspectorate on the Collapse of False-work for the Viaduct over the River Loddon on 24 October 1972
July 1973 HC 425 (London: HMSO)
- 9 Accident at Markham Colliery, Derbyshire
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- 12 Report of the Summerland Fire Commission (1974)
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- 15 Report on the disaster at Whiddy Island, Bantry, Co Cork on 8 January 1979: Stationery Office Dublin 1979
- 16 Success and Failure in Accident Prevention: HMSO 1976
- 17 Effective Policies for Health and Safety: HMSO 1980
- 18 Health and Safety at Work: Cmnd 5034 HMSO 1972
- 19 The Notification of Accidents and Dangerous Occurrences Regulations 1980 (SI 804) 1980

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