Occupational Health & Safety Practitioner

Reading

PRINCIPLES OF ACCIDENT PREVENTION

January 2009
OVERVIEW

This reading explains what an accident is and the importance of management's beliefs. Prevention techniques used to eliminate accidents from the workplace are outlined. Emphasis is given to ensuring appropriate management systems are in place.

Objectives

After reading this information you should be able to:

- state the definition of an accident;
- recall reasons for preventing accidents;
- identify those with responsibilities for preventing accidents; and
- outline methods for identifying hazards, assessing risks and introducing control measures to reduce the risk.

Author

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Section 1: INTRODUCTION

Glossary of terms

When they are first used, glossary terms are indicated with an asterisk (*). Make sure that you are familiar with the Glossary of terms before going any further.

Accident

An accident can be defined as an unplanned event or happening that is not necessarily unexpected, not predictable, foreseen or intended. An extension of this theme is that an accident is an outcome of an event that is not desired. Accidents do not just “happen” they are caused, resulting in interruption to work activities, damage to property or injury to a person.

Source: Commonly accepted definition, no specific source.
1.1 What is an accident?

Every accident* has one or more identifiable causes. The employer is responsible for ensuring a safe system of work is in place and therefore must take action to prevent accidents from occurring or recurring. For some, this concept still causes difficulty. The term "accident" suggests that an event occurred itself, with some degree of chance and it implies no blame or responsibility. Some people associate or equate an accident with injury or damage, when on many occasions accidents do not result in injury or damage. These events are often termed "near misses".

Determining where, why and how accidents occur is fundamental to understanding the causation and implementing preventive measures. Once the circumstances and causes have been identified, effective measures can be taken to prevent similar occurrences.

1.2 Why prevent accidents?

An employee who is injured is likely to suffer financial loss and either disfigurement, disability, pain or in extreme cases death. The effects of an injury may not always be temporary and can have devastating long-term consequences on an individual's personal life, social and other activities. There may also be a significant impact on the injured person's family and friends.

The employer should be concerned with accident prevention because the direct and indirect costs associated with accidents can endanger a company's competitiveness. For instance, financial losses due to increased insurance premiums, lost production or disruption to production schedules, damage to equipment and plant, loss of time for other employees (eg, supervisors) during the accident investigation, training of replacement employees and the possibility of fines and adverse publicity are all issues to consider.

Whilst it is possible to insure against some of the expenses associated with injury, ill health and damage to property, the hidden uninsurable costs could well exceed the insurable costs.
In the increasingly competitive market place, it is becoming common for clients to request companies to provide safety records as part of tender analysis processes or pre-qualification. Additionally in some cases, once the successful companies have been selected, ongoing OHS performance evaluations are conducted on behalf of the principal contractor.

1.3 Management’s beliefs

A number of beliefs are crucial to the success of the accident prevention process. According to the British Health and Safety Executive’s Publication "Successful Health and Safety Management", these beliefs include the following principles:

- People are our most important asset.
- The majority of accidents and incidents are not caused by “careless workers”, but failures in control (either within the organisation or within the particular job), which are the responsibility of management.
- The preservation of human and physical resources is an important means of minimising costs.
- Health and safety is a management responsibility of equal importance to production and quality.
- Control of health and safety is achieved through co-operative effort at all levels in the organisation. Effective health and safety management is not "common sense" but based on a common understanding of risks and how to control them brought about through good management.
- Competence in managing health and safety is an essential part of professional management.
- All accidents, ill health and incidents are preventable.
- Health and safety; and quality, are two sides of the same coin.
Section 2: TECHNIQUES FOR ACCIDENT PREVENTION

2.1 Three basic steps

All employers, employees and self employed persons have a duty of care towards their own, and others' health and safety at their workplace.

Compliance with legislative requirements may assist by providing either performance based or prescriptive criteria to achieve required results. Various legislative requirements may impact on activities within workplaces to ensure that workers are able to work in a safe environment.

Under general duty of care legislation, employers have a duty to ensure, as far as practicable, that employees are not exposed to hazards at the workplace. Under regulations and in accordance with codes of practice, employers also have an obligation to identify workplace hazards, to assess the associated risks and to make the necessary changes to minimise the risks. These three basic steps should be taken to ensure a safe and healthy workplace and prevent accidents. They are based on the concept that the workplace should be modified to suit people, not vice versa. The three steps are:

- **Identifying the Hazard** - involves recognising things which may cause injury or harm to the health of a person, for instance, flammable material, ignition sources or unguarded machinery.

- **Assessing the Risk** - involves looking at the possibility of injury or harm occurring to a person if exposed to a hazard.

- **Controlling the Risk** - by introducing measures to eliminate or reduce the risk of a person being exposed to a hazard.

It is important to regularly review the steps, especially if there are changes in the work environment, new technology is introduced, or standards are changed.
OHS legislation promotes cooperation and consultation between the employer and employees within the workplace to achieve a healthy and safe work environment. Employers should consult with OHS representatives, if any, and employees during these steps. Involvement of elected OHS representatives can provide an opportunity for problems to be resolved using knowledge within the immediate work area.

### 2.2 Hazard identification

A hazard in relation to a person is “anything that may result in injury to a person or harm to the health of a person”.

There are a number of ways of identifying potential sources of injury or disease. Selection of the appropriate procedure will depend on the type of work processes and hazards involved. Procedures may range from a simple checklist for a specific piece of equipment or substance, to a more open-ended appraisal of a group of related work processes. Systematic inspections and audits can be used to detect changes away from the designed or designated conditions. Such programmes can be scheduled on time, fault or random regimes. Importantly the results should be utilised and form part of an on-going base of data for the workplace. A combination of methods may provide the most effective results. Methods of identifying workplace hazards include:

- developing a hazard checklist;
- conducting walk-through surveys and inspections;
- reviewing information from designers or manufacturers;
- analysing unsafe incident, accident and injury data;
- analysing work processes;
- consulting with employees;
- examining and considering material safety data sheets and product labels; and
- seeking advice from specialist practitioners and representatives.
Some hazards are inherent in the work process, such as mechanical hazards, noise, or the toxic properties of substances. Other hazards result from equipment or machine failures and misuse, control or power system failures, chemical spills, and structural failures.

Hazards may be grouped into three categories - physical, mental and biological. Within each category, there are further hazard groups or types. It is useful to consider these hazard types (see below) when identifying work related hazards to ensure that a wide range of potential hazards is considered. The most common hazards in terms of bodily injury or disease are those which result in:

- strain or overuse injuries and disease to back, shoulder, wrist etc;
- cut and abrasion injuries to the eyes, hands, fingers, feet and head;
- impact and crush injuries to the head, feet and fingers;
- burns (by heat, light or chemicals) to the eyes, feet, and skin;
- noise induced hearing loss; and
- toxic effects (short or long term) to respiratory system or skin, resulting in poisoning, cancers or dermatitis.

### Types of hazard include:

#### Specific examples:

<table>
<thead>
<tr>
<th>Types of hazard</th>
<th>Specific examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gravity</td>
<td>falling objects, falls of people</td>
</tr>
<tr>
<td>Kinetic energy</td>
<td>projectiles, penetrating objects</td>
</tr>
<tr>
<td>Mechanical energy</td>
<td>caught between, struck by, struck against</td>
</tr>
<tr>
<td>Hazardous substances</td>
<td>skin contact, inhalation</td>
</tr>
<tr>
<td>Thermal energy</td>
<td>spills and splashes of hot matter</td>
</tr>
</tbody>
</table>
### Types of hazard include:

<table>
<thead>
<tr>
<th>Types of hazard</th>
<th>Specific examples:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extremes of temperature</td>
<td>effects of heat or cold</td>
</tr>
<tr>
<td>Radiation</td>
<td>ultraviolet, arc flashes, microwaves, lasers</td>
</tr>
<tr>
<td>Noise</td>
<td>hearing damage</td>
</tr>
<tr>
<td>Electrical</td>
<td>shock, burns</td>
</tr>
<tr>
<td>Vibration</td>
<td>to hands</td>
</tr>
<tr>
<td>Biological</td>
<td>micro-organisms</td>
</tr>
<tr>
<td>Stress</td>
<td>unrealistic workload and expectations</td>
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The conclusion of hazard identification should result in a list of hazard sources, the particular form in which that hazard occurs, the areas of the workplace or work process where it occurs, and the persons exposed to that hazard.

### 2.3 Assessing the risks

Risk, in relation to any injury and harm, is defined as "the probability of that injury or harm occurring."

Risk assessment should result in a list of any potential injury or harm and the likelihood of these occurring, arising from the hazards identified in the first step. In general, these should be stated from the most to the least serious, for example, from death by crushing to abrasion. The potential for fatal injury should be considered for each hazard type identified.
In assessing risks, consideration should be given to the state of knowledge about the frequency of injury or disease, the duration of exposure to injury or disease sources and the likely severity of the outcomes. Knowledge gained from similar workplaces or similar processes may be relevant to this risk assessment. Items to be considered include:

- Frequency of injury - how often is the hazard likely to result in an injury or disease?
- Duration of exposure - how long is the employee exposed to the hazard?
- Outcome - what are the consequences or potential severity of injury?

Assessing these three factors will indicate the probability or likelihood of injury or harm to workers involved in a particular work process. It also indicates the likely severity of this harm. Incomplete data or incomplete information regarding hazards of a work process may complicate the task. Risk assessment requires good judgment and awareness of the potential risks of a work process. Any person undertaking the risk assessment must have knowledge and experience of the work process.

An assessment of the risk will help determine the consequences (potential injury or disease) and assist to identify methods to reduce the risk. Risk assessment should include:

- assessing the adequacy of training or knowledge required to work safely;
- looking at the way the jobs are performed;
- looking at the way work is organised;
- determining the size and layout of the workplace;
- assessing the number and movement of all people on the site;
- determining the type of operation to be performed;
- determining the type of machinery and plant to be used;
- examining procedures for an emergency (eg: accident, fire and rescue); and
- looking at the storage and handling of all materials and substances.

In some cases it may be necessary to break down the activity or process into a series of parts and assess each part separately.
Risk assessment should provide information regarding which employees face an injury or disease risk, how often, and the potential severity of that injury or disease risk.

2.4 Reducing the risk, and preferred order or hierarchy of controls

The final step is to determine the control measures that need to be taken. In some instances, a combination of control measures may be appropriate. Control measures should be designed to:

- eliminate or reduce the risks of a hazardous work process and to minimise the effects of injury or disease; and
- reduce the risk of exposure to a hazardous substance.

Controls involve implementing measures that reduce the hazard and risk in the workplace. The control of occupational injury and disease risks should preferably be dealt with in a preferred order or hierarchy. The control measures range from the most effective to the least effective. The Hierarchy or Preferred Order of Control is:

Elimination - removing the hazard or hazardous work practice from the workplace. This is the most effective control measure.

Substitution - substituting or replacing a hazard or hazardous work practice with a less hazardous one.

Isolation - isolating or separating the hazard or hazardous work practice from people not involved in the work or the general work areas, for example, by marking off hazardous areas, installing screens or barriers.

Engineering Control - if the hazard cannot be eliminated, substituted or isolated, an engineering control is the next preferred measure. This may include modifications to tools or equipment, providing guarding to machinery or equipment.

Administrative Control - includes introducing work practices that reduce the risk. This could include limiting the amount of time a person is exposed to a particular hazard.
**Personal Protective Equipment** - should be considered only when other control measures are not practicable or to increase protection.

Control measures are not mutually exclusive. That is, there may be circumstances where more than one control measure should be used to reduce exposure to hazards.

The higher level controls generally eliminate, reduce or minimise risk in a more reliable manner than personal protective equipment which is at the bottom of the priority schedule.

### HIERARCHY OF CONTROL

ELIMINATE THE HAZARD  
SUBSTITUTE THE HAZARD  
ISOLATE THE HAZARD  
ENGINEERING CONTROLS  
ADMINISTRATIVE CONTROLS  
PERSONAL PROTECTIVE EQUIPMENT

### 2.5 Information on control measures

Information or ideas on control measures can come from:

- **Codes of Practice or Guidance Notes**  
  See the website of your OHS regulatory authority.

- **Specialist Practitioners and Consultants.**  
  Typically, sources of specialist practitioners and consultants can be obtained from employer, industry and professional associations, telephone directories and licensing/regulatory authorities. Often it may be necessary for an organisation to contract-in expertise, particularly if it does not have the expertise or resources within the company. Indeed bringing in a person who has the relevant skills and knowledge may highlight deficiencies that exist that were not identified by individuals who had either become used to the issues, were complacent or had simply not been knowledgeable in identification of the hazard.
At some point a company will need to evaluate the necessity of establishing its own safety professional or the alternative of contracting services as necessary. The decision as to whether to have a dedicated officer for OHS matters will generally be determined by comparing the cost with the perceived value of having a person available at all times. Companies, which are a division of a larger corporation, may be able to second expertise from a like division to assist in resolution of a matter. The use of a safety professional will assist in setting up an accident prevention programme.

- **Australian Standards or other relevant standards**

Australian Standards are prepared by committees: made up of experts from industry, governments, user groups, and other sectors. The requirements or recommendations contained in published Standards are a consensus of the views of representative interests and also take account of comments received from other sources. They reflect latest (usually several years behind the trend-setters) scientific and industry experience. Australian Standards are kept under continuous review after publication and are updated regularly (usually at intervals of 5 years) to take account of changing technology.

Where standards are published, such as those published by industry or recognised standards organisations, attempts should be made to comply. Often such standards can provide useful information on providing safe and healthy workplaces with the benefit of producing a reliable and quality product. Where local standards or codes do not exist, appropriate information can be sourced from standards from other States or from overseas. Often this is a practicable and cost effective alternative.

- **Employees**

The key to any programme of accident prevention is seeking the co-operation of the employees in the workplace. Employees within a workplace are often aware of the existence of hazards and have the most to gain by having them eliminated. Therefore, employees can be a primary source of information on the existence of hazards and potential hazards. Employees should be encouraged to come forward and identify issues and ensure that they are attended to. Consultation with the OHS should assist in this process. New employees should not be overlooked in this process. New employees may tend to question why certain things occur where as older or more experienced employees may tend to accept the situation rather than seek change.
Other sources of information are Material Safety Data Sheets, industry or employer associations or unions, government organisations, and manufacturers and suppliers.

NOTE: Where regulations require specific methods to control the risk, these must be complied with.

2.6 Review of control measures

Constantly reviewing control measures is important to ensure they continue to prevent or control exposure to hazards or hazardous work practices.

Engineering controls should be regularly tested to ensure their effectiveness. Performance testing and evaluation standards should be established.

Repair and maintenance programs should specify:
- where servicing is required;
- the extent of servicing required;
- the nature of the servicing required;
- the frequency of servicing;
- who is responsible for amending repair and maintenance programs to reflect current usage of equipment; and
- how defects will be corrected.

In order to keep accurate records, a recording or reporting system should be developed, implemented and maintained.
Section 3: ACCIDENT PREVENTION PROGRAMME

Key elements of an accident prevention programme or plan should include:

- management commitment;
- OHS policy, plans and procedures;
- consultation (discussed in other readings);
- hazard identification, risk assessment and control (discussed earlier); and
- training.

3.1 Management commitment

For any accident prevention programme to be successful, commitment from the highest appropriate person within the organisation is imperative. Planning for OHS and accident prevention should be incorporated as part of the overall business plan. Management systems are a fundamental component of general duty legislation.

A signed and dated policy, which provides a clear statement of management's commitment to accident prevention and a safe and healthy workplace, should be developed. The policy should include contractors and visitors to the workplace. The objectives of the policy and programme must be realistic and attainable. Adequate resources (time, money, training, etc) need to be allocated to achieve the policy objectives.

This document should be clearly displayed so any person entering the workplace can be made aware of the company's commitment.
Commitment from line supervisors is also a vital component of any accident prevention programme. With commitment from management at all levels, and employee co-operation, all accidents can be prevented.

To support the policy, plans and procedures should be developed. Appropriate information, instruction, training and supervision is required to complement the documentation.

### 3.2 Planning

To promote OHS management practices, a plan is needed to establish and maintain systems of work so employees are not exposed to hazards.

Accident prevention cannot be left to chance and should incorporate a planned systematic and documented process, where hazards are identified, risks assessed and controlled. The programme must be supervised and reviewed from time to time to ensure that it remains effective.

Part of this process will include the need to list resolutions by priority. This will require consideration of factors such as risk (the likelihood of the hazard resulting in injury) and available resources such as finance and labour.

The responsibility for implementation and management of an accident prevention programme is with the employer. Employees have responsibilities to co-operate, follow the employer's instructions and to ensure their own and others' health and safety in the workplace.

The health and safety programme should be implemented in such a way that it is planned, effective, efficient and functional.

When implementing an accident prevention programme, high-risk areas identified through the three-stage process (spot the hazard, assess the risk and control the risk) should be given priority.
3.3 Training

Training programmes are essential in maintaining an informed workplace. Training and retraining is required in some form in all workplaces. Such programmes may take the form of internal and external training, formal and informal, practical and theoretical types or a combination of these.

It is not enough to simply lecture employees. Their understanding and retention of information should be tested and if an appropriate level of knowledge and performance is attained, then the next stage of the programme should follow. However, if an appropriate standard is not achieved, additional efforts will required till the standard is met.

It must be understood that no task can be properly carried out unless it is safely carried out. The safe way however may not always be obvious or the easiest. Not only is it important to ensure that new employees or employees who are new to the job are trained, but also the person responsible for supervision of employees should be trained. Work processes or raw materials may change over time and increase the risk to employees. Therefore, prevention programmes need to identify subtle changes, which might otherwise go unnoticed.

Accident prevention programmes must be linked in with induction and training of employees. Typically, employees are shown training matters on normal operation of plant, for example, but are not always shown how to deal with unusual or unanticipated problems. Employees at some time or other will lack skills experience in some tasks they are required to perform. Therefore constant review of training requirements is essential in ensuring that employees’ skills are kept up to date.
3.4 Key points

- Management can delegate tasks to be accomplished, but it cannot delegate responsibility to ensure that the tasks have been adequately carried out.

- Accident prevention measures seek to positively influence people to the highest practicable level of OHS awareness. Awareness levels of individuals may vary according to experience, education, training and the level of responsibility a position within an organisation may require.

- Accident statistics are often included with production output and production costs to assist in judging the efficiency of a particular division. An accident prevention programme should utilise data from appropriate and applicable sources. Typically, this could include data from within a specific operation or data from a similar operation. Further comparisons may assist in spending the prevention dollar in the most effective areas initially. Other considerations will include the frequency, potential and extent of injury that could be expected given certain criteria.

- Organisations should draw on past experiences when setting up prevention programmes, as they will generally have an idea where high-risk activities occur. Consequently they may have experienced the cost associated with accidents and have appropriate control methods in place to deal with the minimisation of accidents.

- New or small companies may not necessarily have much experience to draw upon and therefore need to carefully consider how best to set up an accident prevention programme. Where suitable experience does not exist within a company structure, external expertise may be required for an accident prevention plan to be implemented and maintained. Expertise could be sought from other company divisions, employer organisations or by engaging specialist employees or appropriate consultants.
Your feedback

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