Occupational Health & Safety Practitioner

Reading

RISK MANAGEMENT PROCESS

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SafetyLine INSTITUTE®

Contents

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OVERVIEW

The intent of this reading is to provide the reader with a structured system for identifying hazards, assessing risks associated with those hazards, putting in place measures to control the unacceptable risks and to review the control measures to ensure they are effective and have not introduced new hazards. This is called the Risk Management Process.

Objectives

After reading this information you should be able to:

- apply the Risk Management Process to deal with a wide variety of situations;
- research and identify hazards;
- assess the 'level of risk' imposed by a given hazard; and
- use, modify or develop a 'hierarchy of control' to assist in the choice of control measures.

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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.

Hierarchy of Control	The order in which controls should be considered when selecting methods of reducing a risk.
Hazard	Anything which may cause harm, injury, or ill health to a person.
Risk	The possibility of an unwanted event occurring.
Control	The measures we take to reduce the risk to an acceptable level.
Risk Management	Describes the total procedure associated with identifying a hazard, assessing the risk, putting in place control measures, and reviewing the outcomes.
Likelihood	The chance of an event actually occurring.

1.1 RISK MANAGEMENT HAS WIDE APPLICATION

This reading was written from the perspective of industrial workplaces, however, the general risk* management principles can equally be applied to home, recreational or volunteer situations. Figuratively speaking, we can draw a circle round any piece of equipment, process, building, or organisation and apply the risk management* process to identify hazards*, assess risks, and select appropriate control* measures.

Hazards surround us in every aspect of our lives. There are hazards in the air we breath, the food we eat, the places we live in, through to the most hazardous sport, occupation or location we can think of. Almost every aspect of life has a hazard attached to it. To survive we all carry out a constant process of hazard identification, risk assessment, risk control, and review. This process is collectively referred to as the risk management process. Every organisation should invest an appropriate amount of time and resources in relation to risk management in order to ensure its own safety.

To illustrate the concept of risk management we could look at the simple process of crossing the road. The rule is **'Look right, look left, look right again, and if the road is clear move quickly across'.** This rule is extremely simple (although not always observed) and understood by even quite small children. Unless a study is made of the subject, what is not always understood is the process by which this simple rule was arrived at. This reading deals with the process of identifying hazards, evaluating how great are the risks associated with the hazard and what are appropriate control measures to put in place to either remove or reduce the risk to an acceptable level. In applying risk management to the task of crossing a road we first identify that a hazard exists in the form of vehicles which could strike and injure us. When assessing the risk, in terms of the speed, current location of approaching vehicles and our own location and mobility, we recognise that the consequences and likelihood* of an accident occurring are too great to ignore. We therefore develop a procedure of looking, to ensure that we only cross the road at a time when the likelihood of an accident is removed.

By the end of this reading you should understand why this general rule is as it is and not for instance **'Find an overpass or under pass and only cross at this point'**.

There is little doubt that hazards result in accidents. In the next section we look at some of the theories concerning the causes of accidents to give us an insight into how we should approach the task of risk management.

Section 2: ACCIDENT THEORIES

In this section we look at some of the theories concerning the causes of accidents to give us an insight into how we should approach the task of risk management.

2.1 Single Factor Theories

This theory stems from the assumption that an accident is the result of a single cause. Further, if that single cause can be identified and eliminated the accident will not be repeated. This theory is generally not accepted by persons who have even the most basic safety and health training.

Example: A person in a hurry walks through a poorly lit area and trips over a piece of wood.

Single Factor Theory Solution: Remove the offending piece of wood to solve the problem.

The reality is that accidents always have more than one contributing factor.

2.2 Energy Theory

The energy theory proposed by William Haddon (1) states that accidents are more likely to happen at or during a transfer of energy. The rate of energy release is important because the greater the rate of release the greater the potential for damage. The energy theory is discussed in more detail in a subsequent reading. It should be noted that this concept of identifying hazards is very limited and not dissimilar to the Single Factor theory. Factors other than energy release are important.

2.3 Multiple Factor Theory

The multiple factor theory, says that an accident occurs when a number of factors act together to cause an accident. This and similar ideas are favoured by most experienced safety and health practitioners.

Example: A person in a hurry walks through a poorly lit area and trips over a piece of wood.

Multiple Factor Theory Solution: to effect a solution the multiple factor theory would require answers to such questions as:

- was there a necessity for that person to walk in that area or was there a safer route;
- if the person was not in a hurry would they have been more aware of their surroundings and avoided the wood;
- if the area was better lit would the person have avoided the wood; and
- could the wood have been removed.

2.4 Domino Effect

This theory is attributed to W F Heinrich (2) and postulates that the events, which lead to an injury, are like five dominos, standing on end, ready to knock each other over in turn.

They are:

Social Environment:	Those conditions which make us take or accept risks.
Undesirable Human Traits:	Anger, carelessness, tiredness, lack of understanding, inattention.
Unsafe Acts or Conditions:	Poor planning, unsafe equipment, hazardous environment.
The Accident:	The accident occurs when the above events conspire to cause something to go wrong.
The Injury:	Injury occurs when the person sustains damage.

Often accidents occur without injury and they are referred to as near misses. All too often, these near misses are ignored until, figuratively speaking, the last domino is knocked over and the injury occurs.

The domino theory has its merits but may be too limited to consistently reflect reality. A more accurate picture of reality may be gained by combining the elements of the Multiple Factor Theory and the Domino Effect.

2.5 Importance of Risk Management

The necessity of carrying out any form of risk management process is often neglected. Often the perception is that all hazards have been addressed because there is no record of serious accidents. The absence of accidents does not necessarily mean there are no hazards. We often find that hazards with devastating consequences are not addressed until an accident has occurred. This is a clear case of false economy because arguably if the hazard had been identified and the risk adequately addressed before the accident the organisation would not incur the cost of the accident. Included in the rationale of the necessity to prevent accidents is the insurance mentality. This is where people in an organisation take the attitude that being fully insured for the losses incurred through accidents absolves them from further action with regard to accident prevention. Again, this is false economy because insurance payouts usually fall short of the true cost of an accident and insurance companies will usually increase the policy premium until the organisation is obliged to address the problem.

KEY POINT
The absence of accidents does not necessarily mean there are no hazards. A risk management process must be adopted and repeated at regular intervals.

A risk management process should be adopted and repeated at regular intervals, to ensure all hazards have been identified, the risks assessed and adequate measures to control those risks are in place. Initiation of a risk management program is clearly the responsibility of management whilst the employees role is one of support and assistance.

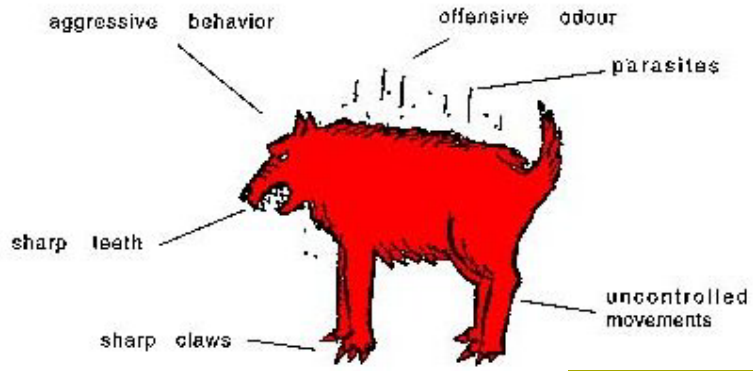
Section 3: PRINCIPLES OF RISK MANAGEMENT

A hazard is defined as anything, which may cause harm, injury, or ill health to a person. The Risk Management Process can be introduced at any time. Good practice and prudence dictates the process should be commenced at the earliest possible time. For example, whether you are designing a piece of machinery or a whole facility, the risk management process of hazard identification, risk assessment, control, and review should be incorporated at the design / planning stage. This will afford greater flexibility with regard to the methods used to control risks and the costs of implementing those controls. If on the other hand you are operating existing machinery or facilities with inherent hazards, the risk management process can still be employed to good effect, however the control solutions may be more expensive and more invasive.

KEY POINT
Reduce costs by starting the Risk Management Process at the design / planning stage.

Hazard identification, risk assessment, control, and review is, in its simplest form, self-explanatory. The implementation of the process will need a little more explanation, which is set out in the following sections.

Section 4: HAZARD IDENTIFICATION



Hazard: anything which may cause harm, injury, or ill health to a person.

Hazard identification is the first step in the risk management process. To ensure accuracy and completeness, the process of hazard identification should be carried out as a dedicated task and not in conjunction with or part of other tasks. Only people with a thorough knowledge of the area, process or machine under review should carry out a hazard identification survey. The parameters of the machine, process, or location under examination should be clearly defined and documented.

The task of identifying hazards should be broken up into clear and manageable sections, in a manner which suits the organisation, the task itself, and the people doing the work. Time should then be set aside for the task of compiling the information needed to identify hazards.

The person delegated the task of hazard identification should explore the many sources of information available for identifying hazards within the area of their inquiry. These may include any of the following:

4.1 Previous Accident Reports

Review the history of the area: any accidents or near misses should be carefully investigated. Sources for this information would include workers compensation records and company accident records. At this stage it is worth sorting all the past accidents and near miss information into a number of categories. Typically these category headings could be:

- Location
- Machine
- Person
- Age of Person
- Time of Day
- Day of Week
- Part of Body
- Severity of Injury
- Occupation

KEY POINT

Only people with a thorough knowledge of the area, process or machine under review should carry out a hazard identification survey, but they should use the many different sources of information available to help identify hazards.

Identifying a trend of accidents in any of the above areas may assist the investigator identify a possible hazard. Sometimes the results of sorting accident information is surprising because the accidents and near misses may be centred around a particular person or confined to a particular time of the day or week. This knowledge will assist the investigator during the risk assessment and control phases of the risk management process.

4.2 Physical inspection of the workplace

A physical examination of the workplace requires an inquiring mind, lateral thinking, and the ability to be and remain open minded. It is of little use to look at a particular area and, in a perfunctory manner, declare it to be hazard free.

Some of the tools used to make sure all avenues of inquiry have been explored are listed below.

4.3 Brainstorming

This is a process of conducting group meetings with people who are familiar with the operation of the area under review, recording all ideas and thoughts relating to possible hazards and then sorting the results into some sort of priority order.

4.4 Knowledge of Employees

Employees should be encouraged to describe any hazards they are aware of. Inquiries of this nature should be conducted in an atmosphere of 'no blame' where even if the employee is not doing things properly they are not criticised for it. The aim is to identify and document hazards at this stage.

4.5 Trade Journals

Trade journals are often a source of information regarding hazards encountered by others in the industry. They can be a source of useful inquiry, as members of the same industry would expect to encounter similar hazards.

4.6 OSH Publications

These publications can be of particular benefit as they concentrate on reporting issues relating to safety and health.

4.7 Contacts

A counter-part in another sudsidiary of the company or even a contact in a competitive company could be a good source of information as they probably share similar safety problems.

4.8 Industry Associations

Safety and health is often brought up at industry association meetings or during informal discussions before or after meetings. An investigator could gain useful information by promoting safety and health discussion at such meetings.

4.9 Manufacturers' Instruction Books

Manufacturers instruction books often provide advice and warnings regarding safety and health issues. It is important to ensure all instructions are understood and, more importantly, followed by all employees.

Manufacturers' information, including material safety data sheets, should always be reviewed to ensure the products in use are the safest available and do not have hidden hazards.

4.10 Ask, "What If…?"

Its important to try to anticipate how human behaviour, plant, and system failures could combine to create a hazardous situation. Constantly ask yourself "What if?...."

4.11 Sample Inspection WorkSheet

Development of a physical hazard list is very important as this forms the basis for the next step of the process. There are no standard formats used to record the data and so the following example worksheet (3) is only reference and may need modification to suit the nature of individual projects.

KEY POINT
Always note details of the hazards onto a worksheet.

for

Company: JHT Printing	Site/location: Paper store/ 5 Jones St, Peterville

INSPECTION WORKSHEET No.1 Inspected by: John Ninks, Angela Smith		Date: 1 Jan 1995
PLANT	**HAZARD AND SOURCE**	**COMMENTS**
Large paper guillotine	Crush from paper holding bar	Operator and casual passers-by need protection.
	Amputation from blade due to: • Access to blade from rear • Safety latch failure • Electronic beam not failing to safety	
Industrial lift truck (reg.no. FSG-7791)	Could tip over or lose load if overloaded	Usually received pallet loads within capacity, but heavier loads than the trucks capacity arrive occasionally
	If raised above mast height load could fall on operator	Fitted with overhead protection
	Person could be struck and crushed by lift truck	Truck regularly operates near operators on binding line
	Rear turning wheels could run over and crush a person's foot	Two people have previously had their feet run over while talking to driver

From National Occupational Safety and Health Commission publication (3)

Company: Ben's Snack Shop	Site/location: 5 The Mall, Smithfield
INSPECTION WORKSHEET No.1 Inspected by: Ben B	Date: 1 Jan 1995

PLANT	HAZARD AND SOURCE	COMMENTS
Pizza oven	Possible burns when taking food out	Has happened frequently. Should use gloves.
Electric knife	Possible electrocution from cutting cord	Could connect through RCD
Electric meat slicer	Possible electrocution	Use RCD : test regularly
	Cutting hazard	Use steel mesh cutting glove & safe work practices.

From National Occupational Safety and Health Commission publication (3)

You might like to use the above kind of worksheet to make notes during your inspection of plant in the workplace. You could use the 'comments' column to record any feedback from people working with the plant or observations that may help you assess the risks associated with the hazards. You can then transfer your notes to the master Risk Management Worksheet detailed at the end of the following section.

Section 5: RISK ASSESSMENT

Risk assessment is the process of evaluating a hazard to determine the level of action required to reduce a risk to an acceptable level. When evaluating the risks imposed by a hazard one should consider both the **likelihood** and **consequences** of the event happening. Judging how likely it is that something will happen or what its potential consequences might be is like predicting the future. You can't be really sure; you can only make a 'best estimate' on the basis of the information available. Because it is so unpredictable it is better to be conservative in your judgement.

Risk: The possibility of an unwanted event occurring.

Likelihood: The chance of an event actually occurring.

5.1 Likelihood

This is defined as the chance of an event actually occurring. In the context of risk management the event referred to is any event which may cause injury or harm to a person. When making an assessment of likelihood, you must establish which of the following categories most closely describes the likelihood of the hazardous event occurring:

- **Very Likely** -- Could happen frequently
- **Likely** -- Could happen occasionally
- **Unlikely** -- Could happen, but only rarely
- **Highly Unlikely** -- Could happen but probably never will

When evaluating the likelihood of an accident, a factor that will modify the likelihood category, is exposure. Exposure is a measure of how often or how long a person is actually exposed to a hazard. Some examples are:

- **Very Rare** -- Once per year or less
- **Rare** -- A few times per year
- **Unusual** -- Once per month
- **Occasional** -- Once per week
- **Frequent** -- Daily
- **Continuous** -- Constant

It is a common mistake to place too much emphasis on the mitigating effects of a low exposure level. Just because a person is not exposed to a hazard very often, does not always mean we can take fewer precautions. The certainty or likelihood of an accident happening is more important than how often a person is exposed to a hazard.

Example: A power press is a common machine in a workshop. In essence the stored energy in a rotating flywheel is instantaneously connected to a crankshaft, via a key. The crankshaft drives a ram from its resting position at the top of its stroke, down to the bottom of its stroke, where it punches a hole in a piece of metal called a blank. When the ram has completed its punching operation on the blank, it returns to its resting-place at the top of the stroke. The operator removes the blank and replaces it with a new blank.

The design of the machine is such that if a fault develops in the key, the press will unexpectedly operate and complete a stroke. If at this point in time the operator has his fingers under the ram whilst changing the blank, the normal result is a severe crush or amputation injury. The operator would expect to have his fingers in the danger zone for only a split second each time the press cycles. There are no guards or devices that can prevent the machine from cycling once a key fault has developed. Good maintenance will reduce the number of key faults happening but they can never eliminate them totally. For this example let us assume that maintenance has reduced the risk of the press malfunctioning to once in 5 million operations. (not an unrealistic figure)

At first glance it seems we need do nothing further to reduce the risk. Closer examination will reveal that operators of presses often exceed 60 operations per minute. Using 60 operations per minute for this example and 1 fault every 5 million operations we find that:

60 operations/min x 60min/hour x 8hrs/day x 5days/week x 34.72 weeks = 5 million operations.

This indicates that a press operator is at risk of having an accident **every 34.72 weeks**. The exposure to risk is 'very rare' however the 'likelihood' of the accident happening is almost certain if a key fault develops.

Control measures must be put in place to reduce the likelihood of this accident occurring because it is unacceptable for an organisation to have a serious accident every 34 weeks.

The location of a hazard can affect the likelihood of the accident happening. For example, an exposed V belt drive located adjacent to a walkway where persons could easily come into contact with the nip points would have a higher likelihood rating than if the same drive arrangement were located in a position from which persons were excluded.

When we assess '**likelihood**' it should be remembered we are only assessing the possibility of an accident happening. As part of our assessment of likelihood we must take into consideration how often and for how long the person is at risk, however this is of lesser importance than the certainty of an accident occurring.

5.2 Consequences

Consequence is a measure of the expected severity should an accident occur. When assessing the consequences of an accident, the most severe category one could reasonably expect to result from that accident should be selected.

The consequences of an event can be categorised as follows: -

Fatal	Death
Major Injuries	Normally irreversible injury or damage to health requiring extended time off work to effect best recovery.
Minor Injuries	Typically a reversible injury or damage to health needing several days away from work to recover. Recovery would be full and permanent.
Negligible Injuries	Would require first aid and may need the remainder of the work period or shift off before being able to return to work.

If the position of the danger adds to the consequences in the event of an accident happening then the added consequences must be taken into consideration and the consequence rating increased.

When making a risk assessment all aspects of likelihood and consequences should be taken into consideration. The interrelated parameters of likelihood and consequences can easily be presented on the simple matrix shown below.

5.3 Basic Risk Assessment

If we consider the likelihood of an accident whilst driving a car and the consequences, statistically it is **highly unlikely** that we will have an accident and the worst consequence would be a **fatality**. From the matrix below we can see that the risk is in the **medium** range which means that we make efforts to reduce the risk of an accident by such means as driver training, road management and vehicle design.

KEY POINT
Use the matrix to develop a list of hazards with highly rated hazards to be tackled first at the top of the list.

CONSEQUENCE	LIKELIHOOD			
	Very Likely	Likely	Unlikely	Highly Unlikely
Fatality	HIGH	HIGH	HIGH	MEDIUM
Major injuries	HIGH	HIGH	MEDIUM	MEDIUM
Minor injuries	HIGH	MEDIUM	MEDIUM	LOW
Negligible injuries	MEDIUM	MEDIUM	LOW	LOW

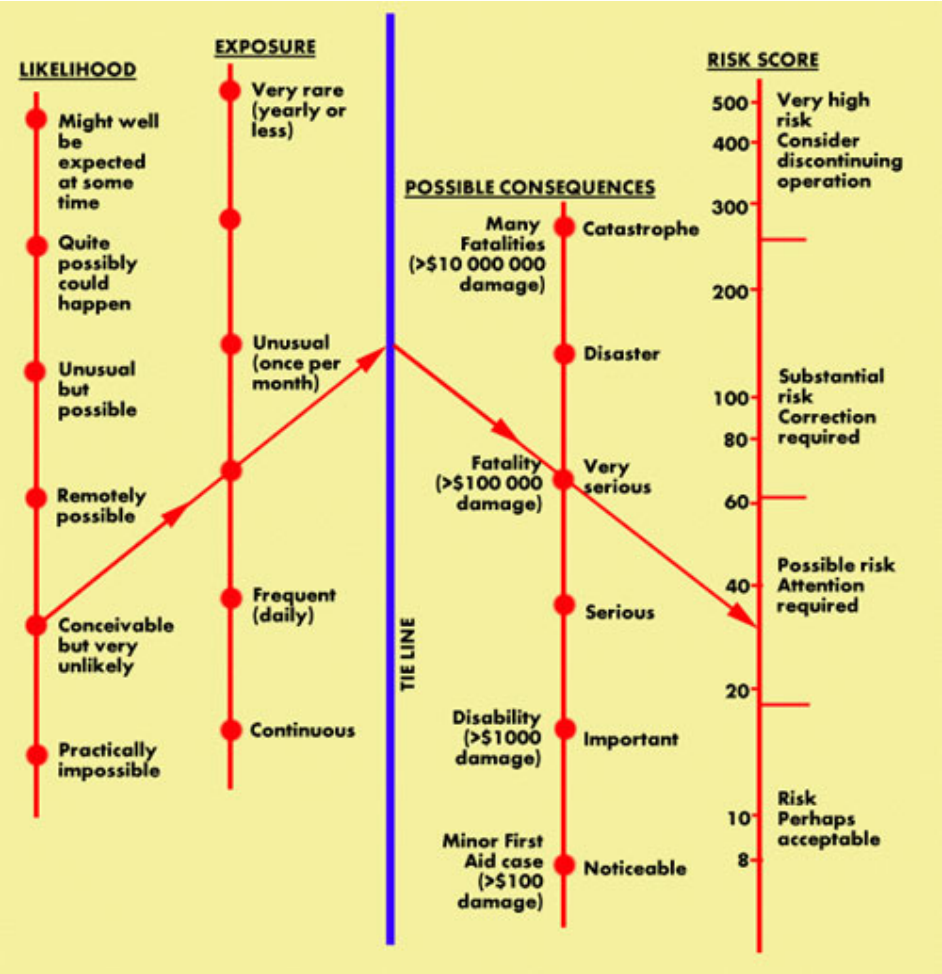
Events or situations assessed as *very likely with fatal consequences* are most serious (HIGH risk); those assessed as *highly unlikely with negligible injuries* are the least serious (LOW risk).

When developing risk control strategies any item with a high rating should be addressed first.

Using the above matrix it would be normal to develop a list of hazards with highly rated hazards at the top of the list. Management would then be expected to determine at what point it would be reasonable to take no further action.

5.4 Risk Nomogram

A more complex nomogram (4) for analysing risk and cost justifications was developed by the American Military and is shown below.



Nomogram for analysing risk and cost justification (from G. F.Kinney and A. D. Wiruth, Practical Risk Analysis for Safety Management).

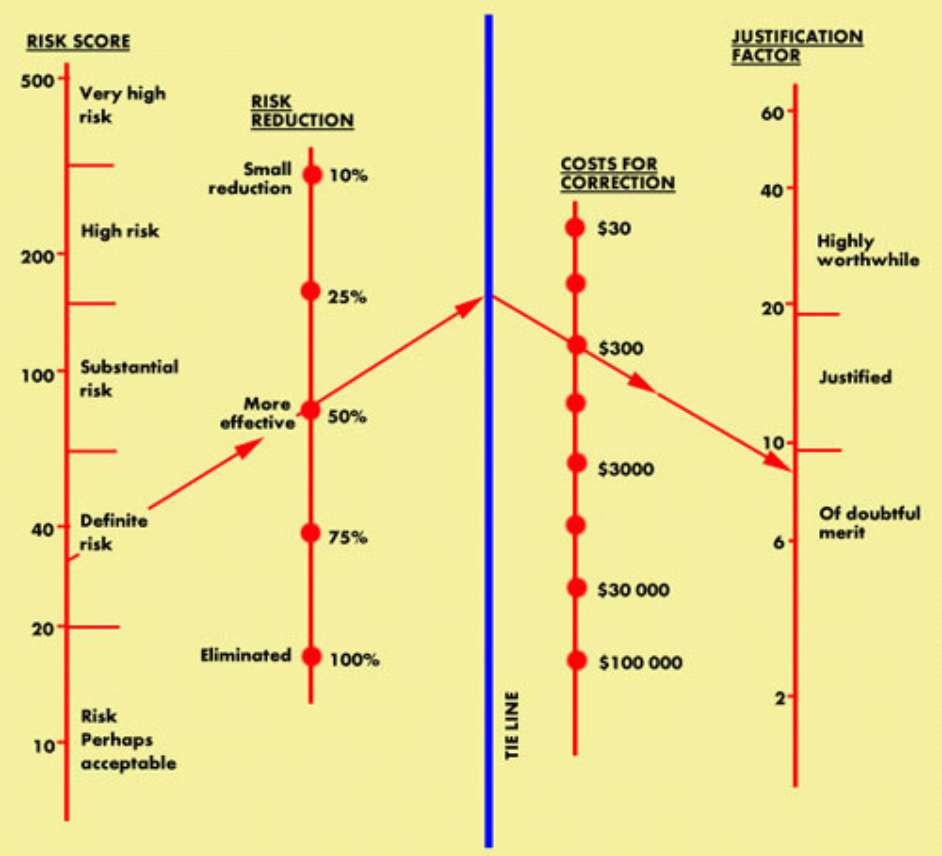
The above nomogram can be used to assist the decision making process by completing the following steps:

1. Assess the likelihood of an accident occurring for each hazard identified and enter the result in the LIKELIHOOD column of the above nomogram.

2. The exposure to risk is then assessed and entered in the exposure range. (exposure is a measure of how often a person is doing something which puts them at risk.)
3. A straight line is then drawn through these two points and extended to the TIE LINE.
4. Assess the consequences of an accident happening and enter this value in the POSSIBLE CONSEQUENCES column.
5. Draw a straight line from the point established on the TIE LINE at step 3 above, through the POSSIBLE CONSEQUENCES point established in step 4.
6. Where this line passes through the RISK SCORE column is an indication of the possible action that should be considered.

5.5 Cost Justification Nomogram

For completeness, an extension of the above nomogram has been included below (4) which provides guidance with regard to justification of the cost of reducing a given hazard.



Nomogram for analysing risk and cost justification (from G. F.Kinney and A. D. Wiruth, Practical Risk Analysis for Safety Management).

The results derived from the risk assessment matrix or the risk assessment nomogram should not be accepted at face value. The results are only indicators and a person using the device must be comfortable with the recommendations provided. For example, the cost for correction column in the risk assessment nomogram could be adjusted for inflation or a different economy. This nomogram was developed in 1976 and a dollar was worth more then than it is today. We also are more inclined to spend greater amounts on safety today than in 1976.

5.6 Risk Management Worksheets

There are no standard formats used to record the data in connection with risk management assessments. The examples given are only for reference and may need modification to suit the nature of individual projects.

KEY POINT

Always use a Risk Management Worksheet for systematic recording.

PLANT RISK MANAGEMENT WORKSHEET				
Company: JHT Printing	**Site/location:** Paper store/ 5 Jones St.			**Date:** 02/01/95
HAZARD IDENTIFIED	**LIKELIHOOD** Very likely Likely Unlikely Highly unlikely	**CONSEQUENCE** Fatality Major injuries Minor injuries Negligible injuries	**RISK RATING** High Medium Low	**CONTROL ACTION** 1. Initiated 2. Implemented 3. Reviewed 1. 2. 3.
Crush from guillotine paper holding bar	Very likely	Major inj.	High	✓ ✓
Amputation from guillotine blade due to: Access to blade from rear Safety latch failure Electronic beam not failing to safety	Very likely Likely Unlikely	Major inj. Minor inj. Major inj.	High Medium Medium	✓ ✓ ✓ ✓ ✓
Crush due to lift truck tipping over when overloaded	Unlikely	Fatality	High	✓ ✓
Crush due to load falling on lift truck operator	Likely	Minor inj.	Medium	✓ ✓
Person struck and crushed by lift truck	Unlikely	Fatality	High	✓ ✓
Foot crushed due to being run over by lift truck	Very likely	Major inj.	High	✓ ✓

From National Occupational Safety and Health Commission publication (3)

PLANT RISK MANAGEMENT WORKSHEET

Company: Ben's Snack Shop | **Site/location:** 5 The Mall, Smithfield | **Date:** 02/01/95

HAZARD IDENTIFIED	LIKELIHOOD Very likely Likely Unlikely Highly unlikely	CONSEQUENCE Fatality Major injuries Minor injuries Negligible injuries	RISK RATING High Medium Low	CONTROL ACTION 1. Initiated 2. Implemented 3. Reviewed
				1. 2. 3.
Heat hazard from oven	Very likely	Minor Inj.	High	✓ ✓ ✓
Electrocution hazard from knife	Unlikely	Fatality	High	✓ ✓ ✓
Electrocution hazard from meat slicer	Unlikely	Fatality	High	✓ ✓ ✓
Cutting hazard from meat slicer	Likely	Minor inj.	Medium	✓

From National Occupational Safety and Health Commission publication (3)

Section 6: RISK CONTROL

Control: the measures we take to eliminate or reduce the risk to an acceptable level.

When a risk assessment has identified a hazard as having unacceptable risks we have to put in place control measures to eliminate the risk or reduce the risk to an acceptable level. What is accepted as safe is not constant or absolute. Each person, organisation or society establishes what level of safety and health is acceptable. Not every one can agree on a uniform level of safety. People would like to be free from risk, however every activity has some risk attached. The level of risk we find acceptable is often open to debate. The standards required by any given society are not constant and usually increase rather than decrease. Standards may vary from industry to industry and are influenced by perceptions, current knowledge and by who is paying for the risk reduction. The hardest area to deal with is the grey area between positively unsafe and patently safe. This area, which we could call uncertain, is the most contentious. Decisions must be made with regard to current standards of society, judicial interpretation, and the public's expectation. There will never be a definitive answer to "how safe is safe enough".

6.1 Hierarchy of Control

Control measures can be sorted into a number of categories with the most effective listed at the top, the list of categories is collectively known as a 'hierarchy of control'*.

Hierarchy of Control: The order in which controls should be considered when selecting methods of controlling a risk.

When selecting appropriate measures to control a risk we should select a control measure from as high on the hierarchy of control list as practicable. The Hierarchy of Control list usually comprises:

- Elimination
- Substitution
- Isolation
- Engineering Controls
- Administrative Controls
- Provide Personal Safety Devices

This list may be customised for each industry or application, however the basic order of priorities shown above should not be changed.

6.2 Elimination

The most satisfactory method of dealing with a hazard is to eliminate it. Once the hazard has been eliminated the potential for harm has gone.

Example: The dangers associated with transporting an explosive called Anfo are known and documented. Anfo is made by simply mixing ammonium nitrate with fuel oil (diesel). Both constituents are safe in isolation but when mixed they become unstable. The dangers of long distance transport can be removed by not mixing the component parts until they are on site. By this simple expedient we have eliminated the hazard.

6.3 Substitution

This involves substituting a dangerous process or substance with one that is not as dangerous. This may not be as satisfactory as elimination as there may still be a risk (even if it is reduced).

Example: many chemicals can be substituted for other safer chemicals which perform in the same manner but do not have the same dangers eg. water based paints rather than those that contain lead.

6.4 Separation

Separate or isolate the hazard from people. This method has its problems in that the hazard has not been removed. The guard or separation device is always at risk of being removed or circumvented.

Example: A guard is placed over a piece of moving machinery. If the guard is removed for maintenance and not replaced people are again at risk.

6.5 Administration

Administrative solutions usually involve modification of the likelihood of an accident happening. This can be done by reducing the number of people exposed to the danger and providing training to those people who are exposed to the hazard.

Example: The dangers of electricity are well known and only trained and licensed people are allowed to work on electrical equipment. We can appreciate that the electrician is still at risk, but their training is such that the risks are reduced to an acceptable level.

Administrative solutions also include danger signs, and written systems of work such as those for working in confined spaces and lock out procedures.

6.6 Personal protective equipment

Provision of personal protective equipment should only be considered when all other control methods are impractical, or to increase control when used with another method higher up in the Hierarchy of Control.

Example: To remove the possibility of a person dropping something on their foot in a workshop situation would be impracticable as it would involve securing every movable object large enough to do damage if it fell on a person's foot. The practicable solution is to provide every person at risk with safety footwear.

Controls are not mutually exclusive, several in the hierarchy may be needed to obtain the level of control necessary.

6.7 Apply hierarchy of control

If we go back to the power press example in 'Risk Assessment' mentioned earlier we can examine the steps we should take to control the risk of an operator having an accident whilst loading the press.

The contribution to industry of the power press is so great that to eliminate them completely from the working environment would not be practicable. Since power presses were first invented in the early part of this century, designers have not been able to eliminate the hazard of an unexpected stroke. Based on the evidence available and current knowledge, elimination of the hazard is not practicable.

KEY POINT
It is crucial to apply the control measure from as high on the hierarchy of control list as practicable.

We could then look to substitution to reduce the risk. We could substitute a power press for a hydraulic press or a drilling machine. Both of these alternatives are too slow to be viable alternatives in most cases.

Separating the operator and the hazard is possible in most cases if we use an automatic feed and a guard to eliminate persons from the danger area. This method is effective, but will not be applicable to all cases.

Administration should be our next alternative. This would involve training the operator to remove the work-piece and place a new blank in the machine without putting their fingers in a position where they could be crushed in the event of a malfunction of the press eg. by using a push stick or similar.

Personal safety devices may not always be applicable. In fact it should be the aim of the organisation to remove the necessity for personal safety devices.

Accepting a solution too low on the Hierarchy of Control list is a common failing which must be avoided.

Section 7: MONITORING AND REVIEW

Review is an important aspect of any risk management process. It is essential to review what has been done to ensure that the controls put in place are effective and that they have not introduced new hazards.

KEY POINT
A review follow-up is always essential.

Example: An agricultural machine was found to be hazardous and a guard was subsequently fitted round the moving parts. This guard excluded persons from the danger area, however, due to the nature of the environment it was found that chaff built up behind the guard. If a review had not been carried out of the new guard after it had been in service for a short while, the chaff in conjunction with the moving parts may have caused a fire.

The lesson to be learnt here is that however good the initial risk management process was, there is always the possibility that something will be overlooked and not addressed in the initial stages. The review system allows further modifications to be carried out.

CONCLUSION

Hazard identification, risk assessment, control and review is not a task that is completed and then forgotten about. Hazard identification should be properly documented even in the simplest of situations. Sample work sheets to assist in this process are very useful. Risk assessment should include a careful assessment of both **likelihood** and **consequence**. Control measures should conform to the recommendations of the hierarchy of control. The risk management process is an on going activity which should include regular reviews of all aspects of an organisations activities including the purchase of new plant and consumables, safety of existing plant, systems of work including administrative initiatives such as evacuation, fire, and violence in the workplace strategies.

Your feedback

WorkSafe is committed to continuous improvement. If you take the time to complete the online Feedback Form at the SafetyLine Institute website you will assist us to maintain and improve our high standards.

REFERENCES & FURTHER READING

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