Course in Mining Supervisor

Unit:

RIIRIS301D
Apply Risk Management Processes (s1)

Student Study Guide

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Notes:

This Study Guide provides learners with content information, references to readings, questions and exercises that are designed to provide the learner with the knowledge to understand the subject matter of this unit.

After successfully completing the Study Guide the learner should be able to demonstrate competency in the performance criteria, as determined in the competency standard.

Highly Recommended Texts

Queensland Government, 1999, Coal Mining Safety and Health Act, 1999
Queensland Government, 2017, Coal Mining Safety and Health Regulation, 2017
Queensland Government, 1999, Mining and Quarrying Safety and Health Act, 1999
Queensland Government, 2017, Mining and Quarrying Safety and Health Regulation, 2017
Queensland Government, 2011 Workplace Health & Safety Act, 2011
Queensland Government, 2011 Workplace Health & Safety Regulation, 2011

Standards Australia, 1999, AS 4360 / ISO31000 – Risk Management, Standards Australia.

Suggested Texts

CCH Australia Ltd, 1991, Planning Occupational Health and Safety, CCH Australia Ltd, Sydney.

CCH Australia Ltd, 1996, Safe Mining: Practical Guidelines for Managing Safety and Health in the Mining and Extractive Industries, CCH Australia Ltd, Sydney.

Department of Mineral Resources (NSW), 1996, Guidelines for Safe Mining, Government Printer, Sydney.

Department of Mineral Resources (NSW), 1997, Risk Management Handbook for the Mining Industry MDG1010, Government Printer, Sydney.

Department of Minerals and Energy, 1999, Safeguard, Brisbane.

Mathews, J., 1993, Health and Safety at Work, Pluto Press, Sydney.

Queensland Government, 1998, Risk Management Workbook, Department of Employment, Training and Industrial Relations, Brisbane.

Standards Australia, AS/NZS 4804 /31000 – Occupational Health and Safety Management Systems, Standards Australia

Taylor, G., Easter, K., Hegney, R., 1996. Enhancing Safety – An Australian Workplace Primer., Technical Publications, Perth

1.0 Introduction

Within Australia there are many laws which control the way we (as individuals, groups or organisations) act during our daily lives whether at home, at work, on the road or at play. We are expected to abide by these laws and if we do not then we may be penalised. In a court of law ignorance of those laws is not accepted as an excuse.

This applies to the way persons or organisations conduct themselves in the workplace and to this end Governments have enacted or supported laws intended to both prevent injury or illness at the workplace and compensate those who have suffered such injuries or illnesses. The following table provides examples of those laws which affect health and safety.

Prevention	**Compensation**
Coal Mining Safety & Health Act 1999 & Regulation 2017 (Qld)	Common Law Judgements Worker's Compensation Payments
Mining & Quarrying Safety & Health Act 1999 & Regulation 2017 (Qld)	
Petroleum and Gas (Production and Safety) Act 2004 (Qld) & Regulation 2004 (Qld)	
Work Health and Safety Act 2011 (Qld) and Regulation 2011 (Qld)	
Electrical Safety Act 2002 (Qld) and Regulation 2013 (Qld)	
Radiation Safety Act 1999 (Qld) and Regulation 2010 (Qld)	

The above laws can be divided into two broad classifications being "common law" or "statute law". The term "common law" refers to the body of legal principles which evolve through the interpretation of law by judges, as distinct from the body of law created through legislation which is referred to a "statute law".

These two classifications are discussed in greater detail in the following sections of these notes.

2. Common Law

Common law consists of a body of legal principles of traditional origin which have evolved by decisions of judges in Courts of Law. These judge made laws are decided based upon the particular set of facts presented to the court. Such decisions then become the precedent or general rule which is applied to cases with a similar set of facts or circumstances.

Whilst breaches of statutory law can result in the offences being dealt with in an industrial magistrate's court, common law cases are dealt with in civil courts. The most frequent cases of common law action are those for damages and compensation following a workplace injury.

Generally common law action is taken when a person believes that he or she has been wronged by another party and is seeking to be compensated for the damages and/or losses resulting from that wrong doing.

Based on these precedents there are three elements that need to be established for such a common law action to be successful being:

a) That one party owes a duty of care to the other; and
b) That the duty of care has been breached; and
c) That the breach of duty has resulted in damage.

Duty of Care

When does one party owe a duty of care to another party? Lord Aitken in his judgement of *Donoghue v Stevenson* (AC 562 [1932]) said:

"The answer seems to be - persons who are so closely and directly affected by my acts that I ought reasonably to have had them in contemplation as being so affected when I am directing my mind to the acts or omissions which are in question."

A person has a duty to care for others in the way in which they conduct themselves. This case is currently accepted as the basis of the modern law of negligence including the concept of Duty of Care.

In relation to the duty of care owed by an employer to his employees, this issue was settled in the matter of *Wilsons & Clyde Coal Co v English* (AC 57 [1938]) which established that employers undoubtedly owed a duty of care to their employees (Brooks 1993). Since this case there have been numerous similar cases which support these findings.

The courts have determined the common law duty of care to mean that all employers must take reasonable care for the safety of their employees and others who may be affected by the employers business or work activities. Sometimes this common law duty of care is described in terms of providing

- safe systems of work
- a safe place of work
- safe plant and equipment
- competent staff

Safe Systems of Work

Employers are required to ensure the coordination and conduct of work activities so that the activity does not endanger the health and safety of the person carrying out the activity or others who are working in, on or around the activity.

Examples of safe systems of work are:

- Standard work practices which include instruction on how work is to be performed so that risk of injury or illness are eliminated or minimized.
- Instruction of workers in standard work procedures
- Instruction and assessment of competency in use of plant and equipment.
- Co-ordination of different work groups and activities.
- Emergency and first aid procedures.
- Health and safety specific work practices including isolation and confined space entry and hazard reporting procedures.
- Manual handling procedures.

Safe Place of Work

It is incumbent upon every employer to ensure that reasonable care has been taken to provide a safe place of work for all their employees. A safe work place includes the premises, plant and equipment used at the workplace, substances used or stored at the premises.

Examples of those things included in a safe workplace are:

- Access areas, stairways, and work areas are constructed properly and do not present a hazard.
- The work environment including noise, lighting, air quality and temperature.
- Location of plant and equipment.
- Suitable and adequate amenities are provided.
- Hidden hazards such as electrical wiring and storage or use of substances do not present a hazard.

Safe Plant and Equipment

It is also incumbent upon every employer to ensure that reasonable care has been taken to provide proper, safe plant and equipment. Further the employer must ensure that the plant is maintained in a condition which will not endanger a person when used correctly.

Examples of those things that must be considered to ensure the provision and maintenance of safe plant and equipment include:

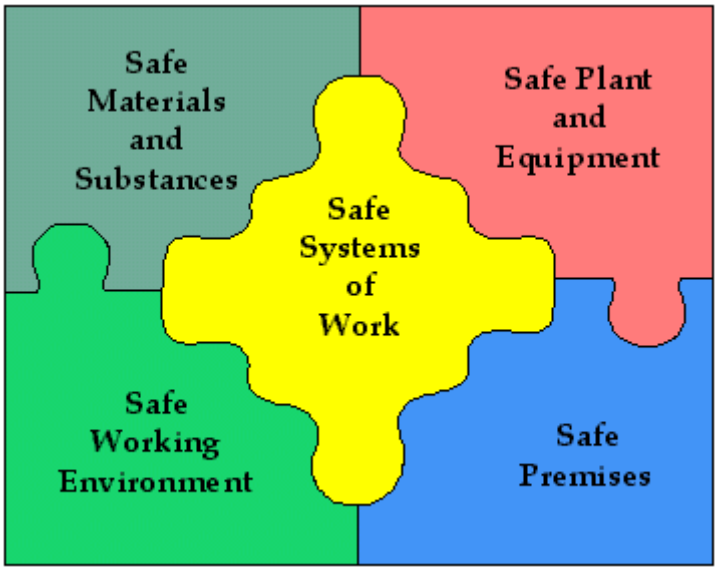
- Plant is suitable for the purpose for which it is being used.
- Where possible plant meets appropriate standards for design, manufacture and use.
- Employees are instructed in its correct use.
- Plant and equipment is maintained. Where manufacturers' instructions exist then maintenance must be in accordance with those instructions.

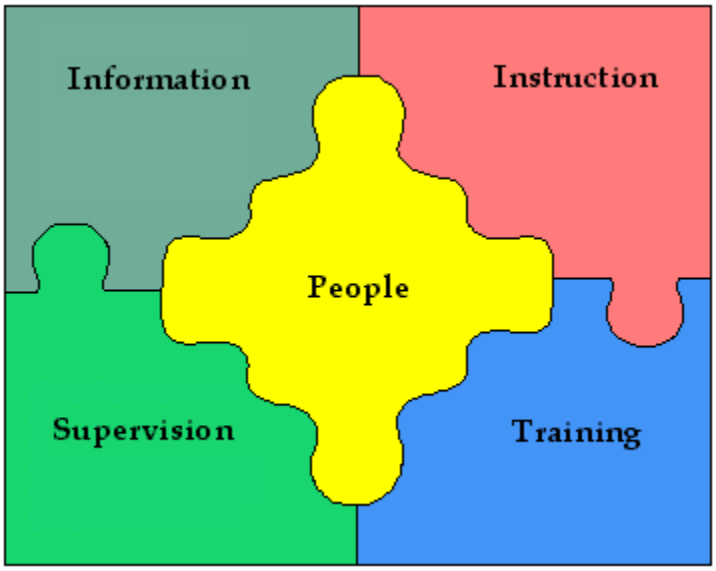
Competent Staff

The discussion on competent staff leads us to the doctrine of *vicarious liability* which arises where a person is held responsible for the negligent acts or omissions of another. This is particularly applicable in the employer / employee relationship where the employer is held responsible for the acts or omissions committed by an employee in the course of his or her employment. In other words the employer has a duty of care to others for the acts and omissions of his or her employees.

Therefore an employer must provide competent staff to ensure that the employers' duty of care is maintained. The provision of competent staff is closely allied to the above as without competent staff an employer would have difficulty in maintaining safe systems of work, a safe place of work and safe plant & equipment.

The National Occupational Health and Safety Commission (2003) likens the duties of care to a jigsaw puzzle. If the jigsaw is not complete and one or more of the pieces are missing then it is likely that the workplace is not safe and an employer has not met their duty of care. Consider the following.





Source: National Occupational Health and Safety Commission

Breach of Duty of Care

The standard of care owed by one person to another is based on the question of what a "reasonable man" would have done in the same situation. This is supported by the findings of Anderson in *Blyth v Birminghan Waterworks Co* (11 Exch781 at 784[1856]) which states:

> *"Negligence is the omission to do something which a reasonable man, guided by those considerations, which normally regulate the conduct of human affairs would do, or something a prudent and reasonable man would not do."*

In establishing a breach of the duty of care Brooks (1993) suggests an approach by Glass, McHugh and Douglas in their book *The Liability of Employers*. Brooks (1993) states:

> *"First, it must be established with the requisite degree of certainty what caused the accident or illness. Second it must be determined whether the risk of such accident was foreseeable. Third it must be decided whether it could have been prevented by practical precautions. Finally, one must decide whether, given the likelihood and the seriousness of the risk, a reasonable and prudent employer would have taken those precautions."*

Causation

What caused the accident? In this area of law, it is legitimate to approach the cause of the accident or illness as simply a question of fact (Brooks 1993, p40). That is the facts of how an accident has occurred must be established, including where the person was working, what the worker was doing at the time and what happened to cause the injury or loss to the worker.

Foreseeability

Is the accident foreseeable? The question of whether the risk of the accident that happened was foreseeable is largely a matter of evidence. (Brooks 1993, p 51). Evidence is needed to show that such an accident was foreseeable. Evidence would include showing that the type of accident has been caused by similar events before (either internally or externally), through industry practice and technical references as an example.

Preventability

Was the accident preventable? The determination whether there are available precautions is not a matter of legal principle but in a large measure a pure question of fact. More precisely, it is a question of evidence (Brooks 1993). To establish that in itself the accident was preventable is not adequate, it must also be established that the preventative action is also reasonable and practicable.

Reasonableness

Would the reasonable person have taken the precautions given the likelihood and seriousness of the risk? Again, evidence in the form of previous cases and industry practice would be brought to show that a reasonable person would, or would not have, taken those precautions.

Therefore when establishing a breach of duty of care the courts apply the concepts of causation, foreseeability, preventability and reasonableness to the case in question.

Damages at Common Law

Finally as a common law action is generally for compensation it must be established that the breach of duty resulted in the injury, loss or damage. In establishing damages some of the areas which may be considered in the calculation include loss of income (both past and into the future) medical and hospital expenses and general damages (e.g. pain and suffering, disfigurement).

Defences at Common Law

Where an employer is sued by an injured worker the employer has certain defences available to them where they may defend such an action.

Firstly the employer can illustrate they have in fact met their duty of care by establishing that they have provided a safe place of work, safe plant and equipment, safe systems of work and competent staff. In addition to this general defence an employer has specific defences available, the most important being the following.

a) *Novus Actus Interviens*

Issues of causation can become complicated in circumstances where an intervening event occurs between the employers conduct and the sustaining of the injury or loss. That is when the chain of an accident is broken by a new and independent cause. Where this can be proven, and it could not have been reasonably foreseeable, the employer may endeavour to escape liability.

b) *Volenti non fit injuria*

The philosophy behind this doctrine is that no person should recover damages where he or she has consented to the risk. For example a boxer cannot claim damages from the boxing promoter for injuries inflicted by their opponent.

c) *Contributory Negligence*

Contributory negligence involves the person's failure to take precautions thereby contributing to the injury or loss.

Many Australian states have enacted legislation which allows negligence to be apportioned between the defendant and the plaintiff.

d) *Act of God*

A defendant may endeavour to escape liability by claiming that the event and subsequent damage or loss was caused by an "Act of God". That is it resulted from some violent natural occurrence (e.g. earthquake or lightening strike).

3. WH&S / Mining Statute Legislation

WH&S Legislation and Information

It is essential that an organisation keep up to date on legislation and other health and safety information and there are a number of ways this can be achieved including the following.

Internet - Regularly visit the **Workplace Health and Safety Queensland** web site at https://www.worksafe.qld.gov.au/ and check for changes and other guidance notes and general information.

Queensland Legislation Website - A good site for obtaining up to date legislation for all areas of Queensland law, including those affecting workplace health and safety is the Queensland Government legislation web site at www.legislation.qld.gov.au/OQPChome.htm.

The **Minerals Industry Safety & Health Centre**, supported by ACARP and industry funding, has developed a range of information resources designed to assist the management of safety & health risks. The 'GATES' listed below provide free access to comprehensive health and safety information about key issues that concern the minerals industry including a Compliance Gateway which list the key Mining Laws, Acts, Regulations, standards for each jurisdiction and can be located at http://www.mirmgate.com.au/index.php?gate=compliancegate

The **Department of Natural Resources and Mines QLD** has the key mining legislation also listed on its site at https://www.business.qld.gov.au/industries/mining-energy-water/resources/safety-health/mining/legislation-standards

The **Australasian Legal Information Institute** (AustLII) provides free internet access to Australasian legal materials. AustLII's broad public policy agenda is to **improve access to justice** through better access to information. AustLII publishes **public legal information** -- that is, primary legal materials (legislation, treaties and decisions of courts and tribunals); and secondary legal materials created by public bodies for purposes of public access (law reform and royal commission reports for example) and a substantial collection of law journals. AustLII is Australia's most popular online free-access resource for Australian legal information. AustLII is a joint facility of the UTS and UNSW Faculties of Law and can be accessed at http://www.austlii.edu.au/

External Consultants – Where appropriate assistance can be sought from external consultants.

Other sources – Other workplace health and safety information can be obtained from other state and national health and safety authorities, unions, libraries and employee or employer organisations

WH&S / Mining Legislation in Queensland

The key work health and safety legislation in Queensland is as follows.

- 🕮 ***Coal Mining & Safety Act 1999 & Regulation 2017 Qld***
- 🕮 ***Mining & Quarrying Safety Health Act 1999 & Regulation 2017 Qld***
- 🕮 **Petroleum and Gas (Production and Safety) Act 2004 & Regulation 2004 Qld**
- 🕮 ***Work Health and Safety Act 2011 & Regulation 2011 Qld***

Other legislation an organisation should be aware of includes

- 🕮 ***Electrical Safety Act 2002***
- 🕮 ***Radiation Safety Act 1999***

Coal Mining Safety & Health Act 1999 (Qld)

Structure

Coal Mining Safety & Health Act 1999 (Qld) (Qld)

The Coal Mining Safety & Health Act 1999 (Qld has logical chapters which are referred to as ***Parts***. Each of these parts may then be further subdivided in **Divisions** and **Subdivisions**.

The fundamental component of the Act is the Section, which also can be divided into subsections.

The Act outlines these Parts, Divisions, Subdivisions and sections in the Table of Provisions.

Application of the Act

Coal Mining Safety & Health Act 1999
Sections 3 - 5

The Act applies to all persons at coal mines or coal mining operations.

3 Act binds all persons

(1) This Act binds all persons, including the State and, so far as the legislative power of the Parliament permits, the Commonwealth and all the other States.
(2) Nothing in this Act makes the State liable to be prosecuted for an offence.

4 What does this Act apply to

This Act applies to coal mines and coal mining operations.

5 Who does this Act apply to

This Act applies to—
(a) everyone who may affect the safety or health of persons while the persons are at a coal mine; and
(b) everyone who may affect the safety or health of persons as a result of coal mining operations; and
(c) a person whose safety or health may be affected while at a coal mine or as a result of coal mining operations.

Objective of the Act

Coal Mining Safety & Health Act 1999
Section 6&7

The objective of the Act is to:

6 Objects of Act

The objects of this Act are—
(a) to protect the safety and health of persons at coal mines and persons who may be affected by coal mining operations; and
(b) to require that the risk of injury or illness to any person resulting from coal mining operations be at an acceptable level.

7 How objects are to be achieved

The objects of this Act are to be achieved by:

(a) imposing safety and health obligations on persons who operate coal mines or who may affect the safety or health of others at coal mines; and
(b) providing for safety and health management systems at coal mines to manage risk effectively; and
(c) making regulations and recognised standards for the coal mining industry to require and promote risk management and control; and
(d) establishing a safety and health advisory council to allow the coal mining industry to participate in developing strategies for improving safety and health; and
(e) providing for safety and health representatives to represent the safety and health interests of coal mine workers; and
(f) providing for inspectors and other officers to monitor the effectiveness of risk management and control at coal mines, and to take appropriate action to ensure adequate
risk management; and
(g) providing a way for the competencies of persons at coal mines to be assessed and recognised; and
(h) requiring management structures so that persons may competently supervise the safe operation of coal mines; and
(i) providing for an appropriate coal mines rescue capability; and
(j) providing for a satisfactory level of preparedness for emergencies at coal mines; and
(k) providing for the health assessment of coal mine workers.

Interpretation of Works and Terms Used

Coal Mining Safety & Health Act 1999
Sections 8 - 28
Schedule 3 Dictionary

Some of the expressions, terms and words used in the Act can be complex and an understanding of these is fundamental to an understanding of the Act.

The Act provides a dictionary which contains definitions relevant to the whole Act. For the more complex expressions the dictionary may refer you back to the appropriate section for a detailed explanation.

The following are some of the terms defined in Schedule 3 Dictionary.

- 9 Meaning of *coal mine*
- 10 Meaning of *on-site activities*
- 11 Meaning of *safety and health*
- 12 Meaning of *competence*
- 13 Meaning of *consultation*
- 14 Meaning of *standard operating procedure*
- 15 Meaning of *accident*
- 16 Meaning of *serious accident*
- 17 Meaning of *high potential incident*
- 18 Meaning of *risk*
- 19 Meaning of *hazard*
- 20 Meaning of *principal hazard*
- 21 Meaning of *coal mine operator*
- 22 Meaning of *geographically separated*
- 23 Meaning of *physical overlapping of coal mining operations*
- 24 When is a coal mine operator not in control
- 25 Meaning of *site senior executive*
- 26 Meaning of *supervisor*
- 27 Meaning of *industry safety and health representative*
- 28 Meaning of *site safety and health representative*

Coal Mining Safety and Health Act 1999 (Qld)
Coal Mining Safety and Health Regulation 2001
Competencies recognised by the Coal Mining Safety and Health Advisory Committee

Note: The competencies determined for the respective positions and operative date for the acquisition of such competencies may be amended by the Committee from time to time if amendments are deemed necessary.

No.	Act/Regulation	Position	Required competency	Required from:
1	Regulation – section 82	All coal mine workers	RIIRIS201D (previously RIIRIS201B, RIIRIS201A, MNCC1006B, MNCC1006A or MNC.C6.A)	01/01/2002
2	Act – section 56	Supervisor	RIIRIS301D (previously RIIRIS301B, RIIRIS301A, MNCG1001A or QMS1), RIIWHS301D (previously RIIOHS301A, MNCG1008A or QMS2) and RIICOM301D (previously RIICOM301B, RIICOM301A, MNCG1009A or QMS3)	30/08/2002
3	Act – section 60(2)	Underground Mine Manager	RIIRIS601D (previously RIIRIS601A, MNCG1003A), MINE7033 or GMIRM; and • First Class Mine Manager's Certificate of Competency granted under the *Coal Mining Act 1925*; or • First Class Mine Manager's Certificate of Competency granted under the *Coal Mining Safety and Health Act 1999*	06/08/2009
4	Act – section 60(9)	ERZ controller	RIIRIS402D (previously RIIRIS402A, MNCG1002B, MNCG1002A); and • Deputy's, First Class Mine Manager's or Second Class Mine Manager's Certificate of Competency granted under the *Coal Mining Act 1925*; or • Deputy's, First Class Mine Manager's or Second Class Mine Manager's Certificate of Competency granted under the *Coal Mining Safety and Health Act 1999*	01/12/2002
5	Act – section 59	Open Cut Examiner	RIIRIS402D (previously RIIRIS402A, MNCG1002B, MNCG1002A); and • Open-cut Examiner's Certificate granted under the *Coal Mining Act 1925*; or • Open Cut Examiner's Certificate of Competency granted under the *Coal Mining Safety and Health Act 1999*	01/12/2002
6	Act – section 109(2)	Industry Safety and Health Representative	RIIRIS402D (previously RIIRIS402A, MNCG1002B, MNCG1002A); and • Deputy's, First Class Mine Manager's or Second Class Mine Manager's Certificate of Competency granted under the *Coal Mining Act 1925*; or • Deputy's, First Class Mine Manager's or Second Class Mine Manager's Certificate of Competency granted under the *Coal Mining Safety and Health Act 1999*	01/12/2002
7	Act – section 93(3)	Site Safety and Health Representative	RIIRIS301D (previously RIIRIS301B, RIIRIS301A, MNCG1001A or QMS1), RIIWHS301D (previously RIIOHS301A, MNCG1008A or QMS2) and RIICOM301D (previously RIICOM301B, RIICOM301A, MNCG1009A or QMS3)	01/07/2002

3.1. Control & Management of Risk

What are requirements for managing risk?

Coal Mining Safety & Health Act 1999
Sections 29-32

The Act imposes obligations that risk must be controlled to an acceptable level through management systems.

Part 2 The control and management of risk and other basic concepts
Division 1 Control and management of risk

29 What is an acceptable level of risk
(1) For risk to a person from coal mining operations to be at an ***acceptable level***, the operations must be carried out so that the level of risk from the operations is—
(a) within acceptable limits; and
(b) as low as reasonably achievable.
(2) To decide whether risk is within acceptable limits and as low as reasonably achievable regard must be had to—
(a) the likelihood of injury or illness to a person arising out
of the risk; and
(b) the severity of the injury or illness.

30 How is an acceptable level of risk achieved
(1) To achieve an acceptable level of risk, this Act requires that management and operating systems must be put in place for each coal mine.
(2) This Act provides that the systems must incorporate risk management elements and practices appropriate for each coal mine to—
(a) identify, analyse, and assess risk; and
(b) avoid or remove unacceptable risk; and
(c) monitor levels of risk and the adverse consequences of retained residual risk; and
(d) investigate and analyse the causes of serious accidents and high potential incidents with a view to preventing their recurrence; and
(e) review the effectiveness of risk control measures, and take appropriate corrective and preventive action; and
(f) mitigate the potential adverse effects arising from residual risk.
(3) Also, the way an acceptable level of risk of injury or illness may be achieved may be prescribed under a regulation.

31 What happens if the level of risk is unacceptable

(1) If there is an unacceptable level of risk to persons at a coal mine, this Act requires that—
(a) persons be evacuated to a safe location; and
(b) action be taken to reduce the risk to an acceptable level.
(2) Action to reduce the risk to an acceptable level may include stopping the use of specified plant or substances.
(3) The action may be taken by the coal mine operator for the mine, the site senior executive for the mine, industry safety and health representatives, site safety and health representatives, coal mine workers, inspectors or inspection officers.

3.2. Workplace Health and Safety Obligations

What are persons or organisations obligations?

Coal Mining Safety & Health Act 1999
Sections 33-48

The Act imposes obligations on all persons who may affect the workplace health and safety of others by their actions or lack of action. An obligation can be defined as "a binding requirement as to action or duty". A person can have more than one set of obligations. For example a person may be a coal mine operator, contractor and supplier of plant at the same time for a single coal mine and be subject to obligations in each of the capacities.

33 Obligations for safety and health

Coal mine workers or other persons at coal mines or persons who may affect safety and health at coal mines or as a result of coal mining operations, have obligations under division 2 (***safety and health obligations***).

The following are listed as holding specific obligations under the Act.

- 40 Obligations of holders
- 41 Obligations of coal mine operators
- 42 Obligations of site senior executive for coal mine
- 43 Obligations of contractors
- 44 Obligations of designers, manufacturers, importers and suppliers of plant etc. for use at coal mines
- 45 Obligations of erectors and installers of plant
- 46 Obligations of manufacturers, importers and suppliers of substances for use at coal mines
- 47 Obligation of provider of services at coal mines

39 Obligations of persons generally

(1) A coal mine worker or other person at a coal mine or a person who may affect the safety and health of others at a coal mine or as a result of coal mining operations has the following obligations—
(a) to comply with this Act and procedures applying to the worker or person that are part of a safety and health management system for the mine;
(b) if the coal mine worker or other person has information that other persons need to know to fulfill their obligations or duties under this Act, or to protect themselves from the risk of injury or illness, to give the information to the other persons;
(c) to take any other reasonable and necessary course of action to ensure anyone is not exposed to an unacceptable level of risk.
(2) A coal mine worker or other person at a coal mine has the following additional obligations—
(a) to work or carry out the worker's or person's activities in a way that does not expose the worker or person or someone else to an unacceptable level of risk;
(b) to ensure, to the extent of the responsibilities and duties allocated to the worker or person, that the work and activities under the worker's or person's control, supervision, or leadership is conducted in a way that does not expose the worker or person or someone else to an unacceptable level of risk;
(c) to the extent of the worker's or person's involvement, to participate in and conform to the risk management practices of the mine;
(d) to comply with instructions given for safety and health of persons by the coal mine operator or site senior executive for the mine or a supervisor at the mine;
(e) to work at the coal mine only if the worker or person is in a fit condition to carry out the work without affecting the safety and health of others;
(f) not to do anything wilfully or recklessly that might adversely affect the safety and health of someone else at the mine.

The obligations of site senior executive for coal mine, contractors and provider of services at coal mines are listed here below.

42 Obligations of site senior executive for coal mine

A site senior executive for a coal mine has the following obligations in relation to the safety and health of persons who may be affected by coal mining operations—
(a) to ensure the risk to persons from coal mining operations is at an acceptable level;
(b) to ensure the risk to persons from any plant or substance provided by the site senior executive for the performance of work by someone other than the site senior executive's coal mine workers is at an acceptable level;
(c) to develop and implement a safety and health management system for the mine;
(d) to develop, implement and maintain a management structure for the mine that helps ensure the safety and health of persons at the mine;
(e) to train coal mine workers so that they are competent to perform their duties;
(f) to provide for—
(i) adequate planning, organisation, leadership and control of coal mining operations; and
(ii) the carrying out of critical work at the mine that requires particular technical competencies; and
(iii) adequate supervision and control of coal mining operations on each shift at the mine; and
(iv) regular monitoring and assessment of the working environment, work procedures, equipment, and installations at the mine; and
(v) appropriate inspection of each workplace at the mine including, where necessary, pre-shift inspections.

43 Obligations of contractors

A contractor at a coal mine has an obligation to ensure, to the extent that they relate to the work undertaken by the contractor, that provisions of this Act and any applicable safety and health management system are complied with.

47 Obligation of provider of services at coal mines

A person who provides a service at a coal mine has the following obligations—
(a) to ensure the safety and health of coal mine workers or other persons is not adversely affected as a result of the service provided;
(b) to ensure the fitness for use of plant at the coal mine is not adversely affected by the service provided.

3.3. How do we meet our obligations?

Coal Mining Safety & Health Act 1999
Sections 36-38

Any person who has a workplace health and safety obligation under the Act must fulfill (that is meet, or discharge) that obligation.

a) Where there is a Regulation or Ministerial Notice

A regulation or ministerial notice prohibits exposure to a risk or prescribes a way to prevent or minimize exposure to a risk. Where a regulation or a ministerial notice exists for a specific risk or hazard then the only way an obligation can be met is by following that prohibition or prescribed way.

N.B. - Regulations or Ministerial Notices Must Be Followed

b) Where there is a Code of Practice / Recognised Standard / Guidance Note

Code of Practice / Recognised Standard / Guidance Notes state ways to manage exposure to risks in the workplace. Where they exist for the hazard, risk or industry then it should be followed, however a person may select an alternate method provided that the alternate method provides equal or better protection.

N.B. – A* Code of Practice / Recognised Standard / Guidance Note *should be followed or another way that provides equal or better control. DOING NOTHING IS NOT AN ALTERNATE!!!!!

c)Hazards where no Regulation, Recognized Standard / Guidance Note / Ministerial Notice or Code of Practice exists

If there is no regulation or recognized standard or guidance note etc about the hazard then a person may choose any appropriate way to manage exposure to the risk. However, the person can fulfill its workplace health and safety obligations only if it takes **reasonable precautions, and exercises proper diligence**.

To assist in establishing reasonable precautions and proper diligence we need to refer to Section 30 of the Act which specifies the way in which acceptable risk can be achieved. This can be summarized as managing health and safety through the **Risk Management Process**.

Therefore where there is no regulation or code of practice about the hazard then a person should manage such hazards through the **risk management process**.

38 How obligations can be discharged if no regulation or recognised standard made

(1) This section applies if there is no regulation or recognised standard prescribing or stating a way to discharge the person's safety and health obligation in relation to a risk.

(2) The person may choose an appropriate way to discharge the person's safety and health obligation in relation to the risk.

(3) However, the person discharges the person's safety and health obligation in relation to the risk only if the person takes reasonable precautions, and exercises proper diligence, to ensure the obligation is discharged.

Failure to meet obligations

Coal Mining Safety & Health Act 1999
Section 34

34 Discharge of obligations

A person on whom a safety and health obligation is imposed must discharge the obligation.
Maximum penalty -
(a) if the contravention caused multiple deaths—2000 penalty units or 3 years imprisonment; or
(b) if the contravention caused death or grievous bodily harm—1000 penalty units or 2 years imprisonment; or
(c) if the contravention caused bodily harm—750 penalty units or 1 year's imprisonment; or
(d) if the contravention involved exposure to a substance that is likely to cause death or grievous bodily harm—750 penalty units or 1 year's imprisonment; or
(e) otherwise—500 penalty units or 6 months imprisonment.

Example of a prosecution

13 February 2008

BMA Coal Operations will pay $300,000 toward coal mine safety research in Queensland, following an out of court settlement in the Industrial Magistrates Court in Brisbane on 30 January 2008.

The company also agreed to pay $236,000 to the Queensland Department of Mines and Energy for investigation and court costs.

The company had been charged with neglecting its duty of care obligations under *Queensland's Coal Mining Safety and Health Act 1999* over an incident at Goonyella Riverside mine west of Mackay on 28 July 2004.
Maximum fines under the Act were $300,000.

The charges arose after two workers were injured by a large quantity of falling mud while trying to clear a build-up of mud from under the body of a large excavator.

One man suffered a fracture to the lower lumbar area of his spine and a fracture to his right ankle while the other suffered a split spleen that had to be removed.

Under the settlement terms the department will use the $300,000 solely for safety and health research, and for safety and health projects that will benefit the Queensland coal mining industry. The Department has total discretion in identifying the appropriate research projects.

The site senior executive of Goonyella Riverside mine XXXXXX will meet the Department's Safety and Health Division to explain improvements made in operating procedures at the mine and any additional improvements which were identified in the Mines Inspectorate's safety investigation report.

Queensland Department of Mines and Energy
Mining Exploration and Development Division
MinesInquiries@dme.qld.gov.au

Miner run over underground

ADRIAN Morrissey was a 40-year veteran miner who lost his career when he accidentally ran over a co-worker in the underground Bundoora Mine near Middlemount.

Morrissey, pictured right, worked at the Anglo Coal-owned mine as an explosive risk zone controller and was a contractor with Mastermyne. He was operating a 32-tonne shuttle car on November 8, 2009 when he ran over 51-year-old Ian Girle who suffered horrific injuries.

The accident had remarkable similarities to the accident that killed Andergrove miner Jason Blee in 2007.

Morrissey, 61, pleaded guilty in the Industrial Magistrates Court in Mackay yesterday to failing in his workplace, health and safety obligations by causing grievous bodily harm.

Mr Girle was working underground conveying mud from a sump to the mine surface. Morrissey was operating a shuttle car when Mr Girle approached him on foot and verbally asked him to move the shuttle car backwards. Mr Girle then walked to the back of the shuttle car and remained within a metre of the side of it. Morrissey expected Mr Girle to walk forwards and not to walk to the back and he drove backwards and ran over him. Mr Girle suffered compound fractures of his left leg and fractures to both sides of his pelvis. He lost a significant amount of skin and required a skin graft. His fractures needed a pin to be inserted in his leg. He remained in the Rockhampton Base Hospital for one month. Mr Girle still requires painkillers and faces further surgery and is restricted to administration duties.

Solicitor Patrick Heilmeier, of S.R. Wallace and Wallace, said as a result of the accident Morrissey had lost his job and his underground deputy's licence. There was no intentional disregard of the safety procedures by Morrissey who was trying not to drive over an 11,000 volt cable which could have had serious consequences if it was broken.
Morrissey worked in mines for 40 years, held numerous licences and tickets, and was highly regarded. He had extensive community service with schools, sports clubs and services to the elderly, Mr Heilmeier said.

The prosecution asked for a fine in the $10,000 to $15,000 range, but Mr Heilmeier said Morrissey did not have the capacity to pay a large fine and the defence sought a penalty in the range of $1000.

Magistrate Damien Dwyer adjourned sentencing to May 13 to allow for more submissions to be prepared on the issue of penalty.

Source: Daily Mercury Mackay
http://www.dailymercury.com.au/story/2011/04/16/miner-run-over-underground-misjudgment-badly-injur/

Townsville Bulletin

http://www.townsvillebulletin.com.au/article/2010/06/05/144165_news.html

June 5th, 2010

AN underground worker at BHP Billiton's Cannington mine has been found guilty of breaching health and safety rules which resulted in the death of a fellow worker two years ago.

Niu Rabuka was working underground at the mine in January 2008 when Michael Auld, a 51-year-old man from Tin Can Bay, died after being caught between a light vehicle and a tool carrier.

The accident happened 375m underground, and BHP Billiton and mines contractor EROC were criticized at the time for not allowing government investigators to speak to witnesses or inspect the scene of the accident until 24 hours after the tragedy.

The prosecution was brought by the Department of Mines and Energy for breaching safety rules.

During the hearing over the past six months, Magistrate Brian Smith made an on-the-spot inspection of the accident site and heard detailed evidence about mining operations.

Timothy Paul Westendorf, the then training safety manager for EROC, the company contracted to the mine owners, explained the induction processes which all new employees must undertake before operating machinery without supervision.

He said he had taken part in the training of Rabuka, and when the training had been completed under the guidance of more experienced workers, he had signed a Full Competency Permit for him.

Throughout the proceedings, it was noted that Rabuka struggled with English from time to time.

Rabuka was operating a tool carrier at the time of the accident.

Yesterday, Mr. Smith found Rabuka guilty of causing Mr. Auld's death, concluding that Rabuka had shown lack of judgment and attention and he had been aware of the risks.

The magistrate accepted Rabuka's extreme remorse at the death of a work colleague, a tragedy ''you will suffer for years to come''.

Submissions from Rabuka's counsel Tui Savu, that the penalty be a fine, were rejected as not appropriate and unjust.

Mr Savu said in that case, he asked that any jail term be wholly suspended.

''The seriousness of this matter limits the options and a custodial sentence is called for,'' Mr Smith said.

Under the circumstances in this court, the maximum was two years and/or a $75,000 fine.

Mr Smith said it would be unrealistic to impose a fine, and sentenced Rabuka to eight months jail, the term wholly suspended for 15 months. He was also ordered to pay $13,437 to cover the costs of both the investigation and the court

3.4. Safety Information, Alerts & Bulletins

Serious accident and high potential incident reports

The Queensland mining and quarrying industries are required to provide the Mines Inspectorate with reports of serious accidents and high potential incidents in accordance with the mining safety legislation.
Summary statements briefly describing some of the accident and incidents are extracted from the reports and are provided to the industry as a reminder of what can go wrong.

These summary statements do not provide all the facts about the incidents and do not indicate blame on any person or company They are provided in good faith to help improve safety and health in our industries. Summary statements from September 2004 are available.

Mines safety alerts

Mines safety alerts are single page documents that warn of accidents in which injury and/or equipment damage occurred, incidents in which no injury or equipment damage occurred but where potential existed for it to occur, and hazards or significant risks which if left untreated could result in injury to a person. An alert is developed when it is considered that the matter is of considerable urgency.

Mines significant incident reports

Mines significant incident reports are single page documents that warn of accidents in which serious injury or a fatality resulted, and incidents in which no injury occurred but where potential existed for serious injury or a fatality.

Mines safety bulletins

Mines safety bulletins are multiple page documents that discuss particular risks or hazards associated with machinery, mining methods or tasks, and repetitive incidents that require analysis of root cause. All discussions are based around the hazards and advocate and facilitate a risk management approach to problem solving.

Other Safety Information
Explosive Safety Alerts/Bulletins and Petroleum & Gas Safety Alerts may also be of benefit in addressing specific issues in the mining industry.

3.5. Recognized Standards

Section 72(1) of the *Coal Mining Safety and Health Act 1999* provides that the minister may make recognised standards and section 72(2) requires that the recognised standard be notified in the gazette.

- RS1: Underground electrical equipment and electrical installations (PDF, 392.9KB)
- RS2: Control of risk management practices (PDF, 323.6KB)
- RS3: Explosion protection of diesel engines (PDF, 298.8KB)
- RS4: Underground non-flameproof diesel vehicles (PDF, 290.1KB)
- RS5: Quality of incombustible dust, sampling and analysis of roadway dust in underground coal mines (PDF, 391.9KB)
- RS6: Inspections for underground coal mines (PDF, 470.4KB)
- RS7: Criteria for the assessment of drugs in coal mines (PDF, 189.4KB)
- RS8: Conduct of mine emergency exercises (PDF, 343.2KB)
- RS9: Monitoring of sealed areas (PDF, 157.2KB)
- RS10: Mine surveying and drafting (PDF, 265.7KB)
- RS11: Training in coal mines (PDF, 491.0KB)
- RS 12: Place change mining operations in underground coal mines (PDF, 373.3KB)
- RS 13: Tyre, wheel and rim management (PDF, 1.3MB)
- RS14: Monitoring respirable dust in coal mines (PDF, 267.4KB)
- RS 15: Underground respirable dust control (PDF, 1.9MB)

Recognised standards are not mandatory, but when followed they provide a way of meeting safety and health obligations. A person may adopt another way of managing a risk, but in the event of an incident the person may be required to show that the method adopted was at least equivalent to the method in the recognised standard.

3.6. Workplace Consultation

Consultation is at the core of any effective workplace health and safety program. This means that management works with workers to create a safe workplace. The mining legislation aims to involve various parties / stakeholders to achieve the Act objectives through the involvement of safety representatives and industry safety and health representatives.

Site Safety and Health Representatives

Coal Mining Safety & Health Act 1999
Sections 93-107

Section 99 outlines the functions of site safety and health representatives as the following:

(1) A site safety and health representative for a coal mine has the following functions—
(a) to inspect the coal mine to assess whether the level of risk to coal mine workers is at an acceptable level;
(b) to review procedures in place at the coal mine to control the risk to coal mine workers so that it is at an acceptable level;
(c) to detect unsafe practices and conditions at the coal mine and to take action to ensure the risk to coal mine workers is at an acceptable level;
(d) to investigate complaints from coal mine workers at the mine regarding safety or health.
(2) The site senior executive and supervisors at the coal mine must give reasonable help to a site safety and health representative in carrying out the representative's functions.
Maximum penalty—40 penalty units.
(3) The site senior executive or the site senior executive's representative may accompany the site safety and health representative during an inspection.
(4) A site safety and health representative who makes an inspection of the coal mine must—
(a) make a written report on the inspection; and
(b) give a copy of the report to the site senior executive; and
(c) if the inspection indicates the existence or possible existence of danger, immediately—
(i) notify the site senior executive or the responsible supervisor; and
(ii) send a copy of the report to an inspector.
(5) If a site safety and health representative believes a safety and health management system is inadequate or ineffective, the representative must inform the site senior executive.
(6) If the site safety and health representative is not satisfied the site senior executive is taking the action necessary to make the safety and health management system adequate and effective, the representative must advise an inspector.
(7) The inspector must investigate the matter and report the results of the investigation in the mine record.

The following other sections in Part 7 are also relevant for the role, powers and responsibilities of the Site Safety and Health Representatives:

Part 7 Site Safety & Health Representatives

Division 1 Purposes of part

- 92 Purposes of pt 7

Division 2 Site safety and health representatives

- 93 Election of site safety and health representatives
- 94 Further election if site safety and health representative not available
- 95 Person must be qualified to act as site safety and health representative
- 96 Ceasing to be a site safety and health representative
- 97 Removal from office by Minister
- 98 Election after removal from office

- 99 Functions of site safety and health representatives
- 100 Powers of site safety and health representative
- 101 Stopping of operations by site safety and health representatives
- 102 Effect of report
- 103 Site senior executive not to restart operations until risk at an acceptable level
- 104 Site safety and health representative not to unnecessarily impede production
- 105 Protection of site safety and health representatives performing functions
- 106 Site senior executive to tell site safety and health representatives about certain things
- 107 Site senior executive to display identity of site safety and health representatives

Industry Safety and Health Representatives

Coal Mining Safety & Health Act 1999
Sections 108-124

Section 118 outlines the functions of industry safety and health representatives as the following:

118 Functions of industry safety and health representatives

(1) An industry safety and health representative has the following functions—
(a) to inspect coal mines to assess whether the level of risk to the safety and health of coal mine workers is at an acceptable level;
(b) to review procedures in place at coal mines to control the risk to safety and health of coal mine workers so that it is at an acceptable level;
(c) to detect unsafe practices and conditions at coal mines and to take action to ensure the risk to the safety and health of coal mine workers is at an acceptable level;
(d) to participate in investigations into serious accidents and high potential incidents and other matters related to safety or health at coal mines;
(e) to investigate complaints from coal mine workers regarding safety or health at coal mines;
(f) to help in relation to initiatives to improve safety or health at coal mines.
(2) The following persons may accompany the industry safety and health representative during an inspection—
(a) the site senior executive or a person representing the site senior executive;
(b) a site safety and health representative or a person representing the site safety and health representative.

The following other sections are also relevant for the role, powers and responsibilities of the Industry Safety and Health Representatives:

Part 8 Industry safety and health representatives

Division 1 Purposes of part

- 108 Purposes of pt 8

Division 2 Industry safety and health representatives

- 109 Appointment of industry safety and health representatives
- 110 Industry safety and health representative to work full-time
- 111 Funding of industry safety and health representative
- 112 Termination of appointment
- 113 Appointment after termination
- 114 Filling of temporary vacancy
- 115 Vacancy generally
- 116 Persons not to pretend to be industry safety and health representatives if not appointed
- 117 Industry safety and health representative restricted to safety and health purposes
- 118 Functions of industry safety and health representatives
- 119 Powers of industry safety and health representatives
- 120 Industry safety and health representative not to unnecessarily impede production
- 121 Inadequate or ineffective safety and health management systems
- 122 Identity cards
- 123 Failure to return identity card
- 124 Production or display of identity card

3.7. Inspectors

Coal Mining Safety & Health Act 1999
Sections 125-181

The main role of inspectors is to monitor and enforce compliance with the Act, and where required implement the enforcement framework.

The inspector has specific powers under the Act and these are outlined below.

Each inspector is issued with an identity card containing a signature and a recent photograph, which he or she must show you before exercising any power under the Act.

128 Functions of inspectors and inspection officers

Inspectors and inspection officers have the following functions—
(a) to enforce this Act;
(b) to monitor safety and health performance at coal mines;
(c) to inspect and audit coal mines to assess whether risk to persons is at an acceptable level;
(d) to help persons to achieve the purposes of this Act by providing advice and information on how the purposes are to be achieved;
(e) to check that safety and health management systems and procedures are in place to control risk to persons affected by coal mining operations;
(f) to provide the advice and help that may be required from time to time during emergencies at coal mines that may affect the safety or health of persons;
(g) if unsafe practices or conditions at coal mines are detected, to ensure timely corrective or remedial action is being taken and, if not, require it to be taken;
(h) to investigate serious accidents and high potential incidents at coal mines;
(i) to investigate matters at coal mines that affect the successful management of risk to persons;
(j) to investigate complaints about matters relating to safety or health resulting from coal mining operations.

129 Further functions of inspectors

Inspectors have the following additional functions—
(a) to advise the chief inspector on safety and health at coal mines;
(b) to make recommendations to the chief executive about prosecutions under this Act.

The following other sections from Part 9 are also relevant for the role, powers and responsibilities of inspectors and authorised officers:

Part 9 Inspectors and other officers and directives

Division 1 Inspectors and inspection officers

125 Appointments
126 Qualifications for appointment as inspector
127 Qualifications for appointment as inspection officer
127A Appointment conditions and limit on powers
128 Functions of inspectors and inspection officers
129 Further functions of inspectors

Division 2 Authorised officers

129A Appointments
129B Qualifications for appointment as authorised officer
129C Appointment conditions and limit on functions and powers
129D Functions of authorised officers
129E Information about functions and powers

Division 3 Identity cards for inspectors, inspection officers and authorised officers

130 Identity cards
131 Failure to return identity card
132 Production or display of identity card

Division 4 Powers of inspectors, inspection officers and authorised officers

Subdivision 1 Preliminary

132A Definition for div 4

Subdivision 2 Power to enter places

133 Entry to places

Subdivision 3 Procedure for entry

134 Consent to entry
135 Application for warrant
136 Issue of warrant
137 Special warrants
138 Warrants—procedure before entry

Subdivision 4 General powers

139 General powers after entering coal mine or other places
140 Failure to help officer
141 Failure to answer questions
142 Site senior executive must help officer

Subdivision 5 Power to seize evidence

143 Seizing evidence at coal mine or other place
144 Securing things after seizure
145 Tampering with things subject to seizure
146 Powers to support seizure
147 Receipts to be given on seizure
148 Forfeiture
149 Return of things that have been seized
150 Access to things that have been seized

Subdivision 6 Power to stop and secure plant and equipment

151 Officer may stop and secure plant and equipment

Subdivision 7 Power to obtain information

152 Power to require name and address
153 Failure to give name or address
154 Power to require production of documents
155 Failure to produce document
156 Failure to certify copy of document
157 Power to require attendance of persons before an officer to answer questions

158 Failure to comply with requirement about attendance
159 Person must answer question about serious accident or high potential incident

Subdivision 8 Additional powers of chief inspector

160 Additional powers of chief inspector

Division 5 Directives by inspectors, inspection officers and industry safety and health representatives

Subdivision 1 Power to give and way of giving directives

161 Directive may be given
162 How directive is given
163 How directive is given for ss 166, 167 and 170

Subdivision 2 Matters for which directives may be given

164 Directive to ensure coal mine worker competent
165 Directive to carry out test
166 Directive to reduce risk
167 Directive to suspend operations for unacceptable level of risk
168 Directive to review safety and health management system and principal hazard management plans
169 Directive to suspend operations for ineffective safety and health management system
170 Directive to isolate site
171 Directive about separate part of the mine
172 Directive to provide independent engineering study

Subdivision 3 Recording of directives and other matters

173 Records must be kept
174 Directives

Subdivision 4 Review of directives

175 Application for review
176 Procedure for review
177 Review of directive
178 Stay of operation of directive
179 False or misleading statements
180 False or misleading documents
181 Obstructing inspectors, officers or industry safety and health representatives

3.8. Coal Mining Safety & Health Regulation 2017

The Coal Mining Safety & Health Regulation 2017 prohibit exposure to a risk or prescribes a way to prevent or minimize exposure to a risk. Where a regulation or a ministerial notice exists for a specific risk or hazard then the only way an obligation can be met is by following that prohibition or prescribed way.

The Coal Mining Safety & Health Regulation 2017 sets out the legal requirements to prevent or control certain hazards in the workplace which might cause injury or death in the workplace. It either

- prohibits exposure to a risk.
- prescribes ways of preventing or minimising exposure to a risk.
- deals with administrative matters.

If a regulation exists for specific risks at your workplace in order to meet your obligations under the Act you **must do what the regulation says** to prevent or minimise the impact of the risk.

A copy of the regulations can be accessed on the internet at www.legislation.qld.gov.au

3.9. Functions and Roles for Consultation in Health and Safety

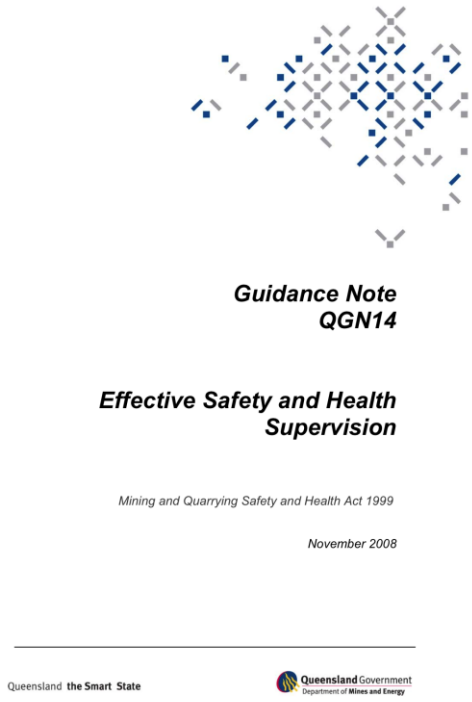
Absolute responsibility for occupational health and safety is the direct responsibility of the person who is in ultimate charge, such as the Site Senior Executive.

Just as authority is delegated from this top position down through the organisational structure to ensure that the objectives of the organisation are efficiently fulfilled (i.e. finance, personnel, purchasing, distribution, sales, production, etc) so occupational health and safety needs to be delegated and persons held accountable.

In order to carry out the task, the degree of authority delegated must equal the amount of responsibility given. The authority delegated to carry out health and safety responsibilities must operate the same way as other management functions. It begins at the top level with an approved set of written policy statements, procedures, rules and instructions that, once issued, must have some type of appraisal system to measure compliance and personal accountability.

Many organisations evaluate health and safety performance, e.g. accident prevention results, as one aspect of performance when considering possible promotion opportunities. Frequently financial loss due to accidents, injuries and damage may equal or exceed the organisation's profit for the same period. Therefore it is advisable that these losses and results be included in all relevant reports, including annual reports to shareholders.

Legislative requirements related to specific Obligations were discussed earlier.



The Role of Supervisors

Source: (Guidance Note QGN 14 Effective Safety & Health Supervision – Nov 2008)

While everyone in an organisation has part to play in the achievement of safety and health, supervisors have a specific role in the *Mining and Quarrying Safety and Health Act 1999*. The Act recognises that supervisors represent management at a worker level.

The following subsections build on this definition to provide a more comprehensive view of the role of the supervisor and their functions in the mining industry.

Who are supervisors?

- are the 'lens' through which the workplace views the greater organisation
- personify what the organisation is about
- are critical to the success of the organisation
- are the members of the management team who are closest to the workforce
- include company supervisors and contractor supervisors
- are individuals who make work more efficient, and
- are a resource and support for workers and contractors.

What do Supervisors do?

1. perform direct and indirect supervision
2. supervise activities at an appropriate level based on the risk of the task
3. problem solve and make decisions
4. manage time and control hours of work
5. implement direction from senior management
6. manage people
7. monitor, control and are accountable for work output and quality
8. organise people and resources
9. investigate, and report incidents
10. implement corrective actions
11. undertake risk assessments, including developing and reviewing procedures, job observations, JSAs, SWIs, etc.
12. perform planned job or behaviour observations
13. plan
14. manage performance
15. communicate, mentor, coach, train and assess workers, or arrange training
16. perform administrative functions, manage human resources and complete documentation, including
    a. shift handovers
    b. safety meetings, including toolbox talks
    c. plan and authorise leave, including sick leave, recreational leave, etc
    d. incident reviews and reports
    e. performance review paperwork
    f. supply ordering and receiving, and
    g. general communication, including e-mail, updates, etc.

7 MAP FOR IMPLEMENTING EFFECTIVE SAFETY AND HEALTH SUPERVISION

Everyone in an organisation has part to play in the achievement of safety and health. Figure 2 below is a possible map for achieving this outcome.

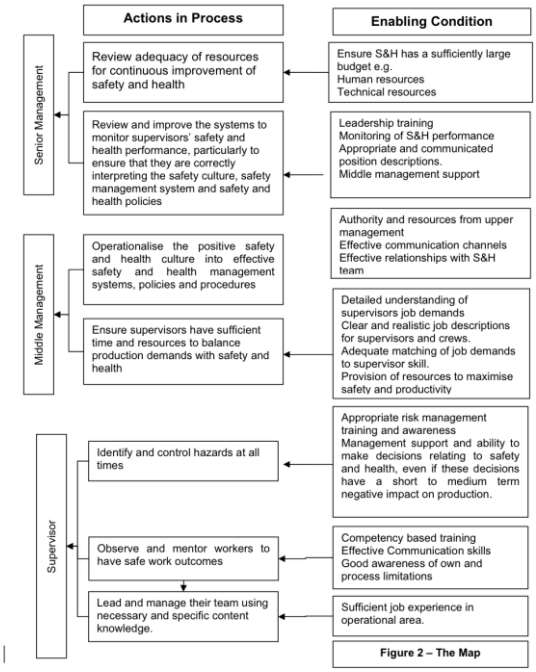


Figure 2 – The Map

Page 12

The competent and effective supervisor

The competent and effective supervisor is able to:

- communicate clearly
- motivate and lead
- delegate, plan and organise
- empower
- develop teamwork
- work cooperatively
- train, coach and mentor
- solve problems
- manage information
- understand the crew, including their strengths and limitations, and
- manage oneself

Most of these could be addressed in current competency training and ongoing professional development

Furthermore, the competent and effective supervisor:

- is focused
- has the stamina and strength to do the job
- understands the organisation and its goals
- has role confidence
- understands the work they supervise
- is fair, predictable and consistent
- balances the competing demands of safety versus production, and
- has presence.

Although these are the qualities of an 'ideal' supervisor, it's important to remember that:

It's not about being perfect, being excellent, being great, being good or bad, or right or wrong... IT'S ABOUT BEING EFFECTIVE!

4. Risk Management

Hazards surround us in every aspect of our lives. There are hazards in the air we breathe, 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.

This risk management process is an integral part of managing any business. It is a logical and systematic approach to minimising losses and maximising opportunities. The key to risk management is to identify the hazards, analyse the risks and evaluate whether the risk is acceptable or unacceptable. Control options then need to be developed, evaluated and implemented to treat the risk.

Communication and consultation should be conducted throughout the risk management process. The success or failure of risk management strategies rests on the effectiveness of this communication and consultation.

The effectiveness of risk control measures often comes down to the commitment of individuals to the risk management process. Therefore it is essential that these people have ownership of the risk management process, and can see the benefits to themselves and the organisation of effectively managing risk.

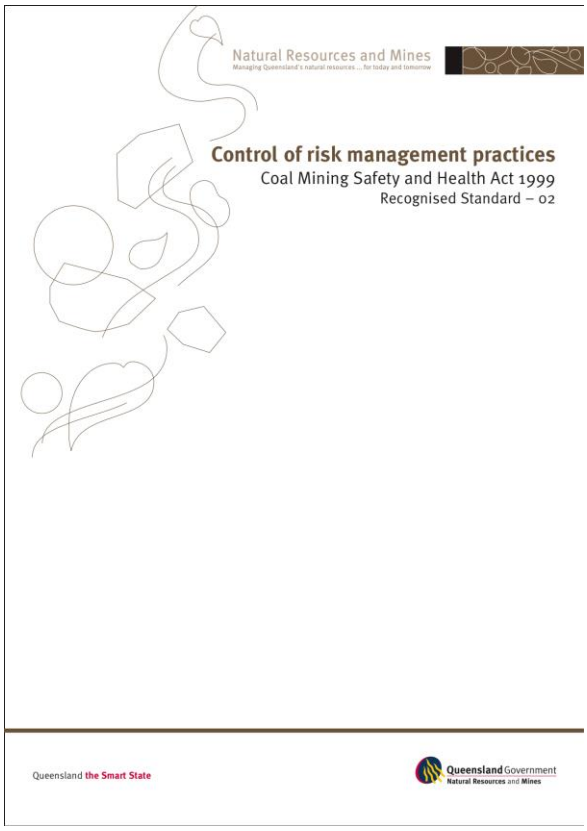
Before we move on, we should consider some key terms that are identified in the Australian Standard for Risk Management (Standards Australia, 1999, *Risk Management*).

4.1. Key Definitions

- **Risk** is the chance of something happening that will have an impact upon objects. It is measured in terms of consequences and likelihood.
- **Hazard** is a source of potential harm or a situation with a potential to cause loss.
- **Consequence** is the outcome of an event or situation expressed qualitatively or quantitatively, being a loss, injury, disadvantage or gain.
- **Likelihood** is used as a qualitative description of probability and frequency.
- **Frequency** is a measure of likelihood expressed as the number of occurrences of an event in a given time.
- **Probability** is the likelihood of a specific outcome, measured by the ratio of specific outcomes to the total number of possible outcomes. Probability is expressed as a number between 0 and 1, with 0 indicating an impossible outcome and 1 indicating an outcome is certain.
- **Risk Acceptance** is an informed decision to accept the likelihood and the consequences of a particular risk.
- **Risk Analysis** is a systematic use of available information to determine how often specified events may occur and the magnitude of their likely consequences.
- **Risk Avoidance** is an informed decision not to become involved in a risk situation.
- **Risk Control** is that part of risk management which involves the provision of policies, standards and procedures to eliminate, avoid or minimise adverse risks facing an enterprise.
- **Risk Identification** is the process of determining what can happen, why and how.
- **Risk Management** is the systematic application of management policies, procedures and practices to the tasks of identifying, analysing, assessing, treating and monitoring risk.

4.2. Risk Management and Workplace Health and Safety

In Queensland Coal and Metalliferous Mining Operations, workplace health and safety is legislated through the **Coal Mining Safety & Health Act 1999 and Regulation 2017 or the Mining & Quarrying Safety and Health Act 1999 or Regulation 2017**. Section 30 of the Coal Mining Safety & Health Act 1999 specifies a risk management approach as a way in which exposure to risks can be managed. A Recognised Standard 02 has been released by the Department for the Control of Risk Management Practices.



Part 2 The control and management of risk and other basic concepts

Division 1 Control and management of risk

30 How is an acceptable level of risk achieved
(1) To achieve an acceptable level of risk, this Act requires that management and operating systems must be put in place for each coal mine.
(2) This Act provides that the systems must incorporate risk management elements and practices appropriate for each coal mine to—
(a) identify, analyse, and assess risk; and
(b) avoid or remove unacceptable risk; and
(c) monitor levels of risk and the adverse consequences of retained residual risk; and
(d) investigate and analyse the causes of serious accidents and high potential incidents with a view to preventing their recurrence; and
(e) review the effectiveness of risk control measures, and take appropriate corrective and preventive action; and
(f) mitigate the potential adverse effects arising from residual risk.
(3) Also, the way an acceptable level of risk of injury or illness may be achieved may be prescribed under a regulation.

However the Act and associated Regulations specify ways in which particular health and safety issues must be managed. These requirements must be followed regardless of the application of a risk management approach.

If there is no regulation, ministerial notice, code of practice about the hazard then the organisation may choose any appropriate way to manage exposure to the risk. However, the organisation can fulfil its workplace health and safety obligations only if it takes reasonable precautions, and exercises proper diligence. This may be achieved through the risk management process.

Risk Management is the systematic application of management policies, procedures and practices to the tasks of identifying, analysing, assessing, treating and monitoring. The previous Risk Management Standard AS/NZS 4360:2004 has now been superseded by AS/NZS ISO 31000:2009, Risk management - Principles and guidelines. In the past, there have been incidents where it has been shown that little was done in managing risks and as a result, people have died and damage has been extreme.

4.3. Process of Risk Management

The Australian/New Zealand Standard for Risk Management AS/NZS ISO 31000:2009, Risk management - Principles and guidelines was developed to provide a generic framework for all organisations.

Risk Management can be used as a process to address risk in an organisation in a systematic way, so that the organisation may be better informed about the potential impact that their decisions may have on operations. Within this competency, our focus will be on the risk that mining activities can have on the health and safety of individuals.

The process covers:

- *hazard identification*
- *risk assessment which separates low, moderate and high risks*
- *eliminating or controlling risks, which is referred to as risk treatment, and*
- *Monitoring and reviewing the whole process and recommendations to ensure remedial actions are completed.*

The process concentrates initially on the highest risks to people, i.e. those risks that are more likely to cause serious injury or death. It also focuses on equipment damage and other risks that are likely to cause harm or interrupt production.

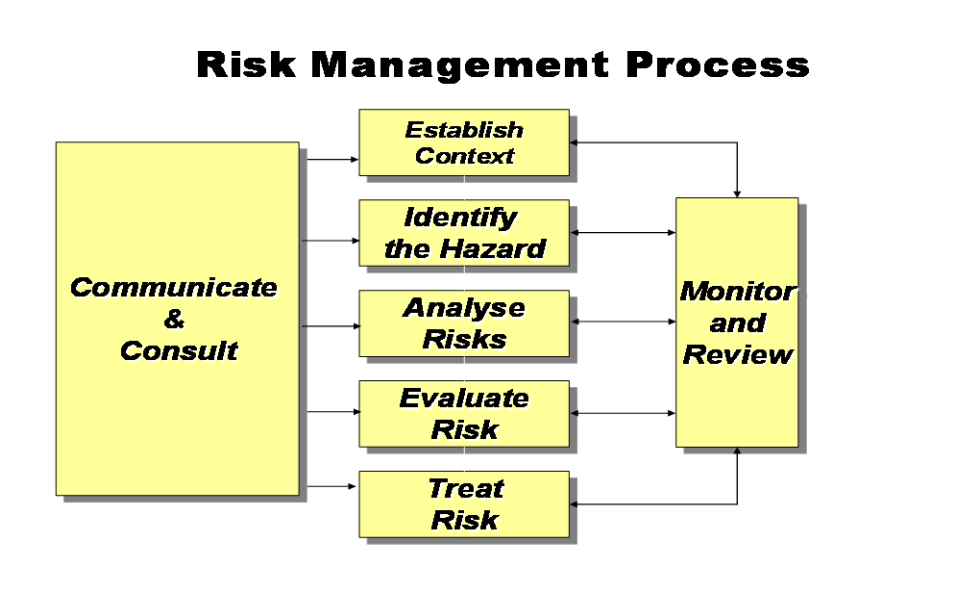


Figure: The procedure of risk management

The process consists of:

1. *Establishing the context* within which the work and the risks lie.
2. *Identifying the hazard/s* which involves asking and answering the 2 questions, "What can happen?" and "How/Why might it happen?" It is important that all steps within a task or project are defined and examined to determine associated risks. This can be achieved through a number of processes, e.g. task analysis.
3. *Analysing the risks,* which culminates in producing a "level of risk". This is achieved by determining the likelihood of incidents occurring and the consequences if the incidents do occur.
4. *Evaluating the risks* includes prioritising risks and determining whether particular risks are acceptable or unacceptable. As it is impossible to eliminate risks completely without eliminating tasks, we need to "live" with those that are acceptable, as long as some controls are in place.
5. *Treating the risks*. There are a number of strategies that can be employed to treat risks, e.g. Risk avoidance, risk reduction, risk transference and risk acceptance and retention. We will look at ways to reduce or control risks, which can result in injury and/or damage, by taking appropriate actions.

4.4 Safety Management Systems and Risk Management

In order to meet their obligations under the respective jurisdiction workplaces will are often required to demonstrate how they intend to manage the risks of the hazards they encounter in their workplaces. Often organizations develop Safety & Health Management Systems. For example the Qld Coal Mining Legislation defines such a system as:

> ***62 Safety and health management system***
> ***(1)*** *A safety and health management system for a coal mine is a system that incorporates risk management elements and practices that ensure safety and health of persons who may be affected by coal mining operations.*
>
> *Source: Queensland Coal Mining Safety and Health Act, 1999*

A Safety Management System (SMS) is defined in the Australian Standard for SMS as the:

> *"overall management system which includes organisational structure, planning activities, responsibilities, practices, procedures, processes and resources for developing, implementing achieving and reviewing and maintaining the OHS policy, and so managing the risks associated with the business of the organisation".*
>
> Source: *AS/NZS 4804 Occupational Health and Safety Management Systems*

Examples of elements that should constitute a SMS under the Coal Mining Legislation for example include:

a) *A comprehensive Risk and Hazard Identification and Assessment Program, complying to a recognised standard that will accurately identify all hazards which may impact on the health and safety of any person at the workplace.*
b) *Hazard and Risk Control Measures, including but not limited to Standard Operating Procedures and Work Instructions to control the identified risks*
c) *Principal Hazard Management Plans*
d) *Programs to implement the Hazard and Risk Control Measures.*
e) *Programs for the provision of First Aid, including first aid supplies and adequate coverage by current First Aid certificate holders.*
f) *Programs for the management of accidents, incidents and hazards.*
g) *Programs for the reporting and investigation of accidents, incidents and hazards.*
h) *Programs for the handling of emergencies.*
i) *Programs for the conduct of Emergency Exercises*
j) *Programs for the communication and dissemination of relevant health and safety information, data and material.*
k) *Programs and schemes for the recording, reporting and storage of relevant health and safety information, data and material.*
l) *Programs to identify training needs, and implement and maintain training programs and training records.*
m) *Programs for the audit, review and continuous improvement of the Safety Management System including correct and preventative measures.*

As a Site Safety Supervisor, your role can include the evaluation of your workplaces' planning, implementation and monitoring of some of these elements, especially in the utilisation of a risk management approach. It is not within the scope of this competency to train you in how to make an evaluation of SMS, but that is something that may be developed with further training and experience.

The Department has released a Guidance Note QGN 09 outlining the process to 'Reviewing the Effectiveness of Safety & Health Management Systems'.

Guidance Note QGN09

Reviewing the Effectiveness of Safety and Health Management Systems

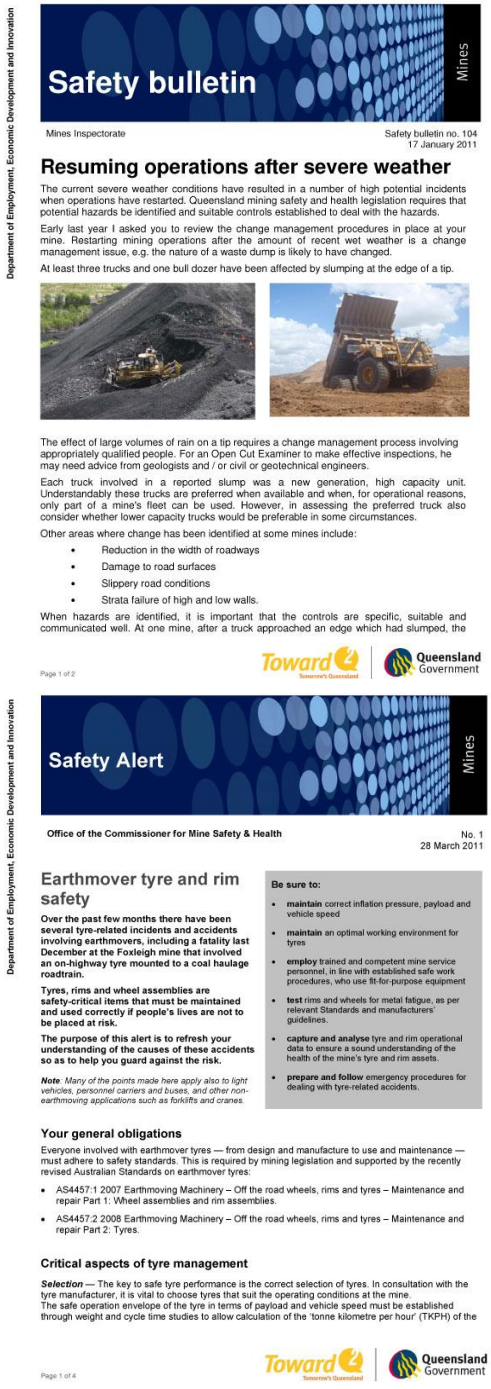
Coal Mining Safety and Health Act 1999
Mining and Quarrying Safety and Health Act 1999

October 2008, Version 2

Queensland the Smart State

Queensland Government Department of Mines and Energy

The Department also regularly releases Safety Bulletins and Safety Alerts about issues, incidents, situations in the industry as a way of assisting the industry with its OH&S obligations. These documents often outline the event, findings, and recommendations.



Department of Employment, Economic Development and Innovation

Safety bulletin

Mines

Mines Inspectorate

Safety bulletin no. 104
17 January 2011

Resuming operations after severe weather

The current severe weather conditions have resulted in a number of high potential incidents when operations have restarted. Queensland mining safety and health legislation requires that potential hazards be identified and suitable controls established to deal with the hazards.

Early last year I asked you to review the change management procedures in place at your mine. Restarting mining operations after the amount of recent wet weather is a change management issue, e.g. the nature of a waste dump is likely to have changed.

At least three trucks and one bull dozer have been affected by slumping at the edge of a tip.

The effect of large volumes of rain on a tip requires a change management process involving appropriately qualified people. For an Open Cut Examiner to make effective inspections, he may need advice from geologists and / or civil or geotechnical engineers.

Each truck involved in a reported slump was a new generation, high capacity unit. Understandably these trucks are preferred when available and when, for operational reasons, only part of a mine's fleet can be used. However, in assessing the preferred truck also consider whether lower capacity trucks would be preferable in some circumstances.

Other areas where change has been identified at some mines include:

- Reduction in the width of roadways
- Damage to road surfaces
- Slippery road conditions
- Strata failure of high and low walls.

When hazards are identified, it is important that the controls are specific, suitable and communicated well. At one mine, after a truck approached an edge which had slumped, the

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Toward Tomorrow's Queensland | Queensland Government

Department of Employment, Economic Development and Innovation

Safety Alert

Mines

Office of the Commissioner for Mine Safety & Health

No. 1
28 March 2011

Earthmover tyre and rim safety

Over the past few months there have been several tyre-related incidents and accidents involving earthmovers, including a fatality last December at the Foxleigh mine that involved an on-highway tyre mounted to a coal haulage roadtrain.

Tyres, rims and wheel assemblies are safety-critical items that must be maintained and used correctly if people's lives are not to be placed at risk.

The purpose of this alert is to refresh your understanding of the causes of these accidents so as to help you guard against the risk.

***Note**: Many of the points made here apply also to light vehicles, personnel carriers and buses, and other non-earthmoving applications such as forklifts and cranes.*

Be sure to:

- **maintain** correct inflation pressure, payload and vehicle speed
- **maintain** an optimal working environment for tyres
- **employ** trained and competent mine service personnel, in line with established safe work procedures, who use fit-for-purpose equipment
- **test** rims and wheels for metal fatigue, as per relevant Standards and manufacturers' guidelines.
- **capture and analyse** tyre and rim operational data to ensure a sound understanding of the health of the mine's tyre and rim assets.
- **prepare and follow** emergency procedures for dealing with tyre-related accidents.

Your general obligations

Everyone involved with earthmover tyres — from design and manufacture to use and maintenance — must adhere to safety standards. This is required by mining legislation and supported by the recently revised Australian Standards on earthmover tyres:

- AS4457:1 2007 Earthmoving Machinery – Off the road wheels, rims and tyres – Maintenance and repair Part 1: Wheel assemblies and rim assemblies.
- AS4457:2 2008 Earthmoving Machinery – Off the road wheels, rims and tyres – Maintenance and repair Part 2: Tyres.

Critical aspects of tyre management

Selection — The key to safe tyre performance is the correct selection of tyres. In consultation with the tyre manufacturer, it is vital to choose tyres that suit the operating conditions at the mine. The safe operation envelope of the tyre in terms of payload and vehicle speed must be established through weight and cycle time studies to allow calculation of the 'tonne kilometre per hour' (TKPH) of the

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4.5 Five Step Process of Risk Management

The civil WHS legislation (WHS Act & WHS Regulation 2011) requires persons who conduct a business or undertaking (PCBUs) to manage all work health and safety risks, so that the health and safety of workers and other people are not affected by an organisation's conduct. NOTE: In Queensland the WHS Act does not apply to Coal or Metalliferous Mines.

Hazard: A hazard is a situation that has the potential to harm a person.
Risk: A risk is the possibility that the harm (i.e. death, an injury or an illness) might occur when exposed to a hazard.

For example, a worker is using a petrol-operated pump in a confined space, such as a well. In this situation, carbon monoxide is a hazard. The associated risk is the likelihood that the worker might suffer carbon monoxide poisoning while working in the confined space because of the operating pump.

The definition of risk and hazard are reasonably consistent within various Australian jurisdictions. For example the Coal Mining Health & Safety Act QLD *1999 defines hazard and risk as follows:*

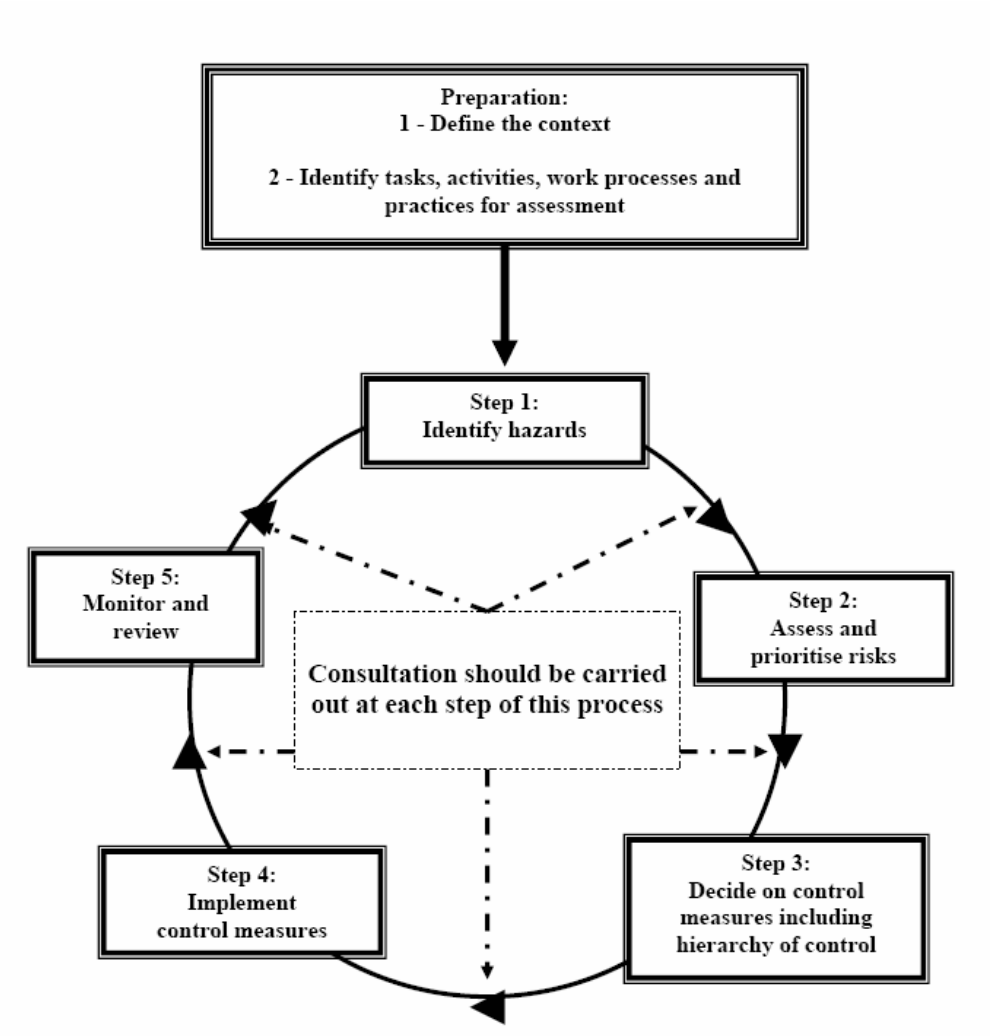
18 Meaning of risk
(1) ***Risk means the risk of injury or illness to a person arising out*** *of a hazard.*
(2) Risk is measured in terms of consequences and likelihood.

19 Meaning of hazard
A ***hazard is a thing or a situation with potential to cause injury*** *or illness to a person.*

20 Meaning of principal hazard
A ***principal hazard at a coal mine is a hazard at the coal mine*** *with the potential to cause multiple fatalities.*

We carry out assessments of workplaces to find hazards and to enable us to appreciate the risks that are present and take corrective action **before** incidents occur. This can be done using a number of techniques such as inspections, audits, task or situation analysis, brainstorming in work groups, fault tree analysis, HAZOP studies, or a number of other recognised techniques i.e. Take 5 worker reviews.

The five (5) step process for managing risks



4.5.1. Identify hazards

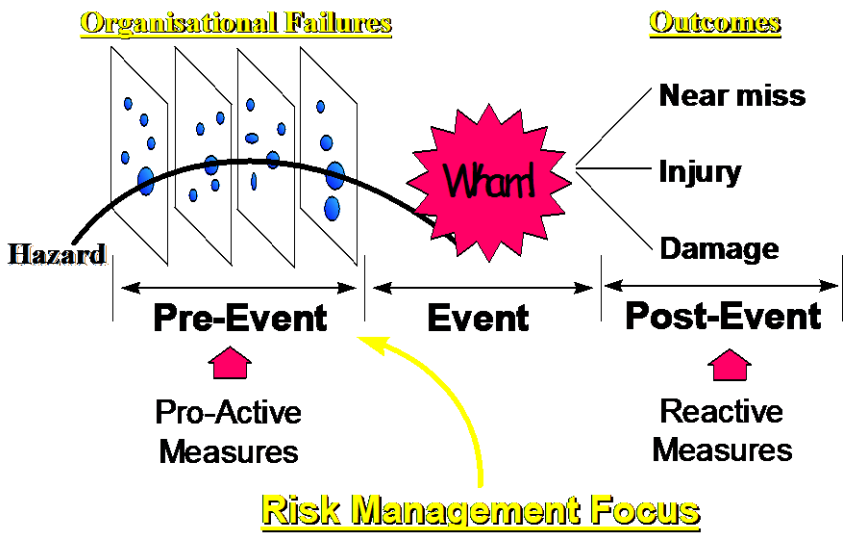
Some hazards may be more obvious than others because they are common and well known in a particular industry. Others may be more difficult to identify. It is important to work closely with workers and look at every task in the workplace to help identify all potential hazards. Workplace records on incidents, near misses, health monitoring and the results of inspections can also help identify hazards. If someone has been injured during a particular task, then a hazard exists that could hurt someone else. Workplace incidents need to be investigated to identify any hazards involved and to control the corresponding risks. Identifying hazards means looking at our workplace and the tasks that we complete, and identifying those things that have the potential to cause harm. Hazards are not always obvious.

Remember that when conducting inspections or entering the workplace any safety rules of procedures must be complied with.

There are a number of ways to actually identify the hazards in a workplace. These include:

- **Inspection and Observation** -walking through an area or location and observing tasks as they are conducted.
- **Consultation** – consulting with workers, WH&S representatives, WH&S Committees.
- **Job Safety Analysis** - considering how tasks are conducted, what could go wrong and considering how equipment or tools could fail;
- **Audits** - independent evaluation (e.g. safety audit, analysis of noise or dust exposure);
- **Workplace monitoring** – testing of plant, equipment and work environment for health hazards, including noise and airborne contaminants. Examples of monitoring equipment includes noise meter, light meter, dragger pump and gas monitor
- **Past Incidents** - reviewing previous reports of accidents and near misses;
- **Safety Data Sheets (SDS)** - A Safety Data Sheet (SDS) formerly known as a *Material safety Data Sheet or MSDS* prior to 2011 is a document that contains information on the potential health effects of exposure and how to work safely with the hazardous substances
- **External Sources** - reviewing information available from industry groups, health and safety publications, manufacturers or suppliers of equipment, chemicals, etc.

The figure below shows the pre-event, event and post-event stages of an incident. The barriers in the pre-event stage represent elements of the risk management systems such as formal risk assessments, task analysis, JSA's and training. They may also be mechanical such as guards on machines.



If there are gaps or holes in the system (organisational failures), hazards can 'track' through them, with the associated risks being recognised resulting in injury, damage or if lucky, a near miss. After the incident has occurred, an incident investigation takes place. This is referred to as incident management.

Risk management is focused on the pre-event stage, although information gained from thorough incident investigations is important when assessing risks. With diligent application of hazard identification and risk assessment, the gaps in the system can be eliminated.

Often, risk management is carried out when a project is near completion or is completed. This is poor management practice because it exposes people and equipment to the unforeseen risks. However, a carefully planned risk management strategy will enable us to define previously undetected risks.

Risk management should be practiced from the concept or big picture stage and continued through the process to the every day practices such as work procedures. It should be included in:

* *New projects*
* *Modifications*
* *Existing operations*
* *Following incident investigations*
* *During job or task analysis*

Hazard identification is an important part of the Risk Management process that can be easily overlooked when wanting to 'fix' a problem. Many techniques and considerations should be made before a risk value can be placed on a hazard, so that the true extent of the issue can be recognised. Hazards are best identified by a variety of techniques, in a variety of contexts, by a variety of people – continuously. These may include:

- Consultation with workplace / site workers
- Conducting Take 5 reports
- Incident and hazard reports
- Inspections
- Performing Safety Interactions with the workers by the Supervisor
- Audits
- Accident Reports
- Workers' Compensation claims
- Supplier/Manufacturer/Importer information
- Specialist consultation

These techniques can apply to risk management activities such as:

- Hazard reporting
- Incident reporting
- Auditing
- Job Safety Analysis

- Scoping Risk Assessments for new equipment, processes or merely to review existing activities.
- Purchasing Controls
- Contractor Management

Once the hazards are recognised and are determined to require rectification, a company needs commence a documentation process. This may be quite simple where the identification occurs as part of a planned inspection or a job safety analysis. Where a singular hazard is identified during the course of daily work activities, documentation needs to occur on a hazard report form or a similar document. From here, the risk management process may be continued through with risk analysis, evaluation, control and review.

Remember the model presented earlier of the Risk Management Approach? The term “Communicate and Consult” was highlighted on the left hand side of the model. It is highly recommended that from this point forward in any risk management activity, you always communicate and consult with others to ensure that you have not ‘missed’ anything. It is essentially a ‘2 heads is better than 1’ philosophy!

The initial part of risk management considers informal hazard identification and risk assessment. This is used every day on all tasks to ensure we understand every day hazards and risks. It is simply a quick way of determining if a task is safe by asking a series of questions prior to commencing any task.

4.5.2. Assess the risk

A risk assessment can help determine:

- the severity of a risk
- whether any existing control measures are effective
- what actions should be taken to control the risk
- how urgently those actions should be completed.

A risk assessment is mandatory for certain high risk activities such as entry into confined spaces, diving work, live electrical work and high risk construction work. In other situations, some hazards and their associated risks are well known and have well established and accepted control measures. In these situations, the second step of formally assessing the risk is not required. If after identifying the hazard, you already know the risk and how to control it effectively, you may simply implement the control. However, a risk assessment should be done when:

- there is uncertainty about how the hazard may result in an injury or illness
- the work activity involves a number of different hazards and there is a lack of understanding about how the hazards may interact with each other to produce new or greater risks
- there are changes at the workplace that may impact on the effectiveness of control measure.

Risk assessment is the process of assessing the level of risk associated with each identified hazard. Risk is the likelihood that death, injury or illness might result from exposure to the hazard. The objective of risk assessment is to provide a structured and systematic method for determining the level of the risk. From this point, risks can be prioritised and evaluated to determine whether they are acceptable or not.

The level of a risk is determined by the magnitude of the consequences and the likelihood. If the consequences of the incident are high and the likelihood of the incident occurring is high, then the risk is high. Risk analysis involves determining the consequences of the incident, the likelihood of the incident occurring and combining these two factors in a systematic way to determine the level of risk.

Once we have determined what the hazards are and identified the associated risks, we need to analyse those risks to determine their level, i.e. whether they are low, medium or high risks.

Risk comprises 2 elements, **Consequence** and **Likelihood**.

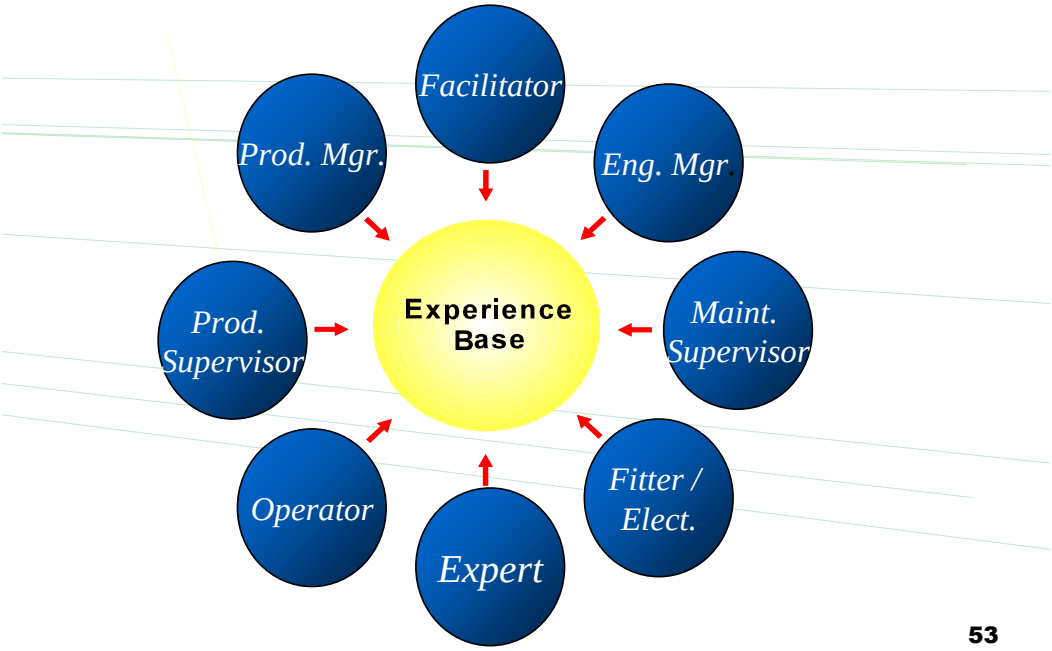
Consequence *is the resultant harm of the out of control energy, if it does occur.*
Likelihood *is the probability of the harm occurring and the frequency with which it will occur.*

You may find examples of where this could be addressed in current legislation as in the example below.

These terms are also found in AS4360/ISO31000 Risk Management. We can therefore conclude that the Australian Standard 'recommends' and mining legislation 'requires' us to decide on the magnitude of the risk (how big) by factoring in both the chance of it occurring (likelihood or probability) and the likely level of harm sustained form exposure (severity or consequences).

If we combine these two elements, it will give us an idea of the magnitude of the risk, after which we have reasonable information with which to define the type of management approach we will use to control it. Let's explore both consequence and likelihood in more detail with a sample "Risk Assessment Tool'.

The Team
Who will be involved with the risk assessment - all or some?



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Before we determine the level of risk let us first look at what constitutes a risk.

How to use a Risk Assessment Tool

Step 1

The first step in the process of finding the level of risk is to determine the consequences associated with the event occurring.

Step 2

Determine the likelihood of the consequences if the event occurs.

Step 3

Once we have determined the consequence and likelihood, we then calculate the risk on a risk matrix.

Where the two columns cross on this matrix is the calculated risk that will show whether the risk is high, moderate or low as per the smaller box on the bottom of the matrix.

There are many risk assessment tools in use in industry.

RISK ASSESSMENT TOOL – AS4360 Risk Management

MEASURES OF LIKLEIHOOD

LEVEL	DESCRIPTOR	DESCRIPTION
A	Almost certain	Is expected to occur in most circumstances
B	Likely	Will probably occur in most circumstances
C	Possible	Might occur at some time
D	Unlikely	Could occur at some time
E	Rare	May occur only in exceptional circumstances

MEASURES OF CONSEQUENCES/IMPACT

LEVEL	DESCRIPTOR	EXAMPLE DETAIL DESCRIPTION
1	Insignificant	No injuries, low financial loss
2	Minor	First Aid treatment, medium financial loss
3	Moderate	Medical treatment required, high financial loss
4	Major	Extensive injuries, major financial loss
5	Catastrophic	Death, huge financial loss

RISK ANALYSIS MATRIX – LEVEL OF RISK

LIKELIHOOD	CONSEQUENCES Insignificant 1	Minor 2	Moderate 3	Major 4	Catastrophic 5
A (almost certain)	H	H	E	E	E
B (likely)	M	H	H	E	E
C (possible)	L	M	H	E	E
D (unlikely)	L	L	M	H	E
E (rare)	L	L	M	H	H

LEGEND:
E: Extreme Risk: immediate action required
H: High risk; senior management attention needed
M: Moderate risk; management responsibility must be specified
L: Low risk; manage by routine procedures

Figure: Risk Assessment Tool from AS4360

When a risk value is made, you need to have consideration for the following:

- *How often the situation occurs*
- *How many people are involved/affected/exposed*
- *Skills and experience of those persons involved/affected/exposed*
- *Any special characteristics for those persons involved/affected/exposed*
- *Duration of the hazard*
- *The position of the hazard relative to other workers*
- *Distractions*
- *Quantities/concentrations/volumes of materials involved*
- *Environmental conditions*
- *Condition of equipment*
- *Effectiveness of existing controls*
- *Heights/weights/ forces and energies*

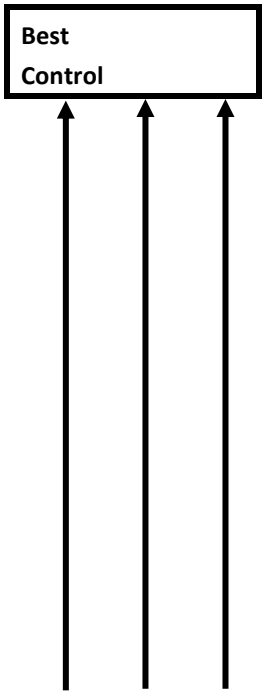
Source: *Workplace Health and Safety Risk Management Advisory Standard 2000*

Therefore, after considering these items, a risk value may be arrived at. Remember that you are less likely to miss vital information if you 'communicate and consult' along the way. For a 'risk analysis' and consequent 'risk evaluation' to be truly representative of the workplace, it must be carried out using a team approach. Your efforts, on your own may grossly underestimate or even overestimate the risk.

4.5.3. Decide on Controls

If a risk is determined to be unacceptable then the risk needs to be treated according to the prioritised lists of risks based on the level of risk assessed.

Treatment options can be identified by working through the control hierarchy. Treatment options at the top of the hierarchy are most effective in reducing the risk.



1. Remove the hazard completely

- e.g. remove risk of electrocution by using compressed air tools.

2. Substitute the hazard for one with less risk

- e.g. use water based glue rather than solvent based glue

3. Isolate the hazard

- e.g. replacing a machine with better guarding
- e.g. extraction fans to remove hazardous fumes
- e.g. Install screens or barriers around hazardous areas

4. Use an engineered control

- e.g. use a machine to lift heavy objects
- e.g. use scaffolding rather than ladders to reduce risks of falls.

5. Administrative controls

- e.g. train persons in lifting techniques or hazardous substances
- e.g. place warning signs
- e.g. rotating workers performing work in hazardous area

6. Personal Protective Equipment (PPE)

- e.g. hearing protection, eye protection, respiratory protection

Note PPE should be the last barrier to protect people when all else fails.

In most cases a number of control measures will need to be implemented to manage the risk. These measures may consist of short-term and long-term strategies. For example, in the short-term personal protective equipment and awareness training may be used to reduce the risk. Longer-term strategies might include redesign of equipment or processes, or purchase of new, less hazardous equipment or materials.

When looking at treatment options, we use the "Hierarchy of Control" method to determine the most effective means of control. This model is illustrated in figure below.

Hierarchy of Control

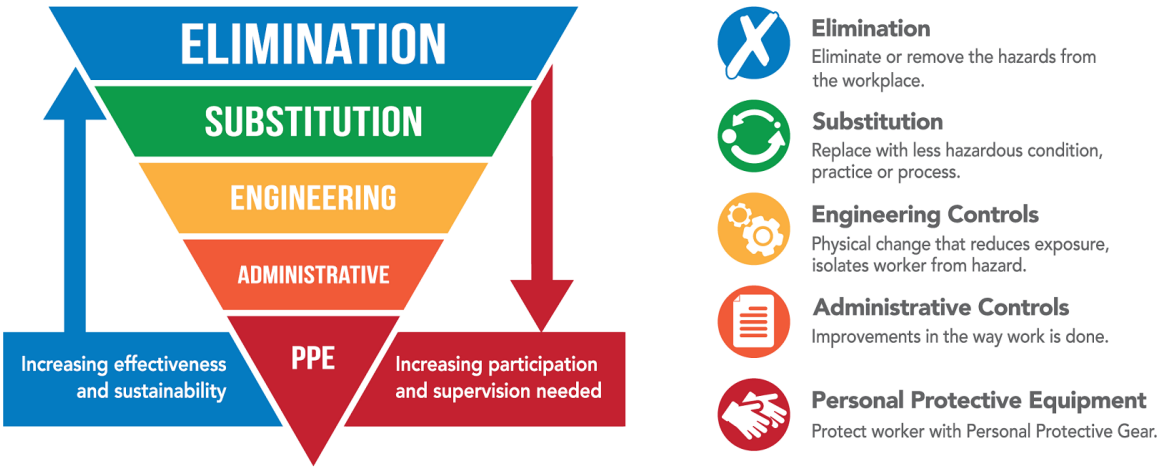


Figure 11: Hierarchy of control

A series of questions is asked starting from the most effective treatment of a risk, which is elimination, and working down the triangle to the least effective, which is personal protective equipment. These questions are:

Elimination - Is it possible to re-design the project or task to eliminate the risk?

Substitution - Is it possible to substitute materials, equipment or process with less hazardous ones?

Engineering/Isolation/Separation - Is it possible to provide physical, engineered barriers to isolate the hazard from people?

Administration/Training - Are there policies, standards and standard working procedures in place to minimise the risk?

Personal Protective Equipment (PPE) - Should PPE be used as additional protection?

4.5.4. Implement the Controls

This is the most important step in managing risks – eliminating the identified hazard so far as is reasonably practicable, or if that is not possible, minimising risks as far as reasonably practicable.

The ways of controlling risks can be ranked from the highest level of protection and reliability to the lowest. This is called the hierarchy of control.

The Civil WHS legislation requires the PCBU to work through the hierarchy of control when managing risks. This means the PCBU must always aim to eliminate the hazard, which is the most effective control.

If elimination is not reasonably practicable, the PCBU must minimise the risk so far as is reasonably practicable by doing one or more of the following:

- substituting (wholly or partly) the hazard creating the risk with something that creates a lesser risk
- isolating the hazard from any person exposed to it
- implementing engineering controls.

If a risk still remains, that remaining risk must be further minimised, so far as is reasonably practicable, by implementing administrative controls or through the use of personal protective equipment (PPE).

Administrative controls are work methods or procedures that are designed to minimise exposure to a hazard (e.g. the use of signs to warn people of a hazard). Examples of PPE include ear muffs, respirators, face masks and protective eyewear. It is important to remember that PPE limits exposure to the harmful effects of a hazard, but only if it is worn and used correctly.

Administrative controls and PPE should only be used:

- when there is no other practical control measure available (as a last resort)
- as an interim measure until a more effective way of controlling the risk can be used
- to supplement higher level control measures (as a backup).

Once a decision has been made on which control measures are the most effective, steps need to be taken to implement these control measures. Activities that might need to be conducted to ensure effective implementation include:

- ***Developing work procedures***

  Work procedures relating to the new control measures may need to be developed. Alternatively, current work procedures may need to be reviewed to ensure that they cover the process with the new control measure in place.

- ***Communicate with workers about implementation***

  Workers and other people affected by the changes should be informed of the changes and the reasons for the changes.

- ***Provide training and instruction to workers***

  Training and instruction needs relating to the changes should be identified, and training conducted.

- ***Supervise and enforce control measures***

Once the training has been completed, it is important to check that the new control measures are being implemented as required and enforce where required.

- ***Record the process***

Records of implementation of the risk management process must be kept.

- ***Set out the maintenance***

Consideration should be given to work procedures relating not only to operation, but also to the maintenance requirements of the control measures to be introduced.

- ***Consultation***

Consultation between workers, supervisors and managers will allow feedback on the implementation of the measures and any new problems which may have been introduced.

When selecting a risk treatment / control the following should be considered.

Identify treatment options - Remember the aim is to try to eliminate or reduce the likelihood and consequences that make up the risk.

Evaluate treatment options - Consider the feasibility of the treatment in terms of 'cost' and 'benefits' before recommending the 'fix'. Select the strategy for the implementation of the fix based on the "hierarchy of control" model. The size of the plan and who is involved in the decision making process depends on the level of risk and the cost of implementation of the fix.

Prepare treatment plans - Plans should be aimed at the elimination or control of the risk based on the chosen options and strategy.

Implement plan - Once the plan is implemented, there should be a reduction in the likelihood and consequences of the event occurring. Remember that it is not always possible to reduce the likelihood, but we can put controls in place to reduce the consequences. In making judgments about the effectiveness of the controls relative to the nature of each identified hazard and its consequences, other questions to ask are:

- What types of controls are provided?
- Are they of adequate technical standards and quality?
- Are there enough of them?
- Does the combination of controls follow a precedence order to match the nature of the hazard?
- Are the controls maintained in working order at all times?
- What contingencies are provided to support and are a back up to the controls?

Remember - controls such as elimination, substitution, design and isolation are stronger and more effective than human oriented controls like education, procedures and administration.

4.5.5. Reviewing risk controls

Controlling health and safety risks is an ongoing process that needs to take into account any changes which occur at the workplace. This is why procedures and risk controls must be reviewed regularly to ensure they are still effective. The Civil WHS Regulation requires a review of control measures in certain situations. A review, and if necessary, a revision is required:

- when the control measure does not control the risk it was implemented to control
- before a change at the workplace which is likely to give rise to a new or different health and safety risk that the control measure may not effectively control
- if a new hazard or risk is identified
- if the results of consultation indicate that a review is necessary
- if a health and safety representative requests a review and they reasonably believe that a circumstance referred to above affects or may affect the health and safety of a member of the work group they represent.

If problems are found, go back through the risk management steps, review the relevant information and make further decisions about risk control. Control measures for serious risks should be reviewed more frequently.

Note: The information provided by this page should be read together with the How to Manage Work Health and Safety Risks Code of Practice 2011 (PDF, 1018.6 KB). This code provides detailed information and practical examples.

The final step in the risk management process is the continual monitoring and review of risks. Areas that should be considered are:

- Have control measures been implemented as planned?
- Are the control measures being used and used correctly?
- Have the implemented control measures been effective in reducing the risk?
- Have the control measures introduced any new problems - new hazards or risks; operational, production or maintenance problems?

A regular review process should be put in place to ensure the process is still valid, and things have not changed.

Monitoring the risks, the effectiveness of the controls and the management system is an essential but often neglected component of risk management. The effectiveness of the control measures and other 'brewing' risks need to be monitored to ensure changing circumstances do not alter your priorities. Few risks ever remain the same.

By conducting an ongoing review, your management plans will remain relevant. Work factors may affect the consequences or likelihood of your risks, as may the cost or suitability of various control options. Therefore, it is necessary to repeatedly implement the risk management cycle.

The evaluation and review process can occur informally/incidentally, or it can be conducted in a formalised way with the implementation of audits and inspections. Both have their place in risk management, and both require the use of observation and feedback. Observation skills and giving constructive and timely feedback are critical to the success of this process.

The use of these activities and skills will be regulated or restricted by:

- Company expectations
- Workplace culture expectations
- Resource expectations
- Procedural expectations
- Behavioural expectations.

For example, if auditing has been used for some time in the organisation, further audits focussing on risk management are unlikely to be viewed upon with suspicion or indifference. They may be 'embraced' by the company's personnel, and personnel at all levels may be interested in hearing about the results. Observation techniques may take a variety of formats:

- Indirect sampling, for example, visual observation with no worker communication
- Direct sampling, for example, short interviews are conducted with selected personnel
- Individually conducted
- Team based observations
- Scheduled
- Unscheduled
- Continuous, for example, where an observation is required at the commencement of the implementation of a new work procedure
- Localised (i.e. by section or generalised).

Feedback is necessary in any system where work requires assessment and possible correction. Early feedback is important with any new process, both for the worker and for management who will then know whether or not the instructions and procedure are accurately received and carried out. Feedback can take many forms:

- Positive, highlighting the aspects done well
- Negative, only highlighting those performed incorrectly
- Immediate
- Delayed, where it is given some time after the event (often not proving to be timely and effective)
- Formal, for example in a report
- Informal, for example in a casual conversation
- Closed, where only a limited number of people are involved
- Carry connotations of discipline issues.

Disenchanted site workers may not be willing to assist with future review processes if they think that their assistance and opinions will not be taken seriously and appropriately actioned. Feedback to them is therefore crucial. Any of these types of feedback may have a bearing on the future success of risk management initiatives, since they are likely to ignite human behavioural responses. The responses may mirror the company's requirement, or may totally ignore it.

Consider this:
The wrong (ineffective) feedback which is also poorly timed can help to stall months of effort that has gone into developing risk management initiatives.

Therefore, a combination of the optimal observation technique for your organisation coupled with the provision of the most suitable feedback is likely to increase your chance of maintaining and /or changing human behaviour to the required performance.

The benefits of applying risk management are:

- Improved performance in key areas of Health, Safety and Environmental Damage, Asset Loss/Damage, Production disruption and Legal Liability.
- A more structured basis for planning and decision-making.
- Improved ability for identifying opportunities and grasping the benefits that flow from those opportunities.
- Identification of the key risks associated with particular activities.
- A means of demonstrating duty of care and effective Corporate Governance.
- Greater openness and transparency of decision-making.
- Improved visibility of the ongoing management process.
- Improved delivery of product or service.
- Enhanced emergency and contingency planning.
- Reduction in insurance premiums for the organisation.
- Better documentation of risks and acceptable strategies for dealing with those risks.
- Enhanced "corporate memory".
- Traveler safety.

5. Job Safety Analysis (JSA) / Workplace Risk Assessment & Control (WRAC)

Two of the most valuable and important management tools to prevent accidents and to improve health conditions are the technique known as Job Safety Analysis JSA or (JSEA/JHA/WMS) and a WRAC (Workplace Risk Assessment and Control). They aim to prevent accidents and losses by identifying and controlling potential loss producing situations. Job Safety Analysis studies a job in order to develop the safest, most efficient work method. A JSA will review job methods, reveal hazards and redesign the job process to eliminate those hazards.

The WRAC lends itself to the analysis of a problem where many variables exist, but each may be analysed separately whilst still contributing to the solution. Examples may include the analysis of newly purchased equipment, changes to the mine's ventilation or construction of a new roadway. A WRAC does not study the tasks within a job, but the elements that comprise the integration of people and machinery, materials and the environment. When your organisation has a requirement to plan a job using a risk management approach, a Job Safety Analysis is a useful tool to employ. A summary of this is presented below.

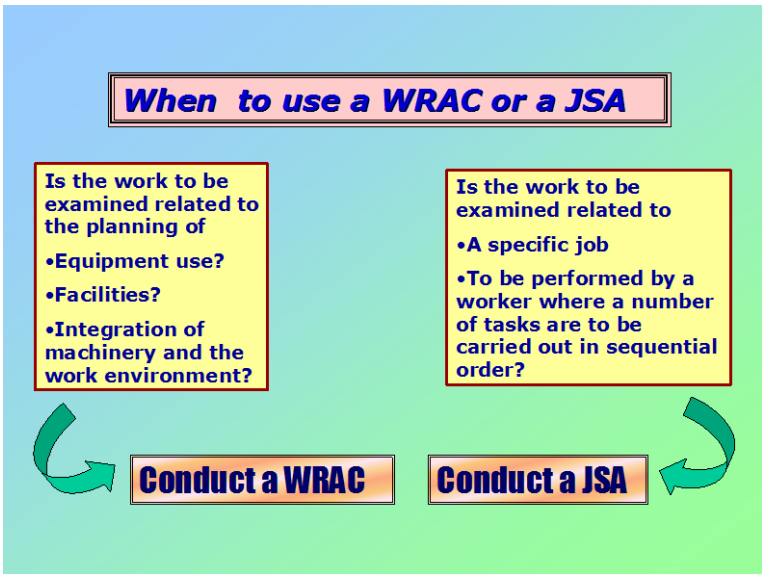


Figure: When to use a WRAC or a Job Safety Analysis

A relatively common method of presentation of the identified hazards, determined risk levels and the required controls within the mining industry is the WRAC (Workplace Risk Assessment and Control), discussed at length in the Department of Mineral Resources (NSW) publication *Risk Management Handbook for the Mining Industry MDG1010*. The method utilizes the risk management approach in presenting an overview of the problem using a risk management approach (and hence format). A 'snapshot' of a sample template is presented here below. The WRAC lends itself to the analysis of a problem where many variables exist, but each may be analysed separately whilst still contributing to the solution. Examples may include the analysis of newly purchased equipment, changes to the mine's ventilation or construction of a new roadway.

A JSA is based on the following:

- Any job or task can be separated into a series of relatively simple steps.
- Potential hazards or risks associated with each step are identified and evaluated.
- Solutions can be developed to control and eliminate these potential hazards.

Effective job training is an easy way to prevent accidents/injury, particularly in the critical jobs or tasks where there are obvious risks or where workers have been hurt. Carefully thought out training by a trained instructor can guide worker skill development in the safest way to do each job.

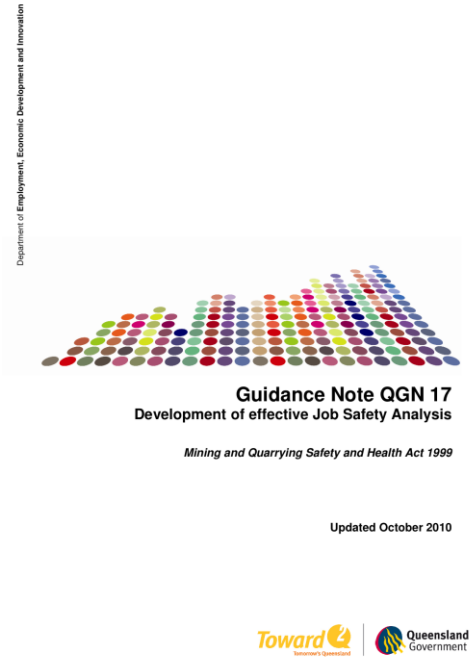
Job/tasks analysis aims to take positive steps to reduce accidents through identifying and acting on potential accident causes before accidents and injuries occur. Safe work procedures prepared from job safety analysis information become basic guides for worker skill training.

Some of the advantages of a Job Safety Analysis are:

- Development of safe work procedures for skill training.
- Safe work procedures can be used to induct new site workers to safe, efficient work procedures.
- Maintains a higher level of safety awareness, which usually results in fewer accidents.
- Use as safety standards to develop refresher training programs and retrain reassigned site workers.
- Assists supervisors maintain a high level of safety awareness during day-to-day workforce contact.
- Assists supervisors and employees to make observations to ensure safe work procedures are being followed.
- Provides uniform safety instructions and procedures for each critical job.
- Review and elimination of outmoded procedures or equipment.
- Involves the people who carry out the tasks in the development of safe work procedures.

The technique for the development of Job Safety Analysis could be summarised into the following steps:

1. Select the job or task to be analysed.
2. Separate the job into its basic steps.
3. Identify all the hazards/potential losses associated with each step.
4. Evaluate your options for hazard/loss control action.
5. Establish controls for each hazard or other potential loss area.
6. Prepare a safe work procedure.



Step 1 – Task Selection

Identify critical jobs, prepare an inventory and set priorities for analysis.

- Inform people who are involved with the process what you are doing and why.
- Encourage site workers to contribute safety improvement ideas.
- Where possible use the people who normally carry out the task.

Step 2 – Separation into Steps

Separate the selected tasks into 5-15 basic steps and record each step on a JOB. Each "Step" or activity listed should briefly describe what is being done but not how to do the operation.

- Usually use 3-4 words for each job step.
- Show the activity or verb/action work first and complete the description by naming the item that is acted upon.
- Ensure no important steps are missed, but there are no more than are actually needed to accurately describe the work. Any job can be separated into steps regardless of its complexity.

Step 3 – Hazard Identification

Examine each step to identify any hazards or other potential accident loss sources.
We include hazards associated with:

- Machine
- Tools
- Supplies
- Worker actions or lack of action
- Job Procedures
- Overall Work Environment

Use the broad questioning approach of "What would happen if?" in relation to each job step to identify potential hazards to the worker or fellow site workers.

The terms/concepts listed can be applied where relevant, to each basic step to make hazard identification easier to job/task analysis recording.

Step 4 – Evaluate Hazard Controls

Develop suitable control solutions designed to eliminate, or if this is not feasible, to adequately control these hazards.

For every known hazard associated with a job step, there must be a solution that offsets that hazard. The control hierarchy should be consulted here. This should be considered using option types in sequence from eliminating the hazard, substitution, engineering controls, administrative controls (procedures etc) and finally, PPE.

Step 5 – Establish Controls

At this stage a neat, permanent record of the job analysis must be completed. There must be a clearly defined procedure for eliminating hazards or loss potential that is exposed by analysis. The completed job analysis will clearly indicate what must now be done to eliminate or otherwise control all the identified hazards or risks. Control measures must be put into action without delay so that preparation of standard job procedures can then proceed.

Step 6 – Safe Work Procedures

A safe work procedure is prepared from:

- Steps outlined on the job analysis sheet.
- Hazards identified and not eliminated.
- Recommended personal protective equipment (include a list of equipment or other safety devices required).
- Any special safety devices recommended.

A format for a safe work procedure will be discussed shortly. Note that there is no need to include that part of a job analysis that indicated hazards that have been subsequently eliminated by the remedial action in Step 5.

A Job Safety Analysis (JSA) is a very important investigation technique and pro-active safety management tool. It is usually prepared by the people performing the task and is prepared by:

➔ Determining the critical job to be analysed.

➔ Breaking the job down into a logical sequence of steps.

➔ Determining the potential for incidents.

➔ Making an efficiency check on each job step.

➔ Developing recommended controls.

➔ Writing the analysis.

This information is then compiled into a task list, after which a JSA can be started. Considerations when identifying tasks that are added to the critical list include:

- high risk jobs associated with accident history
- jobs where site workers are exposed to excessive amounts of energy or hazardous materials
- new jobs, or those requiring the use of new or modified equipment or machinery
- jobs with the potential to cause heavy losses if a stoppage or an accident occurs.

Some examples of organizational JSA's (JSEA/JHA/SWMS) are reproduced herein of on the next few pages *(note that we do not verify correctness or accuracy of any of these though. They are shown as illustrative purposes as how industry is currently producing these documents).*

Job Safety Analysis Video

A video 'Developing an effective Job Safety Analysis' distributed at the 2010 mining conference was developed to support Queensland Guidance Note QGN 17 'Development of effective Job Safety Analysis'.

The Department has provided the video as online versions at

http://www.dme.qld.gov.au/mines/job_safety_analysis_video.cfm .

Each chapter is a separate video for ease of download and is categorized as follows:

1 Injury Prevention - It's Up To You
2 Risk Management
3 Case Study
4 Job Safety Analysis 101
5 Stop and Think
6 Job Safety Analysis Preparation
7 Job Safety Analysis Resources
8 Job Safety Analysis Team
9 Hazard Identification
10 Risk Assesment Tools
11 What is a Job Safety Analysis?

6. Standard Operating Procedures (SOP's) Standard Work Instructions (SWI's)

Over time, we learn that some ways work well and others not so well. From a safety perspective, those ways that do not work so well may have resulted in property damage, injury or death. Therefore, both from a safety and commercial point of view, it is in the best interests of the company to follow the ways that are known to work.

Those ways that work well are commonly known as operating procedures. Management initiates the development of these in order to continue running the business with best-known practice. Whether these procedures have been developed to give both the best commercial advantage and to offer the greatest degree of risk reduction to the site workers is the contentious issue that the safety professional and site workers debate with each other and with management.

Standard operating procedures (SOP) or Standard Work Instructions (SWI's) should at the very least reflect legislative requirements or an Australian Standard. Additionally, a common industry standard is likely to offer a higher degree of safety, since it comes from an industry body that has collective knowledge and expertise developed over time. For example section 10 of the *Queensland Coal Mining Safety and Health Regulations, 2017* states that:

Developing standard operating procedures

10.(1) *The site senior executive must ensure the following steps are taken in developing standard operating procedures for managing and controlling hazards at the mine—*

(a) the site senior executive must consult with a cross-section of the mine's coal mine workers involved in carrying out a task under the proposed standard operating procedure to identify the hazards associated with the task and ways of controlling the hazards;

(b) the site senior executive must prepare a draft standard operating procedure and give a copy of it to the coal mine workers with whom the site senior executive consulted;

(c) if the coal mine workers agree with the draft standard operating procedure, the site senior executive must prepare it as the final standard operating procedure;

(d) if the coal mine workers do not agree with the draft standard operating procedure—

(i) for a disagreement that is not about a legal or technical matter—the site senior executive must decide the disagreed matter and prepare the final standard operating procedure; or

(ii) for a disagreement that is about a legal or technical matter—the site senior executive must—

(A) obtain further information or advice, including, for example, from a person having the necessary qualifications and experience to give the advice or from a recognised text on the matter; and

(B) after consulting with the workers about the information or advice, prepare a further draft standard operating procedure and give a copy of it to the workers; and

(C) if the workers disagree with the further draft—decide the disagreed matter and prepare the final standard operating procedure;

(e) the site senior executive must include the final standard operating procedure in the mine's safety and health management system.

(2) *The site senior executive must ensure—*

(a) the final standard operating procedure accords with—

(i) all matters agreed, under this section, between the site senior executive and coal mine workers; and

(ii) the site senior executive's decision, under this section, on any disagreed matters; and

(b) a record is kept of the disagreed matters.

(3) *In developing the standard operating procedure, the site senior executive must—*

(a) use a risk assessment process recognised by the mining industry as an acceptable process for identifying and controlling hazards; and

(b) have regard to the methods of controlling the hazard stated in the database kept by the chief executive under section 280(1)(a)(i) of the Act.

(4) *If, at the commencement of this section, the mine has a standard operating procedure for managing and controlling a particular hazard at the mine, the procedure is taken, until 1 March 2002, to have been developed under this section.*

It is evident here that a good degree of joint consultation needs to occur in the formulation of these standards at each mine site. After these legislative requirements have been addressed in the development of the standard, each individual company is able to tailor their SOP to the company's goals and policies.

So when are SOP's needed?

Consider the diagram below.

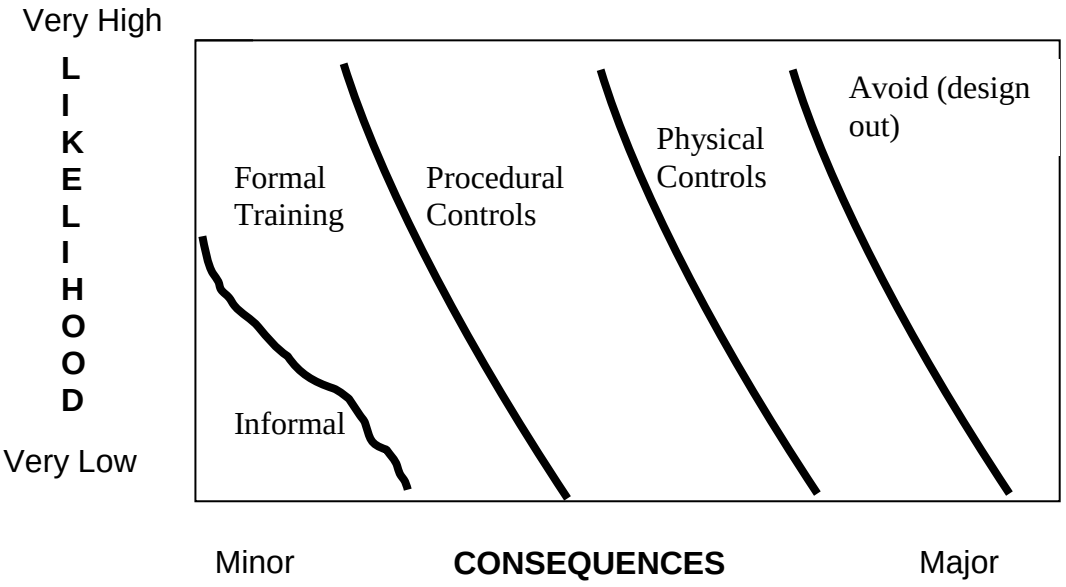


Figure: Risk criteria for control options

Source: Pybus,R., 1996, Safety Management: Strategy and Practice, Butterworth-Heinemann, Sydney.

As can be seen from this Figure, procedures are likely to be needed where engineering controls are not feasible and the work is of about a 'moderate' risk. They form an administrative control, but are not the only answer to controlling the hazard. One must still consider all the other controls in the hierarchy. How are SOP written? Remember that SOP can originate from a Job Safety Analysis. They should have the following features:

- Title
- Purpose/Objective
- Step by step description of required actions
- Assessment of the risk in each case
- Potentially hazardous actions/circumstances
- The controls employed to reduce the risks
- Review date
- References to work teams, personnel or manuals

Finally, procedures are of no use if site workers do not comply with them. In order to make them clear and easily understood, the following features are desirable.

- Justification/Motivation– Why it is necessary. Explain why the workers should comply with the standard. Relate to the workers personal welfare, and to build pride in the worker.
- Concise
- Simple language (avoid jargon or abbreviations)
- Clear distinction between mandatory and advisory
- Use pictures and graphics, rather than straight text
- Make responsibilities clear
- Identify the training requirements
- Ensure it is auditable (you can measure whether it is being complied with)
- Always ensure that 'Hard Safety Barriers' or engineering controls are in place as well as the procedure (i.e., rack out cable as well as attaching safety tag), in order to lessen the total reliability on human decision-making.

Management should have a process in place that gives approval to a SOP and estimates and measures the success of its implementation. The success of the procedure may be evaluated with a 'Task Observation'. Essentially, it will measure compliance with the standard and the practicality of the new standard to the work process and company operations.

Points to consider when choosing risk treatment controls.

Identify treatment options - Remember the aim is to try to eliminate or reduce the likelihood and consequences that make up the risk.

Evaluate treatment options - Consider the feasibility of the treatment in terms of 'cost' and 'benefits' before recommending the 'fix'. Select the strategy for the implementation of the fix based on the "hierarchy of control" model. The size of the plan and who is involved in the decision making process depends on the level of risk and the cost of implementation of the fix.

Prepare treatment plans - Plans should be aimed at the elimination or control of the risk based on the chosen options and strategy.

Implement plan - Once the plan is implemented, there should be a reduction in the likelihood and consequences of the event occurring. Remember that it is not always possible to reduce the likelihood, but we can put controls in place to reduce the consequences.

In making judgments about the effectiveness of the controls relative to the nature of each identified hazard and its consequences, other questions to ask are:

- What types of controls are provided?
- Are they of adequate technical standards and quality?
- Are there enough of them?
- Does the combination of controls follow a precedence order to match the nature of the hazard?
- Are the controls maintained in working order at all times?
- What contingencies are provided to support and are a back up to the controls?

Remember - controls such as elimination, substitution, design and isolation are stronger and more effective than human oriented controls like education, procedures and administration.

All steps in the risk management process need to be documented to:

- demonstrate the process is conducted properly.
- provide a record of risks.
- provide the relevant decision makers with a risk management plan for approval and subsequent implementation.
- provide an accountability mechanism and tool.
- facilitate continuing monitoring and review.
- provide an audit trial.
- share and communicate information.

Individual areas of the organisation are required to prepare and maintain their own hazard register and risk profile. The extent of documentation and dissemination will of course depend on the level of risk and the scope to which it applies within each part of the organisation. As with recording, reporting and decision-making, guidelines are provided by the organisation for keeping a hazard register and recording risk profiles.

This step involves providing management with full and accurate information, including alternatives, so it can make intelligent, informed decisions concerning hazard control. Such hazard alternatives will include recommendations for training and education for better methods and procedures, equipment repair or replacement, environmental controls, and in rare cases where modification is not enough, recommendations for redesign. Information must be presented to management in a way that clearly states the actions required to improve conditions. The person who reports hazard information must do so in a manner that promotes, rather than hinders, action.

After management's decision makers receive hazard reports, they normally have three alternatives:

1. They can choose to take no action.
2. They can redesign or modify the workplace and its components.
3. They can modify the work procedures.

When management chooses to modify the system, it does so with the idea its operation is generally acceptable, but with the reported deficiencies corrected, performance will be improved. Examples of modification alternatives are:

a. the acquisition of machine guards, personal protective equipment,
b. earth leakage circuit breakers to prevent electric shock,
c. a change in training or preventive practices,
d. isolating hazardous substances and processes,
e. replacing hazardous substances with less hazardous substances, and
f. purchasing new tools.

Although redesign is not a popular alternative, it sometimes is necessary. When redesign is selected, management must be aware of certain problems. Redesign usually involves substantial cash outlay and inconvenience. In this case it is vital that a hazard operability study is carried out on the new design to ensure risk is actually reduced.

One way to speed up decision-making regarding actions for hazard control is to present findings in such a manner that management can clearly understand the nature of the hazards, their location, their importance, the necessary corrective action, and the estimated cost.