MinEx Health & Safety Council

Industry Code of Practice

Surface Mining and Quarrying Industries

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1.0 Introduction

In 2004 the Industry[1] agreed to form a Council to guide the Industry in matters relating to Health and Safety. Commitments to support the Council were gained from Industry companies and in late 2005 a formal constitution was adopted and a Board elected.

The operations and management of the Council have been vested in the Board, with delegated authority to act on Council's behalf. The Board, among other things, is responsible for the development and implementation of strategy to achieve Council's objectives.

In June 2006 the Council approved a strategy to improve and promote the Health & Safety Standards and Performance of the Industry in New Zealand. A key component of this strategy was the development and publishing of an Industry Code of Practice and associated Guidelines for the Surface Mining and Quarrying sector. A project team, representative of the Industry, was appointed to complete the development of the Code of Practice and Guidelines.

Building on work previously undertaken by sector organisations and the Mines Inspectorate Group, this Industry Code of Practice and its supporting Guidelines provides a platform to assist the Industry and its individual members achieve high standard of Health and Safety performance.

This Industry Code of Practice is available on the MinEX website www.minex.org.nz

The MinEx Board wish to acknowledge the efforts of all those involved in contributing to this Code of Practice.

2.0 Purpose

A. To provide a best practice guide for the management of health and safety in a surface mining and quarrying environment. It seeks to provide a framework for the management of hazards and associated risks inherent in the sector and is designed to be supported by Guidelines specific to key hazard/risk areas.

3.0 Interpretation

For the purposes of this Code of Practice all definitions shall remain consistent with those outlined in the HSE (Mining Administration Regulations) 1996.

3.1 Competency

In many instances throughout this Code of Practice the terms "competency" and "competent" are referred to. For the purposes of this Code these terms mean:

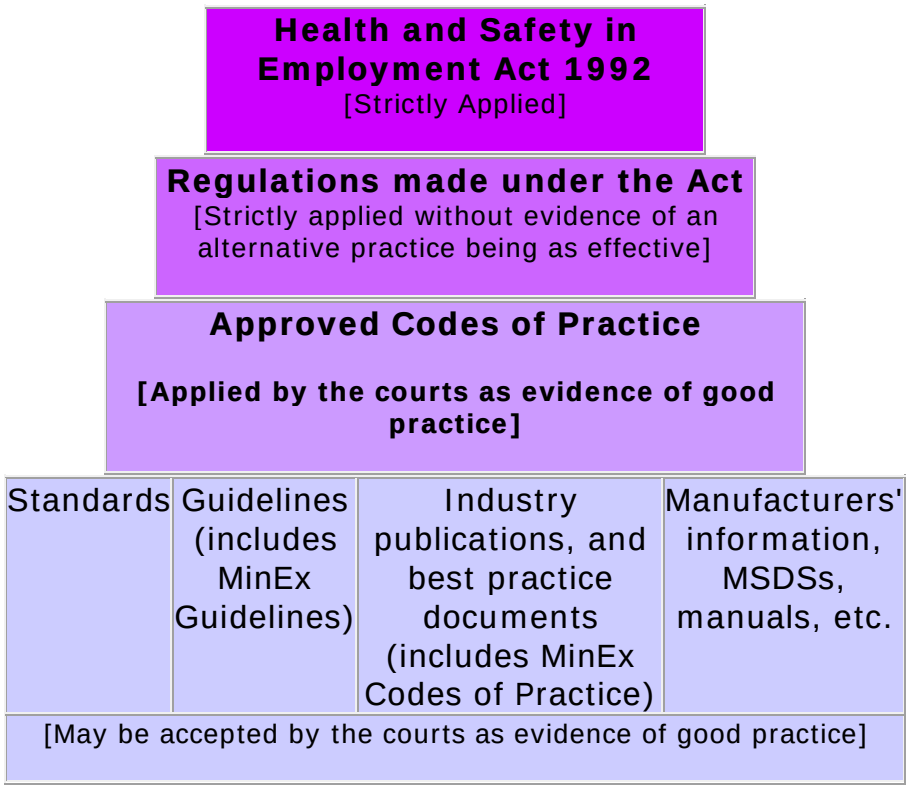
"Having the knowledge, experience, skill, and in some instances qualifications to carry out a task required under the Code of Practice or Associated Guidelines"

Note: Formal qualifications or licences are indicators of competence but are not necessarily absolute requirements for proving such. Each situation should be examined to determine if external qualifications or licences are required to operate in your work environment.

[1] "Minerals Industry" or the "Industry" means all companies involved in exploration for, and production of, any mineral including aggregate, rock, sand, gravel, metallic minerals, industrial minerals, non-metallic minerals and coal.

4.0 Context of this Code of Practice

The following provides a summary of the relationship between this Industry Code of Practice and existing legislation, regulation and associated guidelines.



5.0 Summary of the Health and Safety in Employment Act 1992

The principal objective of the Health and Safety in Employment Act 1992 is to prevent harm to employees at work. To do this it imposes duties on, and promotes excellent health and safety management by employers. It also provides for regulations and codes of practice that set the minimum standards in more detail.

The following information is a brief outline of provisions of the HSE Act. Copies of the Act and associated regulations may be purchased from any Government Print Bookshop, any Occupational Safety and Health Service branch office or accessed at http://www.legislation.govt.nz/.

5.1 Employers

A. If you are an employer then you have a general duty to take all practicable steps to ensure the safety and health of employees while at work. (This is set out in Section 6) In particular, you are required to take all practicable steps to:

   a. Provide and maintain a safe working environment
   b. Provide and maintain facilities for the safety and health of employees at work
   c. Ensure that machinery and equipment in the place of work is designed, made, set up, and maintained to be safe for employees
   d. Ensure that there are control measures in place for employees exposed to hazards in the course of their work.
   e. Develop procedures for dealing with emergencies that may arise while employees are at work
   f. Ensure that all employees are either initially trained/competent to operate plant and equipment or are clearly supervised by someone who is.
   g. Any person who is deemed unfit to work by the manager or supervisor must not be allowed to start or continue work.

5.2 Hazard Management

A. Employers must identify hazards in the place of work (previously existing, new and potential) and regularly review these to see whether these hazards have changed and are significant and require further action. Where an accident results in harm to a person, an employer must record it in a register of the prescribed form[2]. The employer must also investigate whether it was caused by a significant hazard.

B. This does not preclude responsibility on employees to participate in the hazard management process.

C. "Significant hazard" means:

   a. A hazard that is an actual or potential cause or source of: - Serious harm; or

   b. Harm (being more than trivial) the severity of whose effects on any person depend (entirely or among other things) on the extent or frequency of the person's exposure to the hazard; or

   c. Harm that does not usually occur, or usually is not easily detectable, until a significant time after exposure to the hazard.

D. Where the hazard is significant, the Act sets out the steps an employer must take.

   a. Where practicable, the hazard must be eliminated;

   b. If elimination is not practicable, the hazard must be isolated;

   c. If it is impracticable to eliminate or isolate the hazard completely, then the employer must minimise the hazard to employees. In addition, the employer must where appropriate:

      i. Ensure that protective clothing and equipment is provided, accessible and used;
      ii. Monitor employees' exposure to the hazard;
      iii. Seek the consent of employees to monitor their health; and
      iv. With informed consent, monitor employees' health
      v. Regularly review the hazard to identify any changes in status

E. Employers must establish systems for this process of identifying and managing hazards. In situations where exposure to the hazard can only be minimised, the employer must ensure the systems put in place to protect employees are used and monitored.

F. Employers need to involve employees in the development of systems and emergency procedures to be used.

5.3 All Practicable Steps

A. In relation to achieving a requirement under the Health and Safety in Employment Act and associated Regulations an employer is required to take all practicable steps to do so. "All Practicable Steps" is defined as:

B. The steps required to be taken to achieve a result taking into account

   a. The nature and severity of the harm if the result is not achieved

   b. Current state of knowledge about the likelihood of that harm occurring

   c. Current state of knowledge about the nature of that harm

   d. Current state of knowledge about the means of achieving the result

   e. The availability and cost of those means

Note: Risk Assessment is a means to achieve "all practicable steps".

A. Risk assessment is a normal part of operations. Risk assessment shall *be carried out in any instances where the provisions outlined in this Code of Practice are not practicable to meet.*

B. It is the responsibility of the employer to be able to provide documented evidence of a risk assessment undertaken to justify the decision not to follow a provision. Section 10 of this Code of Practice outlines a Risk Assessment process in more detail.

[2] Health and Safety in Employment Act (Prescribed Matters) Regulations 1993"

5.4 Information for Employees

A. Employers must *inform their employees and health and safety representatives* of:

   a. Emergency procedures;
   b. Hazards the employee may be exposed to while at work (ongoing);
   c. Hazards the employee may create while at work which could harm other people;
   d. How to minimise the likelihood of these hazards becoming a source of harm to others; and
   e. The location of safety equipment and how to use and maintain it.

B. The employer must inform employees of the results of any monitoring of health and safety exposure in the workplace. In doing so, the privacy of individual employees must be protected.

C. The employer must ensure employees are either sufficiently competent to do their work safely or supervised by an experienced and trained person. In addition, the employee must be adequately trained in the safe use of equipment in the place of work, including protective clothing and equipment.

D. An employer is also responsible for the health and safety of people who are not employees. An employer must take all practicable steps to ensure that an employee does not harm any other person while at work, including members of the public and other visitors.

5.5 Employees

A. Effective health and safety management shall involve everyone in the place of work. If you are an employee, then Section 19 of the Act requires you to take responsibility for ensuring your own health and safety while at work. It also states you must ensure that your actions or inaction don't harm anyone else. Key actions in meeting this requirement include:

   a. Complying with instructions given by an employer or manager
   b. Using and maintaining personal protective equipment provided
   c. Working in a co-operative manner with an employer in health and safety management
   d. Reporting hazards that you are unable to control individually
   e. Exercising your right to refuse unsafe work
   f. Ensuring the integrity of all health and safety related equipment

B. Section 6.2 gives more specific guidance on employee responsibilities relating to the avoidance of danger while performing work.

5.6 Persons Who Control a Place of Work

A. The Act specifies certain responsibilities for any person who controls a place of work and defines this to mean any;

   a. Owner, occupier, lessee, or person in possession of a place of work; or
   b. Owner, lessee or bailee of plant used in a place of work

B. The responsibilities of the person include taking all practicable steps to ensure that:

   a. No persons in the vicinity of the workplace, including employees, contractors, visitors, are harmed by any hazard arising in the workplace
   b. Persons are warned of any hazard that is likely to be present in the workplace

5.7 Principals/Contractors

C. The term "principal" means a person who or that engages any person (otherwise than as an employee) to do any work for gain or reward.

D. Any principal to a contract has a responsibility to ensure that any contractor, sub contractor or their employees are not harmed at the place of work. Key responsibilities include:
    a. Providing contractors with an induction, including isolation of their work area on site
    b. Informing contractors of hazards they may be exposed to on the site
    c. Ensuring contractors have methods to adequately manage their health and safety and that those methods are used.
    d. Contractors and principals must have effective systems to communicate health and safety incidents arising in the workplace.

E. Contractors must be regularly monitored by the principal to ensure they are complying with their own systems or those that the principal imposes on them.

5.8 Accident (including Near Miss) Reporting

A. Understanding the nature and frequency of accidents within your work area assists in the identification of actual or potential hazards in your workplace. The Act gives specific responsibility to employers to maintain a register of all accidents occurring at the place of work. There is a further responsibility to report all accidents that result in serious harm to the Dept of Labour. This must be in a prescribed format. The definition of serious harm can be found in the First Schedule of the Health and Safety in Employment Act.

B. The principals of self employed contractors are responsible to report all serious harm accidents to Department of Labour and record those accidents in an accident register.

6.0 General Provisions

6.1 Health and Safety Management Systems

A. Effective management of health and safety relies on the presence of a health and safety management system. The nature and size of the operation will determine the complexity of this system[3].

B. The presence of a site or company specific health and safety management system gives a clear indication of the steps to be taken to effectively manage their health and safety issues.

6.2 Responsibilities of Persons in Relation to Hazard Control

A. A person shall, immediately before starting work in any area and frequently during work, carefully examine the area for the appearance of any new or uncontrolled hazards that may endanger the safety or health of any person.

B. Any person who finds or becomes aware of such a hazard must immediately take action (within their capability) to control the hazard so as to remove or reduce the risk of injury or illness.

C. If the elimination or avoidance of that hazard is not immediately possible work should cease and the situation reported to a supervisor or manager.

D. Any person who becomes aware of a hazard presenting a serious and immediate danger at the workplace must immediately suspend any affected operations until the hazard is controlled and area made safe and then report the action taken and the examinations conducted.

E. No person shall drink alcohol or take any drugs that may impair his or her capability of working or responding in an emergency.

[3] AS/NZS 4804: "Occupational health and safety management systems – General guidelines on principles, systems and supporting techniques", provides guidance on the requirements of a health and safety management system. NZS 4801 provides an auditable verification standard for AS/NZS 4804. ACC Workplace Safety Management Practices (WSMP) also provides guidelines and auditable standards.

7.0 Surface Mine or Quarry Environment

7.1 Lighting

A. The lighting provisions for all workplaces[4], travelling ways and fixed installations should be designed so that all activities can be carried out safely.

B. Particular consideration should be given to highlighting hazardous areas and the provision of emergency lighting.

7.2 First Aid Facilities

A. In every operation first aid facilities shall be provided. The publication "Guidelines for the Provision of Facilities and General Health and Safety in Commercial and Industrial Premises" published by the Department of Labour is a useful reference tool for this purpose.

B. In particular:

   a. Appropriate site specific first aid equipment and supplies shall be kept in a position where they are immediately available.

   b. For every shift, holders of a current and appropriate first aid certificate shall be available to render assistance in the event of an emergency.

   c. There shall be planned means for getting emergency services or other means of assistance to any injured person.

C. A regular inspection of the first aid system, equipment and supplies shall take place. A review as to the systems effectiveness shall be carried out annually. It is suggested this review is carried out in conjunction with emergency response exercises (s) as appropriate.

7.3 Dust

A. The employer of the operation shall ensure that there is a dust control and monitoring system in place[5]. This must focus on the health effects of exposure including respirable dust.

8.0 Personnel

8.1 Pre employment health Screening

A. A suitable method of ensuring that a person is medically fit to work in a surface environment should be undertaken prior to commencement of employment. This must be based on specific hazards an employee may be exposed to and should involve examination by a medical practitioner or occupational health nurse.

8.2 Ongoing Health Monitoring

A. Ongoing monitoring to ensure fitness for work is maintained should be carried out at intervals reflecting the impact of the hazard.

8.3 Training

A. Employers must ensure employees receive training or supervision appropriate and suitable to the level of the task(s) to be carried out. Training needs to be recorded.

8.3.1 Induction

A. All new employees should have an induction before start of work.

[4] Further guidance on illumination levels can be found in NZS 6703

[5] Further guidance on dust control can be found in the associated guideline for the control of dust and associated hazards in surface mines and quarries.

B. This should include coverage of company procedures including site specific detail such as emergency response and high hazard areas.

C. All contractors and visitors who are visiting the operation should undergo an appropriate induction. If they are to be directly supervised this may be of a lesser nature than for employees.

8.4 Personal Protective Equipment

A. The provision of personal protective safety equipment is the responsibility of the employer. They shall ensure that all people who are required to wear such equipment are trained in its correct use and maintenance.

B. The ongoing use and maintenance, where applicable, of personal protective equipment is the joint responsibility of the employer and individual employees.

C. Replacement cycles should be identified for all protective equipment. These should reflect the manufacturers/suppliers guidelines and the environment in which the equipment is used.

8.4.1 Hard Hat

A. All hard hats must meet the requirements specified in NZS 2264: "Specification for industrial safety helmets (maximum protection)". Provision for earmuffs should exist. Use of hardhats must be compulsory where there is any risk of head injury. For specialist tasks hard hats may be provided to an alternative suitable standard.

8.4.2 Safety Footwear

A. All safety boots shall comply with AS/NZS 2210.2: Specification for safety footwear.

B. All people in any operational area shall wear appropriate safety footwear.

8.4.3 Hearing Protection[6]

A. The appropriate class of hearing protection must be supplied and worn in any environment exceeding the levels outlined in Regulation 11, Health and Safety in Employment Regulations 1995.

8.4.4 Eyewear

A. All safety eyewear must meet the requirements of AS/NZS 1337:1992 Eye protectors for industrial applications

B. In instances where a risk of eye injury exists the wearing of appropriative protective eyewear must be compulsory.

8.4.5 High Visibility

A. All people outside on site should wear suitable high visibility attire AS/NZS 4602:1999 High visibility safety garments

8.4.6 Other Requirements

A. In instances where there is the potential of injury from gas cutting & welding (Industry Guideline and Department of Labour Guideline), chemical (ref MOSHH Guideline), abrasions/punctures, and heat or cold (Department of Labour Thermal Extremes), appropriate protective clothing shall be worn.

B. If working from height an appropriate form of fall protection is required. Any safety harness shall comply with AS/NZS 1891.1.

8.5 Communications

A. Suitable means of communication should be provided and maintained throughout the operation. These may include the following:

[6] Further information can be found in the associated Guideline for the Management of Noise in Mines, Quarries and Tunnels.

a. Signs
b. Alarms
c. Lights
d. Radios
e. Telephones

B. For people who are required to work alone, appropriate procedures for regular communication with another person should be in place. This may involve the use of a mobile phone or radio. For persons working in remote locations consideration should be given to the use of personal locator beacons.

9.0 Surface Plans

9.1 Site Plan

A. In order to prevent personal injury, damage to services and to facilitate emergency response, accurate plans of the surface area of the site should be prepared and held on site in a place accessible to all employees. This information should be communicated to all potentially affected people. The plans must be to scale and should include:

a. The boundaries of the surface area
b. Offices, buildings, processes, workshops, explosives magazines, fuel storage, emergency assembly areas, underground workings, access roads and any other permanent structures
c. Utilities infrastructure including:
   i. The high voltage reticulation system
   ii. Buried and overhead electrical services
   iii. Gas lines
   iv. Water lines
   v. Sewerage lines
   vi. Communications cables
   vii. Permanent compressed air lines
d. This plan must be reviewed and updated when changes to any of the above occur.

9.2 Plans of Workings

A. In some instances it is appropriate to develop plans of surface workings. These should be updated to reflect changing operations. The nature of the operation (size and potential hazards) will determine the necessity of having such a plan and the frequency of the plan reviews. This plan may include but not be limited to the following:

a. Roadways
b. Pits
c. Slope
d. Faces and benches
e. Water courses
f. Stockpiles
g. Overburden dumps
h. Ponds

9.3 Surface Plan Identification

A. All current site plans should be identified as such. They should have the date they were finalised and indicate the review schedule in a clearly visible place. Each plan is to be signed by a competent person responsible for the planning process and its accuracy.

B. Any redundant plans should be clearly marked as such, and archived.

10.0 Control of Specific Significant Hazards for Surface Mines and Quarries

10.1 The Hazard and Risk Management Process

The hazard and risk management process is constant and ongoing and is applicable to all aspects of the business from organisation and equipment design to managing site behaviour on the job. It also includes the management of change in all its forms.

The process should be as follows:

a. Identification of hazards and associated risks
b. Assessment of the hazard and associated risks
c. Determine what controls are required to manage the hazard and associated risks
d. Develop a recovery plan to prevent escalation if the controls fail
e. Monitor and review controls for effectiveness

The management of specific significant hazards and their associated risks in surface mines and quarries requires specialist knowledge. This specialist knowledge should be derived from a combination of expertise and experience.

The nature and complexity of the environment will determine the required level of specialist knowledge.

The site manager (being the person in control of site operations) shall ensure that appropriate processes are in place for hazard and risk[7] management. This includes the involvement of informed and competent persons.

10.1.1 Hazard and Risk Identification

The identification of hazards and their associated risks is perhaps the most critical step in the hazard and risk management process,

There are two important principles which should be adopted when approaching the identification of hazards and their associated risks in surface mines and quarries:

1. Don't expect one person to identify the hazards and risks; a team with a range of experience and expertise should be used.

2. Use a systematic approach in sufficient detail to ensure all potential hazards identified and that the risks posed by them are confidently and adequately understood.

There are a range of hazard and risk identification methods. Typically a combination of methodologies will need to be applied to ensure complete identification of hazards and risks. The following provides some examples of identification methods:

a. Geotechnical Analysis
b. HAZOP (Hazard and Operability Studies)
c. Task Analysis (Job Safety Analysis)
d. Physical Inspection
e. "What If" Analysis

10.1.2 Hazard and Risk Assessment

A hazard assessment should be carried out to determine which hazards are significant and the exact nature of the risk posed by them. The hazard assessment should:

[7] NZ legislation adopts a Hazard Management process, rather than a Risk Management process. Despite this, the two methodologies are similar and in most instances the risks associated with Hazards are what is being controlled from a practical view point. For this reason the following reference is regarded as appropriate in providing information for formulating Hazard and/or Risk Management Plans. New South Wales Department of Mineral Resources publication, "Risk Management Handbook for the Mining Industry" – 1997 update, MDG 1010; and "Guide to Reviewing Risk - Assessment of Mine Equipment and Operations "- 1997, MDG 1014.

a. Be conducted consistent with recognised hazard and risk assessment approaches
b. Take into account all relevant available information concerning the hazard and associated risks at the operation
c. Identify and assess the nature and magnitude of all potential sources of the hazard and associated risks
d. Include any assumptions made in relation to the identification and assessment of hazard and risks including initiating events
e. Include, in relation to each identified hazard and risk, an assessment of the worst case position of the potential source of the hazard and risk having regard to such things as the nature of the operation, future operations, and any possible changes, geological or otherwise
f. Acts and Regulation, compliance standards, company and industry standards should be taken into account throughout the assessment

10.1.3 Hazard and Risk Control

Any measures used to control the hazard or risks posed by a hazard should be based on information obtained from the hazard assessment. The hazard controls shall:

Follow the hierarchy of control set out in the Health and Safety in Employment Act.

a. Eliminate
b. Isolate
c. Minimise

The hazard control element of the hazard management process should:

d. Set out the measures to be taken to prevent the people coming into contact with hazard
e. Provide for the identification and maintenance of hazard control zones between areas of work and each identified potential hazard if appropriate
f. Include any special systems of working developed for the hazard.
g. Include any assumptions made in the development of measures to control hazards and their risks
h. Be maintained so that the best available knowledge of the risks control at the operation is at all times in practice
i. Be reviewed and if required updated before the operation is developed into any new area

The hazard and associated risk controls should include provisions for reviews of the control's effectiveness.

The manager should ensure that the persons performing duties as part of the hazard and associated risk control process are competent to carry out those duties and are given appropriate and continuing training.

10.1.4 Hazard Monitoring and Review

To be confident that we are adequately managing the hazards and their associated risks, their status and the controls applied must be monitored and reviewed. This is to ensure that:

1. The nature of the hazard or associated risk has not changed
2. The controls that have been applied are adequate to manage the hazard or associated risk in its current state.

The method and frequency of both monitoring and review actions should be formally recorded.

10.2 Hazard Management Plans

Hazard Management Plans should reflect a hazard and risk management methodology as described in 10.1 and should include but not be restricted to the following areas:

a. Geological Failure

b. Underground Workings
c. Flooding and Water Management
d. Hazardous Substances
e. Natural Disasters
f. Man Made Disasters

For each of the above categories, appropriate technical expertise should be used to identify the presence of such hazards for individual sites. Then an assessment of the risks involved should be carried out.

All hazard management plans dealing with the above hazards and associated risks should be clearly documented and held on site for easy access[8].

Each hazard management plan should provide for reviews (internal and external as appropriate) of its contents no less than annually by a competent person and this should be documented.

The hazard management plans should clearly identify the roles, skill levels, and responsibilities required for their implementation.

10.3 Hazardous Substances

A. Notwithstanding anything in this Code of Practice, the provisions outlined in the "Approved Code of Practice for the Management of Substances Hazardous to Health" and the "Hazardous Substances and New Organisms Act" must be complied with in full.

B. Key areas to consider when managing hazardous substance risk through hazard management plans include:

   a. Ensuring that persons responsible for managing Hazardous Substances are qualified at the appropriate level.
   b. Ensuring that hazardous substances are stored and used in a safe manner to ensure exposure is as low as reasonably practicable. The New Zealand Workplace Exposure Standards (NZ WES) shall be used as a guideline for maximum exposure levels.
   c. A system for the medical monitoring of hazardous substance exposure should be in place and define the monitoring protocol and frequency for each substance.
   d. The provision of adequate PPE, equipment and resources to carry out the work safely
   e. Information contained in a hazardous substance's Safety Data Sheet (SDS) should be considered in developing control measures.

10.4 Pre-existing Underground Workings

A. The employer must ensure there is a system in place to control the unintentional collapse of old workings where they known to exist.

   a. Surface extraction should not be carried out in the vicinity of underground workings that might collapse without a specific hazard management plan being in place. This plan should include provisions for identifying underground workings on the ground and in site production plans, so that all operators are made aware of the hazard location. This should not however, prohibit the sinking of passes from the floor of the surface extraction for the purpose of filling underground workings. The area directly above the underground workings should be monitored to register any ground movement which may affect safety of the buildings in the area.

B. Warnings should be erected above the underground workings to indicate the hazard.

10.5 Entry into Old Workings

A. With entry into old workings the provisions of the Health and Safety in Employment (Mining-Underground) Regulations 1999 and the Underground Code of Practice shall be applied. Following consideration of the regulations and Underground Code of Practice entry into such workings should only be carried out if:

[8] Appendix Four provides a template that can be used for documenting Hazard Management Plans

a. A competent person has established it is safe to enter the old workings. This should involve a documented risk assessment and include but not be restricted to the following:
   i. Nature of the support and potential for failure
   ii. Oxygen deficiency
   iii. Explosive atmosphere
   iv. Toxic atmosphere
   v. Inrush or outburst
   vi. Any other risks specific to the old workings.
b. Continuous monitoring methods for flammables, toxics and oxygen deficiency are undertaken whenever any person enters the workings
c. An emergency response and evacuation plan must be in place.

10.6 Geological Management

A. The employer must ensure a system to control any geological failure at the operation is in place. Key areas to consider when managing geological risks through hazard management plans include:
   a. Regular inspections of areas at risk of geological failure e.g. folds, faults, joints, dips, weathering. The greater the risk to the safety or health of persons at a place the more frequent the inspections. This should include a pre shift inspection that is recorded. Key areas to be inspected should include:
      i. Faces
      ii. Benches
      iii. Dumps
      iv. Roadways
      v. Blast Areas
      vi. Dam Areas
      vii. Stockpiles

B. The following should be accounted for when designing the working benches and their faces:
   a. Investigation by a competent person experienced in investigating rock and soil slope stability. A competent person is one deemed competent by the manager having regard to the level of risk and expertise required.
   b. Monitoring by a competent person for a suitable period.
   c. Design by a competent person
   d. A written report by a competent person that includes the statement that the intended height is safe and water discharge and collection is managed.

C. The following outcomes should be achieved:
   a. Each working bench should have separate loading arrangements and be of sufficient length and breadth to provide safe working conditions for the vehicles and equipment used on it as determined by a competent person.
   b. A face should not be worked in a manner that will create an overhang of the face.
   c. Where unconsolidated ground is mined or quarried, the face and sides should be battered to prevent collapse.
   d. A face should not be undercut by excavation of a slot at the toe of the face.
   e. Where a person is required to work at the toe of a quarry face or on the face itself, the face must be safely scaled of any loose rock that could fall on that person.
   f. Unauthorised or inadvertent access to the workings should be restricted.
   g. Faces should be left in a safe condition at the end of each days work.

10.7 Flooding and Water Management

A. The employer should ensure that a system is in place to prevent the adverse affects of flooding or water breaches. Key areas to consider when managing the risks through hazard management and mine or quarry plans[9] should include but not be restricted to the following:
    a. Water control
    b. Basins
    c. Saturation of slopes and machinery operation
    d. Design of water containment or diversion structures
    e. Competency of people carrying out the design and construction work
    f. Fencing or other forms of isolation
    g. Entrapment in unconsolidated silt
    h. Water sampling

11.0 Emergencies

A. A system that deals with emergencies shall be in place and have been communicated to everyone on the site.[10]
B. The Health and Safety in Employment Act: 1992 requires that employees must be given reasonable opportunity to participate in the development of this system.
C. This system should clearly state the methods and process to be used in the tasks of the emergency. It should cover but not be limited to the following:
    a. Emergencies that may be encountered at the site
    b. General emergency procedures including evacuation to assembly areas
    c. Provision for the transport of sick or injured persons
    d. Isolation and control of access to the incident area
    e. Appointment of duties to be carried out by designated individuals
    f. The supply and maintenance and training in the use of emergency equipment
    g. Provision and supply of water storage and reticulation for fire fighting
    h. Reporting and replacement of damaged equipment
    i. Liaison and working with Emergency Services, including guidance to the site, as appropriate
    j. Methods of communication between all parties involved in an emergency
D. The emergency response system for permanent sites should be tested and reviewed in a live simulation at least once per year.
E. Mobile site emergency procedures should be kept current.

12.0 Explosives and Shot Firing[11]

A. Procedures must be developed, implemented and monitored to ensure that only an Approved Handler, as defined by the Hazardous Substances and New Organisms Act 1996 may store, transport, initiate, and dispose of explosives.
B. Procedures should include the following:
    a. Storage of explosives
    b. Transport of explosives

[9] Reference Resource Consents and requirements.
[10] Further information can be found in the associated Guidelines for Emergency Procedures for Surface Mines and Quarries
[11] Guidelines for the Safe Handling and Use of Explosives in Surface Mines and Quarries

c. Preparation and charging of explosives
d. Initiation of explosives
e. Treatment of misfires
f. Disposal of unwanted or deteriorated explosives

C. No person should fire any shot unless, they are an certified Approved Handler and are authorised in writing by the manager. In addition it is recommended that the person is the holder of the appropriate unit standard for surface mines and quarries (NZQA Unit Standard 8918 - *Carry out Shot-firing Operations in Surface Mines and Quarries)*

13.0 Equipment and Machinery

13.1 Fixed plant

13.1.1 General

A. All exposed and dangerous parts of machinery or plant should be kept securely fenced or guarded so as to prevent any person from coming into contact with them[12].

B. Emergency stop facilities, which enable power to be promptly cut off in the event of imminent danger, should be provided within reach on all plant or equipment that may pose a danger.

C. A warning system prior to start-up should be used in all instances.

D. All pipes used to carry compressed air, water, gas or other hazardous substances should be clearly identified and should be checked at regular intervals along the pipe system[13].

E. A system of managing defects that may affect the safety of electrical, hydraulic or mechanical equipment should be in place and cover:

a. The prevention of use of that plant or equipment – see section 15.2 Isolation and Lockout
b. The means by which that defect is repaired and by who
c. The recording of the defect and repair

F. Each site should have a preventative testing and inspection system for the safety related aspects of equipment and machinery. Records of all such activities should be kept.

13.1.2 Isolation and Lockout[14]

D. Procedures must be developed, implemented and monitored to ensure that potentially damaging energy is isolated from persons who are to work on electrical, hydraulic or mechanical plant or equipment.

E. These procedures should include the requirement that isolations are carried out:

d. Prior to any work commencing and that those isolations attain a state of zero energy.
e. Any stored energy is made safe and confirmed as such

13.1.3 Belt Conveyors[12]

A. For guidance on requirements for guarding of conveyors refer to AS1755 and also to AS4024

B. The area in which the conveyor is used should be of sufficient width to allow inspection and maintenance. Access ways beneath conveyors should have adequate overhead protection.

C. Conveyors should be kept free of flammable material, rubbish and spillage.

D. The belt and its load should also remain clear of any other structures such as cable trays and power lines.

[12] A range of DoL publications cover aspects of machine guarding. AS 4024.1601-2006 provides detailed guidance.
[13] NZS Colour Coding Standard: NZS5807 (1980)
[14] Guidelines for the Preparation of Isolation and Lockout Procedures in Mines, Quarries and Tunnels
[15] AS 1755 provides guidance on the guarding of conveyors.

E. Regular inspections should be carried out to ensure undue heating of either the belt or spillage does not occur and potentially present a fire risk and that other points referred to in this section are adhered to.

F. Conveyors, where accessible, should have an emergency stop device along their entire length.

G. Where appropriate rollback/anti-runaway devices should be fitted.

13.1.4 Crushing & Screening Plant[15]

A. The area in which the crusher or screen is located should be sufficient to allow inspection and maintenance.

B. Crusher and screening platforms should be kept free of spillage and other debris.

C. Daily documented inspections should be carried out to ensure crushers and screens are safe to operate.

D. Crushers and screens should be isolated and locked out prior to undertaking maintenance.[16]

E. Appropriate precautions must be taken to eliminate or minimise exposure to noise and dust. Where exposed suitable protection should be supplied[17] and[18]

F. Detailed information may be obtained from the guideline for identifying hazards associated with crushing and screening plants in mines and quarries. Refer to appendix four: Surface Mine OR Quarry Hazard Management Plan.

13.2 Mobile Plant

A. Only competent persons authorised by the manager may operate mobile plant.

B. All vehicles shall be fitted with seatbelts of the appropriate standard for the driver and any passengers. Seatbelts are to be worn at all times when a vehicle is in operation. Passengers shall only be carried where a seat fitted with seatbelt is provided.

C. Mobile plant that operates in an environment in which people are working should be fitted with the following items:

   a. Adequate lights
   b. A suitable fail-to-safe braking system
   c. An effective method for ensuring the vehicle is visible under all circumstances. This may include flashing lights, pole flags, running lights.
   d. Suitable fire fighting equipment
   e. A reverse warning system
   f. Comprehensive vision forward and back
   g. A suitable washing and wiping system for operator visibility

13.2.1 Operator Protective Structures

A. In appropriate instances where an employee operates mobile plant, the mobile plant should be fitted with a “Roll Over” Protective structure. If there is a risk of the mobile plant being struck from above it should be fitted with a “Fall On” Protective structure.[19]

B. If for any reason the protective structure is damaged with the result being a reduction in its effectiveness, the mobile plant is not to be used until such time as repairs are complete and the plant recertified.

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[15] Guidelines for Identifying Hazards Associated with Crushing and Screening Plants in Mines and Quarries
[16] Guidelines for the Preparation of Isolation and Lockout Procedures in Mines, Quarries and Tunnels
[17] Guidelines for the Control of Dust and Associated Hazards in Surface Mines and Quarries
[18] Guidelines for Noise Control in Mines, Quarries, Tunnels
[19] Specifications can be found in AS:2294 – “Earth Moving Machinery-Protective Structures” and the NZ “Approved Code of Practice for Operator Protective Structures on Self Propelled Mobile Plant”

13.2.2 Testing of Mobile Plant

A. Pre-operational checks should be carried out and recorded by operators every shift

B. Provisions should be made for the systematic testing and inspection of all mobile plant by a competent person. All inspections and tests should conform to a schedule of examinations and tests and be documented and records held.

C. Inspection and testing[20] should include:

   a. The thorough examination and testing of all mobile plant at an interval appropriate to the type of transport and according to the manufacturers' guidelines

   b. Steering and lighting systems

   c. The inspection of all moving parts of mobile plant that are practically accessible to establish that they are moving freely and without obstruction

   d. The thorough examination of all parts of the mechanical braking system of the mobile plant, including:

      i. Braking surfaces (pads, blocks and similar parts) to ensure they are not excessively worn

      ii. Brake actuators to ensure that they are operating satisfactorily

   e. The testing of all braking systems of mobile plant shall be to manufacturers instructions/specifications.

13.3 Trains

A. A set of plans showing all parts of the railway system of the mine or quarry operation should be prepared and held at the site office.

B. Rules and procedures determining shunting and loading operations must be documented and communicated to all affected personnel. These should include responsibilities and authorities.

C. Locomotives should be provided with the following safety devices. Effective lights, effective braking system, distinct audible signals, sanding devices, and speedometer.

D. Frogs, guide rails, lead rails, and guard rails should be blocked to prevent a person's foot getting caught

E. Rail transport roadways are to be sectionalised and transport movement controlled by a method of signalling to prevent collisions

F. Rail transport roadways are to be provided with runaway protection devices, e.g. a derailer, stop block or other adequate means

G. For jointly operated sidings a joint operating plan is required under the New Zealand Transport Agency (NZTA) requirements.

13.4 Traffic Control and Roadway Conditions[21]

A. In relation to all mobile plant, rules should be documented and communicated to all parties involved. These should include but not necessarily be limited to the following:

   a. The conditions under which mobile plant is used

   b. Measures taken to keep roadways clear of debris or other materials that may negatively impact on mobile plant

   c. Ensuring the safe operation of the mobile plant by providing for the following:

      i. The maximum loads (by reference to weight, dimensions, number or other criteria) that may be carried in or towed by mobile plant

      ii. The areas in which speed restrictions apply and the nature of the restrictions

      iii. The conditions under which a person may work on or adjacent to a roadway to be used for mobile plant

      iv. Parking procedures for transport or haulage

[20] Further guidance can be found in the associated Guideline for Operation of Mobile Plant in Surface Mines and Quarries

[21] Refer to the guidelines for Mobile Plant and Stockpiles & Dumps.

v. The safe refuelling of mobile plant
vi. Inter-vehicle communication
vii. Overhead obstacles
viii. Traffic flow requirements

B. All roadways on which mobile plant are to operate must be maintained to standards consistent with the safe operation of that mobile plant. In particular:

a. The roadway is clearly defined at all times
b. Signs indicating speed limits are placed in strategic positions
c. Windrows of sufficient height and depth are to be in place in the working area to prevent the type of mobile plant using that roadway, from leaving the roadway. As a rule of thumb, the height of the windrow should be at least half the diameter of the largest vehicle used on the site, and the width should be twice the height..
d. Methods of identifying the roadway in reduced visibility
e. The roadway is wide enough to accommodate all traffic potentially using it.
f. Road grades should be appropriate for all traffic potentially using the roadway.

C. Procedures should be developed with respect to right of way at intersections and associated signage

14.0 Waterborne Operations Involving

14.1 Dredges and Pontoons[22]

A. All dredges and associated equipment must be designed and constructed according to sound engineering practices[23]. There is a requirement by Maritime New Zealand (MNZ) to have all propelled dredges, all barges which carry persons, or a lifting device with a SWL of more than 1 tonne, or is 24 metres or more in length, surveyed.

B. Because each specific operation will be assessed by MNZ and Department of Labour it is recommended you contact MNZ and seek guidance.

C. The manager should prepare documented procedures for the operation and maintenance of the dredges and associated equipment. These procedures should take into account all hazards peculiar to dredging at that site and be reviewed regularly.

D. When preparing these procedures, the unique, site specific, environment and work methods should be taken into account. The following should be considered:

a. Life saving appliances will be required, depending upon the size and location of the operation. These may include:
i. Lifebuoys and sufficient boat hooks at the bow and stern of the dredge on the port and starboard sides
ii. A supply of life jackets, sufficient for the maximum number of people likely to be on board the dredge at any one time
iii. A lifeboat, equipped ready for use with oars and rowlocks, or some other suitable method of propulsion

E. All life saving appliances provided shall be kept in obvious places. Damaged or lost items must be repaired or replaced immediately.

F. Every person who is employed on the dredge or associated equipment shall be trained to use the life saving appliances provided.

[22] This information should be read in conjunction with the following Maritime Rules available for Maritime New Zealand (www.msa.govt.nz): Rule 21 – Safe Ship Management; Rule 40C – Design, Construction and Equipment; Rule 46 – Maintenance and Surveys; and Rule 47 Load Lines

[23] Further guidance can be found in the associated Guidelines for Identifying Hazards Associated with Alluvial Mining and Dredging

G. Nominate the maximum number of people who may be carried at anyone time on a dredge or other vessel associated with dredging, or other mining operations. Employees shall be notified of and aware of this maximum as well as the minimum freeboard clearance required for safe operation.

H. Particular attention should be paid to the winching/anchoring system and the safeguarding of all people around these items.

I. Emergency procedures in the event of the dredge sinking or listing shall be documented, and clearly posted on the dredge. All personnel shall be trained in these procedures.

J. When the use of divers is considered, refer to Health and Safety in Employment Act Regulations 32, 47, 48, 49, and the Department of Labour Guideline for Occupational Diving.

15.0 Stockpiles and Storage Bins[24]

A. No person should walk or climb on top of any surge stockpile.

B. Specific active stockpile management systems should be developed to control the hazards associated with stockpiles dumped on and drawn from simultaneously.

C. All stockpiles should at all times be constructed and maintained so as to ensure they do not slump.

D. Coal stockpiles should be constructed to minimise the potential for heating.

E. Specific bin entry procedures should be developed consistent with relevant confined space entry standards[25]

[24] Refer to the guidelines for Mobile Plant and Stockpiles & Dumps.

[25] Further guidance can be found in the associated guideline for the working of stockpiles and dumps in surface mines and quarries. ASNZS: 2865 Safe Working in Confined Spaces should be used to develop bin entry procedures.

Appendix One: Guidelines

List of NZ Industry Guidelines

1. Guidelines for Use of Gas Cutting and Welding Equipment in Surface Mines and Quarries
2. Guidelines for Safe Operation of Mobile Plant in Surface Mines and Quarries
3. Guidelines for Identifying Hazards Associated with Crushing and Screening Plants in Mines and Quarries
4. Guidelines for the Control of Dust and Associated Hazards in Surface Mines and Quarries
5. Guidelines for Noise Control in Mines, Quarries, and Tunnels
6. Guidelines for the Working of Stockpiles and Dumps in Surface Mines and Quarries
7. Guidelines for the Preparation of Isolation and Lockout Procedures in Mines, Quarries and Tunnels
8. Guidelines for Identifying Hazards Associated with Alluvial Mining and Dredging
9. Guidelines for Emergency Procedures for Surface Mines and Quarries
10. Guidelines for the Safe Handling and Use of Explosives in Surface Mines and Quarries

General DoL Guidelines

1. Guidelines for First-aid Equipment, Facilities and Training: (DoL)
2. Guidelines for the Provision of Facilities and General Health and Safety in Commercial and Industrial Premises: (DoL)
2. Guideline for the Management of Work in Extremes of Temperature: (DoL)
4. Management of Substances Hazardous to Health (MOSHH) Code of Practice: (DoL)
7. Zealand Workplace Exposure Standards (NZ WES); (DoL)

Templates

1. Hazard Management Plan Template – Appendix 4

Appendix Two: Further Information Sources

Standards New Zealand http://www.standards.co.nz

Standards Australia http://www.standards.com.au/

Standards Australia Publications http://www.saiglobal.com

Department of Labour http://www.Department of Labour.govt.nz/

Accident Compensation Corporation (ACC) http://www.acc.co.nz/

Interim Website of New Zealand Legislation http://www.legislation.govt.nz/

UK Health and Safety Executive http://www.hse.gov.uk/quarries/hardtarget/index.htm

http://www.hse.gov.uk/quarries/information.htm

Appendix Three – Standards Documents

Code Title	Description	Comment
NZS 2264:1970 Specification for industrial safety helmets (maximum protection)	Sets out requirements for industrial safety helmets which offer the highest level of head protection currently known and which are intended for use in industries where potential hazards of head injury are high and the continuous wearing of protective helmets is necessary.	NZS 2264:1970A1 Amendment 1 NZS 2264:1970A2 Amendment 2
AS/NZS 2210.2:1994 Occupational protective footwear - Specification	Specifies basic requirements for occupational protective footwear with specific requirements for heavy duty (Type 1), medium duty (Type 2), light duty (Type 3) and waterproof (Type 4) footwear. Requirements for steel and non-metallic toecaps are provided. Specific requirements for oil and chemical-resistant outsoles, penetration-resistant midsoles and electrically conductive and anti-static properties are also provided. (AS 2210:1980 and NZS 5845:1989 jointly revised in part and redesignated in AS/NZS 2210.2:1994.)	AS/NZS 2210.2:1994A1 Specification: Amendment 1 AS/NZS 2210.2:1994A2 Specification: Amendment 2 AS/NZS 2210.2:1994A3 Amendment 3 Amendment must be purchased separately.
AS/NZS 1269.0:2005 Occupational noise management - Overview and general requirements	Provides an overview and general requirements for the occupational noise management series of Standards. AS/NZS 1269.1:2005 Sets out requirements for, and provides guidance on, the types of noise assessments which may be necessary and suitable noise measuring instruments to carry them out. The procedures for noise measurement are also included. AS/NZS 1269.2:2005 Sets outs requirements and guidance on the management of noise control in occupational settings and applies to all types of workplaces and to all types of sounds. AS/NZS 1269.3:2005 Specifies administrative responsibilities associated with a hearing protector program; the selection, use and maintenance of various types of hearing protectors; and training and motivation in regard to hearing protector programs.	AS/NZS 1269.1:2005 Occupational noise management - Measurement and assessment of noise immission and exposure AS/NZS 1269.2:2005 Occupational noise management - Noise control management AS/NZS 1269.3:2005 Occupational noise management - Hearing protector program

Code Title	Description	Comment
AS/NZS 1337:1992 Eye protectors for industrial applications	Specifies minimum requirements for eye protectors and associated lenses designed to provide protection for peoples` eyes in the industrial environment. Types of protection offered are for molten metal, airborne particles and fragments, harmful gases, vapours and aerosols, and sunglare and optical radiation in the natural environment. Markings for lenses to indicate the type of protection offered are also included.	
AS/NZS 4602:1999 High visibility safety garments	Specifies the visual requirements for high visibility safety garments to be worn by people in situations where they may be exposed to hazard from moving traffic or from moving plant or equipment in charge of an on-board controller. The Standard covers garments suitable for daytime wear, night-time wear where they will be seen by retroreflected light or for wear under both conditions.	
AS/NZS 1891.1:1995 Industrial fall-arrest systems and devices - Safety belts and harnesses	Specifies requirements for the materials, design, manufacture and testing of industrial safety belts and harnesses, and ancillary equipment including energy absorbers, lanyards, and pole straps. Appendices include static and dynamic performance tests for the various components and assemblies.	
AS/NZS 4804:2001 Occupational Health and Safety Management Systems - General guidelines on principles, systems and supporting techniques	The objective of this Standard is to provide guidance on how an occupational health and safety management system (OHSMS) may be set up; how it can be continually improved; and what resources may be used to do this.	
AS/NZS 4801:2001 Occupational Health and Safety Management Systems - Specification with guidance for use	The objective of this standard is to set auditable criteria for an occupational health and safety management system. The standard is a specification that aims to encompass the best elements of such systems already widely used in Australia and New Zealand. It includes guidance on how those criteria may be achieved. The standard should not be relied upon to ensure compliance with all legal and other obligations.	Provides an auditable verification standard for AS/NZS 4804

Code Title	Description	Comment
AS/NZS 1680.2.4:1997 Interior lighting - Industrial tasks and processes	Sets out recommendations for the lighting of industrial tasks and processes with a view to providing visual environments in which such tasks and processes may be safely and efficiently performed. It is intended to be read in conjunction with the general recommendations of AS 1680.1.	*AS/NZS 1680.2.4:1997, AS/NZS 1680.1:2006* Interior lighting - General principles and recommendations and AS/NZS 1680.2.5:1997 Interior lighting - Hospital and medical tasks replaced NZS 6703:1984 Code of practice for interior lighting design
NZS 5807:1980 Code of practice for industrial identification by colour, wording or other coding	Defines safety colours, safety signs and other warning indications which will aid in prevention of accidents, indication of health hazards, and location and identification of first aid and fire-fighting equipment. Defines meaning and application of colours and other indications which are recommended for identification of pipes conveying fluids in liquid or gaseous conditions; and identification of conduit and ducting enclosing electric services. Makes provision for identification of contents of industrial gas cylinders. Approved electrical safety Standard.	
AS/NZS 2865:2001 Safe working in a confined space	Provides requirements and guidance in eliminating or minimizing the need to enter confined spaces and in avoiding hazards which may be encountered where entry to a confined space is unavoidable. Contains Sections dealing with risk identification and assessment, monitoring prior to entry, education and training as well as emergency response. Appendices provide additional guidance for cleaning and the precautions needed when undertaking hot work. A sample risk assessment form and written authority to enter are provided, as is a typical check list.	

Code / Title	**Description**	**Comment**
AS 1755-2000 ***Conveyors - Safety requirements***	This Standard sets out the minimum safety requirements for the design, installation and guarding of conveyors and conveyor systems. It includes requirements for users and providers of inspection, maintenance, training and implementation of safe work practices for such equipment. Particular emphasis is given to operational safety and the protection afforded to operators, maintenance personnel or other persons who may be exposed to risks to health and safety associated with conveyors or conveyor systems. This Standard includes requirements for— (a) specific locations such as hazardous areas, confined spaces and coal mines; and (b) specific types such as belt conveyors and mobile or transportable conveyors. The Standard is not intended to apply to platform elevators, moving stairways or conveyors specifically designed for the conveyance of people.	The requirements of this Standard are intended to be used by designers, manufacturers, suppliers, installers, users and owners of conveyors or conveyor systems.
AS 2294.1-1997 ***Earth-moving machinery - Protective structures - General***	This Standard specifies the requirements for roll-over protective structures and falling-object protective structures, additional to those given in AS 2294.2, AS 2294.3 and AS 2294.4. The Standard is intended to apply to operator controlled earth-moving machinery as given in AS 2294.2 and AS 2294.3 and where the design allows for a seated operator. While there are certain types of earth-moving machinery to which this Standard is not intended to apply, it may be used to provide guidance to the manufacturers of roll-over or falling-object protective structures should it be decided to fit such protection in a particular application.	This Standard is intended for use by designers and manufacturers of roll-over and falling-object protective structures fitted to earth-moving machinery.
AS 4024.1601-2006 ***Safety of machinery - Design of controls, interlocks and guarding - Guards - General requirements for the design and construction of fixed and movable guards***	This document is not sold separately but is packaged with the AS 4024.1-2006 Series Safety of machinery. The series provides designers, manufacturers, suppliers, employers and users of machinery with guidelines to help reduce the risks of working with, or near, machinery.	

Appendix Four: Surface Mine or Quarry Hazard Management Plan

SURFACE MINE OR QUARRY HAZARD MANGEMENT PLAN			
Hazard	*Name of the hazard being dealt with e.g. fire and explosion, Spontaneous Heating, Inundation, Strata Failure*		
Location of the Hazard	*Location of the hazard – either for the mine or tunnel as a whole or for part of the mine or tunnel where the hazard is potentially present*		
Date Finalised:	*Date plan was completed and signed off*	**Plan Review Date:**	*Date plan is to be reviewed (should be at least annually)*
Hazard Management Plan Owner:	*Name of the person or position that is responsible for the development, application and review of this plan – typically the Mine, Quarry, or Tunnel Manager or Senior Manager on site*		

Hazard/Risk Management Team:

List the people, and their areas of expertise, who were involved in the development of the plan e.g. Joe Bloggs – Mine Manager, John Smith – Consultant Ventilation Engineer, Peter Smith – Geotechnical Engineer.

Hazard and Risk Identification and Assessment Methodology:

This section should:

1. *Include a description of the methods used to ascertain the presence, nature and extent of the hazard and its associated risks e.g. 3D seismic survey identified presence of faulted areas across the mine; exploratory drilling has indicated methane levels >10^3m/tonne, visual inspection confirmed faulting and unstable ground.*
2. *Reference any technical reports or similar information used.*
3. *Take into account all relevant available information concerning the hazard and associated risks at the underground operation*
4. *Identify and assess the nature and magnitude of all potential sources of the hazard and associated risks*
5. *Include any assumptions made in relation to the identification and assessment of hazard and risks including initiating events*
6. *Include, in relation to each identified hazard and risk, an assessment of the worst case position of the potential source of the hazard and risk having regard to such things as the nature of the operation, future operations, and any possible changes, geological or otherwise*
7. *Take into Account Acts and Regulation, compliance standards, company standards and industry standards*

Hazard and Risk Controls:

This section should:

1. *Describe the range of measures and activities that are to be undertaken to control the hazard and associated risks described above.*
2. *Reference any technical reports or similar information used.*
3. *Provide for the identification and maintenance of hazard control zones between areas of work and each identified potential hazard if appropriate*
4. *Include any special systems of working developed for the hazard.*
5. *Include any assumptions made in the development of measures to control hazards and their risks*
6. *Be maintained so that the best available knowledge of the hazard and risks control at the operation is at all times in practice*
7. *Be reviewed and if required updated before the operation is developed into any new area*
8. *Identify for each control what monitoring will take place and at what frequency e.g. ventilation is a control for fire and explosion – monitoring includes measurement of ventilation flows daily, and continuous monitoring of methane levels.*

Hazard Management Plan Authorisation By Plan Owner

Signature:	Date: