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# Safety Management Plan Guideline

# **SAFETY MANAGEMENT SYSTEM – A GUIDELINE FOR IMPLEMENTATION**

## **STRUCTURE OF THE SAFETY MANAGEMENT SYSTEM**

### **Strategic Level**

The following management strategies are required: -

- Development of organisation mission statement and policy, giving high regard to safety and production, strongly backed by management and owners.
- Have policies made by the organisation that ensures health and safety a critical element in all mining activities.
- Delegate organisational responsibility to appropriate levels.
- Institute formal structures and committees to discuss and implement safety improvements.
- Establishing and maintaining the Safety Management System

### **Management Level**

Management is responsible to follow the strategic lead of the organisation by: -

- Implementing and managing site-specific Safety Management Plans.
- Identification of major hazards and assessment of risks
- Managing hazard reduction plans.
- Defining appropriate roles and responsibilities
- Having personnel with appropriate competencies for the work
- Having site-specific emergency processes in place and tested.
- Providing appropriate guidelines, directives and training.
- Operation of formal structures and committees.

### **Operational Level**

At operational level Managers/ Safety officers, workmen inspectors and workers should: -

- Assess risks associated with each step of all work
- Develop and maintain a Manual outlining worksafe standards and guidelines
- Ensure personnel are trained to a competent level for each work task
- Follow safe operational processes and procedures.
- Actively participate in safety committees and continuous improvement

## **STRATEGIC LEVEL**

### **Health & Safety Policy**

The Mine Health and Safety Policy is a statement by the organisation of its occupational health and safety philosophy and intentions. It provides a framework for action to achieve safety objectives and targets. The Policy should: -

- Provide a mission and vision of a healthy and safe work place
- Be inclusive and understood by everybody in the mine
- Provide management commitment for: -
  - A healthy and safe work place
  - Regular review of risks
  - Support for a Safety Management System (Safety Committee, Risk Assessment, Continuous Improvement etc)
- Carry the expectation that mine management, supervisory staff and workpersons willingly comply with it.

### **Safety Management - Roles and Responsibilities**

The effective management of safety within a mine includes the following: -

- A sound Health & Safety Policy which is supported by all sectors of the mine
- Clear roles and responsibilities of all personnel for safety
- A safety management program and forward plan
- A safe work place design for jobs, equipment and materials
- Induction, training & continuous improvement of staff
- Hazard identification and control management
- Appropriate accident and emergency plans
- Effective accident / incident investigation and reporting
- Auditing of processes and outcomes against Policy
- Review of safety management plans

In the effective management of safety, all mine personnel have different roles to play but still have the same objective. They also share a duty of care to: -

- Provide a safe place of work
- Provide proper equipment and facilities
- Have and follow a safe system of work
- Have competent staff and employees
- Look after fellow workers
- Take appropriate precautions (eg. Use of Personal Protective Equipment)
- Raise safety issues and continuously improve

- Have appropriate emergency procedures
- The roles of the following Key Staff in the Safety System should be clearly spelled out in the safety management system as well as in all the lower levels of the plan.  
Owner, Agent, Manager, Supervisor, Safety Officer, Workman Inspector, Trade Union Representative, mechanic, operator, Worker, Contractor and Contractor Management, etc.

### **Safety Committee**

The Safety Committee can have a significant role in effective Mine Safety Management. It contains representatives from all aspects of the mine, with a focus on ensuring and improving health and safety in the workplace. Whilst the committee's function is well defined in the Mines Rules, the Safety Plan needs to outline the operation of the Safety Committee to ensure committee members and the mines workforce are quite clear on its role, its responsibilities and objectives.

The types of areas to clarify are: -

- The members of the Committee & their roles
- Key Responsibilities of the Committee to: -
  - Improving health and safety in the workplace
  - Reviewing accident / incident reports & statistics
  - Identify hazards & the review of action plans
- Meeting arrangements for sub-committees, if formed
- Implementing & managing the Plan (schedule of activities)
- Reporting responsibilities and notice boards

### Overall Safety Management System and Plans.

Activity	Frequency	Role – Action
Management	Annually	Set and review Mine Health & Safety (H&S) policy
	Annually	Lay basis for Safety and Hazard Management Plans
	Annually	Arrange for internal/external audits
Regular Health and Safety meetings involving representation across the mine.	Annually	Review H & S policy set by Management
	Annually	Implement/manage Safety/Hazard Management Plans
	Annually	Create and manage the Safety Manual
	Annually	Establish high risk areas/issues in mine for review
	Annually	Set program & responsibility for the forthcoming year for hazard review and other issues (eg. training, job analysis, equipment assessment, etc.).
	Quarterly	Review/Participate in new Hazard examinations
	Monthly	Review actions completed against Action Plans; training achievements, work procedures etc
	Monthly	Review accident statistics and accident investigation, adverse incident analysis and make appropriatedecisions
	Monthly	Conduct site inspections
	Monthly	Raise matters of H & S concern
	Monthly	Report against Safety and Hazard Management Plan
	Special	Arrange special meetings as required

## MANAGEMENT LEVEL

### Hazard Identification & Risk Management

The management of the mine should conduct a risk assessment process to identify any hazard that could influence the safety and health of workers of the mine.

For all hazards that pose a potential chance of multiple fatalities at one time and are not fully controlled, a *Hazard Management Plan* must be drawn up.

To operate mines safely all hazards must be quickly identified and controlled. Using a risk ranking process can assist mine staff to identify the highest risk hazards for attention. This process is summarised below.

- Identify hazards
- Assess the risks posed by these hazards (risk ranking)
- Control or treat hazards to reduce unsafe or unhealthy situations

This technique should be used to assist effective management of safety in the workplace within the Safety Management Plan.

### Safety Management Plans.

The Safety Management Plan is a working document, which outlines all of the actions to be carried out to ensure the safety and health at the work place. This document is fundamental to the management of safety by the Health and Safety Committee and Management. The sort of issues which should be addressed in the Safety Management Plan include: -

- Important committee or safety related meeting dates
- Dates to review policies, manual or work procedures
- Dates required for major hazard analyses to be completed
- Outcomes or actions following review of hazards, accidents or statistics
- Actions, dates and responsibilities to complete agreed actions
- Achievement of actions

### Safety Manual

Accompanying the Safety Management Plan should be a Safety Manual. This manual would outline the operational procedures to comply with the overall and specific hazard management plans.

It is the document that would be available to all workers on site and should enable them to be aware of not only the framework within which they have to do their work but also what is



expected from them to ensure a safe and healthy work environment. It could contain: -

- Relevant Acts, Regulations and Circulars
- Emergency Procedures
- Standing Orders
- Individual Job Procedures
- Process for introducing new methods, equipment or materials etc.
- Training Requirements
- Hazard Identification and Risk Management Process
- Safety Management Forms (accident investigation, hazard analysis, reporting etc.)
- Medical examinations
- Entitlements for employees injured or suffering health impacts at the mine

### **OPERATIONAL LEVEL**

Operational processes and safe operating procedures need to be made to suit the site-specific conditions of the mine. These need to be simple and clear whilst meeting the requirements of legislation, regulations, Mine Standing Orders and recognize Hazards associated with that work. These operating procedures must form the basis for training and competency assessment of mine operators.

Typically, safe-operating procedures would be required for the following areas: -

- Work associated with each step of the mine production and maintenance
- Roof Support methods and rules
- Explosives transport, storage, handling and usage
- Ore handling, storage and transport
- Traffic rules and safety on haul roads
- Rules for operating equipment

- Usage of Personal Protective Equipment and critical spots in the mine for dust, noise, heat, vibration, Illumination etc.
- Inspections, supervisions and daily reporting requirements.
- Emergencies.
- Housekeeping rules.

The safety management system should at all time be such that it promotes a process of **continuous improvement**.

Because of their status and immediacy to the job, Managers and Supervisors have a key safety role in the mine to ensure: -

- The work environment is safe for workers
- Planned work methods are safe & followed
- All accidents & near misses are investigated
- Workers are competent & know their duties
- Adequate reporting on shift change-over occur

## **HAZARD IDENTIFICATION & RISK ASSESSMENT**

### **Definitions**

**Hazard:** Source of potential harm, injury or loss.

**Risk:** combination of the likelihood of a specific unwanted event and the potential consequences if it should occur.

**Risk Assessment:** Is a process that involves measurement of risk to determine priorities and to enable identification of appropriate level of risk treatment (used also to describe the overall process of risk management).

**Risk Control:** Implementation of strategies to prevent or control hazards.

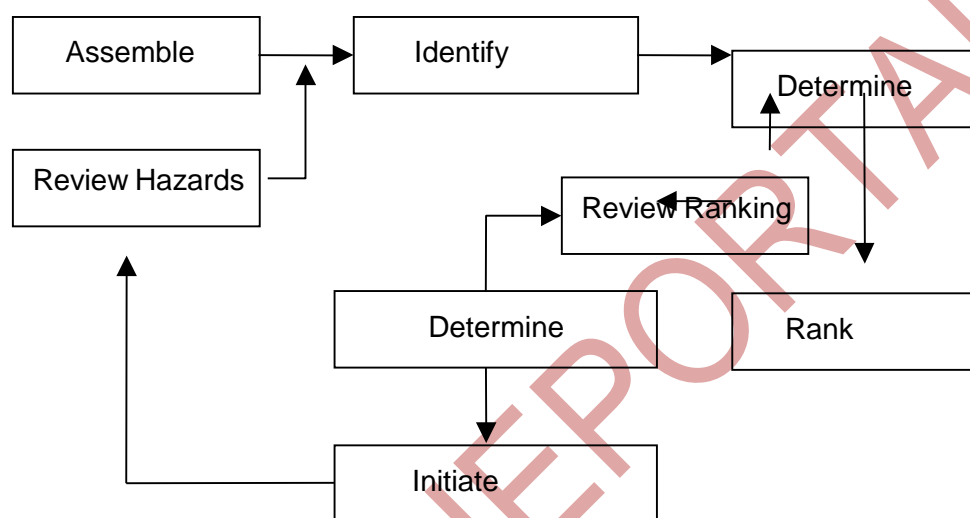
**Risk Rating:** The category or level of risk assigned following risk assessment (eg. High, Medium, Low etc.)

**Risk Management:** Overall description of the steps taken to manage risk, by identifying hazards and implementing controls in the workplace

## Risk Assessment Process

Risk assessment is to be performed on a regular basis. The goal for each risk assessment session is to identify hazards, determine risk ratings and controls, and to review the implementation of risk controls from previous risk assessment sessions.

The following workflow diagram illustrates the areas involved in performing a risk assessment session.



### Assemble the Team

A team approach is recommended to establish hazards in the workplace. It is best to use a vertical wedge of employees (eg. manager, engineer, safety officer, supervisor, worker) as well as workers from different aspects of the operation to provide different perspectives on views, likelihood, consequence and controls that are both practical feasible and cost effective. The members of the team should be varied from session to session to gain a broad perspective of the hazards across a site.

### Identifying the Hazards

The process of identifying hazards is possibly the most important part of the whole risk assessment process. This can be done in many ways but the objective is to ensure that all of the possible hazards are identified.

Hazards are only discounted when they have been assessed not to pose a risk. Until that is done all possible hazards should be identified and noted down.

Normally the best process is to proceed step by step through a task. A number of other processes can also be utilised: -

- Previous experience of accidents or occurrences on the mine.
- Work process evaluation
- Consultation with employees who may have experience in the job
- Off-site specialists with experience at other mine sites (consultants).
- Fault tree analysis to determine underlying issues and hazards that might not be evident at first glance.
- Safety statistics for this or other mines.
- Significant incident, near miss or accident reports
- Inspections in the mine

Another method is to consider the hazards that could occur from an unwanted release of energy (eg. Mechanical, Electrical, Gravity, Fluids or air, Chemical, Nuclear, Heat, Light, Noise)

Decide how to divide up the workplace, e.g.: -

- By activities (or processes) e.g. drilling & blasting, load and haul, crushing;
- By equipment, machinery e.g. mobile plant, trucks, conveyors, crushers;
- By geographical areas e.g. pit, compound, workshop;
- By specific job activity;

Look at specific issues and jobs. Break processes up into nodes. Examine each node independently and look at failure modes or things that can go wrong for each node. Examine accident-prone jobs or situations. Carry out a brainstorming exercise and visit the site. Identify all hazards. Hazards will be identified that are likely or less likely, have major and minor impact and importance. At this stage collect do not exclude ideas, be defensive or squash potential hazards that are raised. Record findings.

Notwithstanding whichever method is used for the identification of the hazards, they should all be noted down so that a record of their existence is kept. This can be used to save time and effort when further rounds of risk assessment are being done. Simple forms are provided in the Appendix for use.

There should also be a mechanism for reporting of hazards by staff as they are found which is separate from the formal risk assessment process. Hazards to be recorded before staff forgets about potential hazards, or are not selected for the risk assessment team.

### **Assessment of the Risk & Ranking**

Objectives of risk ranking are to: -

- Identify which risks are most in need of attention, and the options for achieving that risk reduction
- Identify which risks need careful ongoing management, the nature of the ongoing management as well as the indicators that show that the risk is being managed.
- Identify triggers which might be used to monitor that hazard and initiate remedial action if elimination is not feasible

The process of Risk Ranking is carried out by considering both the Likelihood of the occurrence of each Hazard and the potential Consequence should the Hazard occur. Each can be estimated or calculated by engineering principles. This will enable the risk ranking to be carried out. Risks are ranked according to the level of risk i.e. the highest risk to the lowest risk. It is important that the risks are ranked to identify those requiring immediate attention and maximize benefits from the efforts.

The risk of any hazard is dependent upon the chance that it will occur (likelihood) and the impact of an occurrence (consequence): -

**Risk Score = Likelihood x Consequence**

**Consequence** is the size of the loss or damage. In terms of health and safety, it is the degree of harm that could be caused to people exposed to the hazard, the potential severity of injuries or ill health and / or the number of people who could be potentially affected. It should be remembered that consequence of a hazard need not only be in terms of safety criteria but could also be in terms of a money loss, incurred costs, loss of production, environmental impacts as well as public outrage.

**Likelihood** is the chance that the hazard might occur.

In some cases personnel are only exposed to the hazard for part of the time. A more detailed analysis can be carried out of the Risk Ranking by taking this into consideration. Replacing Likelihood by Exposure (% time personnel are present) and Probability (chance that they will be harmed).

**Risk score = Probability x Exposure x Consequence**

The values used for Likelihood, Consequence, Exposure or Probability need to be agreed by the risk assessment team.

Risk ranking can be determined by qualitative and quantitative means. It should however be remembered that none of these methods are best. The best choice of method will depend on the circumstances and preferences at the mine at the time the exercise is done. However regardless of the method establishing Risk Ranking will set priorities for Hazard control. The most important purpose in Hazard Identification, Risk Assessment and Ranking is to draw up and implement plans to control these hazards. These plans are then included in the Safety Management Plan.

### **Treatment Controls and Action Plans**

Examine the high priority risks. Consider the potential to reduce or eliminate the risk by using the hierarchy of controls. This assists establishing methods to reduce the risk. From experience, the effectiveness of each method is given as a percentage after each of the control descriptions.

**Elimination:** Remove step to eliminate the hazard completely ( 100% ) **Substitution:**

Replace with less hazardous material, substance or process (75%) **Separation:** Isolate hazard from person by guarding, space or time separation (50%) **Administration:** Adjusting the time or conditions of risk exposures (30%)

**Training:** Improving skills making tasks less hazardous to persons involved (20%)

**Personal protective equipment:** Used as the last resort, appropriately designed and properly fitted equipment where other controls are not practicable (5%).

Control measures can reduce either the Likelihood or Consequence of the event or both. Depending on the level of reduction of the hazard there could still be a residual risk that needs to be monitored so that a secondary prevention process can be initiated when trigger points are reached.

### **Induction, Training & Continuous Improvement**

Each mine will have training programs for employees, which need to be reviewed against safety criteria. The updating of training requirements should include re-training of existing personnel to the new skill level. This can be performed on-the-job. When the new skill, procedure, etc. has been taught to an individual and they have been assessed to have achieved that Competency, this should be recorded.

### **Accident / Incident Reporting & Investigation**

This would be a Standing Order to ensure compliance with Regulations and to inform mine personnel of responsibilities and reporting requirements. It should cover: -

- Responsibility of those on the site
- Immediate response and Emergency backup
- Notifying key staff of accident
- Securing the site
- Treatment of any injuries
- Investigation and Reporting
- Review of any recommendations and determining actions

### **Auditing & Review/Revise**

Reviewing the effectiveness of programs within the Safety Management Plan. This should be an on-going process. This should show whether policies, Regulations and expectations are being met or where systems can be made more effective. Both internal and external audits should be considered. Auditors need training to be objective and independent. Management Team or the Health and Safety Committee would have to decide how often would audits be done, what systems or areas would be audited and reporting arrangements.