

RISK ASSESSMENT & DISASTER MANAGEMENT PLAN

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1.1 DEFINITION

Risk Assessment is all about prevention of accidents and there is a need to be aware that there is the risk of an accident before steps can be taken to prevent it happening. It may not always be obvious that a work place task could lead to an accident. This is way risk assessments are carried out. Emergency may be caused by a number of different factors; it will normally manifest itself in to two basic forms, viz fire, explosion or toxic release.

In Risk Assessment the words Hazards and Risks are often used and it is necessary to be clear what Hazards and Risks are:-

- A Hazard is anything that has the potential to cause harm.
- The Risk is how likely it is that a hazard will cause actual harms.

Having defined the work to be undertaken risk assessment will give a clearer picture of what could go wrong and how serious an accident could be.

1.2 SCOPE

In applying Risk Assessment across the minerals industry, well- credentialed risk management framework need to be applied for all aspects of the life cycle, including mining, processing and downstream stewardship of minerals. Such an approach provides, wherever possible, a transparent risk management approach more likely to have the wide support of stakeholders. An Important element of mitigation is emergency planning i.e. recognizing that accident are possible, assessing the consequences of such accident and deciding on the emergency procedure, both on site and off site that would need to be implemented in the event of an emergency. Emergency planning is just one aspect of safety and cannot be considered in isolation.

1.3 OBJECTIVE

The overall objectives of the emergency plan are:

- To communicate quickly during casualty
- To minimize the impacts of the accident on the environment
- To minimize the impact of the accident on the human health and safety.

Planning of process/ technology and its effective implementation, so that such conditions should either not arise or if it comes, a pre- warning is received for timely action in built or by preparedness for minimizes the negative impacts.

Minimizing the effects may include prompt action, rescue, and first aid, and evacuation, fire-fighting and also passing on information promptly to people living nearby.

1.4 IDENTIFICATION OF HAZARDS

The possible hazards of the mining can be categorized in to following parts;

1.5 PHYSICAL HAZARDS

Hurtful injury remains a significant problem and ranges from the trivial to the fatal. Common causes of fatal injury include rock fall, fires, mobile equipment accidents, falls from height, entrapment and electrocution. Less common but recognized causes of fatal injury include flooding of underground workings, wet-fill release from collapsed bulkheads.

Noise is almost ubiquitous in mining. It is generated by materials handling, and transportation of the minerals.

1.6 BIOLOGICAL HAZARDS

The risk of diseases such as malaria and dengue fever is substantial at some remote mining locations. Leptospirosis and ankylostomiasis were common in mines, but eradication of rats and improved sanitation has controlled these hazards effectively in the developed world. Regular microbiological analysis of the water is necessary to detect Legionella contamination or high concentrations of other heterotrophic microorganisms.

1.7 ECOLOGICAL HAZARDS

No major ecological hazards will occur as proper and adequate precaution will be adopted during mining process. Overburden will be removed gently so felling of tree will be avoided. Mine area will be protected by fencing so movement of wild animal and domestic animals can be avoided. Removed overburden which is full of nutrient will be utilized in green belt development.

1.8 RISK ASSESSMENT

Risk assessment is an important step in protecting workers and business, as well as complying with the law. It helps to focus on the risks that really matter in your workplace – the ones with the potential to cause real harm. In many instances, straight forward measures can readily control risks, for example ensuring spillages are cleaned up promptly so people do not slip, or cupboard drawers are kept closed to ensure people do not trip. For most, that means simple, cheap and effective measures to ensure your most valuable asset– your workforce – is protected.

Activities requiring assessment of risk due to occurrence of most probable instances of hazard and accident are both onsite and off-site.

1.9 ON-SITE

- Exposure to fugitive dust, noise, and other emissions
- Housekeeping practices requiring contact with solid and liquid wastes
- Emission/spillage etc. from storage & handling

1.10 OFF-SITE

- Exposure to pollutants released from offsite/ storage/related activities.
- Contamination due to accidental releases or normal release in combination with natural hazard.
- Deposition of toxic pollutants in vegetation / other sinks and possible sudden releases due to accidental occurrences.

1.11 IDENTIFICATION OF HAZARDS IN THE MINE ACTIVITIES

The possibility of the following may be there for such projects:

- (a) Fire associated with storage of combustible material, lubricants, oil.
- (b) Accidents in the mine
- (c) Increment in Noise level at the area.

To deal the above emergencies, the Emergency Plan is prepared.

1.12 DISASTER DUE TO SURFACE FIRE

The fire could be due to surface fire. Such case has so far not been reported. Likewise equipment sometimes catches fire which needs to be dealt.

Code of Practice in Case of Fire at Mines

Objective:

To deal with fire efficiently and quickly at different locations of mine:

Source of Fire:

- i) Electrical Sub Station.
- ii) Oil & Lubricant Room.
- iii) Mine machineries.

Line of Action:

- i) Sufficient fire extinguishers will be installed at selected locations on site. Besides, numbers of water hydrants with sufficient length of hosepipes will be made available at the surface for fire protection.
- ii) Any person notices any sign of fire shall immediately take steps to give warning by blowing the siren continuously and take steps to extinguish the fire by using appliances available near the site.
- iii) Duties of mine Official: - The Mine officials receiving the warning will forthwith inform at following places.
 - a) Fire fighting station
 - b) Security main gate
 - c) Mines Manager
 - d) Mines Agent / Owner

After intimation he should reach the spot, remove Men & Machinery and take steps to tackle the fire in accordance with the fire fighting instructions. Inform the security office to get an Ambulance if required.

- a) Duties of Fire Fighting Team: -On receiving warning, the team shall reach the site of fire and depending on its nature, class and extent shall take steps to extinguish it and rescue persons who may be caught in fire.
- b) Duties of Mines Manager: -

- (i) On receipt of information about fire, the Manager will forthwith rush to the spot and assess the situation. He will oversee the overall rescue operation and make necessary arrangement for medical aid to the affected persons, if any.
- (ii) Inform the management and statutory bodies.

1.13 CODE OF PRACTICE IN CASE OF EXPLOSION & ACCIDENTS

Objective

To deal with accidents efficiently and quickly.

Line of Action

Any person, who notices any explosion or accident, should immediately take steps to give warning by suitable mean and at the same time take necessary action for withdrawal of men from the site. He shall also inform the mine's Manager and other officials without any delay.

Duties of Mine's Manager

- (a) On receipt of information about explosion or accident, the manager shall forthwith rush to the spot and the situation. He shall make the arrangements for withdrawal of affected persons, if any.
- (b) Inform the hospital for Ambulance for affected persons, if any.
- (c) Provide First aid to affected persons.
- (d) Inform the senior officials and statutory bodies.

1.14 SITE RESTORATION

The incident controller will check the areas thoroughly for possible hazards such as toxic fume or live wires after emergency and will inform site controller accordingly.

The key personnel will meet to evaluate their individuals and overall performance in responding to situation after the emergency is over. The review shall determine.

- Effectiveness of emergency response plan.
- Mine crew performance.
- Any need for updating or revision of the emergency response plan.
- Suitable arrangement for restart of the work.
- Evaluation and control of efficient arising out of mitigating measures like foam discharge & overflow of oil in water.
- Rehabilitate evacuated area.
- Adopt measures to prevent similar recurrence.

1.15 PRECAUTIONS

To avoid all these disasters at working place and to minimize their effects following precautions shall be taken and arrangement shall be made at the working place.

- (i) Periodical maintenance of mine machineries.
- (ii) The persons shall be trained properly to handle the situation.
- (iii) Detailed warning system, implementation procedure, emergency control centre, shall be maintained at the mine with names of trained persons.

- (iv) Details and availability of heavy machinery, fire-fighting equipment shall be available at the site.
- (v) Proper arrangements shall be made for treatment of injured person, if any.
- (vi) All the safety equipment shall be available at the mine.
- (vii) Regular mock drill should be conducted to tackle any causality.

1.16 POST DISASTER ANALYSIS AND EVALUATION

When the emergency is over, the team will carry out a detailed analysis of cause of accident/occurrence, evaluate the influence of various factors and find out the procedures to minimize them in future. At the same time adequacy of disaster management plan shall be evaluated and shortcomings shall be rectified to improve the plan.

1.17 BASELINE DATA & ANALYSIS

Risk assessment often requires the synthesis of risk profiles, which represent the probability distribution of total annual loss due to a certain set of events or activities.

These assessments usually involve estimation of losses for several sub-classifications of the overall process and synthesis of the results into an aggregate risk profile.

Hazards can be assessed by:

- Identifying all materials stored which are classified as hazardous, their, quantities and proposed safe storage and handling (e.g. fuel, raw materials, lubrication oils for maintenance etc.)
- Identifying potential hazards from fire or release of chemicals or fugitive dust, natural occurrences such as floods, landslides, earthquake, maintenance of the machinery used.
- Identifying potential risks to local people and local resources in the event of an emergency.

1.18 OFF-SITE EMERGENCY PLANNING

1.18.1 INTRODUCTION

The off-site emergency plan is an integral part of any hazard control system. It would be based on those accidents identified by the works management, which could affect people and the environment outside the works. Thus, the off-site plan follows logically from the analysis that took place to provide the basis for the on-site plan and the two plans should therefore complement each other. The key feature of a good off-site emergency plan is flexibility in its application to emergencies other than those specifically included in the formation of the plan. The roles of the various parties that may be involved in the implementation of an off-site plan are described below. The responsibility for the off-site plan will be likely to rest either with the works management or with the local authority.

Either way, the plan must identify an emergency coordinating officer who would take overall command of the off-site activities. As with the on-site plan, an emergency control center will be required within which the emergency coordinating officer can operate. An early decision will be required in many cases on the advice to be given to people living “within range” of the accident – in particular whether they should be evacuated or told to go indoors. Consideration of evacuation may include the following factors:

- a. In the case of a major fire but without explosion risk (e.g. an oil storage tank), only houses close to the fire are likely to need evacuation, although a severe smoke hazard may require this to be reviewed periodically.
- b. But if the fire is escalating it might be necessary to evacuate people nearby, but only if there is time; if insufficient time exists, people would be advised to stay indoors and shield themselves from the fire.

.118.2 ASPECTS TO BE INCLUDED IN AN OFF-SITE EMERGENCY PLAN

Some of the aspects to be included in off-site emergency plan are as follows:

- a) Organization
Details of command structure, warning systems, implementation procedures, emergency control centers Name and appointments of incident controller, site main controller, their deputies and other key personnel.
- b) Communications
Identification of personnel involved, communication center, call signs, network, list of telephone numbers.
- c) Special Emergency Equipment
Details of availability and location of heavy lifting gear, bulldozers, specified fire-fighting equipment, fireboats.
- d) Voluntary Organizations
Details of organizers, telephone numbers, resources, etc
- e) Meteorological information
Arrangements for obtaining details of weather conditions prevailing at the time and weather forecasts will be made.
- f) Humanitarian Arrangements
Transport, evacuation centres, emergency feeding, treatment of injured, first aid, ambulances, temporary mortuaries.
- g) Public Information
Arrangements for: -
 - (i) Dealing with the media-press office
 - (ii) Informing relatives, etc.
- h) Assessment
Arrangements for: -
 - (i) Collecting information on the causes of the emergency
 - (ii) Reviewing the efficiency and effectiveness of all aspects of the emergency plan.

.118.3 ROLE OF THE EMERGENCY COORDINATING OFFICER

The various emergency services will be coordinated by an Emergency Coordinating Officer (ECO) who is likely to be a senior police officer but, depending on the circumstances, could be a senior fire officer. The ECO will liaise closely with the site main controller. Again depending on local arrangements, for very severe incidents with major or prolonged off-site consequences, the external control may pass to a senior local authority administrator or even an administrator appointed by the Central or State Government.

.1.18.4 ROLES OF MAJOR HAZARD WORKS MANAGERMENTS

Where the local authority has the organization to formulate the plan, the role of works managements in off-site emergency planning will be to establish liaison with those preparing the plans and to provide information appropriate to such plans. This will include a description of possible on-site accidents with potential for off-site harm, together with their consequences and an indication of the relative likelihood of the accidents.

Advice should be provided by works managements to all the outside organizations which may become involved in handling the emergency off-site and which will need previously to have familiarized themselves with some of the technical aspects of the works activities, e.g. emergency services, medical departments, etc.

.1.18.5 ROLE OF THE LOCAL AUTHORITY

In some places the duty to prepare the off-site plan lies with the local authorities. They may have appointed an emergency planning officer (EPO) to carry out all this duty as part of the EPO's roles in preparing for a whole range of different emergencies within the local authority area. The EPO will need to liaise with the works to obtain the information to provide the basis for the plan.

Rehearsals for off-site plans are important for the same reasons as on-site plans and will need to be organized by the EPO.

.1.18.6 ROLE OF THE POLICE

The police normally assume the overall control of an emergency, with a senior officer designated as emergency coordinating officer. Formal duties of the police during an emergency include protecting life and property and controlling traffic movements. The functions include controlling bystanders, evacuating the public, identifying the dead and dealing with casualties and informing relatives of dead or injured.

.1.18.7 ROLE OF THE FIRE AUTHORITIES

The control of a fire is normally the responsibility of the senior fire brigade officer who would take over the handling of the fire from the site incident controller on arrival at the site. The senior fire brigade officer may also have a similar responsibility for other events. Fire authorities having major hazard works in their area should have familiarized themselves with the location on site of all stores of flammable materials, water and foam supply points and fire-fighting equipments.

.1.18.8 ROLE OF THE HEALTH AUTHORITIES

Health authorities, including doctors, surgeons, hospitals, ambulances and so on, have a vital part to play following a major accident and they should form an integral part of any emergency plan.

For major fires, injuries will be the result of the effects of thermal radiation to a varying degree and the knowledge and experience to handle this in all, but extreme, cases may be generally available in most hospitals.

.1.18.9 ROLES OF THE GOVERNMENT SAFETY AUTHORITY

The Inspectors of Director General of Mines Safety are likely to want to satisfy themselves that the organization responsible for including the off-site plan has made adequate arrangements for handling emergencies of all types including major emergencies.

