

Risk Analysis & Risk Assessment

Risk Assessment is mainly aimed at preventing accident from taking place. Ranking risk to health, safety & the environment is important because we have limited resources managing them. It would be ideal to regularly review our priorities in order to decide which risk deserves more attention.

Ranking risks is a critical step in effective risk management. Ordering risks by their importance allows policy makers to focus on those issues that matter the most. It is required to ascertain:

1. What can go wrong?
2. How likely is it to occur?
3. What could be the consequences?
4. What factors could influence?

Risk Analysis is the science of risks & their probability & their evaluations. Every project manager needs to be aware of the practices & the principles of effective management. The main objectives of preparing a disaster management plan at a mining project includes:-

1. Preventing workers at mines from accidents.
2. Preventing incidents or reducing the severity of injuries during the mining operation.
3. Responding immediately & adequately in case of serious accidents.

Normally the following hazardous operations will have to be carried out at a mining project:-

1. Opening up of the mine (If it is a new project).
2. Storage and handling of diesel, oil & lubricant.
3. Storage and handling of explosives.
4. Drilling of blast holes.
5. Blasting of explosives.
6. Loading & unloading of blasted material.
7. Transport of minerals & waste.
8. Formation of waste dumps.
9. Maintenance at workshop.

In the process of all the above mining operations, the following risks are involved.

Opening Up of the Mine (If it is a new project) or Running Mine, if required:

1. In the course of the construction of roads various accidents take place while dozing, scraping, grading etc.

Precautions to be taken:

1. Machines should be fitted with proper types of horns and lighting system.
2. The machine operator must be well trained.
3. All other precautions, as per rules, will be taken.

Storage and handling of oil, diesel & lubricant:

1. Fire hazard may takes place.
2. Workers make slip down on places where the oil is spilled.
3. As a result of spillage of oil, it may flow into water course and pollute the water.

Precautions to be taken:

1. The room where oil and lubricant are stored will be properly fenced off.
2. Inflammable material will be displayed near the room.
3. Fire fighting equipments like sand, spades and fire extinguishers will be provided.
4. It will be ensured that no dry grass and combustible material are allowed to accumulate around the oil room.

Drilling of blast holes:

1. In case of manual drilling with jack hammers, accidents may take place due to sudden breakage of drill steels.
2. The drill man may fall into the pit while moving backwards carelessly.
3. If the drill rod is inserted into a misfired hole, accident may take place.
4. In case of drilling with wagon drills, the machine may topple down into the pit.

Precautions:

1. Before commencing the drilling operation the drill steels should be examined to ensure that no cracks are developed on them.
2. Only trained persons should be engaged on drilling operations.
3. Before commencing drilling operation the face should be properly cleaned and washed to check against the presence of misfire holes.
4. Before drilling with a wagon drill care should be taken to ensure that no major breaks/cracks exist at the working face.

Blasting of Explosives:

1. Accidents may take place while charging of blast holes.
2. After blasting the projectile materials may hit men and animals present within the danger zone.
3. The blaster may be hit by the projectile while running to the blaster shelter after blasting.

Precautions:

1. While charging the explosive into the blast holes it should be ensure that the holes are neither over-charged or under-charged.
2. Before commencing blasting operations, guard should be posted at all the entry points within the danger zone.
3. A proper siren should be hooted well before blasting the holes.
4. Proper shelter to be constructed for the blaster.
5. After blasting, the blaster checked for misfires, if any.

Loading & Unloading:

The main hazards associated with loading are as under:-

1. Rock falling over the dumper operator or the persons working at the face.
2. Toppling of the dumper due to unevenness of the ground.
3. Failure of hydraulic system.
4. Fire due to various causes
5. Falling while trying to enter into the operator cabin.
6. Electrocutation.
7. Failure of wire ropes.

Precautions:

1. Immediately after blasting a competent person should inspect the working face and ensure that all the loose materials are properly dressed before allowing anybody to work at the face.
2. In case of mechanical loading the boom height of the loading machine should in no case be less than the height of the face.
3. Only trained operators should be allowed to operate the loading machine.
4. The enclosures for the loader operator should be properly designed and maintained.
5. Access to the cabins must be safe & well designed.

6. The cabin should be of sufficient strength, capable of protecting drives in case of fall of rocks.
7. The loading machine should be well maintained.
8. Unnecessary persons should not be allowed to stay near the loading points.

Formation of waste dumps:

1. Boulders may run down the waste dump and hit the men and animals.
2. The wash-off from the dump may clog the water courses during rainy season.

Precautions:

1. Proper terracing of the waste dump should be done.
2. Proper type of retaining walls should be constructed around the toe of the waste dumps.
3. Proper garland drains should be constructed around the waste dump to channelize the rain water and to ensure that no wash-off are transported into the natural water courses.
4. Proper siltation ponds also will be constructed.

In addition the following hazards are also possible at the mine.

1. Hazards due to inundation at the mine.

- 1) In case of sudden heavy down pour, there are chances of deep pits getting inundated, trapping men and machinery therein.

Precautions:

- 1) Deep drains will be constructed around the mining pit to ensure that the rain water flows into the natural water courses. However, in case of continuous heavy rains the men and machinery should be withdrawn from the pit bottom.

2. After closure of the mine it may be a source of danger to men and animals:

- 1) After the closure of the mine, normally no mine officials will be present at the mine. Therefore there are chances of fall of men and animals into the excavated pits.

Precautions:

- 1) The mine will be properly reclaimed and rehabilitated as per the provisions in the final mine closure plan.
- 2) All the deep pits will be properly fenced off as per rules.

3. Fire Hazard:

- 1) Combustible materials like dry leaves, grass and fire wood may catch fire, if proper care is not taken.

- 2) The mining machinery may catch fire due to overheating.
- 3) Fire may take place like office room etc.

Precaution:

- 1) The mining machinery will be maintained properly.
- 2) Fire fighting equipment will be provided as per rules.

Disaster Management Plan:

Objectives of Disaster Management Plan:

The main purpose of preparing a disaster management plan is to ensure immediate tackling of the situation and to restore production. The plan should have wide circulation and the personnel should be trained by carrying out rehearsal/mock drills.

The aim of the Disaster Management Plan is to seek assistance from the outside services, also.

Incident controller/mines manager:

1. Mock rehearsal of the management plan prepared for dealing with accident.
2. To withdraw men and machinery from the affected areas.
3. To make a report on the incident and submit it to the site controller.
4. To ensure that prompt first aid is provided to the needy persons.
5. To make arrangements for transportation of the injured personnel.

Emergency medical facilities:

Stretchers, gas masks and general first aid material will be maintained at the first aid room. Government hospital will be approached for emergency help and the services of private medical practitioners will also be availed. The nearest Rescue Center will be contacted. An ambulance with a driver should always be available.