

RISK ASSESSMENT

Risk Assessment: The mining operations involve various types of risks.

Risk : The risk is the chance of something happening that will ultimately have a negative effect on health and safety of the person, as well as material & resources. The risk is measured in terms of likelihood of events & their consequent loss.

Risk : **Likelihood (Probability) x consequence loss.**

Identification of Risk (disaster factors in core & buffer zones):- This is large mechanized opencast mine with a lease area of 129.50 hect, employing a total manpower of 50 persons. Excavations are being done by using HEMM by making 6.5 to 7 m. height bench and about 8 m. wide benches.

Risk from side fall : In Mining there are always risk of side fall in working pit if not properly kept, sloped & benched and hence it is essential to keep vigil in this respect in opencast mining the maximum accident took place due to this factor.

Prevention from side fall: The mining supervisor are been strictly been instructed to check the sides before start of the shift and rock behavior are constantly been studied, dressing of side is done constantly in dressing the sites safety belt are been used by the workers. The bench slope is maintained to 80° and height & width of bench are kept properly sloped.

2. Risk in dump and dumping area:

- ❖ The disposal of waste will raised unmanageable heights & will be dangerous to side fall. managed in such a way that its stabilization is being done by planting vegetation which will be started from a side to avoid edge & side mass from rolling down.
- ❖ The angle of repose into consideration while dumping of waste.
- ❖ During rains the problem is more serious.

Prevention/Mitigation Measures: That proper dumping and unloading of overburden, spotter always remain in dump area. In order to guide the vehicles. Proper terracing has been done required at every 10 mts. interval.

Plantation has been done on the terracing which give a binding factor in the dump area. Retaining wall in the toe of the dump has been made and proper drainage by way of garland drain has been made in toe of dump.

Water is not allowed to percolate on the top of dump area, that large scale plantation has been done in the dump area.

Risk in handling of explosive and blasting practices: The handling of explosives and blasting involve a great risk if not properly handled it may cause disaster.

Prevention:

Explosive:

- i. **Storage of Explosive:** The explosives are being stored in proper designed and approved licenced magazine.
- ii. The magazine is having lighting arrester to prevent accidental blast due to atmospheric lighting.
- iii. Fencing is made all around the magazine 15 mts.
- iv. 24 hour guard is posted guard is provided with proper shelter.
- v. Magazine in charge keeps all record regarding receipt, issue & return of the explosive.
- vi. Unauthorized persons are not allowed in the magazine premises.
- vii. Explosive is issued to blasting incharge on the bases of indent duly passed by Manager or Asst. manager.
- viii. Explosive transportation is carried out in proper boxes and transported by blaster & helper. Gelatine & detonator are not carried in the same box.
- ix. Primer Cartridges are made in blaster shelter by experienced workers.
- x. **Charging:** Calculated amount of explosive is charged.

PRECAUTION TO PREVENT ACCIDENT DURING BLASTING:

1. All the person are removed from blasting site.
2. Guards deployed to keep all people away from danger zone.
3. Pillars are erected at a distance of every 500 mts., all around. These pillars are constructed also to identify the distance of 500 mts.
4. Warning siren is hooted before blasting.
5. Blaster takes safe shelter before blasting which is at least 200 mts, away from blasting site.
6. Only qualified trained persons are being employed.

Possibility of outbreak of fire: Fire is a significant hazard to the safety and health of mine workers and life of mine too. A large fire in a mine can be a serious threat. The hazardous nature and typical remoteness of mining operations makes extra vigilance in preventing and adequately preparing for fire.

The leading causes of mine fires include flame cutting and welding operations, friction, mobile equipment malfunctions, and the prevention, early and reliable detection, control, and suppression of mine fire are critical elements in safeguarding the lives and livelihood of miners and miners.

Prevention

- Inflammable material will be stored in fire proof containers.
- Dry vegetation will not be stored near diesel storage and adequate fire fighting arrangements will be provided near the same.
- Sufficient supply of sand, or portable fire extinguishers used as fire fighting arrangement.
- Electric apparatus & cables are being checked regularly.
- High speed diesel and lubricants which can be highly inflammable have to be stored separately in a storage tank as per the specification.
- Workers are being trained in fire fighting at strategic location.

Risk in Storage of Diesel and oil lubricants:

Prevention: Diesel at the mine is stored in a proper underground tank for which the lessee has obtained a license from Petroleum and Explosive Safety Organization, Govt. of India. The diesel is issued to vehicles strictly under control by supervisory staff. Proper fencing is done in the area. Fire extinguishers and sand buckets are available in the premises. No unauthorized person is allowed in the premises. The diesel tank has been given earthing so that in case of any lighting no mishap can take place.

Vehicle Movement and prevention of accident from vehicles: If Vehicles are not maintained properly it may lead to accident while in operation in mines or in workshop. Therefore proper maintenance of vehicles is carried out at workshop as per schedule prescribed by the manufacturers. A mechanical engineer supported by mistry and helper has been appointed for this job.

Machinery being deployed at present

Name of Machines	No.	Risk involved	Preventive Measures
1. Shovel a. Tata Hitachi Ex-110 b. Tata Hitachi Ex-200 c. Tata Hitachi Ex-201	3	Risk in operation of loading machines. Some times stones fall from the bucket and the persons working near by suffer injury. Sometimes the injury might prove fatal. Therefore nobody should be allowed to remain in the swing area of the shovel bucket. In case of high benches under	Reverse alarm to caution the persons about the reversal of shovel. No body will be allowed in bucket swing area. No under cutting will be allowed.

		cutting is not allowed otherwise it may result in bench failure or total collapse	
Wagon drill machine	2	Drill bits of proper size is to be used. The operator should be competent & maintain proper pressure.	When a drill is being moved from one drilling area to another, the mast is placed in a safe position & drill steels, tools etc. are properly secured.
Compressor a. Atlas compressor b. IR. compressor c. Tractor compressor	4	Cylinder may sometimes burst. Safe cap & safety valve should be checked to avoid any possible accident. Compressor should be installed on safe place preferably on a rigid platform. Overheating should be avoided.	The compressor should be properly maintained. The suitable lubricating oil used in the compressor should be of a type to minimize production of CO, & harmful gases in the compressor air.
J.C.B. Loader	1	The oiling greasing and regular maintenance is essential.	The J.C.B. operators are properly trained & have adequate knowledge about the Do's & Don'ts.
D.G. Set	1	The D.G. set should be installed as per guideline. The overheating should avoided.	Trained workers in fire fighting at strategies location & mock-drill will be carried out regularly. Sufficient supply of portable fire extinguishers will be made available for fire fighting.
Trippers/ dumper	16	Deployment of dumper at may lead to fall of dumpers. Accident in the mines may occur due to high speed. Therefore speed should be checked to avoid any possible accident.	When dumpers are loaded, nobody should come under swing area.

Risk of employment of untrained persons: There is a constant risk in employment of untrained workers. Such persons may cause accident because of lack of their knowledge and hence it is very important that qualified trained persons be employed for various mining operations:-

- i. **Mining operation:** All persons starting from Mines Manager, to Blaster are competency certificate holders issued by Director General of Mines Safety, Dhanbad. They are well experienced in their job.
- ii. The management along with adjoining mine owner has establish a Group Mine Vocational Training Centre where workers of this mine and adjoining of mine are getting Vocational Training.
- iii. That time to time refresher courses are also arranged for the workers.

Risk of Occupational Diseases: In mine occupational workers may get occupational diseases and hence it becomes necessary to prevent the same.

That periodical medical examination of all the workers is done as per Mines Rules, 1995. A First Aid Room with all the equipments exist in the mines where Doctor from Limestone & Dolomite Welfare Board along with paramedical staff in a mobile vehicle visit the mines twice in week. In case of any need sick persons can be shifted to Hospital of Limestone & Dolomite Welfare Board existing at about 10 km. at Odan.

First Aid Training: All the supervisors & workers are trained in first aid, periodically refresher course are arrange to give refresher training.

To create safety consciousness a pit safety committee under the chairmanship of Mines Manger is in operation and every year this mine participate in Mines Safety Week and twice overall safety award in Mines Safety Week has been done by this mine apart from other prizes.

Other possible risk & prevention measures:

- Danger signs have been displayed at suitable locations.
- Only authorized and trained persons are permitted to operate and maintain equipments.
- The possible risk due to ground water contamination being caused by surface run off from the mines can be started by adopting suitable measures such as construction of peripheral drainage around the waste dump and check dams at suitable places. This aspect has already been covered in EMP.
- The rise in SPM due to the mining operations thereby causing air pollution are also be suitably controlled by measures as discussed in the EMP.

Disaster Management Plan: The aim of disaster management plan is to minimize the adverse effects of a hazard through effective precautionary actions and to ensure timely, appropriate and efficient organization and delivery of emergency response following the impact of a disaster.

The pit safety committee (PSC) has been constituted at the mine level consisting of a mine manager essentially among others which has the aim of promoting safety in the mines. It is manned by qualified persons and the duties and responsibilities of the same are being fixed. Safety education & training is provided to the workers and employees of the mines.

The committee is discuss remedial measures against the unsafe conditions & practices in the mines, inquire about the accidents and give its recommendations. It will also organize the Mines Safety Week and other safety related competition.

The PSC is also remain in touch with local hospitals and community health centres and will provide first aid facility whenever required. It is also consist of a person who is well versed with providing first aid facility. The board indicating the contact persons of relevant departments alongwith their contact numbers is displayed at the mine site and office so that they can be contacted easily during any form of disaster. An alarm or hooter is also been provided to call all the available staff for help in case of any emergency.

The Safety Audit of the mines is also be carried out by experts in association with the pit safety committee (PSC) to assess the safety standards of the mines, to analysis the causes of accidents and to suggest measures to prevent any such recurrence in future.

Safety Management: Safety management for mining operations is governed by a very well defined set of rules, regulations etc. framed by Government of India and modified from time to time.

Legislative Frame Work: All the operations in any metalliferous mines are regulated under the Mines Act, 1952 and rules and regulations framed under it. Metalliferous mines Regulations is a comprehensive legislation framed under the Mines Act and it takes care of the technical and safety aspects of the mining operations.

Mining legislations have been modified from time to time to meet the challenge of the new risks from newer technology and technical advancements for ensuring better safety standards in mines to ensure compliance with the relevant regulation. Government of India has also constituted an Inspectorate under the Ministry of Labour (Director General of Mines Safety – DGMS). The officers of DGMS carry out periodic inspections to ensure that mining operations are in conformity with the law. Permission of DGMS is obtained for various activities as required, including permission to work with Heavy Earth Moving Machinery.

The organizational requirements for ensuring safety, as laid down in the different regulations, are built into the overall of the mine.

Safety Policy: Safety of both men and materials is accorded maximum priority in the mine. A occupational health and safety policy has been framed with the following objectives. In general following measure is being taken.

- Δ To improve working conditions and environment;
- Δ To propagate safety measures and create safety consciousness among workmen, supervisors and officials, which is done during Safety Week, Environment Week.
- Δ To train workmen as well as the supervisors in their respective fields of operations;
- Δ To reduce the scope of accidents and to aim at accident free performance;
- Δ To adopt measures for improvement in health standards;
- Δ To ensure that no long term effects on health due to industrial environment take place.
- Δ To ensure that all statutory provisions relating to safety are followed.

Occupational health: That due to mining activities following impact can take place on workers.

- (a) Impact due to the generation of dust.
- (b) Any occupational disease.
- (c) Safety of the person due to various factors like fall of side, accident due to explosive, running of Dumper etc.

I. Health:

To prevent the inhalation of air borne dust by the workers, following measures are being taken up.

While drilling all provisions of Metalliferous Mine Regulation, 1961 are being followed.

- i) Dust is suppressed as close as possible to its source of formation.
- ii) During any operation of drilling the production of dust is reduced by using drill-bits which are sharp and of proper shape; keeping suitable air-pressure on the bit; and Clearing the cuttings from the bit;

Occupational Health Surveillance at Mine:

1. That a Medical Officer of Limestone and Dolomite Welfare Board visits twice in a week at mine site along with paramedical staff, in a van.
2. All supervisory staff have been trained in First Aid. A First Aid Room exists at the mine.
3. Vibration studies of various mining machinery has been done before their introduction in mining operations as per ISO standards.

4. Ergonomical assessment of all latest machines, before their introduction into mining operation as per ISO standards. ergonomical assessment is included:
 - * Assessment of work process.
 - * Assessment of working Aids/tools
 - * Assessment of working posture
 5. Potability tests of drinking water supplied to the mine employees, is being made once in a year.
 6. Initial medical examination has been done to all workers as per Rule 29 of Mines Rules, 1955.
 7. The frequency of periodic medical examinations existing five years, and three years for the mining employees above 45 years of age.
 8. Employees engaged in driving/ HEMM operation jobs undergo refraction test at least once in a year
 9. As mineral Soapstone and Dolomite is non toxic, no other occupational disease is anticipated.
 10. Protective personal equipments like dust mask aspirators are used.
 11. All precautions under Metalliferous Mines Regulation are being taken.
 12. **Safety Education & Training:** Safety education is considered an important means in pursuit of accident prevention. Before induction, workmen are provided vocational training at the mine. Basic training is provided by faculty from training center to the qualified persons. The skilled category workmen are provided specialized training in their respective areas of work. Training is also arranged for supervisory categories. Specialized training is provided to all the new entrants in fire fighting and first aid. A Mine Vocational Training Centre named as "Haldighati Mine Vocational Training Centre" exists at Semal adjoining the mine in which the mine workers of this mine and other mines are been trained.
- 7.3 Relief & Rehabilitation Actions Plans:** As far as the area is concerned, there is no increase in area of the mines and only increase in targeted production is sought. Hence there will not be displacement of population. The importance of mitigation measures has been highlighted & ensured that after the implementation of EMP there will not be any appreciable effect on the environment. However, there is an adequate provision of medical health checkups and supply of free medicine to the ailing people in general. As and general as and when the emergency situation will arises the mines administration is well equipped to tackle the same. The mine workers are being provided with all safety equipments rest shelter, cool and wholesome drinking water, conducive atmosphere of work. As the workers we in nearby villages, no housing facilities are required, excepting for 10, 12 supervisory staff who being to outside place.