

RISK ASSESSMENT REPORT

HAZARD IDENTIFICATION AND RISK ASSESSMENT METHODOLOGY

All types of industries face certain types of hazards which can disrupt normal activities abruptly. Similar stone mining also have risks which need to be addressed for which a disaster management plan has been formulated with an aim of taking precautionary steps to avert disasters and also take such action after disaster which limits the damage to minimum. In the sections below, the identification of various hazards, probable risks during the operational phase of the mining, maximum credible accident analysis and consequences analysis are addressed either qualitatively or quantitatively.

Risk assessments will help mine operators to identify high, medium and low risk levels. This is a requirement of the Occupational Health and Safety Act 2000. Risk assessments will help to priorities the risks and provide information on the need to safely control the risks. In this way, mine owners and operators will be able to implement safety improvements. The following natural/industrial problem may be encountered during the mining operation.

- Inundation: Filling of the mine pit due to excessive rains,
- Blasting- Fly rocks and Boulders,
- Drilling- Noise and Vibration,
- Handling of overburden and heavy machinery,
- Storage of diesel,
- Slope failures at the mine faces or stacks.

As per proposal made under the mining plan the area will be developed by means of opencast mining method. Extraction of minerals is to be carried out by mechanized mining means. Water table will not be touched during the mining process. No high risk accidents like landslides, subsidence flood etc have been apprehended.

Blasting

This is the reason of common accident into mines. Most of the accidents from blasting occur due to the projectiles and mainly due to overcharging of the shot holes as a result of certain special features of the local ground. Flying rocks are encountered during initial and final blasting operations. Noise and dust also generated during blasting.

Vibration

Whenever a blast is conducted the vibration is felt in the form of ground vibration. The ground motion is essentially a wave motion. The particles of the ground through which the blasting/sound wave travels, set themselves to oscillating motions with respect to their rest positions. These waves can affect buildings and structures by forming visible cracks on the surface, because of compression and tension waves and through vertical and horizontal shearing effects.

Risks due to Inundation

Mining will be done during the non-monsoon periods (March- May); therefore problem of inundation is not likely to happen.

Risks due to Failure of Pit Slope

In order to allay dangers due to open cast slope failure, final pit, slope stability estimations will be made for the existing mines. Determining the factor of safety, the slopes should be monitored at regular intervals to check for any possible failure.

Risk due to Handling of Overburden and Heavy Machinery

During the mining, most of the activities are done by the vehicles and the heavy machinery for mining and handing of the mineral. There is no overburden or waste will be generated during the first five year of mining operation. Heavy machinery also cause for accidents due to mechanical failure.

Risks of Accidents due to Trucks and Dumpers

Identifying the hazards that come along with the presence of vehicles at the workplace (*e.g.* reversing operations, loading) can cause harm if not properly handled. Among some of the factors that may make vehicle accidents more likely are:

- Rough access roads
- Time pressure
- Inadequate brakes (Possibly from lack of maintenance)
- Carelessly parked vehicles (*e.g.* being parked on a slope without being adequately secured)
- Unsafe coupling and uncoupling of trailers, and
- Untrained drivers
- Overturning vehicles

To avoid such instances we will talk to the workers and their representatives and will involve them in the risk assessment process and tell them what to do, to reduce risk. All transportation within the mine lease area should be carried out directly under the supervision and control of management.

- The vehicles will be maintained in good working condition and checked thoroughly at least once a month by the competent person authorized for the purpose by the management.
- Road signs will be provided at each and every turning point up to the main road (wherever required)
- To avoid danger while reversing the vehicles especially at working place/loading points, stopper should be posted to properly guide reversing/spotting operating.
- Only trained drivers will be hired.

Storage and use of Explosive Materials

- Proper and safe storage of explosives in approved and Licensed Magazine.
- Proper, safe and careful handling and use of explosives by competent Blasters having Blaster's Certificate of Competency issued by DGMS.
- Proper security system to prevent theft/ pilferage, unauthorized entry into Magazine area and checking authorized persons to prevent carrying of match box, lights, mobile phones, cigarette or Biri etc.
- Conventional explosives shall be used in their original cartridge packing and such cartridge shall not be cut to remove explosive for making cartridge of different size.
- Explosives shall be conveyed in special containers.
- Before starting charging, clear audible warning signals by Sirens will be given so that people nearby can take shelter.

The results of risk assessment are given in table below:

Table 1: Hazards faced in stone mining operations

S. No.	Activity	Hazard Description (Risk)	Score				Risk Level
			Consequences	Exposure	Probability	Risk Score	
1.	Site planning and layout	Travel in moving vehicle in uneven terrain	1	2	1	2	Level 3
2.	Storage of	Unintended explosions	1	5	3	15	Level 1

S. No.	Activity	Hazard Description (Risk)	Score				Risk Level
			Consequences	Exposure	Probability	Risk Score	
	explosives	(exposure to overpressure)					
3.	Charging of explosives	Unintended explosion or exposure (exposure to overpressure)	1	3	1	3	Level 3
4.	Blasting	Hit by fly rock (bodily injuries)	1	2	1	2	Level 3
5.	Bench Formation	Rock falls or slide due to lack of bench face stability (bodily injuries)	5	1.5	2	15	Level 1
6.	Crushing and sizing of ROM	Hit by Machineries – Electrical Equipment (bodily injuries)	1	3	3	9	Level 2
7.	Transportation of minerals	Vehicle Accident (bodily injuries)	5	5	2	50	Level 1
8.	Transportation of minerals	Accidental fire in vehicle (bodily injuries, exposure to heat radiation)	1	5	1	5	Level 3

By arranging the above hazards from highest to lowest, the hazards were re-arranged as per their risk levels. Ranking of hazards based on risk levels are provided below in the Table.

Table 2: Hazards ranked by Risk level

S.No.	Activity	Hazard Description (Risk)	Risk Score	Risk Level
1.	Site planning and layout	Travel in moving vehicle in uneven terrain	2	Level 3
2.	Storage of explosives	Unintended explosions (exposure to overpressure)	15	Level 1
3.	Charging of explosives	Unintended explosion or Exposure (exposure to overpressure)	3	Level 3
4.	Blasting	Hit by fly rock (bodily injuries)	2	Level 3
5.	Bench Formation	Rock falls or slide due to lack of bench face stability (bodily injuries)	15	Level 1
6.	Crushing and sizing of ROM	Hit by Machineries – Electrical Equipment (bodily injuries)	9	Level 2
7.	Transportation of minerals	Vehicle Accident (bodily injuries)	50	Level 1
8.	Transportation of minerals	Accidental fire in vehicle (bodily injuries, exposure to heat radiation)	5	Level 3

Hazard Analysis

Broadly, the hazards cover explosive material management, working at heights, slope and bench stability, mineral transport, mineral processing and force majeure conditions (rainfall and flooding). The mechanisms due to which hazards (coming under Risk Levels 1 and 2) may actually occur are covered in Table 3.

Table 3: Cause analysis for Level 1 and Level 2 hazards

S. No.	Hazard Description (Risk)	Risk Score	Risk Level	Cause Analysis
1	Travel in moving vehicle in uneven terrain	2	Level 3	<ul style="list-style-type: none"> • Poor visibility • Incompetent driver • Poorly maintained vehicles
2	Unintended explosions (exposure to overpressure)	15	Level 1	<ul style="list-style-type: none"> • Defective explosives • Outdated explosives • Improper storage of explosives • Force majeure conditions such as lightning strike • Fire (can be caused by unsafe practices or as ignition)
3	Unintended explosion or exposure (exposure to overpressure)	3	Level 3	<ul style="list-style-type: none"> • Defective explosives • Outdated explosives • Improper storage of explosives • Force majeure conditions such as lightning strike • Fire (can be caused by unsafe practices or as arson)
4	Hit by fly rock (bodily injuries)	2	Level 3	<ul style="list-style-type: none"> • Poor access control of blast area • Poor blasting practices (leading to excessive fly rock)
5	Rock falls or slide due to lack of bench face stability (bodily injuries)	15	Level 1	<ul style="list-style-type: none"> • Improper design of bench • Force Majeure (such as heavy floods or rainfall) • Improper blasting practices • Incompetent blasting personnel
6	Hit by Machineries – Electrical Equipment (bodily injuries)	9	Level 2	<ul style="list-style-type: none"> • Improper design of equipment • Improper maintenance • Non usage of required PPE • Incompetent Personnel
7	Vehicle Accident (bodily injuries)	50	Level 1	<ul style="list-style-type: none"> • Head on collision between vehicle and another vehicle (due to poor visibility or incompetent drivers) • Poor vehicle maintenance
8	Accidental fire in vehicle (bodily injuries, exposure to heat radiation)	5	Level 3	<ul style="list-style-type: none"> • Accident to vehicle carrying fuel, and subsequent ignition of spilt fuel • Improper storage of fuel, in MS drums, leading to spillage followed by ignition • Driving with loaded material on uneven terrain, and subsequent ignition of spilt fuel

DISASTERS MANAGEMENT PLAN

All types of industries face certain types of hazards which can disrupt normal activities abruptly.

The disaster could be due to fires, inundation, failure of machinery, explosion etc. The following natural/industrial problems may be encountered during the mining operations:

- Mine accidents
- Fire
- Land slides
- Earthquakes
- Rainfall /nallas/rivers may flow to the maximum extend causing flood like situation to the villages /houses / hutments constructed along the river/nalla banks.

All emergency situations in the areas whether these are incidental to mining or otherwise need following arrangements:

- Emergency procedure / management plan should be readily available and should come into force without wasting time and to assist district administration / police / medical authorities of the area.
- Withdrawal of persons from the affected areas.
- Siren / signals to inform the surrounding population likely to be effected by emergency.
- To provide emergency facilities available at the mines at such time.

Environmental Risks:

Any likely risk on surrounding environment needs mitigation .In table below risk involved and mitigation measures required are deliberated.

Table-4 Environmental Risk and Mitigation Measures

Risk	Mitigation Measures
Earth quakes may cause sliding of benches/ slops/ external dumps.	Proper benching, terracing on dumps is essential.
Impact on surface water bodies	No diversion of water bodies, regular cleaning of silts.
Surface drainage pattern	Speed of flow of water in the mining area should be reduced by construction of gully plugs and check dams on slops
Increased traffic/ traffic in the night	The capacity of the road in area should be adequate to take increase traffic. As far as possible traffic in the night should be avoided.
Noise and Vibration	No drilling and blasting should be carried during mining activities in the night is avoided.
Deforestation	Phase wise plantation program will be done

Disaster Management Plan:

The Disaster Management Plan (DMP) is supposed to be a dynamic, changing, document focusing on continual advantage of doing this is to have a system that is in synchronicity with commonly used SHE systems such as ISO 14001 and OHSAS 18001.

Policy

The Safety Health and Environmental (SHE) policy is existing & accessible to all at site and to other stakeholders. The policy has been framed considering legislative compliance, stakeholder involvement, continual improvement, and management by objectives.

Planning

Identification and Prevention of Possible Emergency Situations

Possible emergency situations can broadly be classified into unintended explosions, vehicle collision, and inundation. Additional emergency situations can be developed on the basis of audit or other procedures prior to commencement of operations.

Emergency Prevention

Some of the ways of preventing emergencies are as follows:

- Preparation of a Preventive Maintenance Schedule Program and also covering maintenance schedules for all critical equipments and instruments as per recommendations of the manufacturers user manuals,
- Importantly, it is of great importance to collect and analyze information pertaining to minor incidents and accidents at the site, as well as for recording near-misses or emergencies that were averted. This information gives an indication of how likely or unlikely it is for the site to face actual emergency and what shall be further action to prevent them from occurring.
- Establishment of an ongoing training and evaluation program, incorporating the development of capabilities amongst employees about potential emergencies and ways and means of identifying and averting the same. Most emergencies do not occur without some incident or an abnormal situation. So there is always sometime of few seconds to few minutes to arrest an incident of abnormal situation from turning in to an emergency. This is the role of the shift in-charge who is the incident controller (IC) along with his shift team.

Emergency Plan Objectives

Specific objectives of the Emergency Response Plan are to be clearly listed with regards to the responses desired for successful management of the possible emergency situations. Suggested Objectives could include:

- To define and assess emergencies, including risk and environmental impact assessment.
- To control and contain incidents.
- To safeguard employees.
- To minimize damage to property or / and the environment.
- To inform employees, the general public and the authority on the hazards / risks assessed.
- Safeguard provided residual risk if any and the role to be played by them in the event of emergency.
- To inform authorities like Safety and Fire Dept and Mutual Aid Centers to come up for help.
- For effective rescue and treatment of casualties and to count the injured.
- To identify and list fatal accidents if any.
- To secure the safe rehabilitation of affected areas and to restore normally.
- To provide authoritative information to the news media.
- To preserve records, equipments etc. and to organize investigation into the cause of the emergency and preventive measures to stop its recurrence.
- To ensure safety of staff and patients and resume work.
- To work out a plan with all provisions to handle emergencies and to provide for emergency.
- Preparedness and the periodical rehearsal of the plan.

The objectives are suggested in emergency preparedness plan of TCL. Responsibilities, resources and timeframes require to be allocated for implementing the objectives.

Implementation

Allocation of Resources

Key Personnel are identified for carrying out specific and assigned duties in case of any kind of Emergency. All such key personnel shall be available on call on holidays and off duty also.

- Commander (Manager Quarries)

- Deputy commander (Personnel Officer)
- Site Incident Controller (Shift in charge)
- Deputy Incident Controller (Senior Mining Mate)
- Other key personnel
- Essential workers

Responsibilities of Commander / Deputy Commander

- To take charge at the place of incident.
- To activate the Emergency Preparedness Plan according to severity of situation.
- Inform all the employees and relatives of the affected employees.
- Call all key personnel and inform Doctor to be ready for treatment.
- Commander shall deploy staff carry out following functions.
- ✓ To coordinate and reinforce Emergency Combat at Site along with Site Incident Controller.
- ✓ To liaise with other Departments and guide their personnel.
- ✓ To supervise Assembly and Evacuation at all points.
- ✓ To look after Patients who are bed ridden and any Casualties and give psychological support.
- Activate Assembly and Evacuation Plan if required as per situation by ordering Site Incident Controller.
- Inform and liaise with Chief Operating Officer, Police department and District Emergency Authority.
- Arrange for chronological records of emergency to be maintained.
- Issue authorized statements to News Media.
- Ensure that proper consideration is given for preservation of evidence and arrange for video shooting / photographs.
- Deputy Commander shall carry out the responsibilities of Commander in his absence and assist him in his duties when present.
- Assign Medicare and Emergency Management tasks to all persons of management cadre.

Responsibilities of Mines Foreman

- To take immediate charge at the site of incident.
- Ensure that immediate steps as per Emergency Preparedness Plan are taken and direct the worker staff.
- Inform Commander, Deputy Commander and other key personnel's.
- Shall blow the Siren / Hooter as per situation to declare Emergency.
- Supervise assembly and evacuation as per plan, if required.
- Appoint more than one Deputy Incident Controller to take charge if emergency occurs at more than one place.
- Ensure that Commander has been alerted.
- Take decisions for controlling the emergency till arrival by Commander.
- Ensure that casualties are receiving adequate attention and medical care.
- Ensure accounting for personnel and rescue of missing persons.
- Control traffic movement in Quarry premises.
- When emergency is prolonged arrange for relief of rescue workers and catering facilities.
- Deputy Incident Controller shall take charge at site of emergency in the absence of Site Incident Controller.
- In the presence of same, he shall assist Site Incident Controller or take charge at another location, if emergency exists in more than one place.

Responsibilities of Essential Workers

A task force of essential trained staff is made available to get work done by Incident Controllers. Such work shall include -

- Fire fighting and spill control till fire brigade takes the charge.
- To help the fire brigade, if it is so required.
- Emergency engineering work e.g. isolating equipment, materials, urgent repairing or replacement, electrical work etc.
- Provision of emergency power, water, lighting, material, etc.
- Movement of equipment, special vehicle and transport to or from the scene of the incident.
- Search, evacuation, rescue and welfare. First - Aid and medical help.
- Manning of assembly points to record the arrival of evacuated personnel. Manning of outside shelters and welfare of evacuated persons there.
- Assistance at casualty's reception areas to record details of casualties.
- Assistance at communication center to handle outgoing and incoming calls and to act as messengers if necessary.
- Control of traffic at Quarry premises.

Setting up of Emergency Infrastructure

To enable the key persons to implement the DMP, the following infrastructure will require to be set up:

Assembly Points

In case of emergency the site needs to be evacuated immediately. On evacuation people will go to pre-assigned assembly points. The charge will be taken by shift in charge and in his absence person deployed by Commander will be in charge of respective assembly points and will supervise Assembly and Head Count. A Board indicating the Assembly Point having relevant information is placed at point for guidance.

Liaison with State Authorities

Government authorities, local hospital, police fire services, taluka mamlatdar, district collector will be kept informed about the occurrence and development of any incident by Commander and procure necessary help and guidance from these authorities.

Task Force of Essential Staff

A task force of essential trained staff is made available to get work done by the Commander.

Task Force personnel shall be trained to perform tasks as mentioned above.

Emergency Control Center

Manager-Quarry Office will act as Emergency Control Center and provided with required communication facilities. The Control Center is situated in an area of minimum risk and close to the road to allow for ready access by a vehicle if other systems fail or extra communication facilities are needed to be set up.

The Emergency control center should consist of following items:

- External telephones
- Internal telephones
- E-Mail facilities
- Emergency plan
- Stationeries
- Torches and emergency lights.

Fire Fighting

Person noticing the fire shall immediately raise alarm and ask the nearest person to inform Matron and Manager-Quarry.

Portable Fire Extinguisher shall be used in an attempt to extinguish the fire, by the person at site.

Matron shall assess the severity of fire and if likely to be severe shall take following steps -

- Call fire tenders and mobile trailer pump from nearby fire department.
- Call for assembly of all persons at assembly points
- Arrange for turning "OFF" main switch of electricity supply.
- Manager-Quarry shall review the steps taken by Matron in his capacity as commander and establish a "Control Room" in his office.

Immediate Step in Case of Explosion:

At first the concerned security guard should inform about it to the shift-in-charge and Mgr.-Quarry.

They will take the precaution described in the Work Instruction.

Further Steps in Case of Fire Spreading

Commander shall continuously assess the situation and if it is not being controlled then ensure:

- Assembly of all persons at the assembly points.
- Arrival of fire tenders and / or Mobile Trailer Pump.
- Ensure evacuation in orderly fashion.
- Ensure that any vehicle parked near the Fire Site is taken away to safe area.
- Carry out responsibilities as detailed as above.

Emergency Preparedness for Electrical Shock / Accident

(Applicable in Case of Mechanized Sizing):

- Source of power should be put off immediately in case of any electrical shock.
- Injured person should be shifted to safe place.
- Persons engaged in rescuing operation should use all PPEs and take appropriate precaution while removing the injured persons.
- Trained persons are engaged to give first-aid treatment to injured persons.
- In case of major injury the injured is shifted to the Dispensary/Hospital.
- In case of electrical fire, only CO2 type Fire Extinguisher is used.
- Accident report in prescribed form is sent to appropriate authority in case of reportable injury.
- All the persons engaged to carry out this operation should be equipped with appropriate PPEs (Personal Protective Equipments) like safety shoes, helmets, dust masks etc.

Natural Disasters

Quarry being a single storey building, built on elevated base is structurally safe from effects of Natural Disasters. It affords shelter against cyclone and flood.

Cyclone and Flood

When warning of cyclone or heavy rains is received from Local Administration, the Commander shall alert Staff to be prepared.

- Matron shall withdraw the entire person from work place and accumulate them in quarry building.
- All the equipment should be withdrawn from mine and kept in a higher site.
- The Quarry Manager may advise to leave the staff depending on security of situation.

Earthquake

- When earthquake hits, all persons shall be encouraged to run out in the open areas designated as Assembly Points.
- All the electrical supply should be disconnected by the electrical department.
- All key personnel shall reach Quarry immediately and carry out designated responsibilities.
- All the electrical supply should be disconnected by the electrical department.

- Steps detailed in Emergency preparedness are to be carried out.
- As soon as earthquake tremor stops - Site Incident Controller (Matron) shall :
- Check all areas to ensure that all fires are doused.
- Check all areas for persons trapped inside.
- Search and Rescue Operation shall be launched with help of Workers, if there is obvious damage to building.

First Aid

Basic items in a first aid kit consist of items listed in Table 7.5.

Table 5: Suggested Items in First Aid Kit

S. No.	Description	Quantity
1.	First aid leaflet	1 copy
2.	Sterilized finger dressing	10 nos.
3.	Sterilized hand or foot dressing	10 nos.
4.	Sterilized body or large dressing	6 nos.
5.	Sterilized burns dressing -small	4 nos.
6.	Sterilized burns dressing -large	2 nos.
7.	Sterilized burns dressing – extra large	6 nos.
8.	Sterilized cotton wool (25 gm)	2 tubes
9.	Cetavolon (28 gm)	2 tubes
10.	Eye pads	6 nos.
11.	Adhesive plaster	1 spool
12.	Assorted roller bandage	6 nos.
13.	Triangular bandages	6 nos.
14.	Safety pins	6 nos.
15.	Scissors, ordinary, 12.7cms, both sides sharp	1 pair
16.	Savlon liquid, 150 ml, or equivalent	2 nos.
17.	Cotton wool for padding, 100 gm	2 packets
18.	Eye Ointment of sulphacetamide preparation	1 tube
19.	Loose woven gauze (28"x8"), compressed pack	1 packet
20.	Aspirin, 300 mg (10 tablets)	5 strips
21.	Scribbling Pad, 4"x 6" with a pencil in a plastic cover	1 no.
22.	Adhesive dressing strips	10 strips
23.	Field dressing of modified army pattern	3 nos.
24.	Record cards in a plastic cover	1 set
25.	Torch, medium size without cells	1 no.
26.	Eye wash	1 no.
27.	Wooden splints, small	1 set
28.	Wooden splints, big	1 set

Treatment of affected persons

- Injured / Affected persons shall be provided suitable first-aid treatment and sent to Co.'s Doctor for further treatment depending on injury.
- Patients requiring further treatment shall be sent in Ambulances to Hospitals in Porbandar.
- Patients suffering from minor problems shall be discharged and sent home after preliminary treatment.

Post Emergency Activities

Medical checkup: Medical checkup of affected persons if any and suitable medical aid shall be provided.

Collection of Records: Exact information shall be collected regarding cause of Emergency and remedial measures suggested preventing recurrence.

Inquiry: Detailed inquiry shall be carried out to find out cause which will be in the form of fact finding and recommendations made to suitable authority.

Insurance Claims (if any): Insurance claims for damage due to consequences of emergency shall be filed.

Mock Drill

Full scale mock drill shall be conducted at least once a year in coordination with Safety Department.

Manager-Quarry shall declare the emergency for mock drill and all persons concerned shall perform duties as per Responsibilities given in this Plan.

Training

Regular training of all concerned personnel will be conducted to enable the Staff to face any type of Emergency be it Natural Disasters, Fire in Equipment, Building or any explosion in quarry.

DMP Audit, Non Conformance and Corrective Action and Preventive Action

Since this DMP has been designed as a dynamic document, it is required that its performance be audited at regular intervals. Ideally, persons auditing the DMP should be external auditors (i.e. not employed at the site being audited). The audit should result in a set of findings that are put before the site management for review.

Audits will be periodic, at intervals that are decided by the Head Office. Audit reports shall state the exact non-compliance with the particular clause of this DMP, and should include steps to be taken to attain compliance, through corrective and preventive actions.

Training and Human Resources Development

- i. Appointment and delegating qualified and experienced personnel in various disciplines.
- ii. Adequate training/refresher training will be provided to the supervisors, workers keeping in view provisions of Mines Vocational Training Rules, 1966; Mine Rules, 1955, Mines Rescue Rules, 1985.
- iii. Personnel who have to operate and maintain HEMM, Trucks etc are to be trained under the guidance of the manufacturers and as per provisions of DGMS Circular Technical 1/1989 regarding accidents in opencast mines. Recommendation of Seventh Conference on Safety in Mines on "Safety in Open Cast Mining", "Traffic Rules and Procedures", "Mobile equipments and Highway Delivery Vehicles", "Operations and Operator Training" and other related circulars.
- iv. The training of mine personnel shall be provided regularly with respect to environmental protection.
- v. Special courses for employees will be arranged for afforestation, revegetation, reclamation, health hazards (identification), malaria eradication and HIV prevention etc in the training centre of the company.

OCCUPATIONAL HEALTH HAZARDS

Dry-pit mining by open cast method involves dust generation by excavation, loading and transportation of mineral. At site, during excavation and loading activity, dust is main pollutant which affects the health of workers whereas environmental and climatic conditions also generate the health problems. Addressing the occupational health hazard means gaining an understanding of the source (its location and magnitude or concentration), identifying an exposure pathway (e.g. a means to get it in contact with someone), and determination of likely a receptor (someone receiving the stuff that is migrating). Occupational hazard due to stone mining mainly comes under the physical hazards. Possible physical hazards are as below mention:

Physical Hazards Due To Mining Operations

Following health related hazards were indentified due to stone mining operations to the workers:

- a) **Light:** The workers may be exposed to the risk of poor illumination or excessive brightness. The effects are eye strain, headache, eye pain and lachrymation, congestion around the cornea and eye fatigue.
- b) **Heat and Humidity:** The most common physical hazard is heat. The direct effects of heat exposure are burns, heat exhaustion, heat stroke and heat cramps; the indirect effects are decreased efficiency, increased fatigue and enhanced accident rates. Heat and humidity are encountered in hot and humid condition when temperatures and air temperatures increase in summer time up to 480C or above in the river bed mining area.
- c) **Eye Irritation:** During the high windy days in summer the stone could be the problems for eyes like itching and watering of eyes.
- d) **Respiratory Problems:** Large amounts of dust in air can be a health hazard, exacerbating respiratory disorders such as asthma and irritating the lungs and bronchial passages.
- e) **Noise Induced Hearing Loss:** Drilling, Blasting and Machinery is the main source of noise pollution at the mine site.

Medical Examination Schedule

To minimize the health impacts PPE like dust masks, ear plugs/ muffs and other equipments will be provided for use by the work personnel. All workers will be subjected to Initial Medical Examination as per Mines Rule 1955 at the time of appointment. Periodical Medical Examination will be conducted at least once in five years. Medical camps will be organized. The detail of health check up and periodical medical examination schedule is given below.

Table 6. Medical Examination Schedule

S. No	Activities	1 st Year	2 nd Year	3 rd Year	4 th Year	5 th Year
1.	Initial Medical Examination (Mine Workers)					
A.	Physical Check -up		-	-	-	-
B.	Psychological Test		-	-	-	-
C.	Audiometric Test		-	-	-	-
D.	Respiratory Test					
2.	Periodical Medical Examination (Mine Workers)					
A.	Physical Check -up	-				
B.	Audiometric Test	-				
C.	Eye Check -up	-				
D.	Respiratory Test	-				
3.	Medical Camp (Mine Workers and Nearby Villagers)	-				
4.	Training (Mine Workers)					

Note: Medical Follow Ups Work force will be divided into three targeted groups age wise as follows:

Age Group	PME as per Mine Rule 1955	Special Examination
Less than 25 years	Once in a Three Years	In case of emergencies

Lime Stone Mine (Mine Lease Area 21.106 Ha.) Near Village Chakdura, (Bathyn and Khrew),
Tehsil -Pampore , District- Pulwama (Jammu and Kashmir) By Dawar Cement Pvt Ltd.

Between 25 to 40 Years	Once in a Three Years	In case of emergencies
Above 40 years	Once in a Three Years	In case of emergencies