

RISK ASSESSMENT

Objectives

The objectives of environmental risk assessment are governed by the following, which excludes natural calamities:

- To identify the potential hazardous areas so that necessary design safety measures can be adopted to minimize the probability of accidental events.
- To identify the potential areas of environmental disaster which can be prevented by proper design of the installations and its controlled operation
- To manage the emergency situation or a disastrous event, if any, from the plant operation.

Managing a disastrous event will obviously require prompt action by the operators and the crisis management personnel using all their available resources like alerting the people and other plant personnel remaining inside, deployment of firefighting equipment, operation of emergency shut off valves, opening of the escape doors, rescue etc.

Minimizing the immediate consequences of a hazardous event include cordoning off, evacuation, medical assistance and giving correct information to the families of the affected persons and local public for avoiding rumors and panic.

Lastly, an expert committee is required to probe the cause of such events and the losses encountered and suggest remedial measures for implementation so that in future such events or similar events do not recur.

As part of managing the health and safety of a business, one must control the risks in his or her workplace. To do this one needs to think about what might cause harm to people and decide whether reasonable steps are being taken to prevent that harm.

Risk assessment is required to be carried out by law. A risk assessment is not about creating huge amounts of paperwork but rather about identifying sensible measures to control the risks in one's workplace.

One may be already taking steps to protect its employees, but risk assessment will help one decide whether all requirements for safe work environment have been covered or not.

Definition of environmental risk

The following terms related to environmental risks, are defined before reviewing the environmental risks:

- Harm : Damage to the person, property or environment.
- Hazard: Something with the potential to cause harm; this could be a Characteristic of material being processed or malfunctioning of the equipment. An environmental hazard is thus going to be a set of circumstances, which leads to the direct or indirect degradation of environment and damage to the life and property.

- Risk : The probability of the harm or likelihood of harmful occurrence being released and its severity. Environmental risk is a measure of the potential threat to the environment, life and property.
- Consequence: Effect due to occurrence of the event, which may endanger the Environment permanently or temporarily and, or, loss of life and property.
- Environmental Disaster: The consequence is so severe that it can extensively damage One or all the four components of the environment, namely, (i) Physico-chemical, (ii) biological, (iii) human and (iv) aesthetics.

Identification of hazards

One of the most important aspects of risk assessment is accurately identifying the potential hazards in workplace.

Good starting point is one has to walk around the workplace and think about possible hazards (things that may cause harm). In other words, what is it about the activities, processes or substances used that could injure employees or harm their health?

When one works in a place every day it is easy to overlook some hazards, so here are some tips to help identify the ones that matter:

- **Checking manufacturers' instructions** or data sheets for chemicals and equipment as they can be very helpful in explaining the hazards and putting them in their true perspective
- **Looking back at own accident and ill-health records** – these often help to identify the less obvious hazards
- **Taking account of non-routine operations** (maintenance, cleaning operations or changes in production cycles)
- **Think about long-term hazards to health** (high levels of noise or exposure to harmful substances)

There are some hazards with a recognized risk of harm, for example working at height, working with chemicals, machinery, and asbestos. Depending on the type of work one

Tor-7(xiii) Onsite and Offsite Disaster Preparedness and Emergency Management Plan including Risk Assessment and Damage Control

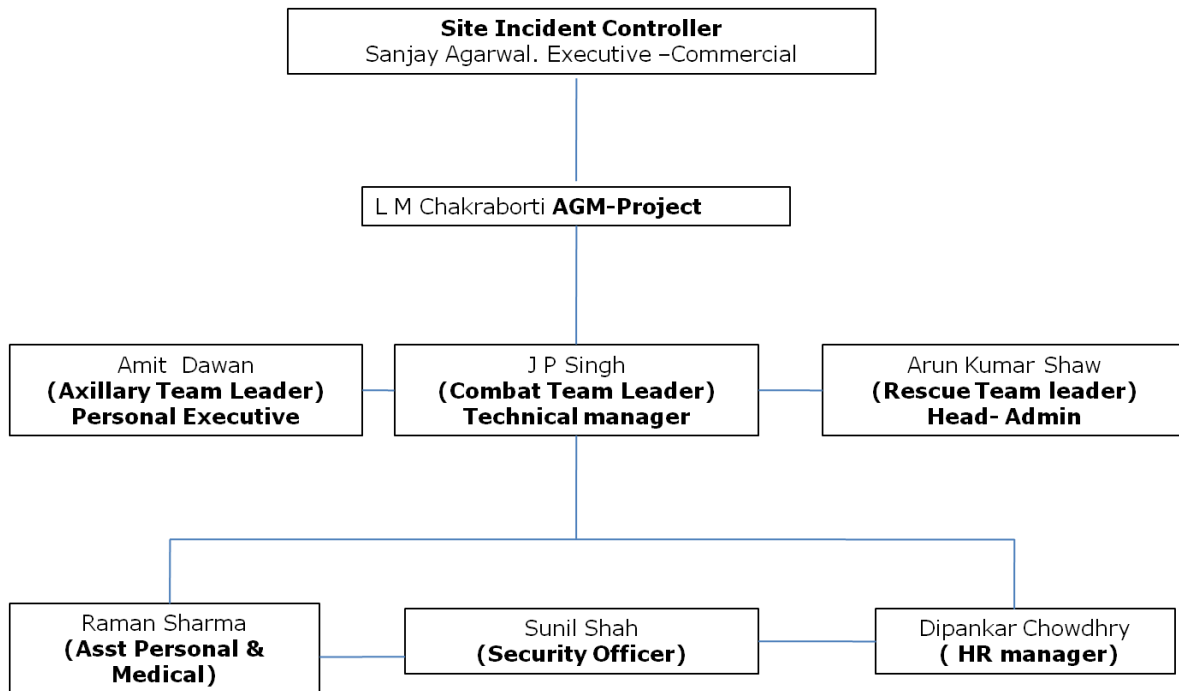
7.2 OBJECTIVE OF ONSITE EMERGENCY PLAN

The main objective of the plan is to take immediate actions to meet any emergency situation for speedy and efficient rescue and relief operations. The main steps in an onsite emergency plan is described below:

- Cordon and isolate the affected area for smooth rescue operation.
- Rescue and treat casualties and safeguards the rest.
- Minimize damage to persons, property and surroundings.
- Contain and ultimately bring the situation under control.
- Secure and safe rehabilitation of the affected area.

- Identify any dead and provide for the needs of the relatives.
- Provide necessary information to statutory agencies.
- Provide authoritative information to the news media.
- Ward off unsocial elements and prying onlookers.
- Counter rumor mongering and panic by relevant accurate information.

7.3 EMERGENCY COMMAND STRUCTURE



Gen.ToR 3(x) Hazard Identification and details of proposed safety systems.

Table 7.3 Health Hazard in Major Shops:

Sl. No.	Group	Item	Potential Health hazard	Preventive measures
		Coal, lime stone, Dolchar Other fluxing minerals	Respiratory track diseases due to Dust,	Dry fogging in conveyors, ID fan bag filter, PPE
		Acids/Alkalis	Skin & eye injury	Water jet for eye washing, first-aid
III	Utilities			
	Fuel gas Distribution	Gas leaks	Fire and gas Poisoning	Use of PPE
	Electric power Supply	Short circuit	Electric shock	Use of PPE
IV	All shops			
	Falling from height	Collapse of scaffoldings	Injury, breaking of bone	Proper scaffolding to withstand Load
		Breaking of slings		Use of safety belt
				Tested from time to time.
	Falling of heavy Objects from height People working over Head, next floor		Head injury	Use of helmet and safety belt

SL NO	ACTIVITY CREATING HAZARD	Rank						Risk potential = (A+B)XC	
		Likelihood of occurrence (A)	RANK	Likelihood of detection (B)	RANK	Severity of consequence (C)	RANK		Preventive Measures
SMS									
1	Fall of material due to Excess N2 purging	LOW	2	VERY LOW	5	HIGH	10	70	Purging to be done with calculated amount of N2
2	Burn injury due to overflow of hot material	LOW	2	VERY LOW	5	HIGH	10	70	Use of PPE like safety shoes, helmets, gloves, aprons and goggles
3	Burn injury due to broken of wire rope	LOW	2	VERY LOW	5	HIGH	10	70	Cordening of area with hooter arrangement during transportation
4	Fall of ladle due to broken of hanger	LOW	2	VERY LOW	5	HIGH	10	70	Cordening of area with hooter arrangement during transportation
5	Slip and fall due to accumulation of sponge iron on shop floor	MODERATE	3	MODERATE	3	LOW	6	36	Use of PPE like safety shoes, helmets, gloves, aprons and goggles
6	Falling of scrap due to mishandling of scrap during charging of scrap to SMS	MODERATE	3	MODERATE	3	MODERATE	8	48	Use of helmets and safety shoes
7	SLIPING OF PERSONS DUE TO Spillage of material on the shop floor during charging of raw material through mobile equipment	MODERATE	3	MODERATE	3	MODERATE	8	48	Use of PPE like safety shoes, helmets, gloves, aprons and goggles
8	Electrical Flashing / shock during Air cleaning of furnace capacitors and switch gear	LOW	2	LOW	4	HIGH	10	60	Electrical isolation, tagging, spot earthing
9	Electrical Shock during Checking of Capacitor bank	VERY LOW	1	MODERATE	3	MODERATE	8	32	Rubber hand gloves and insulator tools



11	Occurrence of static electricity/electric spark in the Mill Cellar Room	VERY LOW	1	VERY LOW	5	HIGH	10	60	Proper earthing to be ensured
12	Splashing of molten metal and slag	LOW	2	VERY HIGH	1	HIGH	10	30	Face shield, helmet, asbestos apron
Rolling Mill									
1	Fall of material during hot slab handling	LOW	2	VERY LOW	5	HIGH	10	70	Sling to be checked from time to time, Use of PPE
2	BODY PART in between slab/chain	LOW	2	VERY LOW	5	MODERATE	8	56	Use of Hand gloves, Stopper switch at short intervals
3	Fire due to Electric short circuit during Firing with Tar	LOW	2	VERY LOW	5	LOW	6	42	Use of MCB
4	Back firing during Firing with Producer gas	LOW	2	VERY LOW	5	LOW	6	42	Use of Face shield
5	Fall of Plate, Cutting set, Fall on person during Plate/Cobble Cutting	LOW	2	VERY LOW	5	LOW	6	42	Use of helmet
6	Collision of hot coil strips during Shifting of Coil	LOW	2	very low	5	low	6	42	To be mechanically handled
7	Falling of objects from top	MODERATE	3	VERY LOW	5	MODERATE	8	64	Use of helmet & Safety Shoe
8	Un safe disposal of oily wastes of Rolling Mills	HIGH	4	Low	4	Moderate	8	64	To be collected in drums and capped



7.4 ROLE OF KEY PERSONS

7.4.1 WORKS MAIN CONTROLLER:

He is the Managing Director of the unit and is generally available in the factory or in the colony nearby except on tours. On emergency, he can reach work site at any odd hour within 20 minutes time. In his absence, HOD project & co-ordination shall take up his charge as Works Main Controller (WMC).

On being informed of an incident, he has to:

- Rush to the emergency Site, collect all information from SIC.
- Decide if emergency is to be declared and advise Site incident Controller (SIC) accordingly and reach Emergency Control Room (ECR).
- Advise Rescue Team Leader (RTL)/ Security Gate to blow the siren with appropriate code for declaration of emergency.
Two minutes with a pause of five seconds for 3 times for fire hazard.
Three minutes with pause of five seconds for 5 times for Gas leakages.
- Advice (Auxiliary Team Leader) ATL for communication to statutory authorities and for mutual aid as required.
- Through (Auxiliary Team Leader) ATL ensure constant communication to statutory authorities and to mutual aid partners as required.
- Maintain continuous communication with Site Incident Controller (SIC) to review the situation and assess the possible course of action for emergency operations.
- To declare normalcy at the end of operation and advise Rescue team leader (RTL)/security Gate to blow "all clear siren" [for 1 minute continuously].
- Ensure the record keeping of emergency operations chronologically.

7.4.2 SITE INCIDENT CONTROLLER:

He is available at the factory or in the colony nearby. At any point of time and on being informed about an accident, he has to:

- Intimate the works main Controller (WMC) and proceed to the emergency site.
- Take the necessary instruction from Combat Team Leader (CTL), assess the situation and call Rescue Team Leader (RTL) and Auxiliary Team Leader (ATL).
- Inform Works Main Controller (WMC) regarding the situation.
- Take necessary steps and provide guidance to Combat Team, Rescue Team, and Auxiliary Team Leaders to mitigate the emergency situation.
- Examine for major emergency shutdown operation activities, decide safe escape route and announce for evacuation to Assembly Point.
- Inform Works Main Controller (WMC) about the status of the situation at regular intervals.

7.4.3 COMBAT TEAM LEADER

He is the leader to attend to the emergency and is available in the factory or in the colony at any instant.

On being informed about an accident, he has to:

- Immediately rush to the site and lead the team to control the situation.
- Inform Site incident controller (SIC) about the incident and request him to rush to the spot.
- Instruct the rescue Team leader (RTL) for fire fighting and medical assistance.
- Co-ordinate the activities of team members and combat the emergency, so as to eliminate the root cause of the hazard.
- Shut-down the plant if necessary to take up repair measures.
- To arrest the leakage and spillage from various equipments, shut down the concerned equipments.
- Take necessary action to remove unwanted persons from the site of the incident.
- Keep informed about the developments to Site incident Controller (SIC).

7.4.4 RESCUE TEAM LEADER

He is the person who conducts rescue operations and should be available at any instant.

On receiving the information about the incident he has to:

- Rush to site of emergency through safe route.
- Ensure presence of all his team members, availability of fire fighting facilities and take necessary action to arrest the fires/leakage of gas.
- Arrange for safe escape of entrapped persons.
- Make necessary arrangements to send the affected persons for immediately medical attention through the medical officer.
- Search for the missing persons on the basis of role call taken by Auxiliary team leader (ATL).
- Give the feedback to the site incident controller (SIC) about the developments.

7.4.5 AUXILIARY TEAM LEADER

He is the communication manager for the crisis management. On being informed of the emergency, he should proceed to Emergency Control Room (ECR) and:

- Keep in constant touch with works main controller (WMC) and Site Incident Controller (SIC).
- Inform the Statutory Authorities and District Administration.
- Communicate to mutual Aid Partners, Fire service stations at Asansol.
- Send communications to District Hospital Puruliya Road for rendering services.
- Inform the relatives of casualties and send them to their residence or hospital as the case may be.
- Take care of visit of the authorities to the Emergency site.

- Give feed back to work main controller (WMC) about the status with respect to his areas of activities.

Table 7.2 ACTION PLAN FOR ON-SITE EMERGENCY

STEP NO	INITIATOR	ACTION TO TAKE
1.	The person noticing the emergency	<ul style="list-style-type: none"> Inform the Security Gate, Combat team leader and the concerned Shift-in –charge immediately.
2.	Combat team Leader (CTL)	<ul style="list-style-type: none"> Inform site incident Controller (SIC) and rush to spot and organize his team. Take charge of the situation, arrange for fire fighting and medical first-aid available at site. To start combating, shut-down equipments, arrest the leakage of gas/fire.
3.	Site Incident Controller (SIC)	<ul style="list-style-type: none"> Inform works main controller (WMC) and rush to emergency site. Discuss with Combat Team Leader (CTL), assesses the situation and call the Rescue Team Leader (RTL) & Auxiliary Team Leader (ATL). Organize the Rescue Team and Auxiliary Team and send the rescue Team to site. Arrange to evacuate the unwanted persons and call for additional help. Pass information to the works main controller (WMC) periodically about the position at site.
4.	Works main Controller (WMC)	<ul style="list-style-type: none"> Rush to emergency site and observe the ongoing activities. Take stock of the situation in consultation with the SIC. Move to Emergency Control Room. Take decision on declaration of emergency. Advise Auxiliary Team Leader to inform the statutory authorities and seek help of mutual aid from partners as required. Decide on declaration of cessation of emergency. Ensure that the emergency operations are recorded chronologically.
5.	Rescue Team (RTL)	<ul style="list-style-type: none"> Consult with Site incident controller (SIC) and organize his team with amenities to arrest fire fighting and medical treatment. Rush to Emergency Site through safe route along with the team members. Arrange to set off the fire by fire fighting equipments and hydrant points to arrest the fire or to evacuate the area. Shift the injured persons to hospital by ambulance after providing necessary first aid.

		<ul style="list-style-type: none"> To inform the auxiliary team Leader for necessary help from mutual aid Partners.
6.	Auxiliary Team (ATL)	<ul style="list-style-type: none"> On being directed by works main Controller (WMC) inform about the emergency to statutory authorities. Seek help of Mutual Aid partners and Coordinate with Mutual Aid partners to render their services. Arrange to inform the relatives of casualties. Take care of visit of the authorities to the Emergency site.
7.	Team members	<ul style="list-style-type: none"> Each of the team members should follow the instruction of concerned team leader to mitigate the emergency.

7.5 SILENT HOUR COMMAND STRUCTURE

- The Senior Officers/ Key Persons of the plant remain during day time i.e. 8am to 8 pm. Hence the timing of 8pm to 8am is considered as silent hour that to 10pm to 8am is the crucial time. Still each and every unit/section of the plant is headed by shift in charge in the rank of Officer, Engineer or Sr. Engineer or Asst. Manager, who shall be responsible for handling the emergency. The other supporting/services and emergency sections like Fire Service, Ambulance, Security, Personnel, Water Supply, Transport departments etc. are also running for 24 hours shift wise with shift in charge and crew to handle emergency during the silent hour till main command personnel arrive. However, most of the key persons of the main command structure reside in nearby area and can reach within minimum time.
- The command structure of the silent hour shall be same as during normal hour, however, during the silent hour, the operation Shift-in charge of the concerned area where the fire or leakage of gas has taken place, shall act as SIC-in – charge, till the arrival of actual designation members.
- Since WMC, SIC, CTL, RTL & ATL may not be available inside the plant; they shall be informed by the SIC-in-charge either by telephone or by sending special messengers to their residences.
- On receiving the information WMC, SIC, CTL, RTL & ATL shall reach the site immediately & simultaneously take actions to ensure the presence of their respective team members.
- Therefore the action plan as well as the role of key person shall be same as the normal hour execution of command structure.

7.6 ACTIVATION & CLOSING PROCEDURE FOR ON-SITE EMERGENCY

7.6.1 ACTIVATION PROCEDURE

The person noticing the incident of fire or leakage of gas, shall inform about the location & nature of fire to the combat team Leader (CTL), security Gate and concerned Shift-in-charge.

Combat team Leader (CTL) shall inform site incident controller (SIC) and shall rush to the site immediately. He shall arrange for fire fighting and first aid available at site. He shall arrange to take necessary steps to eliminate the root cause of fire.

Site incident controller (SIC) on getting information shall inform the WMC and reach the site at the earliest. He shall take over the charge and shall direct Rescue Team Leader (RTL) to carry out rescue operations including fire fighting and medical attention. Site incident controller (SIC) shall co-ordinate with Combat team leader (CTL) to eliminate the root cause of fire.

- Work main controller (WMC), on arrival at site shall take stock of the situation from site incident controller (SIC) and then rush to emergency control room (ECR) to declare emergency on the basis of assessment made by (Site incident controller (SIC). He shall give direction to the security gate/ (Rescue team Leader) RTL to activate siren.
Two Minutes with a pause of five seconds for 3 times for fire Accident.
Three Minutes with a pause of five seconds for 5 times for leakage of gas.
- Rescue Team Leader (RTL) shall mobilize fire fighting and medical resources to site and shall assist (Site incident Controller) SIC.
- Auxiliary Team Leader (ATL) shall take charge of Emergency Control Room (ECR), shall ensure smooth operation of ECR and shall inform relatives of casualties. Informs mutual Aid partners and ensures their arrival at site if required.
- Auxiliary Team Leader (ATL) informs statutory authorities and district administration regarding emergency suitably and coordinates their visit at site.
- Works main controller (WMC) coordinates and keeps the track of all the activities at site and off the site and arranges the recording of the activities in a chronological manner for review of the Onsite emergency Plan.

7.6.2 FACILITIES AVAILABLE FOR ON-SITE EMERGENCY PLAN:

(a.) Assembly Point:

In any emergency it will be necessary to evacuate people from affected zones or the zones likely to be affected, to a safer place. Safer places are identified and designated as Assembly Points. Taking the area and hazard zones into consideration two assembly points have been marked in two different areas i.e. one near administrative building (Assembly Point-1) and other near canteen Area (Assembly Point-2) Both the points are well connectable to the plant road and facilities like drinking water, temporary shelter and first aid is available there. This has been well marked in the lay out map and will be displayed in side the factory.

(b.) Escape routes:

Escape routes are those that, allow reasonably safe passage of persons from the work area to assembly point during emergency situation. These routes would be different depending on wind direction, Fire and explosion scenario. Escape routes will be displayed in all the control rooms and administrative building which will facilitate all for safe evacuation.

(c.) Emergency Control Room (ECR):

The emergency Control Room is a place from which all emergency management operation are directed and coordinated. Also it is the place from where all communication will be established, with outside agencies and district authority also. Administrative building will be used for this purpose.

Facilities to be Available at ECR:

- a. Plant general Layout, ear marked with hazard zone, Assembly points and escape routes.
- b. List of working personnel in various shifts and general shift.
- c. Mobile telephone Nos., of emergency command structure personnel.
- d. Emergency command structure.
- e. Rhythmical siren code for different emergency situation.
- f. Relevant material safety data sheet.
- g. Emergency Control Room Register.
- h. First Aid Box with antidotes.
- i. Required personal protective equipment with self carrying breathing app.

RESPONSIBILITIES

1. Responsibilities of Firefighting personnel.

- To report immediately at the scene of fire.
- To take instructions from fire officer.

2. Responsibilities of Fire officer.

- To direct the deployment of firefighting personnel and firefighting appliances.
- To organize additional firefighting crew, if required, depending upon gravity of the situation.
- To guide plant employees in Firefighting.
- To coordinate between different groups of firefighting personnel and team of trained workers from the Department.
- To control the spread of fire and rescue operation, if necessary.
- To extinguish the fire.
- To replenish the required firefighting materials / equipment.
- To arrange relievers wherever necessary.
- To assess the situation and arrange additional help if necessary in co-ordination on with disaster control room.
- To advise for all clear siren to be blown after the major fire emergency is over.

3. Responsibilities of security personal at the manned gate.

- To prevent entry of unauthorized persons.
- To keep the gate open for the emergency vehicles and officers and staff concerned with fir fighting and allied operations.

4. Responsibilities of Medical officer during major fire.

- To be available at the first- aid center for necessary medical advice.

- To depute one of the medical staff to the scene of fire to render any medical assistance required at site.

5. Responsibilities of CEO during major fire.

- To arrange the transport of the firefighting personal with minimum loss of time from township in consultation with the fire control room/fire officer.
- To make arrangement for the refreshment meals for persons engaged in firefighting.
- To inform the fire officer regarding the actions taken.

6. Responsibilities of Head of the Electrical Maintenance Dept. during major fire

- To report to fire officer and render assistance to be required from Electrical department such as installation of equipment provision of temporary lighting. Disconnecting supply where ever required.

7. Responsibilities of Head of the Materials procurement Dept. during major fire

- To arrange to manage the stores for emergency issue of materials. If the materials are not available in the stores or are likely to be exhausted during firefighting operations he would arrange for the same from neighboring industries or other sources.

Mutual aid system

At times the possibility of a major emergency a situation out of control of plant authority cannot be ruled out. In such a case, the plant authority would declare it to be a major emergency and total control would be transferred to the district level office of contingency plan committee. Necessary help would also be sought from neighboring industries having necessary infrastructure for dealing with disaster.

7.6.3 FACILITIES TO BE AVAILABLE INSIDE PLANT

- **Fire Hydrant System**

Fire pumps are to be connected to main fire hydrant to maintain a pressure of 7Kg/cm². In case of temporary power failure, the fire pumps are to run through DG. An underground tank supply water to the fire main. A security jeep is stationed at main gate (main control) to meet the emergency.

- **Fire Extinguishers**

Required types of fire extinguishers are to be provided at different locations of the plant.

Fire Buckets

Fire buckets filled with dry sand must be provided in different locations of the plant.

- **Siren**

Company must have Siren/ hooter arrangement, which can be activated manually during fire related emergency.

- **Communication**

Public address system and EPABX telephone will be available for effective communication inside the plant. Telephone directory is available in the entire department.

- **Dispensary**

A well-organized First-aid center with ambulance, stretchers, oxygen cylinder etc. shall be located inside the factory. The First-aid center is manned by one doctor, one pharmacist, 2 nos. attendants. The first-aid center is manned round the clock. In the event of emergency, the doctors and staff attend the first-aid center. The existing first-aid center is to be strengthened & well-equipped to meet the emergencies. In case of requirement outside ambulance services are to be contacted.

- **First Aid Box**

Company has provided First Aid boxes with required first aid medicines at different locations inside the plant for any injury. First aid boxes are checked by the medical staff once in a month & medicines are filled/replaced. The first aid boxes are provided in control rooms and workshops.