

C APTER 6. ADDITIONAL STUDIES

6.1. Risk Assessment

Broadly, following types of possible risk/ hazards are encountered in the Cement plant and their safeguards are suggested as under: -

- Physical Hazards like burns, heat, humidity, noise etc.
- Electrical Hazards like unsafe equipment, unsafe work practices, unsafe environment.
- Mechanical Hazards like machinery having moving parts.
- Damage due to lightening, earthquake and landslides
- Fire emanating from different sources and due to different causes.

6.1.1. Physical a ards

eat: Heat is the most common hazards in the Industries specially where furnace is used. Its continuous exposure causes heat, exhortion, and heat cramps. Thus, for safety of the workers, reasonable temperature which is normally acceptable in working area should be maintained, which is about 70° F to 80° F and could be achieved by proper ventilation. Otherwise job rotation for overexposed persons shall be practiced.

6.1.2. Electrical a ards:

Most electrical accidents occur from one of the following factors:

- a) Unsafe equipment
- b) Unsafe environment
- c) Unsafe work practices

Electrical accidents could, therefore be prevented through use of:

- Proper Insulation
- Guarding
- Earthing
- Electrical protective devices

➤ Insulators

Insulators such as glass, mica, rubber, or plastic used to coat metals and other conductors help stop or reduce the flow of electrical current. This helps prevent shock, fires, and short circuits. Before connecting electrical equipment to a power source, it's a good idea to check the insulation for any exposed wires for possible defects. Insulation covering flexible cords such as extension cords is particularly vulnerable to damage. No live wires shall be allowed to hang at any place, where persons can normally go.

➤ Guarding

Guarding involves locating or enclosing electrical equipment to make sure that people don't accidentally come into contact with its live parts. This should be done for equipment with exposed parts operating at 50 volts or more specially where it is accessible to

authorized people, qualified to work with it. The recommended locations are room, vault or similar enclosure, a balcony, a gallery or elevated platform. Sturdy permanent screens also can serve as effective guards. Conspicuous signs shall be displayed at the entrances to electrical rooms and similar guarded locations to alert people to the electrical hazards and to forbid entry of unauthorized persons. These signs may contain the word "Danger", "Warning" or "Caution" and beneath that appropriate concise wording that alerts people to the hazard or gives an instruction such as, "Danger / High Voltage / Keep Out" should be given.

➤ **Earthing**

Earthing is a tool or an electrical system means intentionally creating a low resistance path that connects to the earth. This prevents the buildup of voltages that could cause an electrical accident. Earthing helps to protect the operator as it provides an alternative path for the current to pass through from the tool or machine to the ground and does not affect the operator.

➤ **Safe Work Practices:**

Electrical accidents are largely preventable by adopting safe work practices such as:

- ❖ Checking Insulation of the equipment before installation
- ❖ Properly earthing the equipment
- ❖ De-energizing electrical equipment before inspection or repair
- ❖ Keeping electrical tools properly maintained.
- ❖ Using appropriate protective equipment such as:
 - a) Rubber insulating gloves
 - b) Hoods
 - c) Sleeves
 - d) Matting
 - e) Line Hose
 - f) Protective Helmets
 - g) Protective Eye Glasses

6.1.3. Mechanical Standards

Protruding and moving parts of machinery are big hazards/ risk factors in almost all Units. Proper devastating shall be provided in such areas and sufficient space for proper movement should be avoided to avoid any accident.

Handling of Fine Dust: The hot raw meal (Powdered limestone, laterite additives etc. will be heated in a multi - stage pre-heater) will be stored in the raw mill silos. It is very common that the hot raw meal gets jammed in the chute and screw conveyers. During the maintenance process, the operator generally works in the pre-heater cyclone and other areas. Always there is a possibility of hazard that the jammed material falls on the workers and due to hot temperature of the material, possibility of injury may occur to the worker, sufficient care should be taken in the maintenance operations.

Handling of Hot Clinker: The hot clinker will be transported by chain conveyors to the top of the silo where it is subjected to screening. During this operation, there is a possibility of spill out of hot clinker. Proper care for the conveyor system and the bund wall for the clinker stock pile should be provided.

6.1.4. Damage due to lightening, earth quake and landslides

Lightening:

Tall buildings are prone to lightening strikes especially during rainy seasons which can not only damage the building but can result in fatal accidents for workers. It is, therefore, necessary that in order to avoid lightening strikes, causing any damage, lightening arresters should be provided with proper earthing as per the electricity rules in all the buildings individually.

Landslide: The project site is located in flat terrain the elevation of the site is ranges between 1815 to 1820 m above MSL, having no chance of landslides.

Earth quake The study area falls under seismic zone V, with very high risk zone.

6.1.5. Fire hazards

Handling of Coal/Pet coke

- The coal/pet coke will be received in the trucks and stored in stock yard.
- During summer season, there is chance of coal/pet coke catching fire due to hot temperatures
- Effective sprinkling systems should be provided all round the coal/pet coke stock yards.

6.2. Disaster Management Plan

A major emergency has the potential to cause serious injury or loss of life. It may cause extensive damage to property and serious disruption both inside and outside the work. It would normally require the assistance of emergency services to handle it effectively. Emergency may be caused by a number of different factors, e.g. plant failure; it will normally manifest itself in two basic forms, viz fire, explosion or toxic release.

Scope: The aim of disaster management plan is preventing accidents through good design, operation, maintenance and inspection. Through DMP it is possible to reduce the risk of an accident, but it is not possible to eliminate it. Since, absolute safety is not

achievable; an essential part of major hazard control must also include mitigating the effects of a major accident.

An important element of mitigation is emergency planning, i.e. recognizing accidents as soon as possible, assessing the consequences of such accidents and deciding on the emergency procedures, that would need to be implemented in the event of an emergency.

Objectives: The overall objectives of the emergency plan are:

- To localize the emergency and, if possible eliminate it; and
- To minimize the effects of the accident on people and property.
- Elimination will require prompt action by operations and works emergency staff using, for example, fire-fighting equipment, water sprays etc.
- Minimizing the effects may include rescue, first aid, evacuation, rehabilitation and giving information promptly to people living nearby.
- To deal with the above emergencies, DMP is prepared. The DMP is prepared by the Trunboo Cement Ltd. (TCPL) to specify the response to the emergency of those who work on the site.

6.2.1. Alarm and Communication Systems

Communication is crucial factor in handling an emergency. It is the practice at many plants that any employee can raise an emergency alarm, so allowing the earliest possible action to be taken to control the situation.

Alarm systems vary and will depend on the size of the plant. There should be an adequate number of points from an audible warning, or indirectly, viz. a signal or message to a permanently manned location. The alarm should alert the people to implement appropriate emergency procedures. In areas where a high level of noise; it may be necessary to install more than one audible alarm transmitter or flashing lights. Automatic alarms may be appropriate on some sites.

There should be a reliable system for informing the emergency services as soon as the alarm is raised on site. The details of the communication arrangements should be agreed locally; in some cases, it may be advisable to have a direct line to the fire bridge. Predetermined code works to indicate the scale and type of the emergency may be valuable.

6.2.2. Fire fighting system

In view of vulnerability to fire, effective measures will be taken to minimize fire hazard. Fire protection is envisaged through hydrant and sprinkler system, designed as per the recommendation of Tariff Advisory Committee of Insurance Association of India. The following areas in the power station are mainly susceptible to fire:

- Cable galleries
- Electrical switchgear/ MCC room.
- Coal/pet coke handling areas: Conveyors, transfer points, tunnels and storage yard.

For containment of fire and preventing it from spreading in cable galleries, section wise fire barriers with self - closing fire resistant doors will be provided. The ventilation systems, if any, provided in cable galleries will be interlocked with the fire alarm system, so that in event of a fire, the ventilation system will be automatically switched off. In order to avoid spreading of fire all cable entries opening in cable galleries, tunnels, channels, floors, barriers etc will be sealed with non-inflammable/Fire resistant sealing materials.

For detection and protection of the plant against fire hazard, any one or a combination of the following systems will protect susceptible areas:

- Hydrant system.
- Automatic high velocity spray system
- Medium velocity spray system
- Portable fire extinguishers
- Fire alarm systems

Fire hydrant points will be provided throughout the premises. Automatic high velocity spray system will be provided for protection of transformers and cable galleries. Manual medium velocity spray system will be provided for protection of fuel oil storage and coal conveyor galleries.

Water for hydrant, spray and sprinkler system will be supplied from the firewater pumps located in firewater pump house adjacent to Raw Water Reservoir. The hydrant system will be designed as an ordinary hazard class. Adequate number of portable and mobile chemical fire extinguishers will be provided at strategic locations throughout the mobile chemical fire extinguishers will be provided at strategic locations throughout the plant. Fire detection and alarm system will be provided at strategic locations throughout the plant. Fire detection and alarm system will be provided to detect fire/ smoke in vulnerable areas of the plant through smoke /heat detectors

6.3. Social Impact Assessment

The project will create employment opportunity to people of the area. The project will improve the socio-economic status in the study area by creating better paying job opportunities. The company is committed to employ local people, and depending upon their skill and experience they will be trained and allotted suitable jobs. The project will create direct employment for 200 people during the operation out of which 100 will be staff workers and 100 will be contractual worker. During the construction phase, about 250 people will be employed for 24 months. TCPL will employ local people for plant construction and operation, depending upon the skill and capability. Several other indirect employment opportunities will be created in the surrounding area. Transport business, vehicle drivers and attendants, workshops, grocery and retail, medical, school, coaching centers, technical institutes, restaurants, self-employed persons like tailors, carpenters, plumbers, electricians, etc will get indirect job opportunity

Demographic profile of the area will undergo some change. More people will come from other places in search for business and employment. More and more amenities like educational facility, health centers, recreation centers, etc. will come up in the area along with several other infrastructure facilities. Large beneficial impacts in terms of gross economic yield will accrue on account of the project. The gross economic yield will increase through increase in high economic group and subsequent market multiplier effect. The benefits accrued will be tremendous in local as well as in regional context.