# SAFETY AUDIT 2017

**BHAVYA CEMENTS LIMITED**
Tangeda Village
Dachepally Mandal
Guntur District


**Prepared By**
**TEC Vidyasagar M.Tech**

**Safety Management Specialist**
**003 B Mudfort Apts**
**211 Mudfor Road**
**Secunderabad 500 009**
**Mob: 9849231962 emai: tec.vidyasagar@gmail.com**

Contents


| | |
|---|---|
| 1.Preamble | 1 |
| 2.Safety Management System | 3 |
| 3.Mines Area | 12 |
| 4.Cement Process Plant Area | 15 |
| 5.Coal Unloading Area | 16 |
| 6.RAW MILL (VRM) | 17 |
| 7.COAL MILL (VRM) | 18 |
| 8.BC 4 Crusher Bottom Conveyor | 19 |
| 9.Preheater Top (118 metres- 8 Floors) | 20 |
| 10.Silo Jamming | 21 |
| 11.CCR (one end of Kiln) | 22 |
| 12.Cooler Area – Clinker Removal | 23 |
| 13.Cement Mill | 24 |
| 14.Packing Plant | 25 |
| 15.Electrical System | 26 |
| 17.Instrument Panel | 29 |
| 18.Conclusion | 30 |
| 19.Disclaimer | 31 |

# BHAVYA CEMENTS LIMITED

Tangeda Village
Dachepally Mandal
Guntur District

## Safety Audit 2017

### 1.Preamble

Bhavya Cements Ltd (BCL) is engaged in manufacture of Ordinary Portland Cement (OPC) & Portland Pozzolona Cement (PPC). Manufacture of cement is included as hazardous process under first schedule of Factories Act. Management has initiated a Safety Audit of manufacturing facility of Cement. Accordingly Safety Audit is conducted by the undersigned.

### 1.1.Major Plant Facilities

Stacker & Reclaimer (300 TPH)
Impact type Lime Stone Crusher (L&T)
Vertical Raw Mill(UBE)
Coal Mill- Vertical Mill Type(Chenyong)
Coal Truck unloading System
Raw Coal & Fine Coal Hoppers
Rawmeal Silo
6 stage Preheater Tower
Rotary Kiln (Alstom)
Fons Cooler (LNVT)
Clinker Grinding
Two Cement Mills (Ball Mill type) (Alstom) 185
Packing Plant (FLSmidth) (Two numbers of rotary packers)
Pollution Control systems – Bag Filters, RABH and ESP
Plant started production in the year 2011. The organisation manufactures different grades of OPC & PPC

### 1.2.Audit Schedule

1. Plant is visited on 4$^{th}$, 5$^{th}$ and 6$^{th}$ July, 2017.

2. There was an opening meeting conducted on 4$^{th}$ July, 2017 under the chairmanship of Vice President (Unit Head) and all Heads of department attended. Objectives and Methodology of Audit Process is explained.

## 1.3.Audit Closing Meeting

In the closing meeting, salient observations are explained and priorities are detailed.

## 1.4.Safety Audit Protocol

1. Safety Audit is conducted based on IS 14489 Protocol. Field visit is conducted followed by review of records.

2. Qualitative evaluation of illumination levels after sunset is made at important locations including packing plant area.

3. The report of observations and recommendations is divided into Safety Management System and Process Plant Operations including electrical system.

## 1.5.Support During Audit

I place on record the cooperation in facilitating Safety Audit and hospitality of the Site Team, during Audit work and sincerely thank.

## 2.Safety Management System

### 2.1.OHS Policy

The organisation is covered by OHSAS 18001 / ISO 14000 / ISO 9001 and OHS policy was declared on 10-1-2012. As a prudent practice, is to be reviewed for adequacy and also copy of the OHS Policy is to be available to employees in simplified regional language and also to contractors and other stake holders.

### 2.2.Safety Officer

Organisation has appointed a Safety Officer. His responsibilities are to be detailed. Also, opportunity to enhance professional qualification can be given so that his services are more useful to the organisation. During the audit, he actively participated and has good familiarity of plant safety issues.

### 2.3.OHS Coverage in Management Reviews

It is recommended that Top Management meets can consider review of Safety Management in the plant and achievements. Same can be followed at other levels in the plant meetings towards cultural transformation.

### 2.4.OHS Management

1. Hazard Identification, Legal Register, Training Need Analysis, Safety Committee Functioning, Emergency Response Plant and Incident Investigation are covered but need to be covered in detail. There is need for identifying relevant provisions under different legislations.

2. For example, two numbers of HSD Tanks each 20 KL with dispensing unit related safety provisions are to be covered.

### 2.5.Safety Manual

1. A safety manual covers safe procedures, safety responsibilities, PPE etc relevant to Mining Operations and Cement Manufacturing Activities.

2. It is recommended to cover Ammonium Nitrate and H.S.D Oil storage, handling, filling into bores are to be covered.

3. Drilling operations, Loading in to boreholes, Blasting Operations, Water Pumping, Stacker- Reclaimer, Fire Risk, electrical risk are covered.

4. A telugu booklet covers Hopper Operations, Belt Conveyors, Screw Conveyors, Elevators, Fan, Compressor – Blower, Dust Collector, Rotary Air lock, crusher, Kiln / Pre Heater / Cooler and Packing House Safety measures are covered and it is appreciated.

## 2.6.Risk Management

It covered Risk Identification, Assessment, Evaluation, Risk Control and Emergency Response Measures.

## 2.7.Contractor Safety Management

1. Company provides helmet, nose mask, gloves and safety shoes. Some of these are on chargeable basis to the contractors.

2. Tool Box meetings are conducted.

3. It is recommended that Contractor Safety Management procedure is to be evolved and included as a part of Contract Document. For each c ritical activity, Methods Statement is to be obtained from Contractor regarding supervision, PPE and safe method of working.

## 2.8.Safety Committee

1. A Safety Committee is constituted with six representatives of management, five members of employee representation and two from contractor representation. Every month, safety committee meets and discusses. Last Meeting was held on 24$^{th}$ June, 2017. Issues like staircases, clinker unloading, monsoon safety, welding power sockets, electrical safety are discussed.

2. The committee has two years of duration.

3. Plant Head is chairman of the committee and Safety Officer is the secretary of the safety committee.

## 2.9.Training Facilities

1. There is a training room. At present, safety video films are being displayed from Laptop. To be more effective it is recommended to use a LCD Projector so that the workers can understand better and follow safety procedure.

2. It is informed that every department gives training plan. Security department gives training on fire safety and stretcher handling. CCR gives important safety precautions.

3. However electric department has to give training on electrical safety, LOTO practice and other electrical hazards.

4. There is a need for structured development of Training Needs of each operational area for each level of employees including contract employees. Also, every employee has to mandatorily undergo training and has to become part of KPI.

## 2.10.Incident / Accident Reporting

1. It is informed that there are no reportable accidents except slips, sprains and abrasions.

2. It is recommended that incident reporting practice is to be followed and every incident is to be reviewed using why-why analysis other investigation technique and root cause identification is to be done and preventive steps are to be taken.

3. It is informed that there were no dangerous occurrences.

## 2.11.Safety Performance Indicators

It is recommended to develop positive safety performance indicators like safety committee meeting, participation, pro-active efforts in addition to lagging indicators so that overall safety approach can be evaluated.

## 2.12.Vehicle Driver Authorisation

This aspect is taken care by HR department and all heavy vehicle operators are licensed and are subjected to periodical medical eye examination.

## 2.13.Plant Safety Inspections

1. Once a month, one section is identified and walk- through inspection is carried out. Issues identified are discussed in the Safety Committee.

2. It is recommended that for each section suitable checklist is to be developed and used during such inspection so that the inspections would be more effective. Process aspects having bearing on safety are also to be covered in addition to general aspects like housekeeping.

## 2.14.First Aid Boxes

There are first aid boxes at 12 locations.

Electrical wiremen are certified in first aid. It is recommended that from cement processing side also, standard first aid training can be planned with the support of Factory Medical Officer.

## 2.15.Dust Exposure Hazard

1. Material transfer locations and other dust prone locations are to be identified and persons are to be insisted to use dust mask in Mine Areas as well as in cement plant areas ( like lime stone crusher area, transfer areas, mills areas (coal, raw and cement clinker, Packing plant)

2. All dust collection equipment such as bag filters, ESP etc are to be subjected to standard inspection, examination and remedial measures are to be initiated. For this mechanism of evaluation are to be in place and maintained.

## 2.16.Medical Examination

1. All employees including contract employees are subject to pre employment and periodical medical examination covering Blood / ECG/ x Ray / Spirometry / etc (through SRL Diagnostics)- a team of doctors come with facility and conduct medical tests.

2. Periodical Medical Examination for Mining Employees is conducted by JRE Labs which is authorized by D.G.M.S Govt of India.

3. In addition, occupational health specialists visited and conducted examination. The review helped in identifying few Diabetes and were counselled.

4. There were no occupational diseases including respiratory ailments detected.

5. In addition, weekly Lady Medical Officer visits for the support of women living in colony.

6. Present dispensary can be expanded into Occupational health centre with necessary facilities and infrastructure.

7. Company has facility for dog bite and scorpion bite / snake bite treatment arrangements. This facilities are availed mostly by the residents of near by villages and company permits this as a part of CSR Programme.

8. Most of the workplace injuries include minor injuries like abrasion, minor burn injuries, minor eye injuries ( for welders).

## 2.17.Factory Medical Officer

Company appointed Factory Medical Officer who stays in the colony, has a dispensary in the factory and is available on call. Organisation can depute the Factory Medical Officer to Professional Meets and for advanced training in Occupation Health Hazard Management and working conditions etc.

## 2.18.Pressure Vessel Examination and Testing

1. Air Receivers are pressure vessels in service and are externally examined and pressure tested using pneumatic pressure. In addition Ultrasonic thickness test is carried out. It is recommended that UT points are to be marked on a drawing and such points be monitored from time to time.

2. Pneumatic testing has inherent hazards compared to hydrostatic test and is to be recognised.

3. It would be a prudent practice to method and standard of examination / test be recorded on certificate.

## 2.19.Lifting Tackles- Tools – Hoists Examination / Testing

1. EOT Crane – Hoists- ACE Hydra- Shackles- Hydraulic jacks are subjected to examination and test by competent persons. In addition to the approved schedule and format of reporting, it is recommended that the competent person could specify the relevant standard and method of examination and testing, status of safety interlocks. All wire ropes and chain slings in use are to be covered for this purpose.

2. One lift for pre heater tower is in repair since Feb 2017. All hoists are to be examined and tested once in six months against present yearly schedule. ( earlier examination / testing was carried out on 15-4-2016). For lift cage operation, safety interlock status has to reflect. Lift door can be openable only at landing and not otherwise. Passenger lift has to be anchored by two sets of wire-ropes and single rope anchored cage is not fit for passenger lift and can be used only for material hoisting without person entry.

3. Side railings and toe at landings are to be improved as there are openings through which persons can fall through in the lift in the pre heater tower. In night shifts, accessing such platforms become more dangerous.

## 2.20.Illumination

1. Illumination levels at few landings of lifts are to be improved.

2. It is recommended to undertake survey of roads, landings, welfare amenities, path ways among work equipment, access ladders, truck temporary parking areas, truck parking areas near gate etc. and where required need to be enhanced as per Indian Standard.

3. The road Junction near packing plant is to be provided with 'glowing' type radium paint or otherwise for easy visibility during night in addition to improving illumination levels.

## 2.21.Truck Parking Area Near Main Gate

1. At truck parking area, rest shed is provided. Warning signs are to be provided pictorially to avoid sleeping under the truck.

2. Security monitoring is there to avoid persons sleeping under the trucks.

3. Rest room is provided with drinking water arrangements.

## 2.22.Storing of LPG and Oxygen Cylinders

It is recommended that LPG and Oxygen Cylinders are to be stored under shade, free from danger of fire hazard. Empty cylinders are also to be separately stored under shade. Loading and unloading of cylinders from trucks are to be carried out in safe manner.

## 2.23.Warehouse / Stores

1. Materials required for plant operation / projects are stored well in stores. Lube Oil / greases / Paints / Rubber hoses / v- belts / flammable materials are to be stored with fire protection.

2. All the time security guard is posted.

## 2.24.Tarpaulin Tying Location

Warning sign regarding risk of fall from height while tying tarpaulin is to be posted and lifeline is to be provided with two or three fall arresting points which can be used while tying tarpaulins.

## 2.25.Fire Safety

1. It is recommended that deployment of fire extinguishers and adequacy of such equipment, early detection and warning and mitigation for every location and major equipment are to be evaluated with reference to Indian Standards or National Building Code (Industrial Installations).

2. A detailed checklist for inspection and maintenance of first aid fire extinguishers are to be developed and implemented.

## 2.26.Emergency Plan

1. It is recommended to connect mine and cement plant emergency management plans.

2. Last emergency response plan is conducted in the Month of September, 2016.

3. Procedure and technique of rescuing workers from height is to be included as an emergency action and persons are to be trained. Use of industrial nets below the location where workers are working is to be considered (without obstructions).

4. Each department has to contribute emergency stoppage and isolation of plant under their control and all such points are to be consolidated in the main emergency plan.

## 2.27.Heavy Earth Moving Equipment

Heavy earth moving equipment workshop is located in cement processing plant area and it includes maintenance of Excavators, Dumpers, Trucks and covers parking brake, service brake, lights etc.

## 2.28.Work Permit System

It is recommended that a detailed procedure and programme are to be developed covering work at height, work in confined space, hot work, excavation, electrical energy solation and jam clearing etc. Person or Department initiating the permit has to take permit from the process or area owner and all necessary physical tests are to be conducted like confined space evaluation with toxic gas analyser, oxygen deficiency meter etc. Employees initiating the permit, those authorising and those executing are to be given specific training. Use of Lock out Tag Out are to be familiarised to employees. Different energy isolation etc are to be practiced with LOTO system and methodology are to be familiarised to employees. Life of a permit, closing of a permit are to be included in procedures. Role of contract workers are to be made clear. In very critical jobs, before issuing a work permit, a job safety analysis is to be carried out to understand criticalities in addition to general checklist. In all work permit arrangements, emergency rescue is also to be included.

## 2.29.Change Management System

Any process changes, equipment upkeep, new location, new operation etc including engaging a new employee are to be evaluated from safety and safety related legal requirements through brain storming before taking a decision.

## 2.30.Plant Environs

1. Plant facilities are well connected by concrete roads and very interesting and positive feature is tree plantation. Considerable area of the plant is dedicated for greenery and it is appreciated. Lot of fruit bearing plants with organic farming are practiced.

2. Work Place monitoring covering ambient air quality, noise levels is carried out periodically including stack monitoring (under environment monitoring requirements) periodically and the record is available.

## 3.Mines Area

### 3.1.Power Supply

1. Power supply is received at 6.6. kva. One 250 kva transformer is provided. Power is stepped down to 440 volts. Transformer area is to be fenced and fence is to be earthed at two locations.

2. In the MCC Room fire extinguishers are provided.

### 3.2.Explosives Handling

1. The Mine Magazine is licensed to store explosives including slurry explosives (15 te), detonators 44,000 Nos, and D'Cord 30,000Mtrs.The Ammonium Nitrate licensed to store 30 te

2. Blasting precautions are in place and authorised blasters are engaged. Blasting is done between 1230 and 1400 hrs.

3. Two ABC fire extinguishers are provided and are to be under shade.

4. On the storage building, two lightning arresters are provided and are adequately earthed. Periodically earth resistance including that of the lightning arresters is measured and recorded.

5. Every hour, security guard makes a round and records observations.

6. Solar fencing is provided.

### 3.3.Water Sump

It is recommended to provide fencing to water storage sump.

### 3.4.Stacker&Reclaimer

One stacker & reclaimer is installed. Stacker & reclaimer are provided with pull cords.

### 3.5.Crusher House

1. Crusher hopper can be fed from two sides by the tippers/dumpers. On reaching the crusher hopper area, tippers reverse and access hopper area. It is recommended that the illumination at hopper area is to be improved and arrangement to prevent fall of tipper into hopper is to be ensured. At present, at the hopper, the height of the stopper wall is of 300 mm and would not be adequate.

2. As the operation of crusher house could be extended even after sun-set time, it is recommended to ensure adequate illumination.

3. Water fog arrangement is provided to suppress the dust emanation.

4. Bag filter type dust collectors are provided and any fall in differential pressure in the collector cum filter takes place, there is an indication in the control room and the operator is alerted.

5. It is recommended that at the crusher motor also, one fire extinguisher is to be placed.

6. From the crusher house, there is no communication and mobile support is taken for the operational aspects.

7. For any of the maintenance work on the crusher equipment, one 14 te hydra is used and as such, there is no EOT Crane in the crusher area. Hydra Operating Safety Arrangements are to be in place.

8. Crusher drive is guarded. Guard can be painted with yellow-black glowing paint for visibility.

9. LPG Oxygen Gas Cutting set is in use. Each of such gas cutting sets are to be provided with Flash Back Arrester.

10. Crushed Lime stone conveyor is provided with hooter arrangement and before start, it gives warning hooter signal.

11. Air receiver is provided with pressure gauge and periodically inspected and tested including SRV as required under regulatory requirements.

12. Access steps between hopper location and crusher area are too steep.

13. For the fan drive guard is not fixed and is mobile. It is recommended that the guard could be secure. Shaft of the drive is also to be guarded.

14. Crushed Lime Stone is transferred from Mine area, crossing the public road to Plant Area. The cross over on the public road is permitted by authorities with standard precautions in place. Bottom rollers of the conveyors are protected from falling on to the ground, with use of a deck plate below conveyor.

## 4.Cement Process Plant Area

1. Two numbers of Lime stone hoppers, one Laterite and One Iron Oxide hoppers are located and access is provided. Access platform is to be provided with hand rails and toe board.

2. In the MCC (001) for LS Hopper, access steps are broken. Identifications on the panels are small and need to be bold enough. Two fire extinguishers are located. Rubber mat is provided

3. On the rear side of the panel, there is no adequate space for safe operations.

4. it is recommended that an emergency light be provided in the MCC Panel. This has to be followed in PCC and Control Rooms and other critical locations.

5. Two industrial gas cylinders are lying on ground and are to be avoided.

6. Near the panel, Cable joining and painting operations are carried out. It is to be avoided.

7. To the staircase, the toe board is to be provide.

8. At the limestone weigh feeder platform, there is an opening of about 300 x 300 mm size and there is risk of person falling through.

9. Also, for the Bag Filter (LS Hopper) platform openings are to be closed for safety reasons.

10. A repair work at weigh-feeder 35 WF2 is observed and is under repair and repair work is being carried out. There is no LOTO practice and only on oral communication, power supply is said to be isolated. It is a dangerous practice.

11. To this platform, there are no toe boards provided.

12. It is recommended that all locations of Tension Adjusting Pulley Assembly (counter weight system) is to be provided with fencing to prevent persons accessing that location. There have been instances of the pulley assembly falling down due to cutting of conveyor belt in the past in other organisations.

## 5.Coal Unloading Area

1. About 1500 te coal storage area is marked for Coal. Coal size is about 50 mm or less.

2. Truck unloader is installed. When truck is parked, truck is to be properly anchored to prevent sliding of the coal truck.

3. One water delivery line of 100 mm dia is provided. Subsequently, such temporary arrangement is to be replaced with regular fire hydrant system with pressure water. However in coal storage area, fire detection and fire alarm ( at security) are to be provided. In addition, first aid fire extinguishers are also to be provided.

4. At present, two security persons provide fire watch round the clock.

5. Coal is fed through one grill of 450 mm x 450 mm size. Coal is fed through loader system.

## 6.RAW MEAL (VRM)

1. VRM operating platform has no toe boards and hand rails. These need to be provided and maintained.

2. Industrial gas cylinders are seen lying haphazardly on the ground. This practice is to be avoided.

3. For the access to the hydraulic system of VRM, bushes are there and can lead to hazards specially in night shift. Bushes need to be cleared and access needs to be rendered safe.

4. In the hydraulic system, pump identification is to be given properly. Also, drives are to be covered. Fire Protection (DCP or Foam Type) is to be provided.

5. VRM Motor being of high energy (2.4 MW), is to be provided with fire protection.

6. Roller bearing lubrication system related water tank water level is to be interlocked with VRM operation.

7. There are 3 compressors and are on auto-start. Warning of equipment on auto-start is to be posted. Further noise level is to be posted with mandatory sign of essentiality of hearing protection.

## 7.COAL MILL (VRM)

1. Excessive vibration trip is provided.
2. The equipment area is to be considered as permit required confined space.
3. Inlet hot air has a temperature of about 250 deg.C and outlet temperature of 80 to 90 deg.C. Temperature control is with water cooling.
4. Staircase is made of torque steel and very steep. It has hand rails.
5. Around the mill platform, toe board is to be provided.
6. If the temperature of Bag filter is more than 85 deg.C, the mill trips.
7. There are no fire extinguishers all around mill platform. Also, at 650 kw motor no fire extinguishers.
8. Hooter operates before start of Mill.
9. CO2 inertisation System is provided for coal mill VRM which connects process bag filters & fine coal bins, to prevent eventuality of mill fires.

## 8.BC 4 Crusher Bottom Conveyor

1. For the conveyor, before starting an audio alarm is provided.

2. At the driven pulley area, water accumulation is noticed. Rain water also can accumulate. The conveyor pit has no de-watering pump arrangement. It is recommended to have such arrangement. Also, there could be risk of frog and snake menace and is to be recognised.

3. There is no fire hydrant arrangement for the conveyor fire protection and also there is no smoke / fire detection arrangement.

4. Walkway along side wall to the bottom of the conveyor is uneven. Illumination is to be provided along the conveyor for other shift working.

5. Pull cord arrangement is provided.

6. During next phase, it is recommended that conveyor pit area be covered by CCTV.
7. Raw coal hopper of 85 Te is located. Fire Protection is to be provided for coal crusher location.

## 9.Preheater Top (118 metres- 8 Floors)

1. The Preheater tower design is from LNVT Technology (Sinoma Group)
2. On preheater top there are no toe boards. In 5th floor there are lot of materials which can fall down and this has to be avoided.
3. On the cyclone top where access is provided, there are no toe boards.
4. On the second floor, toe board is provided. Castables are dropped from height.
5. Hot spots are noticed.
6. Persons working at pre heater cyclone areas are to be provided with fire retardant suit and face and hand protection. Special precautions are necessary for jam clearing. Air blasters are provided.

## 9.1.Mekaster Passenger Lift

The lift is under maintenance and lift cage moves on rack- pinion arrangement. For the outer door, there are no interlocks and can be opened during movement. This is not desirable. Also, the lift should stop only at landing and should not stop any where, the door is opened. Such arrangement is dangerous. Also, lift cage has two sides openings. Both such openings are to be with safety arrangement. It is recommended that this being a passenger lift, all safety arrangements are to be ensured before use for lifting passengers and worthiness of using has to be reflected in periodical test certificate by competent person.

## 10.Silo Jamming

It is informed that the operations did not experience any silo jamming problems. However occasionally Blending Silo jamming occurred.

## 11.CCR (one end of Kiln)

1. There is no emergency light in CCR. It is being planned to have CCTV in different zones and connect them CCR.

2. Electrical Panel Room is below CCR.

3. There is no public address system in the plant and in CCR. Mobile Phones are relied upon.

## 12.Cooler Area – Clinker Removal

1. It is to be considered as confined space working. Two workers were noticed working and there is no Permit to Work system implemented.

2. Connecting platform between Blending Silo and Pre heater is to be provided with toe board.

3. Two transformers near Deep Pan Conveyor area have lot of dust. Lot of dust is around. However good arrangement noticed is both transformers are separated by wall.

4. For Hydraulic system near cooler clinker movement area, there is a Heat Exchanger. One DCP Extinguisher is provided here. It is recommended to provide one more DCP / Foam Extinguisher in this location.

5. Adjoining electrical panel room, instrument room, waste material is accumulated and need to be cleared off to reduce fire hazard.

6. At Cooler to Clinker silo area, housekeeping is to be improved.

7. At Gypsum hopper platform, on two sides, protection is missing. Hopper is Teflon sheeted to minimize material clogging. Conveyor guard needs to be improved. Vibrators are provided to prevent sticking of gypsum.

## 13.Cement Mill

1. Side walkway is too close to rotating mill and entanglement can occur.
2. On two sides, hand rails are provided but there are no toe boards to the platform.
3. Manhole Points for charging and discharging material are at two locations and can result in entanglement. Additional protection at those points is necessary to prevent entanglement.
4. Hydraulic system and Lube Oil System area fire protection is to be provided.
5. Noise levels are obviously high and there is no mandatory warning to wear ear protection and also persons are noticed not wearing ear protection.
6. Mill identification on the equipment and concerned electrical equipment are to be given prominently.

## 14.Packing Plant

There are two loading points in packing plant for PPC and 3 Loading points for OPC and bulker loading points are common.

### 14.1.Rotary Packers

1. Persons are not wearing noise protection.
2. Comparatively work area is clean.
3. In HDPE bag storage area, fire protection is recommended.
4. Around bucket elevators, openings in the platforms are to be closed.

### 14.2.Compressor House

1. Air receivers are located outside.
2. Compressors are adequately separated. Compressors have auto-unloading.

## 15.Electrical System

### 15.1.Cable Vault below Pre-Heater Area

1. 5 racks of cables and at few locations, cables are overflowing. In general cable identification tags are missing.

2. In the cable vault area, there are no smoke detectors. Smoke / Fire / Heat detection is desirable in cable vault which is the life nerve of any cement plant. It is recommended to provide linear heat sensing detecting cables in each rack in cable vault and be connected to suitable alarm /warning system.

3. At present, in an 8 met x 20 met area, there is not even a single fire extinguisher. Cable vaults are highly prone for fire incidents. Therefore, a detailed fire safety review is essential here and in similar areas.

### 15.2.Pre Heater Load Centre

1. MCC 3001/ 3002 / 3003 area

2. PCC 301 Area- there are 8 panels. Identification of the panel is metal plate with sticker. Identification has to be as per IE Regulations.

3. Incomer of 6.6 KV is stepped down to 415 Volts through 2.5 MVA transformers

4. HT Capacitors of 586 & 286 kvar are connected to Preheater Fan and Coal Mill LT Capacitor is 1000 kvar

5. One Generator of 500 kva and is on manual start. Instrumentation is on UPS. Battery charger is of 110 v.

6. In all the above areas, there are no smoke detectors. Also, there are no emergency lights.

7. Transformers have about 21000 litres oil. It is recommended to consider provision high velocity sprinklers (often termed as mulsifyre).

8. At present, there are 3 buckets of sand meant for extinguishing fire. These are inadequate. In the yard there is no vegetation and well maintained.

9. Between the transformers in the yard and substation, there are number of windows and in the event of fire in yard, the windows can allow fire spread. Therefore, it is recommended to close the windows and compensate ventilation of the windows.

10. It is recommended to use infrared scopes to monitor high voltage electrical joints. The same scope can be used to monitor metal surfaces like kiln shell etc for any damage in refractory work or insulation.

11. Electrical panel room is to be provided with emergency lights. The room has two doors and one of them can be for emergency.

12. For the steps of entry staircase, toe board is to be provided.

13. In 132kv station, one set of 33 kv high voltage gloves are available with due date of 2017.

14. At present, ordinary rubber gloves are available. It is recommended to have at least 33 kv resistant gloves.

15. It is also recommended to have arc flash suit for high voltage operations.

16. Ventilation is satisfactory. However dust is also noticed. It is informed that once in two or three days air blowing is done.

17. There are few holes or openings in the panel and are not dummied or closed. Openings which are not required are to be dummied or closed properly to prevent rodents entering inside the panels and it may lead to short-circuiting and severe fire incident.

18. Electrical energy isolation is supported by Colour Tags (yellow at panel, red at CCR, White with operator who is working) and is not a safe practice. LOTO practice is to be planned and a detailed programme is to be developed and implemented. This aspect is dealt in detail at work permit system in the Safety Management System.

### 15.3 Installation

1. Installation Manager is qualified and authorised for 11 kv and has applied for 132 kv. In addition Naveena Contractors are also authorised.

2. It is recommended that one of the qualified, trained Electrical Manager could be designated as Electrical Safety Officer as per CIE Regulations.

## 17.Instrument Panel

1. Maintained under lock and key and entry is by authorisation.
2. Batteries are of maintenance free.
3. Room is provided with AHU ( at the time of visit, AHU is not in operation).
4. It is recommended to provide one smoke detector in this room and be connected to centralised warning system at Security or control room where always, persons are present to understand the gravity.
5. For the Platform between Pre heater and Control Room, there are no toe boards.

## 18.Conclusion

1. The observations are representative samples made during the audit and does not purport to cover entire plant activities. Best effort is made to collect representative samples.

2. The observations and recommendations made by the undersigned are based on evidence gained during plant visit, discussions and records produced for verification.

3. Review of Safety Management System and Observations of the Field visit by Auditors indicate appreciable level of safety management system and practices in place.

4. Salient features of observations are placed before site management During post Audit Review and as draft report.

5. Important aspects are appraised to Management Tea, through a presentation..

6. Management Representatives have been open in sharing information and expressed desire for continuous improvement of safety level.

1-9-2017

Date: 1st September, 2017
Secundeerabad

TEC Vidyasagar M.Tech
Safety Management Specialist