

VASAVADATTA CEMENT



A VIEW OF THE PLANT

UNIT PROFILE :

Vasavadatta Cement is the 2nd green field project of Kesoram Industries, Located in the district of Gulbarga, 3 Kms., away from Sedam town. The Line-I Cement Plant was conceived in the year 1983-84 and commercial production was started in the year 1986. and line –II went in to the stream in 1997 The both Line-I & Line-II plant are supplied by world known plant supplier M/S KRUPP POLYSIUS, GERMANY and their counterparts M/s KRUPP INDUSTRIES INDIA LTD. The present capacity of Line-I & Line-II is 2.05 MTPA of clinker. This is based on dry process Pre-Calcliner technology and the major equipments of the plant include single stage Hazemag impact crusher for Limestone crushing, Stacker-Reclaimer for preblending/homogenisation/transport of crushed limestone, Polysius Vertical Roller Mills for Raw Meal & Coal grinding, Single Continuous Blending Silo for storing Raw meal, Rotary Kiln for Clinkerisation, Aumund's Deep Pan Conveyor for Clinker transport, closed circuit mill with Roller press for cement grinding and six electronic packers for despatching Cement, with 15.7 MW Captive Thermal Power Plant commissioned in 1997.

The Unit manufactures 43Gr OPC, 53Gr OPC & Fly ash based Blended Cement (PPC). During the period 20023 –2004, the plant has produced : 1880250 MT of Clinker & 2042518 MT of Cement with an Annual Sales turn over of Rs 41381 Lakhs.

Cement being highly Energy Intensive Industry, Conservation of Energy has been a Constant Endeavor at Vasavadatta Cement with Continuous monitoring of Energy Consumption, Periodic Energy Audits.

The trend of Specific Energy Consumption in past Three years of Line –1 & Line –2 (L-1&L-2) are given below :

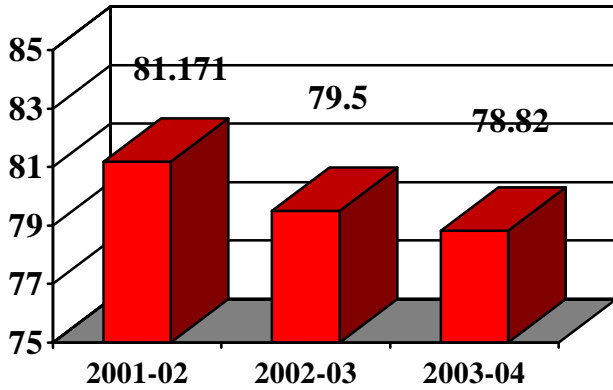
Description	Unit	2001-02	2002-03	2003-04			
Annual Cement Production	MT	1532060	1762660	2042518			
Electrical Energy Consumption	Lakhs Kwh	1208.46	1449.43	1539			
Thermal Energy Consumption	M.Kcal x 10 ³	1155.43	1430.63	1508.25			
Total Energy cost / Annum.	Rs.Lakh	7825.54	9527.52	9931.79			
Energy cost as % of Total Manufacturing cost.	%	55.62	53.75	49.93			
Sp.Electrical Energy Consumption.	Kwh / Ton of Cement	L-1	L-2	L-1	L-2	L-1	L-2
		81.17	77.93	79.51	77.23	78.82	76.41
Sp.Thermal Energy Consumption.	K.cal / Kg of Clinker	L-1	L-2	L-1	L-2	L-1	L-2
		732	725	726	724	715	715

Graphic Presentation follows :

ELECTRICAL ENERGY CONSUMPTION

KWH/ TON OF CEMENT

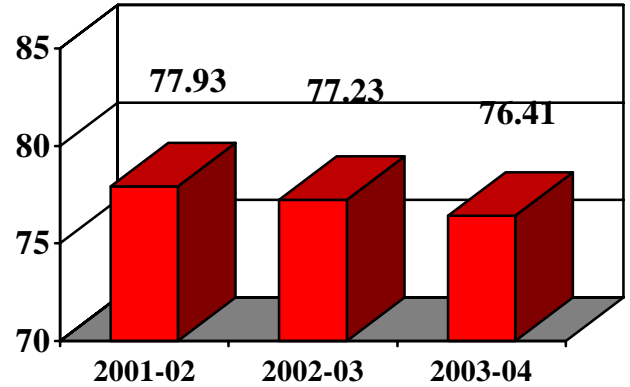
LINE I



ELECTRICAL ENERGY CONSUMPTION

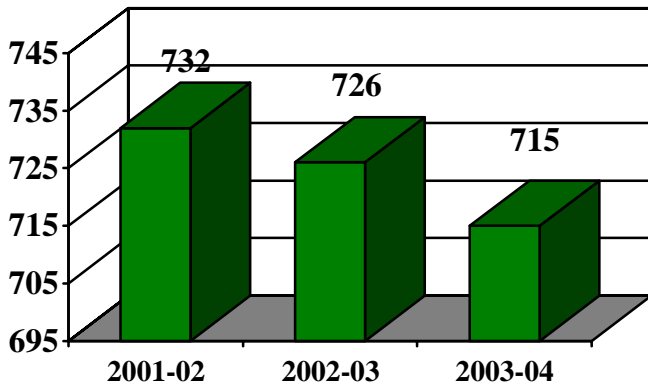
KWH/ TON OF CEMENT

LINE II



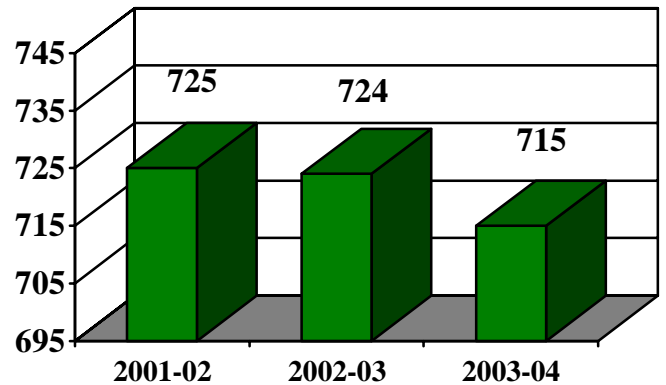
THERMAL ENERGY CONSUMPTION

K CALI/Kσ Clinker



THERMAL ENERGY CONSUMPTION

K CALI/Kσ Clinker



ENERGY CONSERVATION COMMITMENT, POLICY & SET UP.

Vasavadatta Cement is committed to conserve energy in Cement Manufacturing & Power generation process has a basic objective of creating “Awareness & to impart training to the Employees” towards Energy Conservation with a Philosophy of “Energy saved is Energy Produced”.

The Electrical Energy Audit is being conducted by Electrical department on regular basis for power consumption & for Thermal Energy by G.M.(P& QC) for fuel consumption. Audits are also conducted at regular intervals through External agencies like CII & Energy services Group.

VASAVADATTA CEMENT



ENERGY POLICY

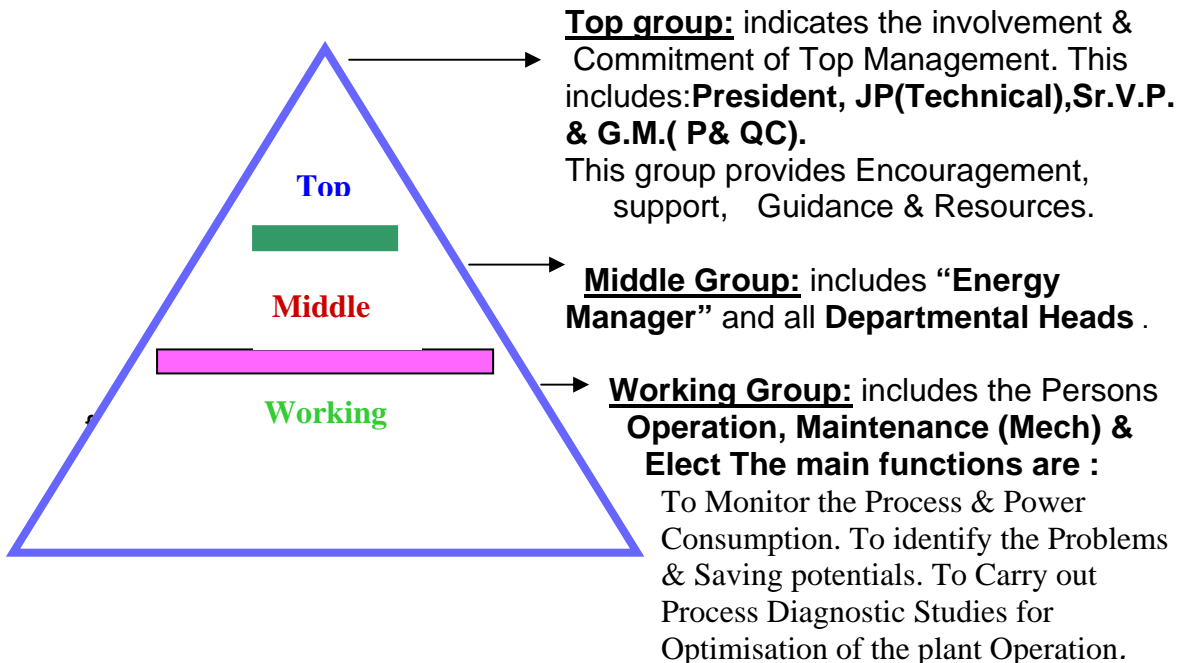
We are committed to Conserve Energy in Cement Manufacturing, Power generation process and related activities by Efficient use to Preserve Environment and to save Natural Resources.

Objectives:

- Awareness & Training to Employees for Encon with Philosophy “Energy Saved is Energy Produced.
- Periodic Energy Audit, Continuous Monitoring, Review of Targets And Bench marks for Energy consumption.
- Identify the Potential areas & Equipments for Energy Conservation.
- Implement Innovative Ideas/Modifications, Improvements & Up gradation of the Equipments.
- Process Optimisation & Diagnostic Studies to maintain High productivity & Capacity Utilisation To minimize the Sp.Energy Consumption.
- Utilisation of Cheaper And other Renewable Energy sources.
- Explore utilization of waste & Hazardous material as alternate source of Thermal Energy.

ENERGY MANAGEMENT SET UP:

The Energy management set up involves three groups i.e. Top level, Middle level & Bottom level.



The Process Parameters are closely monitored for various systems this includes : Gas flow measurements, Circuit sampling for Particle size distribution, Heat Balance for Kiln system & Circuit Velocity & Pressure profiles.

This Exercise on regular basis helps us to identify the Saving Potentials / Problems. Any abnormalities found are brought to the Notice of G.M. (P& QC). Points are discussed in the daily HOD's meeting & same are rectified on top priority with help of Section In charge.

The Energy Conservation Proposals / Modifications duly authenticated by : Data, Drawings, Values & Expected savings are submitted to President for approval. Once the proposal is approved, the equipments / Instruments are purchased and the same is being implemented.

Energy Conservation Achievements :

During the Year 2003-04 number of Encon measures were implemented

Apart from the following Major steps a number of Minor measures are also taken for Energy conservation:

- 1.Pre heater fan in let box modification.
- 2.Poldos-sc commissioning in PC firing.
- 3.pre heater fan bypass duct.
- 4.Belt Bucket Elevator for Raw mill –2 Silo feeding.
- 5.Replacing /Retrofitting of low efficiency Cooler fans in Line- 1&2.
- 6.Optimisation of Grinding Media loading in Cement mill –2.
- 7.Installation of Fuzzy logic system for Cement mill 2 operation.

- 8.VVVF drive for CSP –2 Bag filter fan.
- 9.Optimisation of Air flow in Coal mill –2.
- 10.VVF drive for 4Nos Bag filter fan in Packing plant.
- 11VVVF drive for 8Nos Rotary Air lock in Raw mill –2.
- 12.FRP blades for Kiln shell Cooling fans & HT motor Cooling fans.
- 13.Optimisation of Separator Air flow in Cement mill –1.
- 14.Reduction of Cable losses .
- 15.Kiln main drive cooling blower modification in line-I.
- 16.Cooler grate drive 1&2 cooling drive modification.
- 17.VVVF drive for Raw mill-II hopper top dust collector.
- 18.Raw mill-II out let duct modification.

Please refer annexure 16(B) for write-up on each major energy conservation projects implemented during the year 2003-04

Energy Conservation plans for Future & Targets :

1. Belt bucket elevator for Kiln feed in line-II
2. Installation of integration belts to transfer V-Sep reject material to Cement mill-I for enhancing capacity.
3. Replacing /Retrofitting of low efficiency Cooler fans in Line- 2.
4. Installation of Fuzzy logic system for Cement mill -I operation.
5. Installation of Vibrating screen and secondary crusher after limestone crusher for size reduction of lime stone to increase Raw mill out put.
6. Modification of PC duct in line-II
7. Kiln inlet riser duct modification in line-II
8. Raw mill-II body modification.
9. Dynamic Sep for Coal mill-II.
10. LV Tech Classifier for Raw mill-I and Coal mill-I.
11. Poldos-sc commissioning for main firing system in line-I.
12. Belt bucket elevator for Raw mill-I

By implementing the above Energy conservation measures Power Consumption is Expected to reduce by : **1.0 - 1.5 Kwh/Ton of Cement in each unit**

Environment & Safety :

Environment policy :We are committed to develop sustainable, Clean Environment by reducing Pollution, Energy and water consumption by establishing Environment Management System (EMS) as per ISO –14001. The Basic Objectives are : Prevention of Pollution Incidental to Plant operation, Compliance with all applicable Legal & Statutory Requirements, Conservation of Natural resources & Continual Improvement.

Water :

Being complete Dry Process Technology cement plant does not require any process water & does not generate any Trade Effluent. Process cooling water management is done by “Open Re Circulating cooling system” where in Same water re circulated repeatedly after Cooling in Cooling Tower. Sewage from Colony treated in Sewage treatment plant employing “Activated Sludge Process” & same is up graded by adding

“Pressure Sand Filter & Chlorinator” presently. Treated sewage water is used for green belt development. Trade effluent generated at TPP is utilised at Cement plant for cooling ,Dust suppressions and green belt development.

Air :

Total 7Nos of ESP's & 27 Bag filters are operated in the plant to Control the Emissions.

- Continuous Emissions Monitoring System installed in nine Stacks, display is in CCR and is being monitored by operator continuously.
- We have located Total 6Nos of “Ambient Air Quality” Stations for monitoring Ambient Air in consultation with State Pollution Control Board.
- Dry fog systems to Control Fugitive Dust emissions.
- Dense phase system to Transport the Cooler ESP dust to Cement Mill hopper.
- 15.7MW Captive Thermal power plant & 3 nos of 4 MW Capacity DG sets have been installed to meet 100% Energy requirement for Un interrupted power supply & Efficient operation of Pollution Control Equipments.
- Vehicles Emission checking for Company Vehicles & also for all Employees Vehicles once in Six months.

Solid waste :

100% of the Waste generated at our Thermal power plant is used in the Cement manufacturing Process, apart from this we are also consuming Fly ash from Raichur Thermal power plant for production of PPC.

Plantation :

Plantation is done on Scientific basis using native Species. Over 2 Lakh trees/Plants are surviving as on date covering an area of 245 Acres.

Safety :

A Central Safety Committee & Departmental Committees are in existence. The Company was certified to Occupational Health & Safety Management system standard OHSAS –18001 in the year 2002. Competitions are conducted on the eve of National Safety Day. Publicity is given by a way of Safety Posters, Slogans, Stickers & Calendars. A full fledged Occupational Health Center is in operation.

- Safety & Environmental Pillar is functioning actively under TPM.
- Formats developed for Accident report, Near miss report, Check list for Toilets.
- Work permits for : Height, Confined area, Hot & Radiation, excavation.
- Safety patrolling rounds at regular intervals to find out Un safe areas & Rectification.
- Task / Critical task observation.
- Mock Drills are being conducted at regular intervals to check the response time .
- For Visitors, passes are issued at main gate along with Safety gadgets before entering in the plant.

Write –up with salient details on each major projects implemented during the year 2003-04

1.PH FAN BYPASS DUCT IN LINE I & II

I & II) Background & observations made of the Projects.

In line-II, When kiln runs on 215 - 225 tph feed rate, draft required at PH outlet is in the range of 530 - 550 mmwg. At this feed rate if raw mill stops for any reason PH fan has to be stopped and kiln runs on ESP fan only. Many times it was observed that, during this situation we are not able run the kiln at 215 - 225 tph, as we are not getting the required draft at ph outlet even though ESP fan is operating at full speed & full damper open. subsequently kiln feed has to be reduced to 190 - 195 tph. ESP fan design specifications : volume is 540000 m³/hr. pressure 950 mmwg. Esp fan inlet pressure was measured (948 mmwg) & found that it was operating very close to rated pressure. this has made us to think & to analyse the problem. Hence during raw mill stoppage, entire circuit pressure profile was measured. i.e. from PH out let to ESP fan inlet. And similar study is carried out in line-I also.

III) Technical & Financial analysis made.

During Raw mill stoppage, PH Fan has to be stopped & the entire amount of PH exit gases are passing through PH Fan casing. The available area is very less, which leads to very high pressure drop at the Fan casing. So we have decided to reduce flow across PH Fan casing by providing Bypass duct.

Investment made: Rs: 11.5 Lakhs

IV) Impact of implementation.

During raw mill stoppage kiln out put will not get effected as lot of margin available in Esp fan

SAVINGS ON POWER

As pressure drop across preheater fan reduced, resulting in the reduction of Esp fan power

power reduced due to installation of by pass duct :(during raw mill stoppage)

Esp fan line - 1 :100 - 120 kw

Esp fan line - 2 : 300 - 320 kw

Basis : Raw mill & Kiln running hrs 2002 - 2003.

Kiln 1 running hrs = 7301.

Raw mill 1 running hrs = 6673.

Difference in running hrs =628 hrs / annum.

Power savings = 628 hrs x 100 kwh = 62800 kwh

Savings /Aannum = 62800 @ rs.4.60 / kwh
Rs 2.9Lac /Aannum
Kiln 2 running hrs =7578.51.
Raw mill 2 running hrs = 6819.66.
Difference in running hrs =756 hrs / Annum.
Power savings = 756 hrs x 300 kwh = 226800 kwh
Savings /Aannum = 226800 @ rs.4.60 / kwh
Rs 10.43 Lac / Annum
Total savings = Rs. 13.33 Lac/ Annum.

2. Raw mill-II out let duct modification.

I & II) Background & observations made of the Projects.

Higher pressure drop in mill out duct between two Expansion joint.

III) Technical & Financial analysis made.

After analyzing the entire circuit pressure profile, it was found that 55-60 mmWG pressure drop is there from EJ-10 TO EJ- 11 Expansion joint, and duct velocity is also an higher side i.e 25 m/Sec. Decided to increase the duct diameter from 2880 mm to 3200 mm to reduce pressure drop.

Investment made: Rs: 8.74 Lakhs

IV) Impact of implementation.

1. Mill out duct velocity reduced by 6 m/sec ie. From 25 to 19 m/sec.
 2. Pressure drop is also reduced by 35-40 mmWG.
- As result of above steps, it is possible to run Raw mill ESP Fan with 97 % GRR instead of 100 %. So we are able to save the power by 75 KWH.
Savings:
1.Power : $75 \times 20 \times 330 = 4,95,000$ kwh.
2.Rupes : $4,95,000 \times 4.6 = 22.77$ Lakhs/Annum.

3.POLDOS-SC COMMISSIONING FOR PC FIRING IN LINE-I

I & II) Background & observations made of the Projects.

Earlier we were using weigh feeder , FK pump for conveying the coal to PC firing system and this system has more number of drives. Due to this power consumption was more.

III) Technical & Financial analysis made.

After comparing the Coal feeding system of line-I with line-II (Line-II is already having Poldos-SC).The power consumption in line-I was more then line-II, because line-I system having more number of drives. So decided to replace weigh feeder & FK Pump by Poldos-sc system by developing necessary software in DCS.

Investment made: Rs: 33.71 Lakhs

IV) Impact of implementation:

Power saving.

Power consumption before modification : 58.0 kw/hr

Power consumption after modification : 39.0 kw/hr

Total power saving:19.0 kw/hr

Total power saving in Rs.19.0kw*4.60*24*330 = 6.92 Lacks /Annum.

4.MODIFICATION OF PRE HEATER FAN –2 IN LET BOX.

I & II) Background & observations made of the Projects.

Very high pressure drop at Pre heater fan inlet resulting in higher power consumption

III) Technical & Financial analysis made.

This particular problem was studied in detail by taking Pressure reading from GCT out let to PH Fan inlet and Fan volumetric flow. It was observed that a very high pressure drop was taking place from GCT outlet to fan inlet. This problem was analyzed and found that Gas velocity at Fan inlet was on higher side as kiln is operating on higher out put after installation of Ball mill in VRM –II.

In consultation with the designer, it was decided to increase the Fan in let area to avoid the pressure drop.

Investment made: Rs: 1.64 Lakhs

IV) Impact of implementation:

As gas velocity at fan inlet reduced, pressure drop also reduced resulting in reduction of power drawn by the fan.

For estimating the power savings, power drawn by the PH Fan was taken at same out put levels for before and after.

Power saving s : At clinker out put :143 TPH.

Power Drawn by the fan : Before :950 kwh

Power Drawn by the fan : After : 895 kwh

Power savings :55 kwh = 55*20*330= 3.63 Lac kwh

= 3.63* Rs.4.60/kwh

= Rs.16.69 Lac / Annum.

5.Fuzzy expert system for Cement mill-II

I & II) Background & observations made of the Projects.

Earlier plant optimization was purely depend on the operator .As he was to monitor all the process parameters and change the set point as per requirement of the plant conduction. So manual intervention was more and Sp. Power consumption is also high.

III) Technical & Financial analysis made.

FUZZY EXPERT SYSTEM was commissioned for optimization of the Cement mill-II. Operator need not to change any parameter, he will give parameters range. It will change in auto as per requirement of load and draft of the mill and some other parameters.

Investment made: Rs: 12.0 Lacks

IV) Impact of implementation:

- a) Energy saving.
- b) Increase in Production.
- c) Manual intervention reduced.

Power saving per annum; $14,00,000 \times 4.60 = 64.40$ Lacks /Annum.

6.Retrofitting/Replacement of Cooling air Fans in LINE I & II by high efficiency Fans .

I & II) Background & observations made of the Projects.

- 1.Fans are operating with lower efficiency.
- 2.Power consumption was high.
- 3.Fans design specification are not matching with operating parameters.

III) Technical & Financial analysis made.

To over come above said problems it was decided to retrofit with new impellers having design specification closer to operating conditions, to improve operational efficiency of the Fans.

Investment made: Rs: 6.00Lakhs

IV) Impact of implementation:

Power consumption reduced by : 35 kwh
Savings: $35 \text{ kwh} \times 24 \times 330 = 2.772$ Lacks kwh
Savings per annum : $2.772 @ 4.6 = 12.7512$ Lacks Rs/ Annum .
In line-II Power consumption reduced by : 84 kwh
Savings: $85 \text{ kwh} \times 24 \times 330 = 6.732$ Lakh kwh
Savings per annum : $6.732 @ 4.6 = 30.9672$ Lacks Rs/ Annum .

7.Optimisation of separator in line-I Cement mill.

I & II) Background & observations made of the Projects.

% Coarse fraction in final product was high,

III) Technical & Financial analysis made.

Separator fan was operating at 100 % speed. As mill dimensions are designed for open circuit, Recycle quantity of material is on lower side. Air to material ratio was on higher side when compared to norms.

To bring down Air to material ratio it was decided to operate the Separator fan at reduced speed with the help of GRR. Now Separator fan is operated at 65% GRR.(850 RPM).

Investment made: Rs: NIL

IV) Impact of implementation:

- 1.% Coarse fraction reduced in the final product.
- 2.Power saving:

Before: GRR = 100 % Fan power = 280 kw

After : GRR = 65 % Fan power = 240 kw

Total power savings : = 0.3 kwh/Ton of Cement.

= 0.3*5.0 Lakh tons/Annum = 1.5 Lakh kwh

= 1.5 @ 4.6 / kwh = Rs.6.9 lacks/ Annum.

8.Reduction of cable losses.

I & II) Background & observations made of the Projects.

Power factor was low.

III) Technical & Financial analysis made.

1400 KVAR Capacitor bank disconnected from cement mill main drive and same was connected in bus section "A" to increase the Power factor and to reduce the Cable losses

Investment made: Rs: NIL

IV) Impact of implementation:

Cable losses reduced

MD reduced approximately 100 KVA

Savings = 100 X 180 X 12 = Rs.2.16 Lacks/Annum.

9. Kiln main drive cooling drive modification.

I & II) Background & observations made of the Projects.

Power consumption was high.

III) Technical & Financial analysis made.

Due to high speed motors for cooling blowers the motors were running with higher vibrations and some time resulting in failure of bearings
Replaced the cooling blowers by FRP fans and also replaced the motors from 7.5 KW TO 5.5 KW with 1500 Rpm motor and modified cooling system.

Investment made: Rs: 0.1 Lakhs

IV) Impact of implementation:

- 1.Noise level reduced from 107 DB to 88.7 DB.
- 2.Power saving is 5.10 KW/ hr.
- 3.Power saving per Annum in Rs.= $5.10 \times 330 \times 24 \times 4.60 = 1.85$ Lakh.

10.Cooler grate drive 1&2 Cooling blower modification in line I & II.

I & II) Background & observations made of the Projects.

Power consumption was high.

III) Technical & Financial analysis made.

Due to high speed motors for cooling blowers the motors were running with higher vibrations and some time resulting in failure of bearings
Replaced the cooling blowers by FRP fans and also replaced the motors from 3000rpm to with 1500 Rpm .

Investment made: Rs: 0.1 Lakhs

IV) Impact of implementation:

- 1.Noise level reduced from 107 DB to 88.7 DB.
- 2.Power saving is 1.0 KW/ hr.
- 3.Power saving per Annum in Rs.= $1.0 \times 330 \times 24 \times 4.60 = 0.36$ Lakh.

11.VVVF Drive for raw mill –II hopper top dust collector.

I & II) Background & observations made of the Projects.

Power consumption was high.

III) Technical & Financial analysis made.

Earlier RM-II hopper top dust collector fans used to run in DOL mode at full speed and creating more suction that required. VVVF drive is installed and commissioned for dust collector fan and required software is developed in DCS to operate the drive at required speed from control room.

Investment made: Rs: 1.6 Lakhs

IV) Impact of implementation:

Motor power consumption before VVVF Drive : 16.5 kw

Motor power consumption after VVVF Drive : 6.2 kw

Power saved : 10.3 kw

Power saved in terms of Rs: $10.3 \times 4.6 \times 20 \times 330 = 3.127$ Lakhs.

12.VVVF Drive for CSP top dust collector fan.

I & II) Background & observations made of the Projects.

Power consumption was high.

III) Technical & Financial analysis made.

Earlier CSP top dust collector fans used to run in DOL mode at full speed ,more suction produced then requirement. VVVF drive is installed and commissioned for dust collector fan and required software is developed in DCS to operate the drive at required speed from control room.

Investment made: Rs: 1.6 Lakhs

IV) Impact of implementation:

Motor power consumption before VVVF Drive : 18.5 kw

Motor power consumption after VVVF Drive : 14.3 kw

Power saved : 4.2 kw

Power saved in terms of Rs: $4.2 \times 4.6 \times 24 \times 330 = 1.53$ Lakhs.

13.VVVF Drive for Packing plant-II silo top dust collector fans (4 Nos).

I & II) Background & observations made of the Projects.

Power consumption was high.

III) Technical & Financial analysis made.

Earlier silo top dust collector fans used to run in DOL mode at full speed with 75 % damper opening because to reduce in pressure at Bag filter in let . Four numbers VVVF drive is installed and commissioned for dust collector fans and required software is developed in DCS to operate the drive at required speed from control room.

Investment made: Rs: 6.4 Lacks.

IV) Impact of implementation:

Power saved : 0.94 Lakh kw

Power saved in terms of Rs: $0.94 \times 4.6 = 4.32$ Lakhs.