



UltraTech Cement Limited, Anantapur, Andhra Pradesh

(i) Unit Profile : Andhra Pradesh Cement works:

The UltraTech Cement Limited, Andhra Pradesh Cement Works is located 360 kms south of Hyderabad in the state of Andhra Pradesh in South India. Along with the grinding unit at Arakonam. The plant is ideally suited to cater to markets in Andhra Pradesh, Karnataka, Tamilnadu and Kerala.

Andhra Pradesh Cement works (APCW) is situated in Tadpatri, an ancient temple town, which is located on the banks of river Penna. Tadpatri, comes under Anantapur district of Andhra Pradesh. Tadpatri is well connected by railway line and roads. The Chennai-Mumbai railway line runs close to plant. Peculiarity of APCW is its mines fall in Kurnool district while the plant is in Anantapur district.

APCW has many firsts in the country to its credit:

The Cement plant has been engineered with world leaders in cement Technology from FLSmidth, Denmark. Critical Machinery have been imported. APCW have supplied majorities of the equipment. Cement plant is fully automated and is Centrally controlled by process Computers linked to the plant machinery to avoid manual intervention and resulting power conservation.

High efficiency Vertical Raw Mill ATOX 50 (2 Nos of 370 tph each), Vertical Coal Mill ATOX 27.5 (1 No of 71 tph), Double String Six Stage Preheater, Kiln 4.75 X 75 mtr 8000 TPD, CIS-CFG Coolax Cooler, Belt bucket elevators for Raw Meal & Kiln Feed in place of conventional pneumatic conveying system, Cement mills (2 Nos. of 161 tph each) with roller press, Fuel Efficient Captive power plant (2 x 11.87 MW) with waste heat recovery boilers are salient energy efficient equipment installed at APCW.

Total 112 Nos. V/F Drives and 7Nos Slip Power Recovery Systems are installed at APCW for saving of power on continuous basis.

(ii) Energy Consumption

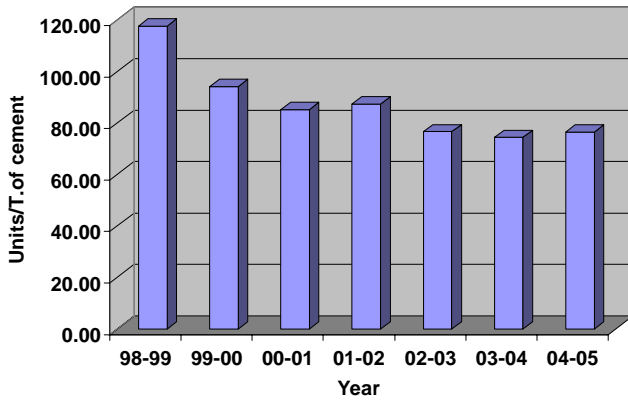
The several measures were taken for the reduction in the Energy Consumption as mentioned below:

| Sl.No. | Particulars | Unit | 2002-03 | 2003-04 | 2004-05 |
|--------|---|-----------------------|----------|----------|----------|
| 1 | Electrical Energy | Kwh / Ton of Cement | 73.33 | 71.1 | 72.9 |
| 2 | Thermal Energy | K Cal / Kg of Clinker | 687 | 685 | 684.3 |
| 3 | Total Manufacturing Cost | Rs. Lakhs | 24883.65 | 28911.16 | 31098.02 |
| 4 | Total Energy Bill | Rs. Lakhs | 5946.18 | 6380.13 | 7653.47 |
| 5 | Energy as % of Total Cost of Production | % | 24 | 22 | 25 |

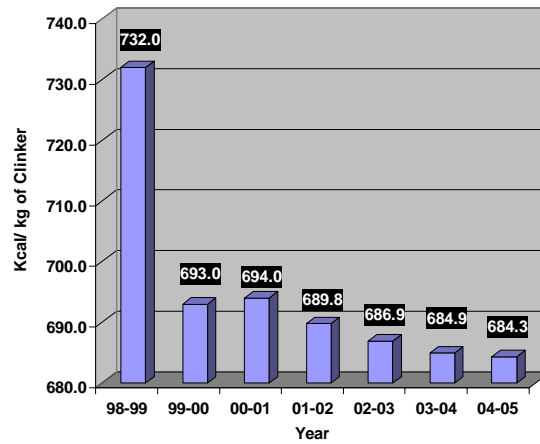
| | Specific Electrical Energy Consumption | | Specific Thermal Energy Consumption | |
|-----------|--|----------------------|-------------------------------------|--------------------|
| Year | kWh/tonne of Clinker | kWh/tonne of Cement* | K Cal/Kg of Clinker | K Cal/Kg of Cement |
| 2002-2003 | 53.46 | 73.33 | 687 | - |
| 2003-2004 | 50.60 | 71.1 | 685 | - |
| 2004-2005 | 50.50 | 72.9 | 684.3 | - |

* Excluding Utility

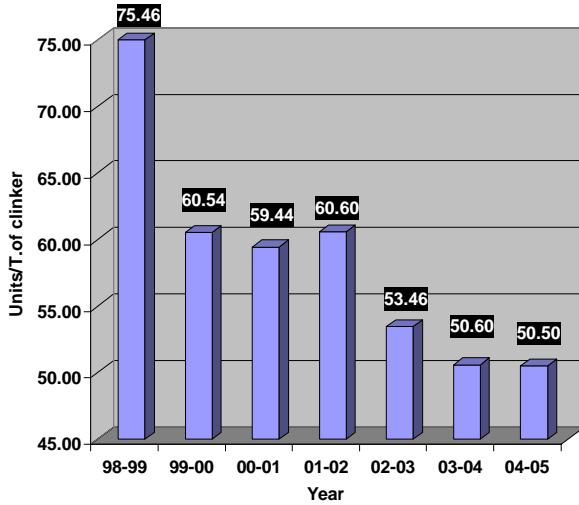
Electrical Energy Consumption



Thermal Energy Consumption



Electrical Energy (upto Clinkerization)



(iii) "Energy Conservation Commitment, Policy and Organizational Set up

Energy Management at APCW - Tadpatri

The cross-functional personnel constitute the energy pillar team across the plant. They identify and implement various energy conservation projects.

The cost of the power is minimized by controlling the MD and optimum power consumption from APGPCL, Electricity board and DG sets.

The individual identifies and quantifies the energy losses in his section and takes suitable actions for optimum loading of the equipment and reduction of losses.

The power factor is continuously monitored and maintained above 0.97.

The fuel consumption is continuously monitored during power generation to maintain the generation efficiency.

The awareness is spread among the employees and residents for conserving the energy.

The various proposals are prepared such as renewable energy source for reduction in the green house gases and utilization of waste heat available in the exit gases.

The management has been striving to achieve the milestones in the Industry since the commissioning of the plant. We are achieving the best in a short span of time and we will achieve the various milestones in future with the total commitment from the top management and involvement of all the employees.

In view of management's excellent commitment for the conservation of Energy, the Management has been awarded "Quality, Environment & Safety Management System" in confirmation with ISO 9001 (2000), ISO 14001 (1996) and OHSAS 18001 (1999).

To Improve further, the management had set up, various committees like Energy Conservation Committee, Water Conservation Committee, Seva Committee, Small Group Activities, Suggestion Schemes, Shop Floor Committee, Improvement Steering Committee and conducts various meetings for involving all the people such as Area Effective Level Review Meetings, Pillar Level Meetings, Organizational Level Review Meetings etc...

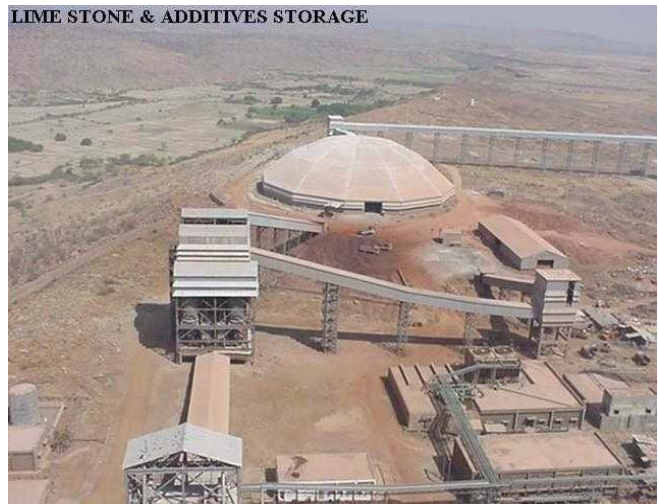
(iv) Energy Conservation Achievements

Include one paragraph write-up on each major energy conservation project implemented during the year 2004-2005 only



The plant is located at a height of 351.5 from M.S.L. Though the state govt. limit for stack is 115 mg/ Nm³, APCW has gone for Reverse air bag house technology with special design of Imported bags to restrict the emission to below 50 mg/Nm³. The entire limestone stockpile is covered and capable of storing 60000 Mt.

In all the transfer points and vulnerable areas bag filters are provided to make the plant and surrounding hamlets dust free. We produce, market and sell cement of different grades with environment friendly technology. The finished product is packed in paper sacks, which is a biodegradable and environmental friendly product. Besides this on the request of customer cement is packed in PP bags also.



With the focus on reduction in fugitive emissions in all over the plant, the occupational health problems are negligible. Besides technological initiatives,, there is a system of conducting the complete health check-up for all the employees including Spirometry (Lung test) with sophisticated equipment. This is being conducted once a year. The results of the studies show that there is no significant impact on their health.

LSS & ADDITIVE STORAGE



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The production processes take care of all the emergency situations with suitable electronic interlocks in the system. And also an On-site emergency plan is developed as a part of implementation ISO 14001, which takes care of any untoward eventuality. Till date no environmental incident/accident in the plant has taken place.

RABH ,MAIN CHIMNEY & PRE-HEATER

There have been no accidents, which has endangered surrounding villages in any aspect. Burning of HFO sludge and waste mineral oil in kiln avoids circulation of the Hazardous waste.



The top most priority is given to the safety by all employees. The daily five minutes safety spreads the awareness among all.

| Sl.No | Measures Taken | Cost incurred | Savings |
|-------|--|---------------|-------------|
| | | Rs in Lakhs | Rs in Lakhs |
| 1 | Reduction of pulley for LS Crusher JPF fan | 0.04 | 1.42 |
| 2 | Reduction in separator area of Raw mill 1&2 for efficiency improvement | 12.00 | 30.97 |
| 3 | Providing V/F Drive for raw meal feed RBC R1J04 & R2J04 | 1.00 | 6.19 |
| 4 | Installation of HT vfd for cooler vent fan | 40.00 | 12.39 |
| 5 | Installation of vfd for CF silo aeration blower | 1.20 | 0.93 |
| 6 | Installation of vfd for kiln shell cooling fans | 7.50 | 3.41 |
| 7 | Derating of blower motor [K1V18] from 110KW to 75KW | 0.02 | 0.46 |
| 8 | Change in the pulley diameter for speed reduction of blowers [K1V09,10,19,20,21,22] | 0.29 | 6.19 |
| 9 | Installation of swing cooler at cooler | 3.00 | 7.74 |
| 10 | Reduction in tap position from 3 to 2 of transformer cement mill [T13] | 0.00 | 4.40 |
| 11 | Lighting optimisation at Gypsum, Flyash & Slag yard | 0.06 | 0.57 |
| 12 | Installation of HT vfd for Sepax fan-1 | 40.00 | 25.12 |
| 13 | Lighting load optimization & Providing transparent fiber sheets for day light | 0.25 | 0.69 |
| 14 | Reduction in packer idle running hours by providing PLC interlocking | 0.10 | 1.88 |
| 15 | Reduction in Bulk cement loading idle running hours by providing PLC interlocking | 0.00 | 0.41 |
| 16 | Providing ON/OFF switch for for lighting optimisation at WLM, TLM area | 0.05 | 0.51 |
| 17 | Providing individual SV for all spout aeration to stop air during OFF condition in Packer- 6 | 0.05 | 0.10 |
| 18 | Bypass chute for bulk clinker loading reversable belt conveyer [U1U22] RRBC | 0.20 | 0.59 |
| 19 | Mearging of Poking air with main compressor air grid to reduce unloading hours | 0.70 | 9.06 |
| 20 | Removal of Catridge filters in air filters for compressor | 0.00 | 2.09 |

LSC - JPF Pulley reduction of A1P05

Background of the Project

Presently the JPF fan is being operated with partial damper opening with fan speed of 744 rpm. The further reduction of JPF fan speed by 11% will lead to more power saving.

Observation made

- 1) Open the damper fully to 100%.
- 2) Reduced the fan speed from 744 rpm to 664 rpm (11% reduction) by reducing the drive pulley size.
- 3) Blocked 06 nos. filter chambers of JPF to reduce the suction load on fan.
- 4) After speed reduction, power consumption of fan has reduced from 37 kW to 26 kW

Technical & Financial Analysis

| | | |
|--|------|--------|
| Annual Savings observed (11 kW x 11 hrs/day x 300 days x Rs 3.91/unit) | 1.42 | lakhs |
| Investment | 0.04 | lakhs |
| Payback | 0.34 | months |

Impact of Implementation

Modified the JPF Pulley and achieved the savings Rs.1.42 lakhs per annum

Derating of K1V18 blower motor from 110KW to 75KW

Background of the Project

Motor under loaded

Observation made

| | |
|-------------------------------------|---------|
| 110kw motor derated with 75kw motor | |
| 110KW motor power consumption/hour | 57.3 kw |
| 75KW motor power consumption/hour | 55.8 kw |
| Power saving/hour | 1.5 kw |

Technical & Financial Analysis

| | |
|---|------------|
| Annual Savings observed (1.5 kW x 24 hrs x 330 Days x Rs 3.91/unit) | |
| Investment | 0.02 lakhs |
| Payback | |

Impact of Implementation

Derated the motor and achieved the savings of Rs. 0.465 lakhs per annum.

Providing V/F Drive for R1J04 & R2J04 RBC

Background of the Project

The mill feed is getting control through mill dp, when ever the mill is running in auto mode. In case of any variation in dp the feed is getting controlled from change in the set point of dosimate feeder and the material travel time to mill is 4 minutes. The provision of the vfd on feed belt the feed rate can be varied quickly and the reduction in speed will reduce the power consumption.

Observation made

Rated kW of RBC motor is 90kW

| | | |
|--|----|----|
| Running kw of motor | 56 | kW |
| Running kw of motor after providing V/F drive | 51 | kW |
| Power saving by providing V/F drive (oprating at 75 to 85 speed)/ hour | 5 | kW |
| Power saving by improving the mill feed control with DP/hour | 10 | kW |
| Total power saving / hour | 15 | kW |

Technical & Financial Analysis

| | | |
|--|------|--------|
| Annual Savings observed (2 x 15 kW x 16 hrs x 330 Days x Rs 3.91/unit) | 6.19 | lakhs |
| Investment | 1.00 | lakhs |
| Payback | 2 | Months |

Impact of Implementation

Installed the V/F Drives and achieved the savings of Rs. 6.19 lakhs per annum.

Reducing T13 trafo tap from 3 to 2

Background of the Project

Cement mill 1 distribution transformer secondary voltage is 425 volts,Optimum voltage required is 416 volts.

Observation made

After reducing the tap from 3 to 2, voltage reduced from 425 to 416 volts.
Average KW on the transformer reduced from 498.5 kwh to 484.3 kwh.
Net power saving is 14.2 KW per hour.

Technical & Financial Analysis

| | | |
|--|------|--------|
| Annual Savings observed (14.2 kW x 24 hrs x 330 Days x Rs 3.91/unit) | 4.40 | lakhs |
| Investment | 0.00 | lakhs |
| Payback | 0 | Months |

Impact of Implementation

Reduced the voltage and achieved the annual savings of Rs. 4.4 lakhs per annum.

Lighting optimisation at Gypsum,Fly ash and slag yard.

Background of the Project

Slag,Gypsum and Fly ash circuit lights were ON even equipment were in OFF condition.

Observation made

Providing MCB for individual circuits and switching on when ever required.

Lighting power consumption reduced by of 4 kw per hour.

Technical & Financial Analysis

| | | |
|---|------|--------|
| Annual Savings observed (4 kW x 10 hrs x 365 Days x Rs 3.91/unit) | 0.57 | lakhs |
| Investment | 0.06 | lakhs |
| Payback | 1 | Months |

Impact of Implementation

Optimized the lighting and achieved the savings of Rs. 0.57 lakhs per annum.

Commissioning of HTVFD for sepax fan

Background of the Project

Cement mill no1 sepax fan speed was varing according to grid frequency,this had resulted into closing the damper at higher frequency and lower operating KW at lower frequency.In order to meet constant flow to the system speed regulation was required.

Observation made

After installing VFD to sepax fan cement out put was increased by 3.0 tonnes per hour with constant KW of sepax fan.

The increased output is equivalent to power saving of 80 Kw per hour .

Technical & Financial Analysis

| | | |
|--|-------|--------|
| Annual Savings observed (80 kW x22 Hrsx365 daysx Rs 3.91/unit) | 25.12 | lakhs |
| Investment | 40.00 | lakhs |
| Payback | 19 | Months |

Impact of Implementation

Installed the V/F Drive and achieved the savings of Rs. 25.12 lakhs per annum.

Lighting load optimization & Providing transparent fiber sheets for day light in Packing Plant area

Background of the Project

Providing transparent sheet for truck loading, wagon loading shed, bag godown, glass for sub station, Office, Packer area etc to switch OFF lights during day time. Replacement of HPSV 70 w lamps to Metal Lamps - 35 nos.

Observation made

Providing transparent sheet for truck, wagon loading shed, bag godown, glass for sub station Office, Packer area etc to switch OFF lights during day time. Replacement of HPSV 70 w lamps to Metal Lamps - 35 nos will enable to remove 50 nos; 70 w fittings.

Technical & Financial Analysis

| | | |
|---|-------|--------|
| Annual Savings observed (5 kW x 12 hrs x 292 Days x Rs 3.91/unit) | 0.685 | lakhs |
| Investment | 0.25 | lakhs |
| Payback | 4 | Months |

Impact of Implementation

Power saving of 17,520 units PA was achieved

Reduction in packer idle running hours by PLC interlocking

Background of the Project

All packer & feeding circuit, JPF, RBC, were running idle during Loading machine stoppage, truck / wagon placement.

Observation made

This is amounting to average of 10% of the running hours in shift & a sp. Power wastage of 20 kw/packer/hour. So when ever the packer is not discharging any bags for 300 sec / no packer running for 300 sec all feeding circuit, JPF and discharge circuit can be made stop to have power saving and reduce ideal running of equipments.

Technical & Financial Analysis

| | | |
|--|-------|--------|
| Annual Savings observed (20 kW x 400 hrs x 6 x Rs 3.91/unit) | 1.877 | lakhs |
| Investment | 0.10 | lakhs |
| Payback | 1 | Months |

Impact of Implementation

All Feeding circuit, JPF, Discharge circuit stops after sensing 300 sec of ideal running of packer / stop condition of packer.

Reduction in Bulk cement loading idle running hours by PLC

interlocking

Background of the Project

Packer and its transport circuits are running due to material extraction problem- Ideal running of all 6 packer is around 5000 hrs

Observation made

Suitable modification in extraction, silo level maintenance & interlock modification has resulted into the reduction in idle running by 25 % from present level

Technical & Financial Analysis

| | | |
|--|-------|--------|
| Annual Savings observed (7 kW x 1500 hrs x Rs 3.91/unit) | 0.411 | lakhs |
| Investment | 0.00 | lakhs |
| Payback | 0 | Months |

Impact of Implementation

Power saving of Rs. 0.411 Lakhs Per annum was achieved

Providing ON/OFF switch for WLM, TLM area for lighting optimisation

Background of the Project

Providing tranperant sheet for truck, wagon Tippler sheed, clinker loading, Packer area ect to switch OFF lights during day time. Replacement of HPSV 70 w lamps to Metal Lamps - 40 nos.

Observation made

Providing tranperant sheet for truck, wagon Tippler sheed, clinker loading, Packer area ect to switch OFF lights during day time. Replacement of HPSV 70 w lamps to Metal Lamps - 35 nos will enable to remove 50 nos 70 w fittings there by reducing lighting power

Technical & Financial Analysis

| | | |
|---|-------|--------|
| Annual Savings observed (3 kW x 12 hrs x 365 Days x Rs 3.91/unit) | 0.514 | lakhs |
| Investment | 0.5 | lakhs |
| Payback | 12 | Months |

Impact of Implementation

Power saving of Rs 0.514 Lakhs per annum was achieved

Providing individual SV for all spout ariation to stop air during OFF condition-PAKER 6

Background of the Project

HP compressor for Packer spout areation were always ON during Packer running / ideal running hrs. By providing separate SV we switch OFF this HP compressor. air during ideal running hours and during gap between each filling.

Observation made

Suitable modification in HP air line, providing SV control & interlocking it with packer operation has led to reduction in HP air consumption by 25 % from present level.

Technical & Financial Analysis

| | | |
|--|------|-------|
| Annual Savings observed (0.5 kW x 5000 hrs x Rs 3.91/unit) | 0.10 | lakhs |
| Investment | 0.05 | lakhs |

Payback

6 Months

Impact of Implementation

Power saving of Rs 0.10 lakhs Per annum is achieved.

Bypass chute for bulk clinker loading reversable belt conveyor [U1U22] RRBC

Background of the Project

U1U22 belt will run some times for silo1 & some times for silo 2 for fill the two silos.

Observation made

Arranged the Bypass chute for one silo in bulk clinker loading and feed the other silo continuously

Technical & Financial Analysis

| | | |
|--|-------|--------|
| Annual Savings observed (3.45 kW x 12 hrs x 365 days x Rs 3.91/unit) | 0.591 | lakhs |
| Investment | 0.2 | lakhs |
| Payback | 4 | Months |

Impact of Implementation

Power saving of Rs .59 lakhs Per annum is achieved.

Merging of Poking air in Main compressor air grid

Background of the Project

To Optimize the Compressor air energy

Observation made

Separate line for poking is consuming more power consumption.

Technical & Financial Analysis

| | | |
|---|-------|--------|
| Annual Savings observed (29.25 kW x 24 hrs x 330 Days x Rs 3.91/unit) | 9.058 | lakhs |
| Investment | 0.7 | lakhs |
| Payback | 1 | Months |

Impact of Implementation

Merged the line and achieved the savings of 29.25 kw/hr

Removal of Catridge filters in Air filters

Background of the Project

To Optimize the Compressor air energy

Observation made

Observed the loss due to catridger filters in air filters

Technical & Financial Analysis

| | | |
|---|-------|--------|
| Annual Savings observed (6.1 kW x 24 hrs x 365 Days x Rs 3.91/unit) | 2.089 | lakhs |
| Investment | 0 | lakhs |
| Payback | 0 | Months |

Impact of Implementation

Removed the filters and achieved the savings of 2.089 Rs in Lakhs

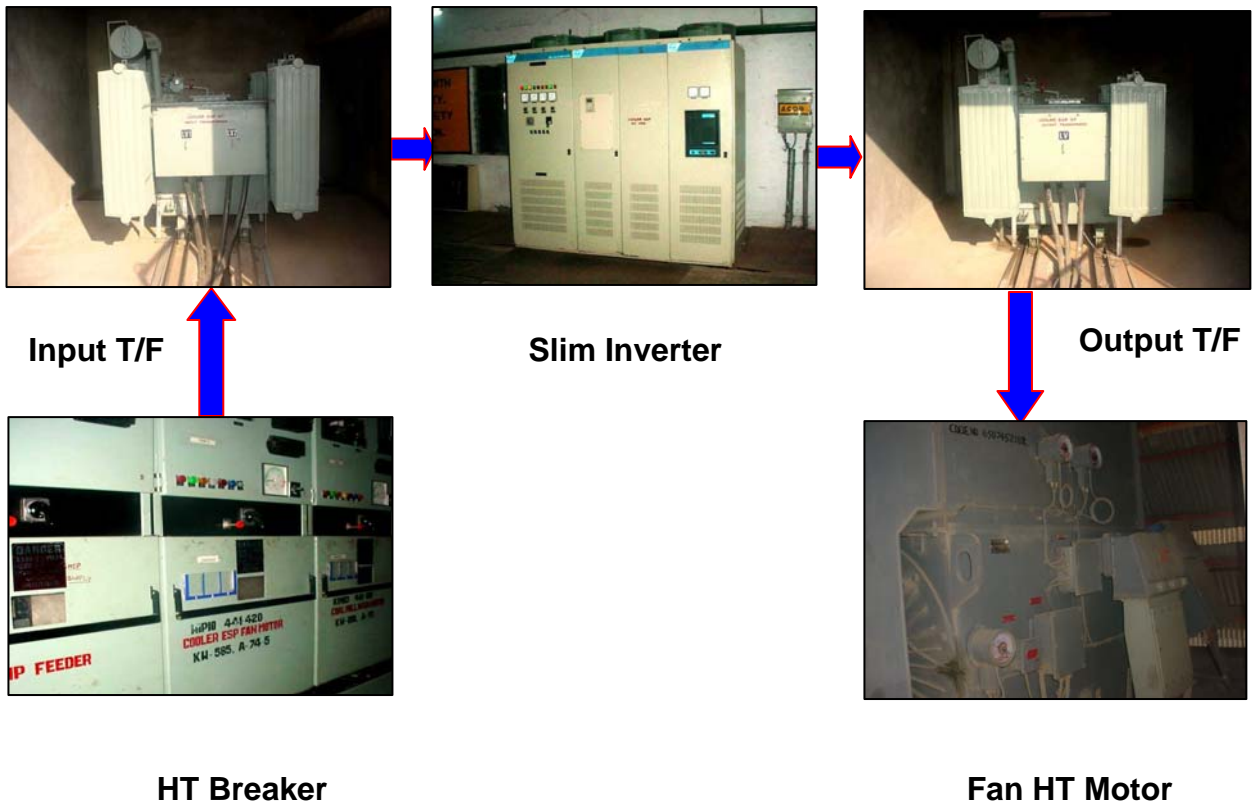
Installation of HT VFD for new Cooler vent fan

Background of the Project

The ESP fan speed could not be reduced due to fan operating at lowest speed in SPRS mode. The damper was partially closed. The installation of HT VFD made it possible for reduction in further speed and opening of the damper fully.

Observation made

| | | | |
|---------------------------------|---------------------------|-----|----|
| ESP FAN power consumption /hour | in sprs mode of operation | 200 | kw |
| SPRS saving /hour | | 40 | kw |
| Net power consumption | | 160 | kw |
| ESP FAN power consumption /hour | in VFD mode of operation | 120 | kw |
| Net saving/hour | | 40 | kw |



Technical & Financial Analysis

| | | | |
|-------------------------|--|-------|--------|
| Annual Savings observed | (40 kW x 24 hrs x 330 Days x Rs 3.91/unit) | 12.39 | lakhs |
| Investment | | 40.00 | lakhs |
| Payback | | 39 | Months |

Impact of Implementation

Installed the V/F Drive for Cooler vent fan and achieved the savings of Rs 12.39 lakhs per annum.

Reduction in seperator area of Raw mill 1&2 for efficiency improvement

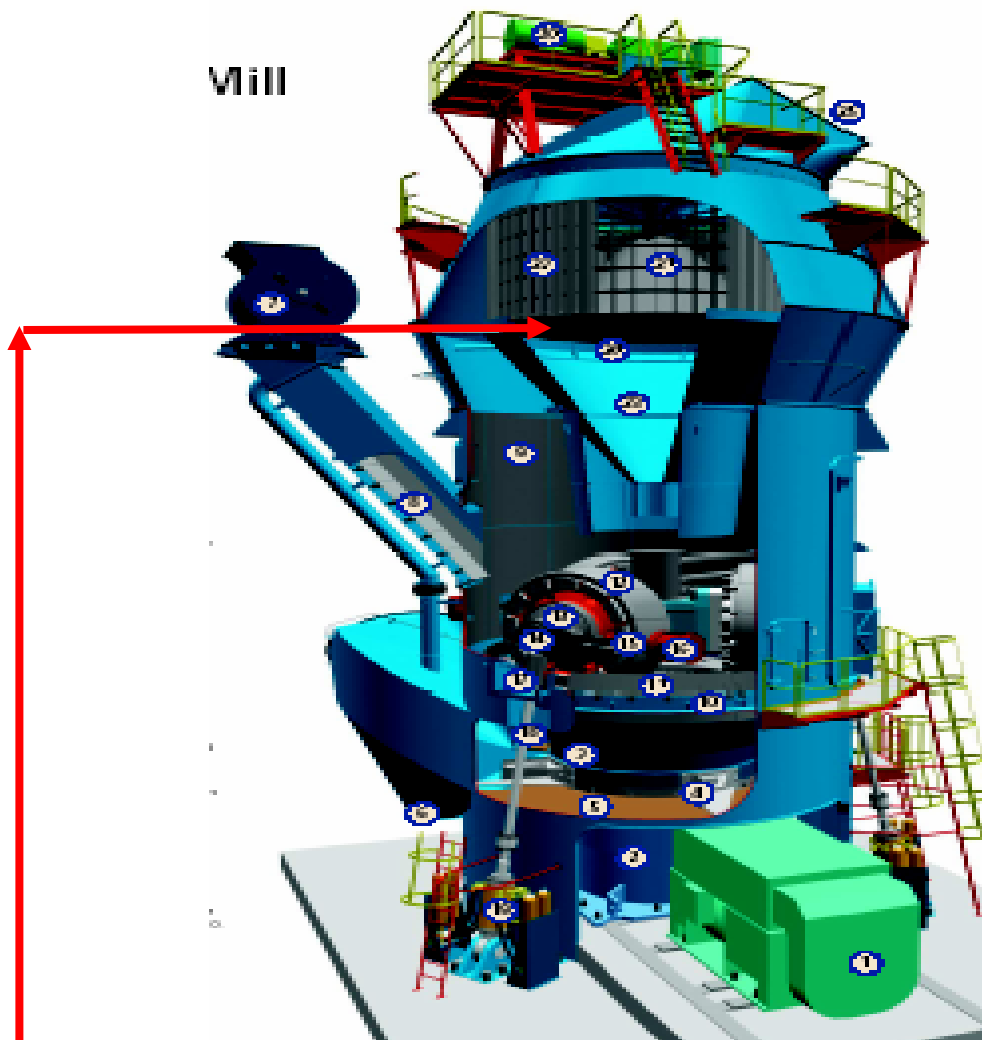
Background of the Project

To increase the mill out put, the separator velocity is increased from existing 8 to 12 mtrs/sec by reducing 38 % of the area in RM-1.

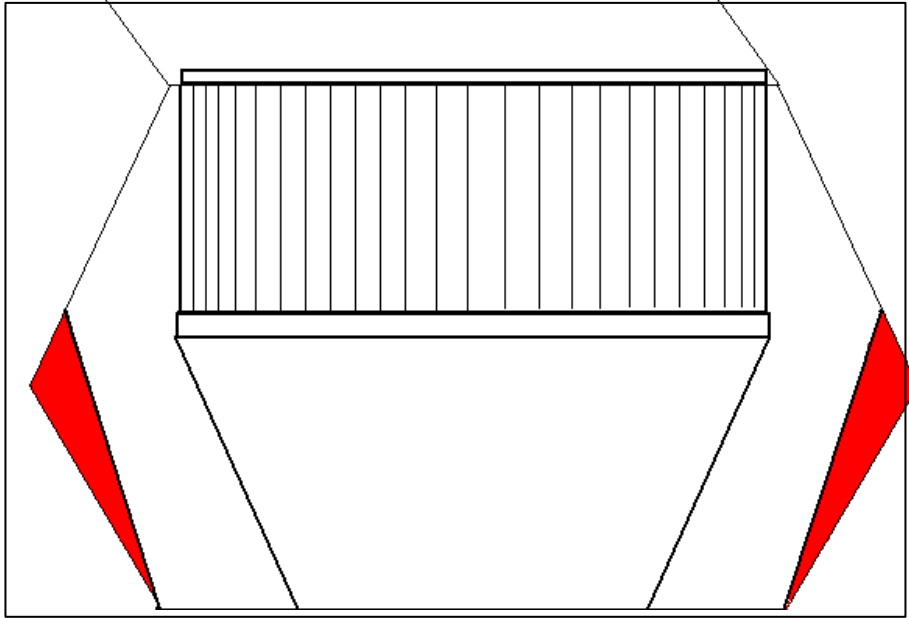
Observation made

Mill Specific power consumption was reduced by 0.2 kWh/MT (85 kWh) and Production increased

Reduced the area by fixing the Tiscral plate 8mm thick (Covered area is approx.32 %)



ATOX 50 RAW MILL



Technical & Financial Analysis

| | | | |
|-------------------------|--|-------|--------|
| Annual Savings observed | $(2 \times 85.72 \text{ kW} \times 14 \text{ hrs/day} \times 330 \text{ days} \times \text{Rs } 3.91/\text{unit})$ | 30.97 | lakhs |
| Investment | | 12.00 | lakhs |
| Payback | | 5 | Months |

Impact of Implementation

Specific Power Consumption reduced and achieved the savings of Rs. 30.97 lakhs per annum.