Madras Cements Ltd.,
Alathiyur

Unit Profile

- The manufacturing unit at Alathiyur near Trichy were set up in two phases. The Line I has the designed capacity of 2200 TPD commissioned in the year 1997. Which was upgraded to 2950 TPD in the year 1999 and again upgraded to 3300 TPD in the year 2004. The Line II was designed for capacity of 3000 TPD, which comprises the South Asia's first SF Cross Bar cooler and largest Vertical Roller Mill for clinker grinding and commissioned in the year 2001 and upgraded to 3300 TPD in the year 2004.

  This is one of the very few energy efficient plants in the world and it is very friendly to ecology and environment.
  Plant has the State-of-the-Art Technology and equipment at every stage of production. Surface miners for mining, Energy efficient MMD crusher for limestone, Vertical roller mills for Raw materials and Clinker grinding.

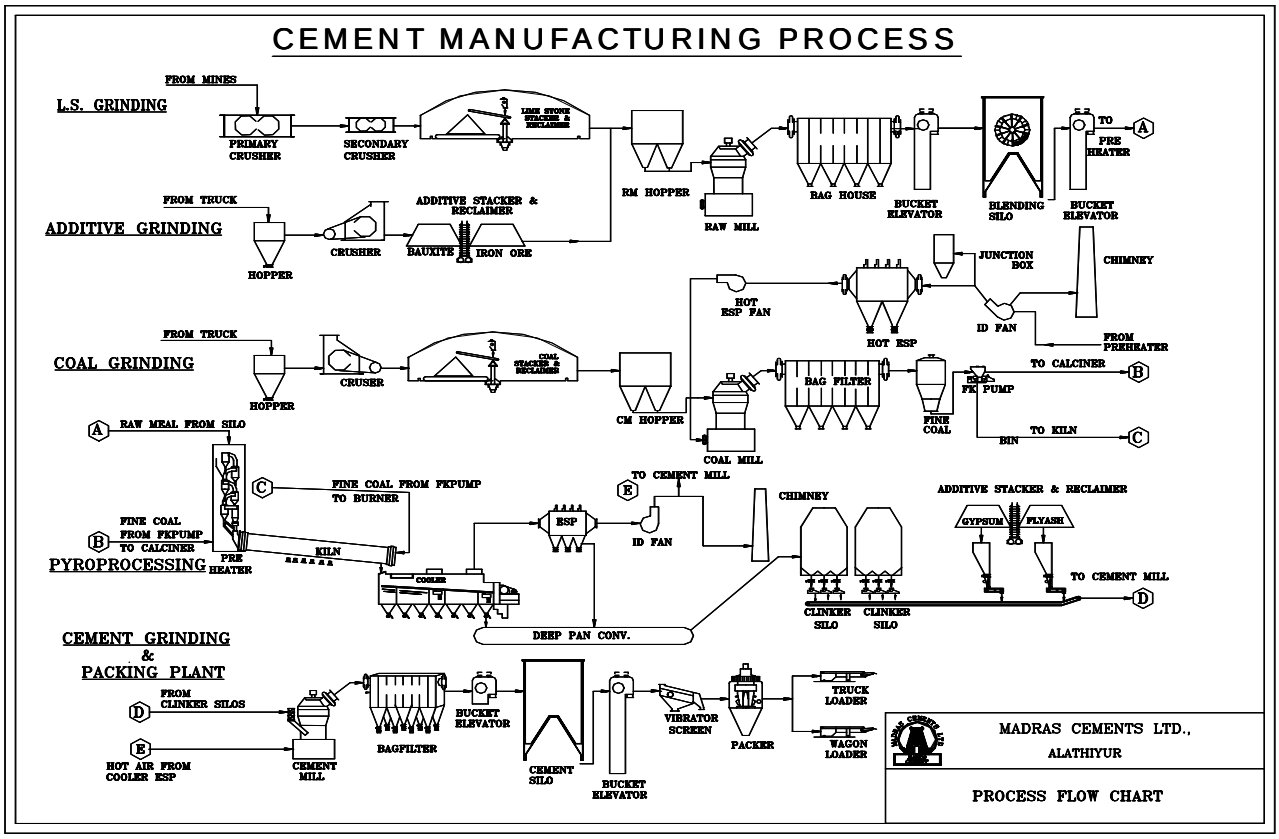
- The manufacturing products are:
  - **Ordinary Portland Cement**
  - **Portland Pozzolana Cement**

- There is 20 MW (6MW * 2 & 4 MW * 2) captive power generation, which will meet 75 % of Plant Power demand.

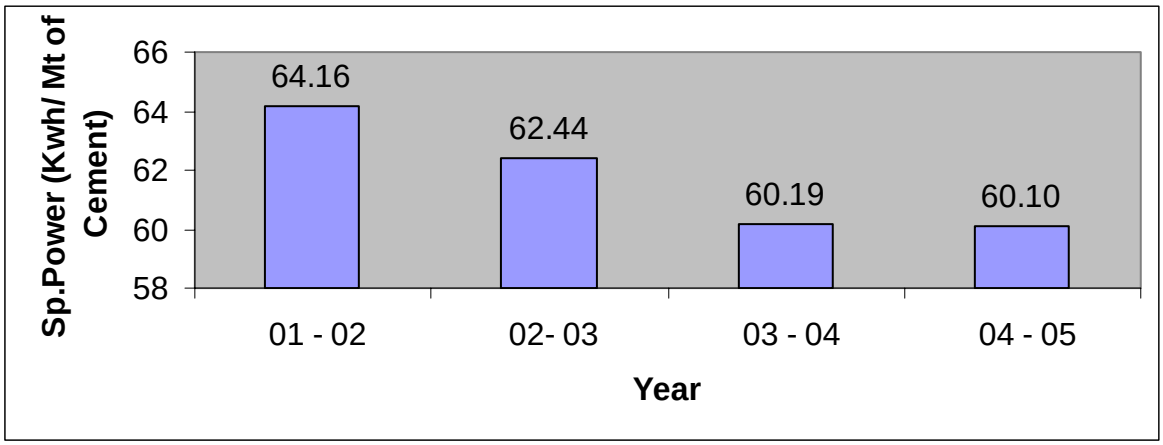
- **2 X 18 M.W** Coal based Power plant was installed to reduce the power cost.

- Operating efficiency of the equipment in each section in the plant range from 100 to 115 % of installed capacity.

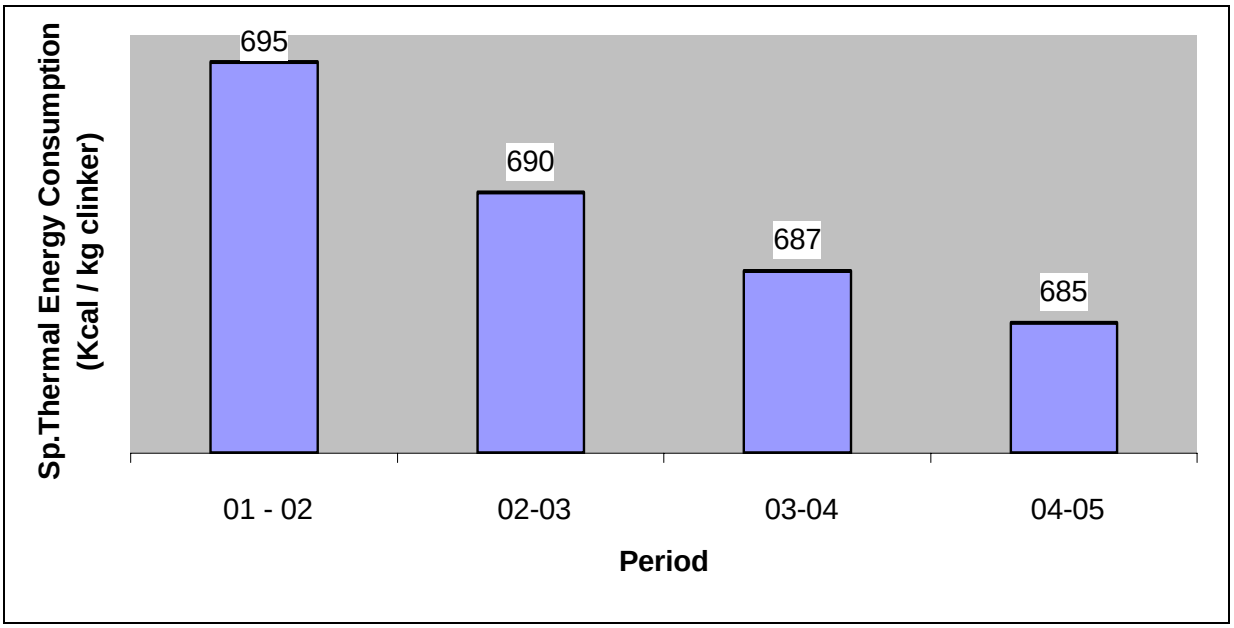
- The plant is ISO 9001, ISO 14001 & OSHAS 18001 systems certified.



Reduction in Sp. Power Consumption from 2001 – 2005



Reduction in Sp. Heat Consumption from the Year 2001– 2005

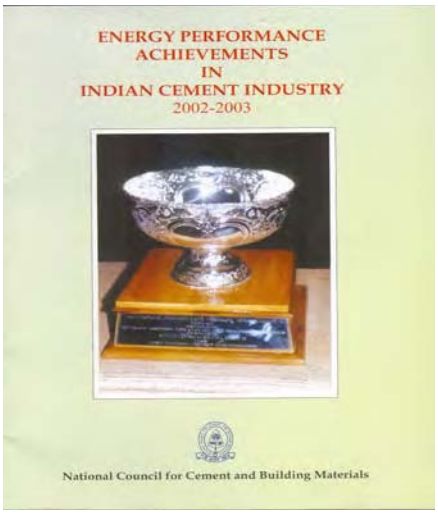


Source of information

***** National Benchmark**

ENERGY PERFORMANCE ACHIEVEMENTS IN INDIAN CEMENT INDUSTRY 2002-2003

Source of information:

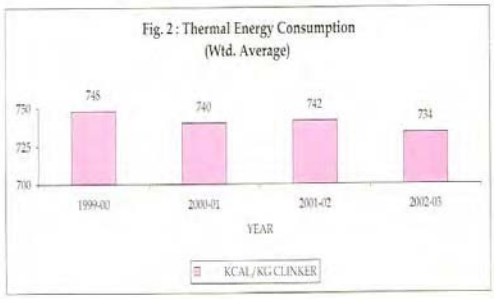


3.0 THE ENERGY CONSUMPTION SCENARIO

The energy consumption scenario of the cement plants is as under:

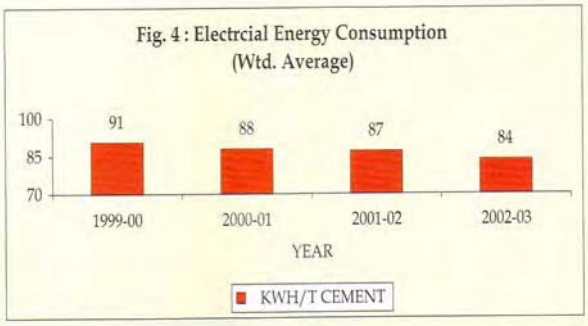
3.1 Thermal Energy Consumption

The analysis carried out for the 38 dry process plants show that the weighted average thermal energy consumption of 748 Kcal/kg clinker in 1999-2000 has reduced by 1.87% to a level of 734 Kcal/kg clinker in 2002-03 (Fig. 2).



3.2 Electrical Energy Consumption

The weighted average electrical energy consumption in dry process plants during the year 1999-2000 was 91 kWh/t cement, and it has reduced by 7.69% to a level of 84 kWh/t cement in 2002-03 (Fig. 4).



Frequency distribution for energy consumption show that 12 plants are operating within the range of 85-95 kWh/t cement, 12 plants are operating in the range of 75-85 kWh/t cement and 8 plants are operating below 75 kWh/t cement (Fig. 5).

***** International Benchmark**

ENERGY MANAGEMENT POLICY-GUIDELINES FOR ENERGY INTENSIVE INDUSTRY OF INDIA, Bureau of Energy Efficiency Ministry of Power, Government of India. June 2003.

Source of information:

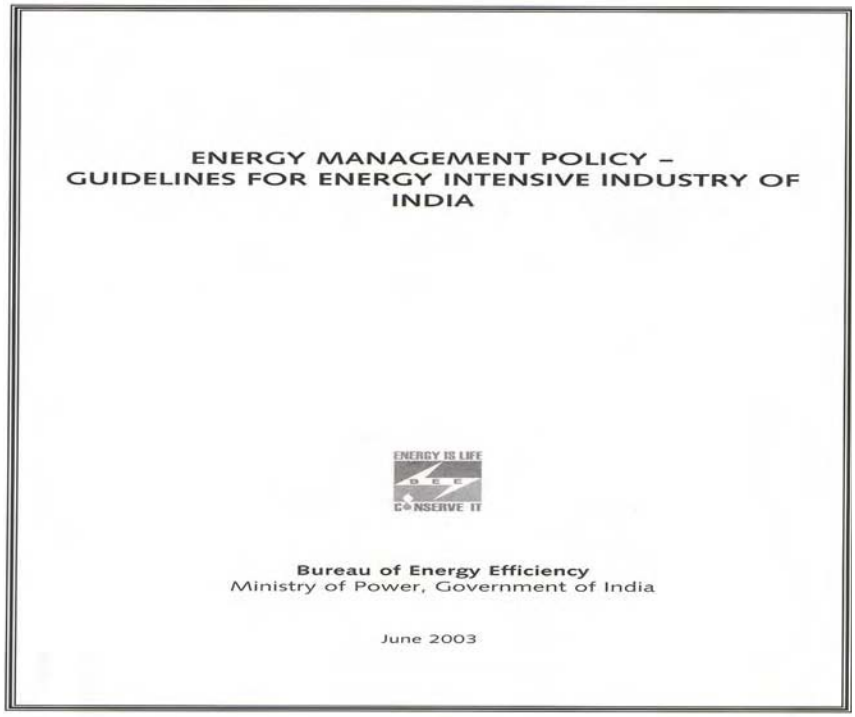


Table 4.1.1 Specific energy consumption – international comparison (1999-2000)

Country	Electrical (kWh/t cement)	Thermal (kCal/kg clinker)
Japan	95	690
Korea	99	710
Taiwan	98	730
Thailand	103	720
India	105	750

Source. Cement Manufacturers' Association

Comparison of energy performance of Indian cement industry with other countries reveals that there exists scope for improving the energy performance of the Indian cement industry. Based upon the CMA data, the best reported energy performance figures in the world are 65 kWh/t of cement and 650 kCal/kg of clinker whereas the best in India is 69 kWh/t of cement and 665 kCal/kg of clinker. This clearly bring out the fact that although we have some of the best plants in the world in terms of energy performance, there are many plants where there exists scope for reducing energy consumption.

Energy Conservation Commitment Policy & Setup

Top most priority has been given for implementing energy conservation ideas and proposals to conserve energy not only for the benefit of the organization, but also to conserve natural resources for the betterment of future generations. This goal is achieved by the energy conservation team headed by energy manager with the support of top management and managers to identify, monitor, control, implement the proposals.

Levels of Management	**Responsibility**
Sr.General Manager – Works Sr.General Manager – Admn.	Long term plans Targets setting Objects & Support, Review of Results, Cost control, Budget and Reward / Appreciate the achievements.
Sr.Managers – Maintenance Managers – Maintenance Dy.Managers – Maintenance	Plan, Do, Check, Act, Brain Storming, Quality circles, Energy management report, Payback analysis
Sr.Engineers - Maintenance Engineers - Maintenance Supervisors - Maintenance Workman - Maintenance	Implementation of Energy Products, Reporting, Brain storming, Quality circles, Suggestion schemes.
Sr.Engineers – Production Officers – Production Workman - Production	Execution, Production Optimal production, Maintaining optimal Parameters.

List of Energy Conservation Projects implemented during 2002 – 2005

Sl No	Title of Energy Saving project implemented	Year of Implementation	Annual Electrical Savings achieved		Annual thermal savings		Total Savings	Investment Made
			Units Million	Rs Million	Tons of Coal or Oil	Rs Million	Rs Million	Rs Million
1	3 Nos Cooler fan IGV's removed	02-03	0.2304	0.8064	0	0	0.8064	0
2	Increase of primary Air fan	02-03	5.21	18.235	0	0	18.235	0.025
3	Modification of Kiln Inlet Area & Calciner	02-03	0	0	936	2.34	2.34	0.2
4	Stopped Booster fan at Cement Mill	02-03	1.024	3.584	0	0	3.584	0
5	Optimiztion of cement Mill -II	02-03	5.71	19.985	0	0	19.985	0.2
6	Optimization of Baghouse fan	02-03	0.6912	2.419	0	0	2.419	0
7	Cement Mill bag filter purging time increased	03-04	0.015	0.0525	0	0	0.0525	0
8	By pass duct installed for Cement mill booster fan from coller vent fan	03-04	0	0	1440	5.4	5.4	0.26
9	Nozzle ring modification and grit cone extension at Coal Mill	03-04	0.5465	1.913	0	0	1.913	0.05
10	Air balancing and optimization at Coal Mill	03-04	0.2049	0.717	0	0	0.717	0
11	Collecting airslide blower one number stopped at Cement mill	03-04	0.0012	0.0042	0	0	0.0042	0
12	Classifier grit cone extension,flap adjustment and nozzle area modification at Line - II Cement mill	03-04	4.68	16.38	0	0	16.38	0.5
13	Armour ring and grit cone extension at Line - I Cement Mill	03-04	0.594	2.079	0	0	2.079	0.15
14	Classifier sealing correction and deflector ring fixing at Raw Mill	03-04	0.2116	0.741	0	0	0.741	0.05
15	Armour ring angle modification and grit cone extension at Raw mill	03-04	0.6348	2.222	0	0	2.222	0.1

Sl No	Title of Energy Saving project implemented	Year of Implementation	Annual Electrical Savings achieved		Annual thermal savings		Total Savings	Investment Made
			Units Million	Rs Million	Tons of Coal or Oil	Rs Million	Rs Million	Rs Million
16	Installation of seperate conveying and dozing system for alternative fuels	03-04	1.656	5.796	0	0	5.796	0.2
17	Replaced 80 Watts HMPV Lamps with 50 Watts MH lamps in Packing plant and other places	03-04	0.01122	0.03927	0	0	0.03927	0.115
18	Coal Conveying line Optimization at Kiln-II	04-05	0.0792	0.277	0	0	0.277	0.02
19	Pre heater cyclone modification at Kiln – I	04-05	0.7425	2.599	0	0	2.599	1
20	Provide software interlock to stop the dedusting fan whenever feeding conveyor stops	04-05	0.016	0.056	0	0	0.056	0
21	Provided dampers in the inlet of dust collector fans in packer to control the suction whenever the packer operates with single discharge	04-05	0.125	0.439	0	0	0.439	0
22	Changed 100 nos of fittings from 80 Watts HPMV lamp to 50 Watts MH lamp at Packing plant	04-05	0.0131	0.045	0	0	0.045	0.12
23	Godrej ControlAir for compressed air system at Flyash handling	04-05	0.1353	0.4736	0	0	0.4736	0.69
24	Modification of inlet box in Line -II Prehaeter fan	04-05	0.18	0.63	0	0	0.63	0.07
25	Nozzle ring modification&Grit cone extension at Coal mill	04-05	0.546	1.913	0	0	1.913	0.05
26	Classifier blades modified from Flat to Curved at Both raw mills	04-05	1.296	4.536	0	0	4.536	1.5
27	Raw mill inlet duct modification at Line -I	04-05	0	0	784	2.89	2.89	0.05
28	2 X 18 M.W Coal based power plant to reduce the energy cost	04-05	0	110	0	0	110	950

E: Innovative Project Implemented

1. Optimisation of Raw Mill

It is a Vertical Roller Mill with high efficiency separator supplied by M/s.Loesche, Germany.

Description

Mill
Make : M/s.Loesche, Germany
Mill size : LM 38.3
Drive : 1750 Kw

Modifications

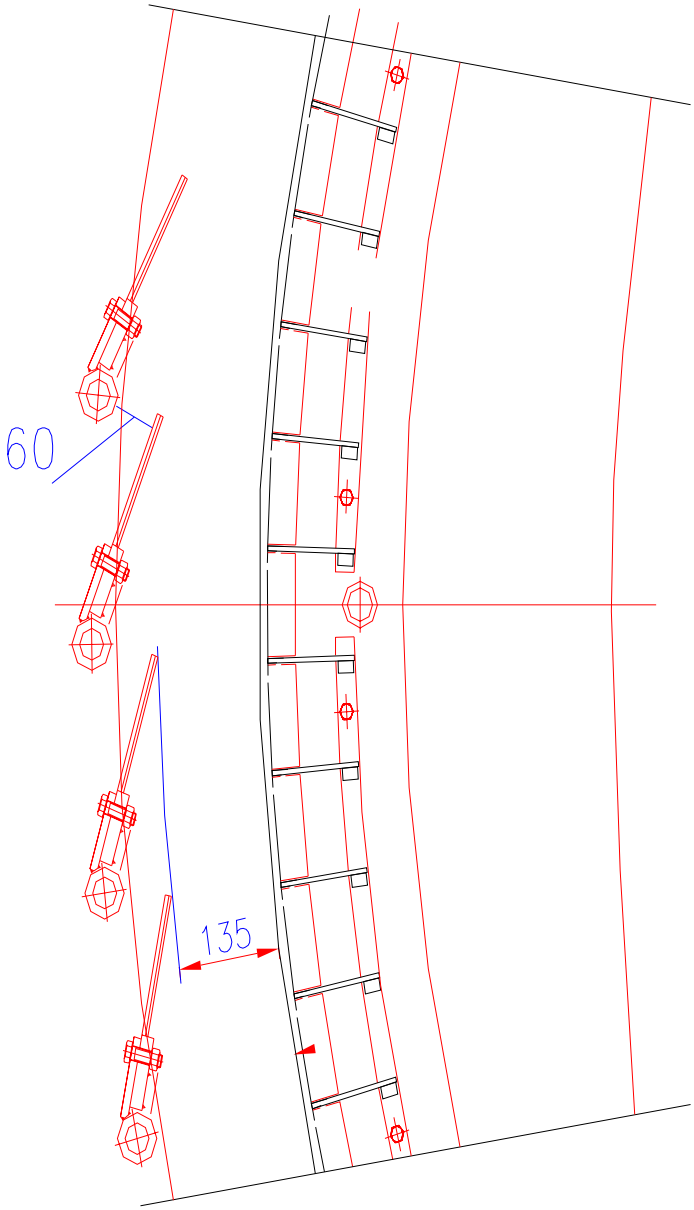
1.Classifier blades where changed to Curved from Flat surface

2.Gap between static blades were adjusted.

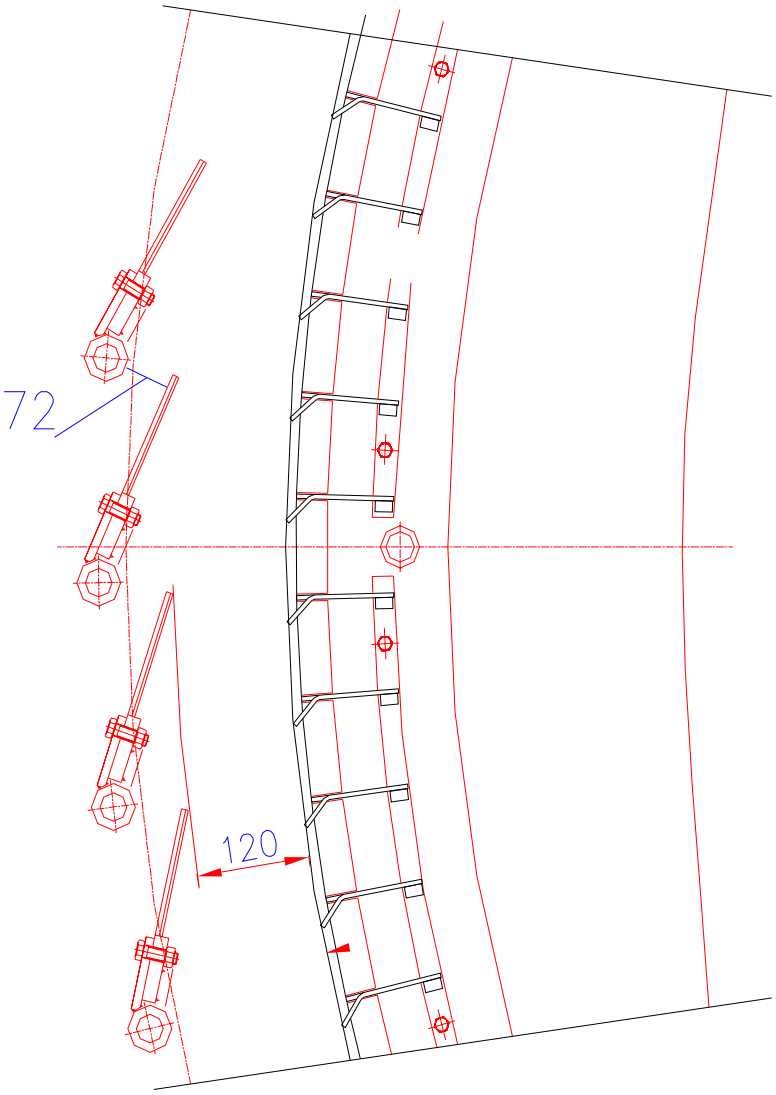
Result :

Increase in Mill Output by 5 TPH and Power reduced by 0.75 Kwh/ Mt of Raw Meal

Before Modification



After Modification

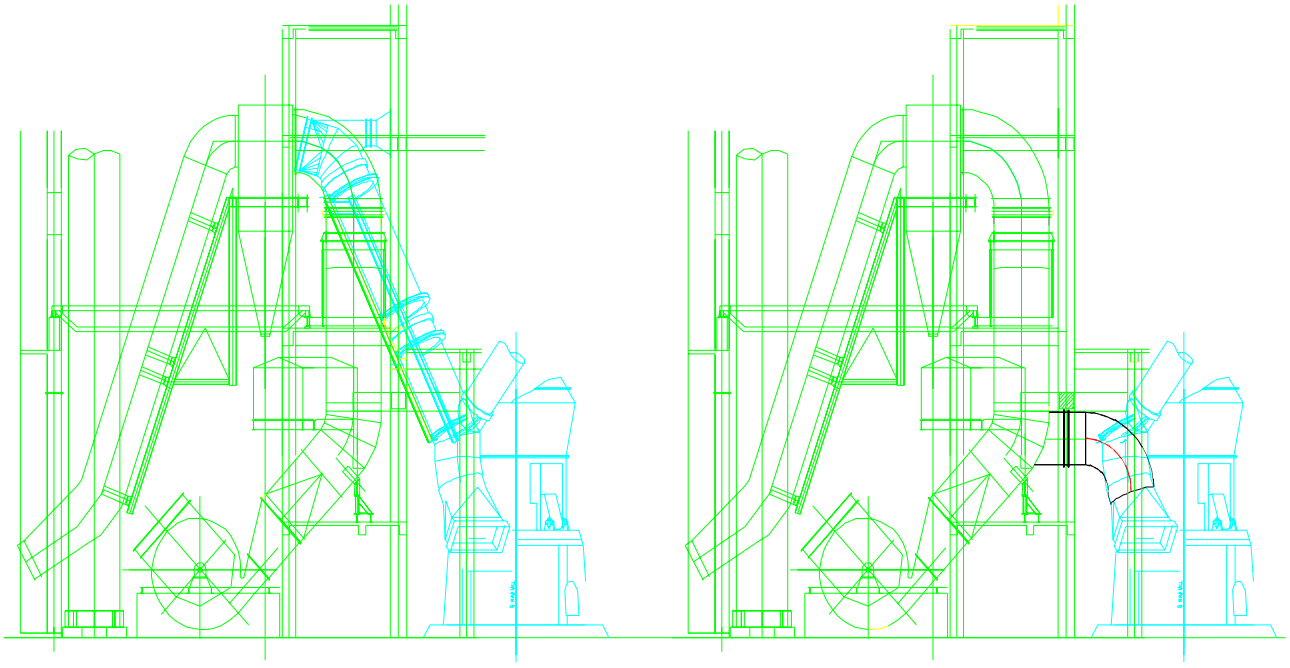


	Units	Before Modification	After Modification
Feed	TPH	235	240
Flow	m3/hr	315000	302000
Mill D.P	Mbar	77 to 83	71 to 75
Mill Power	KW	1135	1138
Fan Power	KW	1325	1195
Total	KW	2460	2333

	Kwh / Mt	10.47	9.72
Savings	Kwh / Mt of Material	0.75	

Power Savings = 0.75 KWh/T of Material
Total Savings = 0.75 X 24 hours X 240 MT X 300 Days X Rs.3.5
= Rs.4.54 Million / Annum

2. Rerouting of Raw Mill Inlet Duct
Modifications
1. Mill inlet duct was directed towards the Mill.
Result :
Increase in Mill Inlet temperature from 295degC to 304 degC.



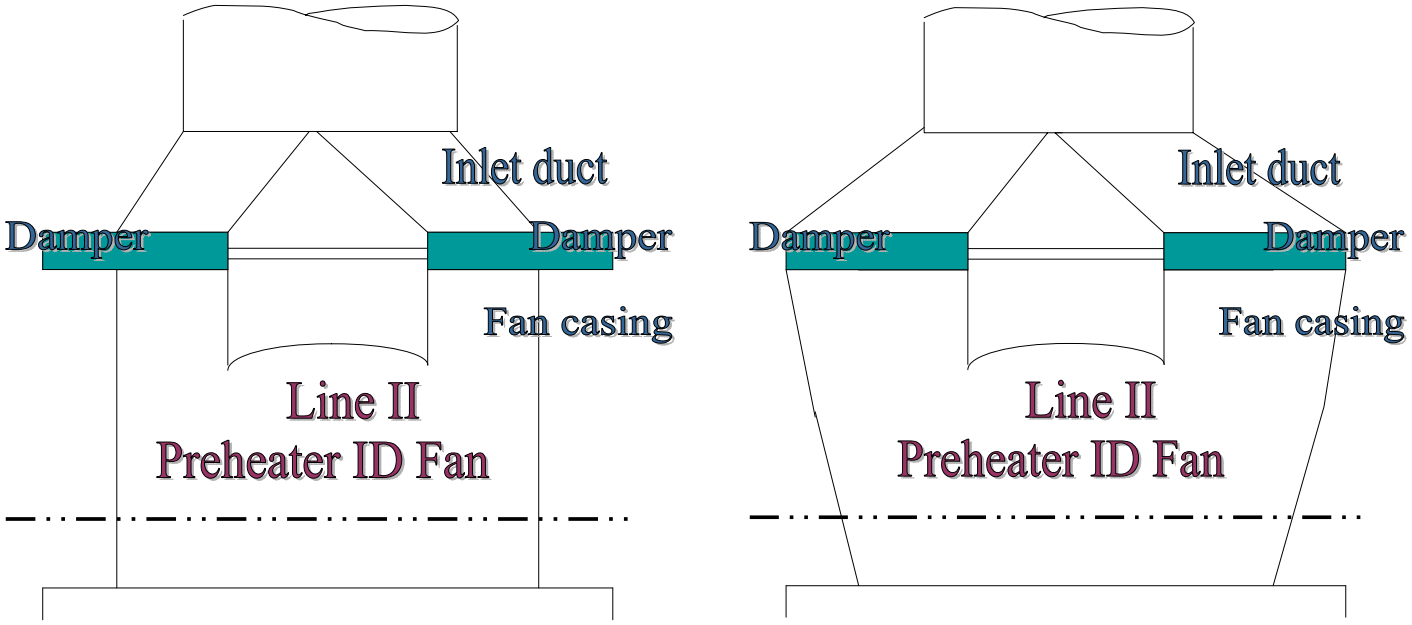
Before Modification **After Modification**

		Before Modification	**After Modification**
		Mill inlet	Mill inlet
Flow	m3/hr	501630	509579
Temp	degC	295	304
Density	Kg/M3	0.65	0.65
Heat Input	kcal/hr	23541924	24689868
Savings	Mkcal/hr	**1.148**	

Summary
Thermal Savings = 0.176 MTs of Coal / Hour
Total Savings = 0.176 Mt X 24 hours X 185 Days X Rs.3700
= Rs.2.89 Million / Annum

3. Modification of Inlet box of I.D.Fan
1. Induced draft Fan inlet duct was modified to reduce the power.

Result :
Power reduced by 25 K.W per hour



Before Modification **After Modification**

Summary
Power Savings = 25 K.W/Hour
Total Savings = 25 X 24 hours X 300 Days X Rs.3.5
= Rs.0.63 Million / Annum

Ultimate Target, Objectives & Strategies to sustain benchmarks

The company always believes in continuous up date of technology to improve the productivity and hence reduction in power and fuel consumption. The target being

Electrical Energy : 55 Kwh / T of Cement
Thermal Energy : 660 Kcal / Kg of Clinker

Energy Conservation Measures taken up

1. Preheater cyclone modifications (in Line- I) to enhance higher productivity.
2. Classifier modification in Raw Mill – I & II to improve productivity by 5 TPH and hence power savings by 0.75 Kwh / Mt of Raw Meal
3. Modification of inlet box of I.D.Fan- II and reduced power by 0.11 KWh/Mt of Clinker.
4. Modification of grit cone and Nozzle ring at Coal Mill – I and reduced power

by 8 KWh/Mt of Coal.

5. Coal Conveying line Optimization for secondary firing at Kiln - II and reduced power by 0.08 KWh/Mt of Clinker.
6. External Auditors like Godrej & Boyce were engaged to analyse the Energy Management at Compressors and Blowers for further possible savings.
7. **2 X 18 M.W** Coal based Power plant was installed to reduce the power cost And to save Rs.1.5 / Kwh.

To achieve the Desired targets

The following energy conservation projects under progress to achieve the desired targets and for sustenance

1. Line-1 preheater fan modification with high efficiency impeller to save power by 1.09 KWH/ MT of Clinker.
2. Bag house fan impeller modification to save power by 0.29 KWH/ MT of Clinker.
3. Cooler vent fan modification to save power by 0.11 KWH/ MT of Clinker.
4. Classifier modification in Coal Mill – I to improve productivity and to save power by 10.0 KWH/ MT of Coal.
5. SPRS for cement mill fan Line – II to save power by 0.70 KWH/ MT of Cement.

Resource Utilization

Our organization has taken various initiatives for Resources Conservation ,minimizations And Effective utilizations at various levels.

Some of salient features are :

1. Implemented the powerful ERP(Entrepreneurs Resource Planning) system,which helps us in planning at each levels.
2. Pet coke a refinery waste enables us to use our low grade limestone (SiO2 – 16 to 20 %) about 1.5 Lac tones / Annum,which indeed extends the life of our mines.
3. Power plant waste Fly ash is being used for blended cements.
   Waste oil generated from our heavy equipments at Mines is being reused in our conveying equipments (Drag Chains) at our LSS (Limestone storage shed,Coal storage shed and Additive storage shed)
4. Our colony generated Sewage is treated in the STP(Sewage treatment plant) and recycled to our colony for gardening purposes.
5. Bio waste fuels such as cashew shell,Ground nut shell is being used as alternative fuels.
6. Waste tyres and cut piece rubber which pollute the atmosphere while disposal is fired in our kiln.
8. Commissioning of Power plant eliminates the usage of Gensets for power generation thereby consumption of Furnace oil and Diesel are nil.

Role of Energy Manager

1. Study and implementation of suggestions from the suggestion schemes.
2. Study and implementation of Cost Saving projects.
3. Creating awareness of Energy Conservation and motivating to develop ideas on ENCON.
4. Statistical analysis of Electrical Energy Consumption and Thermal Energy Consumption – Compare with National and International Standards.
5. Conducting energy conservation audits, through internal and external auditors and implementing the audit findings in time.
6. Impart training to Field staff on energy conservation and Environmental improvement activities.
7. Preparation of Management reports and submission to Top Management.