

## **MADRAS CEMENTS LTD., Alathiyur**

### **Unit Profile.**

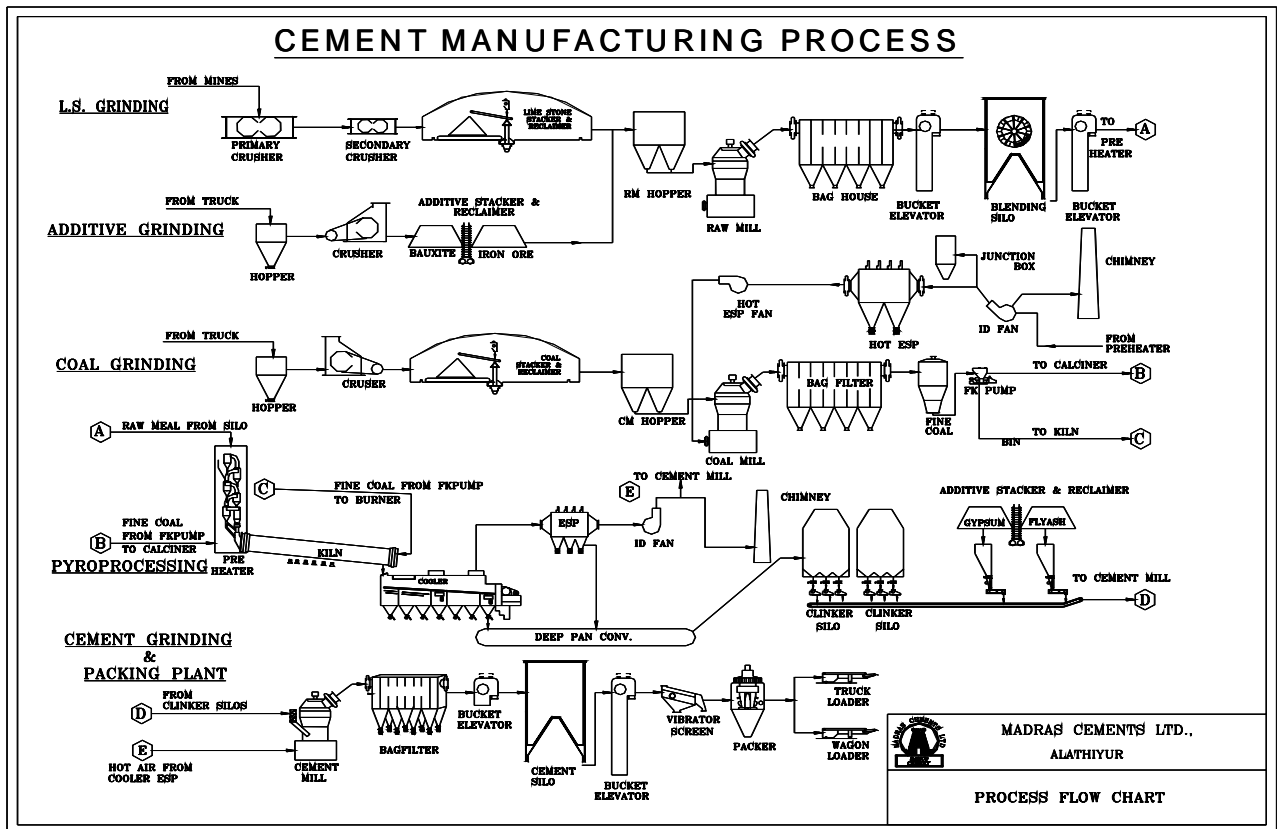
- The manufacturing unit at Alathiyur near Trichy were set up in two phases. The Line I has the designed capacity of 2200 TPD commissioned in the year 1997. Which was upgraded to 2950 TPD in the year 1999. The Line II has the designed capacity of 3000 TPD, which comprises the South Asia's first SF Cross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

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.

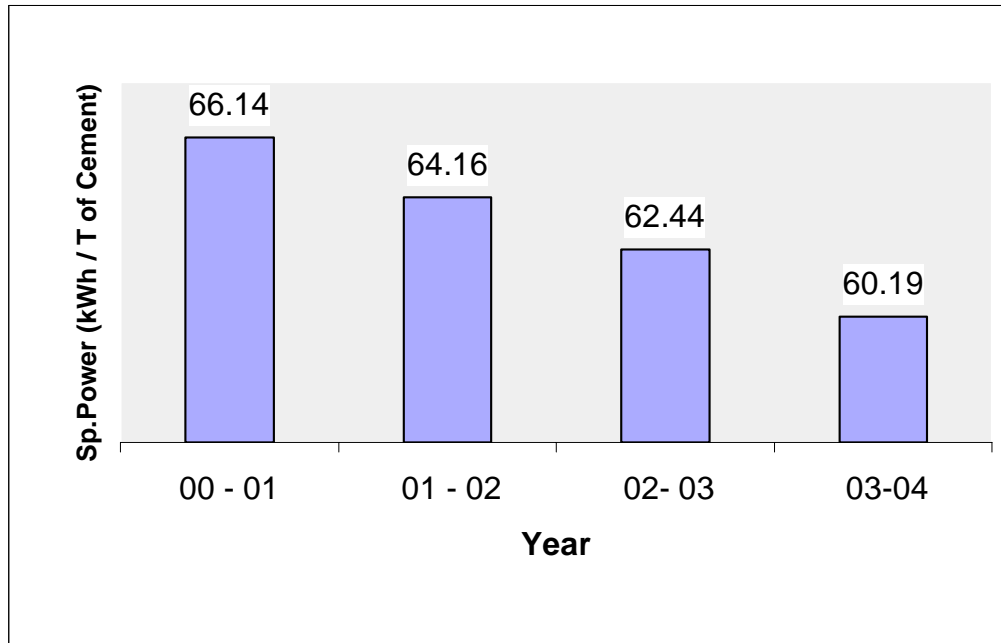
- The manufacturing products are:
  - **Ordinary Portland Cement**
  - **Portland Pozzolana Cement**
- There is 20 MW (6MW \* 2 & 4 MW \* 2) captive power generation, which will meet 75 % of Plant Power demand.
- Operating efficiency of the equipment in each section in the plant range from 100 to 115 % of installed capacity.
- The plant is ISO 9002 & ISO 14001 systems certified.

# Annexure - I

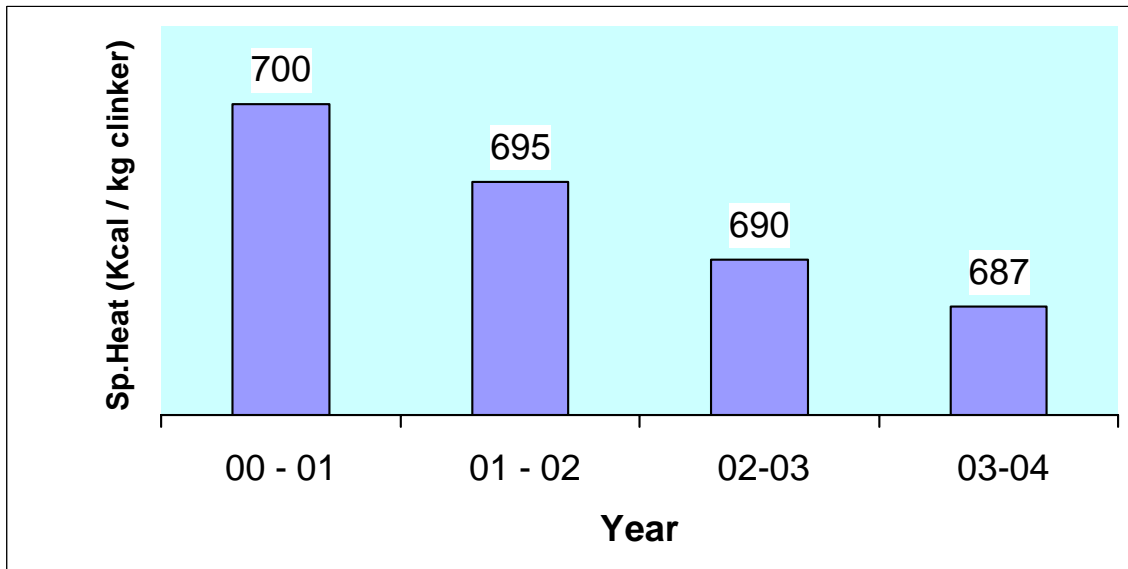


## Annexure – II

### Reduction in Sp. Power Consumption from 2000 – 2004



### Reduction in Sp. Heat Consumption from the Year 2000– 2004



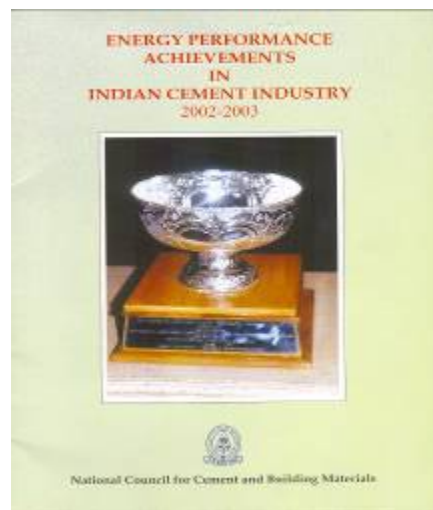
## Annexure – III

### Source of information

### \*\*\* National Benchmark

## ENERGY PERFORMANCE ACHIEVEMENTS IN INDIAN CEMENT INDUSTRY 2002-2003

### Source of information:

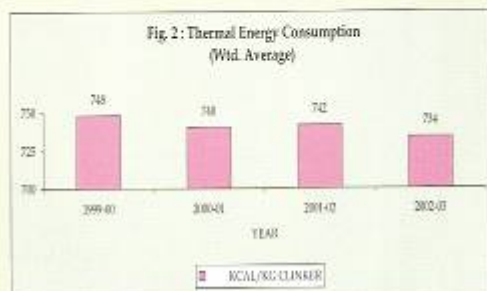


### 3.0 THE ENERGY CONSUMPTION SCENARIO

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

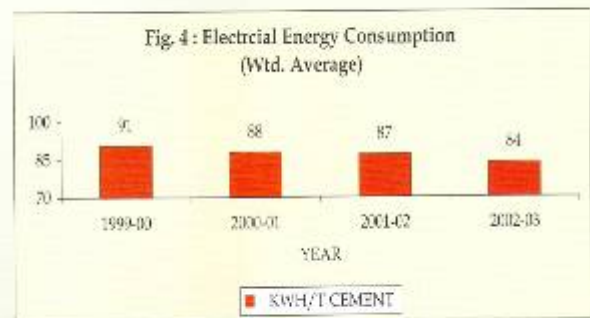
#### 3.1 Thermal Energy Consumption

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).

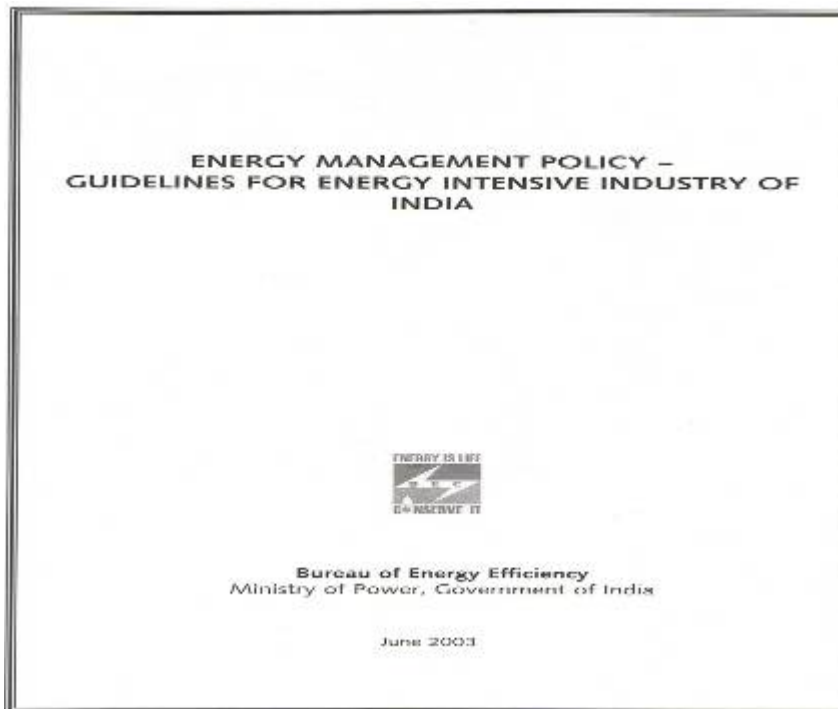


Frequency distribution for energy consumption show that 12 plants are operating within the range of 85-95 kWh/t cement, 12 plants are operating in the range of 75-85 kWh/t cement and 8 plants are operating below 75 kWh/t cement (Fig. 5).

### \*\*\* 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.

## Annexure – IV

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

## Annexure - V

List of Energy Conservation Projects implemented during 2001 – 2004

Sl No:	Title of Energy Saving project implemented	Year of Implementation	Annual Electrical Savings achieved		Annual thermal savings		Total Savings	
			Units Million	Rs Million	Tons of Coal or Oil	Rs Million	Rs Million	Rs Million
1	Changed 4 Cooling tower fan blades from Aluminium to FRP hollow blades	01-02	0.682	2.387	0	0	2.387	0.12
2	Cement Mill-I Fan impeller modification	01-02	0.6	2.1	0	0	2.1	0.09
3	Magnetic resonators in DG sets installed	01-02	0	0	0	0	0	0.02
4	Optimized operation of Booster fan at cement mill	01-02	0.715	2.503	0	0	2.503	0.3
5	GFR was installed at Coal Mill-II fan	01-02	0.297	1.04	0	0	1.04	0
6	V/F Drive was installed in primary air fan	01-02	0.08	0.28	0	0	0.28	0.69
7	A dedicated team continuously monitors on the reduction of false air ingress	01-02	0	0	0	0	0	0.009
8	Incoming voltage is adjusted from 6.5 to 6.55 K.V to reduce the iron losses, by adjusting the tap changing	01-02	0.12	0.42	0	0	0.42	0
9	Motors taking load less than 50 % were converted to 'STAR' from 'DELTA' connection to avoid the iron losses and to improve the power factor	01-02	0.2	0.7	0	0	0.7	0
10	Replaced CFL 11 Watts Lamps with 8 Watts tube lights in corridors and other places	01-02	0.041	0.144	0	0	0.144	0.03
11	High efficiency tube lights were installed in CCR and other areas	01-02	0.02	0.07	0	0	0.07	0.03
12	# Nos Cooler fan IGV's removed	02-03	0.2304	0.8064	0	0	0.8064	0
13	Increase of primary Air fan	02-03	5.21	18.235	0	0	18.235	0.025
14	Modification of Kiln Inlet Area & Calciner	02-03	0	0	936	2.34	2.34	0.2
15	Stopped Booster fan at Cement Mill	02-03	1.024	3.584	0	0	3.584	0
16	Optimization of cement Mill - II	02-03	5.71	19.985	0	0	19.985	0.2
17	Optimization of Baghouse fan	02-03	0.6912	2.419	0	0	2.419	0
18	Cement Mill bag filter purging time increased	03-04	0.015	0.0525	0	0	0.0525	0
19	By pass duct installed for Cement mill booster fan from collar vent fan	03-04	0	0	1440	5.4	5.4	0.26
20	Nozzle ring modification and grit cone extension at Coal Mill	03-04	0.5465	1.913	0	0	1.913	0.05
21	Air balancing and optimization at Coal Mill	03-04	0.2049	0.717	0	0	0.717	0
22	Collecting airslide blower one number stopped at Cement mill	03-04	0.0012	0.0042	0	0	0.0042	0
23	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
24	Armour ring and grit cone extension at Line - I Cement Mill	03-04	0.594	2.079	0	0	2.079	0.15
25	Classifier sealing correction and deflector ring fixing at Raw Mill	03-04	0.2116	0.741	0	0	0.741	0.05
26	Armour ring angle modification and grit cone extension at Raw mill	03-04	0.6348	2.222	0	0	2.222	0.1
27	Installation of separate conveying and dozing system for alternative fuels	03-04	1.656	5.796	0	0	5.796	0.2
28	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

## Annexure – VI

### **Innovative Projects Implemented**

#### **I) Optimisation of Raw Mill - II**

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

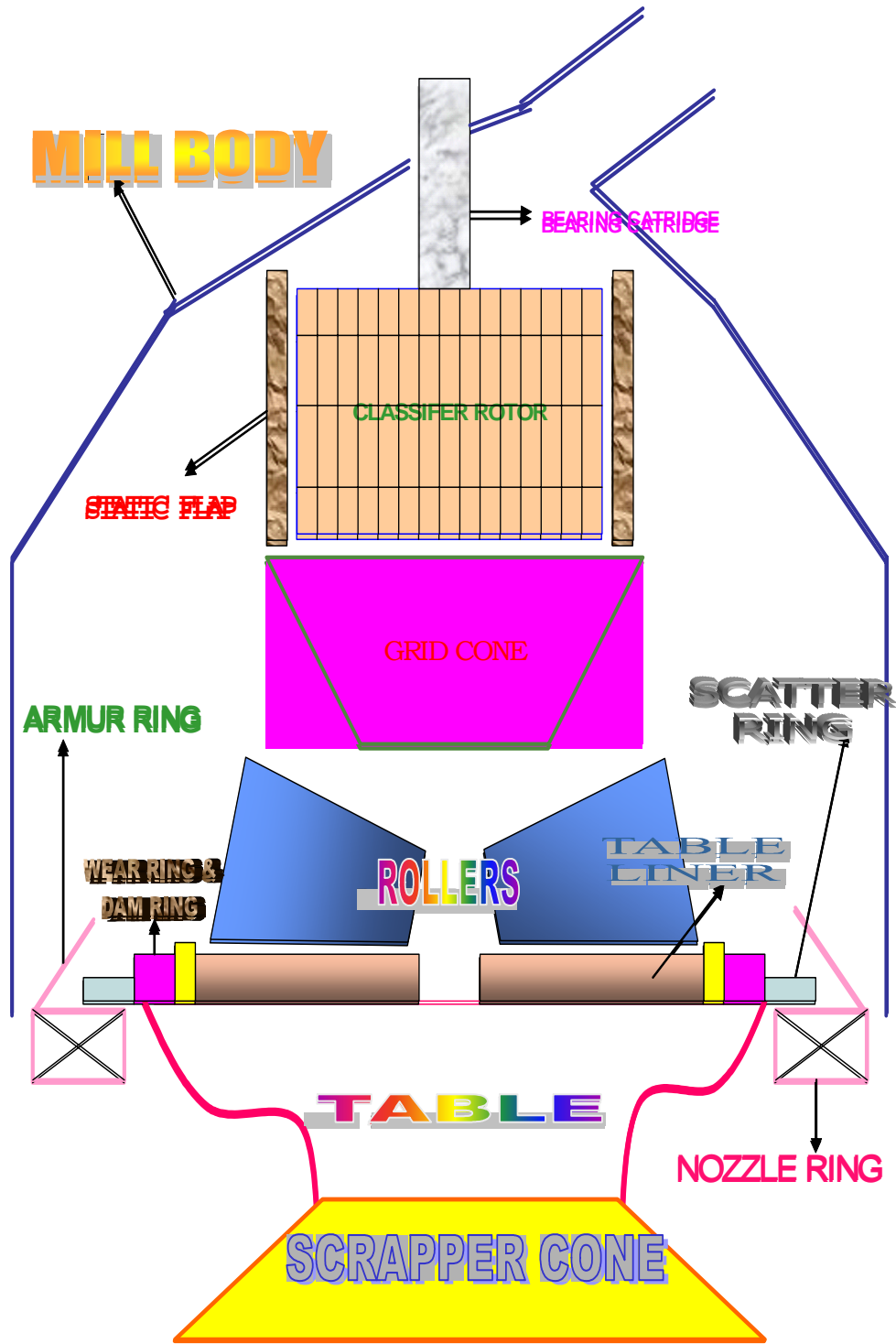
Drive : 1750 Kw

#### **Modifications**

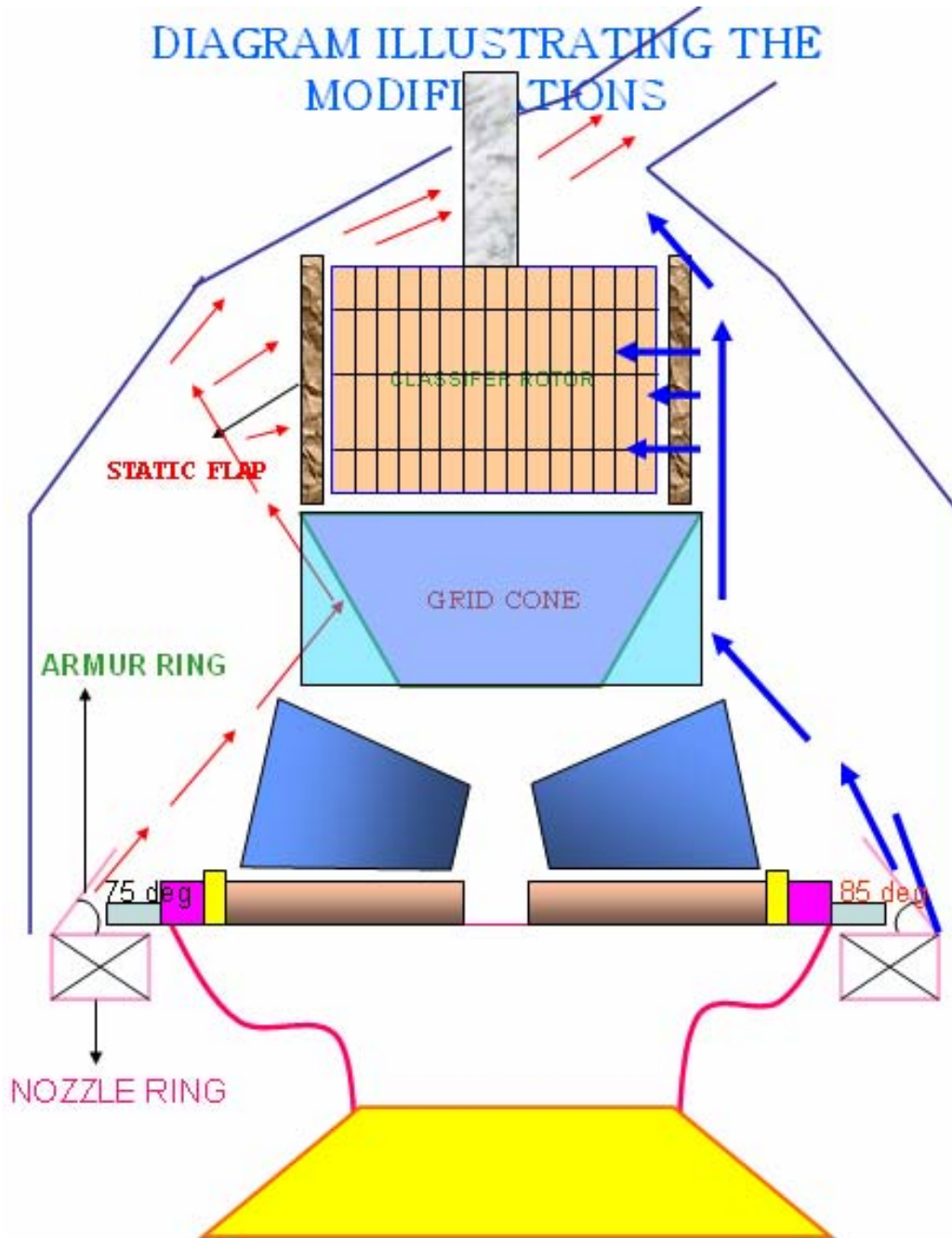
1. Armour ring angle modification & grid cone extension
  - \* Angle was changed from 75 Deg to 85 Deg
2. Classifier sealing correction & Deflector ring fixing



Before Modification



# DIAGRAM ILLUSTRATING THE MODIFICATIONS



	<b>Units</b>	<b>Before Modification</b>	<b>After Modification</b>
Feed	TPH	220	230
Flow	m3/hr	330000	315000
Mill D.P	Mbar	80 to 85	75 to 78
Mill Power	KW	1125	1185
Fan Power	KW	1385	1255
Total	KW	2510	2440
	Kwh / t	11.41	10.61
Savings	Kwh / t of Material	0.80	

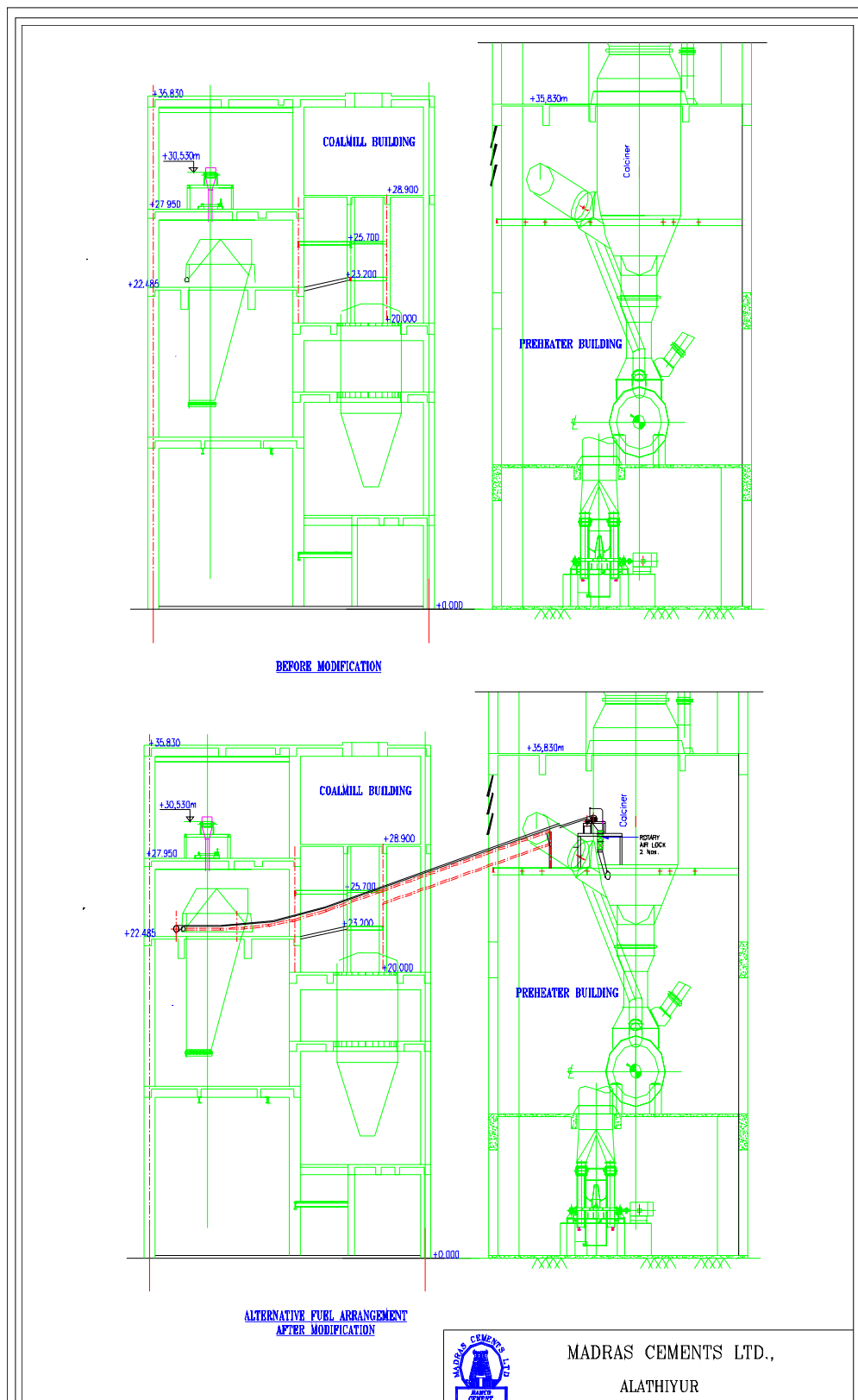
**Power Savings = 0.8 KWh/T of Material**

**Total Savings = 0.8 X 23 hours X 230 MT X 200 Days X Rs.3.5**

**= Rs.2.96 Million / Annum**

## II) Installation of Alternative Fuel feeding system.

Usage of Biological/Industrial waste products as cheaper fuels.



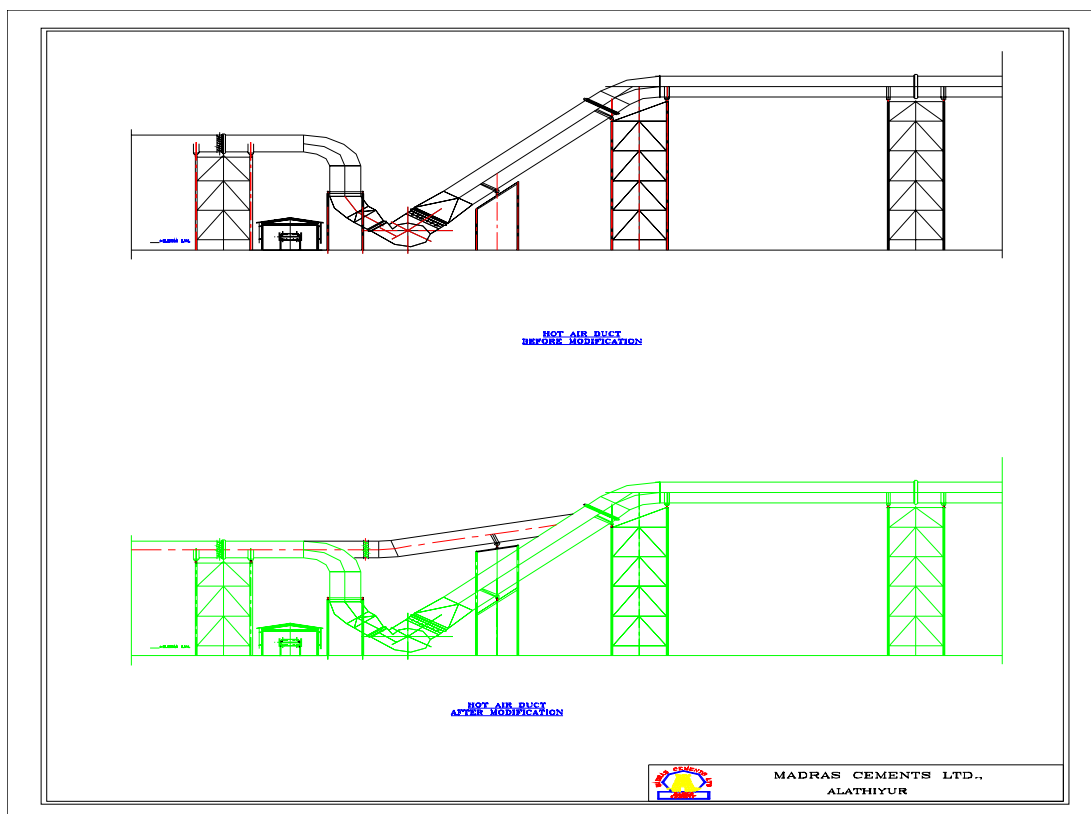
We had introduced a separate system for feeding the Alternative fuels directly To the pre-heater, thus eliminating inter-grinding of fuels.

Power Savings = 20 Kwh/T X 23 TPH X 18 hours  
= 8280 Units / Day  
= 8280 Units X 200 Days

Total Savings = 5.796 RS in Million

### III) Installation of By-Pass duct at Cement Mill Booster Fan.

We introduced a by-pass duct at Cement mill booster fan to regain the heat energy from the hot air that was vented from cooler.



Thermal Savings = 4.0 MT of Coal per day  
= 4.0 MT X 360 Days  
Coal Saved = 1440 Mts

Total Savings = 5.40 RS in Million

### **Annexure – VII**

#### **Ultimate Target, Objectives & Strategies to sustain benchmarks**

The company always believes in continuous up gradation of technology to improve the quality and its production and reduction in power and fuel consumption. The target being

**Electrical Energy : 55 Kwh / T of Cement**

**Thermal Energy : 670 Kcal / Kg of Clinker**

#### **Energy Conservation Measures taken up**

1. Modification of inlet box and inlet duct of Cement Mill – I fan.
2. Modification of grit cone and Louvre ring in Raw Mill – II .
3. Modification of Armour ring and Louvre ring in Cement Mill - II
4. Modification of grit cone and Nozzle ring at Coal Mill – II to enhance higher productivity.
5. Installation of separate dozing and conveying system for consuming alternative fuels like rice husk, cashew husk, cashew shells and coconut shells.

### **To achieve the Desired targets**

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

1. Preheater cyclone modifications (in Line- I ) to reduce the pressure drop across the cyclone, to enhance higher productivity and reduce power by 2 kwh/Tonne of Clinker.
2. Modification of inlet box and inlet duct of I.D.Fan to reduce power by 100 to 120 K.W per hour.
3. Modification of inlet box and inlet duct of Cooler Vent Fan to reduce power by 40 K.W per hour.
4. Classifier modification in Raw Mill – I & II to enhance higher productivity.
5. Classifier modification in Coal Mill – I & II to enhance higher productivity.
6. SPRS for Raw Mill and Coal Mill fans for energy savings.

## **Environment and Safety**

Clean environment and pollution abatement is one of the concerns of the management. The plant is an ISO:14001 Company and is in process of getting certified for OSHAS 18001. The following measures were taken to prevent and control pollution.

### **At Plant & Mines:**

1. Green belt development in Plant and Mines.
2. Development of full fledged roads in and around the plant and mines, to suppress fugitive emission.
3. Rain water harvesting in both the plant and mines are carried out, so as to conserve the available water resources.
4. Output water of the treatment plant used for the plantation purposes in the Plant and in the mines.
5. Transportation of limestone to plant is done through closed belt conveyors of 3 km distance. This is unique in cement plant thereby avoiding usage of heavy vehicles and its fuel, spillages and fugitive emissions coming out from the vehicles. Also ensures safety by avoiding heavy traffic in the mines.
6. Installed Reverse air Bag house for venting Raw mill and kiln, Bag filter for coal mill and Cement mill and ESP for cooler venting gases.

7. All the material transfer points were connected to Unit bag filters. Concrete Roads inside the plant were made
8. Purchased a road sweeper machine to keep the plant clean
9. The dust let - off in the stacks are well below the prescribed limits. The recent results of test conducted by the TNPCB on March 28, 2004 is given below:

Stack	TNPCB Norms (Mg/N Cu.m)	Actual results 28.03.2004 (Mg/N Cu.m)	Equipment
Kiln	100	37	Baghouse
Coal mill	100	42	Bag filter
Cooler	100	49	ESP
DG Set	100	44	DG
Packing Plant – I	100	83	Bag filter

**Green Belt Development at Madras Cement Ltd., Alathiyur**

**Plantation details at factory and colony from 1996 to 2004**

<u>S.No.</u>	<u>Location</u>	<u>Areas in Acres</u>	<u>No. of Trees</u>
1.	Mines	44.06	20,120
2.	Factory	50.02	51,700
3.	Colony	29.93	28,300
<b>Grand Total</b>		<b><u>124.01</u></b>	<b><u>110,120</u></b>

Madras Cements has the following arrangements for achieving zero accident in plant.

- a. Employees should wear safety shoes and helmets in the plant.
- b. The plant has safety & fire protection equipments.
- c. Safety audits are conducted by (Internal) safety committee members.
- d. An external auditor inspects the plant for safety measures implemented in the plant and report for improvements.
- e. A hospital is arranged in colony to meet any emergencies.
- f. Safety interlocks provided for each equipment in the computerized plant operating system. Which ensures accident free operation in the plant.

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