Grasim Cement – Raipur
(A Unit of Grasim Industries Limited)

(i) Unit Profile:

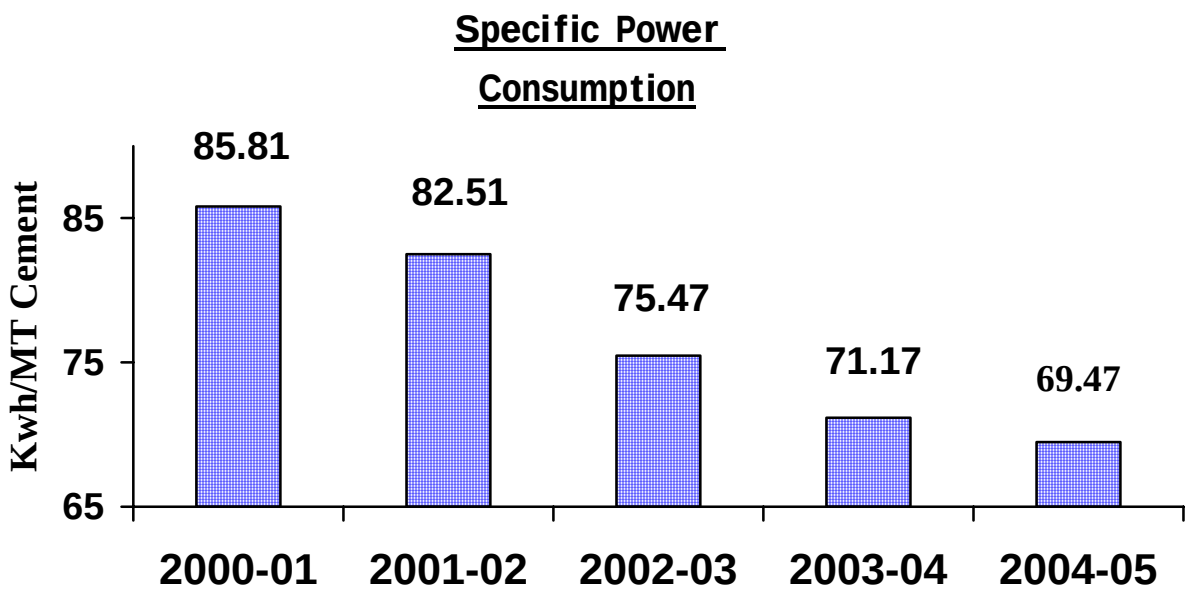
Grasim Cement, an ISO-9002, ISO-14001, OHSAS 18001 & SA 8000 certified company of Aditya Birla Group, is located at village Rawan of Dist. Raipur in Chattishgarh State. The Cement plant of 1 MTPA capacity was successfully commissioned in March 1995 with most advanced State-of-Art technology available in the world. The plant capacity was soon enhanced to 1.7 MTPA by putting up a separate Slag Grinding & Mixing Unit. Presently the unit has reached the capacity of 2.16 MTPA after several minor modifications. Our Unit manufactures high quality OPC (Ordinary Portland Cement), Blended Cement (PPC & PSC) and IRST-40 Railway Sleeper Cement with greater consistency keeping customer at the center of business. Our prime aim is to produce more blended cement so as to utilise the Granulated Blast Furnace Slag & Flyash, the wastes of Steel Plants & Thermal Power Plants respectively.

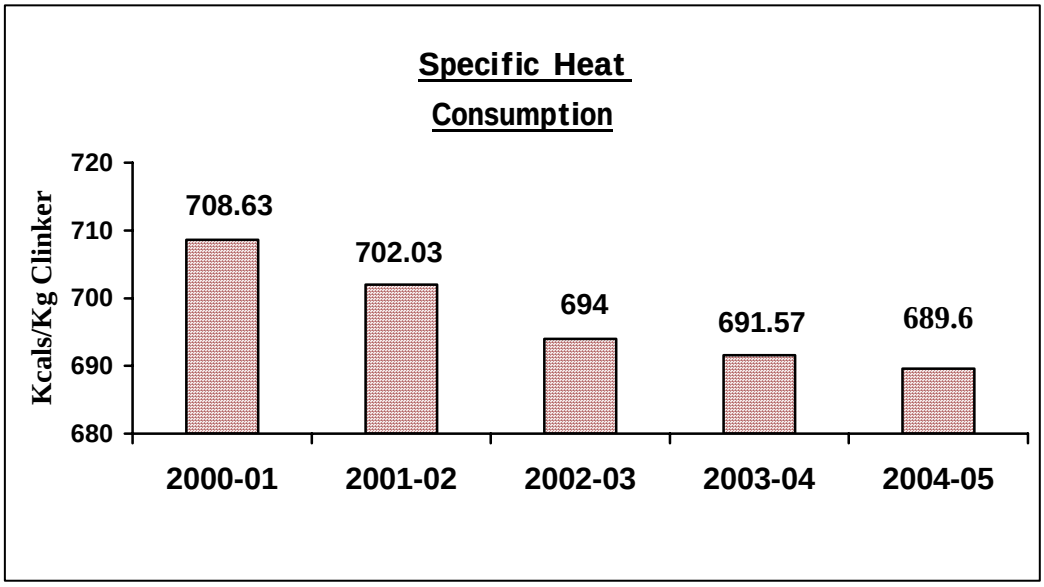
(ii) Energy Consumption:

The Cement Industry is highly energy intensive. The primary energy inputs are in the form of Coal for Clinkerisation, Furnace Oil for DG sets (Captive power generation) and Electrical power from State Electricity Board and captive power plant. As a result of implementation of various energy conservation measures on continual basis, there is a steady decline of specific energy consumption. Last four years' specific energy consumption figures are shown in the table and graphs as below:

Performance Indicator

SL No	DESCRIPTION	Unit	2001-02	2002-03	2003-04	2004-05
1.	Electrical Energy	Kwh/T Cement	82.51	75.47	71.17	69.47
2.	Thermal Energy	Kcal/Kg Clinker	702.03	694	691.57	689.6
3.	Total cost of production	Rs. Lakhs	23819	25199	25729	
4.	Total Energy Bill	Rs. Lakhs	7076.62	6816.5	7147.28	8545.28
5.	Energy as percentage of total cost of production.	%	29.71	27.05	27.77	39.3

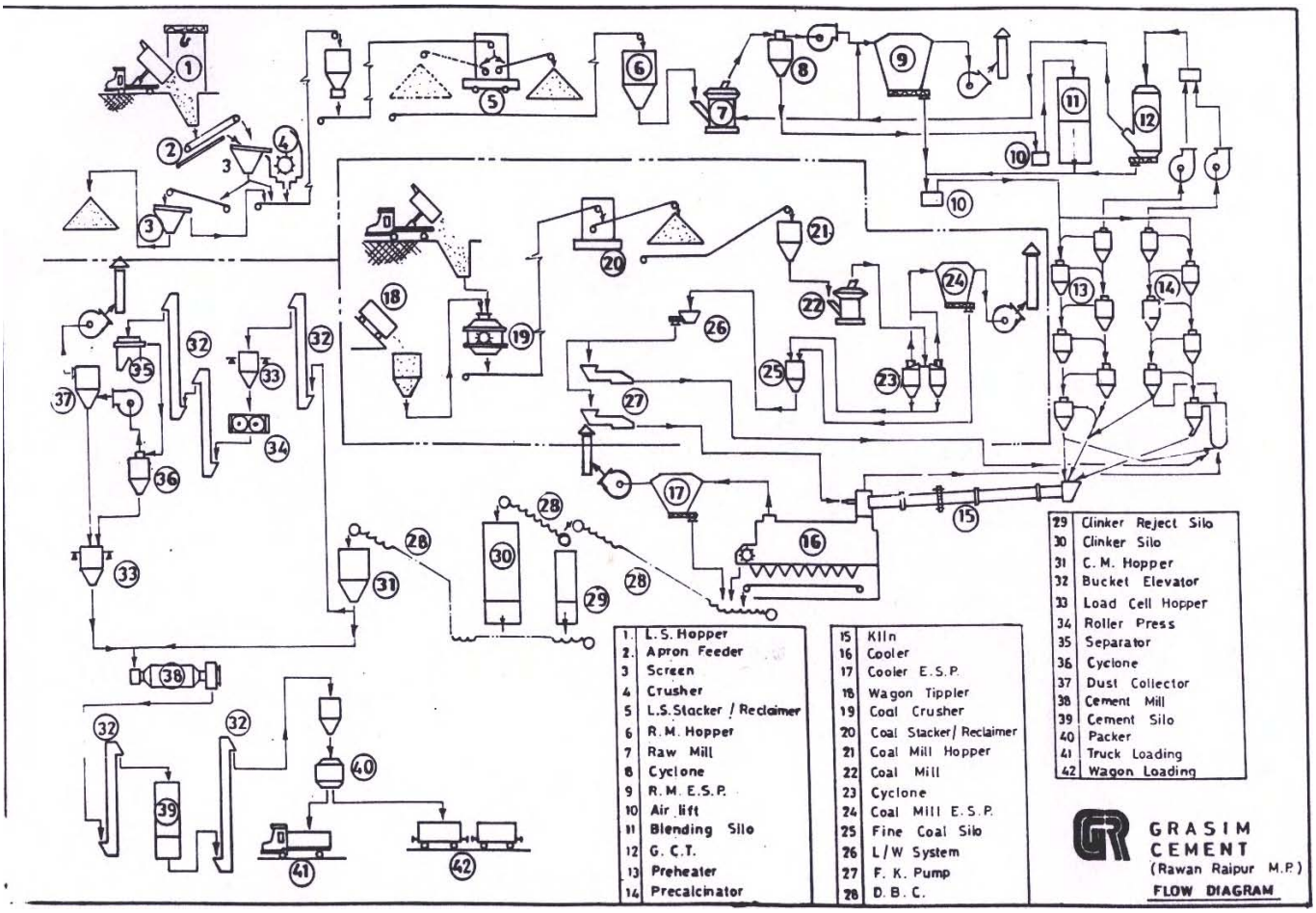




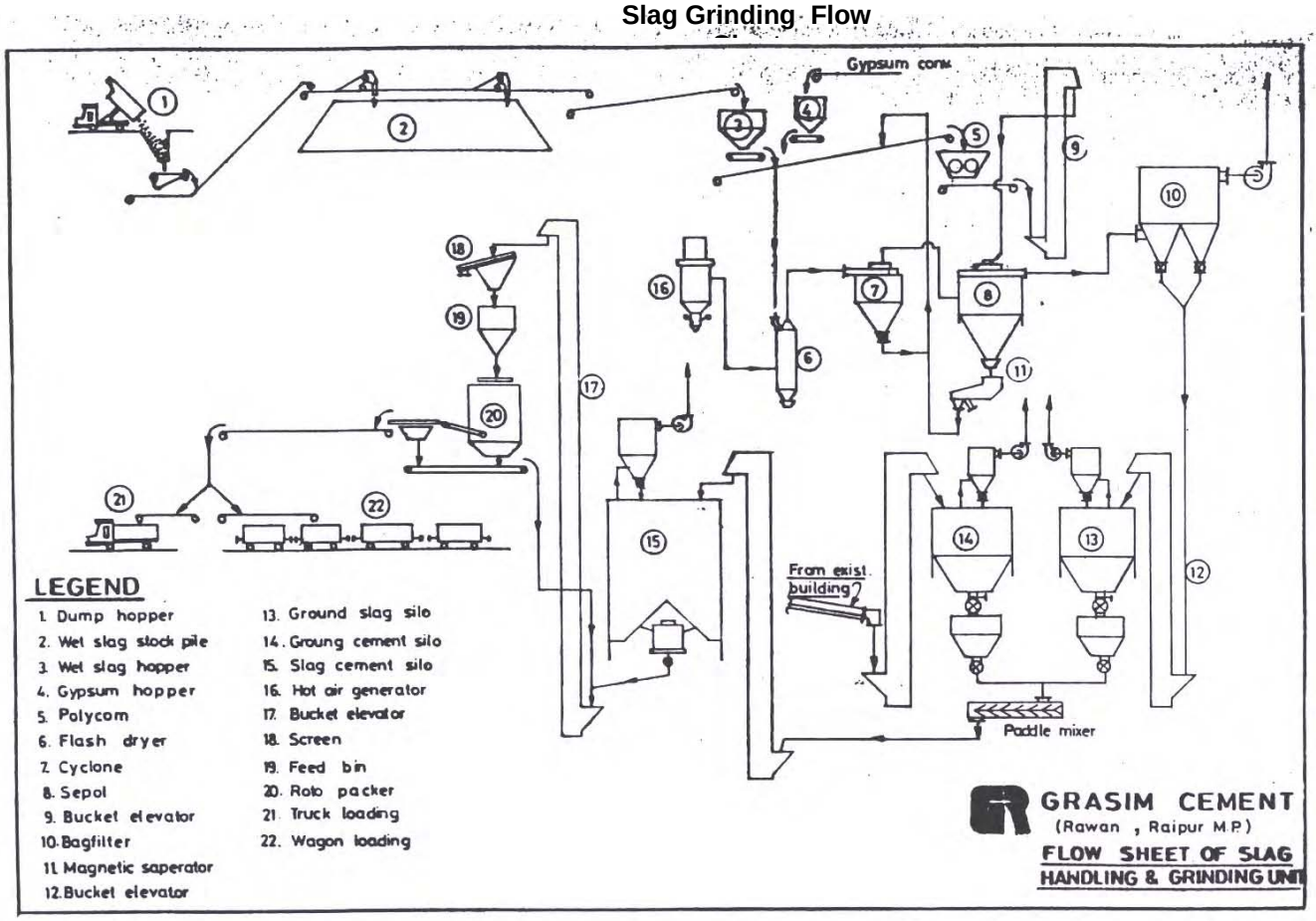
Energy Conservation, commitment, Policy & Set up:

The management is fully committed to conserve the fast depleting energy resources and measures for energy conservation have been followed from design stage of the plant itself. We have been continuously striving for reduction in energy consumption since inception of the plant. To achieve this goal, a daily Technical co-ordination meeting is held in which day to day energy parameters are monitored and analysed. The Cross Functional teams for each section monitor and analyse energy consumption at drive level every day and give feedback to Unit Head. The concept of energy conservation is percolated down the line through WCM team leaders. Workers/ Staff contribute in reduction in energy consumption through Suggestion Scheme also. Good Suggestions are rewarded to motivate the people. Energy Performance parameters are also reviewed by Unit Head every month in Technical MPR (Monthly Performance Review) meeting. Energy Audits are also conducted by agencies like CTC (Central Technical Center, AV Birla Group) annually and other competent agencies like NCBM.

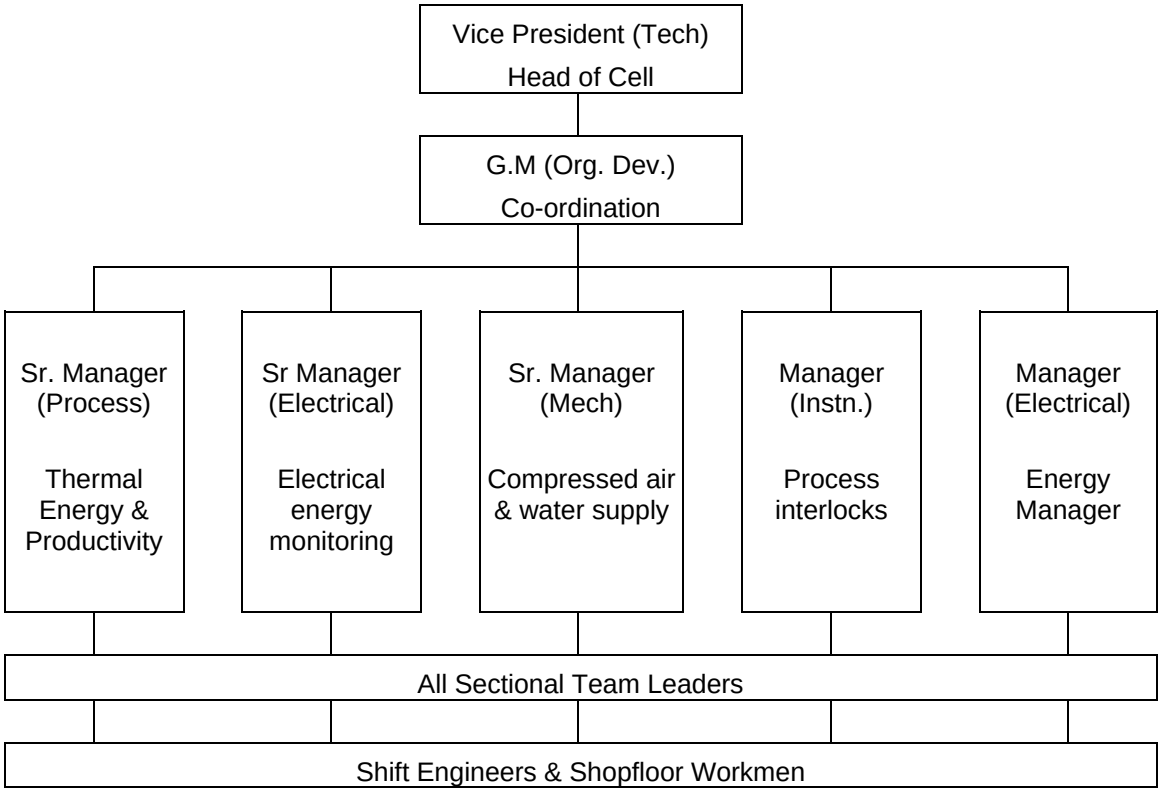
Plant Flow Chart



Slag Grinding Flow



Energy conservation cell structure



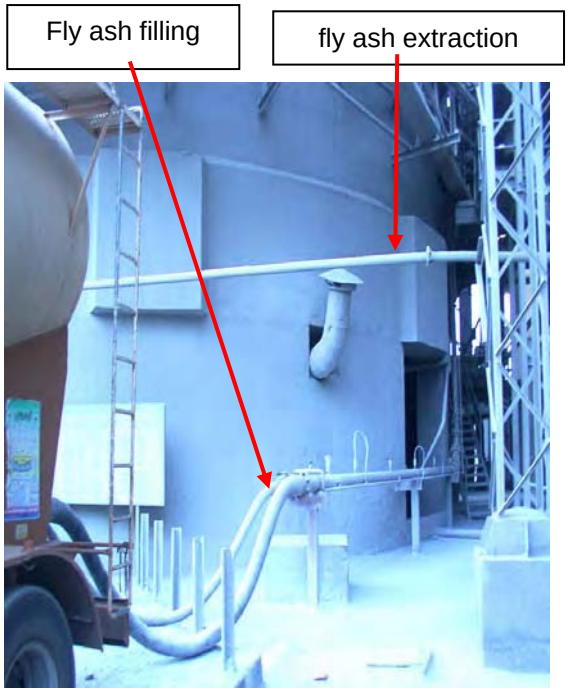
(iii) **<u>Energy Conservation Achievements:</u>**

Due to implementation of various energy conservation measures, the unit has been able to reduce its specific power consumption from 131.80 Kwh/tonne-cement in year 1995-96 to 69.47 Kwh / tonne-cement in year 2004-2005 and specific Heat consumption from 827 Kcal/ kg-clinker in year 1995-96 to 689.6 Kcal/kg-clinker in year 2004-2005.

Write-up for the projects completed during 2004-05

1. **Conversion of one compartment of cement silo to dry fly ash storage**

The blended cement has more benefits compared to the conventional OPC category of cement in its application by way of durability of structures. Also it allows use of waste material from the steel plant (Blast furnace slag) and power plant (Fly ash) as additives in cement grinding replacing the costly clinker. To enhance the blended cement, marketing was geared up to create awareness among the customer about the immense benefits of the blended cement usage in civil structures. Though large quantity of fly ash available from the near by area, the non-polluting transportation, storage and handling were the main infrastructure. Grasim Cement has increased the dry fly ash storage by converting one of the compartments of multi-sectional silo. The compartment was fitted with pneumatic filling from tankers and separate extraction through dense phase conveyor to transport the same to cement mill.



Multi section silo for fly ash storage

2. Installation of GRR in cooler fan-G

Scenario

⇒ One of the cooler fans was driven by 265 kW HT Sq.Cage Ind. Motor at constant speed of 990 rpm and air flow was controlled through damper with operating range of 60%to 75% (Damper opening)

⇒ Flash Dryer Fan motor for slag grinding circuit was equipped with GRR for speed regulation but the fan used to run at full rpm due to process requirement

⇒ One LRS for FK pump for slag mixing was also not in use

Actions Taken

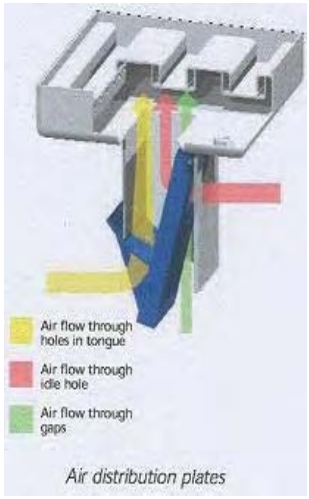
✓ Replaced GRR of Flash Dryer Fan with LRS
✓ Replaced 265 kW Sq.Cage Ind. Motor of Cooler Fan with 225 kW Slipring Induction Motor.
✓ Provided the GRR of Flash Dryer Fan in cooler fan motor
✓ Air flow of the cooler fan was regulated with speed control instead of damper control

Benefit

➢ Fan power was reduced by 20 kW with saving of Rs 2.5 lac per annum

3. **Retrofitting of cooler section with CIS/MFR stationary grate plate**

The kiln system was operating at a higher capacity due to various improvements, modification and optimization. As one of the optimization with a view to reduce the heat consumption by enhancing the recuperation of heat from cooler, the CIS/MFR stationary grates are placed in the start of cooler. The mechanical flow regulator coupled with stationary CIS plates have increased the heat recovery from cooler in terms of secondary &Tertiary air and there by reduce the heat consumption of pyro-system. In addition this reduced the air intake in cooler, reduced the hot gases in cooler vent and clinker temperature. The modification improved the distribution of clinker in cooler and reduced the red river formation.



4. **Installation of AC drive in Limestone Stacker Travel drive**

Scenario

- PLC Cards were getting loosened from the card rack due to heavy vibrations during starting and reversal of direction
- Heavy jerk during starting due to DOL starting of the motor
- All the above were increasing start-stop and failure of the gear box input shaft
- Increase power consumption due to above reasons

Action Taken

- ✓ Soft starter was installed to ensure smooth acceleration of the travel drive with torque setting of 35% to 100% in 5 seconds.
- ✓ Heavy duty thruster brakes provided to ensure that drive comes to stand still before every start

Benefit

- ⇒ No nuisance tripping of stacker and no failure of gearbox shaft since last one year
- ⇒ Low wear and tear of Mechanical components
- ⇒ Very smooth operation of travel drive
- ⇒ Reduction in electrical energy consumption

Other Projects

- ✓ Use energy saver for street lighting
- ✓ Installation of Asian make 28 watt tube lights in colony & office area
- ✓ Use of 9 watt CFL in guest house, shopping complex and hospital
- ✓ Replacement of metallic impellers by FRP impellers (kiln shell cooling fans, raw mill drive GRR cooling blower, centralized AC blowers)
- ✓ Use of soft starter for truck loader shuttle drive
- ✓ Coal and Raw mix quality fine tuned to have lower heat consumption

Energy Conservation Plans & Targets:

We are fully committed to our energy conservation drive and planning to implement following projects for further reduction in energy consumption:

1. Replacement of DAG cooling Blower motor from 7.5 KW to 3.5 KW
2. Replacement of GCT pump motor with lower rating by 20KW
3. EPIC II controller for Raw mill ESP
4. Cooler up gradation to CFG Technology
5. Close circuiting of cement mill
6. Re-engineering of cement mill feeding system by removing one bucket elevator and two belt conveyors
7. Expert system for kiln and raw mill control
8. Retrofitting with high efficiency impellor in coal mill booster fan
9. EPIC II controller for Raw mill ESP Hot air duct from cooler to slag HAG.
10. Installation of VFD for process fans
11. Installation of Solar Water heater in Guest house & Canteen

We have planned to achieve the specific electrical energy consumption of 68.5 Kwh/mt of cement and Specific thermal energy consumption of 675 Kcals/Kg of clinker by 2005-06.