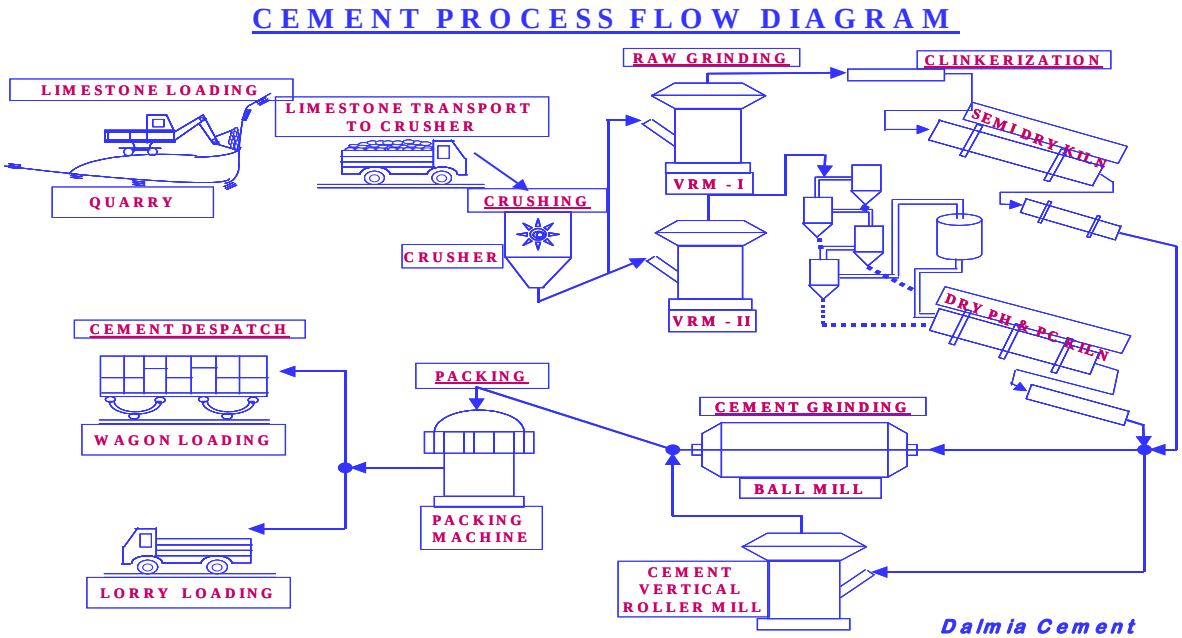
DALMIA CEMENT (BHARAT) LIMITED

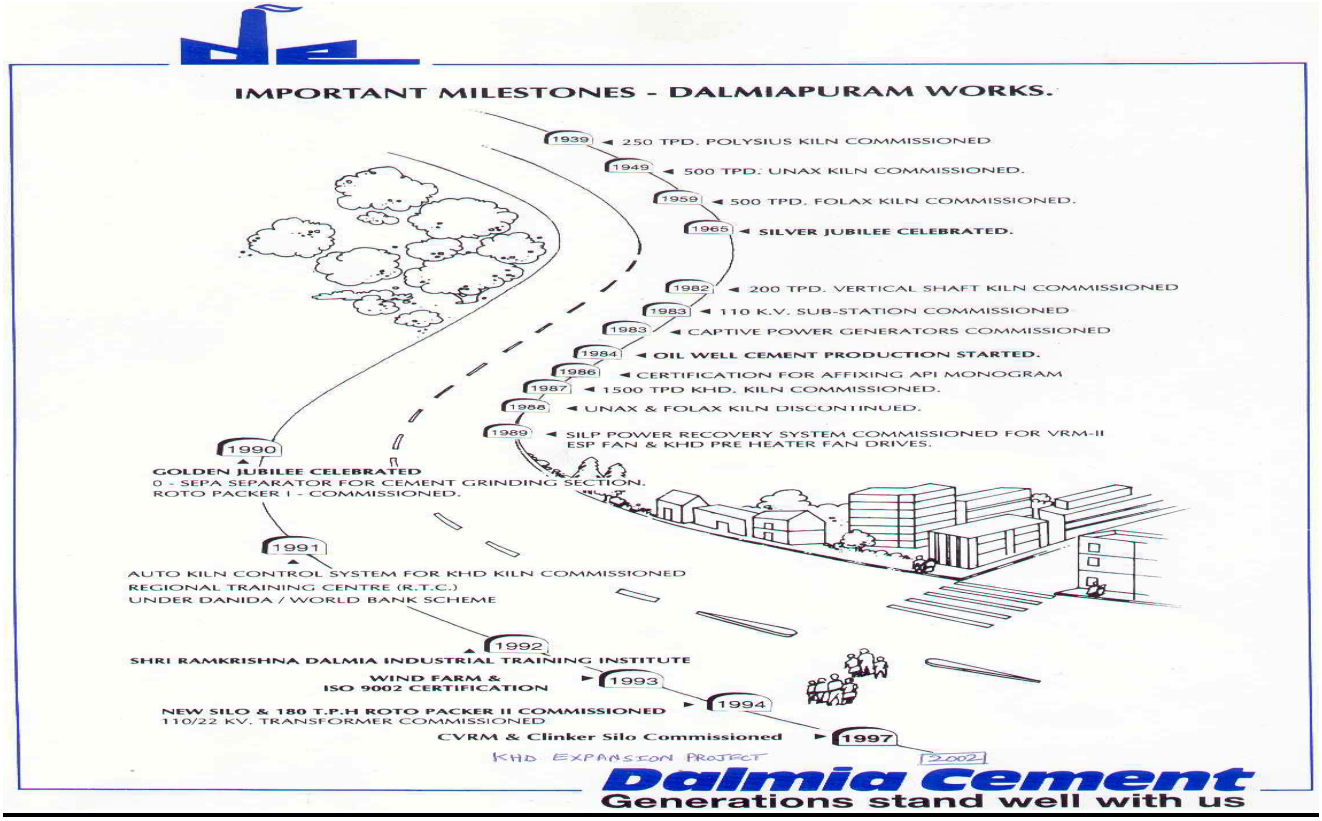
Tirchirappalli (Tamil Nadu)

UNIT PROFILE :

It was in the year 1939, during the pre-independent era, the company started its cement unit as a venture towards Building up a self-reliant India with respect to one of the country's essential commodities. As far back as 1987, the old wet process technology has been replaced by modern precalcinator dry process technology and the first company to adopt this in Tamilnadu,

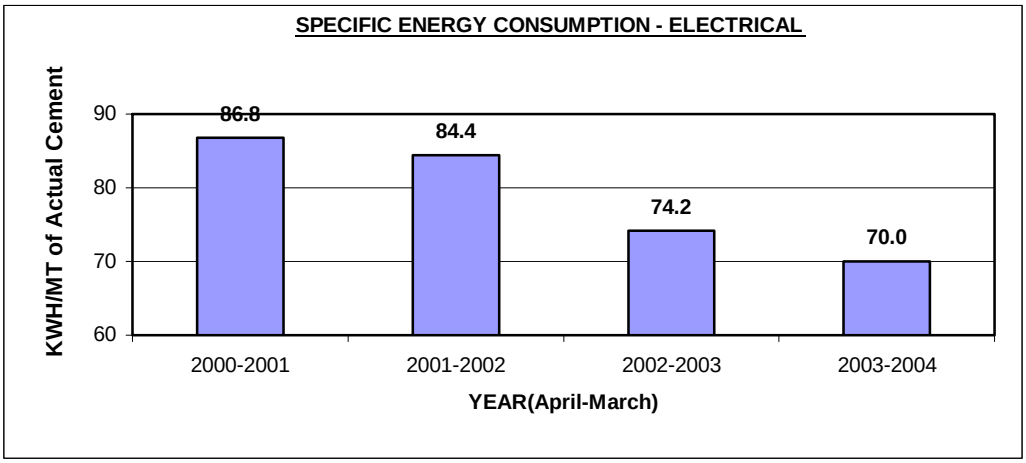


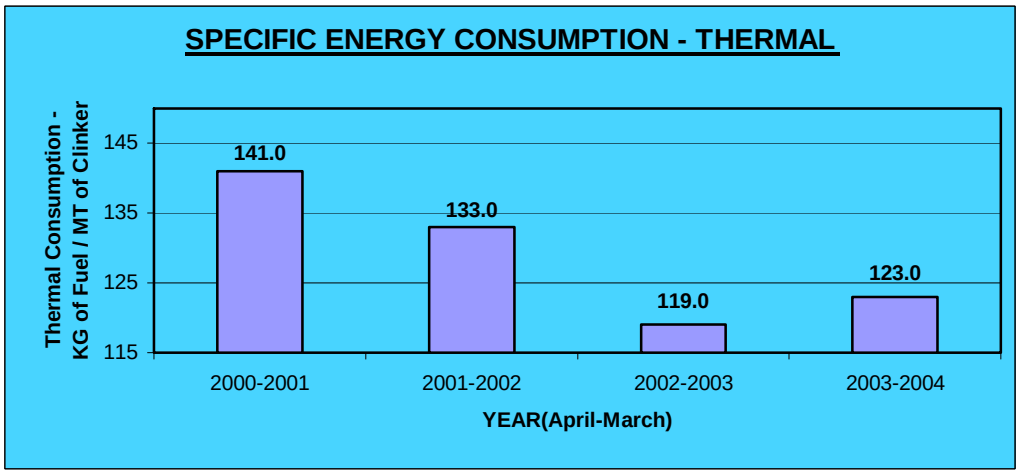
mainly with a view to conserve energy.



ii) ENERGY CONSUMPTION :

The consumption of both Electrical and Thermal energy shows a decreasing trend, which is achieved by means of various measures and commitment from employees.





iii)ENERGY CONSERVATION COMMITMENT, POLICY AND SET UP :

ENERGY POLICY

Excellence in Energy Efficiency
Achieved by

- Identifying & Eliminating wastage of energy,
- Adopting Energy Efficient and Eco friendly Technologies,
- Using Alternate and Renewable Energy Sources,
- Energy Conscious Employees.

N.GOPALASWAMY
Whole Time Director

An Energy monitoring cell has been formed to monitor the electrical energy consumption of individual energy centers of the plant and decide on actions for improvements.
The activities of the cell are,
i) Proper recording of various Energy related data.
ii) Analysing the thus recorded data.
iii)Set right the deviation from norms/standard
The energy monitoring cell meets around Ist week of every month and discuss the trend of the power consumption. Whole time director chairs the meeting. Thus there is a top management commitment towards

iv) **ENERGY CONSERVATION ACHIEVEMENT :**

Receiver / Storage Tank Connected to Process Header **Control Panel** **Pressure Regulator**

1. **Goderj – Compressed air Optmisation System**

EnergAir Automation system for Supply side Management and Control Air System for Demand side Management installed on a turnkey project by Godrej & Boyce Mfg. Co. Ltd. The system was inspected and commissioned by GODREJ & BOYCE MFG. CO. LTD., during Dec 2003 – Jan 2004, at DALMIA CEMENT (BHARAT) LTD., Dalmiapuram Works.

Basically this system classified our plant Air applications in Two Groups – one that consumes at Steady rate (Process Applications)and the second that consumes at Cyclic pattern(Fluxo Pump Applications). Two headers were formed - one dedicated for each group.

Selected applications were provided with Pressuree / Flow controllers – where application pressure can be set. All twelve screw compressors were connected to Central Controller – which can switch on and off each compressor depending on Demand.

All screw compressors supply air to Process Header at Preset Pressure. From this Header , Process Applications received Air through Flow controller at lesser but steady Pressure. The compressors are run to maintain Header pressure within a set range.

A base of total 12nos. ELGI screw compressors and 7nos. of Khosla reciprocating compressors and operated in de-centralized networks to meet plant demand.

2. Savings

- ***Guaranteed Energy Savings = 15 %***
- ***Actual Achieved Energy Savings = 27 %***
- ***Stoppage of 2-3 Compressors.***

With and without this system energy consumption readings were taken and the energy savings effected by the system was found to be 27% as below :

MEASUREMENT OF POWER CONSUMPTION AND ENERGY SAVINGS:

Following readings were taken on M/s DALMIA CEMENT (BHARAT) LTD's energy meters in presence of their representatives for proving the energy savings.

WITHOUT System: **WITH System:**

Average Daily Compressor Energy Consumption - 11,284 kWh / day 8,224 kWh / day

Difference of Energy Consumption between "WITHOUT Control System" and "WITH Control System" = 11,284 – 8,224 kWh / day

Energy Savings with EnergAir & ControlAiR system = 3,060 kWh / day

% Energy Savings with EnergAir & ControlAiR system = 27.12%

This system will pay back within one year.

v**)** **ENERGY CONSERVATION PLANS AND TARGETS :**

In the next one year, the company is committed to further reduce the electrical and thermal energy consumptions. Some of the major projects planned for the next year are given below.

Sl No.	Energy Conservation Measures (Planned)	Anticipated savings			Approx. investment (Rs.lakhs)	Project Commencement & Completion year
		Power Saved in Lakh units per annum	Tons of coal / oil saved	Expected annual savings (Rs.lakhs)		
1	Five stage preheater with modern cooler as compared to 4 stage preheater with grate cooler		7122	39.2	2604.0	commencement April 2004 completion May 2005
2	Low efficiency CVRM booster fan retrofit with new high efficiency impeller	4.9		12.3	12.0	commencement Oct 2004 completion Mar 2005
3	Low efficiency Rotary compressor replacement with Screw compressor	1.5		3.87	6.0	commencement Oct 2004 completion Mar 2006
4	Low efficiency pump in mines replacement with high efficint ones	0.3		1.5	1.2	commencement Oct 2004 completion Jan 2005
5	Verabar - low power flow metering system for VRM II	1.53		4.0	4.5	commencement Oct 2004 completion Mar 2005
6	Increasing % dry fly ash in PPC by installing Solid flow meter for dry flyash feeding	1.31	1010	9.0	6.0	commencement Oct 2004 completion Mar 2005
7	Tertiary crusher for coal	3.3		8.3	11.0	commencement Oct 2004 completion May 2005

8	Use of alternate fuels (tyre, paint sludge)		1500	57	2.0	commencement Nov 2004 & continuous

vi) **ENVIRONMENT AND SAFETY :**

Our organization has initiated no. of measures for Pollution Prevention, Waste Management, Conservation of Key resources and creation of environmental awareness among all concerned. With the above effort our company has obtained the **IS/ISO 14001 Certificate** in February 2004, from BIS.

IS/ISO14001:1996 Environmental Management System Certification for Manufacture and Supply of Various Kinds of Cements including activities of Captive Mines.

21. Whether any dispute pertaining to statutory requirements of safety and pollution control is pending with any Government Agency. If Yes, give details:

NO

Enlargement of Recirculation duct for VRM II.

Vertical Roller mills are basically air swept mills, I,e., they require optimum air volume to get the desired output. Part of the air from the mill fan is recirculated for making up the volume. During modification of three fan system recirculation duct was provided with 800 mm dia which was offering higher pressure drop because of the large volume requirement. As a result atmospheric air was introduced resulting in additional amount of air volume for ESP, Fan etc resulting in loss of production, increase in power consumption and stack emission.

All the above problems were studied and it was further decided to increase the diameter from 800 mm to 1150 mm to have the adequate quantity of recirculation gas thus avoiding intake of atmospheric air. Complete Engineeing, Fabrication and commissioning was completed with the inhouse talent. This project has resulted in a annual power saving of 1.8 Lakh units corresponding to a cost saving of 6.7 Lakhs with an investment of 5.4 Lakhs.

Sl No 2 : VRM I ESP Fan retrofit.

VRM I ESP fan was operating with a perpendicular inlet box giving a pressure drop of about 150 mmwg and relatively low efficiency of about 77 %. With this high power consumption and pressure drop it was difficult to increase the necessary volume to maintain the output and specific power consumption for VRM – I (Vertical Roller Mill – I)

After obtaining the offers and after careful analysis, high efficiency impeller with an investment of Rs 6.0 Lakhs was provided. Efficiency was improved to about 85 % resulting in a power saving of 2.6 Lakh units per annum and a cost saving of 9.3 lakhs per annum was achieved.

Sl No 3 : IKN Fan II retrofit.

IKN – Fan II was operated to provide necessary combustion air to the kiln system after cooling the clinker bed placed on the top of the fixed grate plates supplied by IKN. Because of the inefficiency of the fan it was very difficult to have required air volume at higher production levels as the resistance of the clinker bed increases. Thus proper cooling air was not provided.

Fan was replace with high efficiency design with higher head and volume and VFD control to meet the volume , pressure requirement according to the production level. New fan is operating with a efficiency of 85 % in comparison to old efficiency of 67 % & eliminated damper loss as the fan is now controlled with the help of VFD. The Investment for this project was 2.2 Lakhs (Fan alone) and the power saving was equal to annual saving of Rs 4.0 lakhs per annum.

Sl No 4 : Dry fly ash storage & handling system for CVRM.

In the production of Portland Pozzolona Cement (PPC) fly ash is replaced with clinker to the tune of 27 %. Wet fly ash was used generally if no storage and handling system is available. The disadvantages of using wet fly ash are, as it is having around 25 % moisture it calls for Hot air source. Air pollution control systems have to be provided in the belt transfer points and covered storage is necessary.

However if dry fly ash doesn't requires hot gas, it can be directly unloaded from tanker to silo and then can be fed to mill in pipelines. As it is having higher fineness it increases the production rate dons not requires grinding. With view of the above, Storage and handling facilities for dry flyash addition was provided with a project cost of 15 lakhs, which has saved thermal energy equivalent of 793 MT of coal with total cost savings of 29.2 lakhs per annum

Sl No 5 : Installation of low power flow metering system.

Air volume control plays a major role in operation of Vertical Roller mill. Head meters such as Venturi meter and Orifice meter are generally used for metering purposes which has the disadvantage of power loss in the form of pressure drop due to their basic principle of operation.

Advanced flow metering system such as Vera bar uses the principle of pitot tube in a modified manner operates with an accuracy of more than 98 % with a mere pressure loss of 1-2 mmwg in comparison to 20 mmwg pressure loss by venturi/orifice. One such instrument was used to replace the existing venturi meter in Cement VRM saving 11.00 Lakhs per annum with a mere investment of Rs 4.2 Lakhs.

Sl No 6 : Installation of VFD's for cooler fans , hot gas fan

In general fans are provided with additional volume margin of 20 % to take care of the future expansion / increase in production. Due to the fluctuations in the production levels , process conditions flow is controlled with dampers resulting in power loss across dampers. With the advancement of VFD technology damper control can be completely eliminated and speed control throughout the entire operating range of the fan is possible.

Five such fans previously operating with damper control were provided with VFD's with an investment of Rs 31 Lakhs resulting in a power saving of 3.1 Lakh units per annum corresponding to 14 Lakhs money savings per year.

Sl No 7: Capacitor bank addition to improve power factor.

Due to the over design of motors under loading takes place and the overall plant power factor drops. The loss in power factor is compensated by addition of capacitor banks. We had a spare unused capacitor bank in our old cement ball mill that was operated only for lesser period in year.

In order to improve the power factor in the continuous operating kiln section we decided to add this idly kept capacitor bank along with the existing capacitor bank. Practically no investment was needed for this project and it has given a cost saving of 3.3 Lakhs per annum due to power factor improvement.

Sl No 8 : Speed reduction of auxiliary bag filters.

Auxiliary bag filters are provided for silo ventilation, bin ventilation etc. In general considerable margin in terms of pressure and volume is provided to take care of the emergencies. Optimization studies can save power as well as operation costs to a great extent.

Bag filters operating on silo top and roto packer were having extra volume and pressure and they were changed with low speed motors resulting in a power saving of 6.4 Lakhs per annum.

Sl No 9: Removal of one air slide fan by modifying extraction circuit.

In the Four compartment Cement silo extraction circuit, modifications were carried out to alter the circuit with the existing vertical height and space available. One air slide fan was eliminated as a result of this modification and a cost saving of Rs 1.1 Lakhs per annum was obtained.

Sl No 10 : LOW NOX modification at Genset.

Conventional DG sets are provided with high NOx burner which have higher emissions and wear rate. With an investment of about 14 Lakhs the burner was replaced with low NOx burner with almost 40 % reduction in NOx levels and oil saving of 1.120 MT per annum

Sl No 11 : Screw conveyor retrofit with Air slide.

Mechanical conveyors like screw conveyors require more power, maintenance when compared to Air slides for transporting powdery and non abrasive low temperature materials like Cement, Raw meal etc.
Considering the above salient points we have replaced one Screw conveyor in Packing machine section with the existing unused / spare air slide box and saved to a tune of Rs 0.9 Lakhs per annum.

Sl No 12 : Changing the temperature settling in lub oil heaters.

In DG sets lub oil heaters (electrical heaters) are provided to maintain the flow ability of the oil. Electrical heating is the costliest way of heating and it costs to about more than 2000 Rs per Mkcal of heat generated.

During engine running conditions, as the oil from engine comes out at a higher temperature the temperature settings of the electrical heating systems can be reduced further. This doesn't requires any investment and has a cost saving potential of Rs 2.8 lakhs per annum.

Sl No 13, 14 & 16 : Remvoal of venturi in KHD coal mill , Idle running of belt conveyors & Lower feed size optimization :

As a part of our energy auditing methodologies, internal optimization procedures venturi meter not used for flow control and offering a pressure drop was eliminated. Idle running of Belt conveyors were avoided by suitably providing interlocks and VRM output was optimized with feed size control.

All these projects were carried using optimization techniques thus saving a cost of about 12.2 Lakhs per annum with a mere investment of Rs 0.2 Lakhs.

SL.NO.15 COMPRESSOR OPTIMISATION WITH GODREJ OPTIMUM AIR SYSTEM

i) Compressors Energy Consumption

The Compressors at Old plant were installed near to each application, but connected / interconnected with all applications – literally - like a spider web. Almost any compressor's air can go to any application – resulting in an un- optimized use of Air and consequent wastage of Energy.

To monitor the energy , we have installed energy meters for individual compressor – in the old plant - and recorded the energy consumed by each compressor, daily

The total energy consumed by all compressors totally was approximately 2,41,000 units per month

From our preliminary study , we understood, that it is adequate that if we run only the 12 Screw compressors with total installed capacity of 9507 M^3 / Hr (and power 1003.5 KW) in the old plant to meet the air demand for all sections (VRM-1 , CVRM , MH , PH and Polysius). Balance compressors can be stopped. Even these 12 nos Screw compressors need not run all the time – that is, there is surplus capacity. There is scope for energy saving.

How ever , this optimization and consequent energy saving is possible if we procure and install a supervisory monitoring and control system to operate all screw compressors.

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