



CHETTINAD CEMENT CORP. LTD.

KARIKKALI WORKS

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UNIT PROFILE

CHETTINAD CEMENT CORPORATION-KARIKKALI



With growing demand for cement with in India and South East Asian countries CHETTINAD CEMENT CORPORATION LIMITED, installed a new green field plant at Karikkali village near Guziliamparai, Dindigul district Tamil nadu. having a capacity of 0.9 million tons per annum and commissioned in September - 2001.It has the most advanced equipment from L&T and FL SMIDTH- Denmark and LOESCHE, GERMANY. Energy efficient vertical roller mills are carrying out grinding operations, for RAW MILL and COAL MILL supplied by LOESCHE and Cement Mill by Onada and Kobe.

The Pyro-processing consists of five- stage pre- heater with low-pressure drop cyclone and highly efficient Coolax cooler with excellent heat recuperation efficiency.

latest state- of- art pollution control equipments have been installed for achieving the lowest emission comparable to international standards.

The only plant equipped with two modern cross belt analyzers (Gammametrics), procured from THERMO ELECTRON CORPORATION, USA, one at mines that continuously monitor and control the quality of limestone mined and the other cross belt analyzer installed before raw mill for online quality control of raw mix. The plant also has x-ray fluorescent analyzer for analyzing the clinker and cement quality and MALVERN 2000 analyzer for analyzing particle size distribution in cement to achieve optimum particle size.

The automation process is one of the most advanced instrumentation control having sub control system linked with MODBUS & PROFIBUS communication. Field IO PANNEL is located at site, which is unique for cement industry.

The Plant has variable frequency drive, with maximum of 3150KW and transformers are protected by electronic relays. Power is being monitored

through MODBUS communication and all the readings are made available in central control room for efficient operation.

Chettinad Cement is continuously adopting multi pronged approach in the areas of energy conservation to improve overall performance and productivity

ENERGY CONSUMPTION
AND CONSERVATION
MEASURES

Preheater Top Cyclone Water Spray system

Background of the Project

The top cyclone water spray system was installed to increase the clinker production from the existing kiln for the extra clinker requirement for the new 0.5 million ton cement grinding unit. The project was feasible as the hot air requirement for the raw material was low due to very less moisture content in our limestone. Further the pre heater fan was taking less load as compared to the installed power. The project was having low investment and execution can be done independently and final connection was done during window of opportunity of kiln stoppage.

Observations Made

Pre Heater fan vibration level was normal with no coating in the blades. Bag House DP was less even during kiln mode operation after implementation.

Technical and financial analysis made

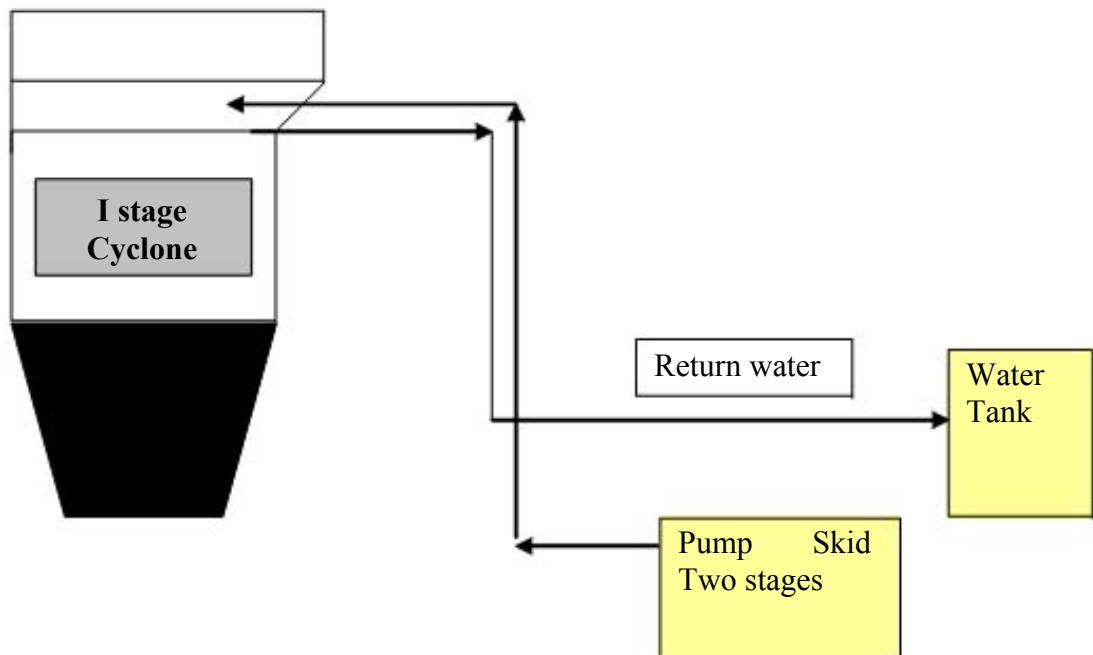
Sl. No	Parameters	Pre Implementation	Post-Implementation	Savings per annum (Rs. Lacs)
1	Preheater Temp. (°C)	342	290	
2	Pre Heater Fan (KW)	995	965	10.7(+)
3	Bag House Fan (KW)	650	450	35.64(+)
4	Reverse air fan Rhrs	8	5	
5	Reverse air fan (KW)	164	102.5	21.9(+)
6	Pumps power consumption(KW)	0	30	10.7(-)

Investment for the Pre Heater water spray system	Rs 22 Lacs
Net Savings per annum	Rs 57.5 Lacs

Impact of Implementation

Savings in the pre heater fan and also bag House fan mainly because of lesser rpm of Pre heater fan for the same output from the kiln and no fresh air dilution for the bag house fan.

Further savings could be achieved at the reverse air fan as the cleaning cycle got substantially reduced.





Pump skid with two stages to reduce the power consumption in place of one pump for achieving the required pressure.



Seven nozzles located in the top circumference to have even distribution of water.

Cooler Water Spray System

Background of the Project

Original design of the cooler water spray supplied by L & T was based on multiple full cone nozzles with low pressure water pump. The water droplets had a tendency to combine with the nearby nozzles leading to bigger droplets. With the above problem the water is not getting completely evaporated and this leads to clinker buildup in the ESP take off duct and also temperature fluctuation in the cooler water spray. The present water spray system was having more nozzles located closer to the clinker bed and also fine water spray. Each pair of nozzles was designed with different flow rates to maintain a constant temperature by fixing different temperature settings.

Observations made

Stable cooler outlet temperature could be achieved because of fine water droplet and also no build up in the ESP take off duct. Better collection efficiency could be achieved because of less resistivity of the particles and also no coating formation in the collecting and emitting electrodes.

Technical and financial analysis made

Sl. No	Parameters	Pre Implementation	Post-Implementation	Savings per annum (Lacs)
1	Cooler vent Temperature	290	250	
2	Cooler vent Fan (KW)	56	36	7.13(+)
3	Water pump power(KW)	15	16	0.35(-)
Investment for the Cooler water spray system			Rs 11.64 Lacs	
Net Savings per annum			Rs 6.78 Lacs	

Impact of Implementation

Savings in the cooler vent fan power because of stable temperature.

Savings in terms of cleaning the build up in the cooler vent duct.

Savings in scaffolding and maintenance cost for repairing the cooler vent duct.

Emission reduction from 35 mg/Nm³ to 25 mg/Nm³ in the cooler vent chimney after installation of new water spray system.

Cooler water spray system



Nozzle
Location

Automatic
control valve.

Primary air Fan

Back Ground of the project

Primary air fan supplied at the time of the project was having a constant speed motor with damper control. During throttling of the damper we experienced unstable flame formation leading to less refractory life. Flame momentum requirement was varying with the different kind of fuels leading frequent change in the primary air volume. To offset the loss of power during throttling and also to have a stable flame, VFD drive was installed for one of the primary air fan. Generally it was observed that the Motor control cubicle connected with Primary air fan was tripping due to high starting current before VFD installation.

Observations made

Stable flame formation could be achieved for different primary air fan flow and also substantial increase in the refractory life.

Technical and financial analysis made

Sl. No	Parameters	Pre Implementation	Post-Implementation	Savings per annum (Rs. Lacs)
1	Primary air fan Damper	70%	100%	
2	Primary air fan RPM	2950	2700	
3	Refractory Life(Burning Zone)-days	280	330	
4	Primary air fan(KW)	82	69	4.63(+)
Investment for the VFD			Rs 8.4 Lacs	
Savings per annum			Rs 4.63 Lacs	

Impact of Implementation

Power system stability could be achieved after Variable Frequency Drive [VFD] installation with substantial savings in power.

Stable flame formation could be achieved by running the fan at lower rpm and improved refractory life.



VFD Panel for
Primary Air
Fan



Primary
Air Fan
motor

Insulating Bricks for pre Burning Zone

Background of the Project

Recommendation of refractory schedule given by supplier was to use HA 40% bricks near the girth gear and III tire. General observation reveals that insulating property was low after one year of installation the radiation level was high with shell temperature ranging between 270-320 deg C.

To reduce radiation losses from the kiln insulating bricks for a length of 14 meters, ACC-Refratherm was installed from inlet up to girth gear and from the shell temperature savings of 5 Kcal/kg of clinker could be derived.

Observations Made

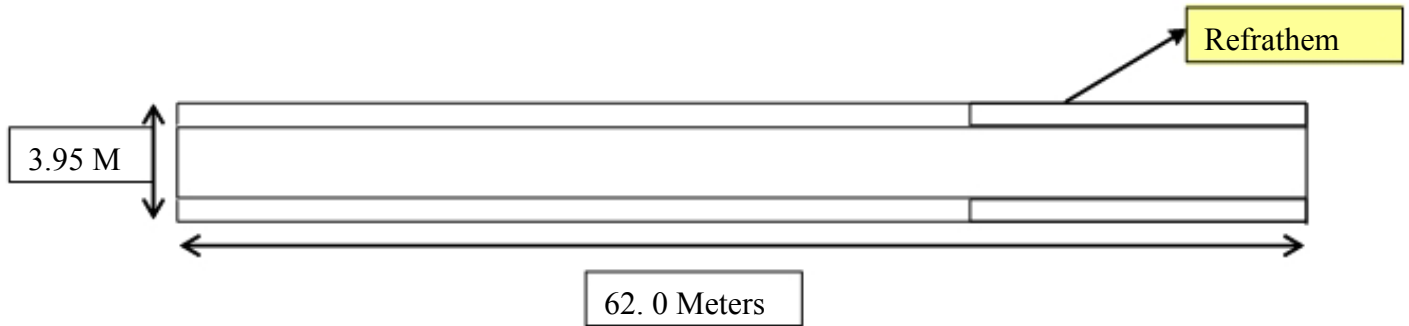
Substantial shell temperature reduction could be achieved with less radiation loss and the inspection of rebricked area reveals no spalling.

Technical and financial analysis made

Sl. No	Parameters	Pre Implementation	Post-Implementation	Savings per annum (Rs. Lacs)
1	Shell temperature between kiln inlet to Girth Gear(Deg C)	270-320	160-180	
2	Reduction in shell radiation losses(Kcal/Kg of Clinker)	32.9	27.6	
3	Refractory Life(Burning Zone)-days	280	330	
4	Thermal energy savings	-		38.93
Investment for the VFD			Rs 13.55 Lacs	
Savings per annum			Rs 38.93 Lacs	

Impact of Implementation

Thermal energy saving followed with improved life of kiln shell, III tier and girth Gear and also better environment could be achieved after installation.



RENEWABLE ENERGY PROJECT

Renewable Energy Project

Solar Water Heaters

Background of the Project

To promote the use of renewable energy, we have installed solar water heaters in colony houses to reduce the power consumption by avoiding the use of electrical water heaters. Top level executive quarters were fixed with solar water heaters.

Observations Made

The hot water up to a maximum of 80 deg C was available all throughout the day.

Technical and financial analysis made

Installation cost of solar water heater per unit : Rs 22,000

Approximate energy saving per house per month: 200 Units

Savings per annum per house : Rs 8400

Impact of Implementation

Solar Water Heater has several advantages over conventional water heating systems. For consumers, they save electrical energy, save interior space (because they are usually located on rooftops,)and eliminate the risk of accidents in bathrooms due to electrical water heating equipment, They require little or no care and attention by providing hot water for about 300 days in a year. They reduce the need for fossil fuels for electrical generation and thereby, they also reduce degradation of the environment



ENERGY CONSERVATION
COMMITMENT & POLICY

Energy Conservation commitment, Policy and Set up

Energy Conservation CELL

Energy manager coordinates energy management cell and meeting is conducted once in a month. The steering committee is headed by President / General Manager and designated persons from each department, will review the past performance with respect to fixed norms, targets and review the methodology of monitoring and controlling energy consumption for reduction in consumption as suited.

Energy Auditing and Monitoring

Energy manager is responsible for preparing annual activity plan, energy conservation proposals with technical and financial feasibility and getting approval from top management followed with implementation and evaluation. In addition energy manager will be responsible for conducting energy audit from outside agencies and coordinating during the audit activities. Energy manager will prepare information material and conduct internal workshops about the topic for other staff.

Energy management policy

- To be the lowest specific energy consumer in cement industry. To be the leader in using alternative fuels.
- To promote the use of renewable energy sources.

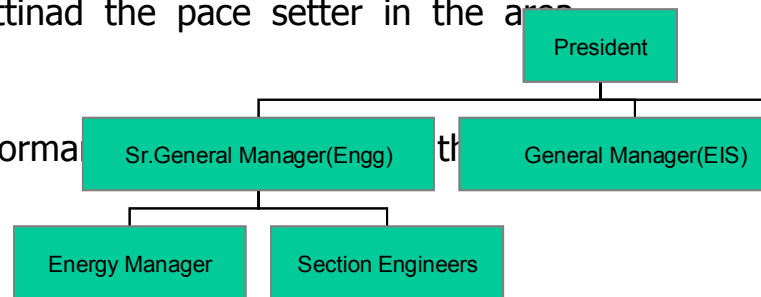
To achieve the above we plan the following

- Manage efficiently the utilization of energy sources, upgrade hardware and employ cleaner and more efficient technologies.

Encon Structure

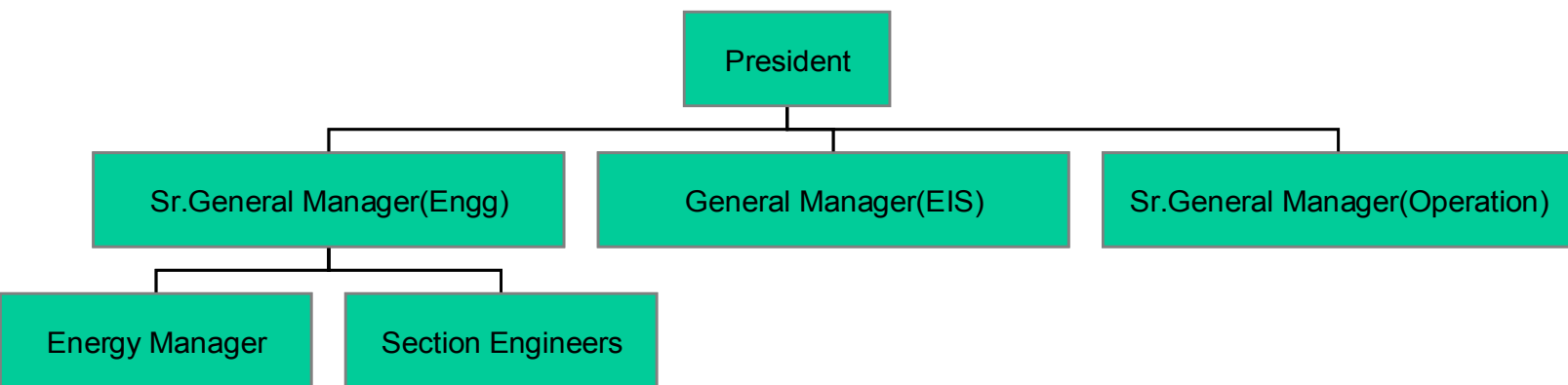
- Train the employees to make Chettinad the pace setter in the area of energy conservation.

- Bench mark continuously our performance with the rest of the world.



Energy Conservation Cell Structure

Encon Structure



**COMMITMENT TO
ENVIRONMENT AND
SAFETY**

Commitment to Environment and Safety

EOHS POLICY

Environmental, Occupational Health and Safety Policy

We shall be committed to protect Environment, Occupational Health & Safety of the workforce by continual improvement and complying with applicable Environmental, Occupational Health & Safety legislation and other requirements and adopting well established Environmental, Occupational Health & Safety Management system in our processes leading to the manufacture of various grades of cement.

We therefore strive:

- To reduce overall emissions and contamination
- To achieve continual improvement in the prevention of Environmental Pollution by adopting suitable technology and practices
- To promote greenery in and around the factory
- To minimise waste, to promote recovery and to conserve natural and Energy resources
- To create awareness among the employees about Occupational Health & Safety obligations
- To reduce loss time by ensuring safe work practices, work environment, identifying and controlling hazard/risk areas
- To make available the policy to the employees, public and the interested parties.

PRESIDENT

This we plan to achieve by the following

- We have taken up Green Field Development in 25% of our total area in plant and colony. Under Green Field Development programme, we have planted 44 735 saplings for the past SIX years.
- We have laid concrete roads inside the factory and surrounding areas linking to the entry to avoid fugitive emission due to vehicle movement.
- Cooler vent hot gas is fully utilized for drying and grinding operation in Cement mill.
- The unit has installed bag filters to arrest emission in all transferpoints in material handling systems.
- We have banned the use and throw of plastics inside the factory premises and installed boards in all the entry gates to create awareness among staff and workers.

Safety committee meetings and outcome

Safety committee meetings are conducted once in two months, chaired by technical head along with permanent members with sufficient participation of workers in all categories coordinated by safety officer.

- In the committee meetings safety related points are discussed and target dates are fixed for implementation. Section heads shall take the responsibilities of execution in time.
- The workmen, Supervisors and Engineers assemble on every Friday morning in their shop floors and take Safety Oath. One of them will be asked to speak on Safety related matters.
- Training programmes on Safety related matters are routine affair. Every month at least one Safety related training programme is conducted. Training on Fire Safety, First Aid and Life Saving Support systems are also done frequently.
- Safety Audit for the entire Plant is normally conducted once in a year and points raised by the consultant will be implemented in a time bound frame.
- The Personal Protective Equipments Helmets, Safety Belts, Shoes, Goggles, Gloves etc., are provided to all workmen including contract workmen.
- For all new contract workers safety induction programme is conducted before starting the job.

Top Management commitment to safety

Safety officer shall meet unit head to appraise the outcome of the safety meeting and also to get approval for investment oriented activities.

CEMENT PROCESS FLOW DIAGRAM

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