



Green Cementech 2010,
Hyderabad

ENVIRONMENTAL MANAGEMENT- THROUGH CEMENT PLANT SERVICES & MAINTENANCE

Siteram Sharma
Vice President – After Sales & Services

KHD | HUMBO.DT
WTDAG

Executive Summary

Executive Summary

**GII Green Cementech, 2010 -
Hyderabad**

Environmental protection and sustainable development have been the cornerstones of the policies and procedures governing the industrial and other development activities in India.

Looking in to the present industrial scenarios, the main focus is on energy conservation (thermal & electrical) and on reduction of CO₂ & NO_x emissions.

KHD, one of the world leader in cement plant machinery suppliers, is now taking lead in environmental protection through plant services & maintenance (like replacing existing inefficient equipment, plant audits for performance enhancement, imparting training, upgradations with latest generation equipment, offering solutions for using alternate fuels, offering timely spares etc.).



KHD | HUMBO.DT
WTDAG

Impacts of cement industry on environment:

- The energy consumption by the cement industry is estimated at about 5% of the total global industrial energy consumption.

Due to the dominant use of carbon intensive fuels in clinker making, the cement industry is also the major emitter of CO₂.

- Cement manufacture contributes green house gases both directly through the production of carbon dioxide (CO₂) when calcium carbonate is heated, producing lime and CO₂, and also indirectly through the use of energy.
- NO_x, SO_x & dust emissions

KHD is taking lead for environmental protection by offering ***"cement plant services & maintenance"*** to:

I. Reduce ENERGY CONSUMPTION

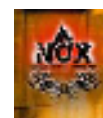
- a) Thermal energy
- b) Electrical energy



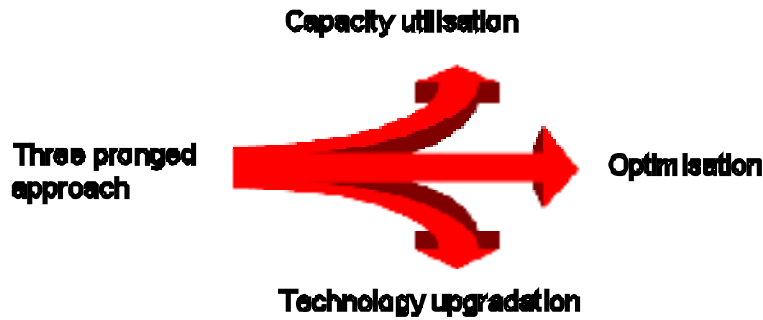
II. Reduce CO₂ emissions to atmosphere



III. Reduce NO_x emissions to atmosphere



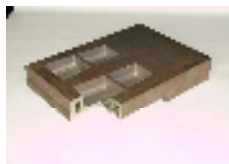
Energy Conservation Methodology:



Energy Conservation Methodology:

Capacity Utilisation:

- By providing technical support to customers:
 - > Through plant audits and suggestions on preventive maintenance measures (for mechanical as well electrical equipments) before system breakdown
 - > Through other services like hot kiln alignment, vibration monitoring system, equipment health condition monitoring etc.
- By providing solutions to add additives like fly ash, puzzolona, slag etc. for capacity enhancement
- By providing genuine spares for critical equipment



Energy Conservation Methodology:

Optimisation:

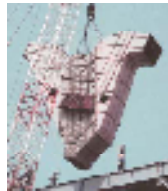
- By process (energy) audits and optimisation studies (harmonics study)
- By implementation of optimisation software
- Retrofitting of old/ obsolete automation systems with state-of-art PLC/ DCS systems (for complete plant from crusher to packing plant)
- Complete automation of kiln thrust control system
- Energy management through latest software
- Imparting training to plant personnel for improving their plant operation skills
- By providing specific process check list to ensure optimum running of the plant.



Energy Conservation Methodology:

Technology upgradation:

- By detailed process & layout studies for incorporation of new equipment
- By incorporating latest generation equipment / machinery in the existing system depending upon the suitability like addition of Roller Press with latest static & dynamic separators with existing open / close circuit ball mills for capacity enhancement
- By adding additional PH strings, if kiln has potential, latest generation cooler retrofits and replacing existing burner with latest generation burner (low primary air %)
- Providing new solutions like waste heat recovery, technologies for using alternate fuels (saving natural resources, reducing handling of waste hence providing better environment) etc.



D) Solutions for reducing energy consumption:

Thermal & Electrical Energy:

A. Pyroprocess:

- i) Retrofits in Preheater - No. of stages in preheater tower:
The selection of no. of stages is generally governed by raw material moisture. Through detailed heat balance analysis, decision on no. of stages shall be taken. Based on the heat balance study, preheater stages can be increased.



Retrofits in Preheater - Selection of optimum cyclone size:

As most of the pyro plants are running at increased capacities against design capacities, it is eminent that there is potential for reducing the PH pressure drop by choosing optimum cyclone sizes for the increased system production rates.



Replacing existing cyclones with new high efficiency LP cyclones (depending upon the layout suitability)

D) Solutions for reducing energy consumption:

Thermal & Electrical Energy:

A. Pyroprocess:

Benefits:

- Reduced exhaust gas temperature (reduced dust losses) at PH outlet due to better heat transfer thus reduction in specific heat consumption
- Reduction in PH pressure drop thus saving in specific power consumption

D) Solutions for reducing energy consumption:

Thermal & Electrical Energy:

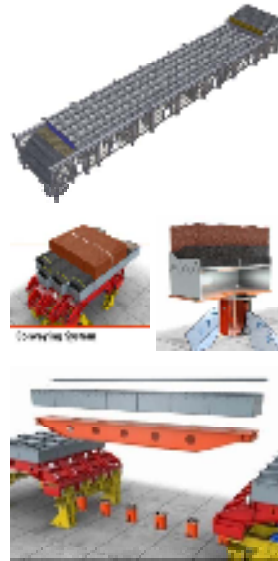
A. Pyroprocess:

ii) Retrofits of coolers:

As most of the coolers in India are of previous generation, there is improvement for increasing the cooler recuperation efficiency by suitable retrofits (like direct aeration to complete recuperation zone etc).

Benefits:

- Increased cooler recuperation efficiency – Reduction in specific heat consumption
- Reduced specific air consumption resulting in reduced specific power consumption



D) Solutions for reducing energy consumption:

Thermal & Electrical Energy:

A. Pyroprocess:

iii) Through regular maintenance activities:

- Maintaining optimum burner operational parameters (velocity, primary air ratio etc. through rectification of burner outflow components)
- Sealing false air entry through proper inspection & maintenance
- Replacing worn out parts like cooler plates, sealing etc.
- Optimising radiation losses etc.

Benefits:

- Reduced exhaust gas volume thus reduction in specific power



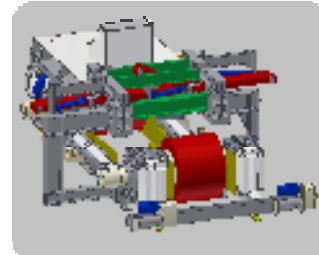
D) Solutions for reducing energy consumption:

Electrical Energy:

B. Grinding:

i) Through latest technology

- As Roller Press is the most energy efficient comminution machine, existing close / open circuit ball mills shall easily be upgraded.
- Replacing existing separators with latest high efficiency static & dynamic separators.



Benefits:

- Increase in production in multiples of 1.5-2.0 times depending up on the size of existing ball mill size
- Reduction in specific power consumption

D) Solutions for reducing energy consumption:

Electrical Energy:

B. Grinding:

ii) Through proper plant maintenance

- Following time bound maintenance schedules for Roller Press and roller wear inspection & in-situ welding, Roller refurbishment, ball mill grinding media regradation, replacement of traditional mill liners with most efficient wave liners, replacing worn out parts etc.



Benefits:

- Increasing the longevity & efficiency of the machine thus more production which results in reduced specific power consumption.



II) Solutions for reducing CO₂ emission to atmosphere:

The CO₂ emission to atmosphere can be reduced by :

- Improvement of the energy (thermal & electrical) efficiency of the process by adopting
 - 1) Efficient pyro & grinding technologies (6 stage PH, latest generation cooler, Roller Press etc.)
 - 2) High efficiency classifiers
 - 3) Energy efficient motors and drives
 - 4) Variable speed drives
- Shifting to more energy efficient processes (Finish, Semi finish grinding)
- Applying lower dinker / cement ratio (increasing the ratio of additives / cement) to the permissible limits by establishing better PSD of product
- Removal of CO₂ from the flue gases (thought process)



III) Solutions for reducing NO_x emission to atmosphere:

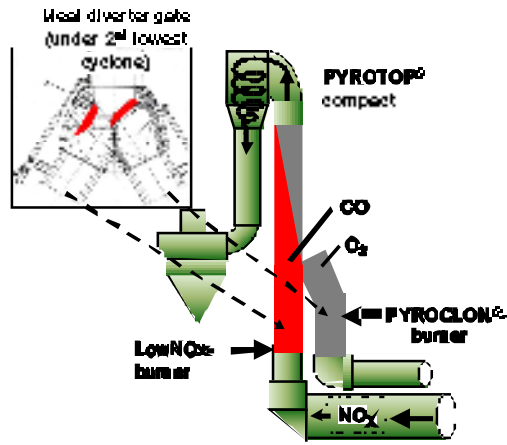
By adopting the following techniques, the NO_x emissions can be reduced in Cement Industry.

- PYROCLON® LowNO_x Calciner (primary measure)
- Through Selective Non catalytic Reduction (SNCR) technique (secondary measure)



III) Solutions for reducing NO_x emission to atmosphere:

1. PYROCLON® LowNO_x Calciner (primary measure)

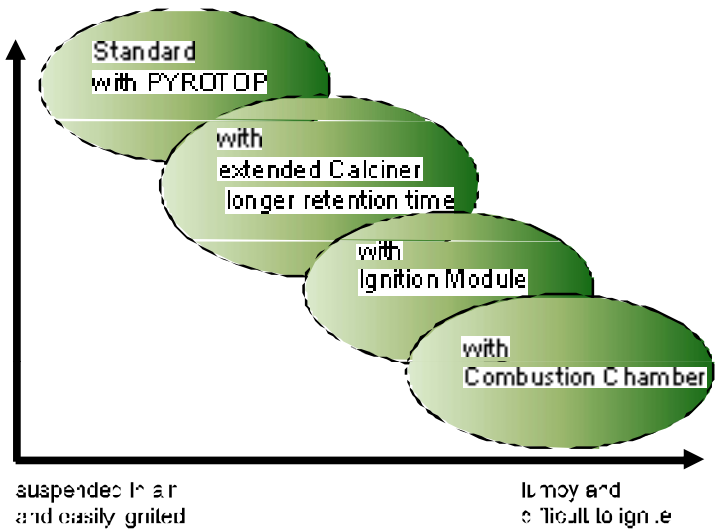


- Staged combustion / under stoichiometric burning
- BAT "Best Available Technique"
- High efficiency and flexibility

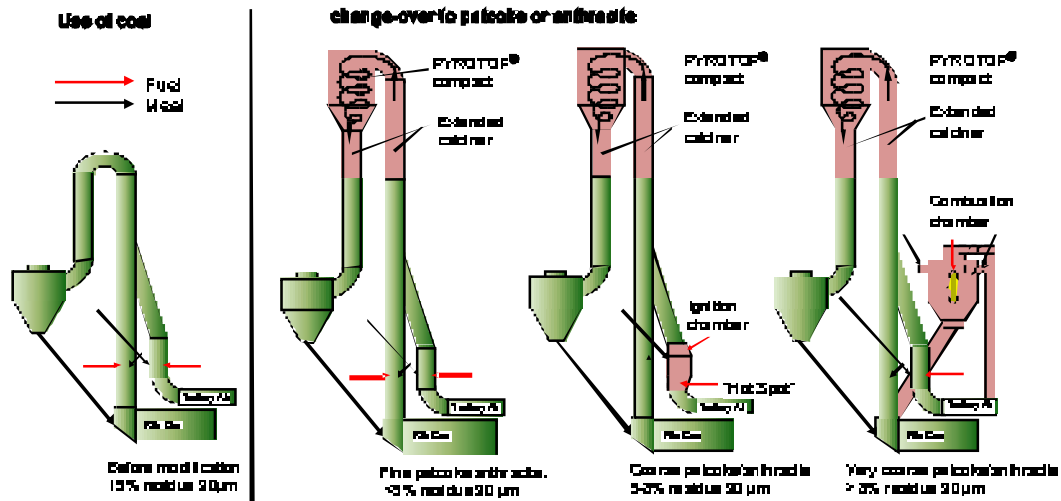
III) Solutions for reducing NO_x emission to atmosphere:

PYROCLON® LowNO_x Calciners (primary measure)

- coal (< 15% R90 µm)
-
- coal (> 15% R90 µm)
- Petcoke/Anthracite (<5% R90µm)
- RDF / Sewage sludge (Tyre chips flyable)
-
- Petcoke/Anthracite (5-8% R90 µm)
-
- Tyre & Wood chips
- Lump coal, Petcoke/ Anthracite (> 8% R90 µm), Pressed material

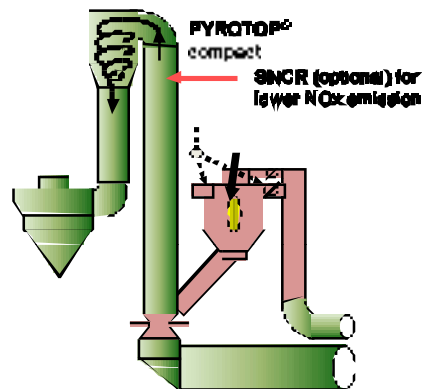


III) Solutions for reducing NO_x emission to atmosphere:
PYROCLON® LowNO_x Calciners (primary measure)



III) Solutions for reducing NO_x emission to atmosphere:

2. SNCR (secondary measure)



- SNCR (Selective Non Catalytic Reduction)
 - Introduction of ammonia
- $$4 \text{NH}_3 + 4 \text{NO} + \text{O}_2 \rightarrow 4 \text{N}_2 + 6 \text{H}_2\text{O}$$

Cement plants can turn around their growth of energy consumption, CO₂ emissions & NO_x emissions via proper solutions.

Plants can sustain their activities while decreasing carbon intensity from:

- Production processes
- Fuels uses
- Product end use



REMEMBER

KHD is always there to provide the solutions to counter the crisis of climate change.



**THANK YOU VERY MUCH
FOR YOUR
KIND ATTENTION**



For any assistance, please contact:

SITARAM SHARMA
VICE PRESIDENT (AFTER SALES & SERVICES)
HUMBOLDT WEDAG INDIA PRIVATE LIMITED
"MEHTAB HOUSE", A-36, MOHAN CO-OP ESTATE
MATHURA ROAD,
NEW DELHI - 110 044
PHONE NO. : 011 - 4218 1150 - DIRECT
MOBILE NO. : +91 - 98628 48141
EMAIL ID : SR.Sharma@khd.com