CASE STUDY 15: JOURNEY TOWARDS ZERO FUEL COST - ACC LTD., MADUKKARAI CEMENT WORKS

Project Implemented by : ACC Ltd, Madukkarai Cement works

Project Implemented in : 2007

Company Details

ACC Limited is India's foremost manufacturer of cement and concrete. ACC's operations are spread throughout the country with 16 modern cement factories, more than 40 Ready mix concrete plants.

Since inception in 1936, the company has been a trendsetter and important benchmark for the cement industry in many areas of cement and concrete technology. ACC has a unique track record of innovative research, product development and specialized consultancy services. The company's various manufacturing units are backed by a central technology support services centre - the only one of its kind in the Indian cement industry.

Madukkarai Cement Works is one of cement plants in ACC Group. This is located at Palghat main road, Madukkarai.

Project Details

The Project Zero Fuel Cost was launched at ACC Madukkarai Cement works in the month of December'09, when the Thermal Substitution rate (TSR) was 0.91%. TSR is increased from 0.91 to 3.41% after taking many initiatives in use of alternative fuels.

Mission: To achieve zero fuel cost at Madukkarai Cement works by sustained usage of Alternative Fuels and raw materials (Industrial waste and MSW) without compromising cement quality, environment and OH&S.

Process Description

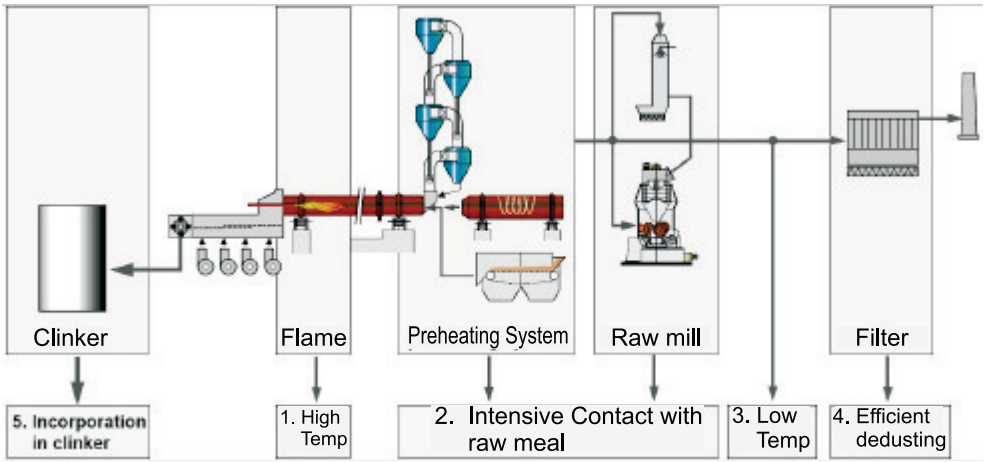
Madukkarai Cement works uses waste from textile, rejected shampoos, rejected face powder, plastic.

Received Waste materials are stored in storage shed. Dump hopper is provided near storage shed. Waste material is fed to dump hopper by means of dozer. Waste fuel is extracted from dump hopper and is transported Precalciner with help of belt conveyor. Waste fuel is fired in kiln riser duct also.

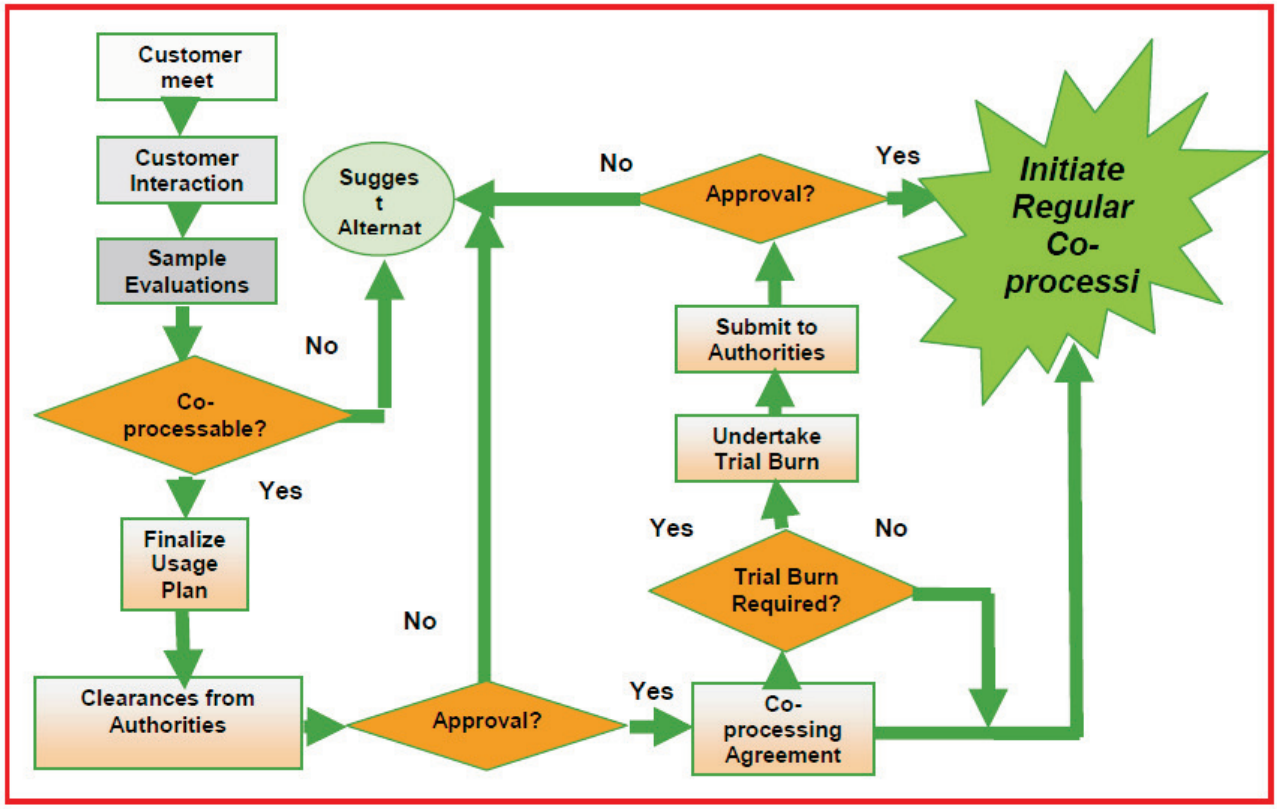
Some of proactive practices and procedures followed at Madukkarai Works for co-processing of Industrial Wastes are summarized below

- Minimal emissions from AFR are ensured by strictly observing the some principles., which are distilled from Holcim's two decades of experience.
- No Industrial Wastes will be fed via the "cold end" (raw mill or kiln feed) of the kiln system where the temperatures are not adequate for destruction. The concentration of volatile Heavy Metals (Hg, Tl, Cd) and input of other heavy metals are limited in the AFR by determining the adequate feed rates by Fuel Mix Optimizer model
- The negative impacts of co-processing the Industrial Wastes in kiln on clinker, cement and concrete quality are checked by:

  1. Carefully watching and counteracting if the sulphurization degree in clinker becomes too low by an increased sulfur volatilization
  2. Strictly limiting the input of water of each AFR to avoid production loss
  3. Strictly observing the limits for kiln feed fineness to avoid a degradation of clinker burnability and clinker variability
  4. Avoiding reducing conditions in the kiln, by feeding the Industrial Wastes in calciner where the velocity of hot gases is high. This ensures that the waste is destroyed due to greater turbulence and higher residence time in the calciner
  5. Strictly limiting the input of some critical minor elements such as P2O5 which affects the setting time of cement



The following procedures are followed prior to acceptance of the Industrial Wastes from WASTE GENERATORS:



Waste Profile Details:

Contamination (with water, dirt, other materials) in the material is risk from the Industrial Wastes. Precautions for handling and storage including required personnel protective equipment and requirement for transportation were understood and the MSDS are being provided to ACC by the waste generators.

AFR Technical Assessment:

Thermal characteristics of the kiln system is assessed and the point of feeding of the Industrial Wastes in the kiln system was established. Process sulfur/alkali/ chloride balance is within the allowed range for stable cement kiln operation. The AFR technical assessment helps in averting production loss, quality problems and additional emissions from the kiln stack. AFR technical assessments done in the past in other ACC cement works has shown that 20-25% (or higher) of the total thermal requirement in the plant may be met by feeding the Industrial Wastes and other wastes in the form of solids and foils in the calciner, where the feeding system for feeding the waste is installed.

Baseline Emission Monitoring:

The annual baseline emission monitoring of the kiln stack at kiln was conducted when no waste or AFR materials are used. It will form the basis for assessing the incremental emissions from co-processing wastes in the subsequent years. Emission parameters that were measured in this exercise are dust, SO_2, HCl, NH_3, H_2O, CO, O_2, Benzene, Mercury, Heavy Metals (Sb, As, Cd, Cr, Co, Cu, Pb, Mn, Ni, Tl, V); Dioxins / Furans (PCDD / PCDF) and Total Organic Compounds.

Issues faced during implementation of this Project

- Delay in obtaining Co-processing permits from Pollution Control Board for regular Co-processing of Industrial waste
- Delay in allotment of land from Municipal Corporation to establish the one and only kind pre-processing platform
- Investment for set up of system for handling and storage
- Process issues while the usage of Waste

Results of the Project

- Co-processing of waste at cement kiln is the best disposal option than conventional options of land filling and incineration.
- Substitutes fossil fuel

Replication Potential

Replication of Similar project is possible in several Cement/steel/Power plants, where there is high use of energy.

Recommendation to other units

It is recommended to co-process the waste in cement rotary Kiln.

Contact Information of the plant

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