JKCement

JK Cement Works Muddapur

Great Place To Work. Certified

CII National Award for Environmental Best Practices 2021

Presented by
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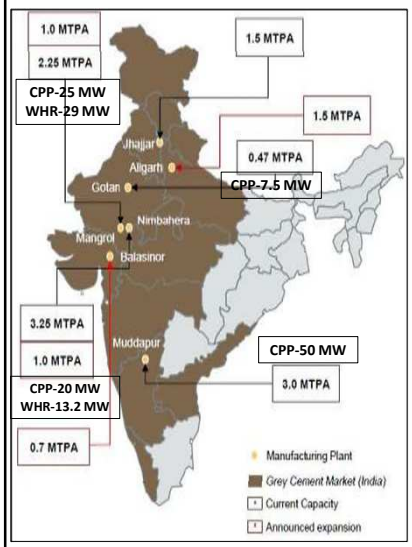
ABOUT JK CEMENT LIMITED



A leading cement manufacturer in the country, JK Cement Ltd is an affiliate of the multi-disciplinary industrial conglomerate JK Organization, which was founded by Lala Kamlapat Singhania.

Today, JK Cement has an installed grey cement capacity of 16 MTPA, making it one of the top cement manufacturers in the country.

JK Cement was the first company to install a captive power plant in the year 1987 at Bamania, Rajasthan and the first cement company to install a waste heat recovery power plant to take care of the need of green power.

Today at its different locations, the Company has captive power generation capacity of over 145 MWs which includes 42 MW of waste heat recovery power plants.

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FLY ASH MANAGEMENT IN CPP & REDUCTION IN FOSSIL FUEL CONSUMPTION

Brief Description:

- Three types of ash generation viz. Bed ash, Dry fly ash (fine) and Dry fly ash (coarse).
- LOI in the range of 0.5 to 15 %.
- During Indonesian coal firing, LOI is observed as below:
  1. Bed Ash – 0.5 to 0.6 %
  2. **Dry Fly Ash (Fine) – 5 to 6 %**
  3. Dry Fly Ash (Coarse) – 7 to 15 %
- **Our target is 100 % dry fly ash utilization**.
- Dry fly ash (fine) was only been able to use.
- Dry fly ash (coarse) was not able to use in cement manufacturing due to high LOI 7 to 15 %.
- ESP section fine ash LOI 5 to 6 %.
- Both Economizer (ECO) & Air Pre Heater (APH) section coarse ash LOI 7 to 15 %.
- Several brain storming experiment / trail were conducted to meet out the target.

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TRIGGER OF THE PROJECT

- Dry fly ash is directly mixed-up with final product of cement with certain ratio.
- Improves workability, durability, cohesiveness and ultimate strength.
- Part of fly ash (High LOI) was not able to use in cement manufacturing.
- High LOI in ash causing lower efficiency of boiler and high fossil fuel consumption.
- Initiatives are pride to manufacture the green cement and healthy atmosphere.
- Improved CPP Fly ash Quality increases reactive SiO_2 content with higher fineness.
- By Improved Fly ash, Clinker Factor got reduced and resulted into CO_2 reduction.

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CHALLENGES FACED & BRIEF ON COUNTERING

- Fly ash (coarse) with high LOI (7 to 15 %) was unable to use in Cement plant.
- Ash composition parameters and data collection carried out in all ash collection hoppers like Bed ash, ECO & APH and ESP fields.
- Data collection in various load pattern and tabulated for ease study.
- **ESP section fine ash LOI is 5 to 6 %.**
- **Both ECO & APH section coarse ash LOI is 7 to 15 %.**
- Separate Study carried out in these two ash collection points and analyzed.
- **ECO section ash LOI 5 to 7 % with less fine particles.**
- **APH section ash LOI 7 to 15 % with more coarse particles.**

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CHALLENGES FACED & BRIEF ON COUNTERING

- ESP fields ash is being transported towards Silo 1.
- ECO & APH ash was being transported thro' common conveying line towards Silo 2.
- **Decided to merge ECO section ash along with ESP fields' ash at silo 1.**
- Fine fly ash Quantity increased.
- APH Section coarse ash was diverted/re-circulated into furnace.
- APH section ash conveying system was modified to recirculate the coarse ash.
- Various trials and experiments were carried out.
- Finally, started to get low LOI ash in regular basis irrespective of plant load.
- Regularly shifting to cement plant through bulker for PPC manufacturing.
- Ash dumping is totally been avoided.

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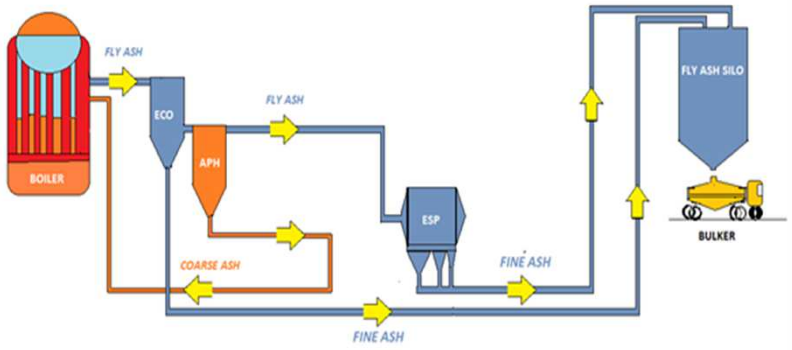
SCHEMATIC DIAGRAM

RECIRCULATION OF APH COARSE ASH BACK TO BOILER



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TANGIBLE BENEFITS - COAL

Project Cost (in Lakhs)	Tangible Benefits	Savings (in UOM)	Saving (INR Lakhs)	Pay Back (Years)
2,00,000 (MS piping)	Savings of Coal	2 MT/Day	21 Lacs PA	One Month

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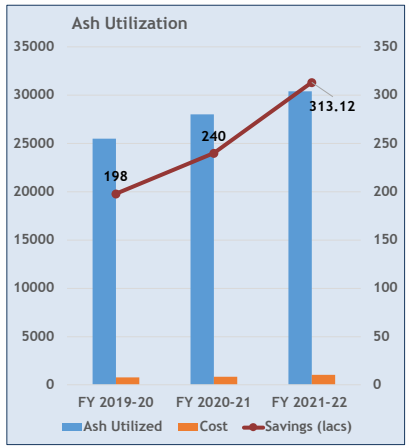
TANGIBLE BENEFITS – DRY FLY ASH (FINE)

Particulars	Ash Utilized	Cost	Savings (lacs)
FY 2019-20	25500	776	198
FY 2020-21	28000	863	240
FY 2021-22 (Qtr 1)	7600	1030	80
Predicted Ash utilization for this FY at current rate			
FY 2021-22	30400	1030	313.12



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INTANGIBLE BENEFITS

- Save Natural Resources.
- Utilization of land fillings
- Reducing wet fly ash generation is leading to water positive and maintaining clean environment.
- Organised methodology of ash management is applied in scientific manner.
- Better understanding of all the environmental aspects
- More ash management system improved.
- Team knowledge and capability enhancement.

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REPLICATION POTENTIAL OF PROJECT WITHIN SECTOR

- APH Section coarse ash was diverted/re-fed into boiler furnace thro' available peephole opening (**just above fluidization bed**) by modified ash conveying system.
- Various trials and experiments were carried out, finally started to get low LOI ash on regular basis irrespective of plant load and shifting to cement plant through bulker for PPC manufacturing and ash dumping is totally been avoided.
- After installation in our JK Cement, Muddapur (Karnataka) Unit, same project has been implemented in our unit like JK Cement Works, Nimbahera (Rajasthan) and getting results successfully.

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ACHIEVING NATIONAL BENCHMARKS / STANDARDS

Parameters	UOM	IS NORMS (IS 3812)	CPP FLY ASH
LOI	%	5 (Max)	4.5-5.0
SiO2	%	35 (Min)	56-62
SO3	%	3 (Max)	0.2-0.3
LR	N/mm2	4.5 (Min)	6.5
Na2O	%	1.5 (Max)	0.07
Blaine	M2/kg	320 (Min)	340
Chloride	%	0.05 (Max)	0.004

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PLANNING & RESOURCES

ECO, APH & ESP Ash Samples Data Collection & analysis.

Decision on segregation of ECO & APH ash .

ECO ash to be conveyed to SILO
APH ash to be taken into boiler as recirculation

Independent MS Piping system laid from APH ash hopper to Boiler as recirculation.

The whole modification work was carried out by in-house team.

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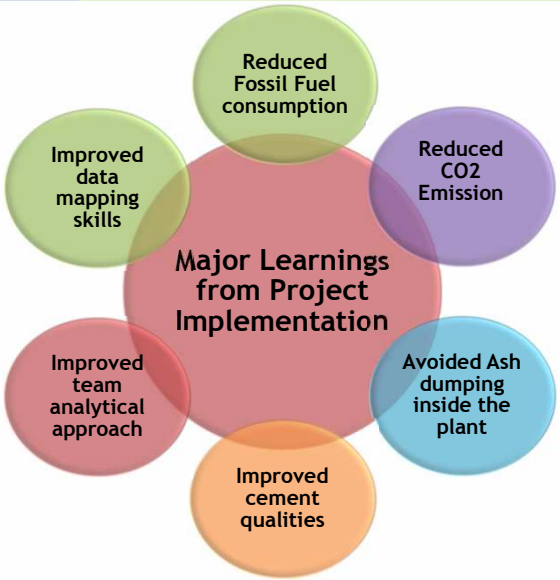

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ENVIRONMENTAL PERFORMANCE EVALUATION

- **Dry Fly ash (coarse) around 2500 MT per year** was being drained from SILO and dumped as wet pond ash at back yard.
- The ash was been fed into boiler by mixing with coal after dried out.
- Other resources like vehicle, manpower, fuel, water and land was been used.

- After implementation of the ash re-feeding system into boiler furnace, the following benefits achieved:
  1) Water required for wet pond ash draining was saved around **1250 M3 per year.**
  2) Dumping area of around **800 M2** was being freed and the same is being used for green development.
  3) The additional utilization of resources like fuel, manpower and vehicles was totally avoided.

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