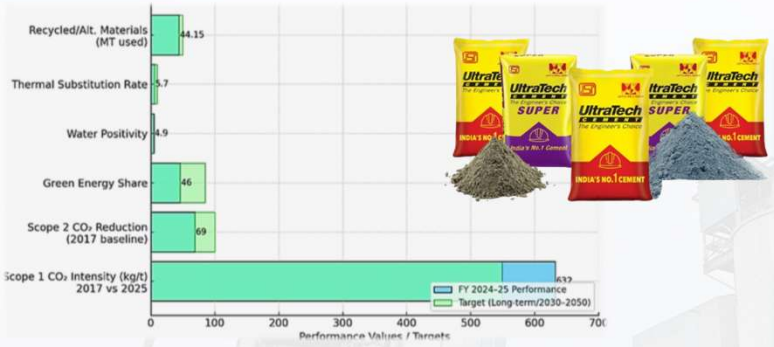
ULTRATECH: DANKUNI CEMENT WORKS

CII NATIONAL AWARD FOR ENVIRONMENTAL BEST PRACTICES 2025



192.26 MTPA

1.0 MTPA Bahrain

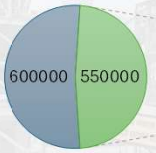
4.4 MTPA UAE

1.5 MTPA Sri Lanka

Scope 1 net CO2 emission (in kgCO2/t cementitious material)

205 NET ZERO

EAST A ZONE VOLUME (Ton)



Proportion of total capacity (Cement)

19.2% North India
18.1% East India
27.5% South India
18.2% West India
17.0% Central India

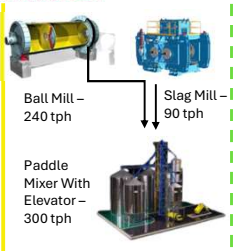
East A Others Dankuni Durgapur SonarBangla Chattisgarh

1

PROJECT TITLE : INCREASING PCC OUTPUT RATE TO IMPROVE THE CLINKER FACTOR

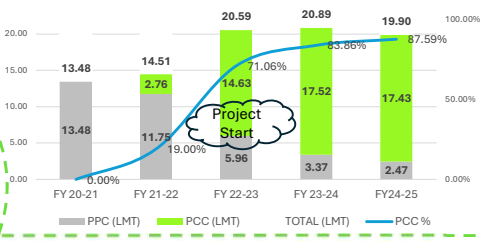
PREFACE:

- Dankuni Cement Works has one Cement Mill with capacity 240 tph. Initially designed for PPC, Slag grinder and Paddle Mixer was installed in FY 2021-22.
- Project was installed to increase the production of PCC in view of reducing the overall clinker consumption on total cement. However, since installation, the Paddle Mixer circuit operated at 250 tph against the capacity of 300 tph due to constraints in the extraction Solid Flow Meter.



TRIGGER: PADDLE MIXER OUTPUT VS CAPACITY – 250 / 300 TPH

Dankuni Cement Works - 5 Years Production and Product Ratios



Capacity enhancement from 1.8 MTPA to 2.4 MTPA. Commissioning of new Slag Mill Capacity 225 tph & Paddle Mixer Capacity 300 tph

Project Execution in FY 24. Improvement in PCC out put rate. Product Mix of PCC:PPC achieved for FY 24 is 84:16.

2015 — Dankuni Cement Works Commissioning of new Cement Mill (Make KHD). Installation Capacity 225 tph

2021 — Operation Stabilization of Slag Mill and Paddle Mixer. Product Mix of PCC:PPC achieved for FY 23 is 71:29. Bottle Necks identification and Project Inception

2023 — Improvement in Product Mix of PCC:PPC in FY 25 to 88:12. High LOI Fly ash waste Utilization in total Cement Fly ash.

2024

2025

2

PROJECT IMPLEMENTATION: GAP ANALYSIS AND MODIFICATION

ADITYA BIRLA GROUP

UltraTech Cement — The Engineer's Choice — INDIA'S NO.1 CEMENT

Problem Statement – Constraint in out put increase of Paddle Mixer

Why 1 – Feed variation while increasing the tph and frequent factor adjustment at SFM.

Why 2 – Material flow irregularity and retention in the Intermediate Silo bin.

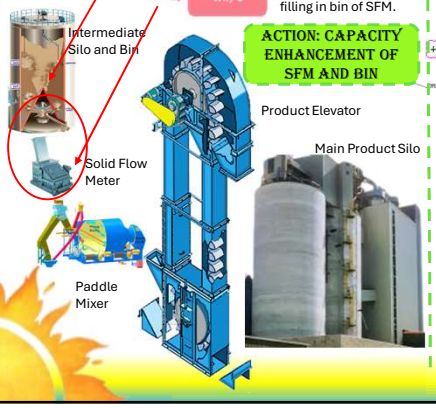
Why 3 – Insufficient bin capacity against the extraction rate.

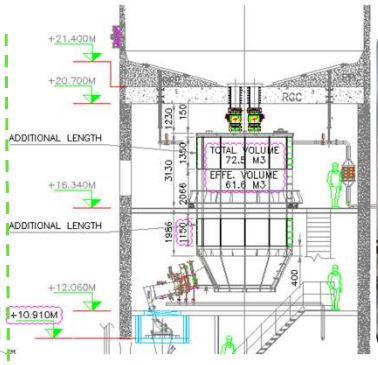
Why 4 – Insufficient and limited capacity of SFM.

Why 5 – Limitation in material filling in bin of SFM.

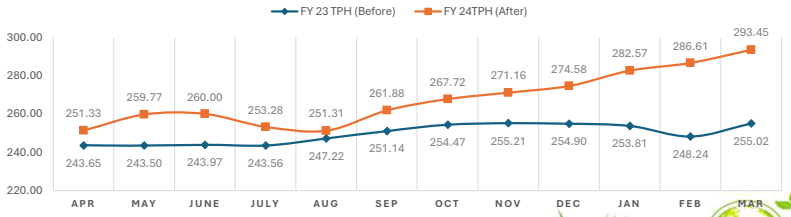
Why Why Analysis

ACTION: CAPACITY ENHANCEMENT OF SFM AND BIN





PCC TPH BEFORE VS AFTER MODIFICATION



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PROJECT IMPROVEMENT: WASTE TO RESOURCE – HIGH LOI FLY ASH USAGE

ADITYA BIRLA GROUP

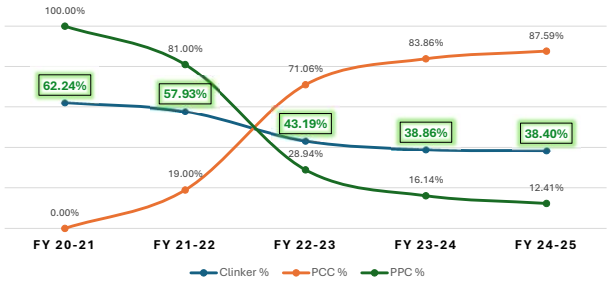
UltraTech Cement — The Engineer's Choice — INDIA'S NO.1 CEMENT

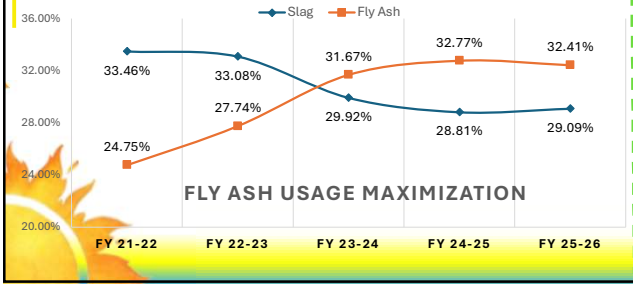
Waste – To – Resource an approach of Sustainable Circularity. Fly ash constitutes of 33.14 % on the total cement produced at Dankuni Cement Works.

Grasim Industries unit—Jaya Shree Textiles engaged in producing Wool and Fabrics is located at Rishra, District Hooghly is 15 Kms from Dankuni Cement Works. Unit has 2 Coal fired boilers and waste of Flax and boiler ash is generated daily with an approximate quantity of 30 MT.

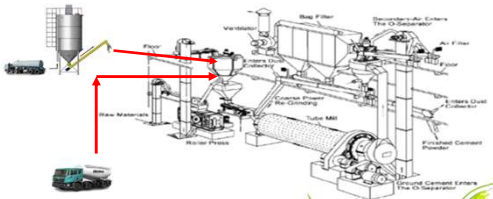
For Jaya Shree Textiles Flax and Boiler ash is a waste and unit must take authorization for disposing this waste in a friendly manner.

Improvement in Clinker Factor through increase Product Ratio





Dedicated Unloading point



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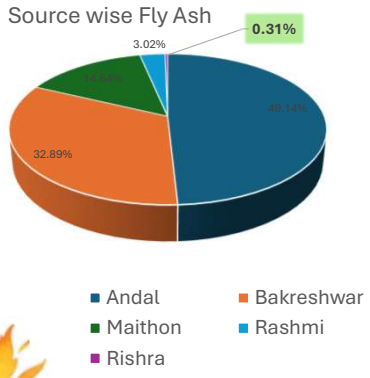
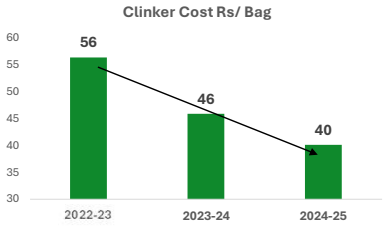
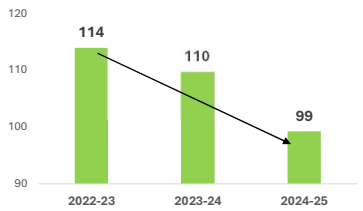
TANGIBLE BENEFITS

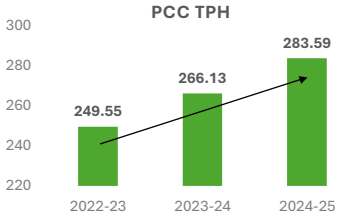
- ✓ Out of total Fly ash around 0.31% (2079 Mt) consumed from Rishra.
- ✓ Annual cost savings of Rs. 9Lacs achieved .

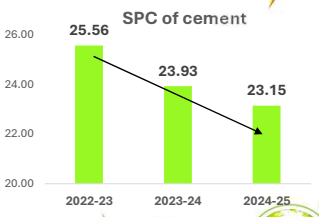






- ✓ Rs. 15 / bag reduction as Clinker consumption reduced from 43.19 % to 38.40 % and Fly ash consumption increased from 27.74% to 32.77%.
- ✓ 2.43 units reduction in PCC specific power consumption due to increase of 34 tph from FY 23 to FY 25.





5

INTANGIBLE BENEFITS

PEOPLE AND SOCIETY:

- ✓ Provided a productive use of waste material, reducing the need for disposal and potential environmental harm for waste management solution for Rishra Unit.
- ✓ With reduction in clinker consumption, Dankuni Cement Works carbon emissions reduced from 27.23 Kg CO2/ ton of CM (FY 22) to 14.24 Kg CO2/ ton of CM (FY 24)

SKILL UPGRADATION:

- ✓ GAP analysis and rectification ability of team enhanced through use of RCFA, Why – Why and other Lean tools.
- ✓ Seamlessness among the cross functional team increased.

MORAL / MOTIVATION:

- ✓ Modification of bin carried out in a constraint space scenario. Increased tph upscaled the team morale.
- ✓ Innovation and adaptability towards waste minimization improved.

AVAILABILITY:

- ✓ Maintenance availability of Paddle mixer circuit improved.

6

CHALLENGES AND MITIGATION DURING IMPLEMENTATION

PCC PRODUCTION RATE ENHANCEMENT:

Layout Constraint:

To improve the material retention and flowability through SFM post SFM modification, effective volume of bin was required to be increased from 50 m3 to 75 m3.

Mitigation:

With available space utilization, we increased the bin length towards top portion by 1350 mm, increasing the total volume to 71.5 m3.

Manpower Skill and Safety Concerns:

Mitigation: Mixed deployment of highly skilled manpower along with dedicated supervisors and safety stewards was ensured for Zero Harm achievement.

WASTE TO RESOURCE – WASTE FLY ASH UTILIZATION:

Quality of Fly Ash from Rishra Unit:

The ash was generated from 2 Coal fired boilers and waste of Flax and boiler.

The residue, lime reactivity and IR of this fly ash is in range of 45%, 4.6 MPa and 83 respectively and is in range of requirement.

However, the Blaine was high, 520 and colour index was low 18.7.

Mitigation: We have 4 unloading points, 2 directly to mill bins and 2 to Fly ash silos. To normalize the overall fly ash quality in view of complying to Blaine and colour index, one dedicated point has been allotted at fly ash silo so that the extract is having the homogeneous quality.

7

BEST PRACTICES IMPLEMENTED DURING THE EXECUTION OF PROJECT

PCC elevator draft controller:

It was anticipated that boot draft will move towards positive side. To avoid frequent tripping of Bucket elevator, interlocking system was introduced which reduces the feed while the boot draft was high and subsequently increased the feed again when draft becomes normal.

PCC grinding from Line 1:

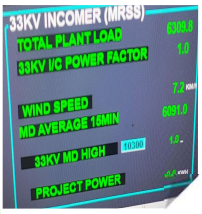
To avoid stopping of paddle mixer during Silo sufficient scenario due to increase in PCC tph, at Line 1 cement mill, the composition of the shell liners improved from %C: 1.0, %CR: 10 with hardness – 48 HRC to %C: 2.0, %CR: 22 with hardness – 53 HRC to utilize the idle time of PPC for grinding more PCC.

Radiation Loss control in the HAG:

During Annual shutdown, Aluminium Painting at HAG and duct was done to reduce radiation and conventional losses. At many areas where the refractory deterioration was observed, surface was repaired with new MS plate and external painting was done which reduced our Fuel consumption.

HAG fuel optimization:

HAG required minimum 4000 GCV coal mix for required heat generation. Initial fuel mix was 100% imported coal which was later improved to 50:50 imported and domestic coal. Further coal fines reject of size less than 10 mm was identified at M/s Bengal Energy which further reduced imported coal mix.



MD Controller:

Plant approved contract demand is 11000 KVA without any surcharge.

We created the 4-stage logic in DCS to control the MD within 10300 KVA.

This helped us maintain the load factor more than 65% by minimum utilization of approved contract demand during the average dispatch seasons.

HAG ash chamber reject usage:

The ash collected from the ash chamber is collected, cooled and is re used in the system in our Slag Mill.

By this means we are re utilizing the bed ash that is generated and avoid disposing the same.

On an average 3 – 5 Tons of ash is generated and same is reused.

8

MAJOR LEARNINGS FROM THE PROJECT OUTCOME

SAFETY

Throughout the project implementation, team ensured zero harm culture and maintained that all the manpower involved in the process followed the UTCL complied safety standards.

INNOVATION

Team continually innovated the processes, brain stormed and analysed the challenges using lean tools for adopting the digital solutions.

Being a premium quality cement supplier, at Ultratech we follow stringent agreed quality norms and adhere the same while implementing any modification in raw material iterations.

QUALITY

Challenges are pursued as opportunities and all the team members stretched to an extra mile for the accomplishment of the output to align with 2050 Net zero goal.

LEAVING COMFORT ZONE

9

"WE ARE THE FIRST GENERATION TO FEEL THE EFFECT OF CLIMATE CHANGE AND THE LAST GENERATION WHO CAN DO SOMETHING ABOUT IT"

thank you

10