

Ultratech Cement Limited Unit: Rawan Cement Works



Welcome to CII 45th National KAIZEN Competition

Category : Renovative

KaizenUtilization of Waste Heat in TPP fromTitle•WHRS AQC-1 Boiler.



Slides to Share





COMPANY PROFILE – At a Glance



The Engineer's Choice



<u>UltraTech Cement Ltd</u>

Our Vision : "To be the Leader in Building Solution." Our Mission : "To deliver superior to stockholder on the four pillars of Sustainability, Customer Centricity, Innovation, Team Empowerment."

- UTCL : A part of ABG which is the best employer in India and Asia Pacific region.
- The Company has a consolidated capacity of 116.8 million tonnes per annum (MTPA) of grey cement.
- The Company has 22 Integrated Manufacturing Units, 27 Grinding Units, 01 Clinkerisation Unit, 07 Bulk Packaging Terminals
- Certified with ISO 9001, 14001, OHSAS 18001, ISO 27001, SA8000 standards & Excellence in Energy Efficient.

Integrity

Commitment

Passion

Seamlessness



UNIT PROFILE : RWCW TPP



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Power Source	Unit	Equipment	Make	Capacity	Year of Inst.	
TPP - 55MW	TPP-1	Boiler	Thermax B & H	115 TPH	2009	
		Turbine	HTC - China	25 MW	2000	
<image/>	TPP-2	Boiler	Thermax B & W	135 TPH	0044	
		Turbine	HTC - China	30MW	2014	
		Boiler	Hangzhou Boiler – China	HP Steam – 104.2 TPH LP Steam - 30.8 TPH	2015	
		Turbine	Triveni Steam Turbine	20.4 MW		
Solar - 10.8MW	Solar	Solar (Own)	TATA BP Solar	0.8 MW	2012	
		Solar (Purchased)	ZNSHINE SOLAR - 9622	10 MW	2019	
Integrity	Com	mitment	Passion Sea	mlessness	Speed	



Implementation Team





Speed



Sr. No.	Members Name	Remark	
1.	Shriprakash Gupta	Coach	
2.	Antony Anand Divyan	Leader	
3.	Sunil Kumar Verma	Member	
4.	Parag Ambilkar	Member	
5.	Raghvendra Mishra	Member	

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TPP Process Flow



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Why This Kaizen?



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Purpose:

One of the Major Contributing factor in Clinker Cost was Power Cost which constitutes about 10% of Total clinker cost.

One of the Major Contribution in TPP Power Cost was Heat Rate.

Why This KAIZEN:

1. Turbine 4th Extraction steam line circuit was used for preheating of Condensate water through LP Heater.

2. Extraction Steam (9 TPH) was used to maintain Deaerator temperature of 160°C.

3. Specific Steam consumption of Turbine was 4.35 Kg/Kwh and Heat Rate i.e. 3045 Kcal/Kwh @100% PLF.





Speed

Consequences :

High TPP Power Cost.

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Earlier System - TPP

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Impact Of Problem



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Theme Selection - Problem Solving Tools

Build beautiful

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Fish Bone Analysis



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Why Why Tree Analysis

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Development of Kaizen

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Development of Solution

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PDCA CYCLE APPROACH

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PLAN

Plan to Utilize WHRS AQC-1 Boiler outlet Flue gas to preheat Condensate.

DO

Engineering, Material Procurement, Erection & Commissioning of Project

ACT Continuous Monitoring

done and feedback was taken to sustain. SOP developed, Taken in Interlocks for CPH operation.

CHECK

After Successful Implementation Collection of Process Data for Performance Evaluation

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Seamlessness

New Coil Module of Heating Surface area 2225.1 m2 is

Boiler outlet path.

Mapping of Energy

at WHRS AQC-1 **Boiler outlet Flue** Gas & Heat and Mass Balance.

introduced in

WHRS AQC-1

Development of Solution - 4

Speed

Achieve

Target

JitraTech

Provision of isolation valves at both ends for smooth operation.

Provided a

dedicated

to TPP LP Heater.

200 NB line from WHRS AQC-1 boiler 5

Option provided for both TPPs and heat will be utilized either TPP 1 or 2.

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3

Passion

Waste Heat Recovery System

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Seamlessness

Build

beautiful

Speed

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Existing AQC-1 Boiler Internal

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Passion

Seamlessness

Speed

Build

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The Engineer's Choic

Modified AQC-1 Boiler Internal

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CPH Erection Visuals

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Seamlessness

New System - TPP

Integrity

Speed

- 1. Temperature gain in condensate water : 55°C (Inlet temp : 60°C & outlet temp : 115°C).
- 2. Turbine Sp. Steam consumption reduction: 0.07 Kg/Kwh (4.35Kg/kwh to 4.28 kg/kwh).
- 3. Total Plant Heat rate reduction : 45 kcal/kwh.
- 4. Plant Auxiliary Power Consumption reduced by 0.1%.

Commitment

Results

Passion

Integrity

Tangible Gains

Tangible Gains

1. Total Plant Heat rate reduction : 45 kcal/kwh and

Achieved Monetary- Saving of Rs 13.8 lacs/month.

- 2. Annual Monetary Saving of Rs 151 Lac/annum.
- 3. Total Investment incurred in Project was 300 Lacs.
- 4. ROI achieved is 2 Years.

Commitment

Passion

Seamlessness

Intangible Gains

Speed

Intangible Gains

1. Reduced CO2 Emission of 2230 Ton/Annum.

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Impact Of Kaizen

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Integrity

The Engineer's Choi

Speed

- 1. Mapping of CPH Process Parameter on daily basis.
- 2. CPH Isolation MOV and AQC-1 WHRS Boiler Isolation MOV taken in Interlocks with Load (Less than 13 MW).
- 3. All Isolation MOVs control taken in TPP for smooth operation.
- 4. SOP Developed to take CPH in circuit. (RWCW/TPP/OPER/SOP/085).

Commitment

5. Training and Awareness program conducted to get familiar with the CPH Process. (Condensate Preheating from WHRS).

Passion

Scope of Replication

Speed

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Way Forward

Speed

Sr. No	Initiative taken	Saving Realised (Kcal/Kwh)	Investment (Lacs)	Target
1.	Reduction of PHR of TPP-1 Turbine by Wet washing of TG-1.	10	0	31.03.2023
2.	TPP-2 Specific steam consumption reduction by utilization of Turbine 2 st Extraction steam instead of PRDS.	12	02	29.04.2023
3.	Performance Improvement of HP Heater by optimization of HP Heater level	05	0	Under Progress

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Speed

We are.....

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