



Performance Improvement and cost reduction using Quality Tools

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ACC Limited

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Venue: Hotel Westin, Pune

- Introduction of Organization
- Performance Journey @ ACC Ltd
 - ✓ Cement manufacturing Process
 - ✓ Need for SPC
 - ✓ Awareness on Quality tools & Methodology
 - ✓ Success stories (Case studies)
 - ✓ Road map for Sustain and improvement
- Way Forward

ACC (ACC Limited) is India's foremost manufacturer of cement and concrete. ACC's operations are spread throughout the country with 17 modern cement factories, more than 55 Ready mix concrete plants, 21 sales offices, and several zonal offices. It has a workforce of about 9,000 persons and a countrywide distribution network of over 10,000 dealers.

➤ **ACC was incorporated on August 1, 1936**, in a historic merger of ten cement companies belonging to four business groups giants like Tatas, Kataus, Killick Nixon and F E Dinshaw groups.

➤ **ACC became Holcim group company in 2005**

➤ **ACC is first among equals**

1947 - First indigenous plant at Chaibasa, Jharkhand

1956 - First with bulk cement distribution at Okhla, Delhi

1961 - First with blended cement using blast furnace slag from TISCO

1978 - First to introduce energy efficient precalcinator technology

1982 - First to commission a 1 MTPA cement plant at Wadi, Karnataka

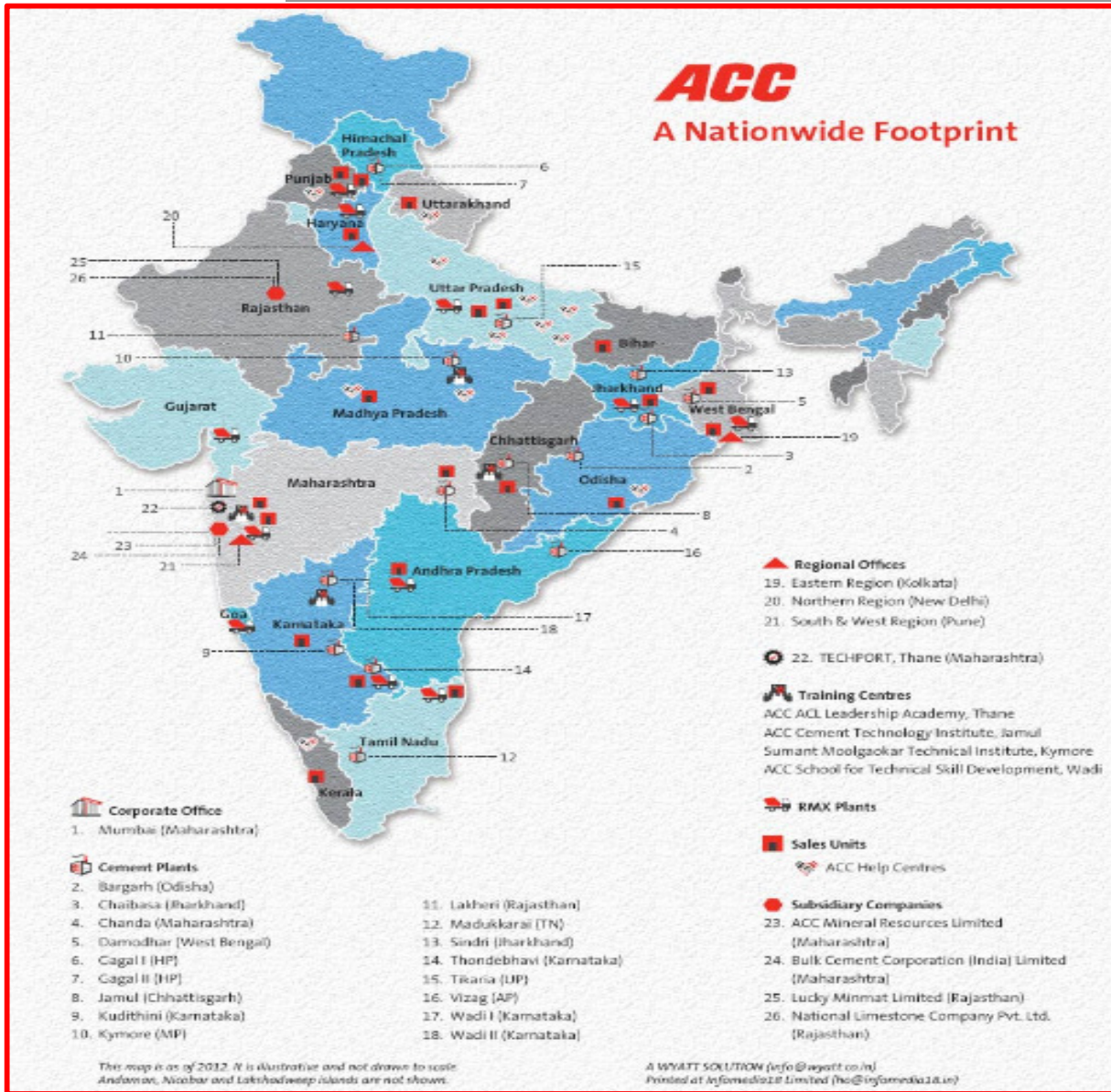
1994 - First to start commercial manufacture of Ready Mixed Concrete

2011 - World's largest cement kiln installed at Wadi Karnataka, with a capacity of over 13000 MT of clinker per day





ACC: Nationwide footprint



➤ Nationwide Plant presence

- 17 cement plants

✓ ACC Cement Capacity: 30.4 MT

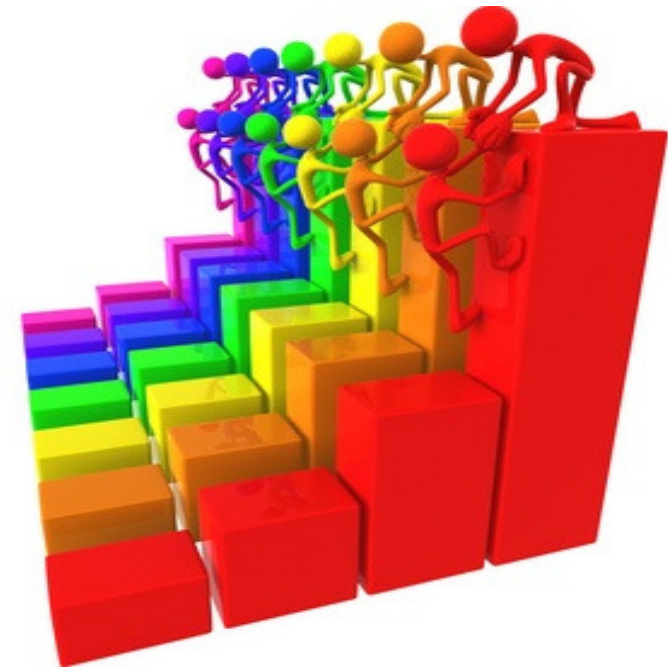
✓ ACC Clinker Capacity: 18.0 MT

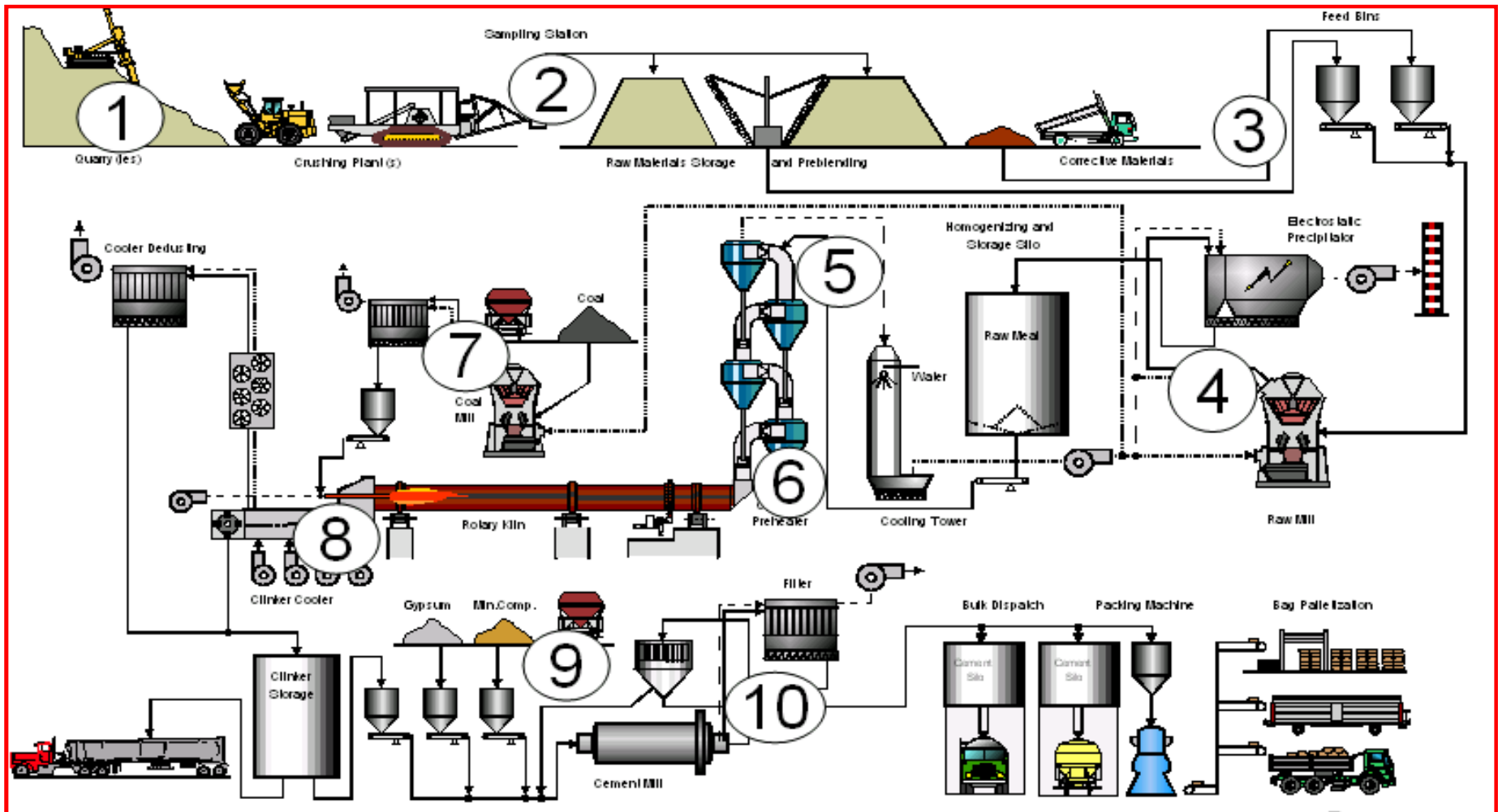
ACC



Performance Improvement Journey through SPC @ ACC Ltd

Quality tools and Systematic Problem solving methodology for achieving Process Excellence at each stage of Cement manufacturing to enhance Core Business & Customer Satisfaction.

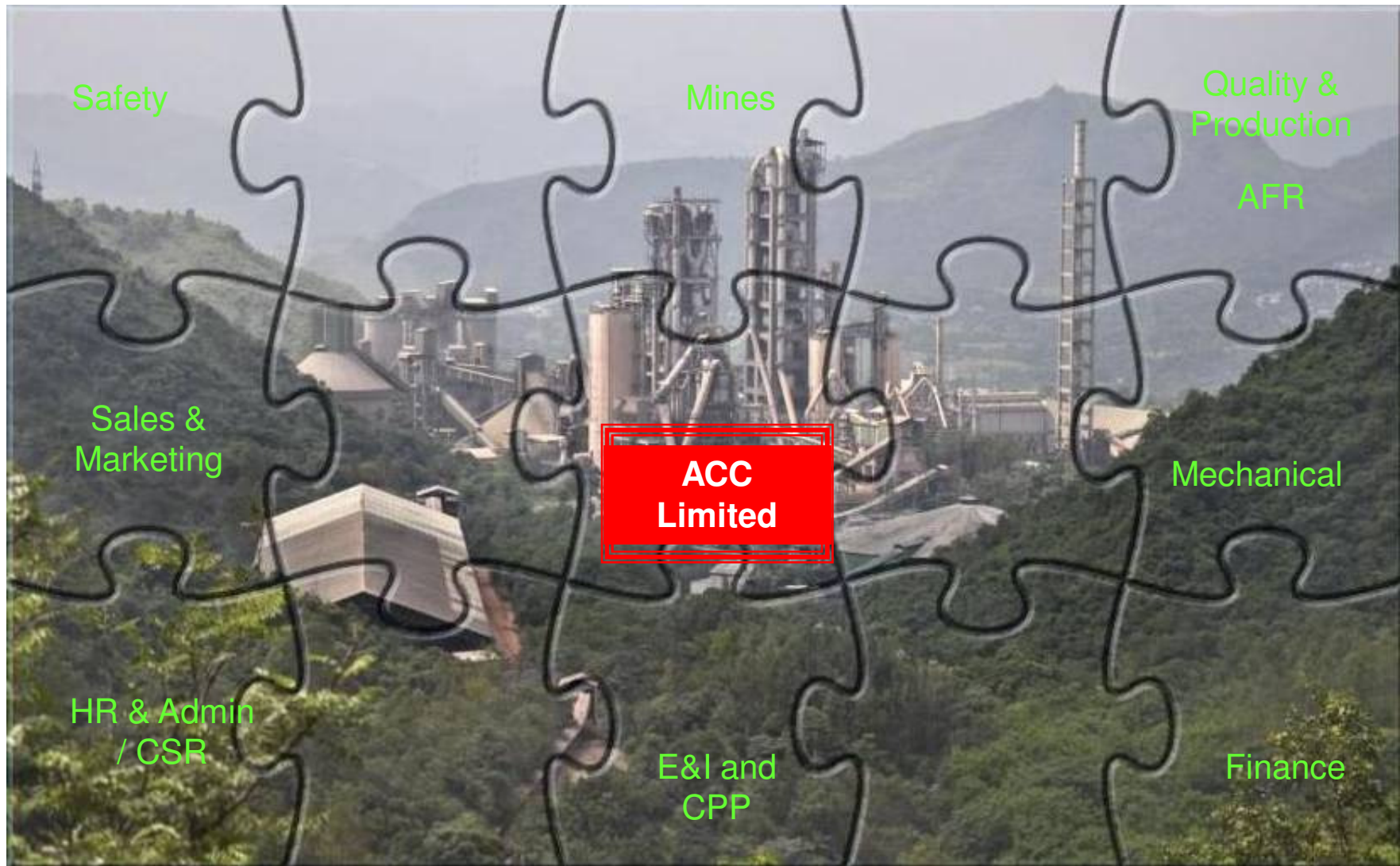




(1) Quarry: Lime Stone extraction, (2) Raw material storage and preblending, (3) Raw Meal feeding system, (4) Raw Meal grinding, (5 to 8) Pyro process for production of Clinker (Feeding system of Kiln feed / Preheater / Coal grinding / Kiln and Cooler), (9) Cement Grinding section (10) Cement packing and Dispatch.



Cross Functional "People Power"



Appraisal Costs

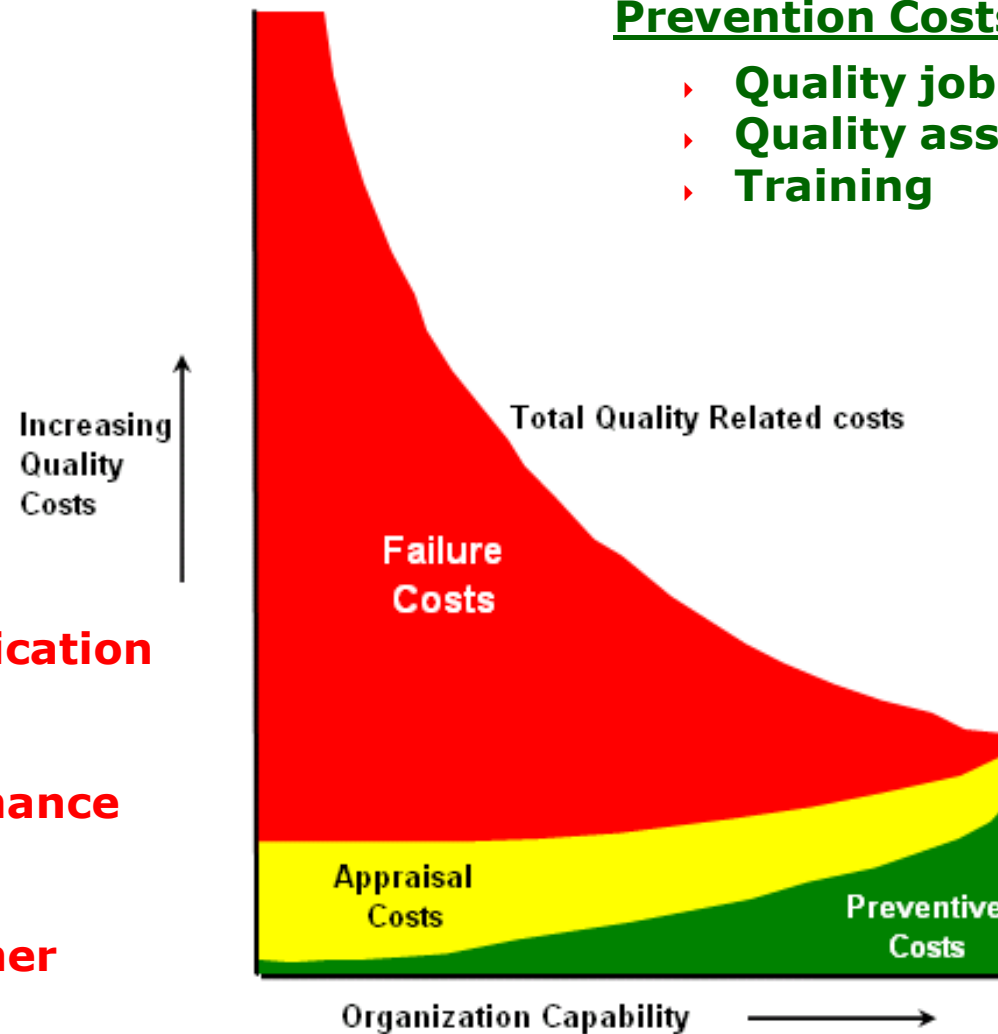
- Verification
- Quality Audits
- Inspection Equipment

Failure Costs

- Rework & rectification
- Re-inspection
- Downgrading of process performance
- Waste
- Failure analysis
- Internal Customer complaints

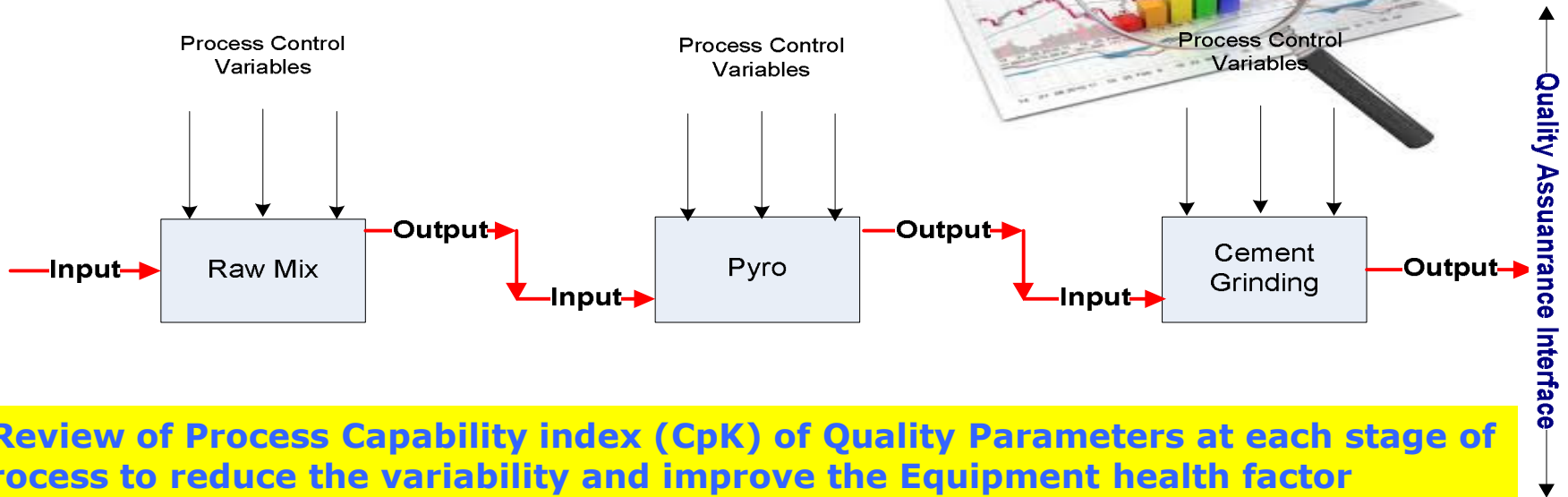
Prevention Costs

- Quality job planning
- Quality assurance
- Training

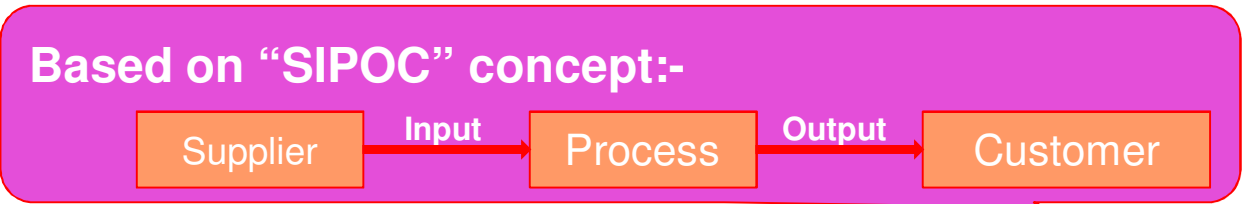


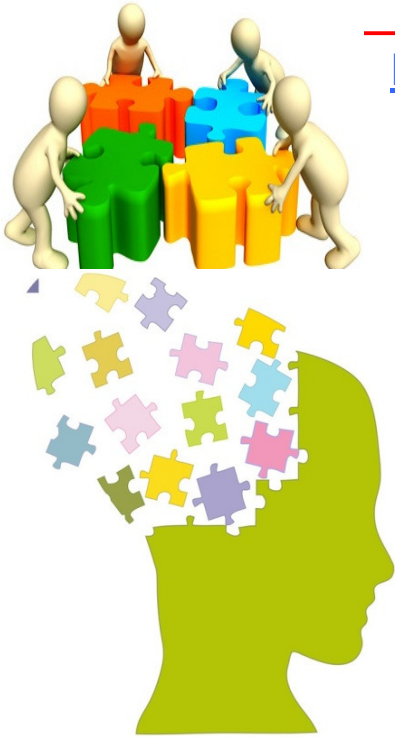


➤ Flow of Process



➤ Review of Process Capability index (CpK) of Quality Parameters at each stage of process to reduce the variability and improve the Equipment health factor



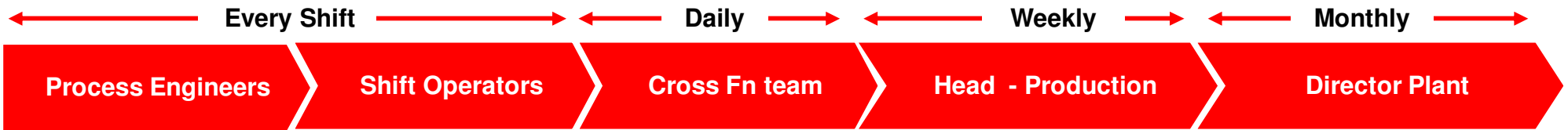


Basic problem solving tools

1. Check Sheet
2. Stratification/
Classification
3. Pareto analysis
4. Cause & effect diagram
5. Histogram
6. Scatter plot
7. Graphs & charts

➤ SPC project methodology

1. Problem Identification
2. Observation
3. Analysis
4. Action
5. Check
6. Standardization
7. Conclusion



Process Engineer to update process control chart. They should discuss variations in control charts with the Operator during the shift and log the corrective action to be taken to eliminate assignable causes

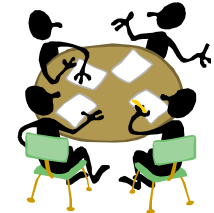


- The process control charts to be displayed in respective control room.
- Analyze the charts with the help of process engineers.
- Handover the charge to the next shift operator explaining him about the variations and corrective action taken.

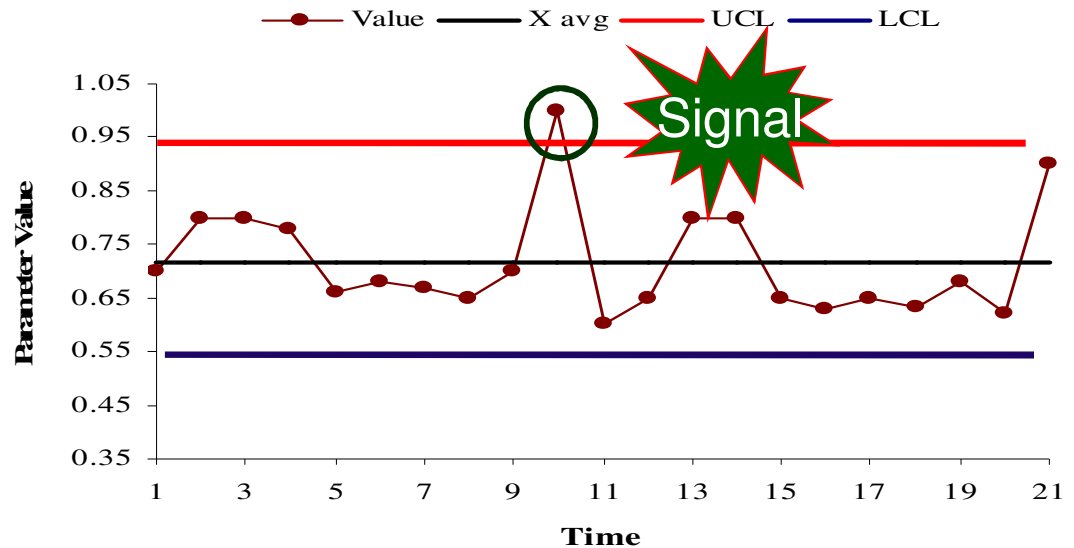


On daily basis review control charts and plan for effective corrective action in the process and equipments.

To hold weekly review meetings with Process engineers and operators and ensure implementation of the action plan. Development of Control plan and Preparation of SOPs.



To review progress on monthly basis with the team and present status in regional monthly review meetings.





Training at Control room by Plant Champions



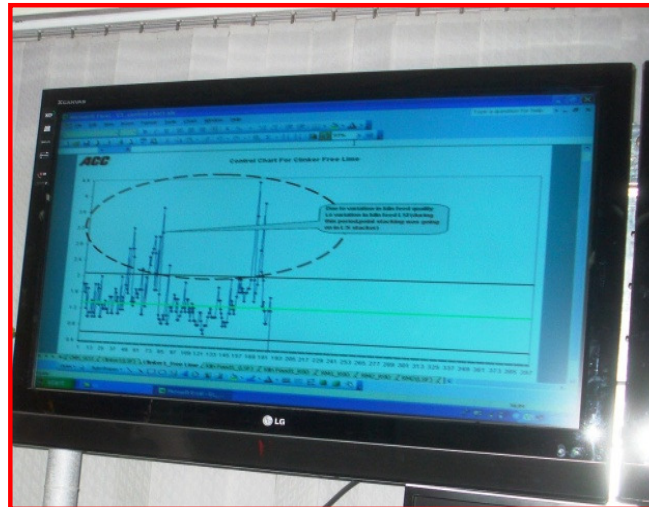
Training to Shop floor associate



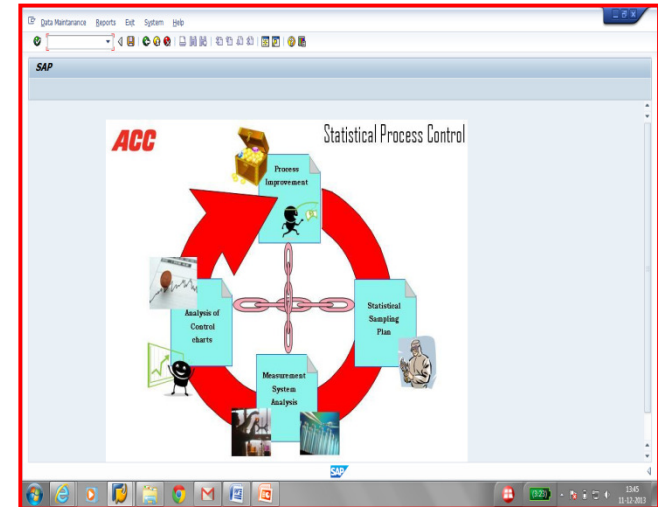
Training and involvement of cross fn team



Review of key parameter with cross fn team



Online display of Quality control tools for review and evaluation.



SPC at SAP system –Quality data base management & review



ACC Cement Mill (GL-1 & GL-2) Performance Board							
Owner of the Board				Date: 21/11/2013			
Gr. Target of the Month: 2,13,733 Tons		Gr. on Date: 99.57%		Grinding Till Date: 18/09/14			
Parameters	Target	On Date	Cumm. for month	Production	Reason for Deviation	IDEA OF THE DAY	
C.MILL-1 (R./HRS.)	93	170	311.35		Clinker hopper empty	1% improvement in clinker consumption	
C.MILL-1 (TPH)	80	79.35	80.71	1247	empty	10% less clinker/ton	
C.MILL-1 POWER (KWH/TON)	37.1						
C.MILL-2 (R./HRS.)	92	150	195.50		Clinker hopper empty		
C.MILL-2 (TPH)	80	68.07	71.05	1030	empty		
C.MILL-2 POWER (KWH/TON)	37.0						
C.MILL-3 (R./HRS.)	81	60	24.5		Planned Stoppage	IMPROVEMENT PLAN	
C.MILL-3 (TPH)	180	170.0	170.3	1000		2% clinker consumption	
C.MILL-3 POWER (KWH/TON)	34.50					10% less clinker/ton	
C.MILL-4 (R./HRS.)	82	88.0	38.5	4188	Power Management	TRAINING DETAILS	
C.MILL-4 (TPH)	200	190.30	191.25				
C.MILL-4 POWER (KWH/TON)	33.5						
C.MILL-5 (R./HRS.)	81	80	328.0	4422	Clinker hopper empty		
C.MILL-5 (TPH)	190	123.60	118.6				
C.MILL-5 POWER (KWH/TON)	33.5						
COST OF CEMENT PRODUCTION /TON				NEARMISS INCIDENT			



Performance Board at job site / department

Daily Performance dialog at job Site

Performance review & sharing with team



Gate meeting at Plant : For awareness of plant performance and recognizing individual or Team by Top management

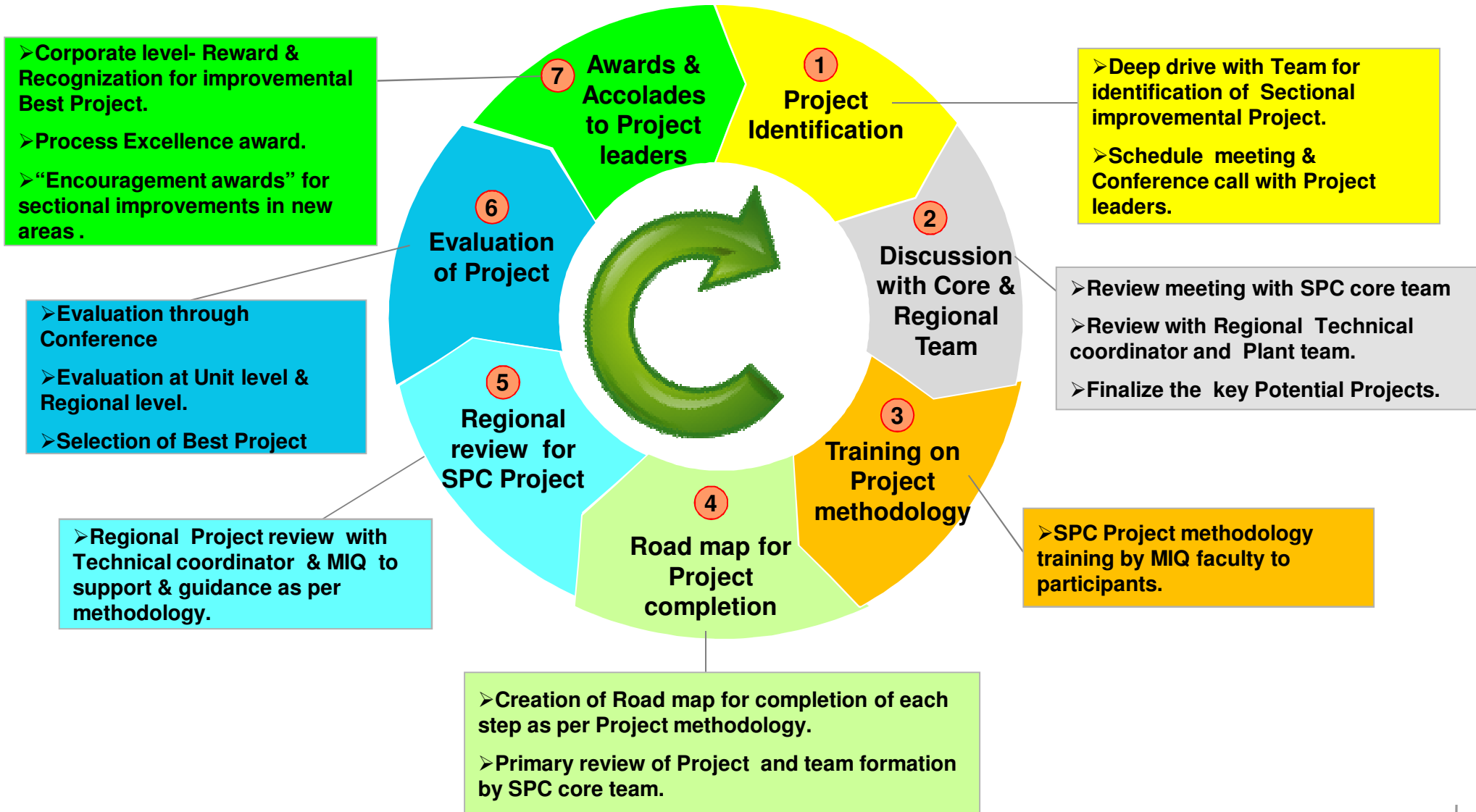


Monthly Reward and Recognition at unit level

- **Project status:- Total 80 development projects for the year 2013**
- **Sectional distribution of Projects:-**

Project'2013	Region- wise			
Section	North	S & W	East	Total
Safety			1	1
Quality	3	3	5	11
Quarry/ Mines	5	2	3	10
Production	5	17	7	31
Energy / Power	2	7	7	16
Packing Section	1		1	2
Lubrication	1		1	2
Sales Unit			3	3
Cost / FICO		2		2
Maintenance/Electrical	1	1	2	4
Total	18	32	30	80





➤ **Completed in Y'2012**

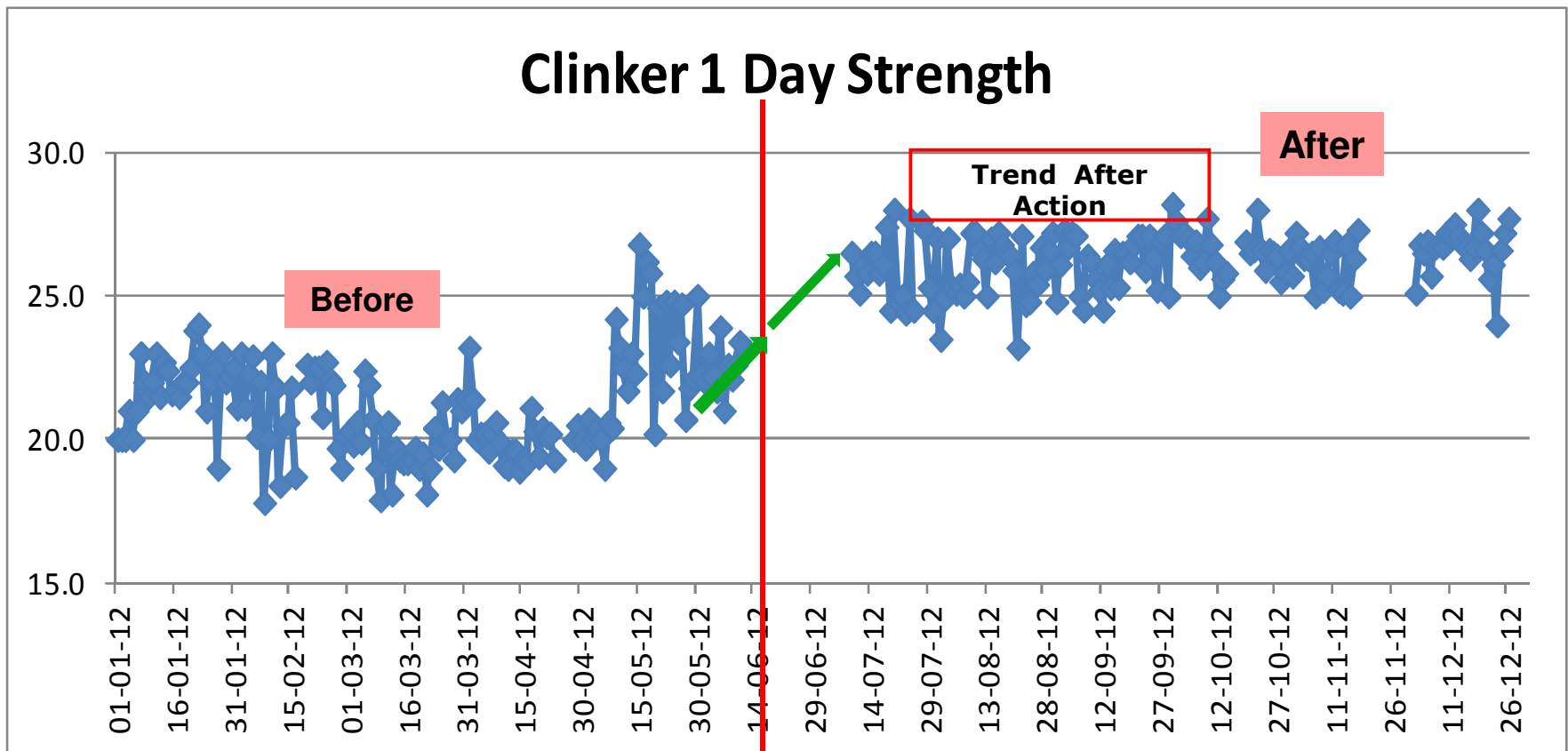
➤ **Project title: To reduce the Clinker factor in Cement grinding.**

✓ **Plant Name : Gagal Cement Works (Himachal Pradesh)**

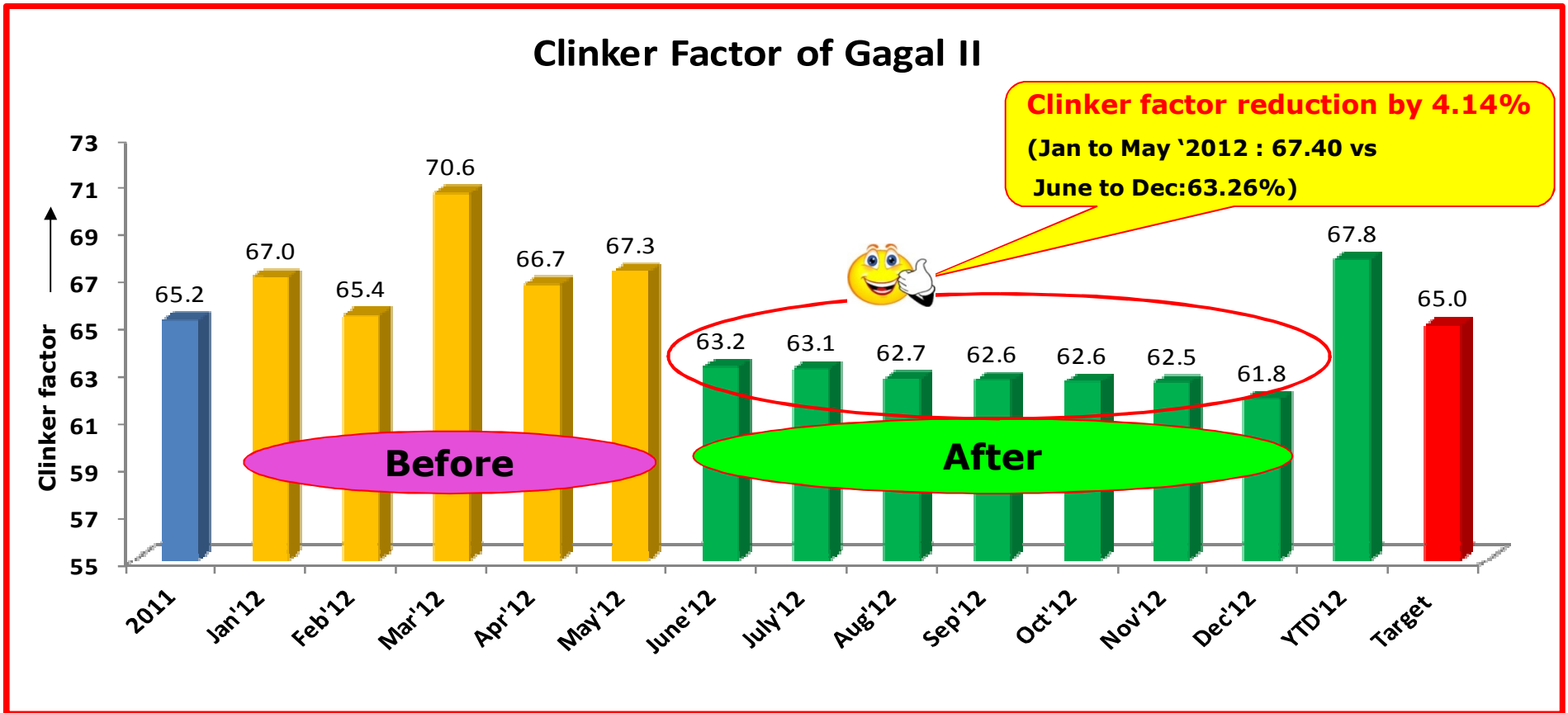
✓ **Systematic approach of Project:-**

- a) Problem solving methodology
- b) Involvement of Cross Function Team
- c) Project time frame (April to Oct'2012)
- d) Focus on Input and Process variation at each stage.
- e) Tracking and continuously monitoring of process and Quality parameter.
- f) Action plan and complete the job accordingly
- g) Verify the results of completed Action point.
- h) Changes in operating philosophy of Cement grinding by SOP
- i) SOP of job and Horizontal deployment in other unit.

➤ Clinker reactivity



As per "Q&PD-Thane" recommendation: Optimization of raw mix design and improvement in Limestone pile formation results into increase the clinker one day strength



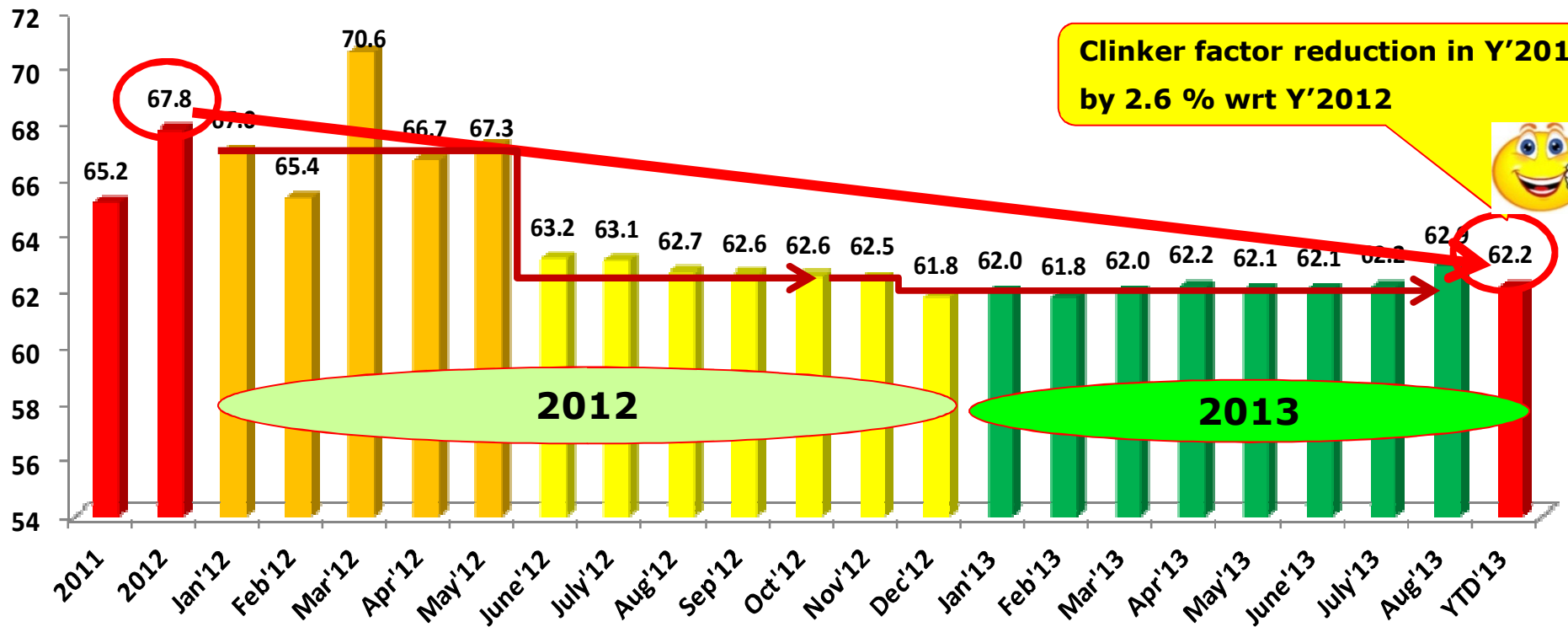
We have reduced the clinker Factor after continuous improvements in Clinker Quality , cement mill circuit, Fly ash feeding system proper maintenance and implementation of initiatives by team.

Project saving on Annual basis: Rs 47 Lakh



➤ Performance sustain and continuously improved in Year'2013

Clinker Factor of Gagal II



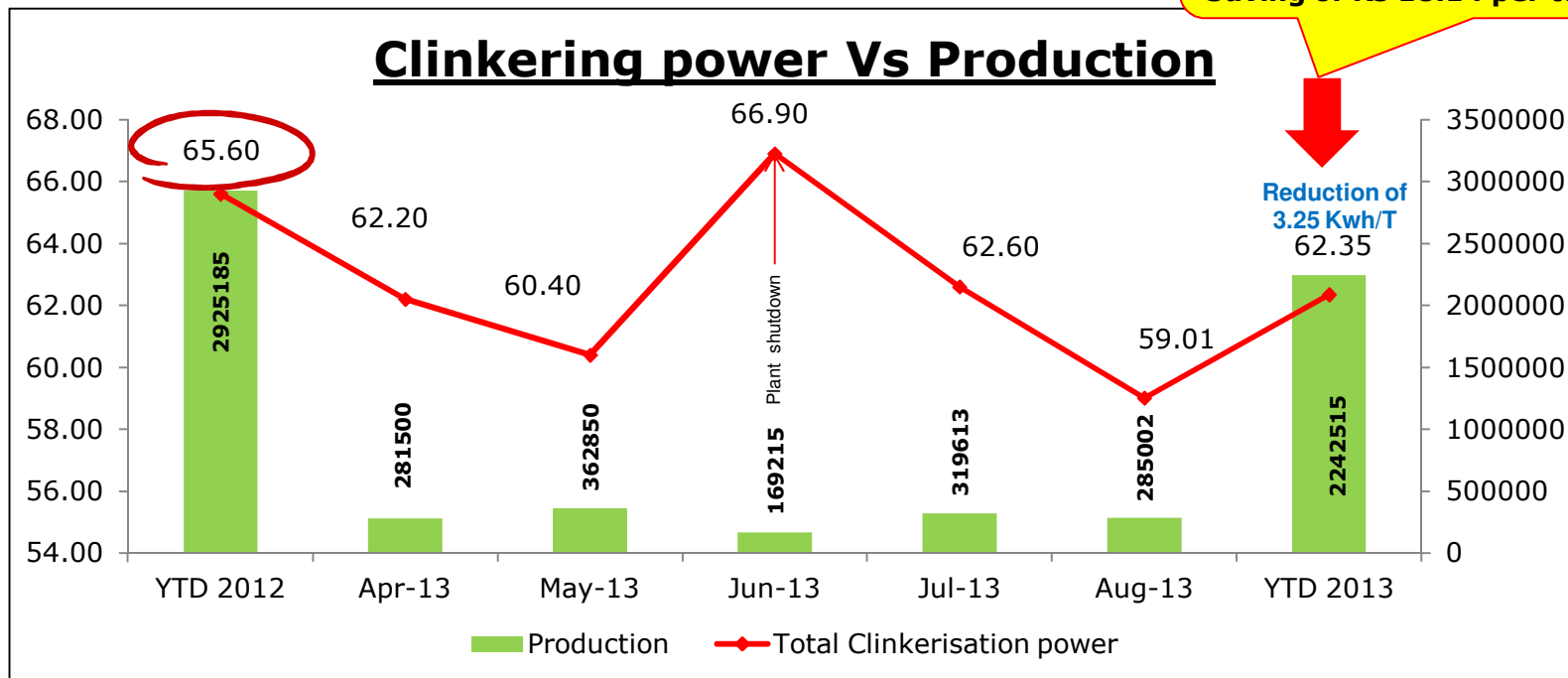
➤ Completed in Year'2013

➤ **Project title:** To reduce the Specification Electrical Energy consumption of Clinkerisation from 65.58 to 62 Kwh/tClk .

✓ **Plant name:** Wadi Cement Works (Karnataka)

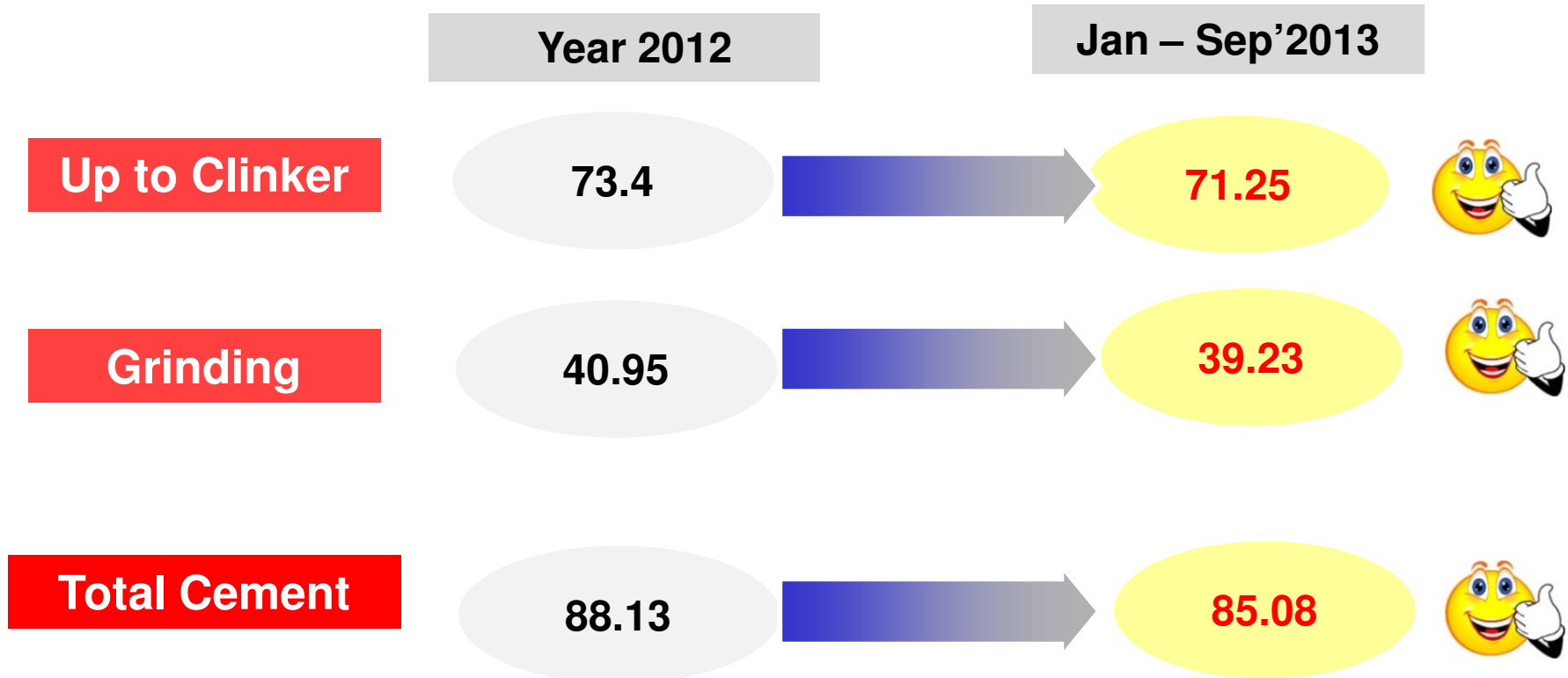
✓ **Electrical Energy of clinkering**

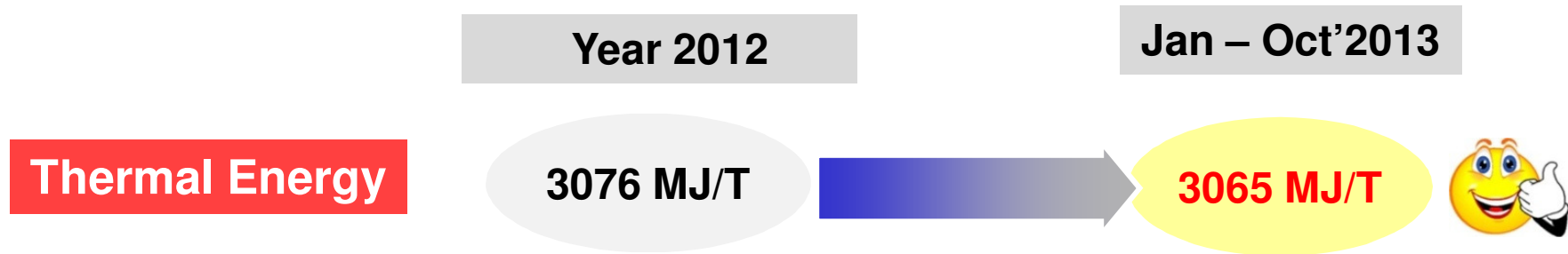
Power reduction by 3.25 Kwh/t.
 (Y'2012 : 65.60 vs Jan to Aug'2013 : 62.35)
 Saving of Rs 18.14 per ton of Clinker.



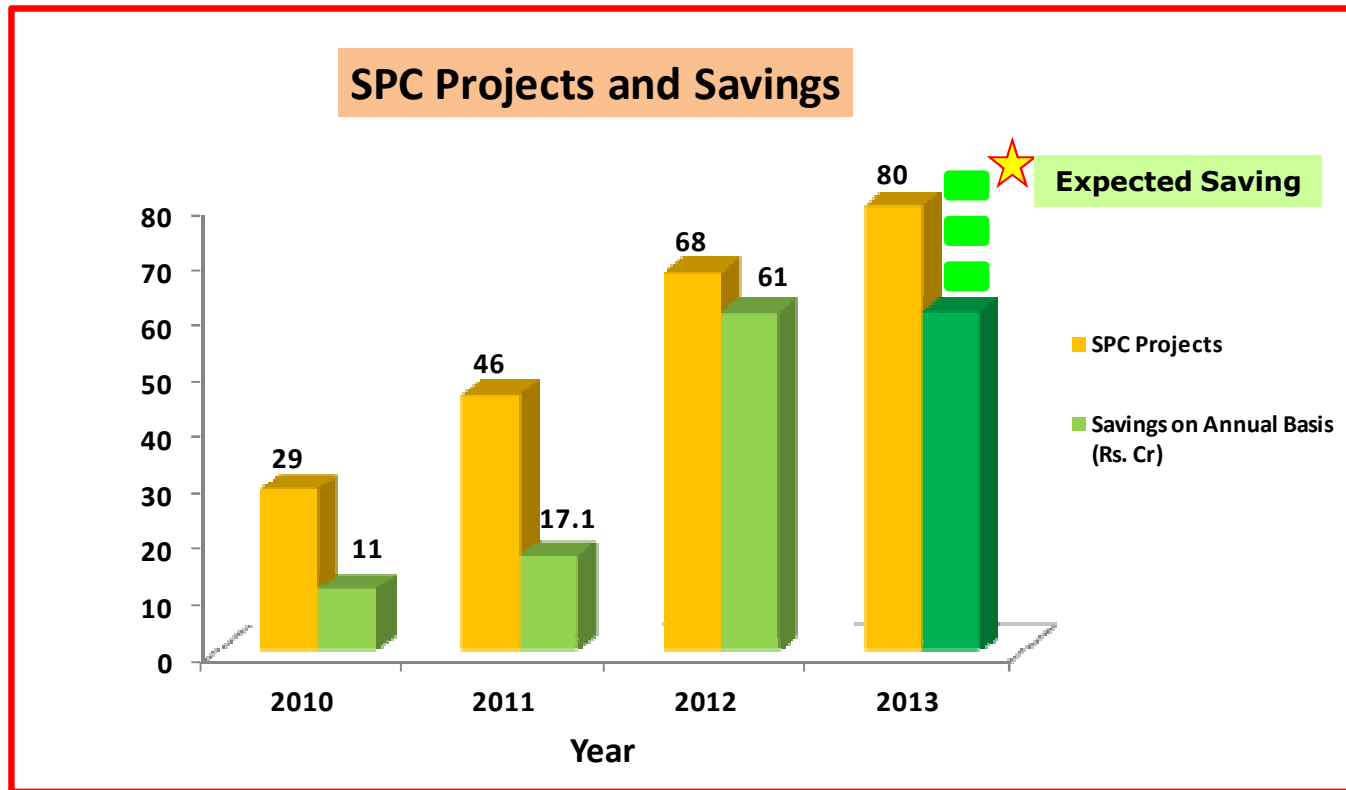
Project saving: Rs 18 per ton of production



ACC plants: Total Electrical Energy consumption**Total Electrical Energy consumption reduction by 3 Kwh/t .**

ACC plants: Total Thermal Energy consumption**Total Thermal Energy consumption reduction by 11 MJ/T**

Projects saving: Y'2010 to Y'2013



*** Project'2013 – Under Evaluation**





Hon'ble CEO & MD Mr. Kuldip Kaura, addressing the participant during SPC Certification ceremony.



Participant from Pan ACC during programme.



SPC trophy for Best Project & Encouragement Award.



Prize distribution ceremony for Best Project by H'ble CEO & MD Mr Kuldip Kaura .



Certificate distribution by Dean - MIQ & ACC-SPC core member.



SPC Team group photograph with Dignitaries.

Set the Culture

- Make SPC a Condition of Success
 - Data analysis through problem solving tools to meet the Objectives
 - Goals and KPIs

Drive Accountability

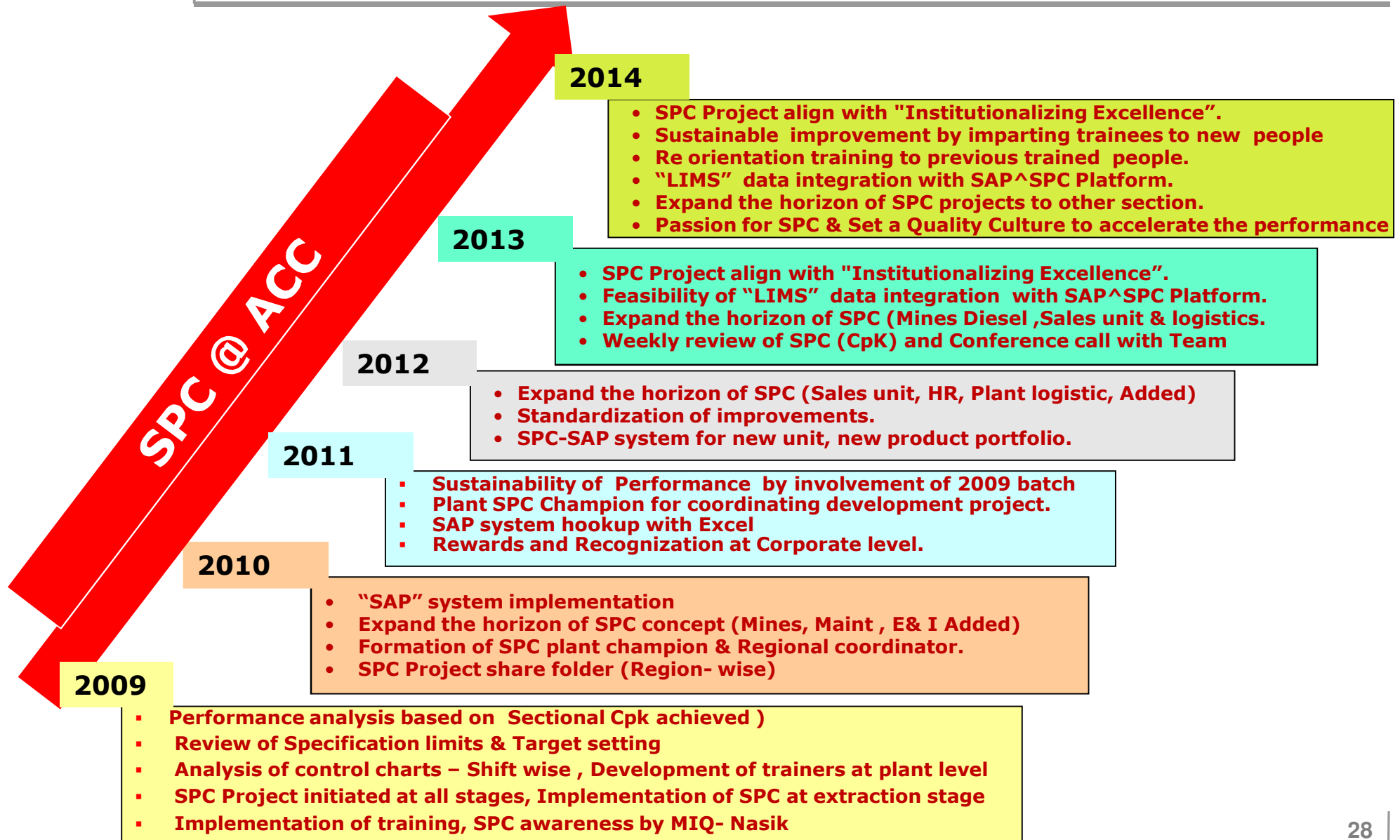
- Reinforce Leadership & Establish Structures
 - SPC responsibility with Line Management
 - Corporate supports
 - Local committees (CCR, Lab, Site)

Mobilize People

- Enhance Skills and Competencies
 - Training various levels (CCR, lab, Site Operations)
 - PMA approach for SPC projects
 - Keeping momentum via good communication

Accelerate Performance

- Monitoring and Recognizing
 - Analysis of performance and consequent actions
 - Review mechanism
 - Feedback for improvement



- “Manufacturing Excellence” through implementation of SPC tools and systematic problem solving methodology.
- SPC Champion at each Plant & Regional Coordinator to support the Project Leader & his Team for pursuing of sectional developmental project.
- Monthly review of SPC report with cross functional team at Plant and Regional meeting.
- Sustainable improvement by imparting Training for new participants and Project leaders.



ACC

