Quality

a Way of Life

Commitment to Quality

From Staff, Technicians and Contractors in Labour Intensive Sector

16th May 2013, Conference on

Quality Systems for Sustainable Manufacturing Growth

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Topics

- ✓ Industry Overview & Challenges
- Quality: A business driver
- Proactive Quality
- Key Initiatives
- Case Study: Zero defect @ Contractors

L&T – Businesses

Heavy Engineering

Hydrocarbon E&C

Infrastructure & Construction

Industrial Machinery

Power – E&C

Electrical & Automation

Quality & EHS Certifications

ISO 9001 : 2008

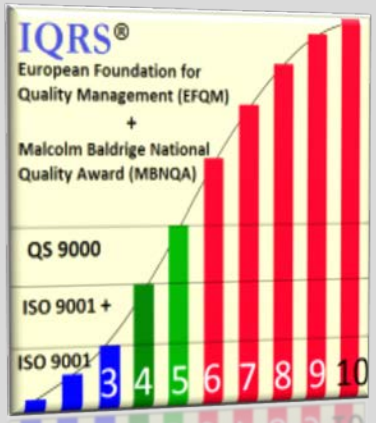
ISO 14001 : 2004

OHSAS 18001 : 2007

Certified System

ISO 9001
&
AS9100C
Certified

BRITISH SAFETY COUNCIL



IQRS Level 8

L&T Hazira

Manufacturing locations

Manufacturing Locations …

Hazira Manufacturing Complex

Year established	: 1987
Area (Sq. m)	: 36,00,000
Capacity (MT p.a)	: 2,00,000

Sohar, Oman

Year established	: 2009
Area (Sq. m)	: 400,000
Capacity (p. a)	: 10,000 MT


Workshops
Cross transfer Area
Ship Lift
Finger Jetty


Ship Lift


Platform Lowered


Platform Raised
...with Ship

JV (74: 26)

Special Steel 100,000 MT/annum

Single piece Ingot up to 600 MT

Forgings Up to
- Diameter : 6.5 m
- Height : 5.0 m

Nuclear grade Alloy
Stainless steel

Products: Process Equipment

KNPC Hydrocracker Reactor
– 1540 MT, 308mm

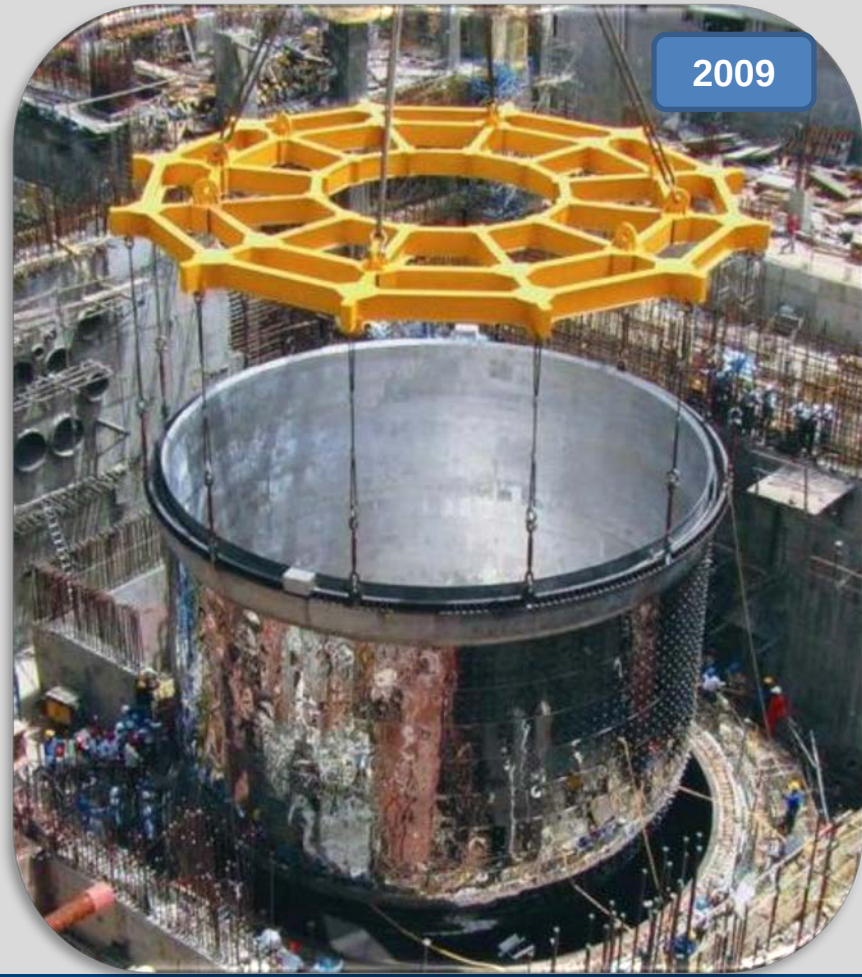
RPL Jamnagar FCC Regenerator
1320 MT, 16.3 M Diameter

Site Assembly

Coal Gasifier: Hebi, China

Weight 1300 MT

Nuclear Power: Fast Breeder Reactor Safety Vessel (13 m Dia) with Reflective Insulation



Trishul Launcher

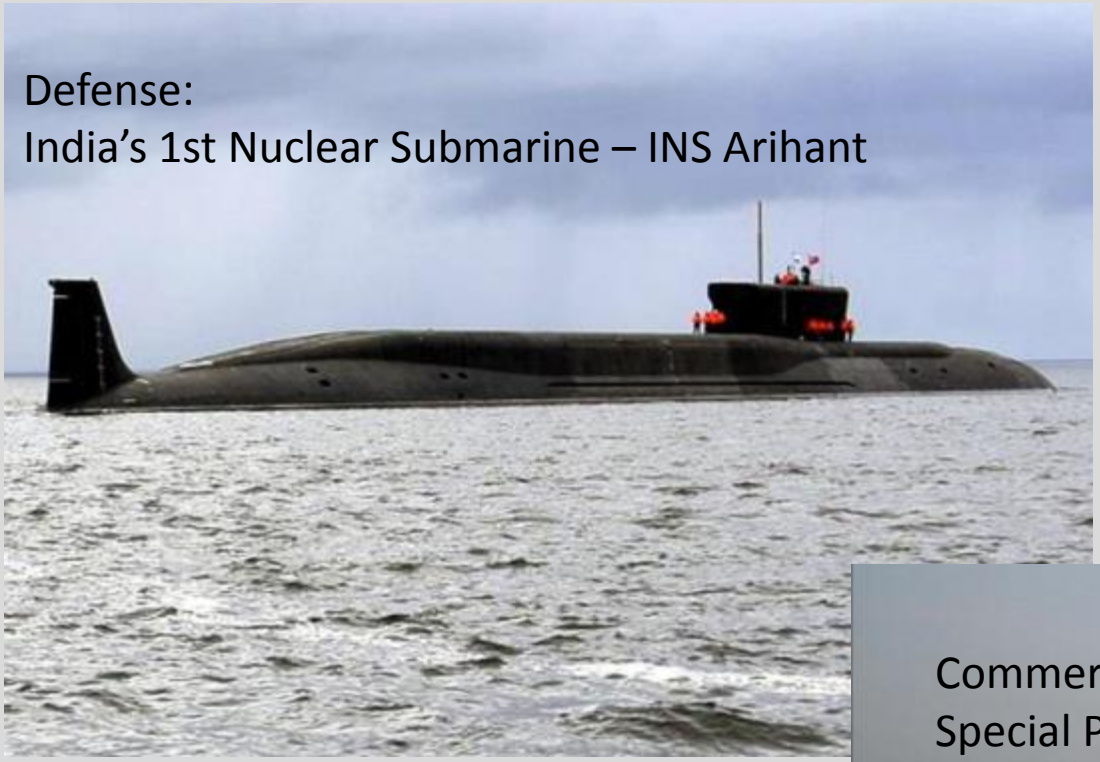
Pinaka Multi Barrel Rocket Launcher

Namica

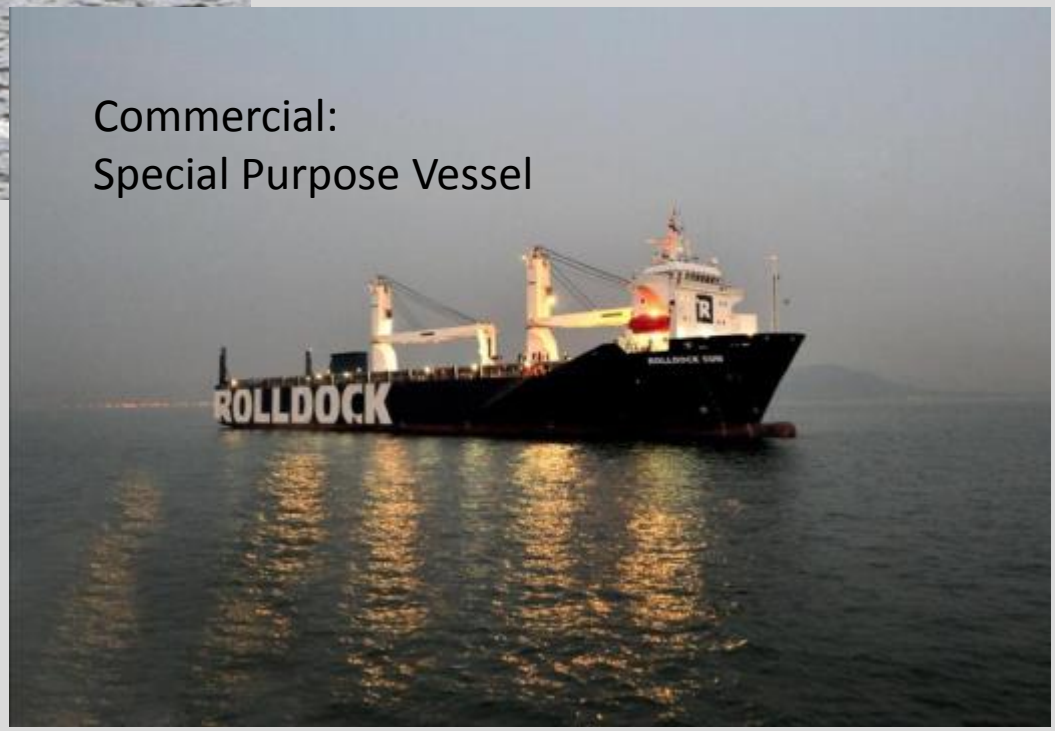
Akash Air force Launcher

Platform for Radar Rohini

Defense:
India's 1st Nuclear Submarine – INS Arihant



Commercial:
Special Purpose Vessel



Challenges

Labour Intensive:

Large Workforce

Wide Range of Skill Levels

Multi-skilling

Custom Built:

Engineer-to-order

Wide Range of Standards

Modular Manufacturing

Quality in ETO Industry

Project Industry:

Multi-location

Multi-Site

Complex Supply Chain

Mission Critical:

Critical Application Areas

Severe Operating Conditions

High Risk on Failure

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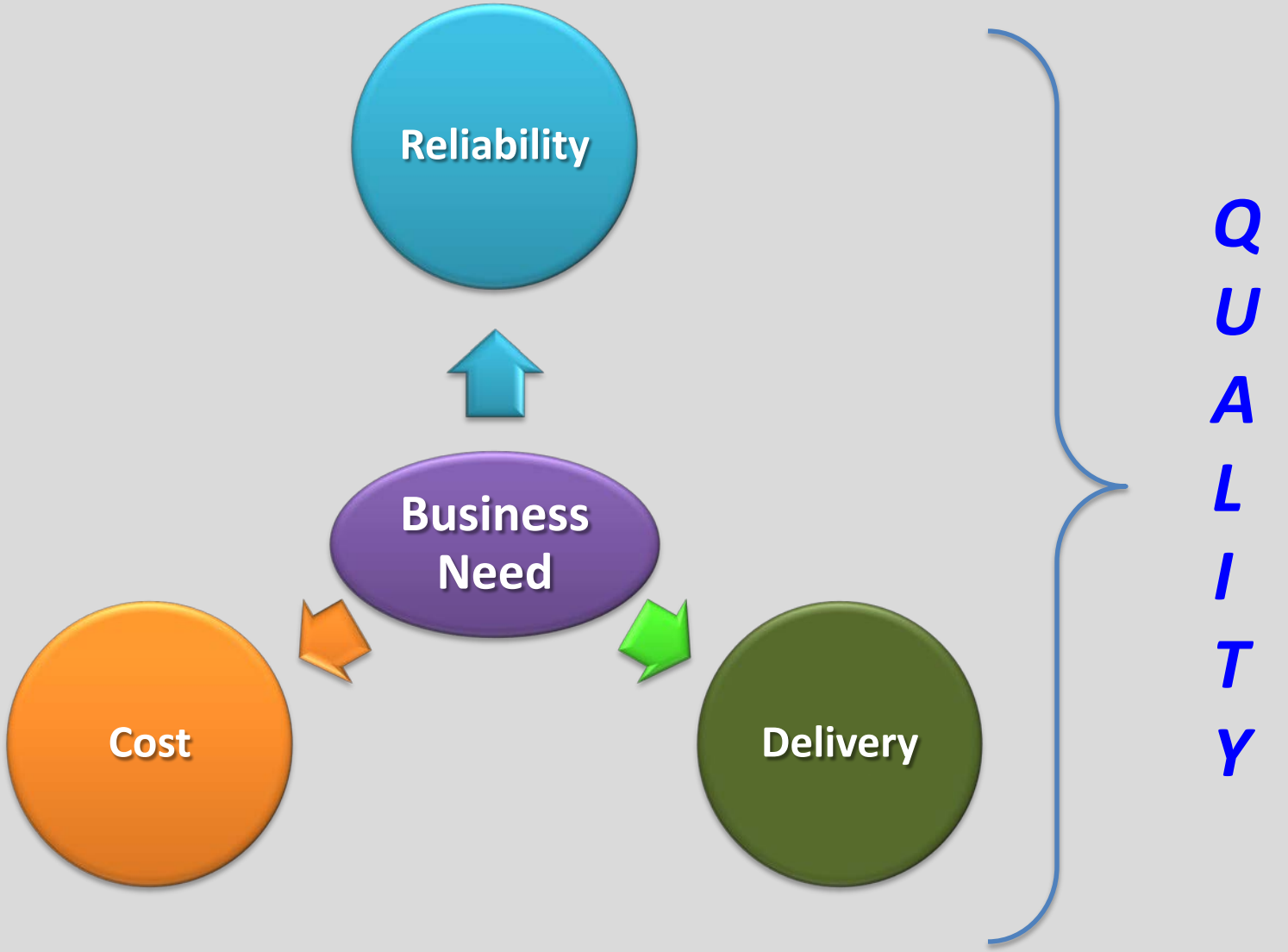
Quality Formula

$$Q = \frac{P}{E} \Rightarrow \frac{\text{Performance}}{\text{Expectation}} \Rightarrow > 1$$

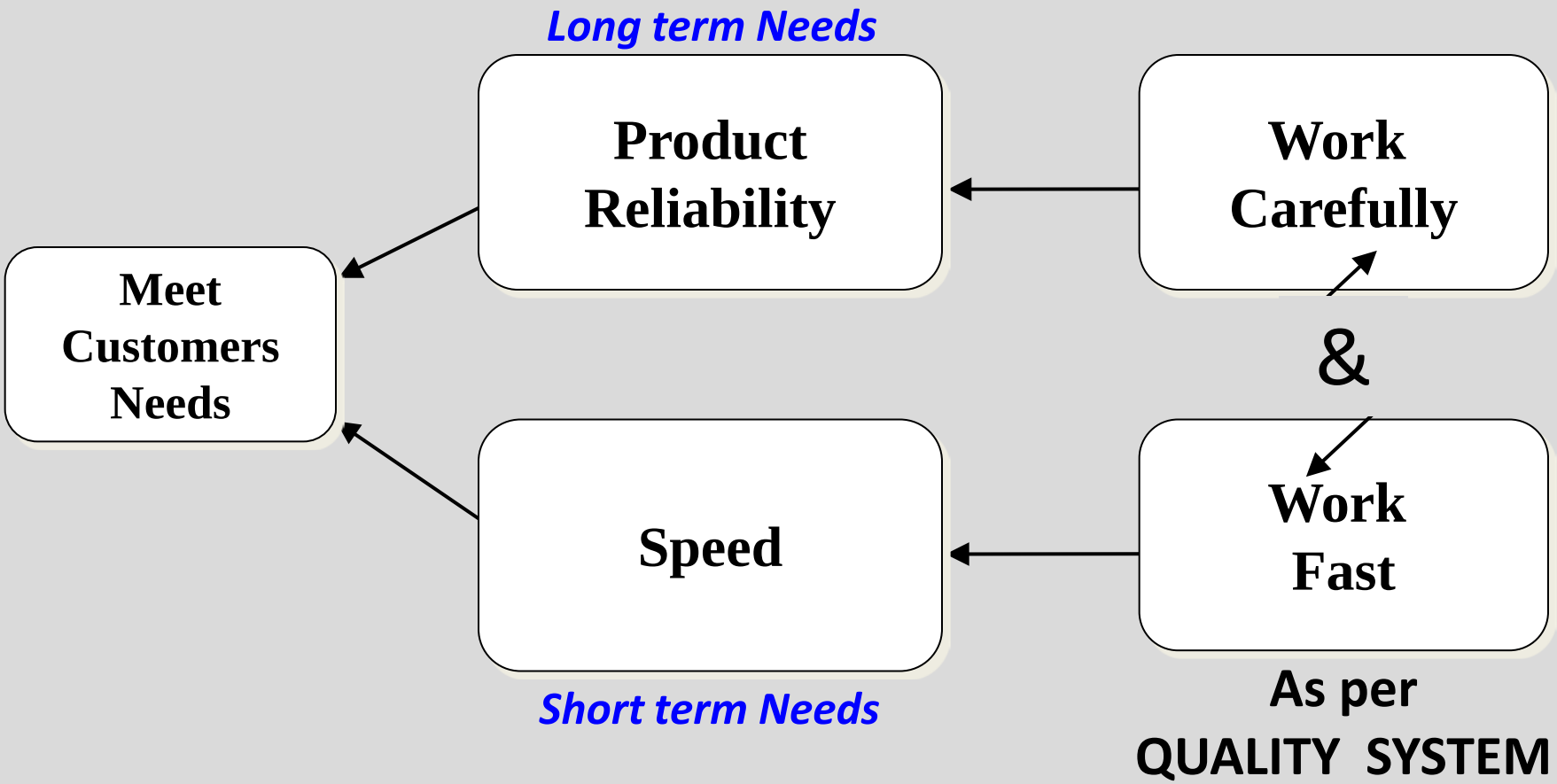
What Customers want?

Cheaper! **Better!!** **Faster!!!**

Is there a Conflict?



Accuracy *OR* Speed?



The ' & ' Paradigm

…Quality & Speed & Cost Effective

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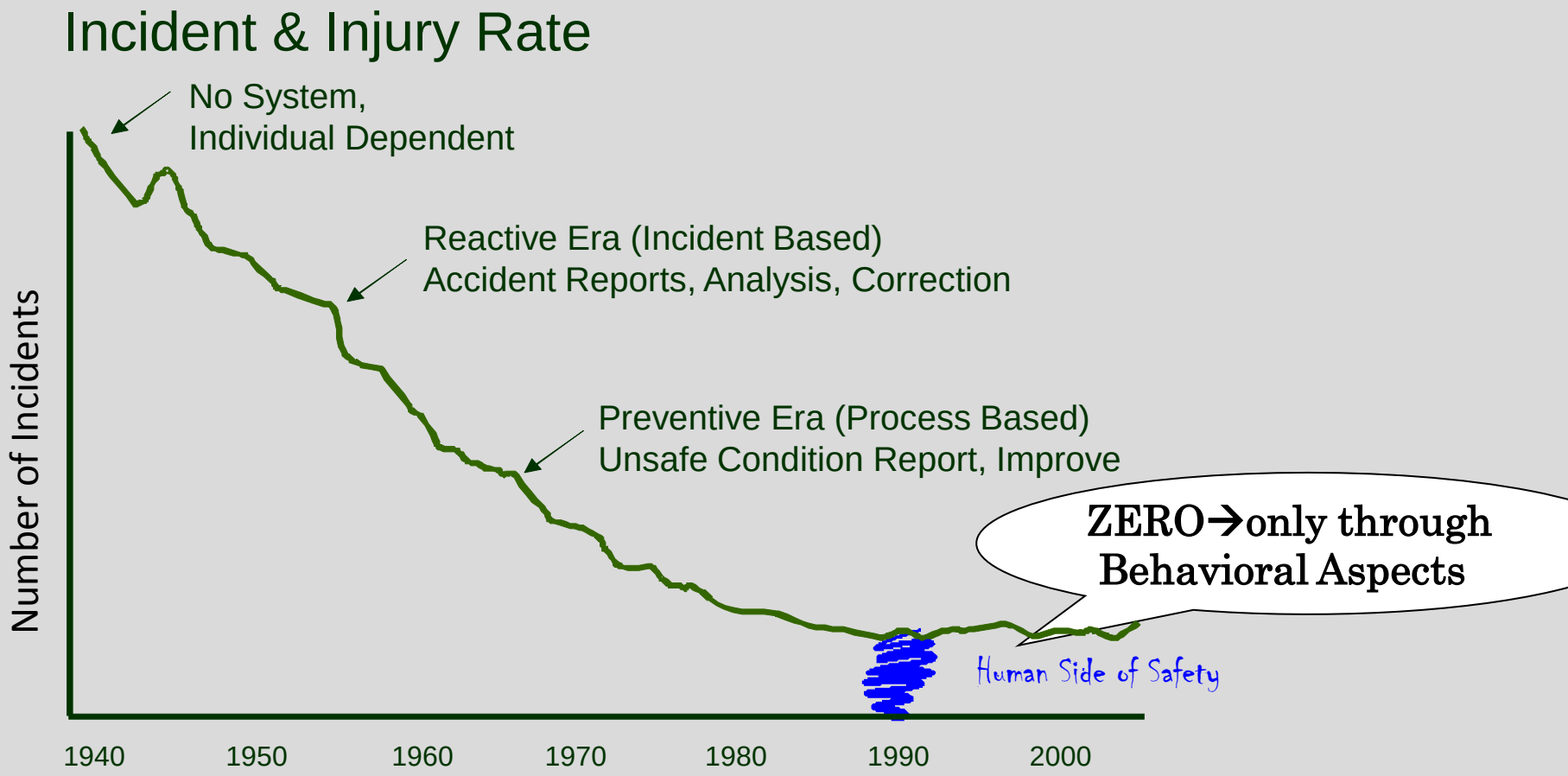
Journey towards Proactive Safety/ Quality



IIF (Incident and Injury Free) ® by JMJ Associate

Incident & Injury ≈ **Nonconformity**

Quality Control Paradigms

Reactive

- Specification
- Stage-based
- Inspection
- QC

Preventive

- Design Intent
- In-Process
- Audit
- QA

Proactive

- User Need
- Natural
- Behaviour Based
- BBQ

Product Control | **Process Control** | **Mind Control**

Product Control

दाग से डरना मना है !

Don't be afraid of the dark !

ISO 9001 8.5.2 "Corrective Action"

The organization shall take action to:
Eliminate the cause of nonconformities in order to
Prevent recurrence.
Corrective Actions: Appropriately address effects of nonconformities.

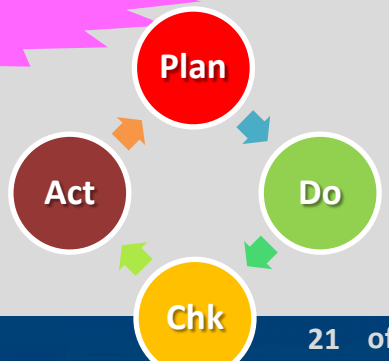
Image of NC

- Penalize the Doer
- More NCR, Worse Quality

→ Reluctance to issue NCR

Need to Remove
"Negative" Image of NC

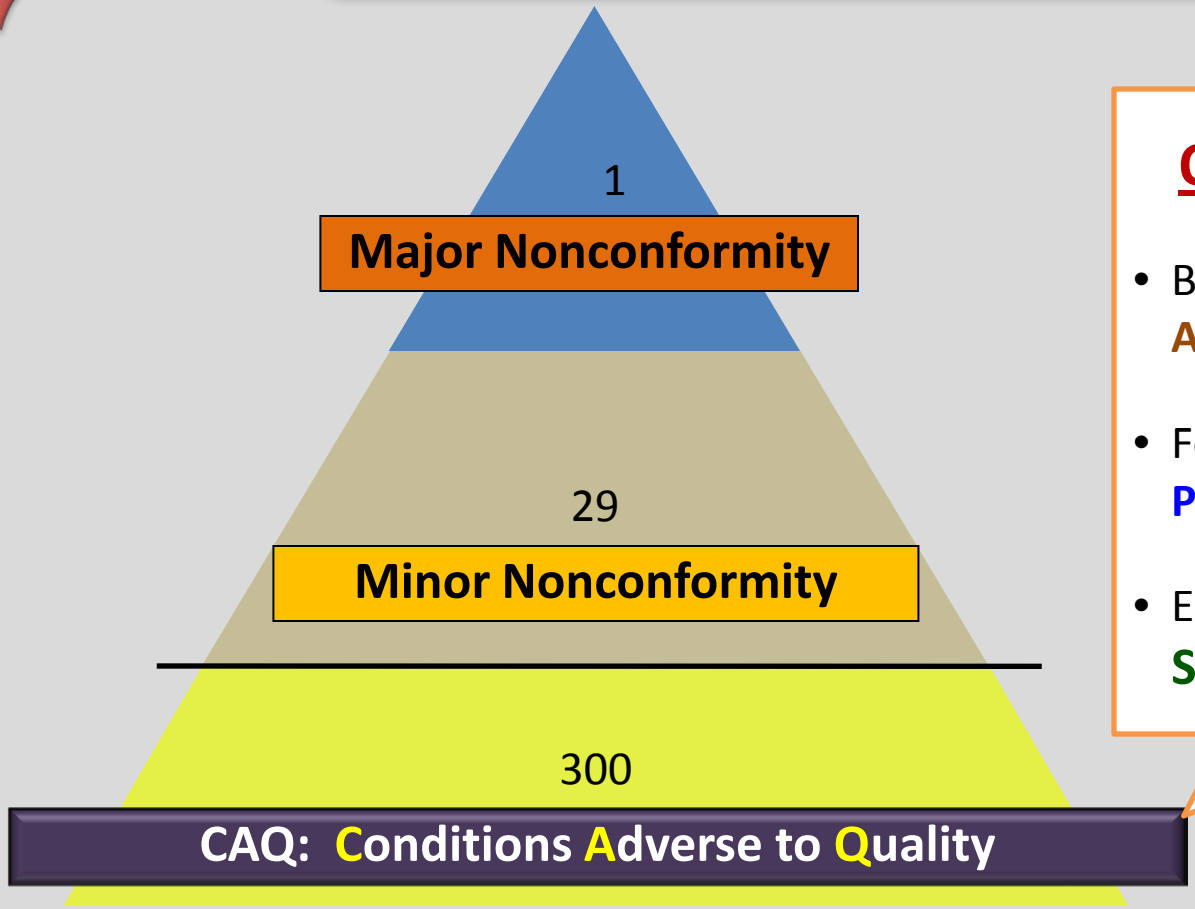
NC Analysis is a Tool for improvement



Process Control

NO सब चलता है

Don't tolerate Non-sense !



Observation or Alert

- Based on:
  Actual Event or Condition
- For Avoiding:
  POTENTIAL Damage/ Re-work
- Enhancing:
  Sensitivity to Quality

Heinrich's law for Incident

Major Incident :Minor Incident: Near Misses =1 : 29: 300

Mind Control

मजा आना चाहिए

Pride in your Work !

Real Motivation for Quality

***K**nowledge*
***L**ove*
***E**njoy* **"KLEPPA"**
***P**ride*
***P**articipation*
***A**wareness*

- Product is worker's baby.
- Where his baby goes/ works?
- How his baby functions?
- What his baby contributes to?
- More *"KLEPPA"* More care of baby!!

Quality Improvement

Confucius:
Knowing is not as good as Loving;
Loving is not as good as Enjoying

BBQ:

Know what's Required
Love my work
Enjoy Doing It
Pride in my Output
Part of Winning Team
Aware of Big Picture

Source: JGC Quality System

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Organization

Quality

Quality Management (QM)

QMS, WMS, Audits, MRMs
ISO Certifications

- Control of QMS
- ISO Manual & Procedures
- Monitor Organizational Quality Objectives
- Planning & Arranging Audits
- Monitoring CAQs
- Monitoring CARs
- Management Review
- Quality MIS

Quality Planning (QP)

QA, QRMs, Vendor Quality
Project Specific Certifications

- ASME Quality Manual
- Align to Customer Requirement
- Study Advance Drawings & Process Plans
- Compilation of CTQ/ QAP
- Inspection Procedures/ Checklist
- Co-ordinate for Customer Audits
- Conducting Job Audit
- QRM, RCA, CAPA

Quality Control (QC)

Inspection, Documentation
Interface with TPI/ Customer

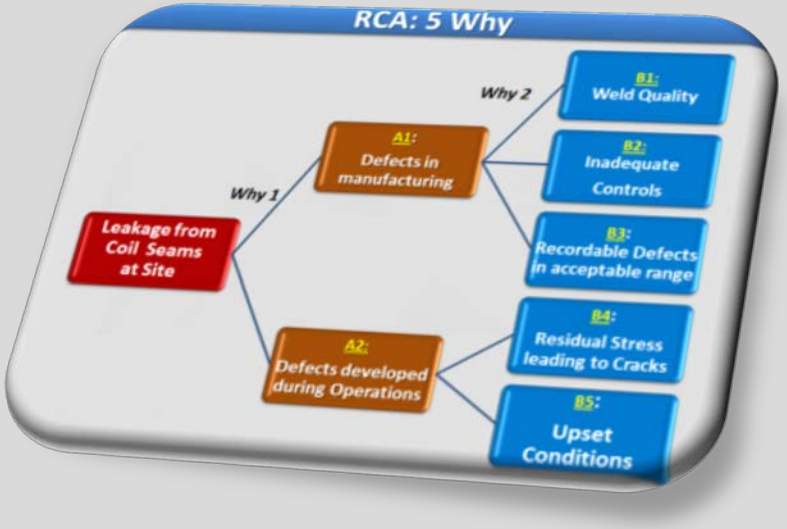
- Inspection as per CTQ's & ICL
- PT/ MT/ Visual/ Dimensions
- Self Verification/ Dimensions Formats
- In-process documentation
- Raising & Validating NCR
- Verification of Correction
- Shop wise NCR analysis
- Final documentation

Key Processes

- Quality Circles & Six Sigma Projects
  - Participation: Workers/ Supervisors
  - Unnati at Hazira
  - Navneet Teams at Powai
- Rigorous NCR Analysis: RRCA
  - Major-Minor
  - Severity & Frequency Analysis
- Monthly QRMs
  - Customer Feedbacks, Top NCRs, RCA results
- Six monthly MRMs
  - Review: Quality Objectives
  - Audit Findings

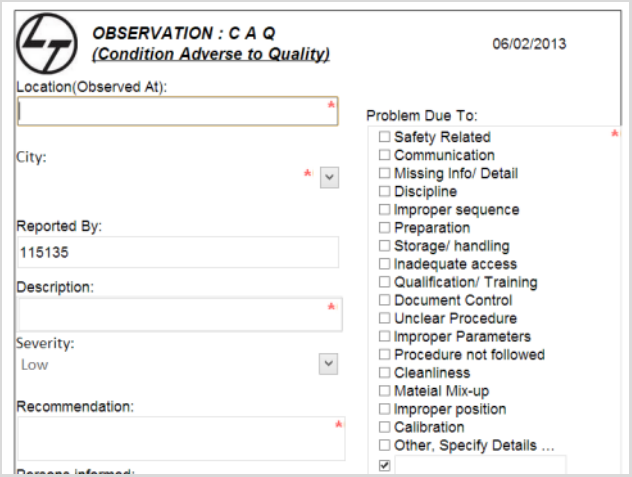
Quality Circles

- 733 Teams in 14 Years of QC Journey
- QC Tools Training
- Fortnightly Review
- Structured Evaluation & Recognition



Key Processes

- Aligning Quality Objectives
  - Department Purpose Analysis
  - Functional Measures
    → Organisation Goals
- Quality Planning:
  - "Critical To Quality"
    Identification at Project Start
  - QA Plan, Procedures & Check Lists
- Awareness Programs for Workmen
  - In Local language
- Intranet based CAQ System


OBSERVATION : C A Q
(Condition Adverse to Quality)
06/02/2013
Location(Observed At):
City:
Reported By:
115135
Description:
Severity:
Low
Recommendation:
Problem Due To:
Safety Related
Communication
Missing Info/ Detail
Discipline
Improper sequence
Preparation
Storage/ handling
Inadequate access
Qualification/ Training
Document Control
Unclear Procedure
Improper Parameters
Procedure not followed
Cleanliness
Mateial Mix-up
Improper position
Calibration
Other, Specify Details ...

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Zero Repair Drive SGA

Champion : S. R. Ramanujam (Production Center Head)
Team Leader : Ganesh Badgujar (Production & Maintenance)
Team members : ***Production:*** Jayesh Patel, Salim Mulani, Balkrishna Doke, Girish Sagare, Karan Kosambi, ***Welding Engg***: Avinash Abnave, ***QC***: John Pinto

Problem Statement

Object of Concern
(Item, Process, Area, Machine)

- Item : Weld Joints in Gasifier Coils
- Process : Manual Welding
- Shops : Mulund Shop (Contract welders)

Effect
(What is wrong)

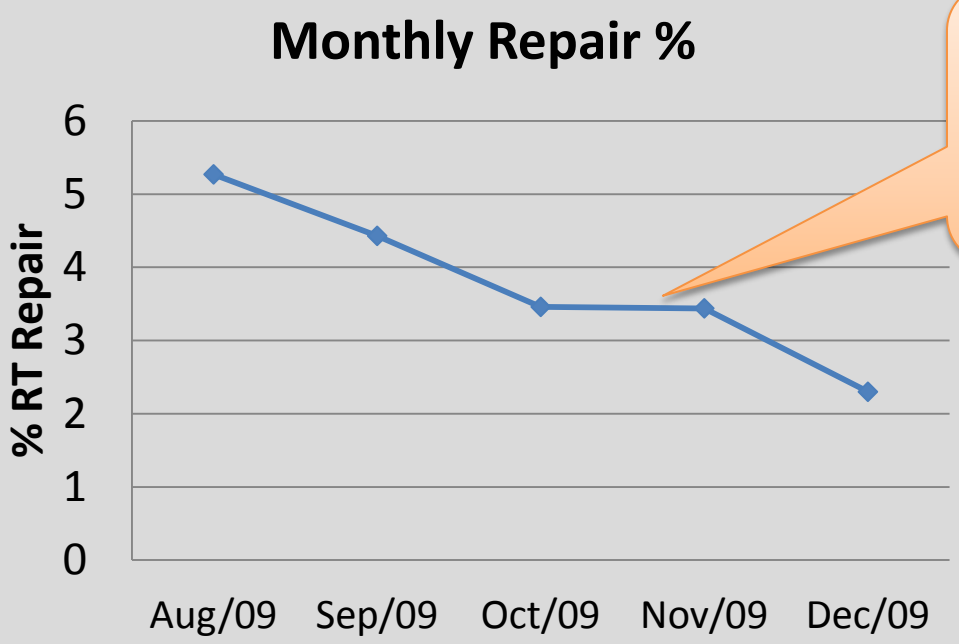
- High level of defects after Radiographic & Ultrasonic Testing

Size
(Extent, Occurrences, Frequency, Severity)

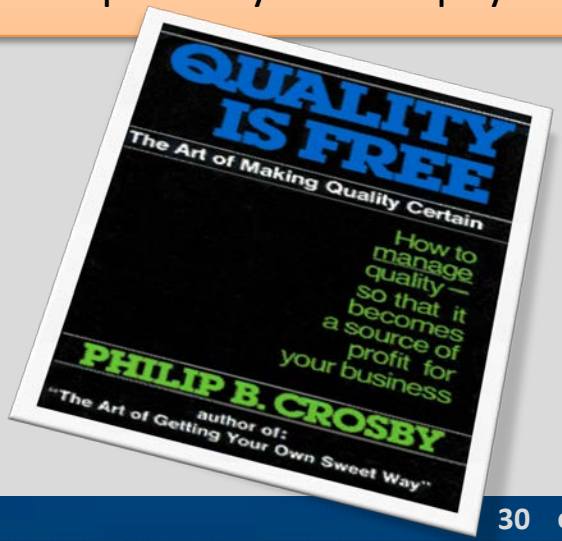
- 85 Repairs in 1612 Spots in August 2009 (5.3%)

Monitoring: Limited Results

Monthly Spot wise repair % from Aug 2009 to Dec 2009.				
Sr.No	Month/Year	Total No of RT Spots	Total No of Repairs	Repair %
1	Aug-09	1612	85	5.27
2	Sep-09	1286	57	4.43
3	Oct-09	1297	45	3.46
4	Nov-09	1656	57	3.44
5	Dec-09	2910	67	2.3



- Continuous Monitoring gave only Limited Results
- Decided to Implement Philip Crosby' Philosophy



Quality Management Maturity Grid

	I Uncertainty	II Awakening	III Enlighten-ment	IV Wisdom	V Certainty
Responsibility for Quality	Quality Department	Valuable, But No resources	Management Driven	Management Participation	Everyone
Quality Function	Hidden	Support Function	Line Function	Business Function	Quality Director on Board
Problem Solving	Fire Fight	Short term Focussed	Methodical Approach	Early Problem Identification	Preventive Action
COPQ	Unknown Maybe >20%	Reported 3% Maybe >18%	Reported 8% Maybe >12%	Reported 6% Maybe >8%	Reported 3% Really is 3%
Quality Improvement	No Formal System	Measurement & Motivation	Fourteen Step Program	Continual Improvement	Continual Improvement
What you hear ?	Why do we GET Problems?	Why do we HAVE Problems?	We Identify & Resolve Problems	Defect Prevention is our motto	We do not have Quality Problems !

14 Step Methodolgy

1 Management Commitment

2 Cross-Functional QI Team

3 Measurement

Philosophy:

- Full commitment & support from **Top Management**
- **ZERO** is Possible and Will be achieved
- No Shortcuts to Quality
- **No "Quick fixes"**

Cross Functional Approach:

- **All are responsible** for welding defects and not the welding engineer or Quality Engineer
- **Participation of all** employees is a MUST

Measurement of Problem & Status of Improvement

- Track and **Monitor** each Weld on **daily basis**

14 Step Methodolgy

4 Cost of Quality Evaluation → **5** Quality Awareness → **6** Habit: Identify & Correct

Cost of Poor Quality
- Production Loss (Hours), Delay Penalty

Awareness
- Supervisors : Impact of Poor Quality on **Profitability**
- Welders : Loss of earnings
  (**Payment** based on "CLEARED" Welds)

Habit
- Daily Feedback is a must
  (Before, During & After Welding)
- Elimination of **all possible reasons** before welding

ज्ञान
और
ध्यान

Mantra: **Knowledge & Attention**

14 Step Methodolgy

7 Zero Defect Task-force

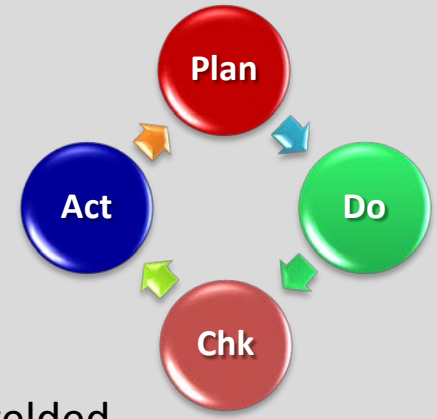
8 Supervisor Trg: Understanding Problems

9 Zero Defects Day

10 Goal Setting

Action Plan

1. **Analysis** : Past data Collection & Monthly Repair
   Brain storming session with workmen:
   100+ Conditions resulting in repairs identified
2. **Interaction** : With welder, contractor, supervisor every month
3. **Training** : Weekly sessions conducted by zero Repair Team.
4. **Checklist** : Standard Preparations for repair prevention
5. **Recording** : By every welder: Pocket Diary→ Details of seam welded
   (Date, shift , Seam no, Process, Thk, Material & status)
6. **Feedback** : Weekly problem sharing sessions
7. **Solve** : All Problems/ Difficulties highlighted by Welders



Zero Defect Policy Announced

14 Step Methodolgy

11 Act on Problems told by Workers

12 Recognition

13 Quality Council

14 Do it again!

Actions Taken (based on feedback from Welders):

- *Electrode brand changed*
- *Ban mobile usage during working hours*
- *Eye check-up for all workmen (welders, grinders, fitters & supervisors)*
- *Monthly appreciation of welders who have produced zero defects.*
- *'Target Zero Repair' – message beside every seam*
- *Depth chart (more than 30thk) for Accountability*
- *End-to-end Task completion by one welder*
- *Daily RT / UT status update at Production Center Head's Cabin*
- *Display Boards, Pocket cards: Quality instructions*
- *Frequent spot check by Shop supervisor*

Weekly Training Sessions: All Welders

Active Interactions

Appreciation:
Zero Defect
Welders

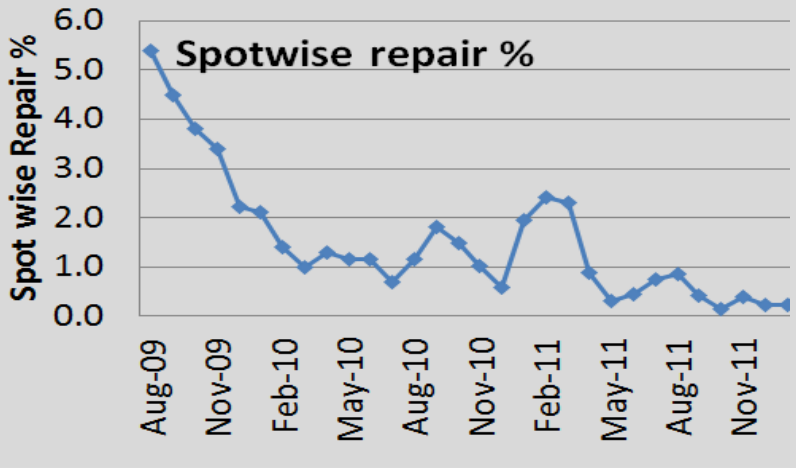
Eye Check-up Camp

Result

Statement of Cost Saving due to improved process of RT/UT

Period	Total Spots RT (Nos)	Total Repair Spots (Nos)	Repair Spot %	Reduction in Repair %	Red in no. of defects (Nos)	Cost per defect in Rs	Cost Saving in Lacs Rs
Aug 08 to July 09	25755	1091	4.2%	<< Reference Point >>			
FY 10-11	24469	330	1.3%	2.9%	707	6,582	46,50,005
FY 11-12	19925	107	0.5%	3.7%	737	6,976	51,41,877

Cost per defect calculated based on "Through-put per hour" saved

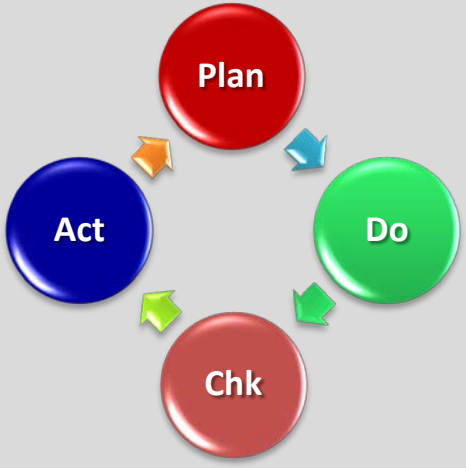


= ZERO Defects

Summary

दाग से डरना मना है !

Don't be afraid of the dark !



NO सब चलता है

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Observation System

मजा आना चाहिए

Pride in your Work !

Strategic System Complex
L&T Talegaon

Thank you