ISA Delhi Section

Setting the Standard for Automation™

FERTILISER MEET 2016

Best Practices to Enhance Safety and Reliability at TATA Chemicals

Standards
Certification
Education & Training
Publishing
Conferences & Exhibits

The International Society of Automation Delhi Section

Safety Pause

We make sure that safety is not viewed as a separate function, but as an integral part of productivity, competitiveness and profitability and that our safety risks are recognised as part of business risks

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- Babrala Plant
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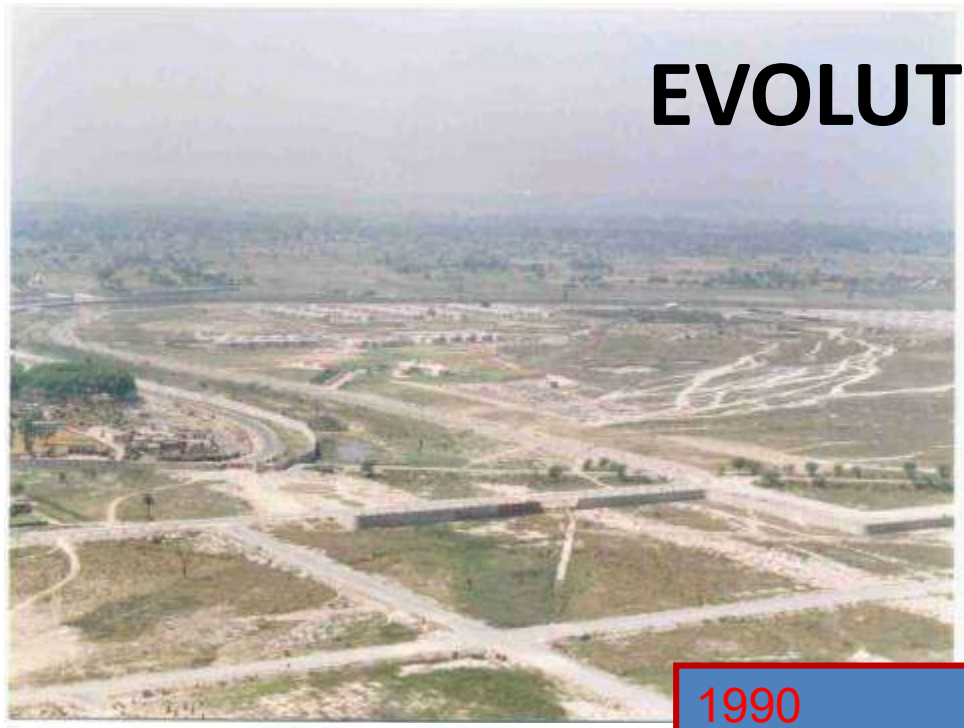
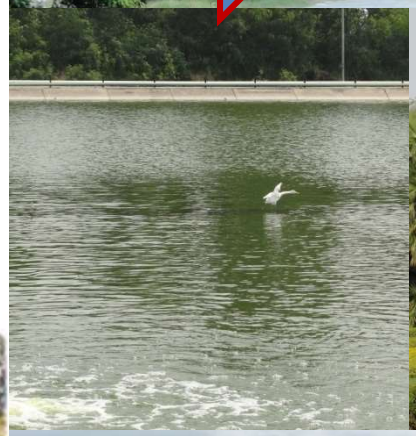
- Safety Culture at Babrala
  - Target Zero Harm
  - TATA Group Safety Standards
- Maintenance Process
- Reliability Enhancement
  - Criticality Matrix
  - Reliability Check (Motor, Transformer, Switchgear)
  - Case Study of RLA Testing of Cables
  - DCS Upgradation
  - Towards Excellence

EVOLUTION

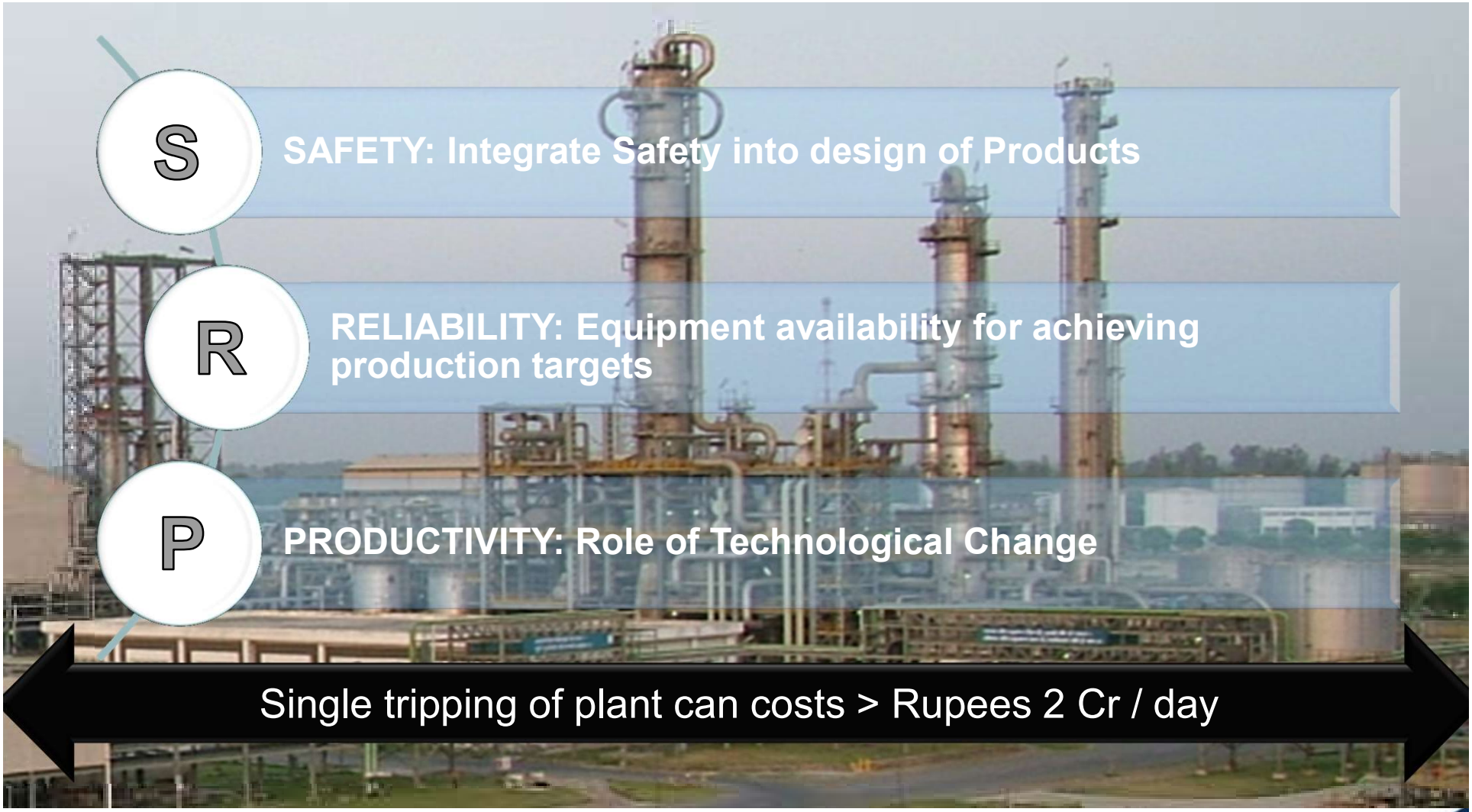


1990

2016



Babrala Plant



Milestones

TATA CHEMICALS

Dec1994
Commercial Urea Production

Sept 2005
Neem Coated Urea (NCU) Production

Oct 2008
Debottlenecking : Urea Production Capacity increased from 2620 MTPD to 3500 MTPD

Nov 2010
Customised Fertiliser Production

Apr 2012
ATR – Plant Reliability Enhancement Project

Plant capacity

- Ammonia--2000 MTPD
- Urea--3500 MTPD
- CF--400 MTPD

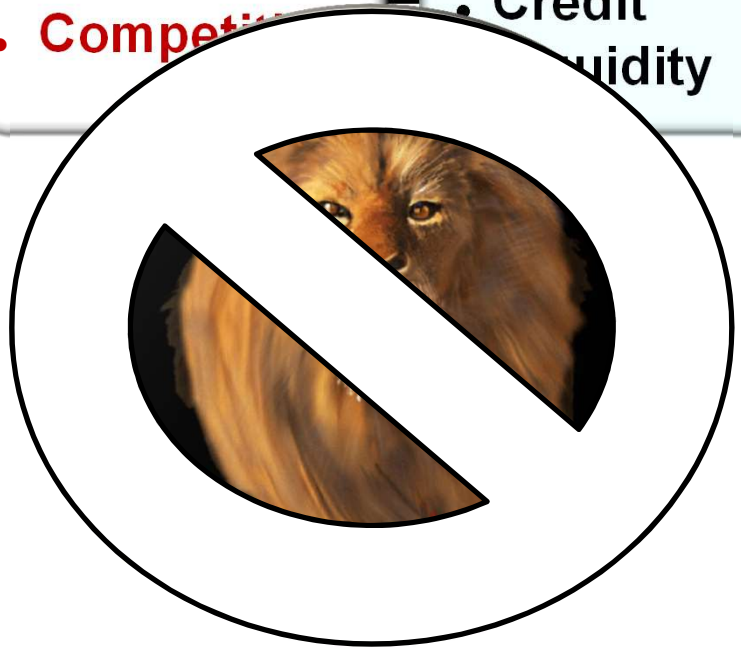
Technology

- Urea : Snamprogetti, Italy
- Ammonia : Haldor Topsoe, Denmark
- CF : A J Sackett, USA

2014-15
Highest Urea production (1250531 MT)

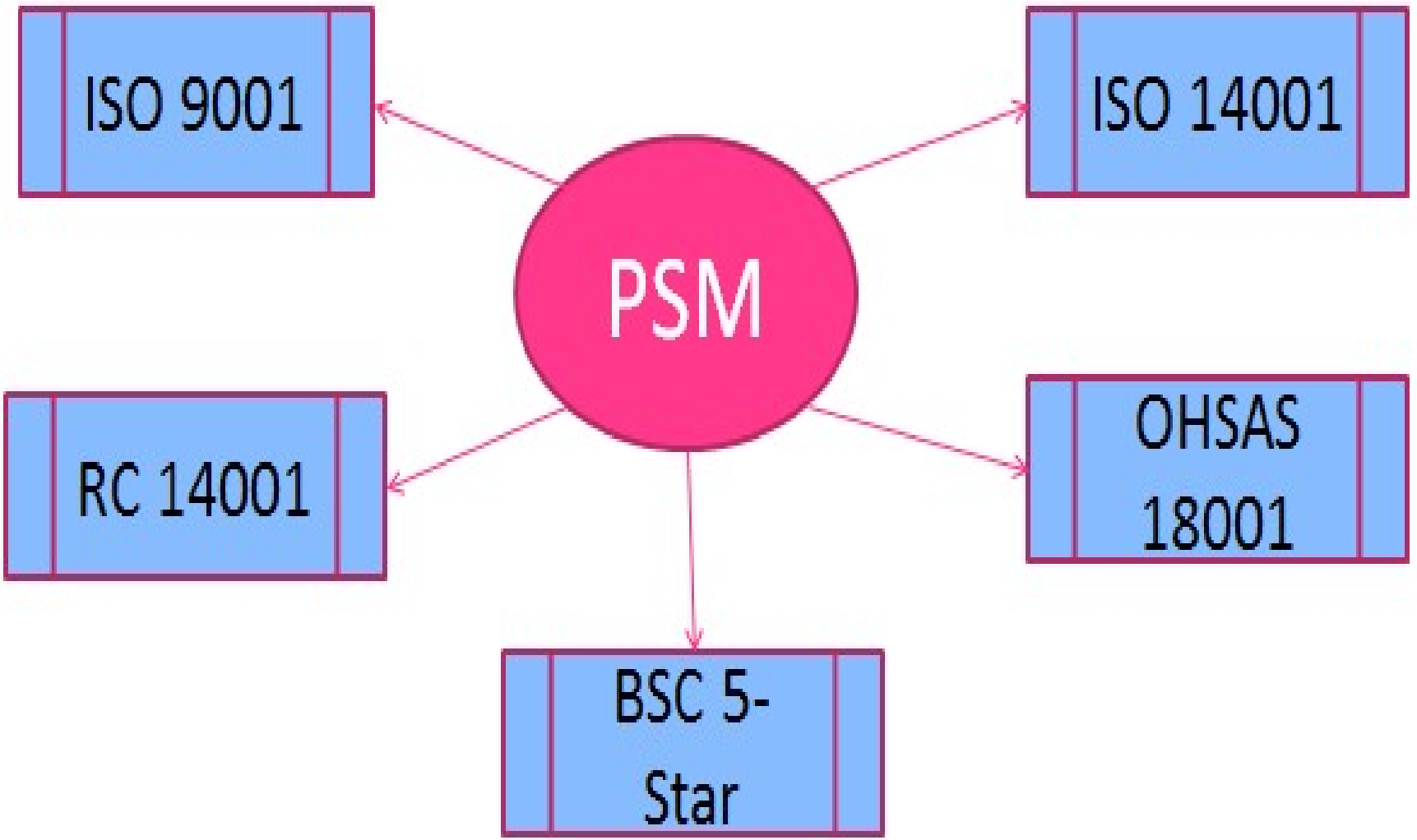
Safety Culture at Babrala

Strategic	Financial	Operation & Maintenance	Reputation
• Business • Market • Compet	• Currency • Interest rate • Credit • uidity	• Inherent risk • Asset Integrity • Technology • Competency	• Public image • Brand Value • Share price



Risk based Process Safety

Target Zero Harm



TATA Group Safety Standards

CONTACTLESS ZERO VOLTAGE DETECTION

BEFORE

No Electrical Flash Protection on 415V LT system

AFTER

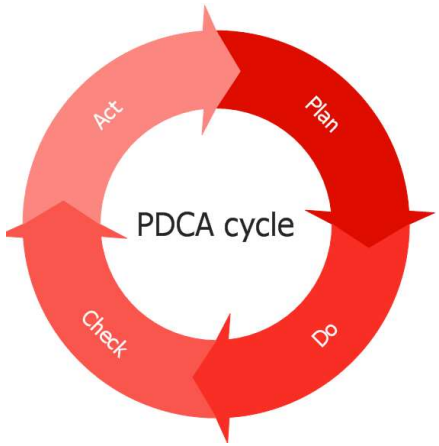
Electrical Flash Protection Suit for Better Safety

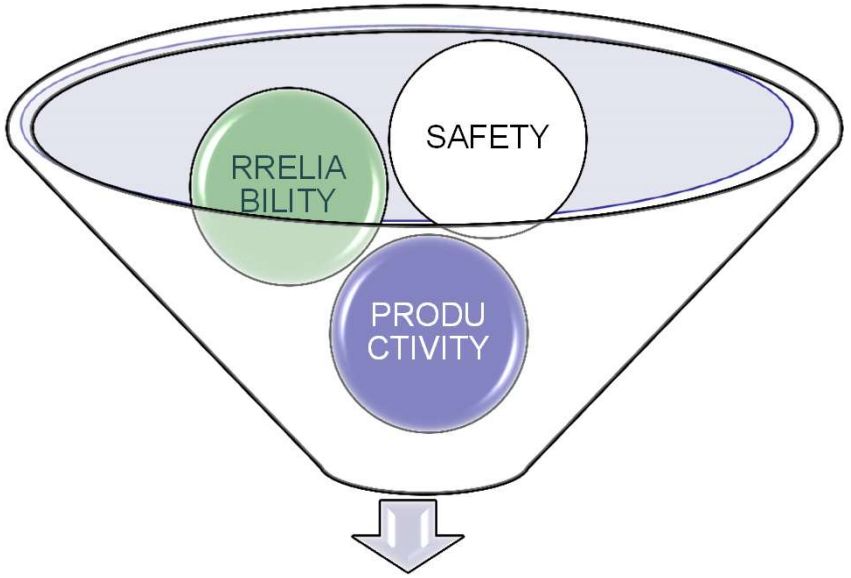
USAGE OF PPEs (OUTCOME OF ARC FLASH STUDY)

UNDERGROUND CABLE ROUTE TRACER

ONLINE SOCKET TESTER

Maintenance Process





MAINTENANCE AND
PROCESS DEPARTMENTS

Collaborative
Culture

Reliability Enhancement

Technology & Manufacturing Management

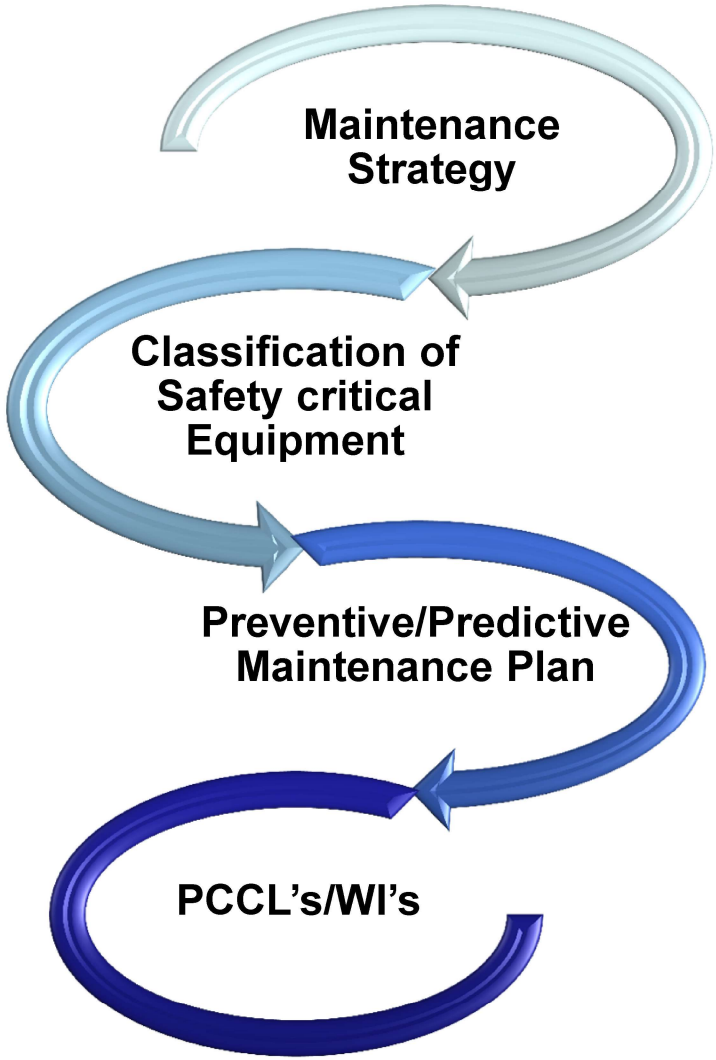
Asset Care Management

- Proactive Maintenance
- Maintenance Planning
- On Stream Maintenance
- Operation and Maintenance of Department Facility

18 elements of KPI Tracked to measure adherence of all 4 Maintenance processes

Criticality Matrix

Microsoft Excel Worksheet



Fluid handled

- Liquid & Gaseous Ammonia(5)
- GV Solution(4)
- Steam Condensate(3)
- CO2 gas(2)
- Instrument Air(1)

Cause of failure

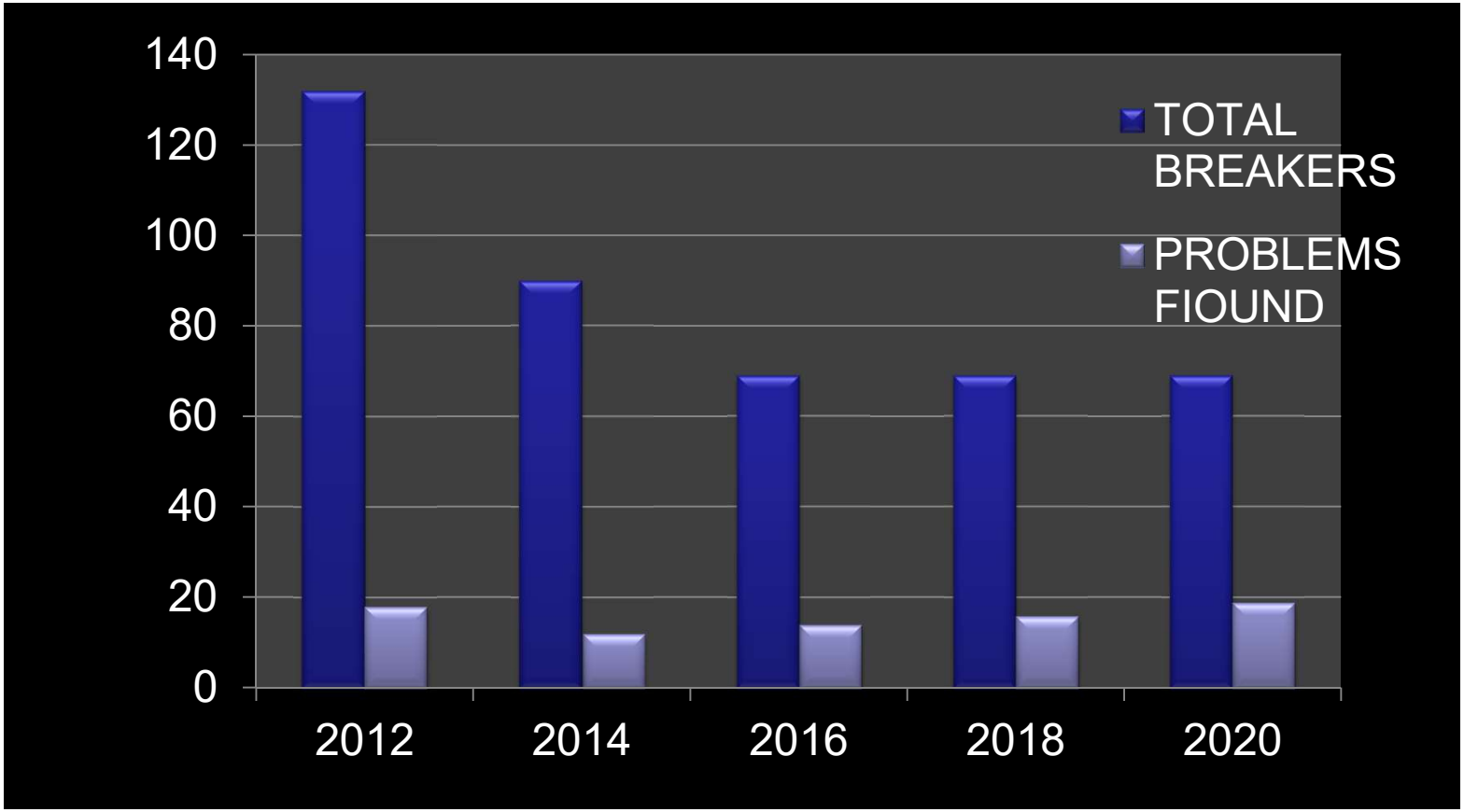
- Internal environment
- External environment

Impact of failure

- People
- Environment
- Assets
- People

Microsoft Excel Worksheet

Switch Gear Reliability



Transformer Reliability

- Dissolved Gas Analysis (2 years)
- Chemical Analysis of the Transformer Oil (6 months)
- Routine Physical Inspection (Fortnightly)
- BDV Value measurement of the Transformer Oil (6 months)
- Over hauling of OLTC (2 years)
- Furan Testing (2 years)

Motor Reliability

Abnormal Sound

- Revised frequency as per M/S Noria recommendation implemented
- Storage of the Lubricant in Air Conditioned room.
- Procurement of New Lubricant Unirex-N3

High Vibration

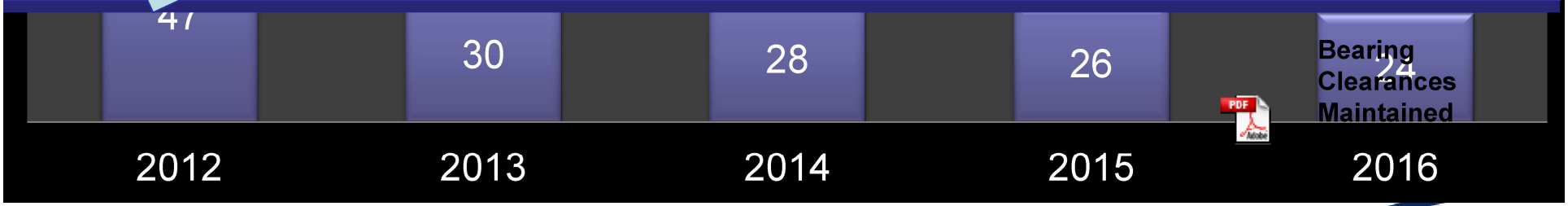
- Spare rotor and end shield procured for c
- Adherence of Monthly changeover

Overload

- Upgradatio ays to Numerical Relays

- ttached Standards

Current Signature Analysis conducted of all Critical Motors



Case Study (RLA Testing of Cables)

Power Supply

- No procedure for testing of cables was developed.

Outcome of RCA

- “Joints in cables have more potential of failure”

Benchmarking

- Chambal Fertilizers(Joint of HT Cable of Ammonia Feed Pump {P1} failed causing Production Down Time)

Process Safety Management

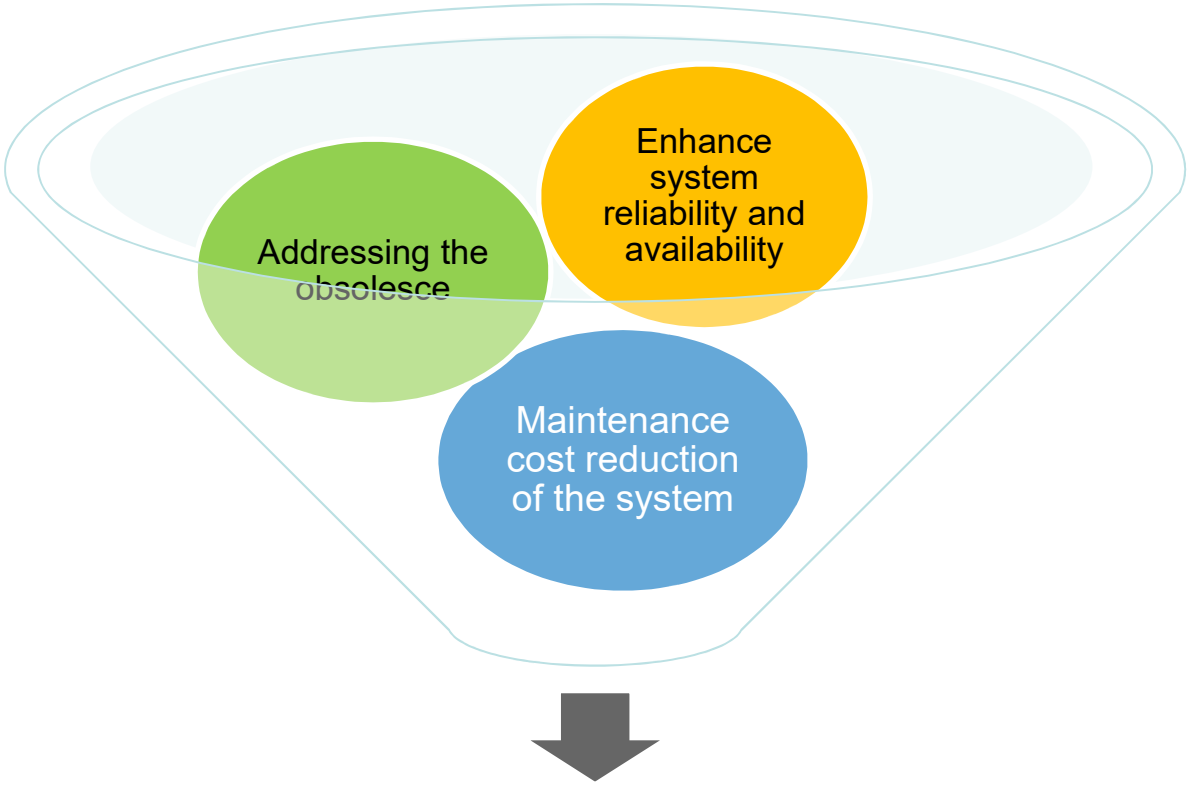
- All Critical 1 equipment's to be tested at a frequency of at least 5 years.


G:\Cable water video.mp4


Microsoft Excel 97-2003 Workshee

DCS Upgradation

Project Objectives



Reliable DCS System with
Ease of Operation

Deliverables

DCS application software release Migration

Migration of History Module from Winchester disk to chip based memory

ESDS for Product Packaging and O&U Plant

23 Numbers of Window based Operating Station (Experion Station T node – EST)

3 Numbers of Window based Engineering Station (Experion Server T node – ESVT)

Prerequisite

Enhance system reliability and availability

Addressing the obsolesce

Maintenance cost reduction of the system

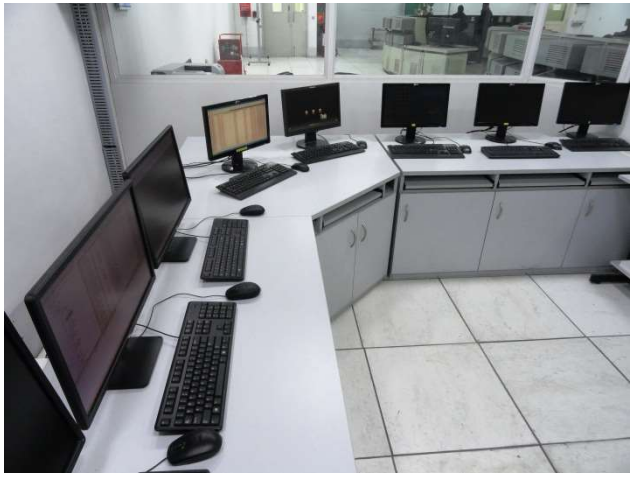
Implementation Stages

Migration of Logic & offline checking

Factory Acceptance Test

Commissioning Activity

Site Acceptance Test



Implementation Stages

Man days : 78
Cost: 108 Lakhs

- LCN Release Migration
- History Module Up gradation
- APC System Up gradation
- PHD System Up gradation

Phase 1

Phase 2

- Up gradation of US to Window based Operating Station (EST)
- Introduce Window based Servers (ESVT)
- ESDS system up gradation of O&U and Product Packaging Plant.

Man days : 153
Cost: 900 Lakhs

Challenges and Mitigation

Challenge 1 ***To acquaint with new operator stations & system.***

- Replaced 6 no's US with EST in running plant.
- All 245 graphics has been verified before initiating phase 2.

Challenge 2 ***Integration of old IOs with new IO modules and controller.***

- Specialized team from Honeywell in association with TCL has been assigned to carryout this activity with customised SOP.

Challenge 3 ***Migration simulation and verification of new control logic blocks.***

- Team from TCL had worked along with Honeywell team, where each and every logic, interlock and graphics was tested and verified.

Challenges and Mitigation

Challenge 4 — *Online migration of HM to SBHM*

- Grouping and move the data and graphics to other HMs to avoid LOV
- Take printout of critical parameter history and refer PHD for history during next 96 hours after migration.

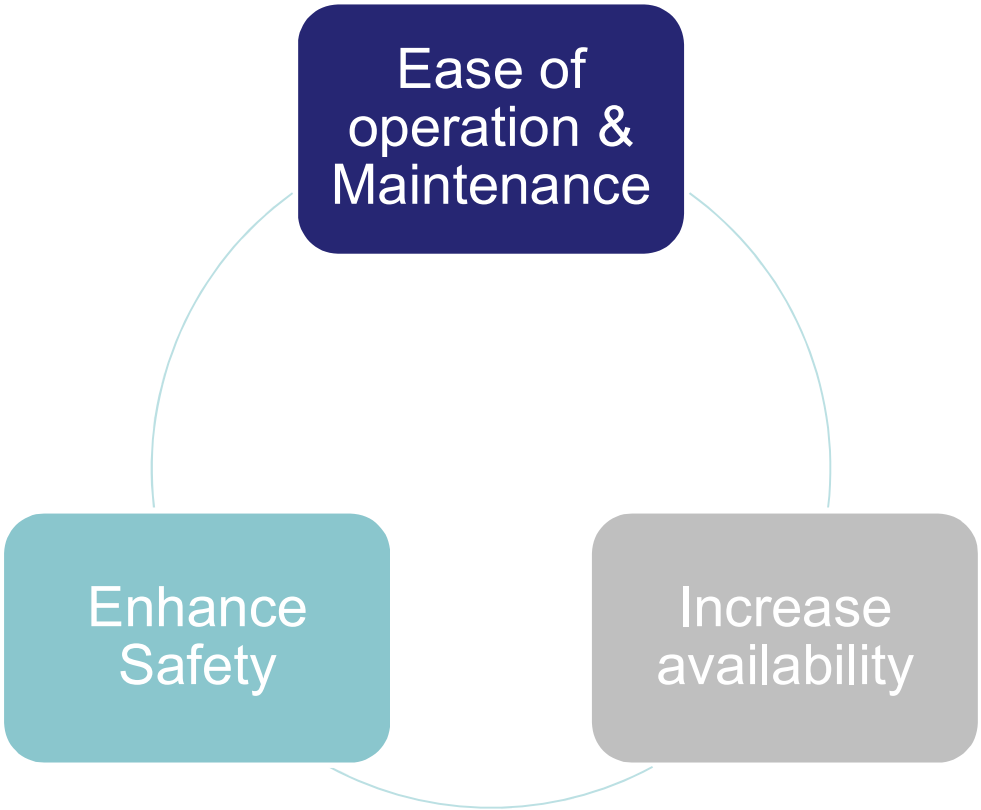
Challenge 5 — *Restart Application Module Node in running plant*

- Review all AMCL (56 Numbers) one by one with process engineer.
- Make the action list in according to the effect of AMCL interruption.

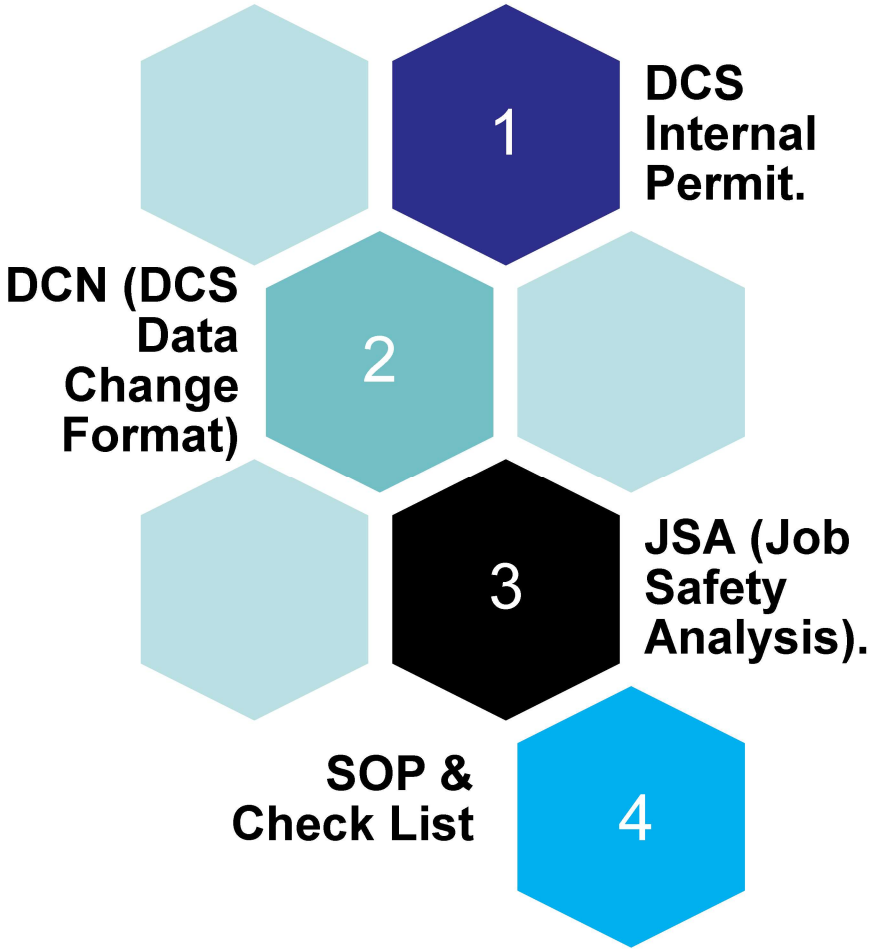
Challenge 6 — *Shifting of NIM from US console to Panel*

- Take shutdown of redundant/standby NIM, move it.
- Power up the node and connect it to the network.
- Change the role of redundant NIM node from primary to secondary.
- Shutdown the secondary NIM and move it.

Benefits achieved



Best Practices- Instrumentation

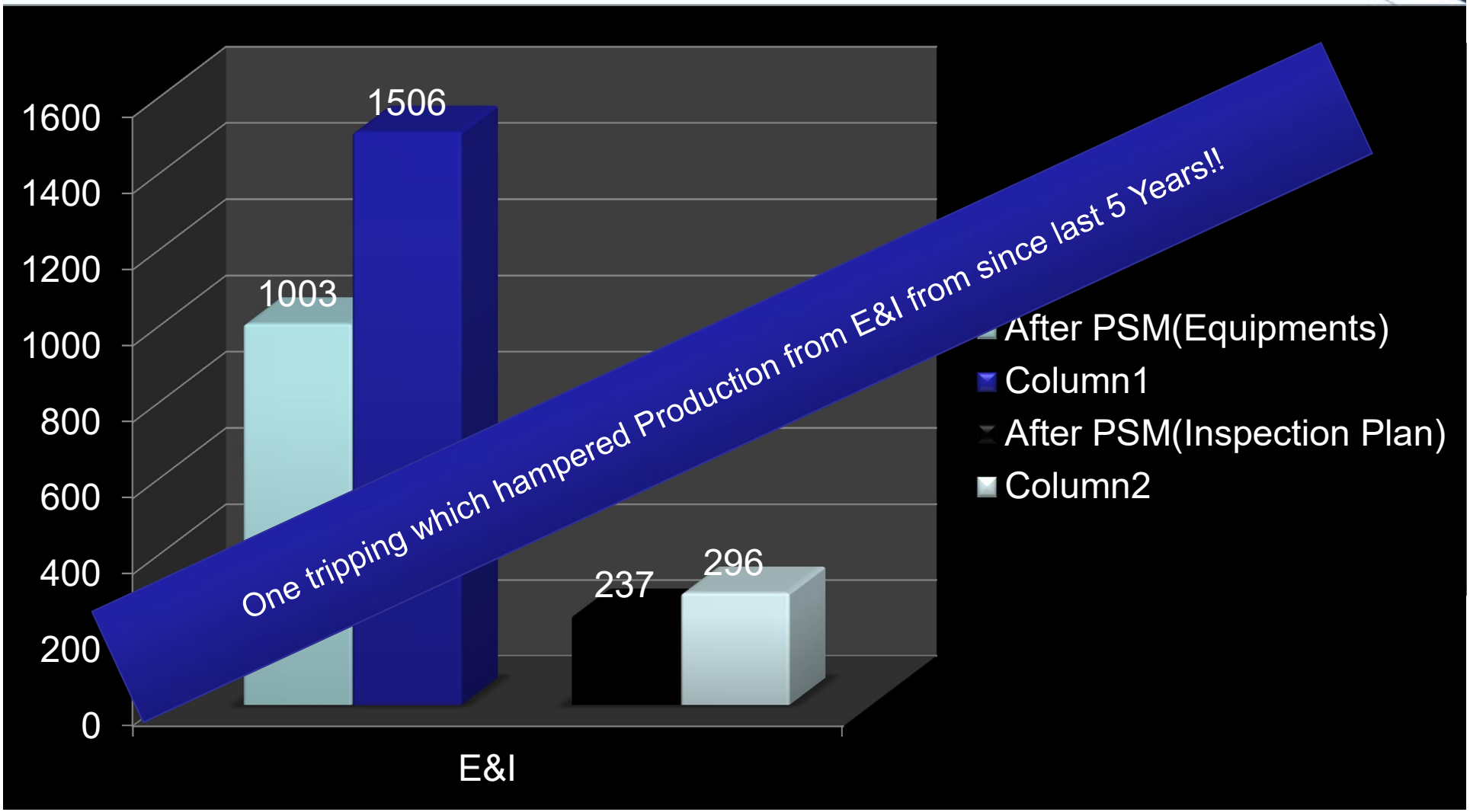


Internal Work Permit

DCS data Change Note

JSA_What if analysis

Trip & Interlock Bypass Format


1600
1400
1200
1000
800
600
400
200
0
1506
1003
237
296
E&I
One tripping which hampered Production from E&I from since last 5 Years!!
After PSM(Equipments)
Column1
After PSM(Inspection Plan)
Column2

TATA
TATA CHEMICALS

ISA

THANKS