13thEdition : CII -National Award for Environmental Best Practices 2026

Confederation of Indian Industry

17th Edition Waste & Resource Management Summit 2026
Resource Management for Sustainable Future
9 October 2026 Hotel Feathers, Chennai



THE FUTURE OF DRIVING IS HERE.

SMART TYRE

TYRE WITH A BRAIN

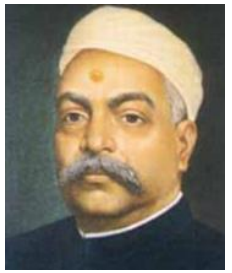
TITLE : PLATEN CONDENSATE CONTROL FOR UNDERCURE SCRAP REDUCTION

JK ORGANIZATION (EZ) – GROUP PROFILE



Late Lala
Juggilal Singhania

- Reputed and diversified group in business for over 125 years
- Turnover of $ 4.0 billion.
- Sales and Service network of 10,000+ distributors and retailers.
- Multi - business operations; footprint across 6 continents, 100 countries & 29 manufacturing facilities across India.
- A team of 40,000+ committed and motivated managers and workers.



Late Lala
Kamlapat Singhania

Group Companies:



JK TYRE TOTAL CONTROL

JK TYRE – MULTI LOCATION FACILITIES



Kankroli Tyre Plant (Udaipur)



Banmore Tyre Plant (Gwalior)



Vikrant (Tyre Plant, Truck Radial Plant),
OTR Plant (Mysore)

- 9 Plants in India
- 3 Plants in Mexico



Tornel - Mexico



Chennai Tyre Plant
(TAMILNADU)



Laksar Tyre Plant (Haridwar)

TYRE CURING PROCESS – AN OVERVIEW:

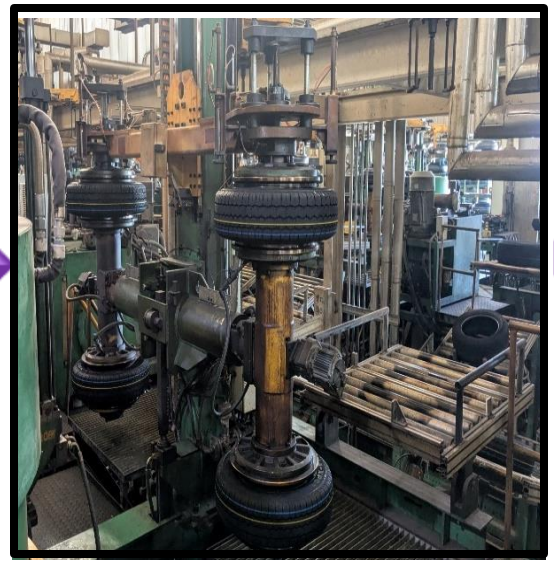
- Curing is the Process of converting green tyre into cured tyre (final product).
- Chemically, it is a vulcanization process. Curing media used are Medium Pressure steam (MPS) & Nitrogen gas.
- Green tyres are kept inside moulds which are fixed in a curing press for desired time under particular pressure & temperature.
- Highly automated machines are being used for precise control of parameters.
- After curing tyres are going to PCI followed by Visual Inspection/Uniformity & Balancing Testing.



GREEN TYRE



TYRE CURING



PCI STATION



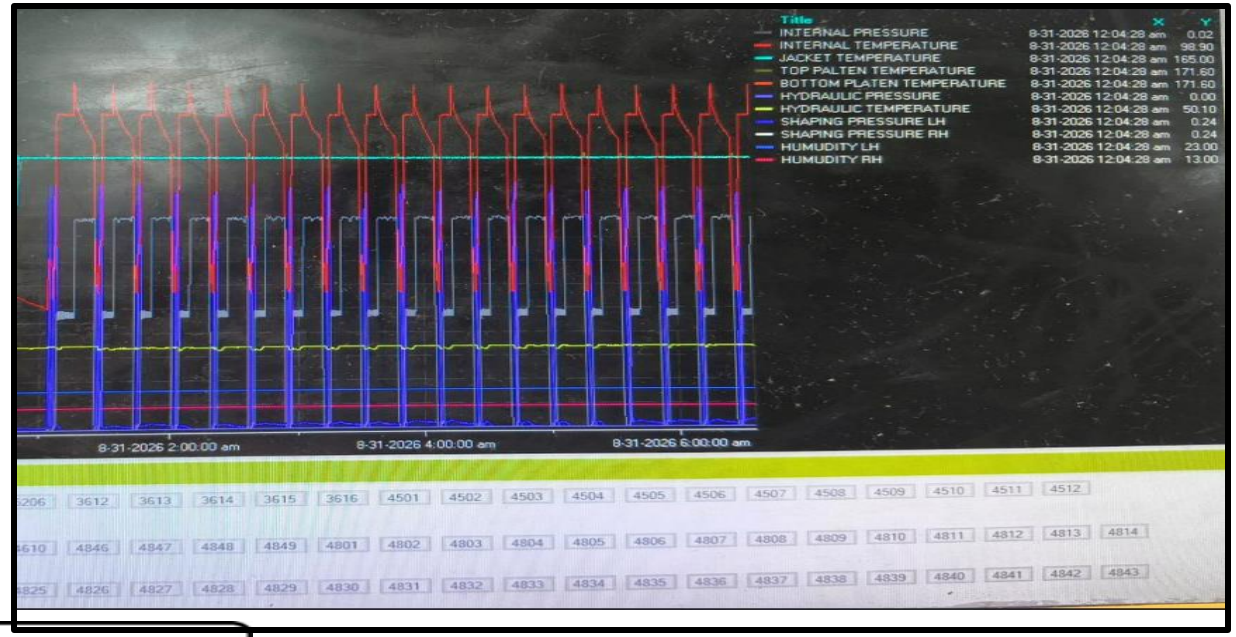
CURED TYRE

PROBLEM DEFINITION

The curing press is experiencing under cure issues in the process. Although the technical specification parameters were not deviated—resulting in no alarms or notifications on the controller or SCADA system inspection revealed under cure in the cured tyre. There was insufficient heat transfer during the curing cycle, leading to incomplete curing despite system compliance with set specifications.

Temperature specification in tyre curing press e.g. SPEC- 165°C ± 2 °C

SCADA MONITOR GRAPH

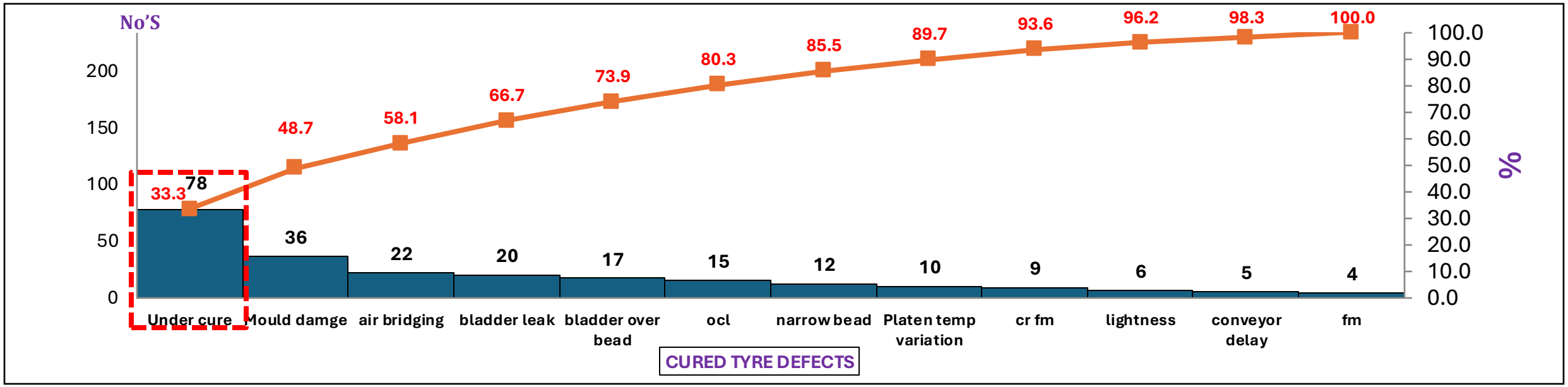


SAMPLE PICTURE

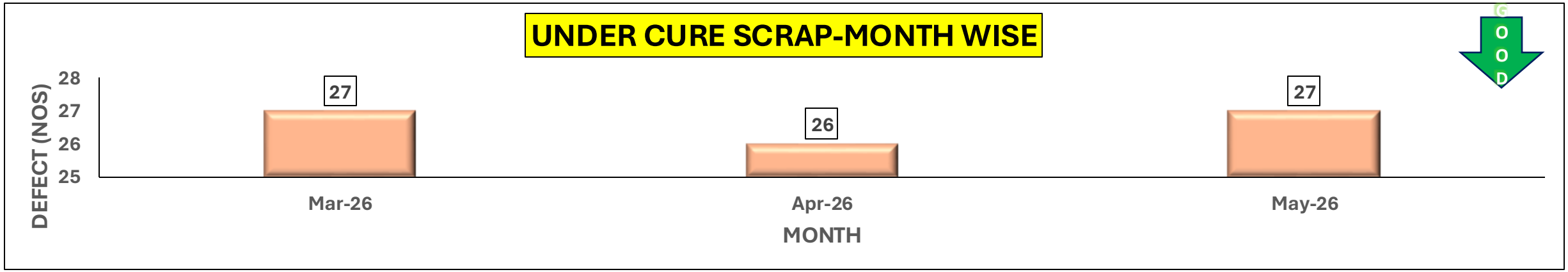


PROBLEM DEFINITION

UNDER CURE DATA FROM MAR-26 TO MAY-26

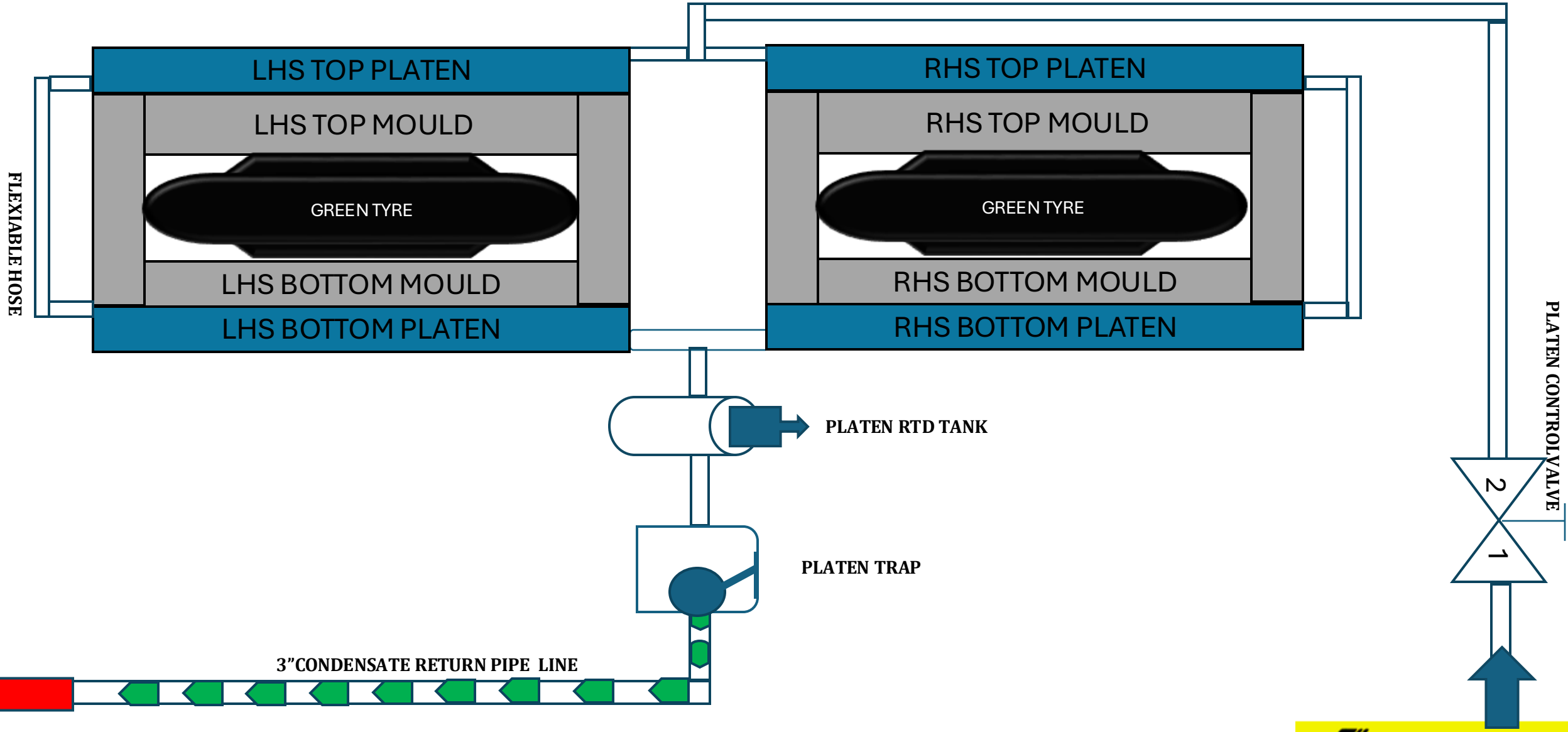


UNDER CURE SCRAP-MONTH WISE



PROBLEM DEFINITION

PLATEN PIPE LINE CIRCUIT DIAGRAM



TRIGGER OF THE PROJECT

- Under-cure defects observed in cured tyres occasionally .
- Scrap generation increased due to incomplete curing.
- No PLC or SCADA alarms despite the quality issue.
- Actual platen temperature was lower than the required curing temperature.
- Investigation identified condensate accumulation in the platen steam line.
- Reduced heat transfer efficiency affected curing performance.
- Improving process reliability and product quality was the primary trigger.

ROOT CAUSE OF THE PROBLEM





WHY - 1
- Tyre Scrap due to Undercure

WHY - 2
- Physical platen temperature variation of up to 10°C at random locations

WHY -3
- **Condensate was not being completely removed from the platen pipelines**

WHY - 4
- Steam flow was insufficient to flushout the Condensate from the (LH or RH) cavity.

WHY – 5
- Steam supply control valve operation remained minimal as RTD indicates no variation

WHY - 6
- Common RTD is used to Control both Cavities in OEM design

Root cause

CII

JK TYRE TOTAL CONTROL

UNIQUENESS OF THE PROJECT

- **Innovative PLC-based solution** developed completely in-house.
- **No additional hardware investment** required for implementation.
- Solved a hidden process issue that was **not detectable through PLC/SCADA alarms**.
- Automatically removes condensate during press opening without operator intervention.
- Improved actual platen heat transfer while retaining existing process settings.
- Eliminated under-cure defects by addressing the root cause rather than adjusting curing parameters.
- Reduced tyre scrap and associated manufacturing losses.
- Achieved significant quality improvement with **zero major equipment modification and minimal cost**.

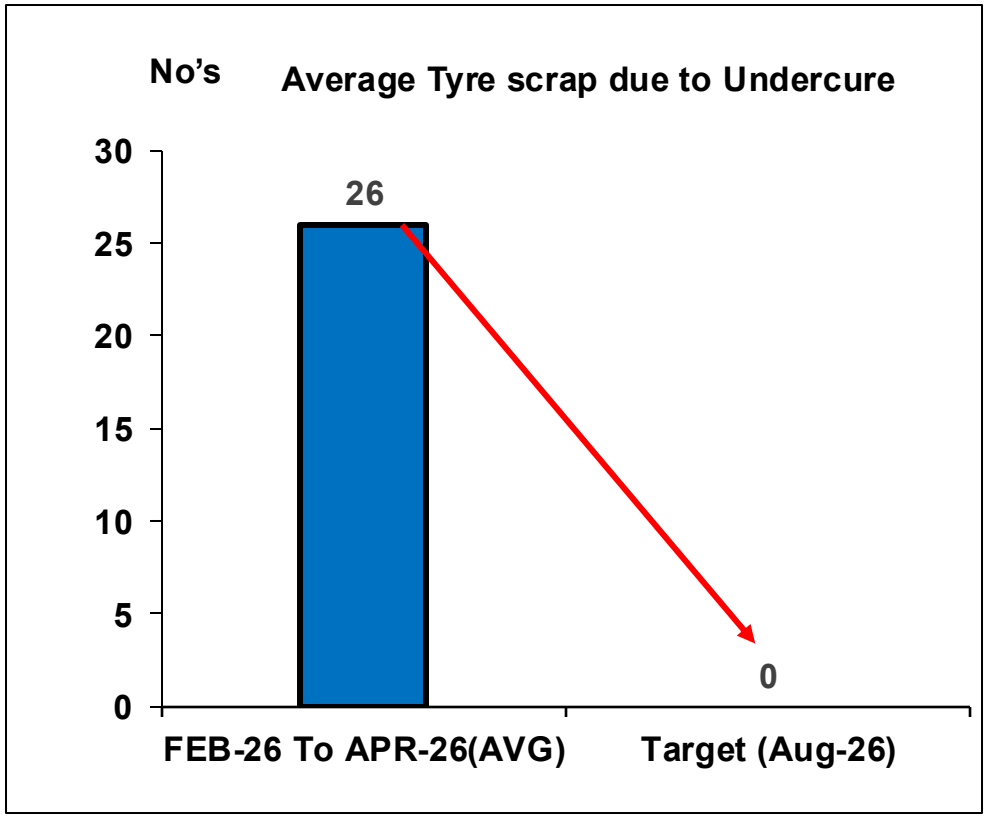
PROJECT PLAN – GANTT CHART

		GANTT CHART													CTQM.00-FR.18/OE			
Quality Circle Name		Engg Team						Regn. No.	072720102266		Department		PCR CURING					
Project Title		PLATEN CONDENSATION CONTROL FOR SCRAP REDUCTION						Meeting Time	15:30 PM - 16:30 PM			Project Category (A/B/C)		A				
MONTHS		May'26				June'26				July'26				Augl'26				
WEEKS		WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8	WEEK 9	WEEK 10	WEEK 11	WEEK 12	WEEK 13	WEEK 14	WEEK 15	WEEK 16	
1.IDENTIFICATION OF PROBLEMS	PLAN																	
	ACTUAL																	
2.SELECTION OF A PROBLEM	PLAN																	
	ACTUAL																	
3.DEFINE THE PROBLEM	PLAN																	
	ACTUAL																	
4.ANALYSIS OF THE PROBLEM	PLAN																	
	ACTUAL																	
5. IDENTIFICATION OF CAUSES	PLAN																	
	ACTUAL																	
6. FINDING OUT THE ROOT CAUSES	PLAN																	
	ACTUAL																	
7.DATA ANALYSIS ON ROOT CAUSES	PLAN																	
	ACTUAL																	
8. DEVELOPING SOLUTIONS	PLAN																	
	ACTUAL																	
9.FORESEEING PROBABLE RESISTANCE	PLAN																	
	ACTUAL																	
10. TRIAL IMPLEMENTATION AND CHECK	PLAN																	
	ACTUAL																	
11.REGULAR IMPLEMENTATION	PLAN																	
	ACTUAL																	
12. FOLLOW UP & REVIEW	PLAN																	
	ACTUAL																	
			PLAN				ACTUAL				DELAYED				PLAN EXTENDED			

TANGIBLE & INTANGIBLE BENEFITS

Tangible Benefits

- Reduction in under-cure tyre scrap - **Cost saved in Tyre Scrap ₹ 70,096 /Month ₹ 8,41,152/Annum**
- Savings in raw material and production costs.
- Reduced rework and rejection costs.
- Improved curing press productivity and machine utilization – **Reduced downtime from 3000 Mins to Zero.**
- Consistent platen temperature throughout the curing cycle.
- Reduction in quality-related customer complaints.



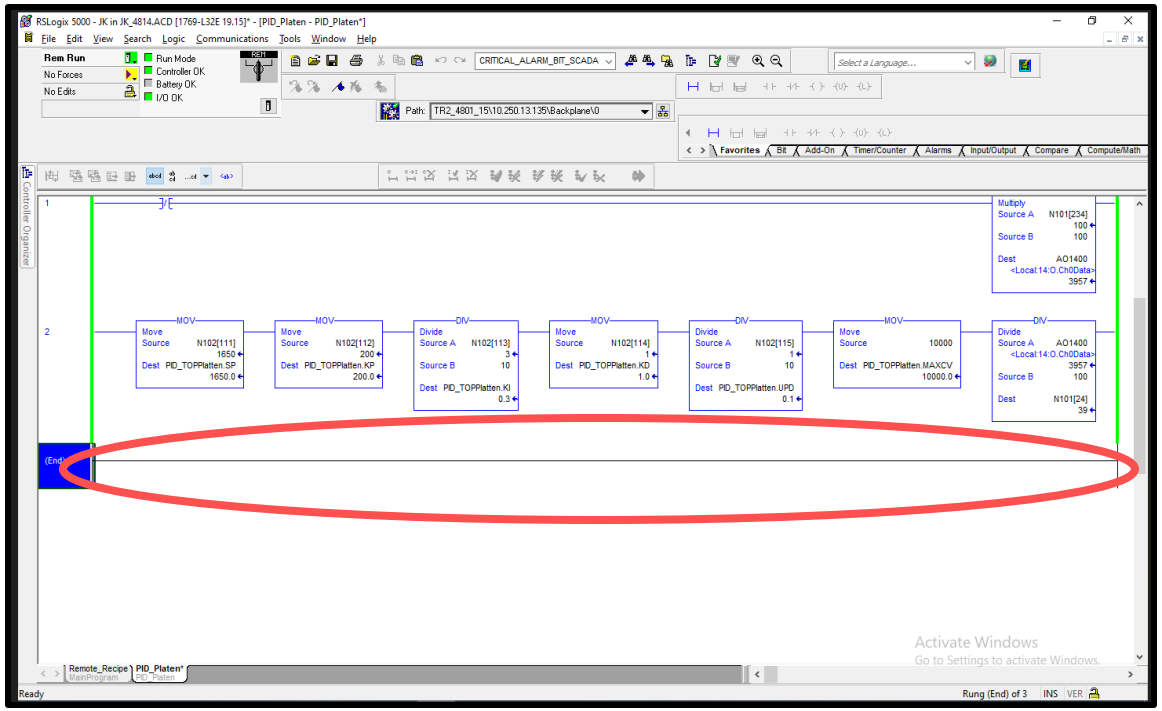
Intangible Benefits

- Increased confidence in curing process performance.
- Improved operator satisfaction through automated operation.
- Better process control and consistency.
- Strengthened in-house engineering and problem-solving capabilities.
- Development of a replicable best practice for other curing presses and plants.

TRIAL IMPLEMENTATION & CHECK – PROGRAM CHANGES

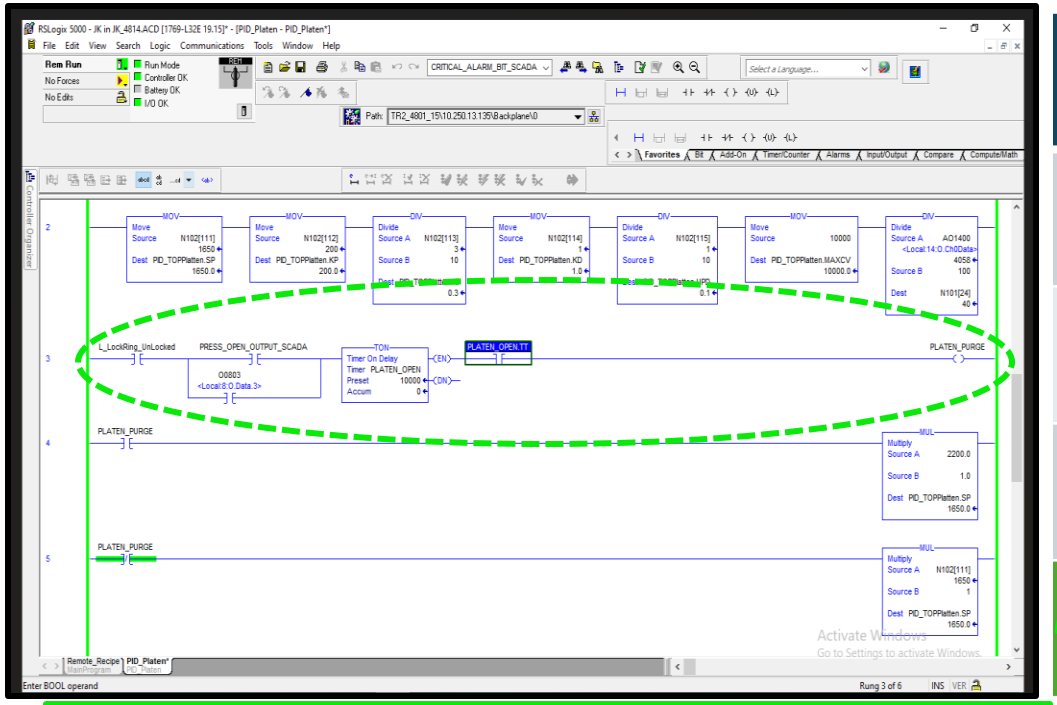
S.No	What	Why	Where	When	Who	How
1.0	AUTOMATIC STEAM PURGE SYSTEM IN THE PROGRAM SEQUENCE TO REMOVE PLATEN CONDENSATE.	STEAM LINE CONDEN SATION	CURING PRESS 4801	02-07-2026	Engg Team	During press opening, the platen control valve will remain fully open for 10 seconds to facilitate condensate purging. After the purge cycle is completed, the control valve will automatically return to normal operation and resume PID-based control

BEFORE



Before – No Platen purging in Auto Sequence

AFTER



After – Platen Purging in Auto sequence

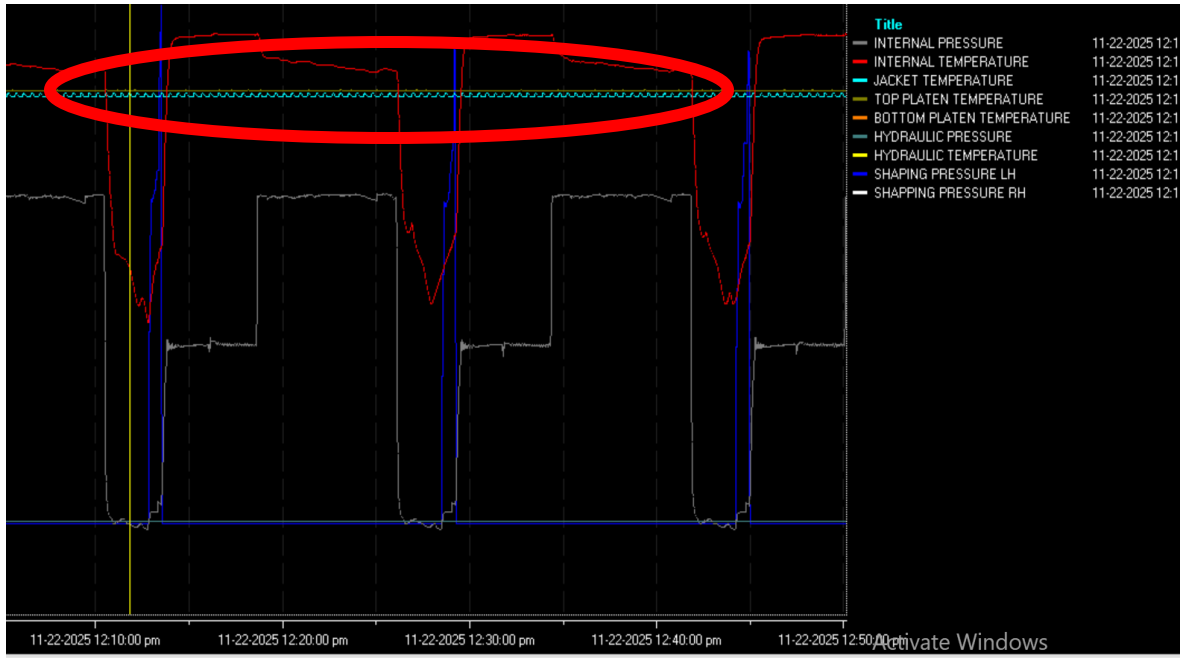
Trail & error method

ON Time	Result
20 Sec	Not Ok
15 Sec	Not Ok
5 Sec	Not Ok
10 Sec	Ok

TRIAL IMPLEMENTATION & CHECK – SCADA TREND

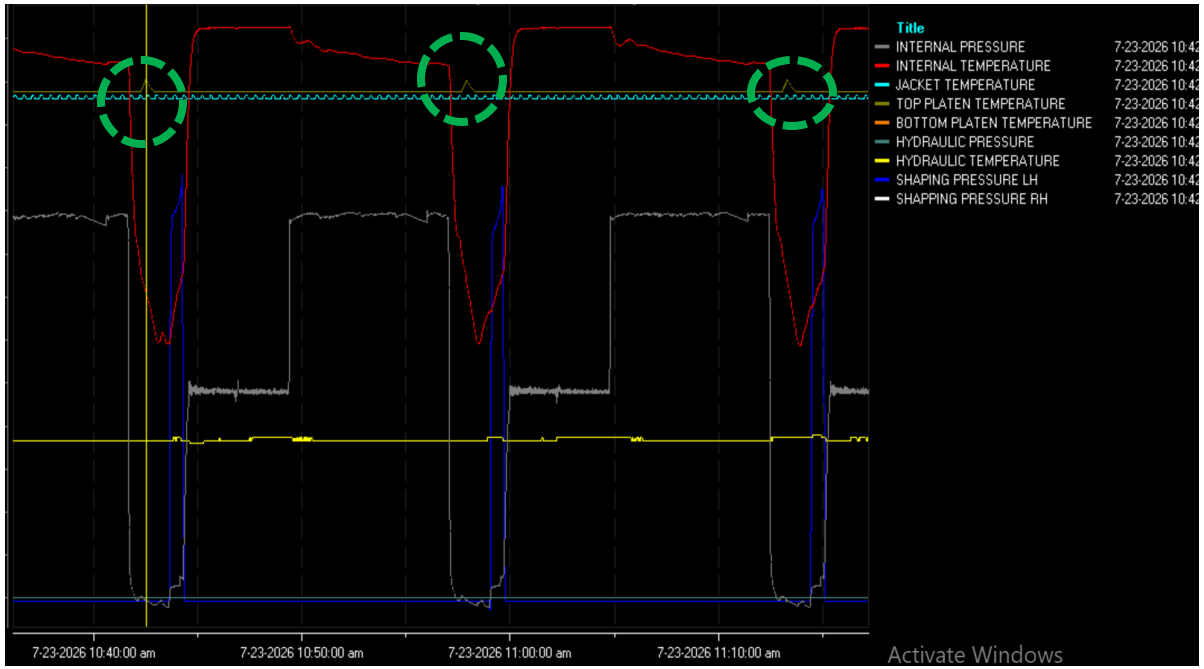
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BEFORE



Before – No Platen purging in Auto Sequence

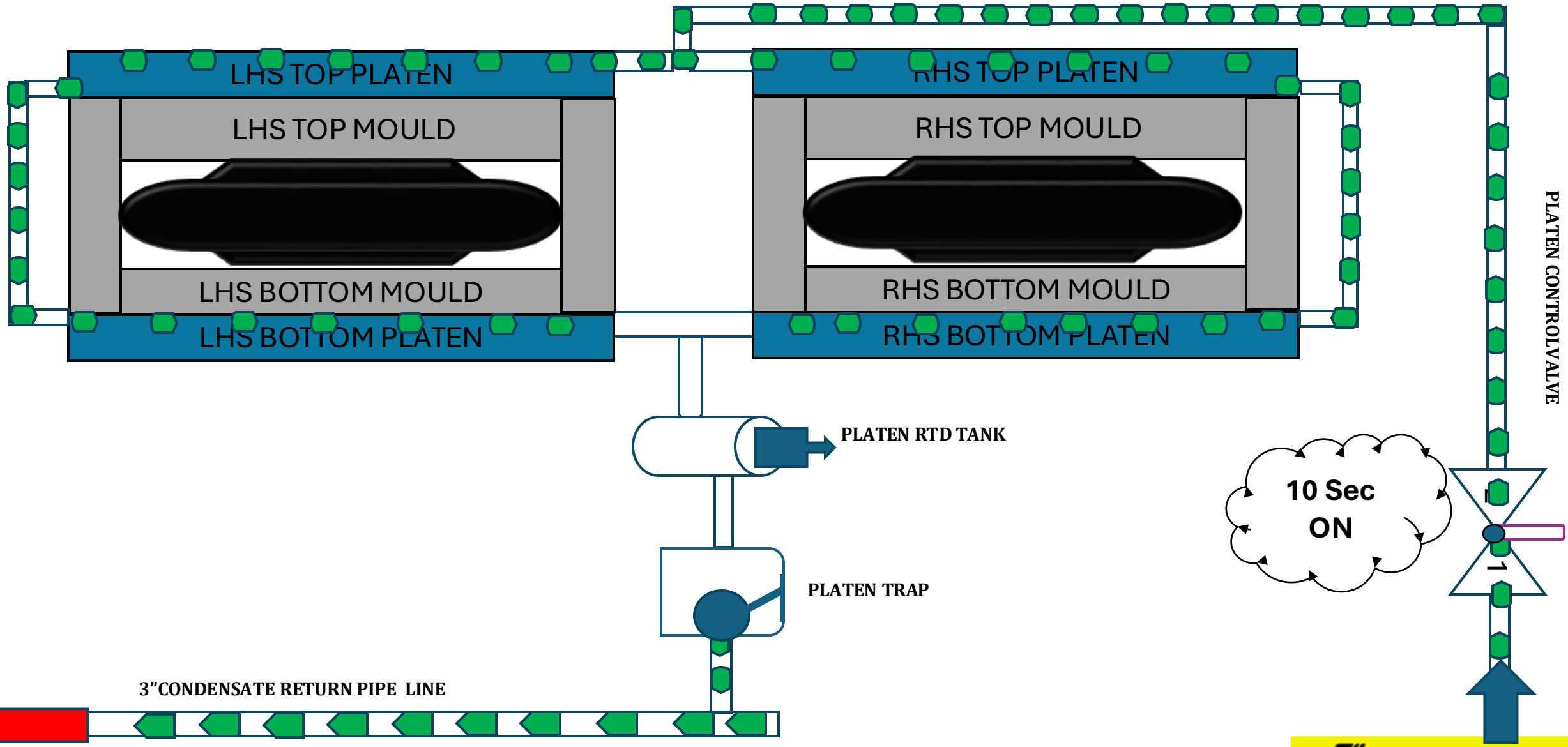
AFTER



After – Platen Purging in Auto sequence

TRIAL IMPLEMENTATION & CHECK – AUTOMATIC STEAM PURGING

PLATEN PIPE LINE CIRCUIT DIAGRAM



LIST OF CHALLENGES FACED

Challenge 1: No System Alert or Alarm

- All process parameters remained within specified limits, resulting in no PLC/SCADA alarms or notifications.
- The quality issue could not be detected through standard monitoring systems.

Challenge 2: Hidden Heat Transfer Loss

- Condensate accumulation inside the platen steam line reduced effective heat transfer.
- Actual platen temperature dropped below the required level, leading to under-cure defects despite compliant process parameters.

Challenge 3: Maintaining Process Stability

- Any process modification had to ensure curing press safety, production output, and cycle time were not affected.

REPLICATION POTENTIAL OF THE PROJECT

Steps Initiated:

✓ Root cause identified through detailed process investigation
✓ In-house PLC-based automatic condensate purge logic developed
✓ Trial implementation completed and validated on curing presses

Achievement Sharing Mode:

✓ Results presented in internal review and improvement forums
✓ Technical discussions held to explain implementation and benefits

Other Knowledge Sharing Platforms:

✓ Kaizen and Continuous Improvement meetings
✓ Project documentation shared through internal knowledge repositories

NATIONAL STANDARDS / BENCHMARKS

The project aligns with the requirements of ISO 50001 (Energy Management System) and ISO 9001 (Quality Management System) by improving energy utilization, enhancing process reliability, reducing waste, and supporting continuous improvement initiatives in line with manufacturing excellence standards.

COST ECONOMICS & ENVIRNOMENTAL BENEFITS

S. No	Project Cost (INR Lakhs)	Intangible Benefits	Tangible Benefits	Savings (in UoM)	Saving (INR Lakhs)	Pay Back (Years)
1	0	Improved curing reliability, reduced downtime, enhanced product quality	Tyre scrap reduced from 26 to 0 per month	26 tyres/month 1 Press -7 tCo2e	8.41	Immediate

The project delivers a saving of **26 tyres/month (312 tyres/year)** and achieves an environmental benefit of approximately **7 tCO_2e reduction in curing press**, while improving curing quality and process stability.

HORIZONTAL DEPLOYMENT & KAIZEN SHEET

S no	Countermeasure	Scope of Horizontal (yes/no)	Area of HD applicable if scope yes	HD Plan	
				Plan (Date)	Actual (Date)
1	During press opening, the platen control valve will remain fully open for 10 seconds to facilitate condensate purging. After the purge cycle is completed, the control valve will automatically return to normal operation and resume PID-based control	Yes	Yes	08.08.2026	16.08.2026

Kaizen Sheet (Format.No: UTQM.00.SQ-66) — **Current Status: Approved By Manager**

Benefits: Quality
Types: MURA
Category: Innovative
Classification: Poka Yoke

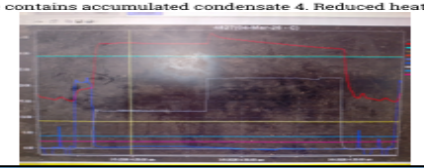
Location:	1900 - CTP	**Plant Area:**	60028321 - Electrical
Implement. Area:	CTP2 - Tyre Curing-PCR	**Kaizen No:**	CTP2027000057
Kaizen Title:	Reduction of Undercure Defects via Condensation Removal in Platen Steam Line		
Kaizen Start Date:	01.04.2026	**Kaizen End Date:**	26.04.2026

1. Problem Description

Curing press is experiencing undercure issues in the platen process line. This occurs because condensation forms in the platen steam line, reducing effective heat transfer and lowering platen temperature.

2.Problem Status: Before Improvement

1. Frequent undercure defects observed in tyres 2. Platen temperature unstable and lower than required 3. Steam line contains accumulated condensate 4. Reduced heat transfer efficiency



3.Root Cause Identification: Why-Why Analysis

Why - 1	Undercure occurs
Why - 2	Heat transfer is inefficient
Why - 3	Condensation present in steam line
Why - 4	Steam is not purged effectively during operation
Why - 5	

4. Root Cause

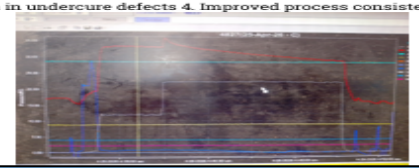
Lack of an effective steam purging mechanism in the platen control sequence leads to condensation buildup in the steam line.

5. Idea to Eliminate Root Cause

Modify the program sequence of the curing press: 1. When the press opens, increase the platen control valve setpoint to a high value 2. Allow steam purging to remove condensation from the steam line 3. Maintain high setpoint until the press is fully open 4. Once fully open, revert control valve to normal PID temperature control

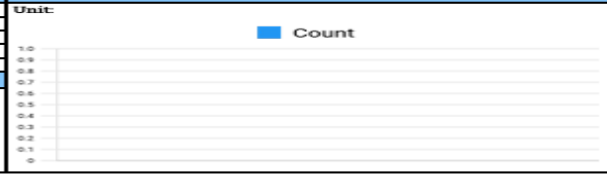
6.After Improvement

1. Condensation effectively purged during each cycle 2. Stable and optimal platen temperature achieved 3. Reduction in undercure defects 4. Improved process consistency and reliability



7.Result

Unit:



Leader

Thameem Ansari A (27727)

Team Members

R.Vinoth Raja (20425), B.A. DHINAKAR (22756)

8. Benefits

Tangible:
Reduction in defect rate (undercure) Lower rework and scrap cost Improved production efficiency Stable temperature control
InTangible:
Improved process reliability Increased operator confidence Better customer satisfaction Enhanced system understanding
Cost savings Rs in Lakhs/Year:
1000000

9.Standardization

1. Update PLC/control logic with purge sequence 2. Train operators on updated process

10.Horizontal Deployment

86
Horizontally deployed all PCR CURING Presses

Kaizen Source/Idea: CFT decision

MAJOR LEARNINGS

✅ In-house PLC logic modifications can effectively solve OEM design gaps without additional hardware investment.

✅ Cross-functional collaboration between Engineering, Production, and Quality teams accelerates problem solving and implementation.

✅ Low-cost innovations can generate substantial financial and environmental benefits.

✅ Best practices developed internally can be replicated across similar curing systems to improve manufacturing performance.


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Ranger A/T
Ranger HPe
Ranger H/T
Levitas Ultra
UX Royale
UX Touring
Ultima HiLife
Ultima Neo
Taximax
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THANK YOU