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Fine Papers - Lasting Impressions

AUTOMATION AND ELECTRONIC SENSORS IN SPB PULP MILL

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SPB'S COMMITMENT

63 Years

And going strong

100% Recyclable & Biodegradable products

Pioneer in Circular Economy

Elemental chlorine free - Eco friendly paper

Self sufficient Plantations - 204.1 million plants covering an area of 24,764 acres of land

RE share : 61 %

Carbon & wood positive

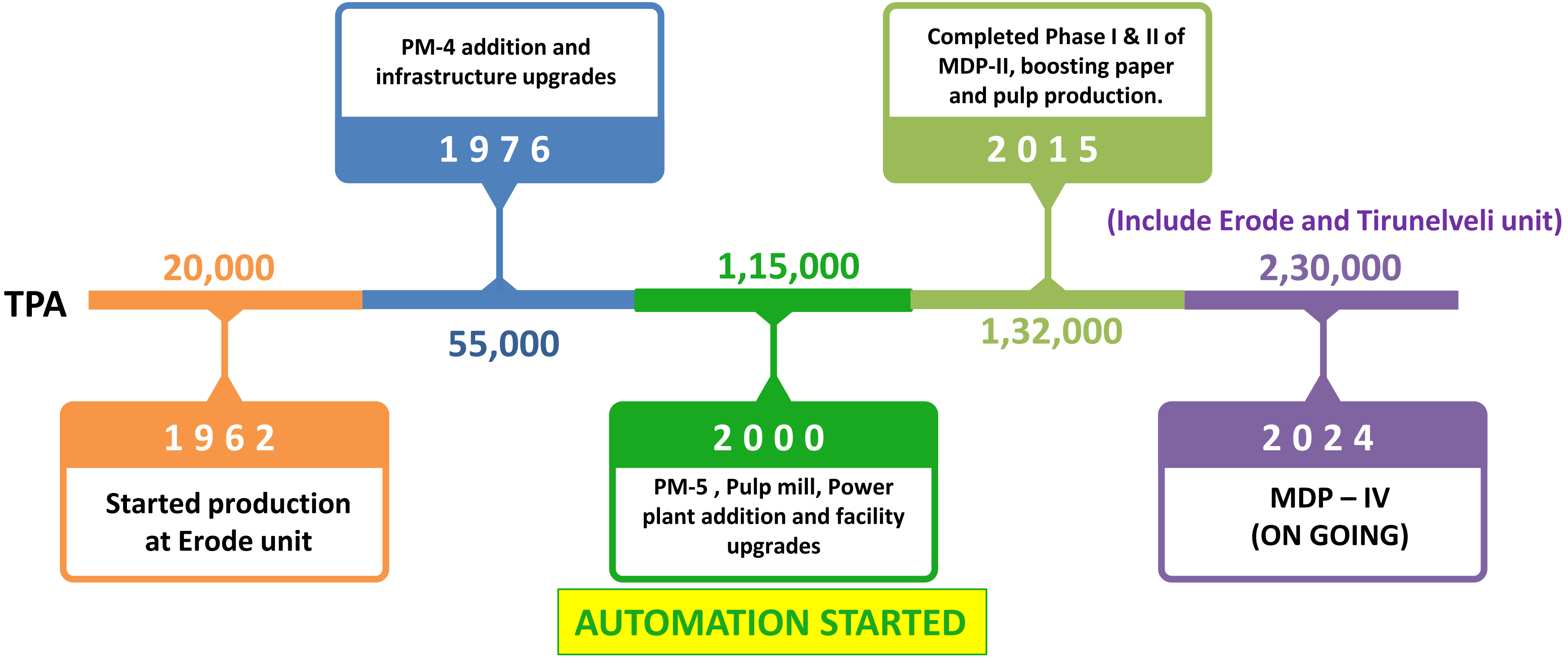
ISO 9001

ISO 14001

ISO 50001

ISO 45001

AUTOMATION PROGRESS IN SPB



CASE STUDIES

1. COST SAVING BY GAMMA DETECTION ELECTRONIC IMPLEMENTATION
2. REAL TIME PLANT STATUS THROUGH e-SERVER
3. TROUBLESHOOTING IDETIFIED BY FIRST IN AND FIRST OUT LOGIC
4. REDUCED DOWN TIME BY CARD FAILURE IDENTIFICATION LOGIC
5. SAFETY ENHANCED BY LAST EQUIPMENT RUNNING STATUS LOGIC
6. COST SAVING AND ENVIRONMENT IMPACT REDUCED BY CHEMICAL OPTIMIZATION

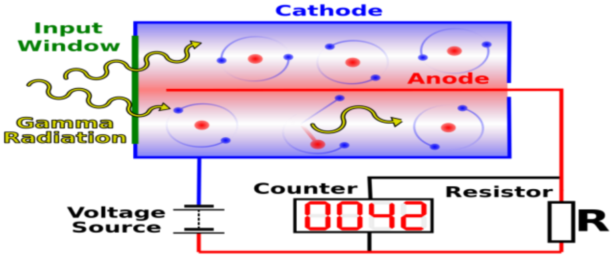
1.BOOSTING GAMMA DETECTION EFFICIENCY WITH SCINTILLATION COUNTERS

BACKGROUND:

In Pulp mills, we use a Gamma source level switch for monitoring chip filling. We use CO-60, which quickly reduces the radiation life cycle.

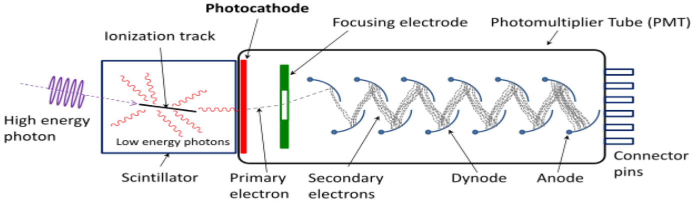
Before: A Geiger Muller detector, it is inefficient at detecting low intensity gamma rays.

Geiger Muller detector



After : Scintillation detector very good energy resolution, and efficient at detecting low intensity gamma rays.

scintillation detector

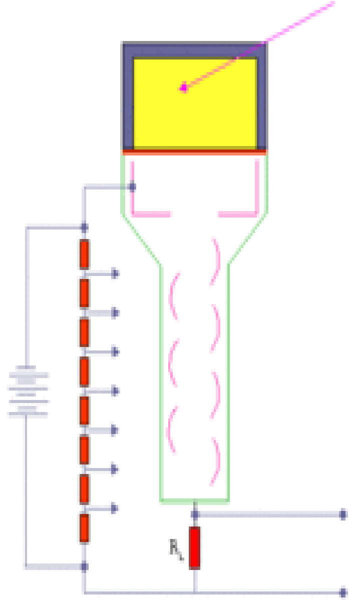


EFFICIENCY WITH SCINTILLATION COUNTERS

BENEFITS:

- Better detection of low-intensity gamma rays.
- Avoid high costs of purchasing and disposing of new gamma sources. Now we saved ₹45 lakh which is one time investment
- Prolongs the usable life of existing gamma sources.
- Ensures precise level measurements, maintaining process efficiency and safety.

scintillation detector

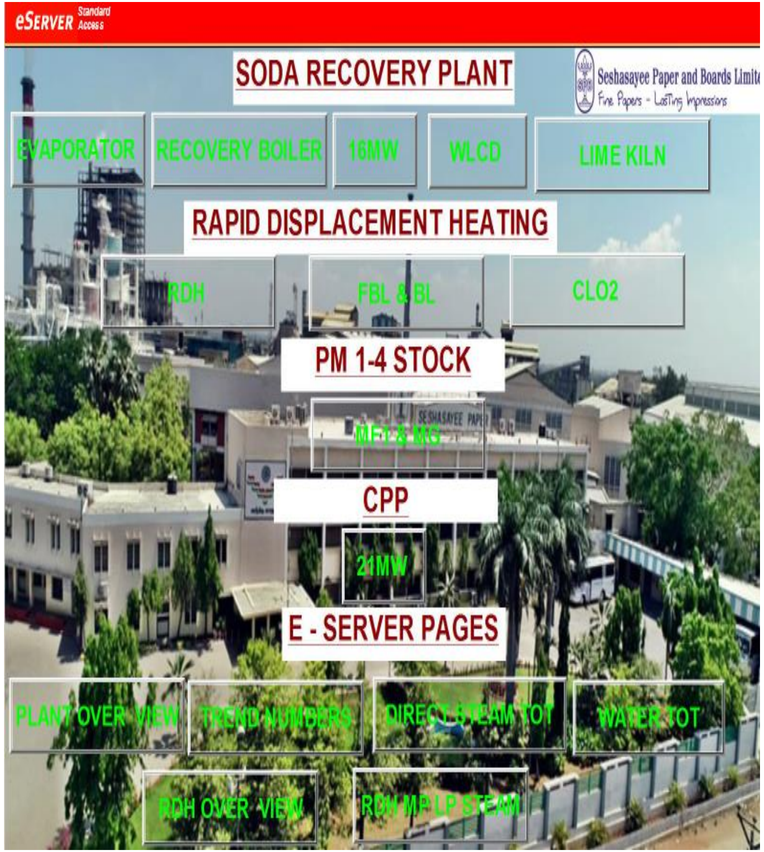


2.e-SERVER IMPLEMENTATION

e-SERVER

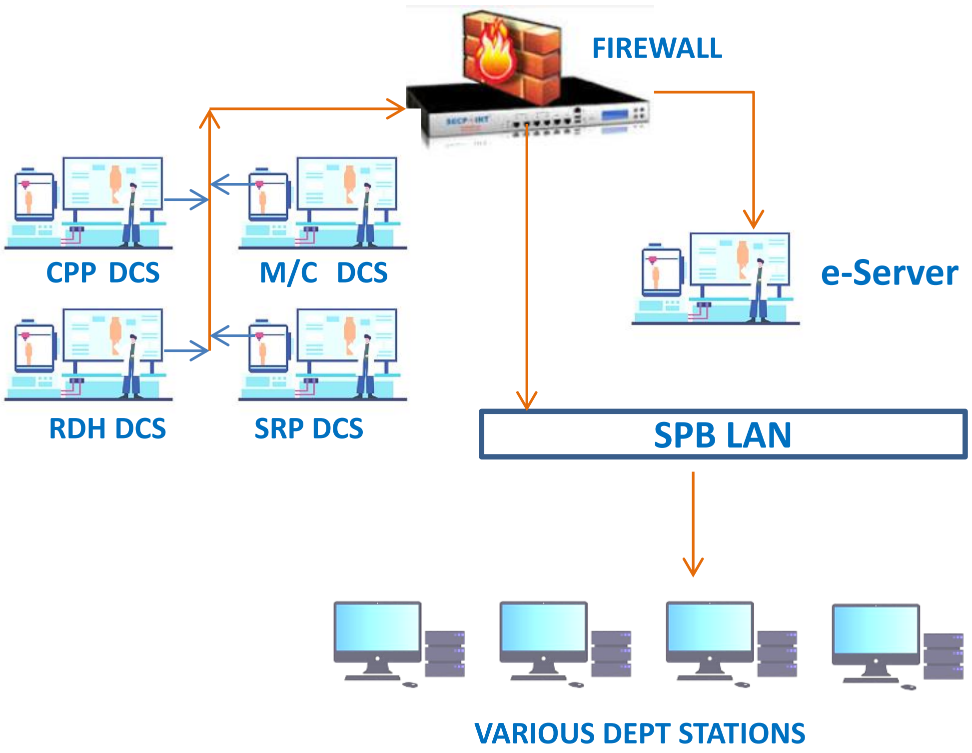
A sophisticated DCS ensures precise process control, complemented by e-Server for real-time plant status, enhancing operational efficiency and transparency.

e-Server main page



IMPLEMENTATION STRATEGY

Image : Network Configuration



Network Configuration:

- Assign a unique IP address to the e-Server within the DCS network.
- Configure the DCS data and securely push real-time data to the e-Server using the assigned IP address.
- The e-Server assigned IP configured with mill LAN network.
- Use network segmentation with firewall rules to isolate and protect the e-Server's communication within the mill LAN.

8

TESTING & BENEFITS

Testing And Validation

- Ensure accurate data from DCS
  Validate consistency with real-time comparisons

BENEFITS:

- **Improved transparency**
- **Empowered workforce**
- **Enhancing operational efficiency**
- **Real-time plant status**
  can view by higher officials and Management

e-Server plant overview

3.FIRST IN FIRST OUT LOGIC

BACKGROUND:

FIFO tag helps in tracking and identifying the sequence of interlock activations and failures, allowing for quicker identification of the root cause when a failure occurs and it will be automatically resets when the plant was started.

Problem:

- Difficulty in diagnosing failures due to complex interlocks
- Significant downtime and production losses when issues arise
- Challenges in pinpointing specific interlock or parameter failures

STEP-BY-STEP IMPLEMENTATION

System Analysis:

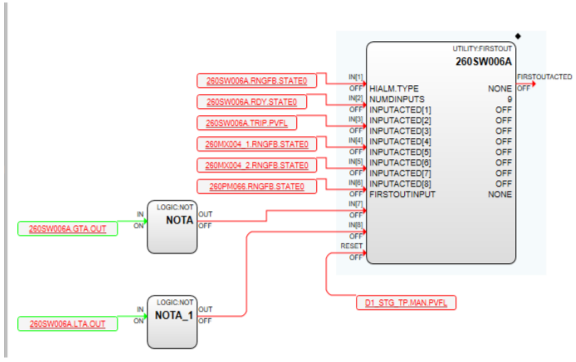
- Identify the critical equipments and Introduce FIFO tagging

Failure Detection and Analysis:

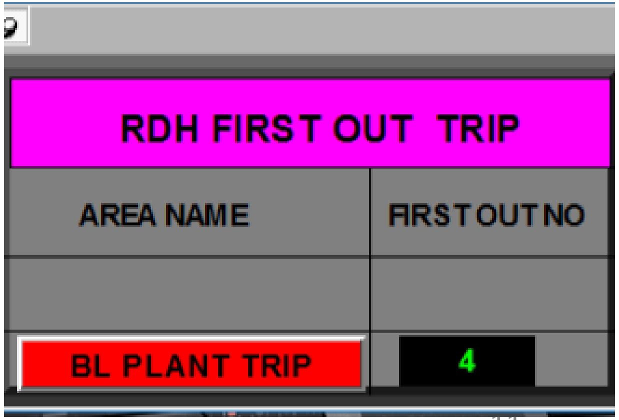
- Highlight failure points using FIFO sequence

BENEFITS:

- **Rapid identification of failures**
- **Reduced troubleshooting time and minimized downtime**
- **Improved safety through accurate failure detection**
- **Efficient data management for maintenance decisions**



First In First Out block



4.DCS CARD FAILURE IDENTIFICATION LOGIC

BACKGROUND:

In a DCS, occasional I/O card failures occur, and pinpointing the exact card responsible for the failure can be time-consuming.

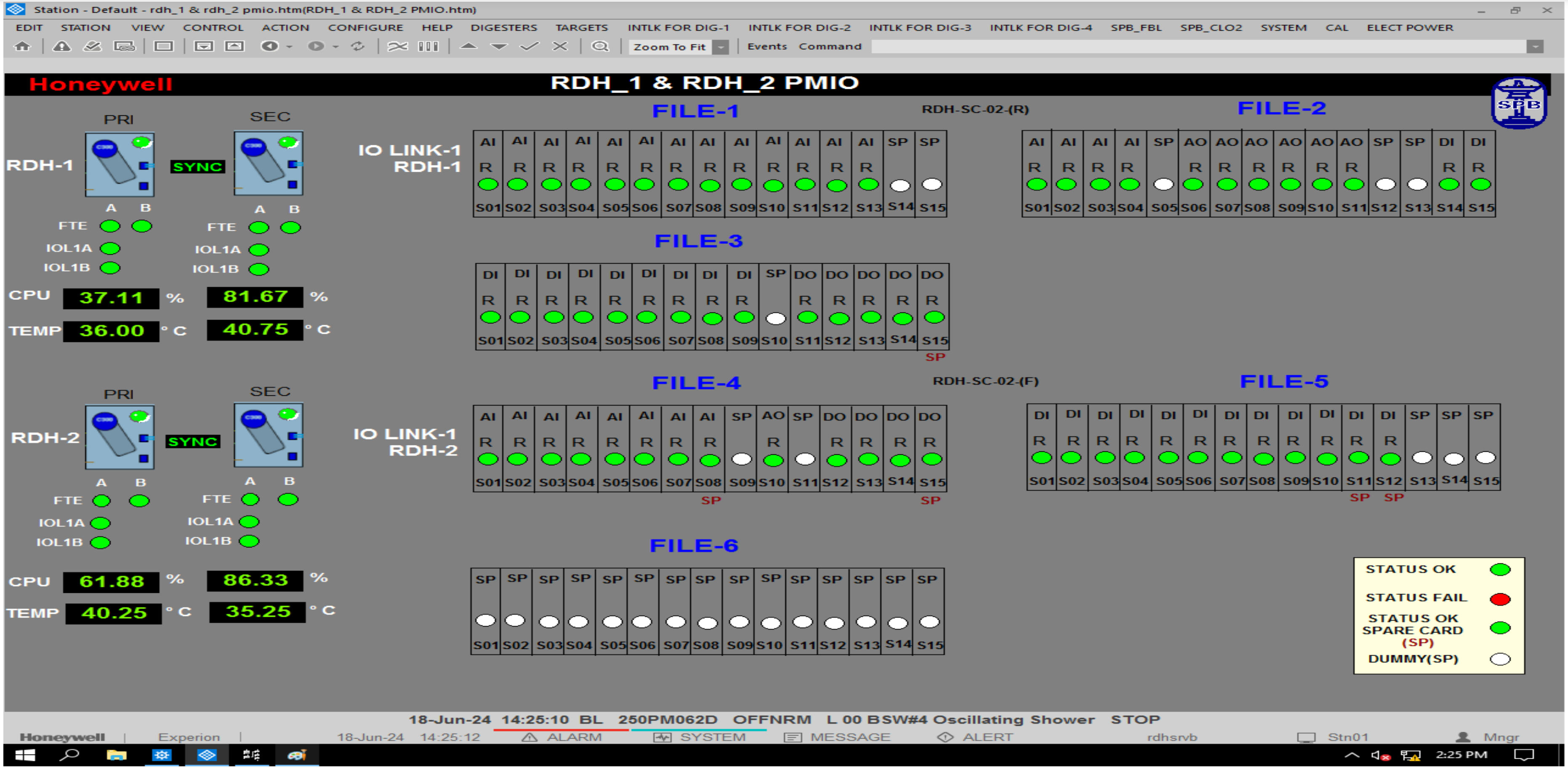
Different I/O cards:

- **DI/DO Cards:** 32 I/O points each
- **AI/AO Cards:** 16 I/O points each
- **Card Slots:** one file rack contain

  15 card slot totally we have 15 files.

DCS CARD

DCS CARD FAILURE IDENTIFICATION DISPLAY



DCS CARD FAILURE IDENTIFICATION LOGIC

Logic Implementation:

- Continuous status monitoring of I/O cards
- Retrieve real-time data (operational status, error codes)

Solution:

- Developed a visual logic system and it helps to enables quick identification of failed I/O cards.

BENEFITS:

- **Quick identification of card failures**
- **Reduced downtime and increased efficiency**
- **Improved process reliability and safety**

DCS CARD

5.LAST EQUIPMENT RUNNING STATUS

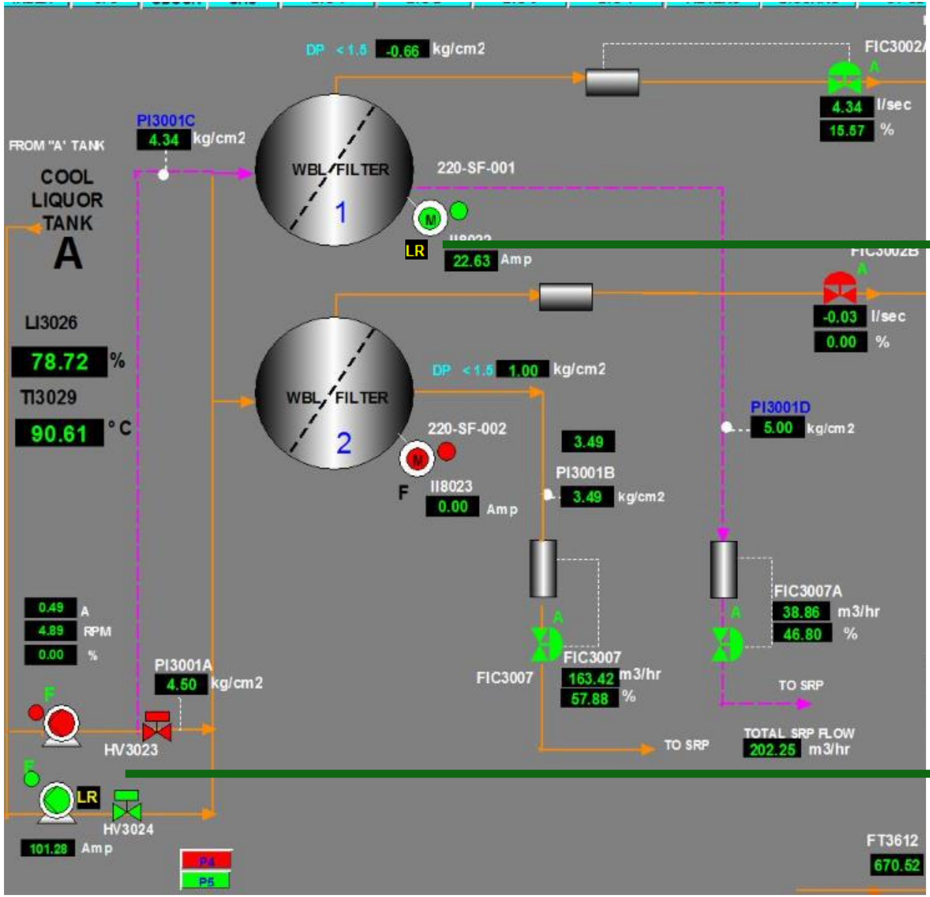
BACKGROUND :

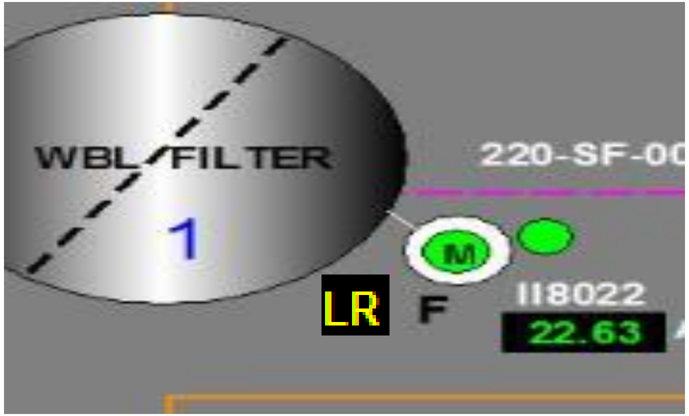
- During equipment changeover, planned shutdowns can lead to extended downtime.
- Lack of awareness about equipment status during shift changes can cause incorrect equipment operation.

Step-by-Step Implementation

- **System Analysis** : Identify critical equipment .
- **LR Tag Setup** : Implement LR tags, integrate with control systems, and log data continuously.
- **User Interface and Alerts** : Created a user-friendly interface and implemented alert systems.

LAST RUN STATUS





Last Run Equipment

IMPLEMENTATION AND BENEFITS

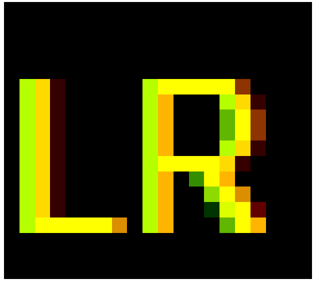
Solution - Implemented the LR (Last Run) Tag:

- LR tag records and indicates the last run status of each and every important equipment.
- Helps the process department and shift personnel to know exactly which equipment needs to be started.
- Improves productivity and reduces the likelihood of errors.

BENEFITS:

- **Accurate Status Tracking**
- **Improved Communication**
- **Reduced Downtime**
- **Enhanced Safety and Increased Production Efficiency**

Last Run Tag



6.ADVANCED CHEMICAL OPTIMIZATION IN PULP BLEACHING

BACKGROUND:

- During the bleaching stage, we utilize ClO_2, H_2SO_4, H_2O_2, and NaOH with specific quantities of these chemicals.
- Despite washing and significant chemical wastage remains a challenge.
- Inconsistent control over kappa number and brightness.

Objective : Optimize chemical usage, maintain quality

Stages : **D0, EOP, D1**

Solution :

We have implemented a new technology to optimize our current chemical usage and achieve our target brightness with more effectively.

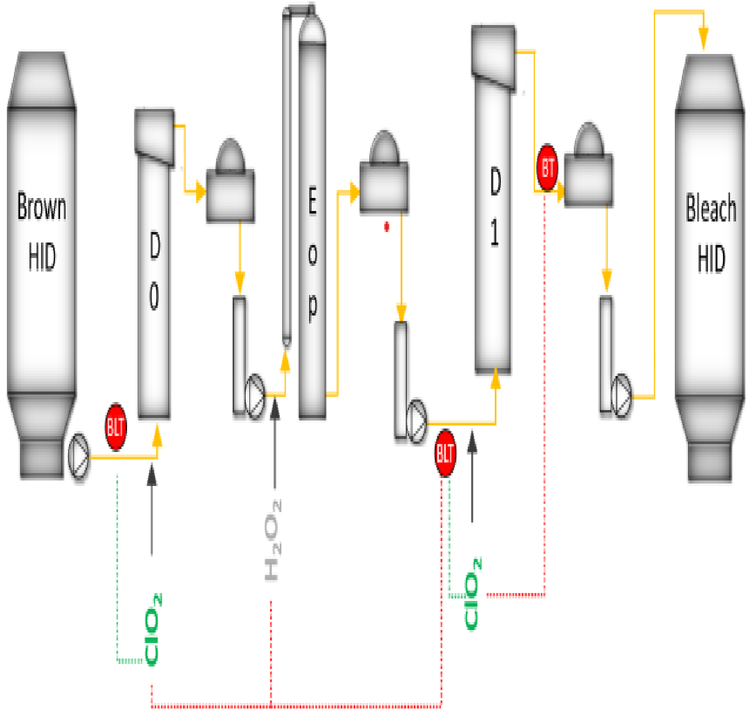
We used MACS (Multivariable Advanced Control System) software with inline instrument sensors (BLT and BT sensors). It is a predictive control software.

ADVANCED CHEMICAL OPTIMIZATION

Sensor Placement:

- **BLT Sensors** : D0 and D1 tower inlets (Kappa, Brightness)
- **BT Sensor** : D1 tower outlet (Brightness)
- **Data Integration** : Real-time Data To Software and DCS for Control Adjustments.

Sensor places



BENEFITS:

- No manual calculations to set the targets.
- Reduced the excess bleach chemical, and saving 1.5 - 2 kg/ton of bleached pulp.
- Consistent brightness control.
- Optimized chemical consumption, improved sustainability.

SUMMARIES

SL. NO	IMPLEMENTATION IDEAS	BENIFITS OF SPB	APPLICABLE TO
1.	GAMMA DETECTOR	We saved up to **₹45lakh** which is one time investment.	Radiation application areas
2.	e-SERVER	**Transparency** with Real-time plant status access.	DCS application areas
3.	FIFO LOGIC	Reduced **troubleshooting time** through accurate failure detection	All Automation areas
4.	DCS CARD FAILURE LOGIC	Reduced the **down time** by Quick identification of card failures.	DCS application areas.
5.	LAST RUN STATUS	Improved the **Communication** and **Enhanced safety.**	Can be applied all unit operations.
6.	CHEMICAL OPTIMIZATION	**Cost reduction ₹ 550 Lakhs per annum** aprox. and **Path Forward Towards IOT.**	Can be applied all unit operations

OUR EFFORTS & JOURNEY CONTINUES IN THE PURSUIT OF **EXCELLENCE TOWARDS SUSTAINABILITY**

By implementing these ideas and new electronics in our industry, we have Enhanced support and achieved our targets.

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THANK YOU