



IX[®] Case Study

Enhancing Pulp & Paper Manufacturer's Asset Availability and Reliability through Strategic Maintenance Approach



IMPLEMENTATION
ENGINEERS[®]
BEYOND CONSULTING

\$6.8M

Annualized
benefits

82%

reduction of
excess &
obsolete work
orders

25%

improvement in
work order
schedule
compliance

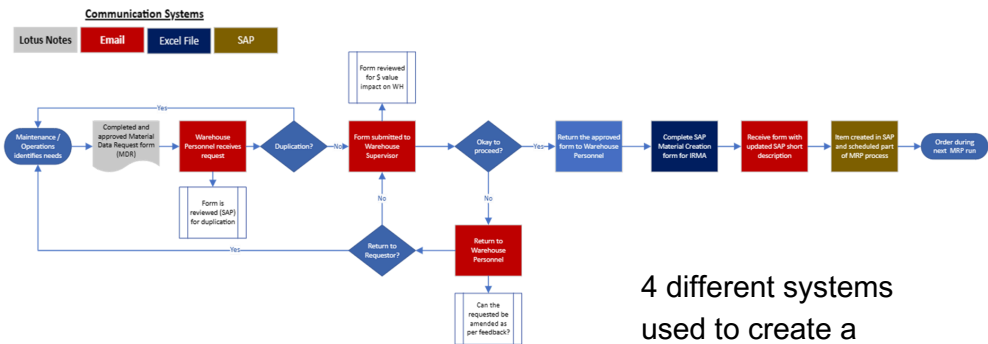
Implementation Engineers partnered with a prominent pulp and paper manufacturing client to drive significant improvements in production and maintenance processes. The collaboration aimed to enhance Overall Equipment Effectiveness (OEE) of paper machines and increase the output of the pulp mill to meet budgeted standards. By leveraging our expertise in operational optimization, the team implemented a holistic Asset Performance Excellence approach that encompassed streamlining MRO procedures, enhancing asset reliability, and optimizing maintenance work management processes. In addition, we successfully implemented operational improvements for our client, resulting in enhanced operational efficiency, reduced losses, and a strengthened team capable of driving continuous improvement initiatives.

Material Management (MRO)

Our client's MRO processes were inefficient and lacked clear metrics for performance evaluation. Critical spares for key assets were not identified, leading to potential downtime and operational disruptions. Implementation Engineers designed and implemented required MRO processes and developed a Responsibility Assignment Matrix (RACI) to streamline decision-making and accountability. By optimizing our client's materials management processes, we addressed the MRO pain points and improved operational efficiency. The implementation of clear metrics, streamlined processes, and proactive spare parts identification contributed to cost savings and enhanced asset reliability for the client. Key activities of the workstream included:

- Validated existing spare parts condition for PM12, PM10 and Converting
 - Developed and installed MRO metrics
 - Developed MRO Process maps & tools
- Formalized and installed cycle counting process
 - Installed critical spares for PM12, PM10 and Converting, including max, mins and safety levels via RE Critical spares project

Material Master Creation Process Baseline



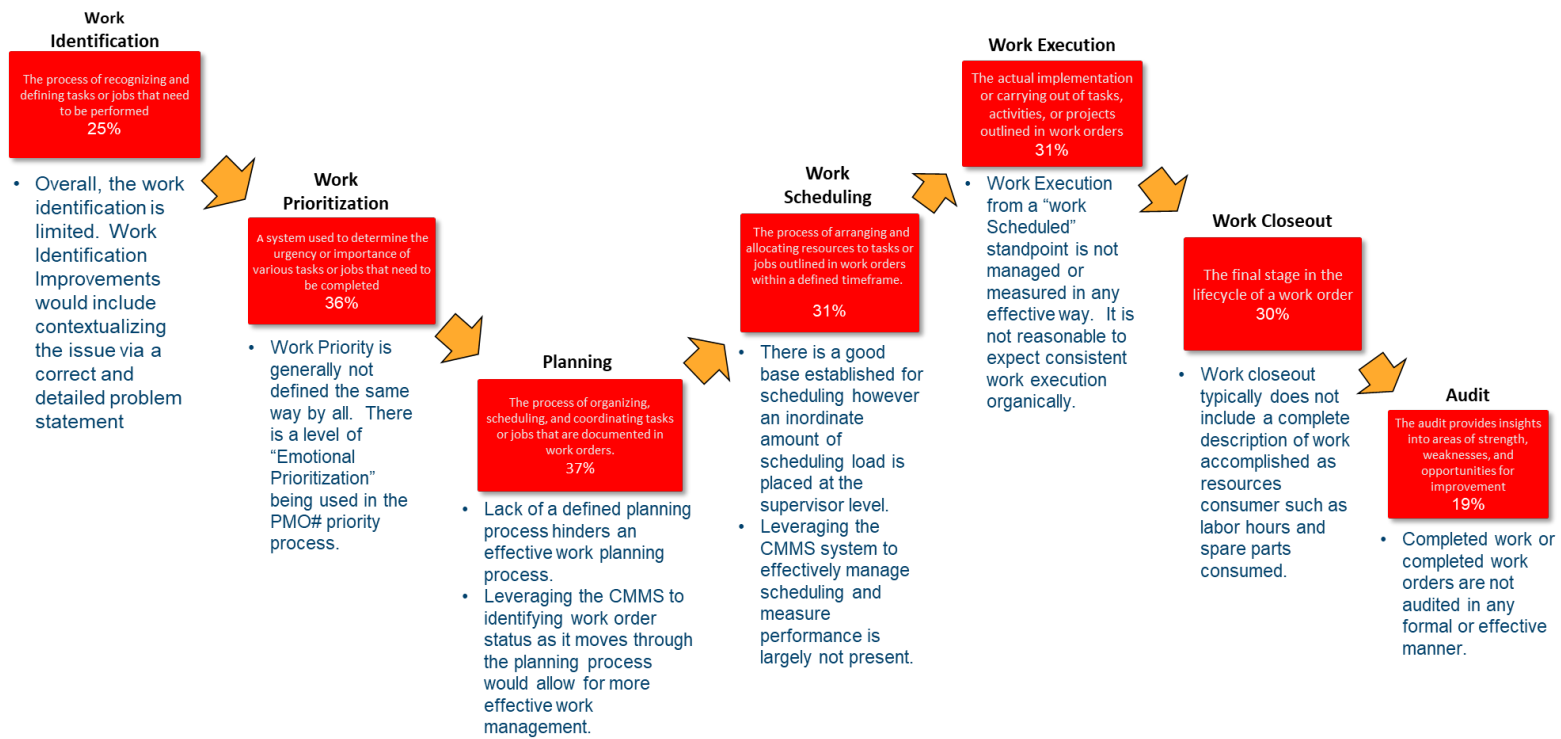
4 different systems
used to create a
material master

The Material Master process was challenged with legacy systems, improper Short Descriptions and not being created with rigor and being supplemented by spot POs

Maintenance Work Management

Implementation Engineers was tasked with improving the work order management process for our client who faced frequent significant downtime events due to fifty-year-old machinery and equipment. Despite being an SAP enterprise user with the Plant Maintenance module, our client lacked the necessary processes to fully leverage this technology.

Work Management Process Baseline



Activities during implementation included:

- Drove an improvement in the Work Order Management process by implementing best practices for Identification, Prioritization, Planning, Scheduling, Execution, Close Out, and Quality Audits
- Collaborated with a multi-functional client team from maintenance and operations to install best practice work order management processes tailored to the organization's specific situation and capabilities
- Implemented a staggered deployment of the seven process steps to facilitate incremental learning and benefits
- Established twice daily "stand-up" operations and maintenance meetings to enhance visibility and communication between functional areas, instill confidence in the processes, and improve response to unplanned downtime events
- Removed excess and obsolete work orders to enhance data quality and focus planner attention on relevant work
- Provided one on one coaching and support to process users at the point of use
- Installed process metrics and quality audits to ensure long term sustainability

Through strategic collaboration, tailored process implementation, and continuous support, we transformed the maintenance work management process for our pulp and paper client. The implementation of best practices, utilization of SAP Plant Maintenance module, and establishment of effective communication channels have resulted in improved efficiency, reduced downtime, and enhanced overall operational performance for our client.

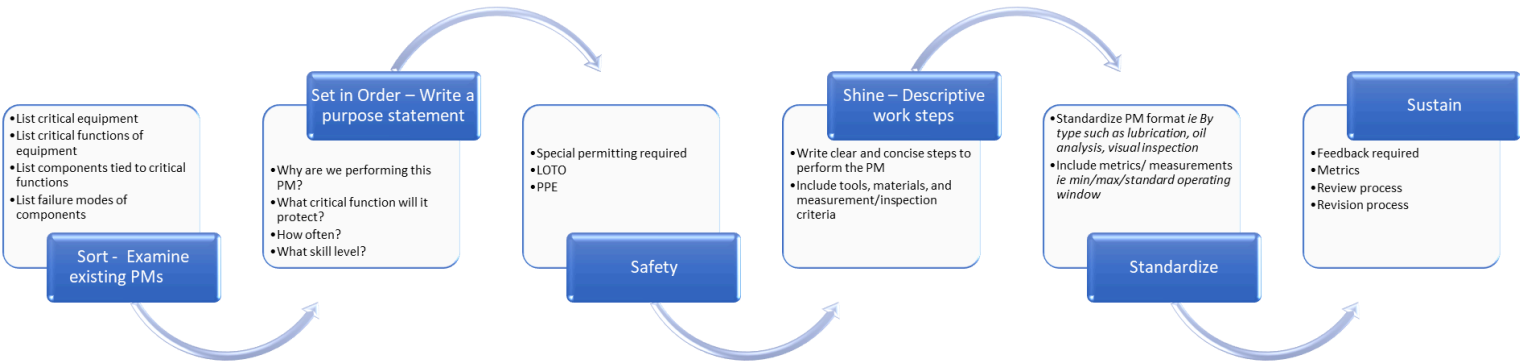
Reliability Engineering

Our client's assets were experiencing low availability and reliability due to underutilization of leading and lagging reliability methodologies and tools. This resulted in increased operational risk, decreased asset life cycle, and higher life cycle costs. Activities of the Reliability Engineering workstream included:

- Implemented a Reliability-Centered Maintenance (RCM) analysis, specifically Failure Modes and Effects Analysis (FMEA), on PM12 to identify potential failure modes and develop a proactive maintenance strategy
- Developed a comprehensive maintenance strategy based on the RCM analysis to optimize asset performance and increase availability within the project window
- Established asset reliability processes and tools utilizing Preventive Maintenance/Predictive Maintenance Optimization (PMO) and Root Cause Analysis (RCA) methodologies to enhance asset performance and reliability
- Defined critical spare parts lists for PM12, PM10, and Converting equipment using IE critical spares tool to ensure timely maintenance and minimize downtime

Reliability Processes & Tools

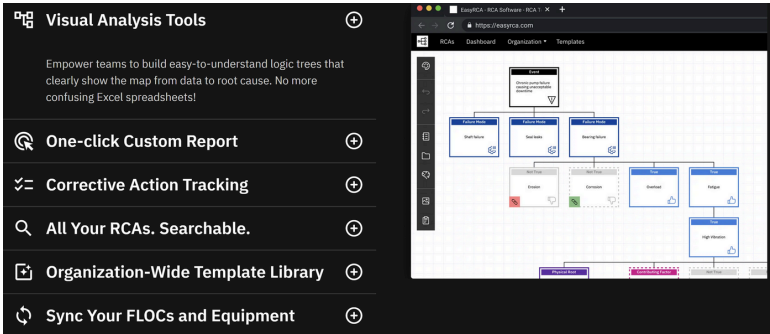
PM Optimization **Protects** the most **Critical Functions** of the most **Critical Equipment**



RCA used to **Protect the People & the Process**



Implemented **EasyRCA digital tool**



Operations

Implementation Engineers conducted a series of Kaizen events to address the operational challenges faced by our client. The key objectives included reducing operational losses, developing our client team's bench strength in Lean Kaizen problem-solving techniques, and establishing sustainable metrics and process owners to maintain the improvements. Implementation Engineers collaborated closely with client leaders to identify and schedule the Kaizen events focused on opportunities within paper machines and pulp production. Through a structured approach, multiple client team members were trained in PDCA and Kaizen events, gaining valuable skills through apprenticeship under the guidance of Implementation Engineers facilitators.

Operations Charters

Project Name

Reduce DT from Breaks for PM12

Problem Statement

Downtime due to Breaks on PM12 account for 3.48% of available operating time...the single largest cause of downtime. Breaks also cause acceptance loss (addressed in a related Charter)

Objectives

Through a detailed analysis of the Break data and execution of root cause analysis we will identify and improvement options to reduce breaks.

Specific Kaizen Title

12 Finishing Rapid Change Over (RW1)

Background and Problem Statement:

Rapid Change over improvements are generally needed when change over accounts for 20% or more of the process downtime.

Objectives and Deliverables:

By leading the team through a Rapid Change Over process...we will reduce the largest source of downtime for RW1

Through analysis of the process will identify steps in process and

Specific Kaizen Title

12 Finishing Rapid Change Over (RW2)

Background and Problem Statement:

Rapid Change over improvements are generally needed when change over accounts for 20% or more of the process downtime.

Objectives and Deliverables:

By leading the team through a Rapid Change Over process...we will reduce the largest source of downtime for RW2

Through analysis of the process will identify steps in process and associated times...separating internal vs external times. Will

Specific Kaizen Title

PM12 Machine & PM12 Winder SLAB Broke Loss Minimization Caused by Break Downtime (DT)

Background and Problem Statement:

Sheet break downtime caused some SLAB broke tonnage losses on both PM12 and its winder. PM12 winder breaks accounted for 19810 minutes in CY 2022 18% of total DT recorded in CY 2022 PM12 winder (machine and left on mandril winder/rewinder amounted to 1

Objectives and Deliverables:

Study the correlation between PM12 machine and winder SLAB broke losses as a function of break downtime
Reduce the broke caused by break down downtime on PM12

Specific Kaizen Title

PM 23 Machine Slab Losses (Paper on Mandril/Lineal Ft)

Background and Problem Statement:

Paper left on Mandril and Lineal feet Incorrect are two of the largest accapetance losses for PM 23. Recent Pixelle data shows 232 ons/per month for the combined catagories.

Cause for these losses is not fully known...

Objectives and Deliverables:

Reduce losses for (Paper left on Mandril) and (lineal Footage Incorrect) by 20% vs an agreed baseline period (avg/median tons/month)

Root casue analysis is needed to understand the causes of these losses and hypothesis testing and validation activities will be used to assure the correction.

Deliverables will include

Engagement of the PM23 team in meetings, root cause analysis and improvement activities. KPIs will be determined to monitor improvement and controls designed and installed.

Primary Metrics

PM Slab losses (Avg/MedianTons/month) for Lineal feet incorrect and Paper left on Mandril

Secondary Metrics

By leveraging the collective expertise of staff and operators, each Kaizen event successfully identified data-driven opportunities and implemented solutions to enhance operational processes. The outcomes included the establishment of standardized work procedures, the development of new maintenance preventive measures, and the initiation of repairs for neglected equipment. Furthermore, process owners were appointed from each event team, equipped with the necessary tools and expectations to monitor operational metrics, take corrective actions as needed, and sustain the improved performance levels.

Let's Get Started

- Schedule a meeting with our team to discuss how Implementation Execution (IX®) can help your organization achieve its goals. Submit an IX® request on our website at www.implementation.com
- Visit www.implementation.com to read more about IX® and how we have helped our clients create sustainable results
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