IMPLEMENTATION ENGINEERS®
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CASE STUDY

Improvement boost OEE, increase productivity

Increase performance for a paper mill's converting operations

An Implementation Engineers Engagement

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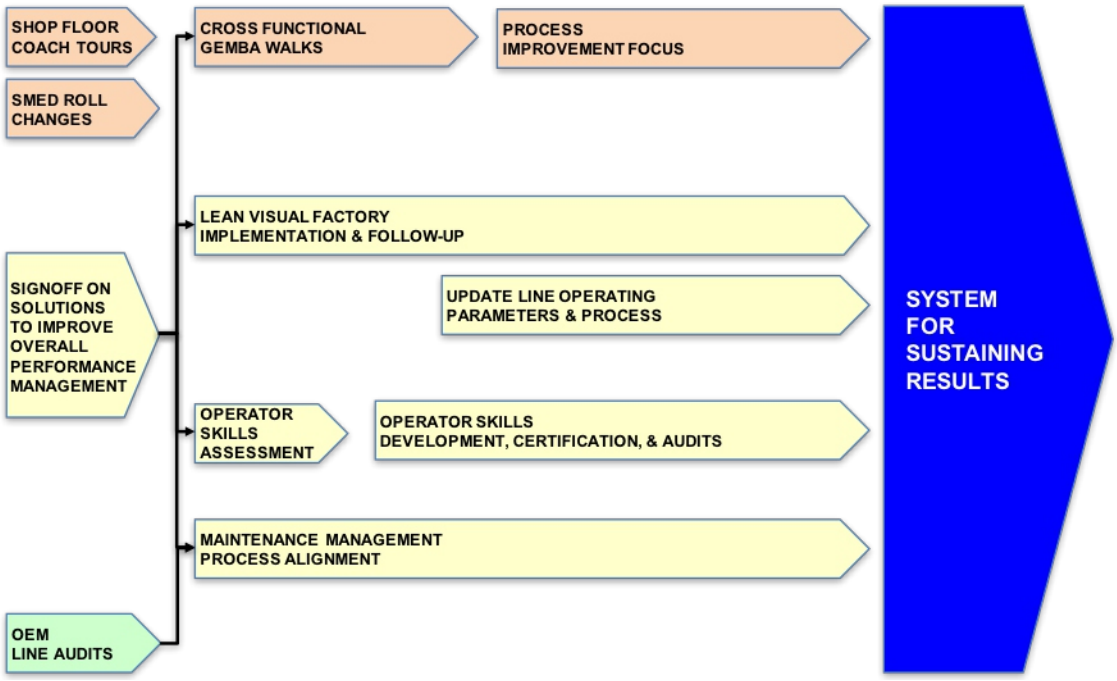
Converting lines were lowest producers in company

Historical data at the client site showed that the availability and utilization levels were resulting in Overall Equipment Effectiveness (OEE) levels of 37%. A sister facility was operating at an OEE of more than 65%. By raising the OEE level at the client site to 65%, the value to the company was estimated internally at $21MM annually. The multi-billion-dollar corporation had tried other initiatives in the past with its operations excellence team, but it was not successful. The GM requested another approach utilizing an outside management services company.

Operating issues impact performance in 4 areas

Area Impacting Performance	**Problem Definition**
People	Leaders were put into position because they were the best operators not due to leadership capability
	Incentives were not in place for operators to perform and other departments offered addition compensation for the same work
	Goals and metrics were not understood by leaders or operators
	The organizational structure did not support continuous improvement or the sustainability of current standard work
	Operators were not formally trained on the equipment they were running
	Front-line supervisors did not know how to engage in the union environment.
Process	There was no defined process for changeovers
	Determination of the maximum possible speed for purposes of determining OEE was not updated with new SKUs or equipment changes
	Maintenance did not routinely utilize work management processes including work identification, work prioritization, planning, scheduling and work order close out.
Management Systems	Management did not have a process in place to identify variance and coach operators or technicians
	Maintenance and Operations did not utilize metrics or prioritization matrices to drive doing the right work at the right time.
	Visual management was not used to drive performance and variance management
	Leaders did not have standard work to manage the business
	The key driver metric Overall Equipment Effectiveness was not known or understood by leadership or operators
Equipment	All maintenance was reactive with the exception of lubing, which was not done properly. No preventive maintenance program was in place
	Equipment modifications were made for 10 years with no documentation of the changes and rationale
	Root cause for equipment failures and abnormal operating conditions were not questioned or understood

High-level plan to address operating issues



Project targets 3 lines operating 24/7 with 150 FT employees

The scope includes 3 paper-converting lines from the time raw material is received (rolls) until the product is wrapped and ready for shipment. The area includes a four-shift operation and covered 24 hours a day, 7 days per week and 365 days per year. There were approximately 150 full-time employees that were in the project scope either directly or indirectly. Approximately 125 employees are union members. The major scope includes working the operations team and maintenance team, but support areas such as supply chain, executive leadership, engineering, IT, human resources, finance, corporate operations excellence were additional stakeholders and included as needed. The duration was 36 calendar weeks.

To support the change initiative there were five working teams that are identified to address the performance gaps, including shop floor performance management, line operating parameters, maintenance, operator skills development and equipment assessments.

Communication plays part in change management approach

The change management process was the guiding force and mission critical. Work content is varied; however, the ability to create and institute change is a key requirement of the project. This has to be a new way of operating for the client not just a flavor of the month. How the team would identify the change, prepare the team and implement it were key elements in creating the methodology. Other work streams required adaptability and rolling wave planning to ensure the gaps in equipment, process and management systems would ensure success and sustainability.

An adopted approach from Kotter established a sense of urgency, formed a powerful coalition, created vision, communicated that vision, empowered others to act, planned and created short-term wins, consolidated improvements, and institutionalized new approaches. Within the project governance communication is an element that transcends all work streams and anything that is project related or impacted stakeholders. The communication plan for the team followed key communication strategies developed during the design phase. An excerpt from a communication newsletter (Figure 1) and the routine modes of communication were newsletters, e-mails, meetings, town halls, and daily huddles.

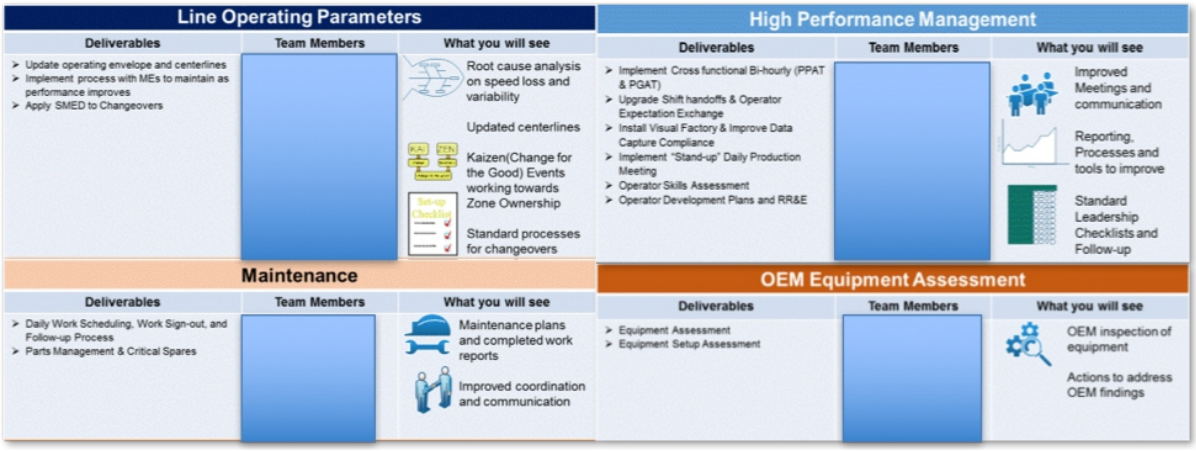


Figure 1: Routine modes of communication

Line control workshop challenges crews, identifies quick wins

A group of off-shift operators joined engineers and other staff met for an all-morning session to address line-control principals and how to apply them. The workshop encouraged participation and was facilitated by a member of the Implementation Engineers team. Increasing common understanding of how speed, availability, and accumulation work together to limit or enable line throughput was one goal of this activity. Attendees simulated an actual production line – predicting, measuring, and reviewing performance – and applied their new learnings to drive output. Output was tripled in the simulation. The group developed an action plan to apply these ideas on the production floor with some work set to begin within the next two days. A second workshop was held a month later for the other converting shifts. During the simulation, teams identified quick wins to implement immediately following the workshop.

At the start of the day, everyone described what they thought they would get out of all-morning meeting. “We haven't been able to do this in the past,” was one comment. Upon completion, those same participants aligned with the future vision and believe that this will happen if they all work together.

Implementation summary

During the project implementation phase, the Implementation Engineers' team applied a host of diagnostic tools – operational and cultural – to identify the specific machine and management issues that were preventing the operation from achieving improvement.

The process was a collaboration the Implementation Engineers' team, client management, and hourly union personnel. It served as the basis for setting priorities, implementation design, and the development of a solid improvement program.

The implementation was scheduled over two project paths – machinery focus and management focus programs. The efforts were focused on the following:

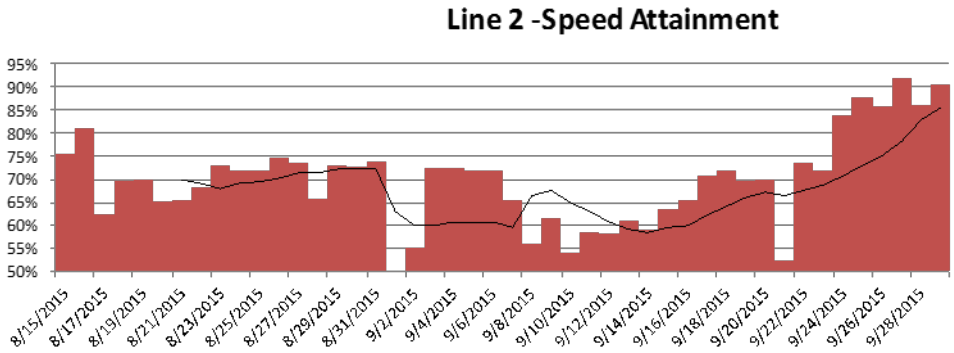
- Increase production-line performance
  - Increase equipment uptime
  - Improve machine center conditions to OEM Baseline levels
  - Develop a maintenance system to impact utilization
  - Reduce changeover times employing Single-Minute Exchange of Die methodology
- Develop and implement standard operating procedures
- Develop and implement equipment control settings (operational envelopes)
- Establish an effective means to communicate area (team) initiatives and results
- Design and structure the Plant Leadership Team (PLT) for success
  - Structure PLT to have focused managers (technical and capability leaders)
  - Coach and counsel PLT in its area of responsibility for business objective improvements
- Design and implement a Continuous Improvement program, so the employees are owners of the process and become results-oriented:
- Design and conduct supervisory training sessions that are tailored to the work environment, culture, and business objectives

A core team, comprised of Implementation Engineers' team members and several representatives of the converting operations, was formed to accelerate and perpetuate the results while directly supporting the PLT initiatives. This joint team approach fosters individuals who can maintain the process.

Changeover times, material handling, OEE improve

This project resulted in many positive results, including:

- Increase in OEE level 28% above baseline
  - Speed attainment increases across all lines
  - Speed Example



- Decrease of unplanned downtime by 10%
- Estimated financial benefit of $21 million. Client policy did not allow release of financials to non-employees
- Line speed increases through programming, maintenance, line balancing and operator training
- Reconditioned equipment to OEM status (more than 1,000 work requests generated and completed)
- Reduction in raw material changeover times by 50 percent
- Organizational alignment to resolve value stream delays
- Institutionalization of maintenance foundational elements
- Initiation of autonomous maintenance program
- Develop and install control methodologies for improvements gained during project with necessary management personnel
- Lines were reprogrammed to optimize production and balance lines (approach by IE automation Subject Matter Expert)
- Workshops to determine root cause of equipment failures and corrective action

Significant production gains were accomplished due to the alignment and improvement of people, processes, and technology. The company culture morphed from reactive to proactive through IE's Change Management program. Data and information is leveraged for root cause analysis and Continuous Improvement.

In addition to the direct operating improvements, corporate leadership recognized an improvement in leadership capabilities and general housekeeping. The improvements enabled the acquisition of a large big box retailer with a rigorous audit process.

NEXT STEPS ›

- Schedule a meeting with our team to learn about our enCompass® methodology and how IE can improve your operations.
- Interested in learning more about the topic covered in this case study? Call us at 1-312-474-6184 and reference the paper you're interested in. We would love to discuss your initiatives.
- Visit www.implementation.com to find out more about our services.

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At our core, Implementation Engineers is a data-driven, global firm with a razor-sharp focus on enhancing mining and manufacturing operations.

We have volumes of success stories, and they can all be attributed to our revolutionary enCompass® methodology. This industry-first approach gives us not only the knowledge to inform you of what needs to be done, but the power to actually implement those solutions for lasting impact.

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