MILLIKEN PERFORMANCE SYSTEM

The Productivity Paradox: Achieving 21st Century Results in Mature Paperboard and Packaging Plants

Performance Solutions by Milliken

Paperboard and packaging (P&P) facilities are typically asset-intensive operations, and many are extremely old (the average paper facility was built prior to 1937). The markets these plants serve, however, are modern with state-of-the-art demands, and include every industry in need of papers, boxes, cartons, and other forms of packaging. P&P executives seek to make their plants as efficient as possible to achieve success today, while developing nimble operations to support future growth, but they face an array of challenges:

Machine downtime is a constant headache for most P&P companies, given the age of their equipment. In addition, many plants run equipment for all three shifts, offering little time for routine maintenance.

Employee safety is an ongoing concern, due equipment age and the massive scale of machines and end products (large rolls and bundles). In some plants, antiquated controls still require operators to push and pull manual levers to activate machines.

The P&P industry is subject to stringent **regulatory requirements** due to the chemical-rich nature of many processes, such as those in paper mills, and large volumes of waste generated by discarded paper and packaging.

Increased **global competition** has compounded price pressures for P&P businesses, especially those creating commodity products (e.g., bulk paper). The Producer Price Index for pulp, paper, and allied products fell from 185.5 in January 2012 to 169.6 in January 2017.

Complex **customer requirements** may represent the biggest challenge to P&P companies, because failure to meet them leads to lost revenues and lower profits. To accommodate smaller orders, shorter runs, and customized products, P&P plants must adopt agile practices (e.g., quick changeovers).

To overcome these challenges, P&P executives increasingly look to operational excellence as a path toward sustained profitability.

Critical P&P Performances

Most if not all P&P executives want to improve their operations. But these massive establishments frequently have such a range of activities and problems, they're unsure of where or how to begin. Less is more: P&P success often can be assessed by a few critical measurements, including:

Machine reliability

Machine reliability is fundamental to P&P operations, yet executives face frequent equipment problems, from minor stoppages to complete breakdowns. Machine-reliability problems wreak havoc on plants running a mix of SKUs, as downtime blows a schedule for the day or even week. No P&P operation can achieve agility and satisfy customers' demands for product variety — swiftly moving from one product to the next — if its lines, processes, and equipment are not reliable.

On average, machines in the paper industry are down 11 percent of the time, and 10 percent of total maintenance is unplanned. For P&P manufacturers, this wasted time is lost revenue and profits. Even minor machine stops will require costly restart and test periods for machine operability, safety, and product quality; major breakdowns lead to a range of production losses:

- Maintenance repair labor
- Production catch-up labor (e.g., overtime)
- Machine replacement parts and temporary equipment
- Shipping costs for replacement parts
- Product costs (damaged during breakdown and restart periods)
- Other costs associated with quality, employee safety, and deliverability.

Quality

Opportunities for quality problems in the P&P industry extend throughout the supply chain:

Incoming materials, such as wood or vegetable pulp in a paper mill, or paper sheets in a corrugated cardboard plant, can be sources of poor quality before production begins.

Imperfect production, such as a flawed coating or color, can result in scrapping a single large product (a paper roll that is 100-inches wide and 10 feet tall). Because plants offer a range of plies, grades, coatings, weights, etc., the opportunities for production errors increase exponentially. The scrap and rework rate in paper manufacturing plants is an average 5.4 percent of sales, a large drain on profitability.

Shipping operations can create quality problems even if the product itself is perfect. For example, the shipping department in a corrugated paper plant may handle thousands of boxes in a day, palleting and labeling hundreds of boxes for a single order. Incorrect counts or mislabeled shipments are major quality problems — and expenses

EHS

Some 10,000 employees were injured in U.S. paper manufacturing plants in 2015, with 10 fatalities. In complex P&P environments with automated machinery and lightning-fast processes, equipment maintenance is a critical element for employee safety.

World-class P&P companies have a safety-first approach, and track employee safety measures — incident rates, near misses, lost workdays as key performance indicators (KPIs), but they stay ahead of safety problems by implementing lead indicators (e.g., safety audit scores, percentage of employees on safety teams). A safe working environment improves workforce morale, improves productivity, and delivers cost benefits (e.g., lower insurance premiums and compensation costs). To establish any improvement system, a workforce must trust the organization and believe that management has workers' interests at heart.

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Cost and Productivity

All the above metrics drive costs and impact plant productivity and profitability. Yet many P&P executives accept poor performance on these and other measures, and typically budget for breakdowns, downtime, and scrap and rework — instead of eliminating them. Even when P&P companies do try to improve reliability, quality, and costs, etc., they often struggle with four common improvement traps:

Isolation

Improvement initiatives in one department or function yield local results, but without alignment to other activities, are difficult to sustain — or spread. P&P manufacturers without a systematic approach to improvement are unlikely to affect plant-wide metrics, and may waste time and resources on projects without impact.

Management ownership

Leaders and managers in a plant can only force so much change. Without engaged frontline associates — empowered to identify and fix problems on their own — improvement efforts will be limited at best.

Overemphasis on tools

Improvement methodologies — e.g., lean manufacturing, six sigma — have captured the attention of many P&P executives in recent decades. Unfortunately, this often results in disjointed use of a methodology's tools — value-stream mapping, 5S, kaizen events, A3s, DMAIC, pull systems — without development of an overall strategy or a system for long-term improvement.

Short-term thinking

Many P&P improvement too often emphasize short-term results over long-term planning and investments — especially when new leadership arrives or a financial target needs to be hit. These results fade over time, as personnel changes and the lack of a sustained effort limits further improvement.

Operational excellence can only be achieved within a system that fundamentally changes behaviors and culture, by linking improvement actions to corporate objectives. Performance Solutions by Milliken — the operations-excellence consultancy of Milliken & Company — offers P&P executives new goals for their operations (zero losses for KPIs) and the means to achieve them (the Milliken Performance System).

Milliken Performance System

P&P manufacturers can revitalize their operations with the Milliken Performance System (MPS), dramatically improving the performance of legacy equipment while preparing for new opportunities.

"A systematic approach requires long-term thinking and discipline," says Phil McIntyre, Managing Director, Performance Solutions. P&P executives want a model that helps them move away from a cycle of short-term, budget-driven initiatives."

MPS is comprised of nine pillars built upon a foundation of safety and strategic clarity. MPS was originally deployed by Milliken & Company and has been relied upon to continuously improve the company's operations, surface new strategic opportunities, and achieve unprecedented industrial performance for the company. Performance Solutions helps P&P executives wield MPS for the same results in their companies.

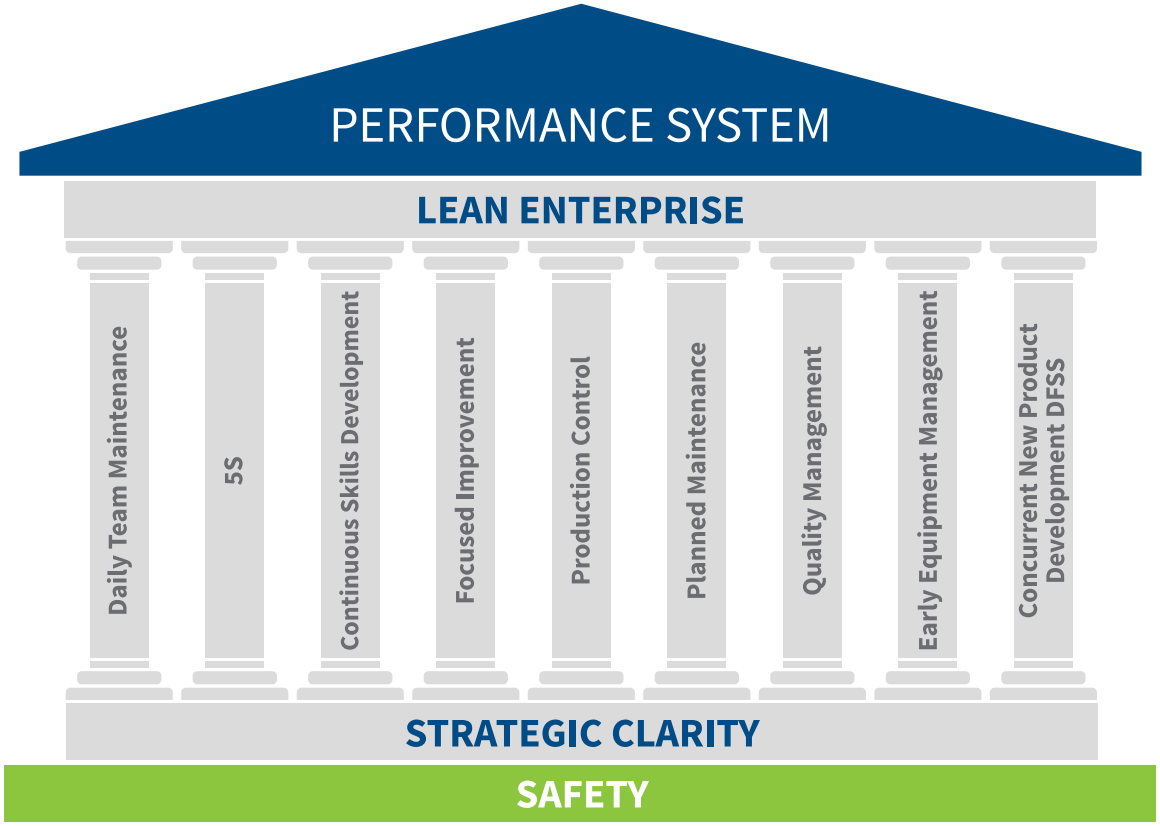
"MPS offers P&P leaders a complete approach to organizational improvement," adds McIntyre. "Systematic planning and identification of priorities; application of common standards; and education and training that lead to sustainable performance and dramatic returns on their effort."

Performance Solutions offers a six-step transformation roadmap for MPS, one that rapidly becomes self-funding for a P&P organization:

1. Accommodate, educate, and demonstrate
Executives in the P&P industry become acquainted with Performance Solutions via the "Accommodate, Educate, and Demonstrate" program. They travel to Milliken headquarters in Spartanburg, S.C., learning about MPS from Milliken leaders while touring high-performance Milliken facilities.

"We present our Milliken journey and explain what they can expect out of the same process," says Doug Skaggs, a Performance Solutions practitioner who has helped P&P companies achieve Milliken-like results. "We take them to our own plants, where they see what a successful performance system looks like, and how it could change their plants' futures." Practitioners have typically spent an average of 20 years working within multiple Milliken facilities, in a variety of roles.

2. Assessment
Performance Solution practitioners evaluate a company's current systems against MPS pillars and criteria, and identify gaps. They also perform a SWOT (strengths, weaknesses, opportunities, and threats) analysis, along with interviewing management, associates, and operators to evaluate a P&P company's culture. Bobby Reddick, a Performance Solutions practitioner with a decade of P&P experience, says that one product of the assessment is a "Y page" for leadership — a simple document that funnels SWOT analysis into an overall corporate vision, which also explains "why" the company needs to improve.



3. Corporate master plan

A steering team from the P&P client then works with Performance Solutions to create a company-specific plan, tailored to the firm's portfolio of plants and production operations. The one-year plan addresses the pillars of MPS, and establishes one or two critical objectives for each pillar to guide and align the organization. Target plants for MPS are identified, and the client's steering team is educated on its roles, responsibilities, and expectations.

4. Plant implementation plan

Performance Solutions practitioners conduct a zero-loss analysis at target facilities, identifying potential savings (e.g., time, resources, money) if all problems — downtime, quality rejects, injuries, time and resource wastes — are eliminated, applying a dollar figure to each. P&P executives are typically taken aback by the amount of waste — and by the possible upside. At this step, the improvement work shifts from strategic to tactical.

5. Model area within plant

During Stage 1 of plant activities, a model line or machine is selected for improvements. The model is highly visible, critical to overall plant performance, and usually in great need of improvement (offering high potential to exhibit the loss-analysis process). Improvements on the line or machine address all MPS pillars until the model is fully transformed toward zero-loss targets. This initial effort typically takes eight to 12 months, with a continuous focus on loss reduction.

"We're building the system and driving out losses through PDCA (plan/do/check/act) practices and kaizen projects," says Skaggs. "Modeling is about learning, making small mistakes, and proving the concept. It's our time to build skillsets and pillar leaders. We can't stay and manage the plant for them. We want them to become practitioners, so that when we leave, they have a process that is sustainable." As the engagement progresses and expands, the P&P plant and company develops its own group of practitioners, gradually assuming the education, training, and monitoring roles of the Performance Solution practitioners.

6. Replicate

Processes and best practices demonstrated within the model are expanded to 50 percent of a plant's A-ranked lines and equipment during Stage 2. Once these areas have been transformed, changes are applied to the remainder of A-ranked lines and equipment during Stage 3. A scorecard and auditing system monitors progress as replication proceeds.

MPS delivers accountability through a layered audit process and accountability reviews conducted by the leadership team and key staff (practitioners-to-be), says Skaggs. "It establishes and always reinforces the expectations, making sure that everybody is doing what is expected out of them." During accountability reviews, managers sit down monthly with each associate to review performance. These reviews are intended to engage and enlighten both manager and associate: the manager seeks to identify gaps in performance and learning, while the associate discusses progress and obstacles in achieving MPS pillar objectives.

Performance Solutions practitioner James Battocchio sees MPS changing culture in plants, both union and non-union environments. "It's a bottom-up system that gets people involved, ensures their issues are addressed, and builds trusting relationships. You can hire engineers to fix a problem, but that doesn't translate into excellence if people aren't involved, or don't buy in."

Performance Solutions and MPS Deliver Results

The six-step MPS transformation roadmap provides early wins (and returns on investment) via the model area, and then helps a P&P company record increasing returns as it develops its own base of practitioners —relying proportionally less on Performance Solutions (the number of improvement areas increases while the number of Performance Solutions practitioners remains the same or decreases).

"I've never been in a plant where — as they've gone through this journey —leaders didn't have 'Aha!' moments and see excitement from associates on the floor," says Skaggs. "They see the value that it brings to their jobs as leaders — how much easier their work is with these systems, how much better the equipment runs, and how much processes improve. We build on what they already have in place, and take it to a world-class level."

It's important to note that the zero-loss concepts presented by Performance Solutions often seem outrageous or impossible at first. P&P leaders sometimes embrace the concept as a direction-setting tool — which it is — without expecting to achieve zero-loss. The zero-loss opportunity that Performance Solutions helps clients to uncover is typically two to four times greater than the company's leadership team is initially willing to quantify. But within two years, P&P companies capture a third of that, and soon thereafter reach 50 percent or more. From there, they develop their own versions of the MPS, train practitioners, expand improvements, and make zero-loss a reality.

P&P leadership also is surprised and pleased to find results that include:

- Returns on investment (ROI) that range from 7-to-1 to 37-to-1 ROI.
- Zero safety incidents in many plants
- Equipment breakdown performance improvements of 73 percent or more
- Minor stops reduced by 73 percent or more
- Rework reduced by 41 percent or more
- Waste reduced by 57 percent or more
- Equipment changeover times reduced by 34+ percent or more.

In addition to these gains, improved productivity typically frees up enough capacity that P&P companies can avoid investing in new lines or plants. Most significant of all is how the roles of management and associates change, with ownership of improvement initiatives gradually assumed by frontline associates. Managers focus instead on future improvement opportunities, as breakdowns, lost time incidents, and firefighting become things of the past.

"We are helping P&P companies push knowledge and decision-making closer to the plant floor," says McIntyre. "Leaders can work on tomorrow's profits, instead of worrying about today's operations and problems."

57%	41%	73%
LESS WASTE	REDUCED REWORK	FEWER BREAK-DOWNS

Performance Solutions and MPS Deliver Expanding CPG Results

Performance Solutions by Milliken® works side-by-side with companies interested in strengthening and improving their operations. The strategic approach that made Milliken one of the safest, most efficient manufacturers in the world is the backbone of the consulting and educational services that Performance Solutions offers worldwide. Performance Solutions by Milliken practitioners are serving over 350 operations, in 27 countries, and covering a wide variety of industries. **Visit www.PerformanceSolutionsByMilliken.com** to learn more about Performance Solutions' consulting and education services.

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