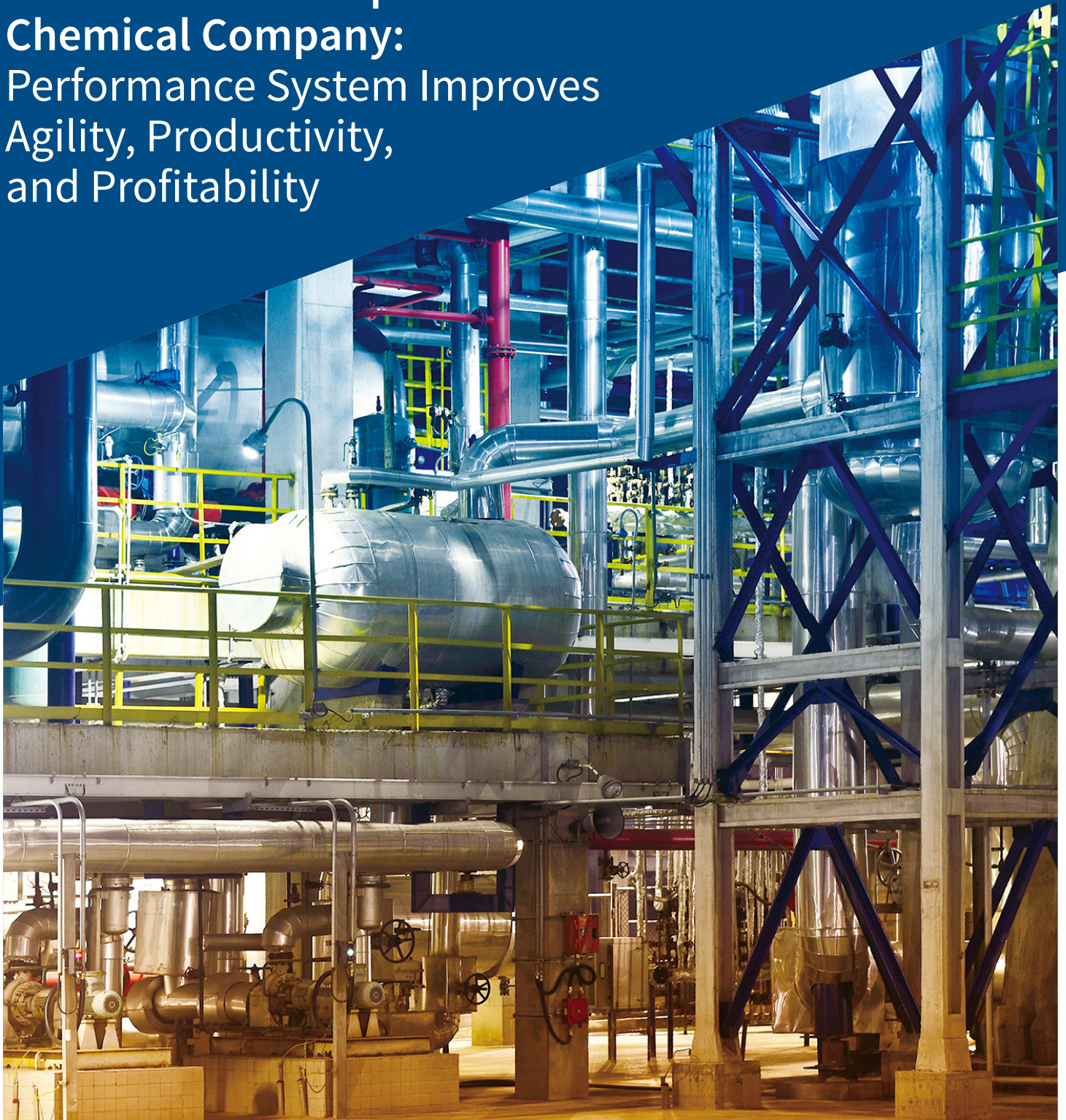


MILLIKEN PERFORMANCE SYSTEM

# The Customer-Responsive Chemical Company: Performance System Improves Agility, Productivity, and Profitability



Performance  
Solutions   
by Milliken

Chemical manufacturers are increasingly required to develop niche products for specific markets, modified to exacting customer needs. Large multinationals, for example, may customize hundreds of products, altering composition, concentration, viscosity, gravity, and other characteristics to suit requirements for industries as diverse as agricultural, food and beverage, lubricants, plastics, and textiles.

Specialty chemicals offer higher margins than commodity goods, but the increased agility and responsiveness they require come with a price: increased stress for managers and employees as they struggle to make processes more efficient, keep pace with product-development changes, and achieve:

- **Faster design-to-deliver cycles:** Even slight differences in chemical composition can require equipment alterations for processing characteristics (e.g., temperature, processing time). Chemical manufacturers must find new ways to move rapidly from product design to launch, preferably with existing equipment.
- **Faster changeovers:** Customized products often require more and smaller batches. Improved agility requires rapid changeover of equipment (from cleaning vats to complex maintenance requirements) as well as improved scheduling of internal processes and supplier feedstocks.

- **Higher levels of reliability and quality:** As production accelerates and the variety of products increases, the potential for machine stops or breakdowns increases, too — along with the danger of poor-quality products as equipment breaks down. Equipment reliability must become everyone’s responsibility — not just maintenance — with frontline associates willing and able to recognize potential issues (e.g., leaks, vibrations) and assume larger roles in startups and changeovers.

- **Continuous improvement in operations:** Chemical manufacturers must continuously improve performances (e.g., cost, safety, speed, productivity) or risk losing customers. Benchmark metrics, standardization of practices, and a well-documented improvement methodology are vital.

- **Next-generation workforce knowledge:** Baby boomers are reaching retirement age, and many chemical companies have high percentages of long-tenured employees. “Many experienced employees are retiring,” says Clara Thompson, senior practitioner with Performance Solutions by Milliken, the consulting division of Milliken & Company. “And their companies face the prospect of losing their tacit process knowledge. They need to codify this knowledge in ways that allow onboarding of new employees into specific, well-documented roles and responsibilities.”

---

“WHAT DOES THE CLIENT NEED TO ACHIEVE? WHAT’S THE BEST APPROACH? AND HOW DO WE ADAPT IT SO THAT THEY ACHIEVE SUCCESS IN CREATING A SUSTAINABLE NEW PROCESS?”

# Obstacles to Agility

The pursuit of agility and the means to achieve it within the chemical industry frequently runs into common production problems:

## **Big-batch mindset**

Legacy, big-batch processes often can't accommodate customized products with small scheduling windows and frequent equipment changeovers. In addition, most management, maintenance, and frontline staff are accustomed to long production runs, and may not have the skills or knowledge to run smaller, more frequent batches. Even worse, legacy equipment is often ill-suited for quick changeovers; in fact, less than a quarter of chemical plants had adopted quick changeover techniques.

## **Equipment reliability**

Some 77 percent of executives in the process manufacturing sector (which includes chemical companies) report that aging infrastructure has affected operations in terms of time and cost. The impact of older equipment is often experienced as failures and minor stops; machine availability at chemical plants is 77 percent (average, as percentage of scheduled uptime), and 11 percent of machine maintenance was unplanned.

## **EHS problems**

Faster production rates on legacy equipment can increase the potential for safety problems and environmental accidents leading to serious injury or death. Stricter regulations have helped to reduce EHS problems — for example, in 2015 there were 2.1 OSHA recordable injury and illness cases per 100 full-time workers among chemical manufacturers, down from 3.2 in 2005 — but even one accident is one too many.

## **Legacy not lean management**

For decades, manufacturers have improved their operations via lean methods made famous by Toyota and others. Yet many chemical executives still think lean is only applicable to discrete

manufacturing operations. Only 59 percent of chemical plants use lean manufacturing methods, and 13 percent of plants have no improvement methodology. “The underlying foundation and methodology of lean is applicable in the chemical industry,” says Thompson. “The execution might be different, but that’s one of the things that we get at through an assessment process: What does the client need to achieve? What’s the best approach? And how do we adapt it so that they achieve success in creating a sustainable new process?”

## **Disengaged employees**

Continuous improvement requires that all employees understand both the job in front of them and the job of improving it. Yet many frontline chemical employees focus only on the first job because management has not yet embraced the 3Es (educate, engage, and empower): Do frontline associates know how to improve or understand the baseline from which to improve? Do frontline associates feel that their efforts at improving their work and the organization are worth it and willing to try? Do managers allow frontline employees to problem solve and take ownership?

Any of these issues can derail efforts to achieve operational excellence and agility. Fortunately, all share a common solution: a proven performance system that leverages daily management activities to surface and resolve issues. An effective performance system encourages frontline employees to take on broader roles in problem-solving by improving communication, collaboration, and trust. It increases equipment reliability — and returns on expensive capital investments — via daily and predictive maintenance. More importantly, as frontline involvement improves daily decision-making, management firefighting is minimized and plant leaders focus on long-term strategy, innovation, and employee development.

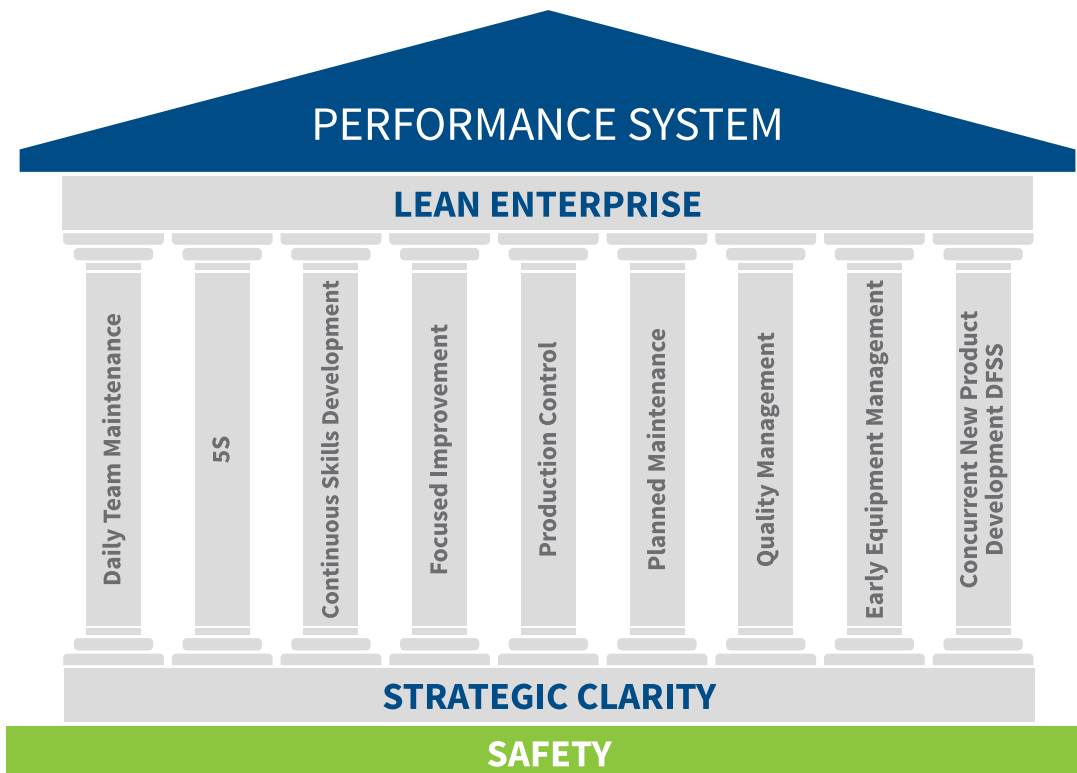
# Milliken Performance System

Implementing a holistic improvement system — i.e., the Milliken Performance System (MPS) — helps chemical manufacturers to transform their operations and become more agile, productive, and profitable. MPS is an improvement platform, capable of delivering short-term performance gains even as the system is implemented. At some chemical companies, MPS fills a management void; at others, it is assimilated to address gaps in an existing system. The real power of is the ability to generate substantial returns as the system expands across a plant and the organization by those within the company.

“A systematic approach requires long-term thinking and discipline,” says Phil McIntyre, Managing Director, Business Development for Performance Solutions. “Chemical executives want a model that helps them move away from a cycle of firefighting and short-term initiatives to that of continuously improving agile operations.”

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 used to continuously improve the company’s operations, surface new opportunities, and achieve unprecedented industrial performance. As the system is embedded within chemical operations, it delivers:

- Safer, more environmentally sound production facilities
- Increased equipment and plant reliability
- Improved product quality
- Increased product/SKU variety
- Faster customer lead times (receipt of order to product shipment)
- More flexible operations
- Lower production costs
- Enhanced workforce engagement, morale, and culture
- Process innovations



“MPS offers chemical 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 helps chemical companies learn about and apply MPS to transform their organizations, guiding clients through a six-step roadmap:

**1. Accommodate, educate, and demonstrate**

Chemical executives become acquainted with Performance Solutions via the “accommodate, educate, and demonstrate” program. They travel to Milliken headquarters in Spartanburg, S.C., and learn about MPS from Milliken leaders and tour high-performance Milliken facilities. Executives hear about the Milliken journey, gain a first-hand perspective of a successful performance system, and begin to explore how their companies can benefit from the MPS. Executives who see MPS at work in Milliken’s textile plants find that lean principles can work in both discrete and process industries.

**2. Assessment**

Performance Solution practitioners — who have typically spent an average of 20 years in leadership in manufacturing — evaluate a client company’s current system against MPS pillars and criteria. They also perform a SWOT (strengths, weaknesses, opportunities, and threats) analysis, interview management and frontline associates, and evaluate the organization’s culture. Practitioners distill their evaluation into a concise document that helps company leaders to establish a corporate vision and explain “why” a company needs to improve.

**3. Corporate master plan**

A leadership team from the chemical client works with Performance Solutions to create

a company-specific master plan, tailored to the firm’s portfolio of plants and operations. This long-term plan addresses the pillars of MPS, and establishes critical objectives for each pillar to guide and align the organization. During this time, the initial plants that will implement MPS are identified, and managers are educated on roles, responsibilities, and expectations.

**4. Plant implementation plan**

Performance Solutions practitioners conduct a zero-loss analysis at the target facilities, identifying potential savings if all problems (e.g., downtime, quality rejects, injuries, time and resource wastes) are eliminated. The wastes identified — and the potential savings estimated — are typically significant, even for a single chemical plant. Most executives are skeptical that zero-loss objectives can ever be achieved, however, they do provide clear direction to where the plant should be headed. And as the improvement work shifts from strategic to tactical, those targets look increasingly realistic.

**5. Model area within plant**

During Stage 1 of plant activities, a model line, process, or machine is selected for improvement. The model is highly visible, critical to overall plant performance, and usually in dire need of improvement. Improvements on the line or machine address all MPS pillars until the model is fully transformed toward zero-loss targets. This continuous, focused effort on loss reduction can take eight to 12 months, generating both cost savings and excitement as workers see what’s possible with a new mindset (chemical plant success can often be driven by a critical piece of equipment, and just the improvements from the model area can be dramatic).

In the model area, Performance Solutions practitioners teach standard MPS methodologies/pillars — e.g., daily management system, continuous skills development, 5S, daily team maintenance. They also help the client company form pillar teams to implement standardized processes, learn the methodology, and become local experts who can communicate pillar activities and the management system to others. After a model area is improved, practitioners coach pillar teams on how to expand the system across the plant.

Standardization of processes and practices are particularly important in the chemical industry. Thompson describes one client where “there had been a lot of management ‘muscling through’ to make things happen at this site, along with individual heroics.” They needed to move toward a more standardized operating system, in which new employees could be onboarded into specific, well-documented, standardized roles and responsibilities. “They were facing an enormous potential brain drain on how to safely and effectively operate their organization.”

## 6. Replicate

Once standardized processes and best practices are fully demonstrated and delivering desired results within the model area, they are expanded to 50 percent of a plant’s primary lines and equipment during Stage 2 (replication). Once these areas have been transformed, changes are applied to the remainder of a facility’s lines and equipment during Stage 3. A scorecard and auditing system monitors progress as this replication proceeds. It’s during this stage that chemical companies begin to develop and fully wield their home-grown practitioners, and, thus, rely less on Performance Solutions practitioners in that plant as the company’s engagement expands to other facilities.

“We look at where a chemical company is and where they are in terms of their industry, where they need to be, and where they think want to be, and then we create an equation to help them get there,” says Bobby Slate, senior practitioner. “Where are they strong? Where are they weak? We help them identify opportunities and close gaps by using our performance sysetem methodology. We have respect for the methodology to work them through that process, and company executives quickly believe in it as well. That is where Performance Solutions brings the value.”

---

“WE HAVE RESPECT FOR THE METHODOLOGY TO WORK THEM THROUGH THAT PROCESS, AND COMPANY EXECUTIVES QUICKLY BELIEVE IN IT AS WELL. THAT IS WHERE PERFORMANCE SOLUTIONS BRINGS THE VALUE.”

# MPS Addresses Chemical Company Weaknesses

The six-step MPS transformation roadmap provides early wins (and returns on investment) via the model area, and then helps a chemical producer record increasing returns as the organization develops its own base of practitioners, who spread system pillars across the firm's portfolio of plants. The long-term returns are often far more significant than leaders expected.

Performance Solutions practitioners help chemical-plant employees to become engaged, creative problem-solvers by working on specific projects with quick wins. As they perfect a model area and learn MPS pillars in greater detail, "they start to run the system and improve operations," says Jeff Rosenlund, Performance Solutions senior practitioner. "And as they run the system, they're also learning how to teach it to others."

"Continuous improvement is a competitive differentiator in the chemical industry," adds Rosenlund. "Especially with large-volume, commodity products, maintaining cost-effectiveness is critical. Executives have to lead their organizations for innovation while driving out inefficiencies. Some try just ruthlessly cutting costs, often at the expense of worker morale and creativity. We help leaders do it by engaging workforces at a much higher level, so they've got more minds thinking together about how to reduce variation and improve processes."

The performance system also helps frontline workers by making performance data more visible — by shift, day, week, and month. "They use performance data to make better decisions about how to respond to issues, select improvement objectives, and prioritize limited resources," says Thompson. "With the right visual management tools, performance feedback conversations, and meeting cadence, they can run the plant more effectively day to day."

Rosenlund says that many chemical manufacturers mistakenly believe that automation, technology, and tracking software — for orders, safety, environmental, quality, etc. — alone can deliver improved results. "But then you start digging into it," he says, "and these systems are either being utilized at 50 percent of their capability, or inaccurate data is going in and poor decisions are coming out. The concept may be great, but without a structured improvement system, the technologies can't deliver."

Performance Solutions practitioners help chemical executives to better leverage their existing technologies, engage all employees to remove the wastes and costs, and create the more flexible operations they seek. Practitioners also have helped chemical organizations in developing process flow maps that optimize scheduling and operations well beyond the plant floor — receipt of orders, supplier and production scheduling, logistics, etc. "We're helping them to understand all the variables in a process, and how each decision impacts something else," says Rosenlund. "We get them to look at their total cost, quality, and delivery."

As chemical manufacturers embrace MPS and leverage the full potential of their workforce, the results speak for themselves:

- Returns on investment (ROI) range from 7-to-1 to 37-to-1.
- Safety incidents in many plants are completely eliminated.
- Equipment breakdowns may be reduced by as much as 75 percent.
- Minor work stoppages may be reduced by 85 percent or more.
- Scrap may be reduced by 50 percent or more.
- Waste may be reduced by approximately 70 percent.
- Equipment changeover times may be nearly halved

## Performance Solutions and MPS Deliver Expanding 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](http://www.PerformanceSolutionsByMilliken.com) to learn more about Performance Solutions' consulting and education services.

