Shop Floor Continuous Improvement Metrics and Activities: Four Illinois Companies

Fueling progress on many fronts.

Joe Sullivan

Huge cost savings, higher productivity, and better customer responsiveness are among the benefits reaped by the Federal-Mogul Corporation (formerly Fel-Pro) plant in Skokie, IL, thanks to its adoption of constraint management (CM) concepts, according to Rick Cummings, manager of materials and logistics. WIP inventory decreased as much as 35 percent over the past year, for an overall savings of $10 million, he said. CM, one of the tools used for several years throughout Federal-Mogul, is a key element in its Lean Manufacturing system. Cummings was a presenter during the recent "Shop Floor Continuous Improvement Metrics and Activities" AME educational event in Lisle, IL. Speakers also represented Andrew Corporation, BorgWarner Corporation, and Flexible Steel Lacing Company.

Management at the Federal-Mogul Skokie plant identified critical success factors that could have a significant impact on business performance, then shifted their focus from labor utilization metrics to processes and the causes of variability in those processes. Constraints, once they were identified, were attacked by the manufacturer of gaskets and sealing products in a four-step process.

Federal-Mogul's Four-Step Constraint Management System

1. First, connect your process to establish true work flow. "Make sure every operator has a clear signal to stop and start work," Cummings said. "You don't want to work towards a schedule that causes you to produce too much material, which then sits in storage some place. When you connect the processes, people can see the whole system and plan their work to make what is needed."
2. Next, stress the system. Pull out stocks of inventory between operations so you can determine what is actually needed – labor, equipment, and materials. "You need to fix problems, not just put Band-Aids on," Cummings said.
3. Reallocate resources to eliminate constraints. For example, process engineering may target improvement projects for better overall output – not just work on isolated upstream or downstream improvements.
4. Maximize the output by eliminating defined constraints – then start all over again. "We want to run at a certain overall productivity rate, not just run product to meet goals in one area of the plant," Cummings said. He noted that management may be tempted to run equipment as fast as possible, while achieving lower overall productivity rates (see Figure 1); more effective use of resources, whether or not machines run at top speed, will bring better results.

"CM forces people to look at a whole process, not just one department," Cummings continued. "You are not simply looking at machine efficiency in various areas, but how the entire operation contributes to the timeline for cash generation. We use Taiichi Ohno's timeline (see Figure 2) as the basis of our metric. Cash generation is the most important element of long-term profitability. When we generate cash faster, we increase our opportunities for creating more profit."

Flexible Steel Lacing: Empowering Employees for Better Customer Service

Robert Hafey, manufacturing manager at Flexible Steel Lacing (Flexco) in Downers Grove, IL, a manufacturer of conveyor belt fastening systems, asked, "With an 85 percent market share, why should Flexco change?" For him, the answer is simple: Customer expectations in the areas of quality, cost, and delivery are moving higher every day. This factor, combined with shorter product life cycles and expanding product variations led him to believe that, for his company to deliver on their mission to be the unexcelled quality leader in supplying belt conveyor maintenance solutions worldwide, "change is the only constant."

Flexco determined that the best approach to manage success in this ever-changing environment is through two key improvement basics. First, empower everyone by moving decision making to the lowest possible level. And second, train to reduce the dependence on specialists.

To accomplish these goals, Flexco has used policy deployment techniques to articulate a clear vision for their organization. The vision statement clearly says "what the organization should look like" and "what are the characteristics of an empowered employee". Combined with training and team performance measurements, this vision creates the "plan, do, check, and act" portions of the kaizen culture Flexco employees seek to achieve. To ensure compliance and success in key business metrics, Flexco monitors its improvement process with a series of improvement reviews culminating in a quarterly continuous improvement (CI) meeting where each team reports key measurements and targets for the quarter, then lists and celebrates team successes. The next quarterly targets and resources required to achieve these targets are then identified.

The number of Implemented Process Improvements (IPI) reflects the success of the process. In 2000, Flexco employees completed over 1800 IPIs! They have resulted in significant improvements in customer satisfaction, on-time delivery, safety, and financial performance.

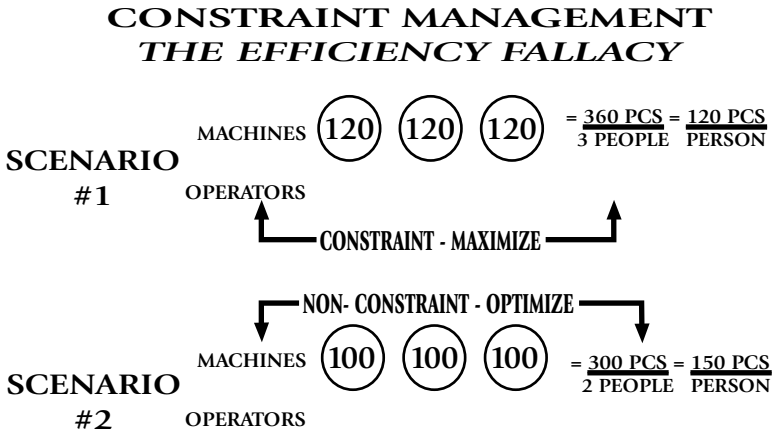

Figure 1. *Running machines at top speed may seem logical, yet overall productivity improves when processes maximize use of all resources. Source: Federal Mogul.*

TIME LINE / CASH GENERATION

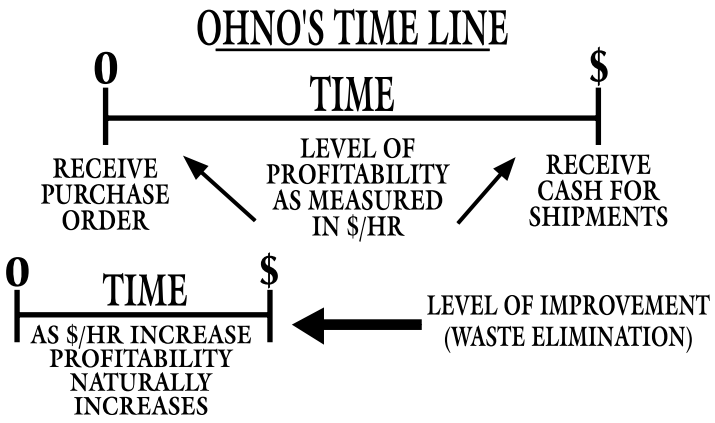

Figure 2. Federal-Mogul—Sealing Systems' timeline for cash generation, based on Taiichi Ohno's timeline; long-term profitability is boosted by speedier cash generation.

Andrew Corporation: People-Focused Measurements

John Midkiff, operations manager, and Tom Miller, cable associate of

Andrew Corporation in Orland Park, IL presented the company's system for aligning training, operator certification, and measurement with the needs of their customers. Employees manufacture cable assemblies for the cable television and communications industries.

Because of the rapid response required by Andrew's customers coupled with their need to operate high-value equipment, Andrew has developed a Step-Pay system where operators have the opportunity to improve their pay level by (depending on the complexity of the job) completing a six month to two year training program. The program clearly identifies requirements for moving from one level to the next, providing motivation as well as positive competition among the machine operators to develop their individual skills. To move from one level to the next, an operator must master a series of tasks. These tasks are grouped into skill blocks and the skill blocks are further grouped into families. Each family has a novice, intermediate, and advanced level. An operator who wants to move from one level to the next must demonstrate to a committee of management and peers that they have mastered the three to six skills required for success within the family. After successful completion of the training, operators are provided with certificates and increased pay.

Tom Miller, who has 18 years' experience as a cable machine operator at Andrew, spoke about how the Step-Pay program works to align operators with markets' increasing service requirements.

In the past, operators were too specialized because of the company's functional silo structure. Now that Andrew is structured for cellular manufacturing and its operators are cross-functional, they are able to plan and react more effectively. Andrew can focus manufacturing on meeting customers' required due dates rather than having the customer be forced to accept the date Andrew is able to deliver. The new Step-Pay program has helped the company gain market share in a very competitive marketplace.

BorgWarner: Integrating Safety Systems

Safety is a key element in BorgWarner Corporation's Continuous Improvement Program and overall strategy for improving the corporate culture at its plant in Dixon, IL. The organization's system for integrating world-class safety systems with business improvement was discussed by Paul Turner, technology and quality manager; Patricia Smith, senior safety and environmental specialist; and Dan Etheridge, continuous improvement manager at Dixon. The facility manufactures air and fluid handling equipment for the automotive industry.

Turner commented that if true improvements were to be made, then management would have to be an active participant in the safety program. To effect this change, management developed a safety program, established teams, identified key measures, and followed up by quarterly reports to senior management.

The focal point of the safety improvement program was participation in OSHA's (Occupational Safety and Health Administration) Voluntary Protection Programs (VPP). VPP is a program developed by OSHA to encourage industry to exceed the minimum OSHA standards. Management and employees work together with OSHA to establish cooperative relationships aimed at improving safety and ultimately company performance. OSHA recognizes excellence in safety and health management by awarding STAR certification. There are approximately 600 STAR work sites in the United States and 26 in Illinois. In August 2000, OSHA awarded BorgWarner's Dixon plant STAR certification for their improvement efforts.

BorgWarner's results have been stunning. Their injury rate is 55 percent below the national average, their lost work day rate is 73 percent below the industry average, and workers compensation costs have decreased by over 80 percent over the past six years. The team at Dixon has also been recognized by the VPP Participants' Association as having the best practices model of excellence in the *2001 Dictionary of Best Practices in Accident Investigations, Safety & Health Training, and Safety Teams/Committees*.

All four of these businesses have demonstrated that the implementation of CI techniques and methods, while not always easy, has tremendous potential in a wide range of businesses.

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