

Use Kaizen as Part of Your Strategic Plan for Continuous Improvement



Rapid changes set the stage for more improvements at Parker-Hannifin Corporation-Gresen Hydraulics Division and Kurt Manufacturing Company, Minneapolis, MN.

Lea A.P. Tonkin

Sure, kaizen projects bring rapid improvements in manufacturing cycle time and many other areas of your organization. Yet the secret to making these projects work best is blending them into your strategic plan for continuous improvement (CI). As participants discovered during the recent Manufacturing Cycle Time Reduction Workshop/AME Kaizen BlitzSM in Minneapolis, MN, speedy progress sets the stage for even more performance gains.

Host companies Parker-Hannifin Corporation-Gresen Hydraulics Division¹ in Minneapolis and Kurt Manufacturing Company² in Minneapolis opened their doors to event attendees and new ideas for better manufacturing cycle times, quality, and productivity. Blitz teams at each site pounced on challenges, after initial coaching in kaizen basics. Michael Bremer of The Cumberland Group provided training for the session. Each team included employees from the project area and other functions in the host company plus "outsider" participants.

Parker-Hannifin Gresen Hydraulics Division, Gear Cell: Blitzing's a Way of Life

"We've been doing kaizen blitzes for quite a few years, so we had a lot of the kaizen techniques such as process mapping, team dynamics, and spaghetti diagrams in place," said Randy McDougal, training coordinator at Gresen. "For our first blitz team, a gear manufacturing cell, we had done groundwork — videotaping, documenting our process, mapping the layout of the gear cell, and establishing baseline measurables

— prior to the workshop."

Gear cell blitzers targeted significant setup time reductions, safety and housekeeping improvements, opportunities to prevent quality problems, and "having fun." They focused on improving the gear utility cell layout marked by excessive walking distances, poor chip containment, average two-hour setup times, the

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need for 5S (housekeeping) application, and revamping a drill press not designed for its application.

Aggressively using kaizen tools such as process mapping, brainstorming, etc., they recommended or completed a series of improvements:

1. *Cell layout changes:* The new layout revised more than half the cell, converting it from a linear to a circular cell. This change reduced walking distance by 80 miles per year; more efficient time usage plus better housekeeping and safety were among the results.
2. *Short-term setup time reduction:* a new hand tool at the machine and the use of shadow boards for tool storage decreased

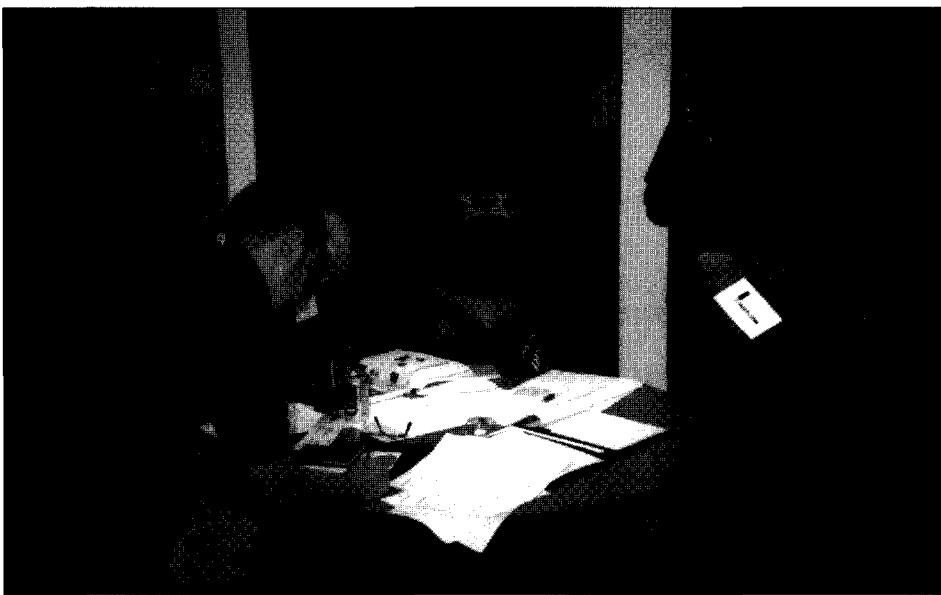


Figure 1. The Parker-Hannifin Gresen Hydraulics Division Gear Cell team calculating the distance saved (walking) if their proposed new cell layout would be implemented; left to right, Jeff Evangeliest, Rick Mortenson, Shawn Holter, Scott Gieger, and Scott Eickstead.

setup time 14 minutes, eliminated search time for tools, and improved ergonomics. This change resulted in the savings of 5600 minutes a year.

3. *Setup time (long term)*: the recommended new drill press will trim setup time 13 minutes, while decreasing scrap, part to part variation, and tool cost. The new press is scheduled to be in place by June 1.

All original goals (setup time reduction of 30 percent and 15 percent productivity improvement) were met, stated Cheri Gaertner, gear manufacturing coordinator. She added, "In addition to this, we have improved the overall quality of the product as well as made this process safer. This was the second blitz performed in 1999 in the gear area and we have another planned for early 2000."

Paul Niehaus, gear manufacturing manager, said the Gear Manufacturing Department progressed from an 80 percent efficiency level to 100 percent in the last two years. "Much of this progress is directly attributed to our focus on continuous improvement — which kaizen blitz is a big part of," he said. "Each kaizen blitz in the gear area has directly resulted in improved efficiencies and productivity while providing quality and safety improvements."

Parker-Hannifin-Gresen Cover Cell: Reduced Setup Times and Other Improvements

A second blitz team at Gresen looked for ways to improve processes on end cover machining areas. The cell included a mix of older manual machines and newer CNC machining centers. The end covers are assembled to create a variety of hydraulic control valve configurations. Their ambitious blitz goals ranged from 50 percent setup time reduction to a 20 percent increase in productivity, safety and housekeeping, and quality problem prevention — and "have fun making changes."

They documented poor product flow and flexibility in the cell, an average 39 minutes' setup time for drilling and milling operation, middling housekeeping performance, and 29-minute production time for one part. Digging into the details of value-added versus non-

value-added processes, the team developed an extensive list of recommended changes (many were implemented during the event):

1. *Cell layout*: The project team determined that the original cell layout was too confined and needed expansion to allow for improved product flow. This change resulted in improved inventory flexibility, gave employees more control over streamlined flow, reduced activity at a grinder, and boosted performance in housekeeping and ergonomics.
2. *The casting prep operation (tub sander) was moved closer to the grinding operation*: Productivity rose 35-40 percent at the grinder and ergonomic factors improved.
3. *Implementation of Kanban from the manual machines to the Niigata CNC machining center*: It improved work balance and reduced WIP.
4. *Setup time improvements (long-term)*: Purchasing a new (recommended) fixture can reduce drilling and milling setup time; the new fixture is slated to be in place June 1.
5. *Setup time improvements (short-term)*: Using multiple fixture plates, a block to set drill depths, and a bushing on a foot drill fixture decreased setup time from 39 minutes to 21.5 minutes, for a \$15,600 annual savings. Two setups were eliminated

after implementation of a permanent setup on the foot drill operation.

Ken Moegle (valve manufacturing manager) said that the impressive results of this kaizen team were, for the most part, accomplished with items that were on hand in the maintenance and tooling area (clamps, fixtures, jacks, etc.). "The entire cost of implementing these improvements was less than \$1000! It's amazing what can be done with good people teaming together to improve 'their' work area," he said. "Watching these kaizen groups attack problems is an affirmation for employee empowerment. This particular group did an excellent job. The addition of outside personnel, brought in by AME, was a definite plus."

Progress Continues

"We've made a number of related improvements since the blitz, but probably 70 percent of the recommended changes were made during the event," said Gresen's Ken Youker, quality assurance manager. "The blitz also helped us to build employee involvement and let us see another version of kaizen — you get another perspective by bringing in outside involvement."

"As with most quality tools, the kaizen blitz can be modified to meet the needs of the



Figure 2. Martin Gardner and others performing a time study to establish a baseline for measuring cycle time improvements at Gresen Hydraulics.

host company," he added. "At Gresen, we have found that the blitz personnel come up with some very good preventive action suggestions. We believe that this is due to the 'fresh eyes' (new perspective) that they provide for the process review."

Kaizen projects are not limited to the plant floor. "We recently held a blitz in the service (warranty) department, and after that, I was sold on the power of kaizen," Youker said. FMEA (failure mode effect analysis), SPC, an internal auditing process ("quality sweeps"), and other tools are also in the Parker-Hannifin Gresen improvement tool box.

"Kaizen is part of our strategic plan, one of our CI elements," stated Greg Kern, business unit manager, Gresen Hydraulics. "Each one of our departments does a business plan, and we use kaizen as one of the ways to achieve these goals."

Lesson Learned: Don't Wait

Asked about lessons learned from kaizen blitzing experience, Youker offered this suggestion: "Don't wait to get into it. As with every other quality principle, there's no magic to it. Improvement takes time, effort, and support," he said. "You need to have the resources at hand to make layout changes and other improvements recommended by kaizen teams, but it is critical to make major changes during the event and not have a long list of changes to consider later."

Substantial benefits from this rapid improvement approach include cycle time and setup time reduction — obvious contributors

to a better bottom line. "These changes also make things go easier and faster for operators and others," according to Youker. Another benefit was creating a perception of value received from "outsider" involvement. More supplier and customer participation in improvement activities is in the works.

Kurt Manufacturing Company: Aircraft Engine Crankcase Cell

Blitzers concentrated on improvements in an aircraft engine crankcase cell at Kurt Manufacturing Company. The cell, built around a flexible machine system (FMS) line, generates mixed model production. Other operations are done on manual machines or bench operations. Project objectives included decreased WIP, rework, and scrap plus better customer delivery performance.

Workstation layout changes were partially completed the first day of the event. Maintenance moved stations and equipment the first night. Blitzers (and later followup activities) also started to take steps towards elimination of an inspection step, for a potential annual cost savings of \$80,000. They also cut the process cycle time from deburr to final inspection from days to less than six hours.

Implementation of a pull system (versus a push system) yielded major performance gains in the cell, for an estimated WIP reduction from more than 40 units to less than six. Blitzers installed an instruction board behind a stud workstation to provide easier access to the instructions. They covered benches with rubber mats to reduce parts damage, improved cart surfaces and design, and improved a dust filtration system to eliminate dust accumulation on deburr stations to prevent damage to units. Even more improvements were on the agenda: establishing colored totes for storing different project materials at the stud station, installing a rotating fixture at the stud workstation to eliminate manual turning of the unit, designing the deburr workstation to allow more efficient storage of material and tools, designing stud tooling to eliminate breakage of studs during installation, and other changes.

Die Cast Division Project

Kurt also hosted a second blitz team, at its Die Cast Division in Minneapolis. They focused on wastes associated with material flow and operator movement in cells. Four small manufacturing cells were observed, improved, and standardized. Reductions in operator movement and total travel distance per part were reported as "impressive." The operators can reach desired parts more easily, and the time savings increased productivity and capacity. The greatest improvements were the controlled aisles, increased visibility and productivity, and decreased part handling. All in all, a good showing in a few days' time!

1. Employees at the Parker-Hannifin Gresen Hydraulics Division plant manufacture directional control valves and their subassemblies, in addition to gears for hydraulic pumps. Manufacturing is primarily machining iron valve and aluminum pump castings, assembly and test of sectional and monoblock directional valves, pumps, electronic components, electrohydraulic components, joystick controllers, and gears. Its global market base includes mobile hydraulics OEMs and distributors.
2. Precision machined parts assemblies, aluminum die castings, aircraft quality gears and gearboxes, automatic screw machine parts, tube fabrication and powder coat, industrial work holding, and automated gaging systems are provided by Kurt Manufacturing Company. Its customer base encompasses all major industries such as aerospace, commercial, defense, automotive, and computers.

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Figure 3. Blitz participants getting their "hands dirty" performing baseline studies for measuring Gresen Hydraulics cycle time improvements.

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