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A kaizen strategy to achieve LSS



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Bruce Hagenau, president of fabricators Metcam, discusses how the Georgia, USA firm reaped big rewards with kaizen.

In the manufacturing sector, and for that matter, in many large organisations across a variety of industries, kaizen is a well-respected approach to improvement. The methodology, whose moniker literally means good change in Japanese, has its origins after World War II. However, based upon many published studies and articles about its adoption, organisations might assume kaizen as a sweeping effort often undertaken by giant corporations with equally large budgets.

When Metcam decided to tackle kaizen in 2013, we believed nothing could be farther from the truth. The beauty of kaizen is it can be applied incrementally, with small changes adding up to major benefits. It is elegant in its simplicity, and its focus on engaging employees in the improvement process was exactly what Metcam needed at the time.

Adopting kaizen was a logical step in our continual quest for improvement—which includes adopting the leanest possible stance—throughout the company. Over the course of 2014, we implemented 11 kaizen initiatives that grew out of consultant recommendations, and the results were dramatic—in some instances, we reduced staff effort and/or production time and expense by as much as 30%.

The journey from good to best

Since its founding in 1989, Metcam has always placed quality and lean principles at the heart of its operations. We have conducted numerous lean improvement projects over the years, some of which succeeded brilliantly and continue to benefit us to this day. However, in other cases, we found after a few months—or sometimes even a year or more—old habits would slip back into these processes and undo some of the benefit we had derived from an initial improvement effort.

We see improvement as a continuum—a journey is never completed. Consequently, we decided to focus on making numerous small changes throughout the plant, one employee project at a time, and to continue that approach, if it succeeded, indefinitely. This decision led us to adopt kaizen.

Prior to adopting this approach, we had already orchestrated numerous major lean improvements. Some of which served as the springboard for our kaizen projects. A few examples include:

- Around 2010, we restructured the way we stored raw materials, ensuring they were always close to the worksite where they were needed, which reduced inventory storage needs and wasted human motion.
- In 2011, we moved to a cellular model of production, which is often adopted by mass-producers but is much less common in small-lot fabrication shops such as Metcam. To achieve this goal, we moved our eight press brakes into closer alignment with our large punching machines and lasers to create multiple cells throughout the building. We also built into the solution the ability to move equipment and reconfigure cells as needed to adapt to the requirements of any job. The restructuring, and the additional production flexibility it afforded, supported our efforts to achieve just-in-time production. This achievement reduced our lead time for many products from weeks to days—and in some cases, less than a day. We began realising 15-20% higher throughput than we had seen, before.

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Between 2010 and 2012, we implemented video work instructions for line employees to help them follow our frequently changing production processes. This one modification helped us reduce errors by up to 86%. Around the same time, we also began creating and distributing simplified in-house versions of customer diagrams when customer-provided information was confusing or hard to follow. This addition brought us a 20%+ improvement in throughput.

All of these changes were beneficial, but we knew we could do better. We knew wasted materials, time and motion were still being left on the shop floor. With this attitude, we tackled kaizen.

Good change in small bites

In late 2013, we hired two kaizen consultants to come to Metcam and evaluate our current processes. Working with and listening to our shop personnel (who are almost always our best source of improvement ideas), the consultants recommended 11 processes that might be improved by a kaizen initiative. After they helped us implement the first two improvements, it was up to us to evaluate and follow through on the remainder.

The adage “Just do it” may not be new, but in our case, it was very appropriate. The entire spirit of kaizen is to effect small changes quickly, so we didn’t expend hundreds of hours planning how we would approach or execute the effort. In essence, we applied lean concepts to our kaizen initiative and just got started.

For each project, the kaizen team—led by the workers themselves—would begin by mapping and timing the production process under review and then exploring how we could make it better and leaner. We would consider even the smallest changes, such as reducing the number of steps taken by a single employee or shaving a few seconds off an assembly process.

Then, the team would go to the line and actually make the changes. There was no trial and error phase, because we didn’t need one. The nature of the changes we were making made it evident if the new structure represented a theoretical improvement. We couldn’t always tell how much better it might be eventually, but we could project there should be enough improvement to merit giving the new process a chance.

Many of the changes we made in the initial projects were very physical. One example was identifying where steps in an assembly process actually constituted creating a subassembly. We found in some instances, this subassembly process was slowing the line down. We extracted those processes from the main production flow and assigned one or two workers to creating just those subassemblies.

This change offered two major benefits. First, the workers could work ahead, creating subassemblies in groups of 500 or so to be ready whenever they were needed rather than starting them on demand. Second, the approach freed the workers to fill in on other tasks if production bogged down elsewhere or a particular production run didn’t require the subassembly.

For each of our kaizen projects, everyone on the line trained on the new processes, on the fly. We then performed 30-day, 60-day and 90-day evaluations to see determine whether the changes were working, whether they offered enough benefit to merit continuation, and whether or not we needed to tweak them any further.

In nearly every case, the benefits were even greater than we anticipated, and the results, as a whole, nothing short of amazing.

- In some cells, we have increased potential throughput, per cell, per year, by up to \$500,000 without adding more people.
- We have saved \$50,000 in the tool centre alone by not purchasing unnecessary tools (see the case example in this article for more detail).
- In a few cells, we have reduced labor by 20% or more.

A kaizen future

During our second year working with kaizen, we remain fully committed to the project and its benefits. Most workers are enthusiastic about kaizen, and many want to be lean on their own, with support but without the need for direction. Anyone can submit a suggestion, and our goal is to eventually have every single employee at the plant participate in a kaizen project.

We have also expanded our efforts outside the production area. We are examining our business processes to see where small change can drive big improvements and increase our lean quotient.

When we really explored our business processes, we realised we were spending a lot of time and effort shuffling paper, and the result was a work order flow not as efficient as it could be. Today, we are streamlining the order process—examining how we track orders from the moment they arrive until the finished product goes out the door. One way we are improving our efforts is with a big push towards making bar coding a ubiquitous tracking mechanism.

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On a related note, we are also integrating our scheduling systems with ERP (enterprise resource planning) software, which automates the workflow of the scheduling and delivery processes. We have long recognised lean management—and kaizen initiatives—can bring beneficial change to business as well as product activities. Now, we are taking concrete steps to realise that potential.

In the interim, we haven't forgotten the lesson we learned with earlier improvements regarding backsliding. Our program incorporates skill development and other resources to help employees recognise the importance of positive change and to transition them from temporarily engaging on specific projects to actively exploring how they can lead their own lean initiatives. We have discovered when plant personnel are the ones making the suggestions and implementing the changes, they are far more likely to embrace our improvement journey as part of their daily culture.

Kaizen in action: Metcam case examples

Although all 11 of our kaizen projects resulted in tangible benefit, a few are particular stand-outs from a lean perspective. Here, we will describe two of them: the redesign of a production flow to reduce traffic congestion and the creation of a tool centre and associated management processes to foster more accurate tool storage and delivery.

Reducing traffic on an assembly cell

For a 10-person station dedicated specifically to cabinet assembly for a major U.S. manufacturer, Metcam's assembly process travelled across two 20-foot assembly lines. Although these lines were adjacent to one another, the process still resulted in some workers traveling up to four miles per week. These individuals experienced foot pain from walking so much during the day.

The kaizen team repositioned two people and modified the assembly process to a single-piece flow with one 16-foot and one five-foot table. Making these two simple changes enabled the line to become a "zero steps" assembly cell, where workers do not walk to complete assembly tasks, at all. The modification freed up valuable floor space and increased throughput by 36%. Employees now go home much happier and in a more positive frame of mind.

Creating a tool centre

Metcam's earlier realignments for raw materials staging and cellular fabrication drove big benefits, but they didn't address the company's tool storage and use of turret punch tools. With the punches distributed around the shop floor, their tools were stored in open racks adjacent to each punch. This was efficient in terms of proximity, but there was no oversight for the tools, and they frequently became lost and scattered. As a result, workers couldn't find the tools they needed and Metcam ended up with multiples of the same tools after they were reordered in error.

One of Metcam's worker suggestions was creating an organised, secured tool centre, with each tool tagged and colour-coded by category for identification. A designated team member (the worker who suggested the improvement) now manages the tool centre, keeping tools organised, maintaining a running inventory and ensuring tools are signed in and out of the centre.

This change also drove the creation of a new ordering process whereby the tool centre receives a work order for the tools needed on every job and a team member pulls them in advance. Metcam has taken this improvement even further and implemented a maintenance management program, including timely, planned replacement of ageing tools.

The easily quantifiable benefit stated elsewhere in the article (\$50,000 reduction in unnecessary tool purchases) is only one aspect of the lean achievements for this project. Production lines are no longer shut down waiting for a tool change and maintenance is achieved on a timely basis, so tools last longer. On the worker efficiency side, some workers had previously spent hours looking for a single tool. With the new tool centre, that occurrence is a statistical impossibility.

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