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# Regal's road to Six Sigma

After doubling in size last year, Regal-Beloit is employing Six Sigma to drive integration and processes company-wide
*– COVER STORY*

October/November 2005


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## FEATURES

**14 Cover story — Regal-Beloit**
**Regal's road to Sigma:** *Regal-Beloit is on a roll; two acquisitions will add $500 million this year and a new Six Sigma program is driving improvement company wide.*

**28 Lean Manufacturing University 6**
**Register today!** *"LMU6: World Class MRO, Manufacturing and Enterprise" is set for Dec. 12-14 in Chicago. LMU6 features an all-new three day, three learning track format with a morning workshop and afternoon case studies each day.*

**30 Exclusive: MRO salaries 2005**
*With skyrocketing healthcare costs and job insecurity still rampant, there are bigger issues on the table than the annual raise.*

**32 Uptime: Wireless tools**
*Tomorrow's tools are here today. See what they can do for your inventory tracking and and equipment monitoring applications.*

**35 Uptime: Belts and hoses**
*Proper preventative maintenance can help pull the longest life and greatest value from industrial belts and hoses. Here's how to do it.*

## DEPARTMENTS

**8** Editorial
**9** Industry news
**11** Advertiser index
**12** Conference calls
**20** MRO Pro
**22** Showcase: Abrasives/brushes
**24** MRO Coach: Maintenance
**26** MRO Coach: Lean
**27** MRO Coach: CMMS
**35** Safety bulletin
**40** Product news

**On the cover:**
A recently redesigned assembly cell in Regal-Beloit's Master Gear plant in South Beloit, Illinois is just one of 97 improvement projects company wide.
*Photo: Brian Thomas Photography*

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# Regal's road to Six Sigma

## Regal-Beloit got more than business units when it acquired General Electric's commercial AC and HVAC motors divisions, it got the tools to transform the entire company

*By Tom Hammel*

On January 3, 2005, Regal-Beloit Corporation finalized a year-long drive that functionally doubled its size. With two major acquisitions, first of General Electric's Commercial AC motor business in August 2004, followed by GE's HVAC motors and capacitors division in late December, Regal-Beloit became the largest producer of commercial/industrial motors in the United States.

In addition to adding about $500 million in sales to its ledger, the deal brings GE products and technologies, a well-placed handful of global facilities and thousands of former GE employees. Add these up and you have immense market potential dampened only by the challenge of integrating them.

### You might as well JMP

As part of its commitment to Lean Six Sigma, Regal-Beloit bought every black belt an IBM Thinkpad laptop loaded with JMP statistical analysis software from SAS Institute, Inc. For more information, visit the Web site: www.jmp.com.

### Lean before "Lean"

Regal-Beloit had been pursuing continuous improvement programs for many years before they became known as "Lean," but a bonus of the acquisition was that, in addition to other top GE managers, Regal-Beloit could also acquire some of GE's famed Six Sigma talent. One name that kept popping up was that of Vivek Bhargava, a 15-year GE veteran who had worked in and led Lean Six Sigma programs and projects for several divisions.

Starting in January 2005, Vivek began meeting with Regal-Beloit leaders, touring facilities and meeting key managers in preparation for the launch of a wholesale Lean Six Sigma program.

News of the acquisition was announced January 3, 2005. Three weeks later, in its annual planning meeting, as as company CEO Henry Knueppel rolled out Regal-Beloit's major goals for the year, creating a Lean Six Sigma program was one of them.

"Henry was an advocate of Six Sigma before the acquisition," Bhargava says. "He saw the GE acquisition as a defining moment for Regal-Beloit and he believed the time was right to launch Six Sigma across the company. This was very important: from the very beginning, the entire Regal-Beloit management was committed to doing it."

With commitment from the top, Vivek next set about spreading the word to upper management. First, he facilitated a two-day orientation for business unit leaders to teach them the fundamentals of Six Sigma.

"Almost every Regal-Beloit leader came to that two-day orientation — between 40 and 50 general managers, plant managers, function managers, finance, IT — everyone who had major segments of people reporting to them," Bhargava explains.

These leaders were then charged with going through their own areas, applying what they had learned, and identifying projects to tackle first.

"Next we asked them to tee up their best people to go into black belt training, one person for every major business and location," Bhargava says.

This posed a major challenge to many leaders, as they were charged with pulling their best people, not merely those who could be most easily reassigned.

The logic was two-fold. First, these black belts would be charged with directing all future Six Sigma projects in their areas for the next 18 months to two years. Secondly, the disciplines, statistical analysis and leadership skills required of black belts make them natural candidates for future leadership roles. After their time as black



*"We've started to drive a culture where green belts can identify weaknesses in their processes and begin to apply improvement tools with guidance from their black belts."*
*— Vivek Bhargava, director of critical business processes, Regal-Beloit*

**"We've been using Lean tools for a lot of years, but adding the formalization and commitment of Six Sigma is going to pay huge dividends. This is really an exciting time for us."**

*— Henry Knueppel, president and chief executive officer, Regal-Beloit*

## Regal-Beloit's family of brands

Over the last 25 years, Regal-Beloit has acquired more than 29 brands or lines. The company's brands now include:

- GE Commercial Motors by Regal Beloit
- Foote-Jones
- Regal Cutting Tools
- Electra-Gear
- Marathon Electric
- Marathon Generators
- Marathon Special Products
- Opperman Mastergear, Ltd.
- Mastergear
- Grove Gear
- Richmond Gear
- Velvet Drive Transmissions
- Durst
- Lincoln Motors
- Ohio Gear
- Hub City
- Leeson Electric
- CML
- Thomson Technology, Inc.

belts, these emerging company leaders will move into positions of greater responsibility, and new black belts will be brought up to replace them.

The first group black belt training program began April 11 in Beloit. The program consisted of a one-week-on, three-weeks-off rotation; one week of intense classroom training followed by three weeks of "take-home tests," homework and work on the projects identified by their leadership.

There was one more reason for this training schedule.

"Black belt training has been described as drinking from a fire hose," Bhargava says. "Each week of training could easily be a semester's classwork in any grad school."

After the first wave of black belts completed their training in early June, green belt training began. Regal green belts will keep their existing day jobs but will also receive some training so they can, with help from their black belts, drive projects.

"We've started to drive a culture where green belts can identify weaknesses in their processes and begin to apply improvement tools with guidance from their black belts," Bhargava explains.

As of early September 2005, Regal-Beloit had trained more than 150 leaders, green and black belts and had 97 projects underway in every area from manufacturing, MRO and indirect purchasing to finance, human resources and IT.

## The MRO project

Because of the GE acquisition, MRO procurement was quickly identified as an area having a major impact on the business. Specifically, the MRO processes in the acquired GE businesses differed significantly from those in their Regal-Beloit counterparts, which also varied between themselves.

"We had several businesses before the GE acquisition, and now we had the opportunity to leverage the entire MRO system for all of Regal-Beloit and make it more efficient," Bhargava says. "Applying Six Sigma tools to this, we asked, 'What are our Critical to Quality (CTQ) parameters for running our indirect materials program?'

"Clearly, maximum uptime is one of these. Uptime is driven by maintenance, so this leads you to drive that CTQ function down into stocking levels, scheduling, job time and so on."

To identify all the CTQs, a cross-functional team, led by black belt Barb Tesch, was created of people from both within the MRO function and outside it, including finance.

"That's where our MRO project is now, with the cross-functional team," he continues. "They've walked through the process map, arrived at their current state, identified their CTQs and how each is affecting the process and now they are working to design an improved process that will best meet each of those CTQs."

Because the MRO project spans two different major businesses that are coming together, the MRO team has had to map the process from both the acquired GE side and the Regal-Beloit side. Vivek is quick to caution that such projects typically take several months of discovery, metrics and analysis before any implementation can begin.

## Hardware and software

At the beginning of their training, each of the first wave of 30 black belts was given a new IBM ThinkPad laptop loaded with JMP, the statistical analysis package that Regal-Beloit has chosen for its Six Sigma programs.

PHOTOS BY BRIAN THOMAS PHOTOGRAPHY

*And this is the easy course? On day two of green belt training, Six Sigma instructor Jim Pelletier teaches new green belts the basics of distribution curve mapping.*

"You don't need to be a statistics major to be a good black belt," Bhargava says. "JMP performs all the math-intensive statistical functions for you, so it's easy to calculate results and apply them to your problem."

Black belts trained on their new computers, using the JMP programs from day one.

Regal-Beloit's green belts, because they would return to their existing workstations, were loaded with JMP licenses at those locations. Every green or black belt company-wide was given a license.

An additional 15 "traveling" laptops were purchased for training green belts at other Regal-Beloit locations.

"We gave them the tools they need to be successful," Bhargava says. "When you pick your best people and charge them with a task but don't give them the tools they need, you've shot yourself in the foot. This also sent a strong message to the entire corporation about how committed the business is to this program."

The investment in people, travel, scheduling and hard- and software has been significant, and the expectation of results is correspondingly high. To justify it all, Vivek, Henry Knueppel and several black belts presented a one-day program to the company's board of directors in mid-August to educate them in the fundamentals of Six Sigma and its potential, report their progress so far and show where the company is headed with it.

## A black belt's perspective

Henry Klein, a senior manufacturing engineer with the Leeson Electric division, was among the first wave of black belts trained. He has implemented Lean tools including 5S, progressive assembly lines and point of view storage at R-B locations for more than five years. Now, having "survived" the intensive Six Sigma black belt program, he expects it to have a major impact across the entire company. Having some Lean tools in place is better than having none, but he now sees any Lean program without Six Sigma as incomplete.

"You can do Lean without Six Sigma but it won't be the complete package," he says. "Lean lets you choose the tools you want to use depending on the problem you want to address, but that's not as disciplined as using Six Sigma, going through the DMAIC steps and applying the metrics to determine a solution."

Lean tools, he says, eliminate waste, but Six Sigma eliminates process variations. Lean will lower the water level of your processes, but what is left over is often related to process variations.

Vivek agrees. "Six Sigma and other tools like 5S are very complementary," he says. "5S is a great program but when you find an area that's messy, it usually coincides with an operation that's out of control. Six Sigma forces you to make sure you have the best metrics identified for applying the process so when you are finished, the controls are in place and things you've improved will stay that way."

## A committed leadership

Henry Knueppel, Regal-Beloit president and chief executive officer, is excited about the gains the fledgling Six Sigma program is already bringing to the company, but he is determined not to push the process too hard or too fast.

"One thing we're trying to be very rigid about is to not short circuit the process," he says. "You can do that, especially when you're trying to get people accustomed to performing the process. We want them to use all the tools, follow the process and maintain the disciplines. We won't rush to close a project just to say it's closed."

The momentum to charge ahead is strong: Regal-Beloit doubled its size with the GE acquisitions and busness has never been better. Six Sigma will enable these entities to come together as one perfectly aligned machine.

"This a one of the few times in a business lifetime when you get a triple win," Knueppel notes. "It makes us a better company to do business with from a customer perspective, a better company to work for from an employee perspective and a better company to invest in from a shareholder perspective."

His enthusiasm is contagious.

"We've been using Lean tools for a lot of years, but adding the formalization and commitment of Six Sigma is going to pay huge dividends," he says. "This is really an exciting time for us." ▲

*GE is a registered trademark of General Electric Company and is used under license to Regal-Beloit Corporation.*

# Reproduction of the cell

For Bob Goessel, a 10-year veteran assembler for the Mastergear division's M series gearboxes, work has never been better. His cell was redesigned in January of 2005 and shifted away from a batch system to just in time production.

The redesign has reduced setup, changeover and production time, reduced floor space, increased productivity, and, according to Bob, saved miles of legwork.

"Everything was all spread out," Goessel says. "The time factor was much longer; machined parts sat in tubs in one holding area; parts my partner made sat in another and the assembly area was way back in another bay. There was a lot of mileage in between steps that we've been able to cut out of the process."

In his new cell, everything Bob needs to do his assembly work, from the milling machine to his parts inventory and fasteners are almost literally within arm's reach. The cell's central assembly bench is positioned between stationary boring, milling and broaching machines. As Bob mills worm shafts to size from raw stock, he prepares subassemblies to receive them. Meanwhile, coworker Eric Meligan bores and broaches other parts, all of which come together at the same time on the bench for Bob's final assembly.

Hand tools on visually designated hanging racks are always visible and easily reached. Bob's screw guns are spring mounted from a rack overhead so he can quickly pull down whichever tool he needs, use it anywhere along the bench he happens to be and let it retract when he is done with the operation.

Small parts and fasteners reside in color-coded bins on a shelf on the bench. Bob pulls forward those bins coded for the unit he is building, puts them back up when he's done, and pulls down the correct bins for the next run.


*"We used to assemble in bulk. Now we build our gear boxes at the same time we make our raw parts. Our changeover times are shorter and we have a lot more flexibility in the jobs we can do. I like this a lot better."*

Larger subassembly parts are kept on rolling racks that move easily to wherever they are most needed. Each different part on the rolling rack is clearly identified by number and the unit it fits into. When he is working, Bob can mill a worm shaft, grab parts and assemble a complete unit without walking more than 20 steps in the whole process.

The switch from batch to just in time production has also provided gains.

"We used to assemble in bulk," Goessel explains. "Now we build our gear boxes at the same time we make our raw parts. Our changeover times are shorter, and this allows us more flexibility in terms of the jobs we can do. If our supervisor tells us we need to break off work on one model and produce five units of another model to ship today, our programs are already in the machines and we're able to switch over very quickly, get those five pieces done and then switch right back." ▲

*A redesigned cell at Regal-Beloit's Mastergear plant in South Beloit, Illinois keeps parts, fasteners and tools at hand and easy to see. Assemblers Bob Goessel (front) and Eric Meligan work with wall-mounted hand tools; power tools are spring-mounted on sliding rails overhead.*

*Small parts bins are color coded according to the units they build. Larger parts are held on rolling racks that can go anywhere they are needed. The cell's milling, boring and broaching machines are positioned to minimize the distance workers must walk.*

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