

Best Practices: Freudenberg-NOK/Cleveland, GA: Continuous Kaizens

Rick Carter, Editor-in-Chief

The global automotive seal maker's plant near Atlanta boasts a 2001 Shingo win and a 12-year record of production improvements, thanks to lean initiatives, Six Sigma and daily doses of kaizen activity.

Freudenberg-NOK is a company with much to brag about. The Plymouth, MI-based manufacturer of seals and gaskets, custom rubber products, PTFE components and other products for the automotive industry, is a leader in most of its markets. Its 17 U.S. manufacturing facilities (part of a global network of 47 plants operated by Germany-based parent, the Freudenberg and NOK group) generated 2003 sales of \$1 billion, and contributed to global sales of \$7.5 billion.



Gary VanWambeke (above right) general manager of Freudenberg-NOK's radial shaft seal division, is joined by Doug Hints, operations manager/valve stem seals, and Emily Bailey, materials manager, outside the Cleveland, GA, plant.

In the 1990s, Freudenberg-NOK underwent a company-wide shift toward lean systems, which helped push it to the top of another category: number of completed kaizens by a single company. As Freudenberg-NOK chairman and CEO Joseph Day was retiring in 2002, a press release announced that his company had reached the industry milestone of 17,000 completed kaizens in its effort to implement lean systems. Whether or not that number is actually a record is a moot point: It's significant. The kaizens helped boost productivity, reduce defects, and slash work-in-process inventory by 80%. Freudenberg-NOK's goal was to boost company output and reduce scrap and defects by making kaizen a routine part of the company's culture. The company wanted to ensure that continuous improvement was, indeed, continuous.

Freudenberg-NOK's Cleveland, GA, plant, which makes valve-stem seals, radial shaft seals and crank shaft seals (used in automobile engines, small-equipment engines, outboard motors and similar powered equipment), has pursued this goal with success. The 15-year-old, 125,000-sq.-ft. facility 65 miles north of Atlanta is a 2001 winner of the Shingo Prize for Excellence in Manufacturing, certified in ISO 14000 and 9001, and QS 9000. And it continues to conduct kaizens, essentially

around the clock.



Automotive seals made at the Cleveland facility include radial shaft seals (the four largest) and valve stem seals.

"We use major kaizen and minor kaizen activity," says Gary VanWambeke, general manager of Freudenberg-NOK's radial shaft seal division, and with the company since 1997. "Major kaizens are typically five-day events, using a cross-functional team. It's facilitated, and we'll do 12 to 30 of those per year." The plant balances this larger-scale and more traditional type of kaizen, he says, with the truncated or "minor" kaizen which is designed to keep the process flexible.

"We wanted to get to where you don't have someone always out there facilitating these week-long events," he says. "A lot of people make small, incremental improvements every day, and we wanted to create a system that promotes that. We call them minor kaizens, which are more of an informal, daily problem-solving experience with a more natural work group. It could be one person or 10, but often it's just a couple of people from one work cell. The focus is narrow," he says, "and we typically perform over 300 of these per year."

Working in and contributing to kaizens is a key stepping stone at the Cleveland plant to both productivity improvement and personal improvement for the plant's 420 employees, but is not the only one. The plant, which supplies virtually all worldwide enginemakers, uses a multi-faceted improvement program created in 1992 called Growth (Get Rid of Waste Through Team Harmony) that joins kaizen activity with Six Sigma and lean principles. Based on the Toyota Production System, Growth helps guide workers into all of these areas as a normal part of their routine. It starts with certification to run a single cell devoted to one seal product, then moves to cross-cell training, then to certification in lean systems (with green- and black-belt levels), and Six Sigma (introduced at Cleveland in 2000, and also with green- and black-belt levels). Along the way, kaizen activity is used to put knowledge to the test, sharpen skills and contribute to efficiency. Cleveland has so far produced nine black belts (four lean, five Six Sigma) and 52 green belts (12 lean, 40 Six Sigma).

"What makes Cleveland successful to me is we're developing a lean culture," says VanWambeke, who holds a black belt in lean systems and a green belt in Six Sigma. "We're developing people who understand the tools, can use them and believe in them." By example, VanWambeke mentions Emily Bailey, the plant's materials manager, who is a Six Sigma black belt and is pursuing her lean-systems black belt.



A Cleveland worker feeds newly made synthetic rubber into a press that will form it into flat sheets.

"Before we promote someone from a set-up to a lead position," says VanWambeke, "they must demonstrate a basic understanding and support of Six Sigma and lean. They can show it by how they're progressing in their certification, by the number of minor kaizens they've done, and by their participation in major kaizen or Six Sigma events. We won't put somebody in a leadership position who doesn't support what we're doing, and the people know that."

This goes for positions throughout the facility, not just on the factory floor. For example, VanWambeke's executive assistant, Donna Unger, is a lean-systems and Six-Sigma green belt, though she works in the plant office. "She did some Growth activity and has been on quite a few kaizens as well as a Six Sigma project, which she did while she was also my assistant," he says. He stresses how important it is that all workers speak the language of lean.

"From a cost standpoint, you have all these people with all these ideas and they want to know how much money they're saving," he says, "so people in accounting have to be able to speak the language. So do people in other departments like human resources."

Lean has simplified production at the Cleveland plant in terms of types of products made and the processes used to make them. The plant will turn out some 200 million oil and valve-stem seals this year in its role as a company "lead" center, which means it specializes in meeting customer needs for a few specific product types. The plant is vertically integrated from "cradle to grave," as VanWambeke says, meaning it is empowered to work closely with its customers to change and improve products and take whatever steps are necessary to best serve customers. Because the plant makes its own synthetic rubber on-site, for example, it can quickly adapt to design changes and experiments. Because the plant dedicates cells to a single customer's orders, that customer, typically a major automaker, always has a direct contact at Freudenberg-NOK who is thoroughly familiar with how the customer uses that Freudenberg-NOK seal. And perhaps most importantly, because the lean implementation took the company away from batch production, quality is placed in the hands of individual operators. Now, single or small groups of cells, typically manned by one operator, create seals on one of two types of presses (generally small-footprint, easily moved equipment) and they pass along completed product in small quantities rather than performing a single function and passing product elsewhere for finishing.

"The big part of this is creating a flow and not having product piling up," says VanWambeke. "It's also about creating ownership. We encourage our workers to

mold it properly and not pass on a defect." He adds that from a Six Sigma standpoint, "The whole goal is variation reduction. This takes it to the next level. We have the same product running in the same equipment by the same operator, day in and day out."

VanWambeke says he recently received a letter from Ford Motor Co. congratulating the plant for shipping zero defectives last year. "This can happen because we don't have half made on one end of the line and half made somewhere else," he says. "The Ford cell makes the product, so there's pride and ownership, and an ability to take the customer's metrics and have them mean something. Each one of these areas is its own business."

The drop in defects at the plant has been dramatic. In 1997, for example, defects numbered 650 parts per million (ppm) manufactured. By last year, defects had dropped to 9 ppm. Other gains are equally impressive. During the same period, sales per associate at Cleveland jumped 57%, and the plant became safer as OSHA reportables dropped 40% and lost work days dropped 80%. VanWambeke says the plant's total 2003 savings from lean and Six Sigma activities was \$1.2 million. Efficiencies at Cleveland have also been enabled by the company's efforts to standardize processes globally. In his position as radial shaft seal division general manager, VanWambeke is also in charge of five other facilities: one each in Brazil and Mexico and three in New Hampshire. His plan is to drive standardization across this division so that as processes are perfected in one facility, they spread to the others.

"We're pretty much boxed in right now," says VanWambeke of space at the Cleveland facility, "but this is where the production-partner opportunities come in." He says recent kaizens freed up seven presses worth of equipment, "so we're sending that to Mexico. Our philosophy is not to add brick and mortar. We have open floor space in Mexico and Brazil, so we'll use it." Many of the plant's customers operate in both countries, he says, so such shifts only give the company greater delivery flexibility.

Flexibility is also a key of the Cleveland plant's management structure. With its strong emphasis on kaizens and other production-improvement activities, the plant extends a high degree of empowerment to its workers so they can participate. They also receive cash incentives for their participation in successful projects.

"This started out as a suggestion system," says VanWambeke, but the company quickly learned that the plant manager could not effectively address multiple requests. "So we turned it into an implementation system. We started with the 'Make My Job Easier' box, and if a worker had an idea, he would put it in there. Growth managers would help the individual form a small work group to fix the problem, then walk them through it showing how it could be done. Over time, people started doing this naturally, so the flood of ideas we got at first went to a trickle because they learned what to do themselves."

VanWambeke says the do-it-yourself approach teaches workers a valuable lesson about the reality of making improvements. "If you have to implement something yourself you might find it's not as easy as you thought," he says. "So instead of getting frustrated because something didn't get implemented, you'll understand the challenges of getting it implemented."

The procedure also strengthens the culture by infusing knowledge deep down in the ranks. All of the changes the company makes may be based on lean principles, "but

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without someone in that position who knows that," says VanWambeke, "you'd have to have a Growth manager in there to facilitate these changes. It's much easier to make improvements when you have someone leading the area who understands lean. You're not going into somebody else's back yard trying to change things."

When workers are ready to pursue higher levels of certification in lean or Six Sigma, says VanWambeke, they're accustomed to figuring things out for themselves. This is important because green- and black-belt certification calls for significant time spent outside of the plant. Not only are reading requirements extensive, applicants must complete projects at other Freudenberg-NOK facilities. Workers must make their own arrangements to complete this work as well as their daily responsibilities. "You are your own lean systems manager," observes Doug Hints, the plant's valve-stem seal operations manager. But the company keeps a close watch. Frequent communications are a key part of management strategy. This includes regular meetings, as well as use of a unique hierarchy that uses two plant managers and single supervisors for all three shifts.

"We encourage our business-cell leaders to walk the lines, be visible and understand what's going on," says VanWambeke. "But it's not possible for someone to do that with 130 people under him. So we went from having one person responsible for an entire area on one shift to having one person responsible for each cell on all three shifts. This is so we don't have a first-shift supervisor saying, 'I didn't cause that defect on my shift.' It's all under one person, and the buck stops with that person."

Because leaders cannot do this each day, says VanWambeke, "They'll typically come in early to catch the end of third shift (7 a.m.), be here through first shift and catch the beginning of second shift. At the end of the week, they might come in at the end of third shift, start first shift, then head out after lunch. They're empowered to adjust their schedule as needed."

By 2000, Cleveland had met the challenge to integrate lean into its operations. Its next challenge was to secure outside recognition. "Joe Day wanted plants to apply for the Shingo award," says Hints, so Cleveland pursued it. With help from previous Shingo winners within the company, Cleveland got an audit on its first application and went on to win the 2001 Shingo in the Large Business category. VanWambeke says the award's exercise of analyzing the plant's accomplishments and unmet goals was important. "By creating that gap analysis, we realized what we needed to do. Before we even had an audit, this had value."

Thanks in part to feedback from its Shingo application, areas where VanWambeke says the plant is placing new emphasis include improving its 5S strategy (a challenge for a company that makes its own rubber), and implementing a behavior-based safety program to further reduce OSHA reportables. The plant is at a stage where "we're doing a lot of refinement," says VanWambeke. "We're trying to raise the level of awareness about ourselves."

He says the company is trying to do the same for its own suppliers, and now encourages them to adopt lean. Experts from the Cleveland plant visit supplier facilities to help them start the process. Hints believes that time will favor auto-industry suppliers who catch on.

"With the requirements the auto industry puts on us, a lot of suppliers aren't going to make it," he says. "The industry is going to become more global, but also more

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centralized with fewer suppliers, and even more requirements. If you're not heavily into lean," he says, "you're not going to make it."

But despite lean's value, the key to making it work "is having a champion," says VanWambeke, "somebody with authority to push it, then surrounding that person with more people like that." Today at Freudenberg-NOK, that person is president & CEO, Dr. Mohsen Sohi, who continues building on the principles of lean and Six Sigma. A Six-Sigma black belt, Sohi requires all plant managers to be similarly certified.

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