

# Best Practices: Metaldyne's 5S Showcase

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**The auto supplier's die-casting facility in Niles, IL, is nearing plant-wide completion of a 5S strategy that has both bonded the workforce and helped keep the unit competitive through tough times.**

Tom Dolack, director of engineering, a Metaldyne worker operates one of the facility's 40 die-cast machines, Tom Fisher, general manager, and a completed automatic transmission valve body is cleaned and inspected.

Die-casting is dirty work. Any time you have molten aluminum at 1,200 degrees F being forced into dies at 10,000 psi, dirt and heat are natural byproducts. For many years, the work area at the Metaldyne facility in Niles, IL, a maker of automatic-transmission valve bodies and other die-cast products, reflected this and more. Hydraulic and lubricating fluid leaked from die-cast machinery onto the floor, fine metallic shot blast was stirred into the air by fans, and, though the plant had a good overall safety record, its OSHA recordables were high. Inescapable heat and poor housekeeping contributed to an environment that general manager Tom Fisher says, at one point, would have been considered a dungeon by many.

Today, this suburban Chicago facility is nothing like a dungeon. The heat is still there, but is controlled. The trash is gone, and so are a range of mechanical and production problems that had been tolerated for years. The Niles facility has, in fact, become a showcase plant for its Plymouth, MI-based parent company, among Metaldyne's 50 facilities in the U.S. and overseas.

The turnaround at Niles began in earnest when Metaldyne purchased the former Global Metal Technologies, Inc. (GMTI), facility in 2001 and introduced company-wide improvements based on 5S strategy and others. Metaldyne sought to bring standards to its group of automotive-industry suppliers, and the Niles plant, part of the company's Hydraulic Controls division, had suffered under GMTI internally. Though GMTI had modernized some aspects of production at Niles - notably the installation of a 380-ft. "launder" system that delivers molten aluminum directly to die-cast machines - the plant lost touch with some of the traditional ideals it had embraced under its previous family ownership. Tom Dolack, Metaldyne's director of engineering technology who has worked at the Niles facility since 1972, is a member of the family that purchased the business in 1954 when it was known as DuPage Diecasting. In his 31 years there, he's witnessed the good, the bad, and the good again.

"When the company was sold to GMTI, it became more organizational," he says. "And with management off site, there started to be room between the people on the floor and the decision makers." The situation created what he calls a "fear factor" among workers that they had less control of their destiny. The plant remained busy, but focused more on getting product out and meeting short-term goals. Internal concerns such as worker relations, training and safety, became less of a priority, and it showed in the way the plant looked and operated.

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Interestingly, Metaldyne's desire to improve its operations was not translated into a formal course of action, but rather a "challenge." Though 5S (Select, Set in Place, Shine, Standardize, Sustain) was being used at other Metaldyne facilities, it was not required at Niles. "It's a voluntary program," says Fisher. "The fact that 100% of the employees want to get involved says a lot about the people."

The process began in July 2002 by calling in an industry consultant. Enrique Mora, a Green Bay, WI-based expert in 5S, Kaizen, TPM and other production-improvement techniques, was introduced to a company that had a veteran staff with the drive and interest in improving, but lacked guidance.

"We were all running in different directions trying to achieve different goals for this quarter or for that quarter," says David Carrasco, die-cast manager. But the plant's 220 workers, with an average of more than 12 years of service at the plant, let it be known they believed things could be better. "Our efforts are driven by a desire to succeed, from our operators to upper management," says Carrasco. "There's a cohesiveness in this plant which I've felt from my start here."

A five-year employee at Niles, Carrasco was the first to contact the bi-lingual Mora, who not only recognized the company's potential, says Carrasco, but could convey new ideas to its largely Hispanic workforce. The first project was to form 5S teams. "We base these on multi-disciplinary portions of the plant," says Carrasco. "We want an even number of machine operators, mechanics, technicians, set-up people and secondary operation personnel so they can understand how one area affects another. We search for the best personnel from each group that will fit in, across all shifts. Once the team is formulated, Enrique has a session on introduction and philosophy combined with hands-on projects with opportunities of correcting actual situations. It culminates back in the classroom with the whole team introducing to management what they received from the training. The employees themselves make the presentation, telling management what they learned."

Within seven months, eight 5S teams had been formed and trained, representing more than 40% of the workforce. By spring 2003, 64% of the workforce had been trained. George O'Malley, Niles' manufacturing manager, expects the plant to reach a 90% level of completion by the end of this year, about half the average time for a plant of this size, according to Mora.

"What's happened with the 5S program is that it cuts across all levels of management and across the bureaucracy," says Dolack. "It gets people from one part of the plant working with those in another part, up and down the organization. So if nothing else happens here, it reforms the communication between management groups and the people in the plant. They see that they really have input into what goes on."

Dolack adds that management at Niles and corporate-level managers are honestly interested in what the workers do "and how they do it. Through 5S," he says, "the Metaldyne Corp. is trying to communicate to the working people that they have a lot more control over their own destiny than they think, that they are really the people who make the difference as to whether the parts are good or bad or a plant is safe or not safe, and whether we get jobs or not."

The new cleanliness of the plant alone, he says, has impressed customers invited to the plant, and helped employees take greater interest in what they do. "That's how we sell the product," says Dolack. "When customers walk into a clean, organized plant where the employees are not afraid to communicate their thoughts and feelings to the customer, the relationship between the customer and that plant is

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much better."

Speeching improvements at Metaldyne's Niles plant are (from left): David Carrasco, die-cast manager; Enrique Mora, consultant; Nayda Figueroa, quality assurance manager; and Tom Fisher, general manager.

The heart of the Niles operation is composed of its 40 die-cast machines, each the size of a small bus. Though this machinery is semi-automated (the 45- to 50-year-old units have been updated with PLCs and newer electronic features), it still requires hands-on and heads-up attention from workers. As the launder system delivers a continuous flow of molten aluminum to each machine, for example, workers wearing eye-, head- and hand-protection control the pressurized metal as it is thrust into a die, pause while the die fills and cools, then remove the finished part as it exits the machine.

The process for each part takes less than 15 seconds, and workers are never far from the 1,200-degree aluminum, which snakes through the plant in heated troughs. Parts exit the machine at a still-dangerous 650 degrees. In one week, Niles produces as many as 30,000 valve bodies (the maze-like "brain" of an automatic transmission that directs the pressurized fluid, causing a vehicle's gears to change) and can make 1.5 million units per year of just one type of valve body. It currently makes 43 types overall, on three shifts.

While the company has long made valve bodies - its core business - for the big-three automakers and others, it also makes transmission pistons, steering-rack castings and various types of automotive brackets. But when 5S was started and production processes were discussed and revamped, it became clear that not all workers understood how the products they made were used. At a company meeting, says Fisher, "One of the team members had the idea of putting a product board on the wall. People make the product, but they didn't know where it goes or how it's used. So we put displays up that show the product and the vehicle it goes into. Now people can see that without that part, that F150 pickup truck wouldn't be driving down the road."

Now, the "Wall of Fame" stretches some 65 ft. down one interior wall of the plant. Informative to visitors and appreciated by customers, it has helped Niles workers understand the long-term significance of their work and their efforts to improve. "We've made the workers more aware of what customer requirements are," says Nayda Figueroa, quality assurance manager. "Now they know what the parts do and how what they do as workers impacts the customer."

Figueroa says a quality fair was also begun in order to "reintroduce workers to the way we do our scrap reporting, corporate reporting, and all the methods we use at our facility to improve our quality and our communication to all employees. We set out [machined] parts that were assembled by the customer because I thought it would be a good idea to show what happens to the part after you send it to the customer. That also helped them understand why customers are expecting a higher quality level. Anything we do to train the employees," she says, "always helps us, the managers, achieve higher quality."

In addition to 5S, the Niles facility has used Kaizen and lean redesigns of work cells, the effects of which are adding up. Compared to four years ago, for example, Figueroa says returns are down 40%. The simple use of machine-posted visual aids, among other things, she says, has helped workers better control the eternal die-casting problem of porosity by showing them what mistakes look like. Similarly, as

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die-cast machines have undergone TPM overhauls, hydraulic-oil usage has dropped and leaks have either been eliminated or diverted to catcher troughs designed by one of the 5S teams.

Also reduced is the plant's production of greasy scrap - scrap metal that cannot be recycled on site due to contamination by oil, and must be shipped out. In 2002, the plant paid to remove 400,000 lbs. of greasy scrap. This year to date, the amount shipped is 140,000 lbs., putting the plant on track to cut by half or more the amount of greasy scrap it sends out, potentially saving the company more than \$50,000. Safety has improved at the plant, too. OSHA recordables are down, says Fisher, and so are days lost due to injury. "For the year, we're running at seven lost days total," he says. "Five years ago, we were at 70 to 80 lost days." There was never a death in the plant, he says, though burns were common, and workers had lost fingers and suffered damage to arms and eyes. Eliminating these problems was, in some cases, the easy part of 5S, says Fisher, such as when one worker had the idea to change the position of fans that were stirring up shot blast.

"This is steel media," he says, which is used to create a matte finish on some castings. Fans used to cool workers "would raise that media and it would get in their eyes," says Fisher. "We tried goggles and different safety glasses, but the end result was to raise the fans up a little to circulate the air and get the heat out, but not raise the dust. That idea didn't come from an executive. It came from one of the people on the floor who stands under those fans every day. This shows the progress we've made under 5S," says Fisher. "And I say 'we' because it's not me sitting here at the desk making the progress. It's each of the individuals in the company making the progress."

And the progress has been recognized where it counts. Ford Motor Co., Niles' biggest customer, earlier this year bestowed upon the plant its Quality Level III distinction due to the effectiveness of its continuous-improvement programs. According to Metaldyne, few die casters reach this level. It's this type of recognition Fisher hopes to use as leverage to get more business from Ford and others.

"Considering the downturn in automotive, we've still managed to grow the company by putting more value into the product," he says. "So instead of just casting and supplying the raw product to the customer, we're starting to implement machining it for the customer. The next step is to not only machine it, but assemble it, and give them more of a 'black box' type of component as opposed to just a raw casting."

Ford, he says, wants to outsource more parts-related work. "And we believe we can provide them the same if not better quality than what they do internally, at a lower cost," says Fisher. "We're machining some valve bodies now, and we're doing finished bracketry work for Saturn." The company has also invested in new CNC equipment to do machining on a new valve body for Ford.

"Obviously, our expertise is die-casting, not machining," says Fisher. "But we have to make sure we develop the infrastructure at the same pace we're developing new products for our customers." That development has been furthered by the plant's lean and 5S initiatives, which have helped the facility find new space in its existing 130,000-sq.-ft. footprint. Landlocked by adjacent properties, the plant would have had to move to grow had it not taken the steps to "Select" and "Standardize" its existing operation.

"The first step in 5S is to clean out your garbage," says Fisher. "So, floor space we didn't think we had prior to 5S, all of a sudden, Wow! We have room to grow."

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A Metaldyne worker prepares to remove a completed valve body from a die-cast machine. To his left, newly made parts cool before being deburred and inspected.

In the intensely competitive automotive market, it will take initiatives like this and more to remain strong, especially against offshore suppliers, says Dolack.

"The biggest challenge ahead is dealing with our friends in China and Korea," he says. "We try to compete globally with someone who is earning the equivalent of 25 cents per hour, and it gets difficult to do that. So we keep trying to become more efficient because that's the only way we can compete at this point. We have an advantage now that not everyone can make these kinds of parts. But if we were just competing on a labor basis, we couldn't."

Fisher says another challenge is the fact that automakers typically demand price cuts be written into long-term supplier contracts, usually in the form of 2% "givebacks." At the same time, he says, the automakers are seeking to improve their own quality levels.

"The automakers want to reduce their warranty costs and improve their J.D. Power ratings, and that's done through quality and customer satisfaction," says Fisher. "So on a product that I've maybe been producing five years, the quality standard may have been at one level five years ago, and today it's different. It's our goal to make sure we're not just reacting to these customer needs. We're trying to foresee and work with them, and get the quality where it should be. You deal with this through programs like 5S and others."

Dolack says he wants to make the Niles facility the type of plant where "when customers walk through, they want you to make their castings. The 5S program is part of that," he stresses. "I know for a fact that the guy who knows best whether that part is good or bad is the guy who makes it. We don't want quality folks running around here trying to catch him," he says. "That's where we were 10 years ago."

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