Best Practices: Goodrich Corp., Cargo Systems Division: Running Lean, Flying High

This North Dakota-based maker of aircraft cargo systems believes its lean-based operating platform is the key to a bright future.

By Rick Carter, Editor-in-Chief
Of all industries hurt by 9/11, aerospace probably tops the list. Commercial carriers, airplane builders and suppliers all saw their business drop after that tragic day. But while carriers still struggle, the airplane builders and certain suppliers have begun a return to profits. Goodrich Corp. is one supplier that has gotten past the industry slowdown, not by taking on less aerospace business but by taking on more. And by creating a lean-based culture for all of its globe-spanning divisions.

The $4 billion, Charlotte, NC-based company has made many products in its 125 years, including B.F. Goodrich automobile tires. But this is one of many non-aerospace businesses the company has sold (to the Michelin Group in 1988) and replaced with aerospace acquisitions. By 2001, Goodrich had dropped all but one of its non-aerospace businesses (along with its “B.F.” initials), and in 2002, with the industry in post-9/11-downswing, it dropped the last.

The next year, Goodrich acquired TRW Aeronautical Systems, owner of a North Dakota-based business, making cargo systems for commercial and military aircraft. The acquisition enabled Goodrich to make the promotional claim it now uses, that its products are “on almost every aircraft flying today.” The company divides these products into three areas: Airframe, which includes landing gear, wheels and brakes; Electronic, which includes systems for fuel, lighting and sensors; and Engine, which includes cargo systems, nacelles (the outer casings of airplane engines), pylons and engine-control systems.

For the workers at the 290,000-sq.-ft. cargo-systems plant in Jamestown, ND, a city of 15,000 in east-central North Dakota, the Goodrich acquisition meant another change in a long line of changes at the facility. Under TRW’s three years of ownership, for example, the plant changed its production line up to focus exclusively on making the systems that guide, move and secure aircraft cargo containers. In the process, it shed the military-aircraft weapons-related business that had existed at Jamestown in various manifestations through four previous

owners. Now with another new owner, Jamestown workers, some of whom had been aboard since the plant opened in 1970, couldn't help but think the front-office door was simply spinning again. So in spring 2004 when Goodrich transferred Tim Dumbauld from its Aircraft Wheels and Brakes business to become vice president and general manager of the Jamestown facility, he was welcomed politely, but not with fanfare.

"My first impression was that this plant had been through a lot of change," he says. "They had seen guys like me several times over the past few years, so they would listen, but in the background they probably felt they knew how to run the business and would just keep going."

And in many ways, they did. An experienced group, the workers were familiar with kaizen events, work cells and lean production, and had been using continuous-improvement techniques since the early 1990s. When TRW took over, the workers adapted to that company's emphasis on the statistical-based Six Sigma quality-improvement program.

But when Goodrich took over a time when plant production had slowed the new owner saw an opportunity to take Jamestown to the next level, chiefly by redirecting the plant's accumulated expertise and progress. Dumbauld's mission was to integrate these strengths, using Goodrich's own lean-based production policies.

"The changes in ownership here, plus the downturn in the aerospace industry were business disruptors," says Dale Riederer, operations director, and a 15-year Jamestown veteran. "Now we're getting back to basics from a continuous-improvement standpoint. This includes lean methodology, 5S basics and visual management." The company also favors combining Six Sigma and lean, which Riederer says ensures that "you use the right tool for the right problem."

But the custom nature of cargo-system design makes standardization especially challenging. For example, while each cargo system includes the same basic parts conveyor rollers and trays, side guide rails, locks, latches, power drive units (PDUs) and cargo control systems configurations vary by aircraft model. Systems are not interchangeable from one aircraft model to another, nor are they built ahead of time and stored. Using a just-in-time process, Jamestown builds one specific cargo system for one specific aircraft just before it will be installed in that aircraft.

Manufacturing production involves three basic steps: machining; processing and painting; and assembly. Hardware (trays, guide rails, latches, etc.) is machined from

aluminum, titanium or steel at the Jamestown facility, using four- and five-axis CNC machining centers. These parts are then processed and painted as necessary, and assembled into completed sections of a system. The sections are then packed in installation sequence in large reusable crates. The crates are shipped to Boeing and Airbus, the plant's primary customers, for installation in the cargo holds of wide-body cargo and passenger aircraft.

Individual cargo-system components, not to mention the numbers of systems ordered, can vary wildly. Systems for the largest planes, such as the Boeing 747, for example, can include 4,000 parts for the main-deck section alone. And while long-running models like the 747 can produce orders for many years, most orders are for planes that will not be in production nearly as long.

"We're a low-rate, high-variety manufacturer," says Riederer. And because of that, adds Dumbauld, "Trying to get lean and even get single-piece flow going is a little more difficult here." As a result, the company has roughly aligned itself into work cells that "are different than what you might see at a high-rate manufacturer," says Riederer. "In the roller-tray assembly cell, for example, we produce those parts in one cell to take advantage of tooling commonality, methods commonality and point-of-use placement to be efficient. So our one-piece flow in some cases, isn't one piece. It's a group of similar parts that we move through the process and in the end, we kit and ship out." It's also a far cry from the 1980s and before, says Dumbauld, when everything made at Jamestown was batch-produced, "blown through the system and placed on a shelf."

Dumbauld says the key to making it work is the company's emphasis on lean. "We've been focusing on the flow-down of lean and encouraging 100% participation in the plant and making it a part of everyone's job every day," he says. "We have a Policy Deployment system which takes the top-level corporate goals and flows them down through various levels in the organization, so, ultimately, the individual knows what he should be working on, primarily in the areas of breakthrough, change and continuous improvement."

Dumbauld explains how, through a series of matrices, the corporation identifies areas of improvement. First, targets are broadly defined. "And as you move down, they get more specific. At the cargo-system level," he says, "we have a matrix that shows our top 10 improvement targets for the year. Dale's department has his top 10 or 12 things that support each of the larger goals that pertain to him. Eventually these get written into people's performance plans." Performance plans are evaluated monthly, and these evaluations are used to determine how well the

company is meeting its goals.

“But these are stretch targets,” says Dumbauld. “It’s X-plus to get people thinking. We don’t expect to meet 100% of all of them. If we do 80%, that’s meeting expectations; if we do 100%, we’ve exceeded expectations.”

Dumbauld says Jamestown employees are starting to understand that continuous improvement, and lean in particular, are everyone’s job. The company reinforces this by holding regular lean-related events on various levels. Some will involve lean training reviews, while others might involve kaizens, 5S initiatives or a total preventive maintenance event on one machine. A cross-functional team of support people, hourly employees and a lean-resources group gathers suggestions from workers and helps choose events.

“They’ll review these every other week and get a three-month look ahead at the opportunities,” says Riederer. “They’ll then tell our steering council what they’d like to go after. It’s a give-and-take in terms of understanding priorities and what will support our business.”

Riederer and Dumbauld give Goodrich’s corporate structure high marks for offering guidance and assistance without constricting them. Jamestown also benefits from other Goodrich sites that are further along in implementing continuous improvement methodologies. These sites will often send lean experts to Jamestown, for example, to help the plant meet its goals.

The plant’s renewed lean efforts have had a positive effect in every department, says Riederer. “We’ve had lead-time savings, inventory savings and overall time savings,” he says. “And other benefits have come along with that, including freed-up space.”

Riederer remembers that when he first arrived at Jamestown, the plant had devoted one large area for secure parts storage that workers needed to visit before they could start a job. “You had to go there, tell what job you were starting,” he says, “and they would pick the material for you. Now that space has been repurposed. Inventory is point-of-use and is controlled by the operator. They not only receive and store it, they pick it for their jobs. They’re responsible for cycle counting and maintaining inventory accuracy, so they’re very aware of what they need to produce the product.”

Riederer, Dumbauld and others on the Jamestown leadership team are also quick to acknowledge that the plant’s successes couldn’t have occurred without its devoted, experienced workforce, currently numbering 480 (average age: 41). The plant benefits from this group’s time in service as well as its superior safety consciousness. From January 2001 to January 2003, for example, the Jamestown crew completed 3 million man-hours without a lost-time injury. It’s also a group with above-average mechanical abilities, a trait Riederer says is common in the agriculture-based states of the upper Plains. Workers do not receive piece-related bonuses, but all are included in a gainsharing program, and all are eligible for company-paid training and education programs. To ensure the company continues

to meet needed workforce levels, it participates in an intern program with major universities in North Dakota and surrounding states.

Despite the plant's remote location, Dumbauld says he is not worried about meeting future workforce needs. "Folks who come here tend to stay," he says. He's also not worried about the fact that the economic health of the major U.S. commercial airlines remains shaky, well into 2005.

"We're bullish on the future," he says. "Obviously, we're more driven by the cargo side of things, and for us, airline business is picking up. We do all the wide bodies, particularly in Asia. And in the cargo traffic between the U.S. and Asia, the airplanes coming this way are jam-packed. Sometimes they're not so full going back," he says, "but the business is recovering in the sense that there is more cargo being hauled and more planes needed."

He also points to a growing number of airplane conversions (from passenger to cargo) and the retiring of older aircraft as trends that mean more business for his company. Most importantly, though, he says Goodrich has entered a new arena of competition regarding cargo-system design.

"We are competing for the contract for the A380 freighter," he says, which is a brand new superjumbo Airbus aircraft with three cargo levels. "This will require not only the mechanicals for the entire plane, but the whole system integration of all decks." It will also involve all three areas of Goodrich expertise needed to fully outfit the plane: mechanical, power drive and control. It could encompass products not made at Jamestown such as lights, fire detectors and panel covers.

"This will be a big effort for us," says Dumbauld. "And Goodrich was the only company that could compete in all three areas of expertise needed to do the job." The company made the same, all-inclusive pitch to Boeing for its new 7E7 Dreamliner, and has been awarded the contract.

"This is important because it separates us from the lower-tier, piece-part manufacturers," says Riederer. "We've gone through this evolution as a business and as a manufacturing facility. We've learned that continuous improvement, lean

methodology and selected application of Six Sigma help reduce waste and take variation from your process."

Is the Jamestown facility ready to take on the new Boeing, Airbus and other potentially big projects? "Our machine shop could take on another 40% in terms of load," says Riederer. "In assembly, we have lots of capacity because that's basically determined by adding manpower. We can grow," he says, noting that the plant currently produces cargo systems for the Boeing 777, which is also expected to see a boost in production.

"Four or five years from now, we'll be pretty full up," says Riederer. "It's a ripe future. We suffered through the downturns like most aerospace businesses did," he adds. "But we've grown through it."