

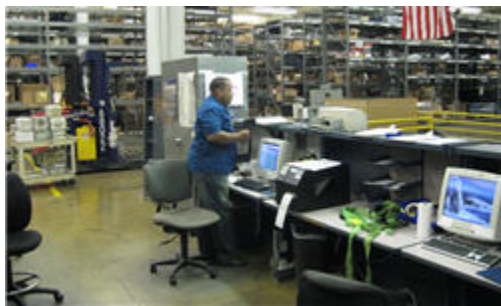


Inside the Four Walls

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By Bob Trebilcock/ Overhaul & Maintenance



The warehouse often is the last link in the supply chain. But what goes on inside the four walls can determine the success of repair operations.

Three years ago, helicopter engine manufacturer Turbomeca USA began implementing Lean processes in its maintenance, repair and overhaul operations in Grand Prairie, Texas. As the company improved the shop floor processes directly related to engine repair, it noticed that its warehousing and logistics processes weren't keeping pace. That, in turn, was slowing

progress in Turbomeca's push for improvement.

"We looked at what happens in the warehouse as not as noble as putting engines together," said COO Larry Alexandre. "But we discovered that without world class support from the warehouse, we couldn't continue to improve our facility."

Too often, the warehouse or distribution center is an after-thought. But when an MRO operation like Turbomeca USA wants to implement Lean processes, it also needs strategies, processes and systems inside the four walls of a parts depot or warehouse to support that move.

Today, Turbomeca is working with a third-party logistics company to transform its warehouse operations to match its repair operations. Other MROs need to follow suit, says Joann Michalik, an associate partner at Oliver Wyman.

"Industries like high tech, automotive and direct-to-consumer, have been putting in place warehouse processes that allow them to reduce inventory and lead times for some time," said Michalik. "In the aviation industry, the MROs are only just now beginning to think of ways to link their inventory and warehousing processes to their demand and service level requirements."

When the two are aligned, Michalik adds, warehousing changes. "You need less storage space because you're receiving in smaller quantities and delivering more of it directly to the line," said Michalik. "The more progressive MROs are looking at the risk profiles of their inventory to decide what items they have to have on hand and which items can be pulled through the supply chain. They're then reconfiguring the space for a very active receiving and put away so they don't have as much on the shelves in inventory."

The benefit: "Done the right way, we can look at a 50% reduction in inventory," said Michalik.

Here's a look at three warehouses, ranging from a traditional facility to one transitioning to support lean manufacturing and maintenance, and how they support MRO activities.

U.S. Navy Fleet Readiness Center Southeast, Jacksonville, Fla. Traditional warehousing and continuous improvement.

In Jacksonville, Fla., SoBran, Inc. supports depot level rework operations on airframes, components and engines, including the F404-GE-F1D2 that powers the U.S. Air Force's F-117A stealth fighter and the TF34 engines that power USAF's A-10 Warhogs for the Navy's Fleet Readiness Center Southeast.

"We have the second largest government contract at the FRC Southeast facility," said Mark Seidl, SoBran's program manager for the production support services contract. "To support that work, we have 175 individuals involved in warehousing."

Those operators are spread across three different facilities. An 85,000-sq.-ft. warehouse is off site but centrally located to the FRC operations. In addition to receiving parts, components and hardware kits, the facility also receives deliveries for other Navy subcontractors and warehouses material for other GSA operations besides the FRC facility.

A second off-site 55,000-sq.-ft. warehouse is dedicated to warehousing parts and components used for the F404 and TF34 engines.

A 45,000-sq.-ft. storage area is located at the FRC facility and is used to store parts and components that come off of the aircraft that pass through the repair operations. "We end up with parts that may not be needed for six months, parts that have to be reprocessed before they can be used again, and parts that will be scrapped," said Seidl. "We inventory them and then work with equipment evaluators to determine what has to be scrapped and what can be reworked." Parts that can be used again are stored in predetermined kit sequences, entered into an inventory database, and then moved into a storage location in the warehouse until needed in the future.

SoBran uses little in the way of automated materials handling equipment or systems. Instead, the facility is managed using well-executed traditional warehouse processes. Parts, components and consumables are stored in plastic totes on basic shelving. Kits and parts are moved to the line on golf carts or with lift trucks.

While kits are barcoded and scanned into an inventory management system for inventory purposes, much of the record keeping still is manually keyed into Excel spreadsheets. "We barcode the plastic kits and track them by an aircraft part number so that our inventory is up to date," said Seidl. "But we still manually key in the part numbers for the specific line items that go into those kits. That information is turned over to the warehouse personnel who are involved in storing and retrieving the kits, and to kit masters who may be tracking several hundred kits that are needed on the line for repairs."

While the operations are low-tech, they are still focused on continuous improvement. "The FRC has a Six Sigma program in place," said Seidl. "We work side by side with the government to develop processes that will support those efforts, but when it comes to automation, we work within the parameters of the Navy's budget."

One example: SoBran has trained its warehouse personnel to create the repair kits that will be needed in upcoming modifications so that more highly trained and highly paid technicians and mechanics can spend their time doing repair work instead of hunting for parts.

"When we receive hardware kits from our suppliers, we have our warehouse personnel screen them and then put them away in the warehouse in the sequence they'll be used for a

job," said Seidl. "That's a non-value-added process that technicians used to do in the repair facility."

Delta TechOps, Atlanta, Ga. Using automation and supply chain software to manage complexity.

While SoBran operates a traditional MRO warehouse for the Navy, Delta TechOps' 200,000-sq.-ft. facility in Atlanta uses materials handling automation and sophisticated supply chain software systems to manage the complexity of its operations.

"Every night, about 40% of our fleet is in a maintenance station," said Tim Dugger, the general manager for logistics. "Half of that repair is being done in a location other than Atlanta, and we don't know where the parts will be needed until late in the afternoon. That means we need very responsive systems to get the parts on time to the right outbound flight."

What's more, MRO work for other carriers is a growing percentage of Delta TechOps business. That means the warehouse has to strike a balance between maintaining the right amount of inventory to meet service levels. "We can't take the chance of grounding a \$150 million jet," said Dugger, while minimizing inventory and labor costs. "The warehouse has to be efficient if we're going to maintain our cost advantage in the MRO market," Dugger said.

The planning for the current operations began about eight years ago. The company brought in a consulting team to create a master plan for the facility. That resulted in a new floor plan that minimized travel times, automated equipment including conveyors and bar code scanning solutions, more efficient storage and staging, as well as the implementation of new software systems, a process that is still underway.

The centerpiece of the facility is an automated storage and retrieval system, also known as an AS/RS, with 90,000 different storage locations. An AS/RS uses automated equipment, known as cranes, to store and retrieve pallets, cartons or totes in a very dense storage area. That reduces the amount of space required for storage, freeing up more of the facility for repair operations that generate income. Delta TechOps manages about 250,000 different parts, receives about 200,000 shipments each year, and fills about 660,000 orders per year, usually with multiple parts to an order.

The combination of conveyors, bar coding and better processes allows the facility to move most incoming shipments from the dock through quality inspection processes and into storage available for use in 12 hours or less.

Those automated systems also come into play in the afternoons, when delivery schedules for the day's orders begin to come together. "We pick and stage orders throughout the day," said Dugger. "In the afternoon, a chart goes up in the warehouse that shows when the major flights are scheduled for departure between 5 p.m. and 9 p.m. That schedule tells us when the work has to get pulled from the staging area and delivered to a plane for loading."

In addition to material handling systems, there has been a major emphasis on supply chain management software systems.

For instance, Delta TechOps has implemented an advanced planning engine to predict the failure of expensive but essential components. "It's not uncommon for us to have one master part number with nine or 10 interchangeable parts underneath it," said Mark Fogle, the general manager for resource planning at the facility. "We're trying to aggregate the consumption of all of those interchangeable parts so we can have the right amount of inventory to meet service levels."

Since parts may sit in bins for months before they're needed, the company has invested in cycle-counting methods, using its ERP system, for inventory control. "We are driving for a 99.95% inventory accuracy rate on parts with a high dollar value," said Dugger. "We do that using control groups of parts that are counted every week."

While those systems are in place now, Fogle and Dugger say the state of the airline and MRO industries mean that they have to constantly look for productivity improvements.

Two examples: As the amount of third-party work grows, Delta TechOps is investing in software systems to accurately capture the work performed and costs associated with handling, storage and repairs. "That's essential to turning our MRO activities into a profit center," said Fogle.

In addition, Delta is working with its suppliers to reduce the amount of inventory in stock. "We're trying to move the consignment model that works in other industries like high tech and automotive into this industry," said Fogle. "We're looking at ways our OEMs can position and hold stock for us."

All of those changes, he adds, will impact the way they warehouse in the future.

Turbomeca USA, Grand Prairie, Texas. Extreme warehouse makeover.

When Turbomeca USA discovered that its warehousing operations were the hurdle in its goal to become the industry's benchmark in helicopter engine production and repair, it faced a classic dilemma: Should it take on the project internally, or turn over the management of its logistics operations to a third party?

"We determined that warehousing wasn't one of our core competencies," said Larry Alexandre, Turbomeca's COO. "Because it's essential, we decided to outsource those operations to people who are experts."

Enter Fort Worth-based Pattonair Americas, part of the UMECO Group, a provider of logistics services to the aerospace and defense industry.

Pattonair already was operating in the Grand Prairie facility, with a contract to manage the line-side replenishment of consumable and C class parts. "That was about 60% of what they were using on the floor," said Paul Fanelli, president of Pattonair Americas. "Working in the facility, we could see the non-value-added things they were doing and proposed doing a mini Six Sigma study."

After mapping the flow of goods and people through the warehouse, Pattonair identified the bottlenecks in the operations and recommended ways to align warehousing processes with MRO activities. Last March, Turbomeca gave them the green light to make improvements, which included:

A new layout: "One of the first things we did was to relocate work areas," said Fanelli. "For instance, we moved the receiving area where we processed deliveries closer to the dock." That meant less travel time getting parts from the dock to the quality inspection lab and into storage.

New space-saving storage methods: Moving storage areas closer to the point of manufacturing and repair cuts down on travel time, but it also eats up valuable floor space. Where possible, Pattonair replaced rack storage with high-density vertical carousels, which provide more storage capacity in a smaller footprint than traditional racks. Better yet, said Fanelli, "I was able to get them used, which saved money."

Getting pallets off the floor: Not everything could be stored in carousels. The remaining racks were turned and repositioned to improve the workflow. More importantly, Pattonair

installed new racks to create an area to pick items from cases, rather than pick them from pallets on the floor. "It's hard to misplace an engine," said Fanelli. "It's not hard to lose a nut or bolt that you absolutely need when you're sorting through cartons on a pallet."

Creating a bin station in the repair area: In the past, technicians and mechanics would spend hours getting the tools and parts they needed for a repair. That's now done for them. "We set up everything they need in the bins, so they don't have to leave a workstation to get parts," said Fanelli.

Implementing an inventory management system: Pattonair performed a full physical inventory to create an accurate picture of what was, and wasn't, in the facility in the way of parts. They then implemented a warehouse management system to control that inventory going forward, and a document management system that allows them to scan all certifications of conformance. "We guarantee 99% part availability and we have in place guaranteed response times that vary according to the maintenance issue on the floor," said Fanelli.

While most of those systems are in place now, Fanelli says the work is far from finished. "Turbomeca is committed to being the best in the business," he said. "That means they will be constantly reevaluating their processes."

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Photo: Delta Air Lines