



Summary

Organization

The NORDAM Group

Industry

Manufacturing

Business Problem

Work-in-progress and non-value added steps contributing to excessive process lead time

Methodology

Lean SCORE

Solution

Eliminated waste in metal bond assembly process

Benefits/Results

Improved cycle time, efficiency and safety

Key Tools Used

- Value Stream Map
- Value-add/Non-Value-Add Analysis
- Takt Time
- SIPOC
- Spaghetti Diagram
- Video Taping
- 6S
- Standard Work
- Kaizen Newspaper

The Challenge

The NORDAM Group, one of the largest independently owned aerospace and aviation companies in the world, recently experienced success with a Lean manufacturing project aimed at reducing the 11-day lead time for assembling certain small aircraft components. The company suspected that the Cessna metal bond process contained non-value-added activities that, if eliminated, would reduce lead time considerably.

According to John Younger, a NORDAM Engineer and Six Sigma Black Belt in training, NORDAM had tried Lean years before. However, when the entire airline industry slowed operation and production after 9/11, NORDAM, like many companies, decided to cut programs such as Lean in an effort to reduce layoffs. Recently though, NORDAM began working with BMG to implement both Six Sigma and Lean initiatives across the organization.

Younger and a BMG Lean expert selected a team that included both process experts and management.

They took advantage of SCORE™, BMG's methodology for Kaizen events, and its ability to quickly reduce waste and achieve fast results from improvement efforts.



Planning and Preparation – The Select, Clarify and Organize Phases

The first order of business was to Select the exact process steps for improvement. After a review of the full Cessna manufacturing process, the team chose the metal bond assembly sub-process because a variety of key components are built here, including fuel tank skins, baggage doors and leading edges. Although it represented only a fraction of the overall process time, the SCORE team found that up to two days worth of parts could be backlogged at this point, waiting for the busy assembly teams to catch up.

After Selecting the process area to focus on, the SCORE team Clarified its objectives and Organized for a four-day Run week.

The NORDAM Group is one of the largest independently owned aerospace companies in the world. Headquartered in Oklahoma, the company employs approximately 2,400 people around the globe, with facilities in the U.S., United Kingdom and Singapore. NORDAM's international business role continues to grow with an expanding array of products and services for airlines, business aviation, air transport OEMs and military segments of the aerospace and aviation industries.

Running the Kaizen Event

On the first day of the Run week, the SCORE team reviewed the existing assembly process by videotaping operators at work. Younger says this was a "great eye-opener" because the operators actually witnessed wasted motion (walking to different work areas, looking for tools, etc.). The team also spent time doing "5S" – sorting, storing, shining, standardizing and sustaining improvements in their work areas. They added an additional "S" for safety.

On the second day of Run, the team discussed what they wanted the assembly process to look like (the "future state process"). The TAKT time goal, based on customer demand, was 50 parts per day at 10.5 minutes per part. The assembly process cycle time would have to be greatly reduced to meet this goal. Over the rest of the week, Younger and his team investigated the assembly process in detail, which led to a host of improvements, including the following:

Eliminating wasted motion:

The SCORE team found that the door assembly workers spent too much time walking to and from a cure oven housed in a different room. The team identified an oven in a closer room that could be used to cure doors, and would reduce walking time. In addition, the employees were given handheld barcode scanners to track work orders, eliminating walking time to a centralized time clock. Younger estimates that these two changes alone saved two miles of walking each day, or 416 miles of walking per year!

(continued)

BMG's SCORE™

Lean is a well-known and proven methodology that eliminates waste, or non-value-added activities, to make processes more efficient. Typically, eight types of waste are targeted, including time, motion, inventory, processing, transport, intellect, overproduction and rework. Typically, more than one type of waste is found in a process. Thus, Lean projects often result in improvement on multiple levels.

To help clients get more benefit from Lean, BMG has combined Lean principles with Six Sigma structure in an approach called SCORE, which stands for Select – Organize – Clarify – Run – Evaluate. SCORE augments Lean's Kaizen events with additional steps, adding critical project selection, planning and evaluation.

Eliminating wasted time and intellect:

Video analysis showed that tank skin builders on the day shift spent the first 40 minutes unloading parts from the oven to complete the previous night's work. Younger and his team labeled this activity "non-value-added" as it was a waste of intellect for these skilled workers.

"The value for them is to build parts," he explains. "That's what they do best, not unload and load parts." Further analysis showed that the night shift operators had ample time to unload the parts from the ovens, so the SCORE team load-balanced the process by shifting the unloading task to the night team.

Improving safety:

The SCORE team noted that the tank skin production process involved securing the tank skins on a 12'x 5' table weighing 130 pounds. The loaded tables were then lifted by employees onto a "baker's rack" to be wheeled into the curing oven at the end of the day. However, a loaded table took four people to lift, leaving the possibility for injury high. In addition to the safety question, the operators sometimes had to pull other employees away from their work to help load the tables.

Younger suggested resizing the tables to better fit the tank skins. Using scrap materials on hand, the team built a smaller prototype table that worked perfectly. The new table was almost half the size, and weighed only 29 pounds, making it safe for two people to lift. "That was one of the simplest changes we made that, in my opinion, made one of the biggest impacts," says Younger.

Load-balancing:

The SCORE team also found room for improvement in the leading edge assembly process. According to Younger, "Our goal was to keep our leading edge builder at his work table at all times." But in actuality, the team found that the builder spent quite a bit of time away from his workstation monitoring parts in the cure oven.

The team experimented with having a co-worker monitor the oven, allowing the leading edge builder to focus on building parts. This change led to an observed 50 percent cycle time reduction, actually doubling the number of leading edges



completed. As a result, the team recommended hiring a person to perform "oven runner" duties. The additional product output would allow for moving one of the two leading edge builders to tank skins, which needed an operator.

In addition to these successes, the SCORE team identified a number of other areas for improvement, including implementing a system for rotating inventory and reducing scrap, and using product carts to help establish "pull" between process steps. "Some of it was just simple, common sense stuff," Younger observes. "But until you step back and take a look, you never would have seen it."

The Evaluate Phase

Since the Lean improvements were implemented, the metal bond assembly process has consistently exhibited lower cycle times. The TAKT time goal of 10.5 minutes per part has been met for leading edges and tank skins, with doors showing steady progress in the right direction.

Even though some of the employees Younger worked with were initially skeptical of the Lean initiative, many of them have come around. Younger stresses that involving process owners on the event team is essential to any Lean project's success. "You can't just say, 'this is the way you're going to do it.' They need to be a part of it, and that's what we did from day one."

Based on the success of this project, other SCORE events have since taken place in NORDAM's manufacturing division. "We were pleased with the response," Younger says. "I think people really believe that this has made a difference." ■

