

Taking the process apart and building a better way.

At this welded assemblies manufacturing company, piles of material was strewn everywhere, there was low morale from constantly running behind, and there was a general consensus that nothing seemed to work right.

Overview

Beneath an airplane's sleek skin lie hundreds of skeletal structures or assemblies that are welded and bolted together. One of our customers was responsible for building these assemblies for purposes such as engine mounts, control columns, landing gear, chairs, and chair supports; 84 different assemblies in total.

Data Collection

Using the Catena® Improvement System and video analysis of the process, the team discovered that assemblies travelled 1,200 feet during the average 22 days in the factory. Remarkably, 93% of that time they were untouched - sitting and waiting as work in process inventory!

In fact, most of the assemblies travelled to five different departments and eight or more work centers prior to completion. Of the time operator and technicians worked on the assemblies, 50% or more was spent on non-value adding work. Things like grinding, pounding, rework, and searching for parts in piles of inventory took up half of their day. Interestingly, only one or two operators were responsible and knowledgeable enough to build certain assemblies, so if they were gone, work sat waiting for their return.

In spite of the fact that most airplanes have engine mounts on the left and right side of the plane and one pilots chair and one copilot chair, assemblies were built individually, instead of as sets, in batches of 20 or more. This meant resources and time were expended for the next 20 pilot's chairs, while the copilots chair for the next airplane, sat waiting and making production fall even further behind schedule.

Transformation

Video analysis helped identify everything needed to reduce the average amount of travel time for operators per assembly from 3,400 feet, to just under 60 feet, improving productivity an amazing 32% for each assembly!

After the analysis was complete, the team began questioning long held process assumptions. Using the principles of One Piece Flow and right sized equipment, the team consolidated the work of five departments into one work cell. Instead of having one welder responsible for the entire build process, the work was divided based on customer demand (Takt Time) and flowed through six successive welding stations based on standard work. Data collection plans were developed to track which parts did not fit and had to be manually ground after being originally cut or milled by extremely accurate machines. Then these parts were change to minimize manipulation after the fact.

These changes, and many smaller improvements, allowed the team to reduce the lead-time from 22 days to 1.5 days which amounted to a 93% reduction. Additionally, the order size was reduced from 20 assemblies per order, to one assembly per order. This allowed work to be pulled as needed: one left engine mount followed by one right engine mount, one pilots chair frame followed by one copilots chair's frame. In addition the inventory was set up in kits by each assembly type and stored at the point of use, therefore reducing inventory by over \$700,000.



*“Improving organizations
one process at a time”*

