

# A better way of cutting defects?

Product and Process Surveillance, a new approach to inspection, improves quality, flow

BY KATHRINE BECK

If you're making a batch of cookies, you might eat one to see how it tastes. If you're making 10,000, you want to know exactly what temperature they should be baked at and for how long." Barb O'Dell, Commercial Airplanes vice president of Manufacturing and Quality, is explaining how a new approach to quality that focuses on correct processes, Product and Process Surveillance (PPS), is helping the business unit reduce nonconformances—the term for deviations in a product from requirements or standards—and simultaneously get leaner.

The traditional method of ensuring quality was to have a mechanic perform a task and then have an inspector check the finished work to see if it met the design specifications. The product was being monitored, but the process that built it wasn't. And when it comes to quality, performing the work according to the established processes can make it or break it.

On the 777 wing line in Everett, Wash., PPS is being used in the panel buildup area. Here, mechanics drill holes for the fasteners that will hold the wings on to the body, using a metal template. In the past, the holes were inspected after the work was done to make sure they matched the drawings and met requirements.

Today, inspectors perform surveillance of the process, watching the mechanic perform the work. The inspector has a checklist and ensures that mechanics are following instructions and documented processes. Inspectors don't watch every hole as it's drilled; the process has been designated as one with extremely low risk, so the surveillance is done on a sample of the work.

"Jobs converted to PPS are evaluated 10 percent of the time. The rest of the time, the mechanics verify their own work," said BCA Quality engineer Stephanie Van Meter. She added an important qualifier: "We implement PPS in areas where it's clear mechanics are engaged and own quality in their area."



Quality team leader Bruce Burns observes electrician Noly Pascua installing insulation at the 737 Final Assembly Blanket Shop. Surveillance of a process as it's performed helps ensure that quality is built into the airplane.

Part of the PPS implementation in the 777 Wing buildup area is that an inspector's stamp is not required for every job. The new process is leaner, too. Inspection is performed as work is being done, and mechanic buyoff eliminates the wait time associated with traditional inspection.

"It's nice to be able to sign off on my own work. It frees up my time and it frees up the inspector's time," said 777 Wing area mechanic Bryan Pierce.

## DROP IN NONCONFORMANCES

Marty Wagner, QA acting manager for the 777 Wings panel buildup area, said there's been a decrease in nonconformances

since PPS was put in place. He said process surveillance makes a difference: "It helps new employees understand the importance of the process, and it helps experienced employees not get complacent. Inspectors can mentor employees and help them realize the process is there for a purpose."

O'Dell added: "Mechanics can build the quality in. Others can inspect defects out. But if you want to build the quality in the first time, the Lean way, you need to focus your attention on those who build, not those who inspect."

PPS also has registered success in a production area that previously had no inspections at all. According to 737 PPS im-



# Watch the process!



MARIAN LOCKHART PHOTO

plementation leader Mary Sullivan, PPS isn't just about getting leaner by using risk assessment and process surveillance to eliminate much traditional inspection. It's also about improving quality, preventing defects and reducing rework.

Employees in the 737 blanket installation shop line the passenger cabin with insulation and clamp it in place, working around windows and other fuselage features. They need to make sure there are proper clearances for later additions to the passenger area of the airplane, such as floors and wiring. The insulation serves as a moisture barrier and fire retardant and keeps cold air out and warm air in.

The blanket installation shop had no inspections, because it was a very low-risk area of the airplane. And it was a good candidate for PPS because defects were being passed down the line.

As part of PPS implementation, a cross-functional team of mechanics, inspectors, and design and manufacturing engineers (composed of members from the Blankets Value Stream Team and PPS Team) was created. They developed stringent quality criteria to ensure that clamps are where they should be, that the fasteners known as blanket buttons are all there and that everything is positioned properly.

They used the quality criteria to create

a "defect map"—a printed map of the work area on the airplane that shows and lists the quality requirements and specs. The map is used to ensure that everyone agrees on the quality criteria. It's also used by inspectors who now do periodic surveys of the work as it's being performed. These same quality criteria are documented in the work instructions used by the mechanics.

Team lead Vivian Bergquist said that working together developing the criteria and the new regular process surveillance have changed the relationship between inspectors and mechanics. "Rather than being like the police, now they're more like teachers," she said of the inspectors. "We're more of a team."

And, she said defect rates are "way, way down. We don't see those guys from flow-day six telling us we didn't get it right." She attributed that to the fact that when her team took a hard look at their processes, "we got together with people from the whole factory to find out exactly what the issues were."

Plans are in work for implementing PPS for the 737 Water & Waste Systems commodity. This is a more complex process with a significant number of traditional inspections. As with blankets, it's expected to improve quality and reduce flow time through the use of surveillance.

Sullivan, the 737 PPS implementation leader, noted that there are currently 9,000 inspections per 737, and 84 percent of them are done by an inspector using the traditional method. She said that means there are a lot of delays in the process—but that a significant number of traditional inspections can be eliminated using scientific risk assessment and sampling.

"But," she added, "we don't want to remove inspections without putting a robust system in place that ensures quality without increasing risk. When you implement PPS, you need to make sure the mechanics have the quality tools to be successful in building a defect-free product the first time. We make sure we are doing both."

And that creates a new role for inspectors. "We can transform the role of the inspector from cop to surveyor and defect preventer," she said. "The inspectors have so much knowledge of the airplane and the factory. They can partner with manufacturing to help them find solutions to increase customer satisfaction, improve quality, improve production flow and increase ownership of quality—and that's all a part of PPS." ■

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