

Team finds a revealing solution to ongoing 777 interior challenge

By Dan Iwanis

Hidden in the Cost of Rework, Repair and Scrap (CORRS) database at the Commercial Airplanes twin-aisle factory in Everett, Wash., was evidence of a costly nuisance lurking behind the interior sidewalls of every 777 passenger airplane.

As part of his job, Matt Boyle, an interiors quality representative who's since become a support cell manager, regularly monitored the database, which tracks the monthly average cost of rework per airplane. Looking for improvement opportunities, Boyle developed a specialized report that grouped CORRS costs by module (for instance, galleys or seat tracks) and displayed the top five for the month.

"Two things emerged quickly," Boyle said. "First, the top five issues were always the same—the order varied, but it was always the same five issues. Second, sidewalls [airplane interior walls] were always among the top five."

From his background in interiors, Boyle had a good idea what was causing rework. Window reveals—clear plastic interior windows and the surrounding frame, which are supposed to snap easily and snugly into cutouts in the sidewalls—did not work like they were supposed to. Mechanics had to twist and bend the reveals to fit them in place, often popping them into place by using a skin wedge, a hand tool with a thin metal blade.

What emerged from this discovery was a textbook example of Lean+ in action: a team effort that involved people taking the initiative, preventing and eliminating waste, and securing the support of appropriate colleagues to provide a benefit to Boeing and its customers.

"This solution really demonstrates the power each of us has to make a difference—to our team, to Boeing and ultimately to our customers," said Alison Timidaiki, 777 Boeing Production System leader and Boyle's manager. "Matt suspected a problem, analyzed the data to verify and engaged all the right people in finding a solution that ensures first-time quality."


ROOT CAUSE

According to Boyle, the structure of the reveal was just a little too big to fit in the cutout, and the placement of the clips on the back of the reveal interfered with part of the sidewall. "There was always this gut-wrenching snap, crackle, pop and you just hoped you weren't breaking something," he said.

The twisting, turning and sharp metal tools sometimes led to minor, cosmetic—but conspicuous—cracks to the sidewall beneath the window reveal, which must be removable so fuselage windows can be accessed for cleaning and other tasks. "We have vinyl repair technicians who can do incredible things. But often as not, customers would insist on replacing the sidewall because the damage is so visible to passengers," Boyle said.

Replacing a sidewall presents several problems: To access the sidewall, seats frequently must be removed. Because sidewall patterns are unique, Boeing Fabrication's Interiors Responsibility

Below th



Mary Dougherty, a flight line mechanic at the Commercial Airplanes facility in Everett, Wash., prepares to replace a 777 window reveal. Using an employee's idea and a lot of teamwork, the window reveals were recently redesigned to greatly reduce sidewall damage during the manufacturing process. GAIL HANUSA/BOEING

e surface



Center (IRC) often had to interrupt regular operations to manufacture single replacement panels. The damage often occurred after a customer requested that certain windows be cleaned—and a delay in replacing a damaged panel threatened on-time delivery.

With the approval of his management and the support of the IRC, Boyle pursued the matter. Christer Bjorkegren of Commercial Airplanes Material and Process Technology (M&PT), the factory support organization in the business unit, investigated the assembly process and determined the parts were built according to design and that three-dimensional measurements and interference simulations were required to further assess the situation. Metrology expert Wayne Clark of M&PT's technology organization used advanced scanning technology to precisely measure all parts of the production assembly. He then used that data to perform a virtual assembly, which confirmed that the structure and clips interfered with the remove-replace procedure. M&PT also helped Boyle develop a prototype modification by grinding down part of the window structure and using smaller clips in a slightly different location.

"We brought in a representative from our vendor who makes the window reveal," Boyle said. "He had no idea. He said, 'If my product is doing that, we need to fix it.'"

PROMISING RESULTS

Kristina Gustin, an IRC design engineer, helped Boyle take his project the rest of the way. "I investigated to make sure the solution would work and not interfere with any of the surrounding components. Chaz Wichman [with IRC estimating] and I worked together on the business case development," she said. "Matt's initial design was pretty much there when he came to us. I just tweaked it a little where needed."

Gustin, who has since moved to the 787 Dreamliner program as a propulsion engineer, quarterbacked the change through the various management, technical review and change boards that had to sign off both at the manufacturing and production levels. "Even with a change that seems, physically, relatively minor, there are so many things to be considered. It was a long, long list," she said.

The change was implemented late last year and the results are promising. Of the 140 777s built before the change, about half required a sidewall replacement. In the 22 since then, only four have required sidewall replacements due to these cracks.

"That's really only part of the story because you know our customers are having the same problem," Boyle said. "They have to clean the windows, so they are dealing with the same issues."

Tom Pellerin, a 777 interiors mechanic who deals with window reveals regularly, is sold on the change. "They pop in and out much easier. You don't have to fight them, and I can put my skin wedge away."

What did Boyle find most revealing about this experience? "Probably the most important lesson I learned through this was how many people and groups are available to help you in this company," he said. "You just need to dig beneath the surface to find them." ■

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