

Degree of difficulty



Doug Loisel makes adjustments to the 777 Freighter's 10-foot-by-12-foot (3.04-meter-by-3.65-meter) main-deck cargo door. GAIL HANUSA PHOTO

Employees key to successful introduction of 777 Freighter into new manufacturing system used to assemble 777 family

By DAN IVANIS

While all airplane derivative programs come with their share of challenges, the 777 Freighter set a new standard for degree of difficulty. Just ask the mechanics, engineers or anyone else involved in getting the first one through the Everett, Wash., factory and onto the flight line.

Partly because of its freighter-unique features and partly because it was introduced into the factory at the same time the 777 program was transitioning to its new Boeing Production System—which includes a moving manufacturing line—the 777 Freighter tested its builders in ways never imagined.

Despite these challenges, the first 777 Freighter made its way on time through the factory and onto the flight line with minimal impact to the passenger airplanes being built all around it.

“One thing I’ve really enjoyed about this first freighter is that it has been a ‘we’ situation,” said Wes Williams, a 36-year Boeing employee and lead for the team that installed the freighter’s mammoth main-deck cargo door. “It was refreshing that everyone met the challenges—but also shared in the pain and wealth of working through the challenges.”

Although it’s the sixth model in the 777 family and the third introduced in the past five years, the freighter was the most demanding of the 777 siblings—and not only because of the manufacturing system changes. Designed to fly farther and provide more capacity than any

other twin-engine cargo plane, the 777 Freighter’s cargo-driven differences pushed the envelope.

Three major differences that separated the freighter from its passenger-carrying family members included installation of a 10-foot-by-12-foot (3.04-meter-by-3.65-meter) main-deck cargo door, a rigid cargo barrier near the front of the plane on the main deck, and a new floor system designed to support and restrain main-deck cargo loads. Each presented its own set of unique challenges.

MAIN-DECK CARGO DOOR

The main-deck cargo door, which is located on the left side of the airplane on the aft section of the fuselage, just behind the wing, is the most striking and visible of the 777 Freighter’s features. Its sheer size allows the 777 to integrate with 747 freighter fleets, which comprise about half the world’s freighter capacity. Cargo operators will easily be able to transfer 10-foot-high pallets between the two models through the new door.

While the large opening is sure to be a customer favorite, it presented mechanics with a new experience.

“On the 777 moving line, the airplane is carried on a cradle as it moves along,” Williams said. “The engineers did a great job of predicting how things would work around this large opening, but it was still new for all of us and something we’ll have to get used to.”

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“We’re still learning the door, so from that perspective it has been a challenge,” said Doug Loisel, a member of the main-deck cargo door team. “I’ve been working on lower-deck cargo doors for 10 or 11 years, so working on this one is a lot the same but on a much larger scale.”

The door itself was installed with few issues and has been performing well.

RIGID CARGO BARRIER

The rigid cargo barrier (RCB) presented challenges because of its size, heft and inflexibility. Semicircular in shape, the one-ton monolith must fit snugly in place in the forward section of the airplane, aft of the flight deck.

“The RCB is loaded into a special tool and then a crane lifts the tool and RCB onto the deck,” said Jon Rogers, a mechanic involved in the process. “The tool was designed to help us move the RCB through the fuselage and into position. Then it has to be lined up and tilted into place. There’s less than a quarter inch of clearance in some places, so there’s very little wiggle room.”

NEW FLOORING SYSTEM

Because the bulk of the freighter’s potential payload of 226,700 pounds (102,829 kilograms) will be carried on the main deck, a new flooring system was designed to accommodate the much heavier load. A monolithic aluminum superstructure is covered by floor panels that are more complex in their design and pattern than those on passenger planes.

“There are about 30 percent more fasteners involved in the freighter’s floor, because each panel has container tie-down fittings. In all, I’m responsible for 16,500 holes,” said Joe Daher, a 13-year Boeing employee and lead for the group that installs the floors.

Complicating the floor mechanics’ plight is that once the RCB is in place, only one door (the main-deck cargo door) provides access to their work area.

“It is quite a dance to work around everyone else on the airplane in that situation,” Daher said.

The transition to the Boeing Production System (BPS) and moving line has been a major change for the 777 program. The transformation began more than two years ago when a 777 was moved from its traditional slant manufacturing position and placed nose-to-door in the Everett factory. Since then, forward and aft fuselage sections have been moved onto moving crawler tools for systems installation work. Final body join was the last position to transition to “crawlers”; this happened earlier this year. This summer, the full U-shaped moving line for 777 assembly is expected to be complete and moving at a rate of 1.6 inches (4.06 centimeters) per minute.

Successfully moving the 777 Freighter through the new production system required close coordination among groups such as Manufacturing, Engineering, Supplier Management, Tooling and Planning. The program

established 10 around-the-clock, rapid-action teams to work with Manufacturing to rapidly support any issues that arose during the build.

“Building this freighter in the cycle we are on while trying to transition to BPS has been extremely challenging,” said Williams. “But people have given the hours and attention it took to get us where we are.”

The 777 Freighter is scheduled to be delivered to launch customer Air France in the fourth quarter. With 78 orders from 11 customers, the 777 Freighter accounts for more than 20 percent of the current 777 backlog. ■

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Adjusting the 777 Freighter’s main-deck cargo door are (from left) Doug Loisel, David DePuy, Michael Mortenson and Wes Williams. GAIL HANUSA PHOTO