

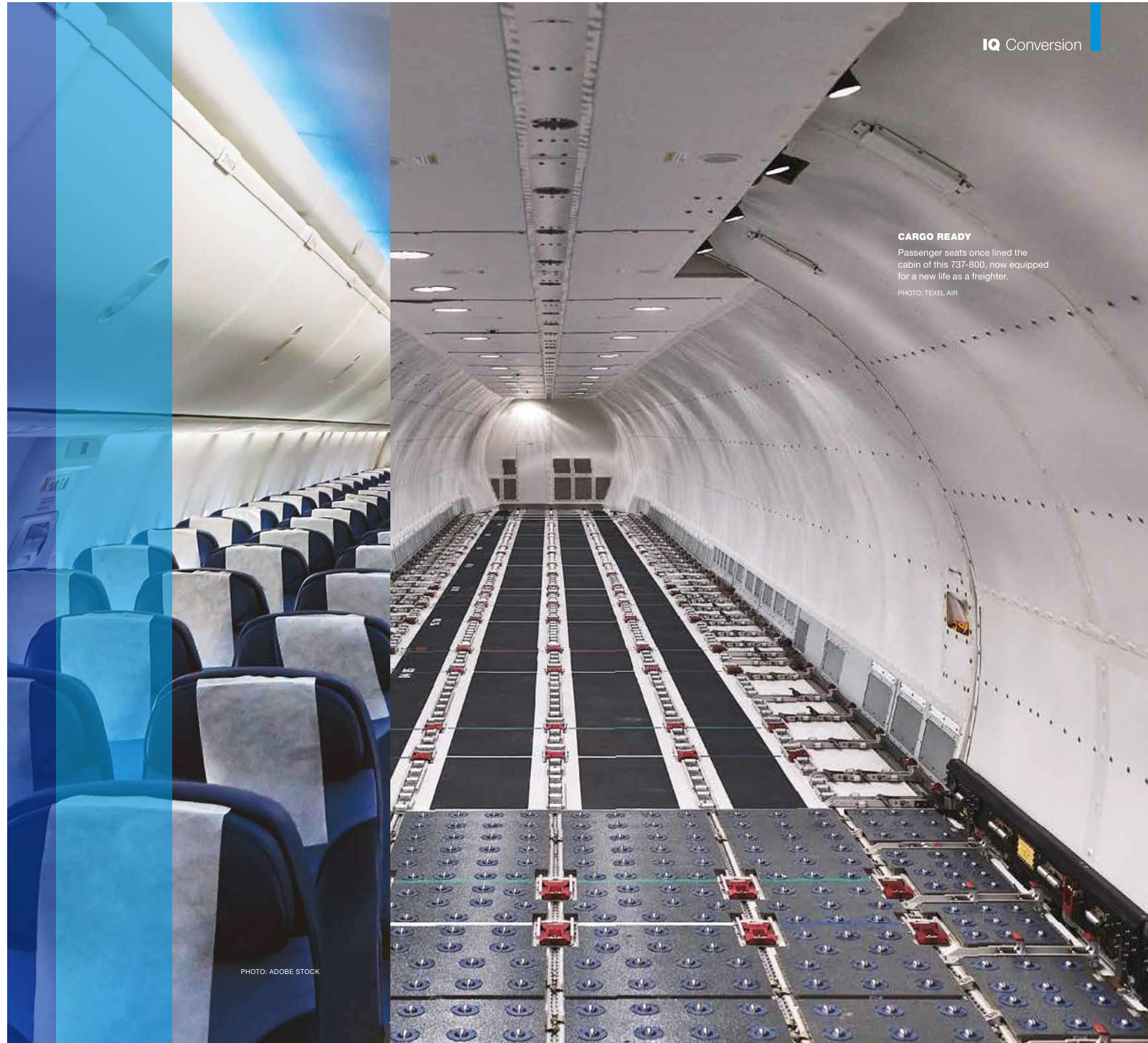
Passengers to Pallets

Freighter conversions can add two decades to an airplane's life

Engineers offer glimpse into how they build blueprints for Boeing converted freighters

BY BRIAN RANTALA, BOEING WRITER

When a passenger airplane nears the end of its initial purpose, it can either end up in a desert "parking lot," destined for an uncertain future, or it can be transformed into a freighter, potentially adding over 20 years to its lifespan.



CARGO READY

Passenger seats once lined the cabin of this 737-800, now equipped for a new life as a freighter.

PHOTO: TEXEL AIR

PHOTO: ADOBE STOCK

Last year, Boeing received more than 100 orders and commitments for its two active freighter conversion programs, the 737-800 Boeing Converted Freighter (BCF) and the 767-300BCF.

OPEN FOR BUSINESS

A 141-inch (358-centimeter) wide main deck cargo door was installed on this 737-800BCF.

PHOTO: TEXEL AIR



FREIGHT FLIGHT

A 767-300BCF in flight.

IMAGE: BOEING

The 52,800-pound (23.9-tonne) capacity 737-800BCF is a popular model for conversion, as it contributes to operator sustainability goals through lower fuel consumption, is highly reliable and offers lower operating costs, compared with other standard-body freighters. The larger 124,600-pound (56.5-tonne) capacity 767-300BCF, meanwhile, shares a large cargo door design and other common elements with the popular 767-300 Freighter, manufactured specifically for cargo. The 767-300BCF, like the 737-800BCF, offers the range and operational versatility required by general, e-commerce and express cargo markets.

MAIN DECK ACCESS

The door on this 9G rigid cargo barrier provides main deck access from the crew area on this 737-800BCF for ground operations and for optional in-flight access.

PHOTO: TEXEL AIR



But how is a complex commercial jet converted for something different than its original purpose? And how does that happen cost-effectively and efficiently? Boeing Freighter Conversions chief engineer Jimmy Williams and senior project technical lead engineer Paul Garcia ask and answer those questions every day.

Because each airplane varies slightly depending on the original configuration at delivery, every airplane gets its own tail-number-specific drawing that contains the actual engineering to perform the conversion.

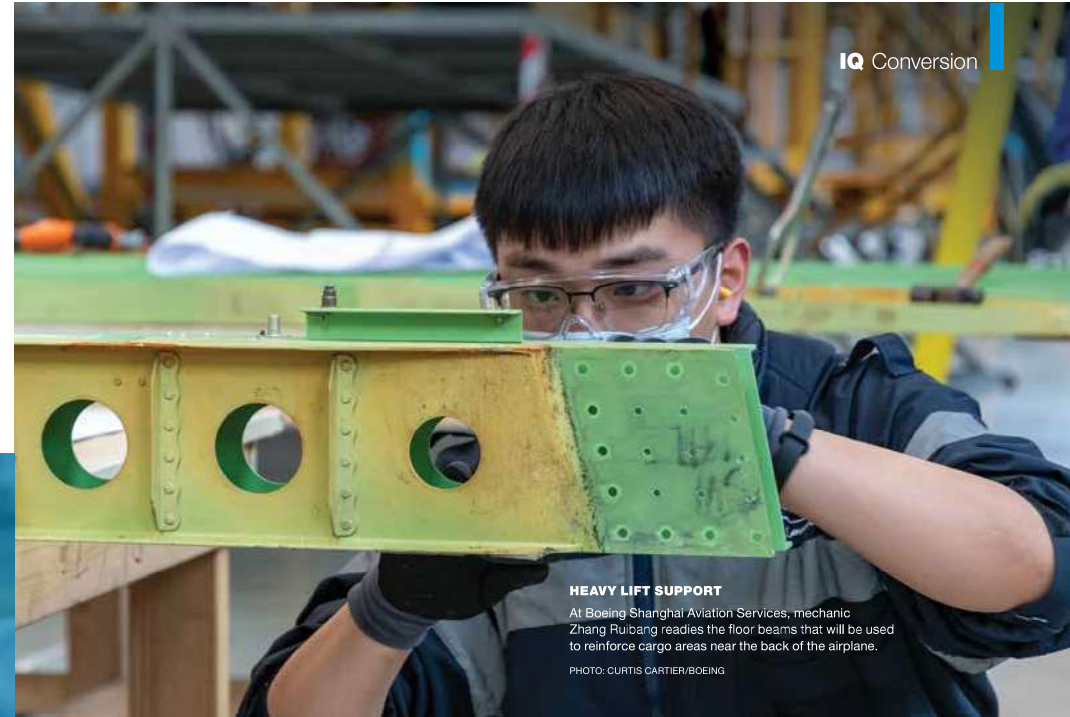
“Our goal is to have each freighter have a similar look with a standard set of option choices, to speed up the conversion process.”

**PAUL GARCIA,
SENIOR PROJECT TECHNICAL LEAD ENGINEER,
BOEING FREIGHTER CONVERSIONS**

BRINGING DRAWINGS TO LIFE

At Boeing Shanghai Aviation Services, mechanic Liu Jixiang uses installation drawings to mark a cutline in the main deck cargo door frame area.

PHOTO: CURTIS CARTIER/BOEING



HEAVY LIFT SUPPORT

At Boeing Shanghai Aviation Services, mechanic Zhang Ruibang readies the floor beams that will be used to reinforce cargo areas near the back of the airplane.

PHOTO: CURTIS CARTIER/BOEING

“Our goal is to have each freighter have a similar look with a standard set of option choices, to speed up the conversion process,” said Garcia.

Engineering teams collaborate and produce an engineering drawing, specific to each airplane, using Boeing Production System guidelines. “In the world of freighter conversions, a priority exists to stabilize and standardize,” said Williams.

Following the engineering drawings for the conversion, parts are created and procured, enabling the modification to begin. All seats are removed from the airplane, as are lavatory facilities, and flooring is reinforced to withstand additional cargo weight. A large main deck cargo door is installed in the side of the fuselage so that pallets and containerized cargo can be loaded onto the converted airplane.

FLOOR MODEL

Freighter floors are lined with an interlocking network of ball mats and pallet locks that comprises the cargo loading system. The pallet locks (red) guide and align pallets before they are pushed over the roller balls (blue), which allow heavy containers and pallets to move with greater ease.

PHOTO: TEXEL AIR



SEALING THE DEAL

During conversion, it is not unusual for an operator or lessor to perform routine maintenance. At Boeing Shanghai Aviation Services, mechanic Zhu BoTao applies sealant.

PHOTO: CURTIS CARTIER/BOEING



“Our freighter lines sell like hotcakes, and the appetite keeps growing. When a customer first comes to us, they ask about the availability for a conversion slot. Once we determine slot availability and the customer’s needs for the conversion, we sign an agreement, and the clock starts ticking.”

**JIMMY WILLIAMS,
CHIEF ENGINEER,
BOEING FREIGHTER CONVERSIONS**

Once an agreement is in place, Boeing teams get to work. About six months ahead of starting the conversion, program managers work with the customer to identify, as part of the “ship’s record,” tail numbers of passenger airplanes identified for conversion (feedstock) and manufacturers’ serial numbers.

After an airplane is designated for conversion, Boeing manages engineering and design work. When it’s time for the plans to come to life, maintenance, repair and overhaul (MRO) facilities, such as Boeing’s London Gatwick facility, induct a passenger airplane and execute the plans designed by the Boeing engineers to transform the airplane into a freighter.

Conversion at the MRO facility begins by taking the starting weight of the airplane. Once in the hangar, the airplane is lifted and stabilized using an intricate process known as jacking and shoring. This process provides engineers with the baseline information they need to continue the conversion.

Finding the proper location for the new cargo door required additional engineering due to the length of the airplane and other factors. The 737-800BCF main deck cargo door was designed to facilitate loading of cargo on the main deck, ensuring a wide, clear opening with adequate clearance and guidance when loading pallet positions. Additionally, the 767-300 Freighter and the 767-300BCF both share a main deck cargo door design placed at the same location on the airplane to maintain consistency.

“Our freighter lines sell like hotcakes, and the appetite keeps growing,” said Williams. “When a customer first comes to us, they ask about the availability for a conversion slot. Once we determine slot availability and the customer’s needs for the conversion, we sign an agreement, and the clock starts ticking.”

TRANSFORMATION

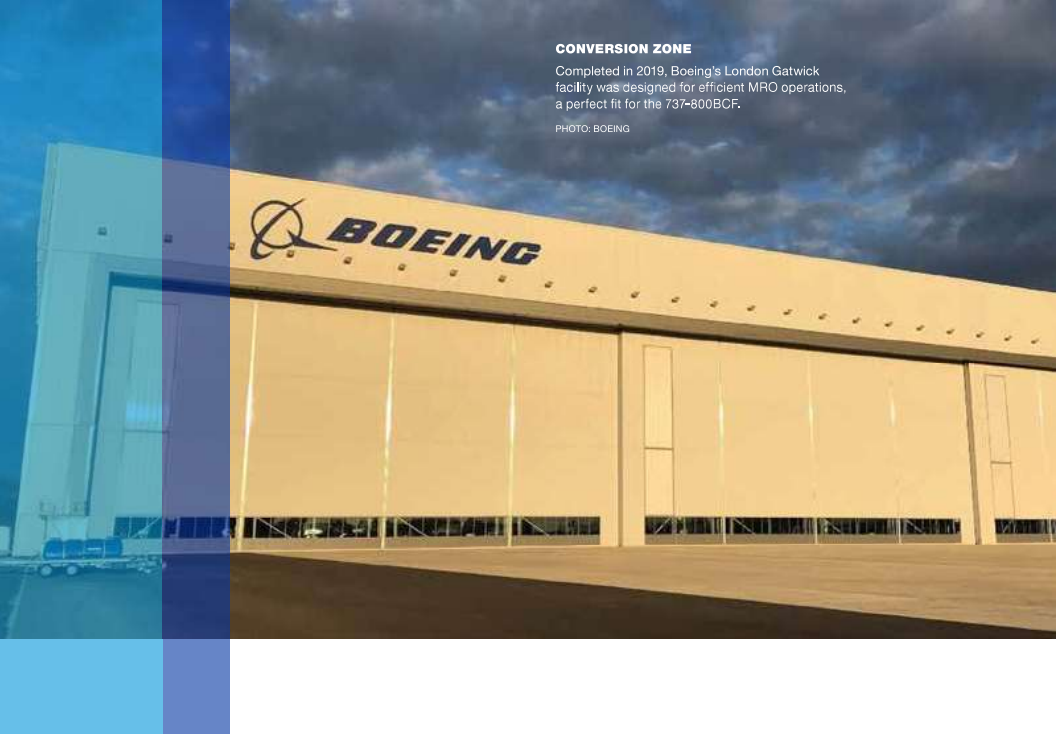
Inside Boeing’s London Gatwick facility, a passenger 737-800 becomes a freighter.

PHOTO: ROSS MUNNERY/BOEING

**CONVERSION ZONE**

Completed in 2019, Boeing’s London Gatwick facility was designed for efficient MRO operations, a perfect fit for the 737-800BCF.

PHOTO: BOEING





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The execution of these drawings, known as “touch labor,” is conducted by trained technicians, who are able to interchange positions along the MRO conversion line, adding efficiency to completion rates.

The MRO network and touch-labor supply chain for Boeing converted freighters prioritize quality and on-time delivery while offering convenience and potential cost savings by being closer to customers and the airplanes they intend to convert. There are active conversion lines for 737-800BCFs in Asia, Europe and the Americas, and more are planned in locations including Costa Rica, Canada and the UK. For the 767-300BCF, there are conversion lines open in Singapore and China, with more on the way.

Each step in an airplane’s journey through conversion benefits from Boeing’s expertise as the original manufacturer. Before leaving the MRO for customer delivery, the airplane is weighed again to confirm weight and balance requirements. All paperwork is completed, and any additional work is discussed with the customer, including maintenance, paint and other tasks. With oversight of work provided by the Boeing Quality organization, the newest Boeing converted freighter is then ready to hand back to the customer and take to the skies.

From service entry as a freighter and throughout the airplane’s in-service life, every Boeing converted freighter operates with the advantage of being associated with the industry’s largest portfolio of services and technical support that helps owners and operators maximize return on their investment. **IQ**

IN PROGRESS

Boeing Shanghai Aviation Services repairs and modifies airplanes. The two 737-800 jetties on the perimeter are being converted to freighter configuration.

PHOTO: BOB FERGLISON/BOEING