

# From skins to bins

At sites in three countries, Boeing Fabrication employees make jetliner parts—by the millions

By Kathrine Beck

Pop the lid off a model-airplane kit and you'll find a box full of tiny, seemingly unrelated parts. But as any dedicated hobbyist knows, somehow—if you do it right—those disparate bits and pieces come together to form an airplane.

Now imagine the box held parts for the wings, fuselage, interiors and tail sections of a full-sized 787 Dreamliner, 777 passenger and freighter airplanes, the Next-Generation 737, the 767 and new models of the 747. Needless to say, the box would have to be enormous to hold everything from stowage bins to wiring to wing skins to panels. And the number of parts would boggle the mind.

That's the scope of work performed by Boeing Fabrication at 10 sites in three countries.

"If you like creating things, Fabrication is a very rewarding place to work, because we build a lot of products," said Ross R. Bogue, vice president and general manager of Boeing Fabrication.

"A lot" understates just what the more than 13,800 employees of Fabrication build. They make millions of parts, assemblies and kits every year that are delivered to Commercial Airplanes factories in Renton and Everett, Wash., and North Charleston, S.C., or to Commercial Aviation Services, which operates a worldwide Spares organization.

This vast array of offerings, which includes advanced primary and secondary composite structures, precision-machined metal parts, interior parts and the complex wire bundles that form an airplane's electrical system, is a source of pride for those who work at Fabrication.

"Just coming to work and driving by the factory and seeing the airplanes, I feel a part of the team and like I'm contributing to the main objective," said Jessica Sandman of Engineering Tech Support, 787-9, at the Boeing Fabrication Interiors Responsibility Center in Everett.

Boeing Fabrication has several strategic roles.

Emergent support—making sure parts are available when needed to avoid production delays—is one vital element.

"They come in with a 3-D model or a drawing or even a sketch," explained machinist Dave Hedstrom. "And they say, 'I need this part right now. The faster you can get it to me, the happier I will be.'"

The quick turnaround could be necessary because of a design modification, a parts shortage or a replacement for a damaged part.

Emergent support can be crucial to an airplane program.

"When we designed the first 777 Freighters, we had a lot of parts, and many of them were not yet sourced into the supply chain. And for some that were, suppliers couldn't meet lead time," said Larry Loftis, vice president and general manager of the 777 Program. "Fabrication came to our rescue and in a short period of time built thousands of parts for us. We would never have been able to get out the first five airplanes without Fabrication's emergent support."

That kind of help is in addition to the steady stream of parts that are routinely

**PHOTO:** Larry Wilkens, bend machine operator, works on a duct for the 777.

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## Boeing Fabrication at a glance

### Auburn, Wash.

About 4,500 employees\*  
Airplane component manufacturing including emergent support work, or making sure parts are available when needed to avoid production line delays or shutdowns

### Everett, Wash.

About 2,760 employees  
Electrical Systems Responsibility Center; Interiors Responsibility Center

### Frederickson site, Puyallup, Wash.

About 1,830 employees  
Composite Manufacturing Center; skin and spar work

### Boeing Portland, Oregon

About 1,450 employees  
Titanium, steel, aluminum, stainless steel machined parts; gear systems; and engine mounts, gearboxes, landing gear beams, flap tracks, carriages, flap support mechanisms and flight control systems

### Boeing Winnipeg, Canada

About 1,380 employees  
Composite structures and subassemblies, specializing in wing-to-body fairings, engine strut fairings and other complex composite parts

### Boeing Aerostructures Australia

About 1,120 employees at two sites  
A range of products including the moving trailing edge for 787; the movable leading edge for 747; and elevators, rudders and empennage panels for 777

### Advanced Developmental Composites, Seattle

About 480 employees  
Primarily focused on development work for Commercial Airplanes

### Boeing Salt Lake City, Utah

About 475 employees  
Fabrication and assembly of a variety of aerospace production parts and kits for all Commercial Airplanes programs as well as Spares.

### Boeing Helena, Montana

About 135 employees  
Hard metal machining on structures for the 747-8, 767 and 787

### North Charleston, S.C.

About 30 employees  
Emergent Operations; Interiors Responsibility Center (both are under construction)

\*Employment numbers as of January 2011



delivered to the 777 program and all other airplane programs. They're built at Fabrication sites from Winnipeg, Manitoba, in Canada to Bankstown and Fishermans Bend, Australia, and locations in Utah, Oregon and Washington. The parts vary from wire bundles, horizontal and vertical stabilizers, tubes, ducts and crew-rest areas, to name just a few.

Working with suppliers is another key role for Fabrication.

For example, 787 side-of-body chords start out as a titanium forging weighing 2,460 pounds (1,116 kilograms) from supplier VSMPO in Verkhnyaya Salda, Russia. They are then rough-machined at Ural Boeing Manufacturing, a Boeing joint venture on the VSMPO campus, down to 780 pounds (354 kilograms), then shipped to Fabrication's Portland, Ore., site. There they are precision-machined, ending up as a complex part weighing 187 pounds (85 kilograms).

Partnership with suppliers is essential.

"In the past there had been almost a competition between internal manufacturing and suppliers," said Perry Moore, Boeing Portland general manager. "That wasn't a very holistic view. We're working to make sure we're doing the right things for the company throughout the complete global supply chain."

Moore co-leads the Metals Commodity Team, whose members from business units

**PHOTOS: (Left)** Layo Harvey, composite fabricator, inspects the quality of the composite material on a 787 vertical fin skin panel. **(Insets, from left)** Daniel Johnsen, assembly mechanic, builds a 777 hydraulic reservoir in Auburn, Wash.; assembly mechanic Rosalynda Parkhurst builds a 737 modular wheel well assembly; and John Albin, assembly mechanic, performs seal work on a 787 vertical fin.

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within Fabrication and Supplier Management manage about 250 suppliers.

And Moore's team isn't unique. The other main commodity groups—Composites, Interiors and Electrical—have similar teams.

Fabrication also is helping develop materials and processes for the airplanes of the future.

Jim Ockerman is former director of operations of a Fabrication business unit in Seattle called Advanced Developmental Composites, which is integrated with product development, research and technology, and supplier management.

"Our basic charter is to create products and manufacturing processes that give our airplanes a competitive advantage and make Boeing competitive for many years to come," Ockerman said.

Keeping Boeing competitive has long been Fabrication's role. When the 777 program was pioneering use of large composite parts—technology later used on a much larger scale on the 787—Fabrication got the call.

"They were with us every step of way," Loftis said. Just as Boeing Fabrication is today, supplying vital, high-quality parts for development programs, emergent needs, spares and airplane production across Commercial Airplanes. ■

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**PHOTOS: (Right)** Sandra Tugade, plastic technician, sands and fills the main landing gear door of the 787 just prior to painting at Boeing Winnipeg in Canada. **ASSOCIATED PRESS**  
**(Insets, from left)** Diane Herd, contour tape-laying machine operator, kits 777 ribs; Robert Nantz, a shop-floor mechanic in Salt Lake City, completes work on a 767 forward instrument panel; and Don Hall, assembly mechanic, performs seal work on a vertical fin. **BOB FERGUSON/BOEING**

