



Boom Supersonic

Use Case – Drill Guides

Customer Profile

Boom Supersonic is redefining commercial air travel by bringing sustainable, supersonic flight to the skies. Boom's historic commercial airliner, Overture, is designed and committed to industry-leading standards of speed, safety, and sustainability. Overture will be net-zero carbon, capable of flying on 100% sustainable aviation fuels (SAF) at twice the speed of today's fastest passenger jets. XB-1, a demonstrator aircraft, rolled out in 2020, and its net-zero carbon flight test program is underway.

Challenge

Joining the various parts of the XB-1 demonstrator aircraft requires numerous holes to be drilled in the airframe structure. Drilling them individually can be extremely time consuming due to the time required to properly locate each hole. The power-feed drilling process also requires fixturing to support the drilling tool and establish the correct angle of each hole. Drill guides offered a practical solution, but conventional metal guides would have presented high costs and excessive lead times.

Solution

Boom engineers 3D printed multi-hole drill guides for accurately locating fastener holes over larger areas of the aircraft's structure. The drill guides were printed on the Fortus 450mc™ and F900™ printers using FDM® Nylon 12CF carbon fiber and ULTEM™ 9085 resin materials. These strong, rigid thermoplastics provide sufficient strength and stiffness to support the power-feed drilling tools while offering the precision needed for accurate hole location.

Impact

Using just one typical drill guide as an example, Boom saved approximately \$3,700 in material cost and reduced lead time from weeks to days. Considering that over 700 drill blocks have been 3D printed in the production of the XB-1 demonstrator aircraft so far, the material cost savings is significant. The lead time savings between in-house 3D printing and machining also has a substantial positive impact on the production schedule.



A sample of 3D printed drill guides used in the production of the XB-1 demonstrator aircraft.



3D printed drill guides being used to drill fastener holes through a carbon fiber reinforced plastic (CFRP) and titanium stack-up in the XB-1 fuselage.

Typical Lead Time Savings



1 Week Average vs. Machining

Example Cost Savings Single Drill Guide



92% vs. Machining