Boeing 7E7 Structure Will Be Made of Composite Materials

Boeing [NYSE: BA] has decided that the 7E7 will be the first commercial jet ever to have a majority of the primary structure -- including the wing and fuselage -- made of advanced composite materials.

Following months of intensive study and analysis, the company has selected a graphite combined with a toughened epoxy resin as the main composite. The wings will also include TiGr composites -- a combination of titanium and graphite. Titanium is a strong metal known for its light weight and durability. Graphite is a stable form of carbon.

Over the past year and a half, a team made up of more than a dozen aerospace companies looked at advanced composites and new aluminum alloys as possible materials for the 7E7.

"Composites offer us a variety of advantages including better durability, reduced maintenance requirements and increased potential for future developments," said Mike Bair, senior vice president of the 7E7 program for Boeing Commercial Airplanes. "We believe this choice will help position Boeing to take advantage of the most modern materials technologies as we enter the second century of flight."

Bair said generally accepted assumptions that composites would weigh significantly less and cost significantly more than aluminum were found not to be universally true.

"The aluminum companies did a great job of offering new alloys that were about as light as the composite materials," Bair said. "And the composite companies made a lot of progress on cost."

Bair noted that the work done by the aluminum companies will be of ongoing benefit to Boeing, as they can possibly be used for smaller structural pieces on the 7E7 and existing airplane models.

"Improved materials are one way we can continue to improve our current products," Bair said. "We are really pleased with the cooperation we've seen from the aluminum companies and the excellent results produced."

Boeing will be using structural health monitoring technologies on the 7E7 -- providing operators with real time, continuous data collection concerning the health of the airframe. The company is conducting developmental work on embedding sensors in the 7E7 structure to detect impacts and monitor structural integrity.

The combination of improved materials properties and the structural health monitoring system will create earlier understanding of any structural repair requirements, allowing operators to better schedule and manage their maintenance activities.

Boeing is in the process of selecting candidate suppliers for composite raw materials.

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