

## THE BOEING COMPANY – PRODUCT DEVELOPMENT ADVANCED MATERIAL INSERTION

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Boeing is the world's largest aerospace company and a leading manufacturer of commercial jetliners and defense, space, and security systems. Within Boeing Commercial Airplanes (BCA), carbon fiber reinforced polymer (CFRP, or simply "composite materials") is increasingly being used in the primary structures of airplanes because of its high strength-to-weight ratio. As Boeing increases composite material use, the need to quickly and accurately certify materials from suppliers is critical to delivering high-performing aircraft on schedule and at competitive prices. The multi-year material insertion process costs tens of millions of dollars in capital investments and any delay increases cost.

Boeing engaged the Tauber Institute team in a 14-week project to document the current state of material insertions for structural carbon fiber composites, identify recurring process issues and potential solutions, and provide recommendations to reduce the time and cost required for future material insertions. Using information gathered from more than 50 informational interviews across multiple internal stakeholders and CFRP material suppliers, the team developed a current state process map of new composite material development. This information was used to generate a detailed illustration of the each organizational role and subsequent interactions. To gather specific time and cost data on the material insertion process, the team completed case studies on three relevant CFRP material developments revealing a lengthy multi-year process that costs tens of millions of dollars.

Based on these findings, the team developed three main recommendations to improve the material insertion process including improved internal IT system to automate redundant steps and to collect time and cost data to drive process improvement. The team also evaluated a potentially underutilized automated test cell project, and recommended reinvesting in the cell and establishing improved procedures. Finally, the team investigated participation in the National Center for Advanced Materials Performance (NCAMP), an industry/university/government collaboration database of non-proprietary composite materials. NCAMP data could supplement a material insertion process and reduce the amount of certification testing by up to a third per project. The team also outlined how to strategically engage with NCAMP to derive continued value going forward. In total, the Tauber team's recommendations will lead to \$10 million dollars in cost savings over the next 10 years for the Boeing Company.