

CAD Answers

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Sample work: Reverse Engineering of airplane Torque Tubes

This task involved reverse engineering airplane torque tubes for enhanced product reliability and reduced manufacturing lead-time. Reverse engineering the part without OEM documentation, and using aluminum in place of magnesium, provided a more corrosion-resistant solution that was also well suited for CNC machining. This solution provided a much more cost-effective in-house alternative for producing the small lot sizes necessary for maintaining the fleet.

Sample torque tubes are first measured for critical geometric dimensions using a coordinate measurement machine (CMM) and laser scanner. The measurement and scanned data are employed for constructing parametric solid models using a CAD system. Once the parametric solid model is available, the product and process re-engineering activities are conducted concurrently. In re-engineering the tube, strength analyses are conducted for both magnesium and aluminum solid models. The aluminum tube is both stronger and more corrosion-resistant than the magnesium tube it will replace. Machining the tubes using CNC is more cost effective, and, more importantly, the manufacturing lead-time is reduced from months to one week.

