

Forgings in the Aerospace Industry



Materials used in the aerospace industry demand durability, making forged metals very prevalent in this field. Since forgings have high strength-to-weight ratios and offer immense structural reinforcement, their properties improve the performance, range, and payload capacity of aircraft. Did you know that an average airplane can contain more than 450 structural forgings, as well as hundreds of forged engine parts? Custom forging of special shapes can yield near-net pieces ready for machining, a huge time and costs savings over working with a solid block of material. Helicopters, piston-engine planes, commercial jets, supersonic military aircraft and space shuttles contain forged parts. From nickel alloy forgings found in jet engines to external titanium alloy components found on spacecraft, forgings have helped the aerospace industry advance.

Supply Chain Challenges Ahead?

Suppliers warn of supply chain challenges as Boeing and Airbus predict booming production, reports Design News. Doug Smock, a contributing editor for Materials & Assembly, writes that strong aircraft demands could outstrip suppliers' capabilities. With Boeing forecasting more than 30,000 new airplanes over the next 20 years, and Airbus projecting the need for almost 26,000 new passenger jetliners and freighters, these predictions may be right on target. Rapid growing economies and more efficient new planes replacing older less efficient models are also pushing demands. "The next supply chain issue could affect engines. Complex, highly efficient next-generation

engines consume large amounts of special metal alloys. Specialty alloys made of titanium, nickel and other metals represent 95 percent of the weight of a jet engine. The number of jet engines required in 2013 is projected at 2,502,566 more than were required in 2010. That's a 23 percent surge for a metals' industry coming off a recession," says Doug in his article. He continues by saying that major specialty metals' producers such as ATI and Carpenter Technology have been boosting capacity to meet projected demand. A few aircraft applications cited which require specialty metals are fasteners, structural components (i.e. landing gear and avionics), and engine components.

US\$5M Ceramic Core Production

Chromalloy officially broke ground on a US\$5 million ceramic core production facility in Tampa, Florida, USA. The new 40,000 square foot production facility will be built adjacent to the company's new industrial investment foundry. The ceramic core facility will be built in 2011 and online by the first quarter of 2012. Ceramic cores are utilized in the investment casting process to form complex cooling passages within the components, which are necessary to operate effectively in the hot and highly stress sections of gas turbine engines.

Chromalloy Casting, the new 150,000 sq. ft. investment casting foundry next door opened and was fully operational in December 2010.

(continued from page 1)

Firth Rixson Opens Aerospace Forging Facility

Firth Rixson, a major provider of forged and specialty metal products to the aerospace industry, announced the grand opening of Firth Rixson Forgings LLC, located in Liberty County, GA. This will be the company's fourth closed die forging operation. The most significant expansion in the company's history, the Firth

tively to pre-forge, forge and post-forge activities, totaling 200,000 square feet of floor space. Modular construction within each of the building structures provides Firth Rixson Forgings LLC extraordinary flexibility in response to customer and market demand. David C. Mortimer, CEO of Firth Rixson, said in announcing the opening, "Firth Rixson has completed a decisive move in the aerospace industry. Within one year of announcing its construction, Firth Rixson Forgings LLC is fully operational. The technical organization assembled for this facility is industry leading. Our facilities, equipment and installations are of world class calibre. Today, Firth Rixson advances its prominent position in the Aerospace industry by delivering a broadened service to our valued customers."



Cross section of a turbojet engine (ca. 1970).

Rixson Forgings LLC facility was custom designed and built to provide rotating components for aircraft engines, with applications ranging from regional jet to wide body aircraft, as well as land based turbines. The manufacturing process will take place in three separate buildings, dedicated respec-

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Inspection Enters Digital Era

The possibility of digital radiography being used as a viable method for inspecting strategic and complex aerospace castings has come about thanks to a collaboration between government and industry. Experts anticipate that by adopting digital radiographic evaluation up to two million US dollars per could be saved versus the existing X-ray inspection methods. Heyward Burnett in an article for Materials

and Manufacturing says, "The jointly sponsored endeavor has generated digital ASTM-approved reference images for steel and Ti." The program has also produced a draft outlining aerospace specific guidance for implementing a digital-radiography inspection process. ASTM is currently working with the creator teams to modify this text to include inspection procedures for other materials as well.

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