

DOD Funds New Corrosion-Resistant Steel

Innovation Could Lead to Safer Aircraft, Cleaner Manufacturing

The promise of structurally safer and more environmentally friendly airplanes within the next five years is growing more likely, due to advances made by the Department of Defense's (DOD) latest research in stainless steel. The project will affect both military and commercial airplane manufacturing.

"The military is always finding ways to make our aircraft safer," said Mr. Alex Beehler, Assistant Deputy Undersecretary of Defense for Environment, Safety, and Occupational Health. "We must do everything we can to protect the men and women who fly them," he said.

Teaming with researchers from QuesTek Innovations LLC, of Evanston, Ill., DoD sponsored development of a new high-strength stainless steel alloy that resists corrosion. Corrosion causes rust, cracks and breaks that could cause aircraft components to fail. The new alloy, known as *Ferrium*[®] S53, could replace the need to use cadmium and other potentially toxic chemical coatings to prevent corrosion of millions of steel components used in aircraft parts, such as landing gear.

Researchers demonstrated a new, innovative computer modeling design technology (now called *Materials by Design*[®]), initially developed in a Northwestern University study, and further refined for the DoD project. The technology allowed researchers to develop the new alloy in just months instead of decades. In addition, the research partners developed a prototype within one year, using only \$100,000 of DoD funding provided through the Strategic Environmental Research and Development Program Exploratory Development (SEED) program. Using old methods, it would have taken at least 10 years and millions of dollars to develop a prototype.

Ferrium S53 could benefit the military and the airplane manufacturing industry in several important ways. The current industrial process for applying cadmium coatings to steel parts is difficult and potentially hazardous to workers. The coating process generates wastes containing heavy metals and volatile organic compounds. Managing, storing, and disposing these materials is time consuming and extremely expensive. *Ferrium* S53 could eliminate these issues, significantly reducing health risks to workers, and reducing costs. Using the *Materials by Design* technology, materials can be created or modified to perfectly fit a specific requirement, which reduces research and fabrication time and produces steels of higher strength, thinner dimensions and less overall weight.

Supported by the Air Force's Applied Technologies for Landing Systems (ATLAS) Program, the testing phase for *Ferrium* S53 is in full operation. Hill Air Force Base, in Utah was chosen as the testing site, and the project is estimated to be completed in 2006.

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