

FTI CELEBRATES 35TH ANNIVERSARY



FTI's new 120,000 square foot corporate headquarters and manufacturing plant in Seattle, Washington.

FTI Attains ISO 9001:2000/AS9100 Accreditation

FTI is proud to be one of the first aerospace suppliers to receive accreditation to the new requirements of ISO 9001:2000/AS9100. This re-certification of our Quality Management System was awarded by RWTUV USA Inc. in November 2003.



In meeting these requirements, our customers are assured that the products and services they receive from FTI will be free of defects and will comply with internationally accepted aerospace quality standards.

The ISO 9001:2000/AS9100 certification was established to standardize worldwide aerospace quality expectations and to achieve significant improvements in reducing costs (continued on page 2)

In 2004, FTI celebrates 35 years of serving the aerospace industry. What started out as a simple wire forming company in a Seattle garage has be-



Scott, Burke and Bruce Gibson (left to right), FTI owners

come a major player in the aerospace community by providing innovative solutions for aircraft manufacturing and refurbishment of aging aircraft.

FTI officially entered the aerospace business in 1969, when we helped pioneer the hole cold expansion process. The cold expansion process originated with The Boeing Company who invented the basic cold expansion method. Within a year, Claire Harter of Industrial Designers (the precursor to FTI) invented and put into production the first machine to manufacture the split sleeve which made the cold expansion process possible. Development continued, and Boeing subsequently granted FTI a license for sale and distribution of the tooling used in implementing the process.

Mr. Burke Gibson, a Seattle businessman, purchased controlling interest in the company

in 1973 and a year later changed the name to Industrial Wire and Metal Forming. In 1976,



Louis Champoux (a consultant with the company) and Chuck Copple (who is still with FTI) built one of the first fatigue-testing machines for further research into the split sleeve cold expansion technology.

In 1980, we changed our name to Fatigue Technology Inc. and moved into a larger facility to keep up with the demand for our cold expansion process. In 1984, in response to customer requests, we expanded our (continued on page 3)

Cost Savings in 2004

FTI technologies have grown far beyond the basic cold expansion systems we are generally known for. Over the past couple of decades, we have



introduced advanced expansion processes in a variety of systems that can be used in aerospace materials—steel, aluminum, titanium and composites. The marketing focus of these systems has historically been on fatigue life improvement.

More recently, the ForceMate®, ForceTec® and TukLoc™ system applications have improved productivity and simplified assemblies. Structural durability is still important, but uses of these systems provide significant cost and time savings as well.

This is accomplished not only with components that are easier and faster to install, but also by using these technologies to change the way systems and components are installed in the aircraft.

Along with increased production throughput, FTI technologies offer significant cost reductions. FTI products are now used to reduce the complexity of fastened joints and system connections. Our innovative products reduce parts count costs, installation time costs and assembly costs.

"The last decade of new product development has been focused on implementing



technologies to reduce manufacturing and maintenance flow-time."

FTI advanced fastening systems and our latest blind fastening technology provide further opportunities for productivity improvements, even in composite materials. These techniques are designed to meet the objectives of today's cost-driven aircraft programs.

For example, a typical multiple bushing installation in a pylon

took two men, two days to complete using precision shrink fit bushings. Changing to FTI's ForceMate bushing installation system, the task was reduced to one man, two hours. Production time was reduced by 90% with zero-reject installations since introduction over 12 years ago. ForceMate also solved a bushing migration problem and a potential fatigue cracking problem in the pylon.

The benefit that cold expansion brings to composites is very compelling. Holes in composite materials can experience damage such as delamination due to drilling, moisture ingress fastener insertion and removal, lightning strike, impact, etc. ForceTec (FTI's rivetless nut plate) can significantly reduce these damaging effects. Cold expansion of retainers into composites can improve conductivity due to the resultant positive contact with the composite.

The use of FTI's ForceTec rivetless nut plates in composites can reinforce the hole and significantly reduce the probability of damage under high compressive loads.

FTI has a proven record of solving problems, and improving aircraft producibility and structural durability. We also pay special attention to the needs of our customers and the aerospace industry as a whole. We appreciate the trust our customers have placed in FTI and we will continue to uphold that trust. ✈

ACCREDITATION, (con't)

throughout the value stream or supply chain. This includes provisions for regulatory requirements and the importance of safe reliability and maintainability. In today's marketplace, aerospace customers are putting more pressure on their suppliers to be in compliance with these standards.

FTI has always been committed to continuous improvement of our products, processes and services. In 1996, we adopted the ISO 9001 (and subsequent



upgrade to ISO 9001:2000) international standard designed to provide companies and organizations with a common approach to applying a Quality Management System. In August 2001, AS9100 was introduced to include additional quality system requirements for suppliers to the aerospace industry and is now approved by aerospace companies in Asia and Europe as well. ✈

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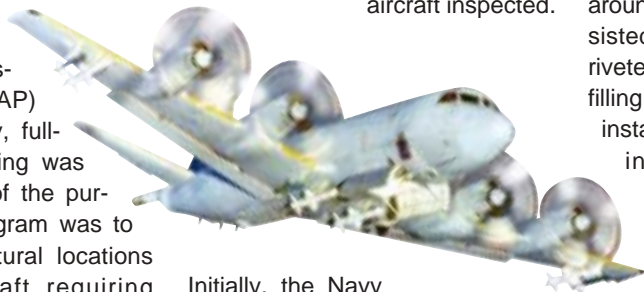
This paper was presented at the USAF Aircraft Structural Integrity Program Conference in Savannah, GA on December 2, 2003.

ForceTec (Rivetless Nut Plate) Keeps Navy's P-3s Flying

ABSTRACT:

The Lockheed P-3 Orion is the maritime reconnaissance workhorse of the U.S. Navy and numerous other defense forces around the world.

As a part of the Service Life Assessment Program (SLAP) for the U.S. Navy, full-scale fatigue testing was conducted. One of the purposes of this program was to identify the structural locations within the aircraft requiring inspection and analysis in order to maintain the P-3 as a viable airframe. During testing, cracking was found in the lower wing skin initiating from satellite rivet holes used to attach riveted nut plates in the location of the underwing fillet fairing. This cracking was now a concern to the Navy since this area was not currently inspected and cracking had not been



reported in the fleet. They immediately initiated an inspection program to look for these cracks and found cracks in nine of the ten fleet aircraft inspected.

Initially, the Navy intended to perform a typical repair using doublers, etc. when Lockheed introduced them to FTI's ForceTec rivetless nut plate as a potential repair. Lockheed then installed ForceTec rivetless nut plates along with cold working into the fatigue test article to repair the cracking. The Navy also funded Lockheed to perform a series of coupon tests, which consisted of

testing a baseline configuration, waiting for cracks to initiate, and then repair using ForceTec. Crack initiation in these coupons began around 6,000 hours. The repair consisted of removing the existing riveted nut plates, cold working and filling the small rivet holes and then installing a ForceTec nut plate into the fastener hole.

After repair with ForceTec, the test ran to 45,000 hours without further cracking detection. In the full-scale test, the repair using ForceTec retainers have been cycled to more than 28,000 additional hours without cracking.

Based on the results of coupon and full-scale testing, the Navy has decided to repair/preventively modify every suspect hole on every P-3. This effort is applicable to the FMS fleet of aircraft as well.

A similar repair is currently in use on the USAF's F-16 upper fuselage skin panels to repair fatigue cracking.

This paper will describe the P-3 SLAP test program, the cracking found in testing and in the fleet. It will also describe the innovative use of ForceTec nut plates to remove fatigue damage and effectively repair this location on the P-3 aircraft. Examples will be given where this technology has also been used to provide solutions for fatigue and corrosion issues on other USAF aircraft. ✈

To receive a copy of the entire paper, please call (206) 246-2010 and ask for the Marketing Dept., or e-mail your request to marketing@fatiguetech.com

ANNIVERSARY, (con't)

materials research center into a state-of-the-art materials testing facility.

Today, we have taken the foundation of cold expansion and developed bushing, fastener and fitting solutions that significantly reduce manufacturing and maintenance flow-time and costs. You can find our products on almost every major airplane and helicopter program in the market.

To support our customers, we have offices and representatives worldwide and in 2001, we moved into our new 120,000 square foot engineering and manufacturing headquarters where most of our 150 employees strive everyday to provide our customers with the very best products and services - a tradition we have held for the last 35 years. ✈



Did you know that FTI's Engineering Department employs a staff of 15 degreed engineers? They average 12 years experience in the aviation industry and over 9 years with FTI. Our engineers utilize the most sophisticated tools available including a fully equipped testing facility, CAD/CAM, and finite element analysis software.



2004 Tradeshows and Events

FTI will be exhibiting at the following events. Stop by our display and say hello to our delegates.

February 23-29
Asian Aerospace
Singapore

April 20-22
SAE General Aviation
Wichita, KS

July 19-25
Farnborough International
Farnborough, UK

April 20-22
MRO
Atlanta, GA

June 8-10
AHS International
Baltimore, MD

September 20-23
Aerofast
St. Louis, MO

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