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NDT LAB Strengthens Its Aerospace Supply-Chain Link



WEST PENN
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West Penn Testing Group

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NDT Lab Strengthens Its Aerospace Supply-Chain Link

West Penn Testing, a Pennsylvania-based independent testing laboratory, has expanded its capacity and personnel to accommodate anticipated growth in commercial aircraft demand through the coming decade. The immersion ultrasonic testing process it performs is vital to the quality verification of flight-critical components.

West Penn Testing (WPT) Group, an independent testing laboratory headquartered in New Kensington, Pa., has spent the last several years building capacity for immersion ultrasonic testing (IUT). After being advised by an aerospace forging customer that it lacked the throughput capacity necessary to meet expected market expansion, the company committed to increasing its testing capacity. Despite the economic recession that shortly followed this commitment, the company continued its initiative.

Given the extent of the downturn and the relative slowness of the recovery, some might think it was a risky time to be making significant investments. However, according to James DeChellis, WPT's COO, "It would have been riskier to postpone investments."

Recovery in Aerospace Markets

Three factors were in support management's decision. The first is that approximately 80% of WPT's business is aerospace-related. Second, commercial-aircraft demand forecasts predict that nearly 12,000 new aircraft will be delivered during the 2009-2019 timeframe. Third is that the economic recovery has accelerated in recent months.

In anticipation of aerospace market growth, WPT began its five-year expansion plan in late 2006. To date, the company has completed installation of five new immersion-ultrasonic inspection and material-handling systems. The company expects to have three more installed by the end of 2011. WPT has also increased its cadre of trained inspectors by 20% to date. And when a group of trainees completes their certification later this year, the number of trained ultrasonic testing (UT) operators will be 50% higher than in 2006.

In the aerospace sector, there is a widely held belief that the success of the airline industry rests on the reliability of nondestructive testing (NDT). The flying public's awareness of the integrity of aircraft – and the parts they are made from – underpins this well-earned feeling of safety. In forging supply chains, that

An aerospace disk undergoes ultrasonic inspection at independent test lab West Penn Testing Group's New Kensington, Pa., facility.

perception is maintained by IUT performed by forgers, OEMs and the independent testing laboratories they both turn to for services.

Immersion Ultrasonic Inspection

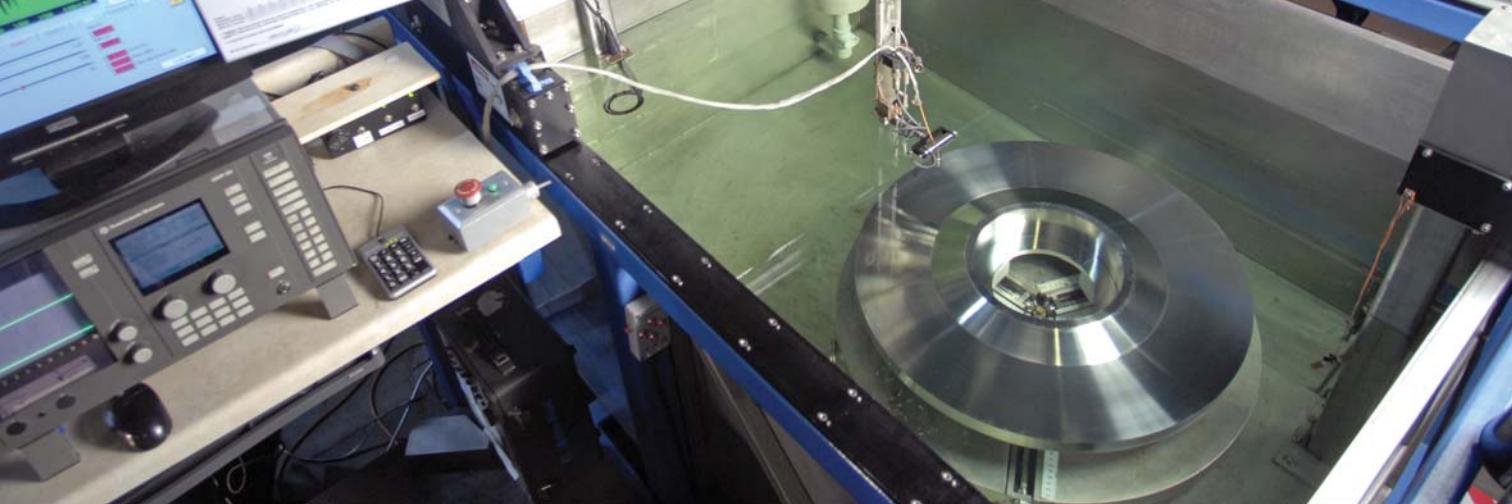
Immersion ultrasonic inspection is the current gold standard for evaluating the metallurgical integrity of flight-critical parts. The technique evaluates parts and structures to detect and reveal internal defects as well as measure wall thickness and pinpoint surface discontinuities.

Every jet engine and airframe manufacturer (WPT provides services, directly or indirectly, to most) has well-defined testing protocols that must be precisely carried out by trained operators through the constant monitoring of tests. There is no shortcut to UT inspection, which is why inspection-cycling capacity is so critical to forgers that serve customers with demanding on-time delivery requirements.

When WPT's management added estimates for new aircraft



Parts await testing in the shop. This year, the number of certified ultrasonic inspectors will increase by 50% compared to five years ago.



West Penn Testing is the exclusive provider of IUT for a number of specific aero-part programs.

to calculations that included anticipated spare-parts production and potential demand from other industrial sectors, they began to appreciate the magnitude of the challenge aerospace forgers would face in meeting customer expectations for timely deliveries. From the company's perspective, however, the situation is more demanding than just testing forgings. Typically, the material the forgings are made from is also mandated for immersion UT. About half of West Penn's inspections are performed on the barstock and billets that forgers use. "We inspect the raw material at one stage in the routing and then inspect the same material again as a forging," DeChellis said.

Maintaining an Efficient Supply Chain

From the forgers' perspective, testing suppliers that have capacity constraints – who, for this reason, may be unable to make timely responses to changes in demand – render the entire forging supply chain less competitive. A slow supplier anywhere in the chain will extend delivery times for the entire chain, rippling down the chain and exposing test system and staffing shortcomings. In these circumstances, chronic late deliveries can translate into missed opportunities for growth and profits, allowing other competitive supply chains to better capture greater growth and profit.

About West Penn Testing

West Penn Testing (WPT) has been providing material testing services since 1952 and immersion ultrasonic testing (IUT) for the last 30 years. During this period, the company has become one of the largest independent testing laboratories in the U.S. The firm has an extensive customer base in commercial transport, defense and a range of other industries heavily dependent on forged components. The company operates out of three locations – two in Pennsylvania and one in South Carolina – with a total workforce of more than 65 employees. Included among WPT's testing certifications are:

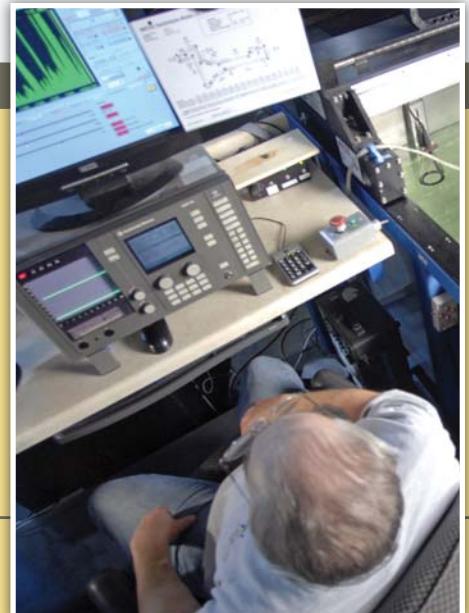
- FAA repair station
- ISO-9001:2001 registered
- Nadcap certified for UT, MT and PT
- A qualified inspection source for 11 aerospace OEMs
- 23 direct aerospace forger approvals
- Approved testing source for OEM requiring Nadcap ISO-17025 or AS 9100 accreditation.

How Immersion Ultrasonic Testing Works

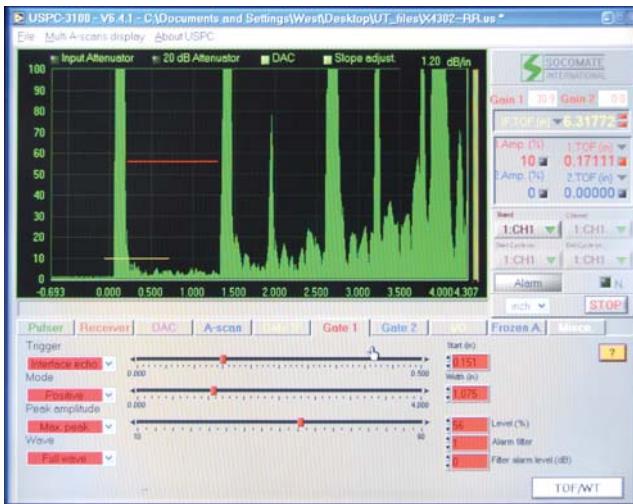
Ultrasonic inspections are performed by transmitting a short pulse of ultrasound (between 0.1 MHz and 100 MHz) into a part or structure. Reflected sound pulses are then recorded and analyzed. During IUT, an operator guides a scanner over the surface of the component to evaluate areas called for in the test plan. The immersion ultrasonic inspection relies on the competence and integrity of the operator to make sure the test article is properly inspected.

Aerospace cycles can turn quickly, and if a recovery is broadly based with multiple manufacturing sectors rising simultaneously, it creates overwhelming demand for raw material and testing services. If additional metalworking sectors such as power generation, construction, automotive and others start rising in step with an aerospace rebound, the collective surge puts intense pressure on suppliers of all types. For example, when a test lab is booked to capacity, it is not easy for customers to promptly find a second or third testing source with necessary capacity and appropriate aerospace credentials. Complicating the issue is that, in most cases for aerospace forgings, a lab needs approvals from both the forger and the customer.

Before a testing lab can do work for an OEM, there is always an extensive exchange between both parties, which occurs independent of the forging supplier who produces components for testing on behalf of that OEM. The OEM seeks to establish the test lab's status as an independent third-party supplier. Working directly with the lab, the OEM defines the test and specifies the information needed from the test and the form in which it is reported. Once the testing lab understands the intent of the test, it designs and submits a plan to address every requirement.



Inspector conducts an ultrasonic test. WPT can accommodate billet and forgings as large a 19,000 pounds



Modern technology helps inspectors monitor UT test results for each part, start to finish.

Then, after trials, the lab will receive approvals for that test, for that part, for that OEM.

The Immersion Ultrasonic Testing Process

In its 30 years providing jet-engine IUT services, WPT has run more than 46,000 lots of material. The immersion process, a more sensitive version of ultrasonic testing, involves submerging the test material in water. The material is then placed on a turntable or bar rotator and turned or rotated past a test probe. This procedure is supervised continuously by a trained operator, following rigorous procedures. Results of the test are painstakingly documented to

ensure that the inspection was performed properly and confirms the test article is within parameters established for that part.

To assist the accuracy and reliability of the testing, the rough forgings are actually designed to facilitate the IUT process. For forgings destined to become turbine disks in jet engines, the rough part geometry is configured to make it as easy as possible for the UT to evaluate the area that will comprise the net-shape part. The intent of the UT programs that every forger and aerospace OEM has in place is to confirm that metallurgical integrity is inherent in the part.

While economic recovery has a way to go before forging supply chains are working near full capacity, companies like WPT are well positioned to absorb work increases. The company reports that a number of customers share their 12-month forecasts on a rolling, quarterly basis, which provides transparency into anticipated demand from the OEM through the forgers and into the supply chain. This level of information sharing and trust between links in the supply chain is expected to make the next up cycle proceed more smoothly than previous ones.

Few independent labs are as embedded in the forging supply chain as WPT. The company is currently involved in an industry-wide initiative to develop a new inspection technology. The group of firms associated with this initiative includes raw-material suppliers, forgers, test labs, jet-engine OEMs and airframers. The initiative, which is about two years old, is making progress in its effort to increase the accuracy and reliability of tests while developing new standards for verifying the integrity of parts.

4 Reasons to Make West Penn Your Lab for Material Tests and Testing R&D

- 1** You'll be among an elite group of global OEM who turn to West Penn Testing (WPT) to perform the most demanding material testing in the aerospace, defense, power generation, automotive and medical industries.
- 2** You'll benefit from the expertise of one of North America's largest independent testing laboratories, with capabilities in ultrasonic, multi-zone, phased-array, DGS and many other testing technologies.
- 3** You'll receive fast service from an organization that has the full suite of governmental and industry certifications, an extensive range of customer approvals, a tradition of responsiveness and an attitude of service.
- 4** You'll see first hand how WPT sets standards through investments in people and technology. We solve testing problems collaboratively with some of the world's most innovative companies.

Get the whole story. Contact Al Fletcher at 1-800-367-9785

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