Norbar Torque Tools

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OVERHAULING AIRCRAFT ENGINES – WHEN TORQUE CONTROL IS A MATTER OF LIFE OR DEATH

When it comes to the safety critical issue of aircraft engine maintenance, many leading companies put their trust in Norbar Torque Tools to make certain that the vital fasteners are set to the correct torque.

One such specialist is Sigma Aerospace, whose large and well-equipped engineering works lie close to Croydon Airport in South London, just off the A23 dual carriageway connecting London and Brighton.

Sigma is CAA and FAA certified to perform overhauls of civil aircraft engines and, with accreditation to ISO9002 from BSI, it is authorised by the defence ministries of countries including Britain, Saudi Arabia and Belgium to overhaul their military aircraft engines.

Engines typically overhauled by Sigma included the massive 22,100 lb thrust Rolls Royce Conway, the first bypass turbo fan engine put in to service by Rolls Royce, used on the mighty VC10 that started flying in the early 1960s. the T56/A15 turbo prop engines used on the ageless Hercules are also regular sights in Sigma's workshops, and some engines are still going strong 60 years after they were first built.

Getting the torque settings right on the hundreds of threaded fasteners involved in the rebuild of an aircraft engine is vital.

John Wilkinson is the Calibration Officer for Sigma Aerospace, and he is responsible for ensuring that the tools used for this safety-critical work apply accurate, repeatable torque.

"Every engine has hundreds of torque settings from 25 lbf.in to 2,000 lbf.ft, and every one has to be set with a torque tool," he says.

Almost all of the 160 or so torque wrenches used by Sigma are made by Norbar. Because its torque requirements vary widely, Sigma uses a variety of wrenches from Norbar's Slimline SL0 and Professional ranges.

The compact Slimline SL0's torque range is 40 to 180 lbf.in (4 - 20 N.m), and with it's high quality 72-tooth ratchet it is ideal for use in the confined spaces often found on aircraft engines.

Almost the full range of Professional wrenches, from the Model 60 with a torque range of 5 to 45 lbf.ft (8 – 60 N.m) to the Model 300 covering the range of 45 – 220 lbf.ft (60 – 300 N.m), can be found in Sigma's workshops.

Regular calibration of the wrenches is important, both to ensure the accuracy of the torque applied to the fasteners and to satisfy the rigorous quality assurance standards to which Sigma works.

Sigma formerly sent its wrenches back to Norbar in Banbury for annual calibration and certification. Last year however Mr Wilkinson calculated it would be most cost-effective to acquire the necessary instruments to calibrate torque tools in-house, and the standards department now has a Norbar ISO1000 90º Torque Wrench Loader, and Norbar Electronic Transducer System and all the transducers needed to calibrate tools up to torques of 500 lbf.ft.

Every wrench is calibrated in accordance with BS26789:1994, which covers the requirements and test methods for hand torque tools. This requires that all torque tools are calibrated at 20%, 60% and 100% of their torque range to within 4% of the torque reading. After calibration, a traceable certificate is issued for each wrench.

"With most of the Norbar wrenches I can calibrate them and a year later they will still be within tolerance," says Mr Wilkinson. "The smaller wrenches that get used a lot need to be calibrated more often, and we are moving these to six-monthly calibration intervals."

The equipment used to calibrate the wrenches is returned to Norbar annually for calibration and certification in its UKAS accredited laboratory.

Norbar has been making torque wrenches for almost 60 years, and the origins of the company go back to World War II, when the need first arose for accurate torque control for fasteners on the Rolls Royce Merlin engine.

Today, companies like Sigma still put their faith in Norbar Torque Tools for applications where getting torque settings right is absolutely vital.