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Automotive Metrology Speeds Ahead

Materials Spur Cutting Tool Innovation

Dream Cars Come To Life

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creates between the stylus and the workpiece. During scanning the Revo maintains the approach angle, which allows a large cylindrical feature such as a cylinder bore to be measured with the same stylus used for measuring a 5-mm bore, with no chance of shanking the stylus."

Special configurations for vendor parts have also been eliminated because the infinite positioning angles of Revo allow measuring a part without special fixturing or consideration of which probe to use. With so few probes, calibration time has dropped to around 46 min. Now QC technicians monitor the calibration instead of calibrating every shift.

"We can measure any part on either machine with a limited amount of fixturing and no special calibrations," says Watts. "We measure all our parts on three types of fixturing. The Revo probe orients itself to the part after it's initially aligned. The utilization of special fixtures has almost been eliminated, without concerns of measurement error due to part alignment."

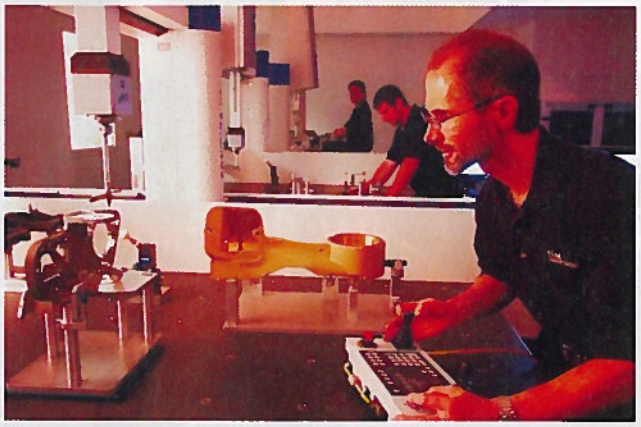
Kawasaki programs all of its inspection routines in-house using Mitutoyo's Mcosmos 3.1 software. The upgrade to Revo inaugurated a shift to parametric and modular programming of inspection routines through in-house development of coding. This allows a program to be used for a part family. "We might have 30 different crankshafts, for example, but because everyone has the same features, only in a different sizes or locations, we can use the same inspection program to measure all the parts," Watts states. "That's one of the big advantages we gained." Infinite angles of the Revo system make it simple to create parametric programs because there is no concern about the stylus interfering with a part feature, due to size or orientation of the feature. The probe automatically aligns normal to the feature being measured, simplifying programming.

The Maryville facility has run more than 50,000 parts through the two Revo-equipped CMMs, and Watts indicates there are plans to expand the use of the Revo system to gear inspection and cam lift if it proves feasible. "We've developed our own algorithm and subroutine in our software for cam lift, and that's something that would have been more difficult to do without the Revo system due to the angle the probe requires to measure the lift on the lobes." **ME**

For more information on Renishaw, go to www.renishaw.com, or telephone 847-286-9953; on Mitutoyo America Corp. go to www.mitutoyo.com, or telephone 888-648-8869.

Measuring Close Tolerances with Confidence

Smiths Machine LLC (Cottondale, AL) knows all too well the importance of actively responding to the needs of its customers. In 2008, Smiths began ramping up both production and CMMs to meet customer needs for handling larger orders, with more complex parts and requiring tighter



Operator measures precision mechanical part for the defense industry at Smiths Machine with a Zeiss Contura G2 aktiv CMM with the VAST XT active scanning technology.

tolerances, and in the three years since, Smiths Machine has achieved compelling results.

Begun in a garage in 1974 as Smith's Welding & Machine Shop, this family-owned business now has two manufacturing facilities and specializes in CNC machining, with three, four, and five-axis milling, turning, and grinding with assembly and CMM inspection. About 60% of the company's orders come from the defense industry, with the rest accounted for by automotive, aerospace, and general manufacturing industries. Typical part materials include mostly aluminum and stainless, but also copper, bronze, and special alloys.

Smiths Machine purchased its first Zeiss CMM, a Contura 700 with a VAST XXT articulating probe in 2004, so the company was familiar with the Zeiss systems when management started searching for two additional CMMs in 2008. They needed to measure complex parts requiring tighter tolerances of about 3µm. Before starting research on the CMMs, a list of all the requirements that would be needed in the new measurement equipment was made. These included some of the same characteristics as their CNC milling machines. They wanted to match the CMM tables to their largest machine tables with respect to both size and volume. Accuracy of the CMMs had to meet new target tolerances and be tighter than on their CNC machining centers. CMM durability and easy-to-use software were also at the top of the list.

As a member of the sales team, Mike Bruce explains, "We expect to give our customers the utmost quality, therefore, we expect the same from the measuring equipment." Smiths Machine determined that the ideal CMMs would still be within the Contura family, the new Contura G2 aktiv 10/16/10, but with the VAST XT active scanning technology. They liked the robust design of the Contura G2 with ceramic guideways in *X* and *Z* axes, providing rigidity and protection against environmental influences. In addition, its size matched up nicely with the company's CNC milling machines.

Photo courtesy Carl Zeiss IMT

VAST XT active scanning sensor is able to use complex stylus configurations, including styli up to 500 grams and 500-mm long.

The VAST active scanning technology enables Smiths Machine to efficiently work with larger batch inspections at maxi-