The MultiSensor
The Internal Newsletter of Werth Messtechnik **Extra Control Edition** May 2009

Trade Show News for Control 2009

TomoScope 200

The TomoScope 200, first presented at Control 2005, now shares a design with the large multi-sensor coordinate measuring machines with tomography sensors, TomoScope HV Compact and TomoScope HV. New x-ray power levels of 150 and 190 KV are now optionally available.

TomoScope - 2009

This makes the series suitable for plastic-, aluminum- and smaller steel parts, up to 90 mm in diameter and 200 mm in length. With a modular design, this machine has great expandability for future requirements. Various software processes for artifact correction ensure high precision in tomography measurement. In addition to these methods, the Werth Autocorrection methodology, patent pending, ensures very small measurement uncertainty values for real parts, even under difficult conditions.

High-Precision Fixed-Bridge CMM with Renishaw SP80

The most precise construction method for high-accuracy coordinate measuring machines is the fixed bridge design. The workpiece moves with the measurement table in the Y direction, and the X and Z axes move separately on the fixed bridge. The advantage comes from the fact that scales and drives can be centrally located for all three axes and the high rigidity of the foundation structure allows very low measurement uncertainty. This style of construction is thus the ideal basis for the SP 80 contact probe system from Renishaw. The SP 80 is a high-precision passive scanning system with integrated scales and 20 nm resolution in each scale. Each axis has a 5 mm measurement range. Due to the parallelogram design, the probe stylus always moves parallel to the axis. prevents, for example, shaft contact when using long stylii (up to 500 mm length). Thanks to its high-precision mechanical components, probing deviations of a few tenths of µm can be achieved with the right basic machine.

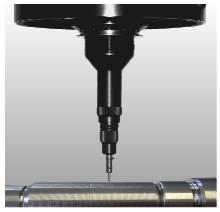
Measurement of internal teeth using VideoCheck + SP 80

Coating Thickness Measurement in a CMM

Based on the well-known Werth Chromatic Focus Probe (CFP), coating thicknesses of material such as glass, paint, semiconductor materials, and plastics can now be measured. The components do not have to be transparent to normal light, because the sensor operates in the infrared range. The measurement principle is based on interferometry. At each boundary surface of the material to be measured, beams are reflected back to the sensor and can be evaluated accordingly. A special standard developed by Werth supports traceability of the measurement results.

New Look for WCP

The Werth Contour Probe has been redesigned, and is now integrated in the Werth magnetic sensor changer system. A new guide system now allows scanning in all axes, without a preferred direction, using probe styli radii as small as 2 µm.



WCP Werth Contour Probe

Open House

A big success

More than 100 companies accepted the invitation to visit Werth Messtechnik GmbH in Giessen. They were able to witness the innovative power of the Company first hand and tour the newly finished 4,000 m² new building. The technical presentations from Werth partners out of research and industry generated great interest. The "Dr. Siegfried Werth Award" granted as a scholarship for a young scientist.

Werth Inc. USA

Record year

Jeff Bibee

Werth Inc. in Old Saybrook, CT, nearly doubled its bookings last fiscal year, compared to the prior year. Personnel were added to the sales and service networks, in order to be able to support customers with a more comprehensive array of services, as well as direct consulting with specialists on site. Sales Manager, Jeff Bibee is optimistic about the future, despite the recession, because the market potential for Werth in the USA, particularly for challenging high-tech solutions, is nowhere near tapped out.

Blum in Bregenz: Field Report on Computer Tomography in Industrial Application

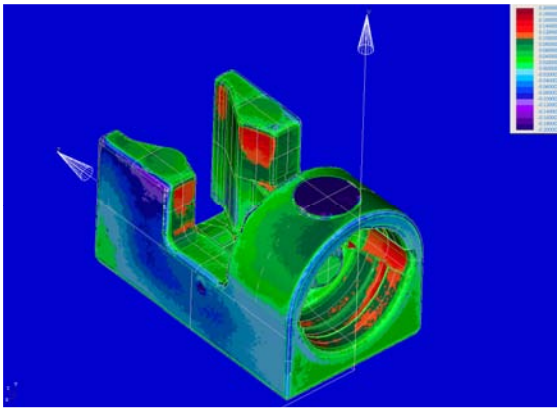
H. Masser (Blum)

For many years, Julius Blum GmbH in Bregenz has relied on coordinate measuring technology from Werth Messtechnik GmbH. With over 5,000 employees worldwide, today Julius Blum GmbH is a global manufacturer of hardware for the furniture industry.

Computer Tomography at Blum

Multi-sensor coordinate measuring machines with computer tomography sensors from Werth have been used successfully at Blum for nearly 4 years. At the time they were installed, solutions were sought that would allow comprehensive component evaluation in as short a time as possible. The internal release cycles for initial samples of plastic parts were taking far too long. Classical 3D measurement technology typically required several days to complete the required measurements. The technology presented by Werth, a combination of measuring machine and computer tomography, appeared to be a promising solution for precisely this problem and a new joint project was started.

The selected path turned out to be the right one. The measurement results obtained today using the tomography sensor are available directly, in just a few hours, as high-resolution, color-coded 3D deviation graphs.

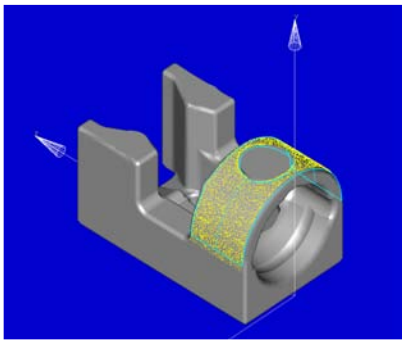


BLUMOTION: : 3D point cloud with color-coded deviation graph relative to the CAD model

This evaluation capability was exactly what Blum had always wanted. It measures against the 3D CAD data, instead of generating yards of "lifeless numbers" in classical measurement reports. At a glance, we can see where it fits and where it doesn't, both internally and externally, without destroying components and without relieving internal stresses by cutting parts and thus generating false measurements. This was groundbreaking. Classical analysis of regular geometric features, with corresponding dimensions, can also be performed. Regions of the 3D point cloud are automatically assigned to the corresponding surfaces. For example, a diameter or radius can be calculated very easily.

Of course, appropriate measurement equipment capabilities must be guaranteed, which places high quality requirements on the machine technology used. Mechanical and thermal stability are a basic requirement for machine superstructures for computer tomography. These requirements can only be met by complete integration in a coordinate measuring machine. Traceable length measurement deviations (MPE) are achieved by calibrating to standards, such as spheres, gage blocks, or spherical offset standards.

Transferring this information to real measured objects, however, is possible only with "cooperative" parts. Large wall thicknesses in real components and complex component geometries, as well as varying material properties, affect the measurement results. This is caused by physically induced measurement deviations, known as artifacts, which arise due to the penetration of the measurement object by X-rays. Because these errors are systematic, however, the patent-pending Autocorrection from Werth provides the ability to capture appropriate measurement points with high-precision optical or tactile sensors and use these points to correct the tomography errors. In practice, the deviations of the tomography measurements from a reference sensor measurements are simply captured. This is done only for the dimensions having appropriately precise tolerances, of course. WinWerth then compensates for the systematic error fully automatically.



Measurement using the 3D point cloud: dimensional capture of a balance cylinder in the point cloud using the CAD model

Summary and Outlook

The measurement times for initial sample inspections, which took many hours or even a few days, have been reduced to a few hours or even minutes. The resulting increase in productivity at Blum paid for the first TomoScope® 200 in about one year. Another TomoScope® 200 was purchased in 2007. The use of cutting-edge coordinate measuring machines has been a decisive advance in technology at Blum GmbH. Werth also gained an industrial partner that was prepared, as a visionary and pilot customer, to guide many advancements to full-scale maturity. Modern computer tomography is sure to continue to develop, and to provide new solutions, but optical and tactile measurement methods will continue to be indispensable for rapid sample inspections in production.

TomoScope® 200

Credits

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