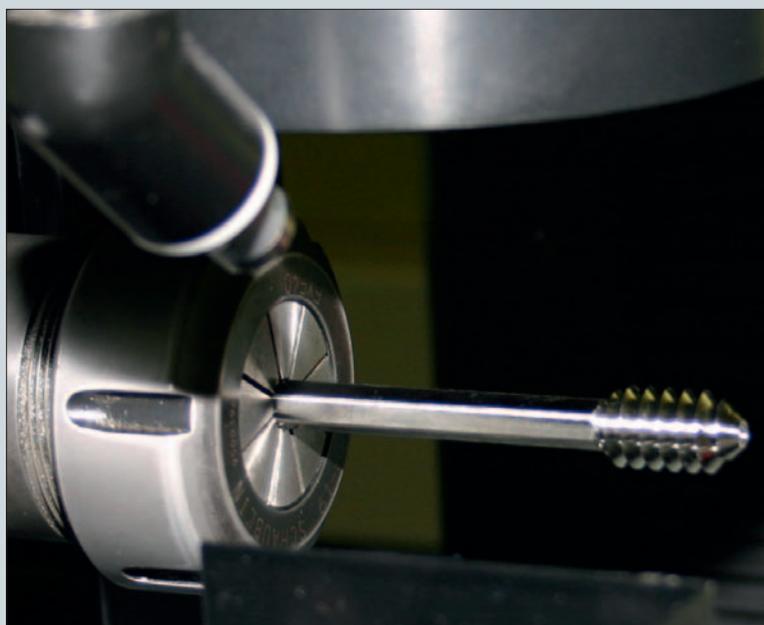


Application Report
Stuckenbrock Medizintechnik GmbH

In One Setup



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Special reprint

MULTISENSOR MEASURING MACHINE MEASURES COMPLEX IMPLANT GEOMETRIES

In One Setup

The complex geometries of prosthetics, implants, and specialty medical screws can be measured with typical measurement equipment with only limited success. Werth Messtechnik, Giessen, is addressing these requirements with the 3D CNC multisensor coordinate measuring machine. Its three different sensors allow it to check all features in one setup.

Prosthetics and implants are becoming more and more complex and delicate. That's why Stuckenbrock Medizintechnik, Tuttlingen, maintains a high level of tech-

For threads that have very thin flanks, this is a formidable specification. A normal tibial pin, in contrast, is a relatively large part."

Stuckenbrock earns its money not with high volume, but with highly knowledge-intensive parts. The high quality of their complex, delicate parts is also responsible for their success. Reliable production processes are indispensable. Klemm and his employees place great value on high quality products, starting with their machine purchases: "Our machining equipment consists of about 20 machines –

countermeasures in case of any drop in quality. Jürgen Klemm emphasizes: "We have a high level of inspection effort, mainly in the area of in-process measurement. The best possible equipment is just good enough for us." He's talking about the 3D CNC multisensor coordinate measuring machine, the VideoCheck IP400 from Werth Messtechnik, Giessen (Figure 2).

The plant manager explains that the complexity of their geometries can be measured with typical equipment with only limited success. It would be a rare case if a single sensor would be sufficient for checking all the quality features. "Today, we need more extensive measurement capabilities, so that there is really no other way than using multisensor technology. Even with this machine, some needs still demand sophisticated fixtures in order to meet each requirement in a single setup."

Investment in only a single machine

Just five years ago, Stuckenbrock invested in the Werth VideoCheck multisensor coordinate measuring machine, which has a measurement range of X = 400 mm, Y = 200 mm, and Z = 200 mm. It is characterized by a stressfree guide system, an additional fourth axis, and a wide range of sensor options.

Klemm reveals the considerations that preceded this purchase: "Typical tactile measuring machines are too coarse for our requirements. We can barely measure our delicate parts with them, because the probe spheres are mostly too large to reach the critical features." Pure optical measuring machines are one alternative, but they do not cover all applications. Additional sensors are needed. The question was raised as to whether to invest in various measuring machines, or in one multisensor measuring machine. "In order to avoid the disadvantages of multiple setups, we decided on the Werth VideoCheck IP400 solution. The patented ultrafine, optical-

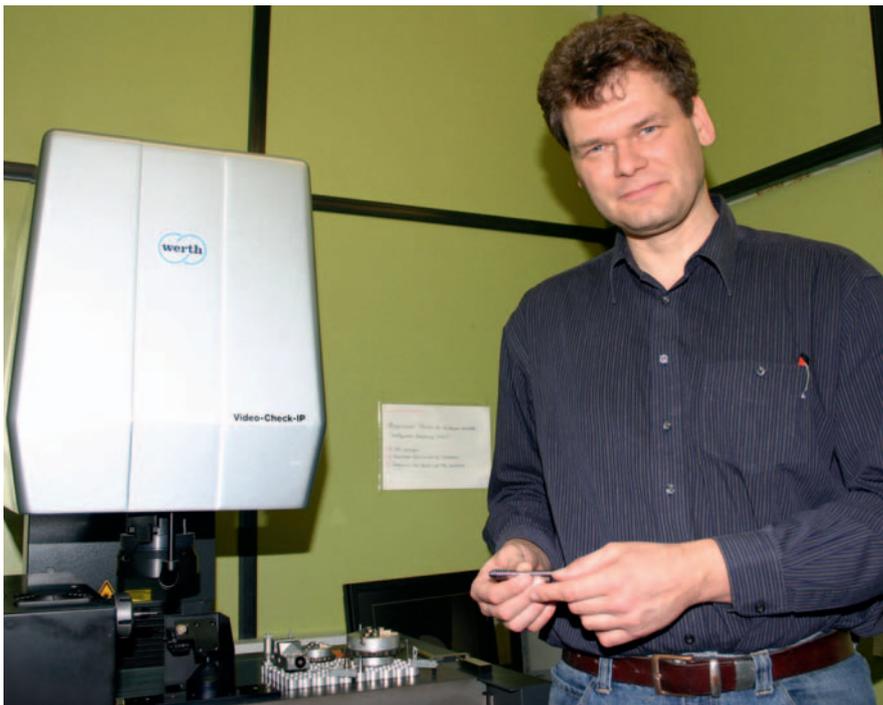


Figure 1. Plant manager Jürgen Klemm: "For our specialty screws – with regard to thread diameters – we have reached precision levels of hundredths of millimeters."

nology (see chapter long tradition). In order to be able to produce and inspect very tight tolerances, the equipment must meet very high specifications. Plant manager Jürgen Klemm (Figure 1) substantiates: "For our specialty screws – with regard to thread diameters – we have reached precision levels of hundredths of millimeters.

grinders, long and short lathes, and machining centers with up to 12 axes – all from manufacturers with good reputations."

It helps to know that their machine tools work precisely. The workpieces must still be checked, however, in order to detect any changes early on, and to take

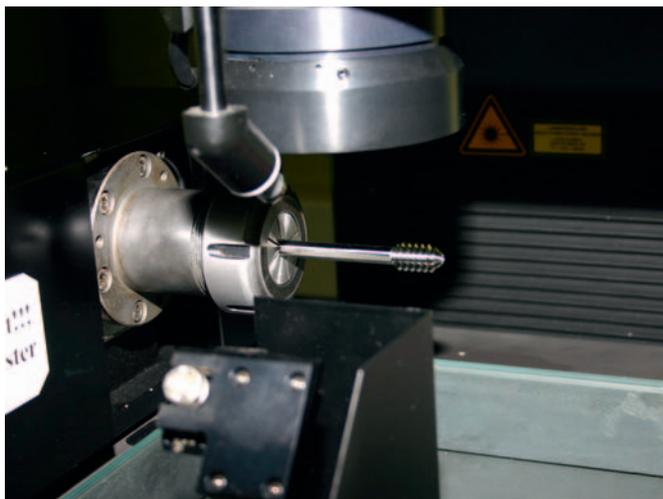


Figure 2. The additional fourth axis of the multisensor coordinate measuring machine simplifies measurement.



Figure 3. The measurement area was designed such that clamps and most fixtures can remain on the machine, which allows faster changeover of parts.

tactile Werth Fiber Probe WFP also convinced us. As far as I know, there is no alternative to its functionality.”

The modular system at Stuckenbrock has three sensors: the fiber probe, with a probe sphere as small as 20 μm , a high-resolution optical sensor with zoom optics, and a laser that is integrated in the zoom optics. All in all, the machine saves time and space, according to the manufacturer.

Its use, and that of its software, is uncomplicated and easy to learn, as Jürgen Klemm confirms: “I completed a training class at Werth Messtechnik, together with my employee Salvatore Bennardo. Afterward, we were able to train our machine operators sufficiently in the use of the measuring machine. This was no problem, and neither is the daily use of the VideoCheck.” Klemm found the use of two screens to be very practical. One is used for the measuring program, and the other displays the video image with edge detection. This eliminates switching back and forth in the software interface. Salvatore Bennardo is responsible for the measuring machine on the day shift. He writes the measurement programs and takes all the measurements. The machine operators themselves are responsible for measuring during the other shifts. These are primarily in-process measurements for various machines, but also final inspections and 100 percent inspections for particularly challenging parts.

The measurement area has been set up so that the clamps and most fixtures can remain on the machine, enabling more

rapid changeout of parts (Figure 3). “Sometimes the time can get tight,” Klemm admits. “Measurements are almost always rushed. After all, the machine tools need to be producing again without long interruptions.”

All measurement programs are available via a network connection to the machine. They can be called up by part number. The product portfolio is now up to about 8000 to 9000 different articles, mostly with small production lot sizes, from under 100 up to 5000 parts.

Measuring tools and workpieces

An example: One of the products is a hip implant, used for classical fractures of the neck of the femur. It consists of various elements and therefore it can be placed on the body without putting stress on the bone. The implant is screwed onto the thigh bone (femur) from outside.

The load-bearing screw that is screwed into the femur bone must meet nearly twenty quality criteria. For the screw thread, the inner diameter, outer diameter, flank angle, radii, and pitch are checked. The positions of the hex socket, external hex, and central C bores to each other must exactly meet the requirements, so that the implant fits perfectly and can be installed later. Without the multisensor measuring machine, such measurement tasks would hardly be able to be implemented.

It is also useful in many other ways. For one thing, the measurement records document the process sequence and

the precision of the products, which can also be useful in case of discrepancies with customers. Tools are measured more and more often as well. Jürgen Klemm explains: “We work with profile tools, among other things, that have surface

Long Tradition

The roots of Stuckenbrock Medizintechnik in Tuttlingen go back to the year 1884, the year the predecessor firm Karl Vögele was founded. It specialized in the fabrication and sales of surgical instruments. Production of scalpels is still an important pillar of the company. Stuckenbrock has become a shareholder corporation of the KLS Martin Group, which also includes Karl Leibinger Medizintechnik in Mühlheim, the Martin brothers, and other companies. The various medical technology manufacturers jointly use the name KLS Martin in the marketplace.

KLS Martin is a complete provider, selling everything that is needed in the surgery room. Its production spectrum has been divided among the member corporations. Of the 180 employees at Stuckenbrock, about 40 work in a separate production area that specializes in prosthetics and implants. Introduction and certification (DIN/EN/ISO 9001, EN 46001) and that of Appendix II of the Directive 93/42 EWG in 1995 are intended to ensure the quality of the products

contours that are responsible for the precision of the manufactured part. In order to get good results right from the start, we have moved to inspecting the tolerances that we require, which was not possible before we had the multisensor machine.”

In the meantime, the VideoCheck machine has been reconfigured and adapted several times in order to meet all the re-

quirements. “Completely capturing all features of an implant in one setup is not an easy task, and requires some adaptations on the hardware side as well,” says Jürgen Klemm. “The Werth Messtechnik technicians were always by our side as fair partners.” □

Translated by Werth Messtechnik GmbH

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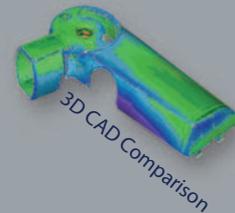
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