The MultiSensor

The Internal Newsletter of Werth Messtechnik

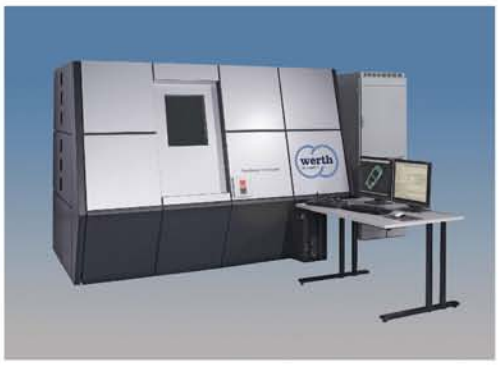
May 2010

A Reliable Forecast for 2010 is Difficult

Dr. Ralf Christoph: For the year 2010, we assume moderate growth for the field of coordinate measuring technology. Precise forecasting is very difficult, and will be quite different for the various fields of application, such as automotive suppliers and medical technology.

The growth of the various companies in our industry will also be correspondingly different. In the past year, Werth was able to keep the reduction in sales due to the crisis well below the industry average.

Due to our market position and new orders in the past few months, we hope for continued positive growth in 2010. One important basis for this, to be sure, is that Werth has adjusted to future trends in a timely manner. The computer tomography that Werth introduced a few years ago into the market for coordinate measuring machines will certainly continue to enjoy increased acceptance. Also, in the past few months, many companies have used this time to get to know this technology. We expect increased investment activity in this area.



Werth TomoScope – Computer tomography will gain acceptance

Micro and nano measurement technology using multi-sensor coordinate measuring machines is in a similar position. Another focus of steadily increasing significance is the integration of coordinate measuring technology in production processes. Fast measurement speeds play a special role here, which is why we expect to have good opportunities for these applications with our patented technologies, such as "On-the-Fly measurement."

Dr. Ralf Christoph believes in positive growth in 2010

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From an interview with Sebastian Moser for "Produktion" magazine

New Internet Presence

Werth Messtechnik GmbH has completed a re-launch of its website. In addition to a new design, changes have been made to the contents.

Under the heading of **Our range**, all Werth Messtechnik GmbH products are listed by category. Click to open one of the five categories: measurement and profile projectors, multisensor coordinate measuring machines, sensors and accessories, software and special measurement devices. Further subcategories lead to the desired product.

All other subjects can be found under the heading of **Navigation**. Under **Werth Newsworthy**, current press information as well as various editions of our in-house newsletter can be found. **About us** introduces the company, and shows milestones for a chronological outline of the company's history. Currently available positions can be found under **Career**.

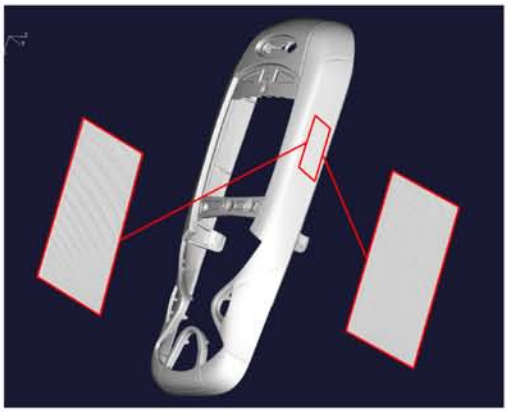
The new homepage

Under **Tradeshows**, all exhibitions that Werth Messtechnik GmbH will participate in are listed. The tradeshow heading is updated every month, with a six-month advance overview. **Services** provides a way to get in touch with our Service department. All of the technical articles and application reports that we have published are archived under **Press**. The heading **Contact** provides an overview of our foreign representatives, contains a contact form, and helps the customer find our company unerringly under **Directions**. **Werth Newsworthy**, in the right column, contains the latest press information in an abbreviate form. The corresponding photo is linked to the longer version. **The Multisensor** contains a link to the latest edition of the in-house newsletter.

High-Precision Reconstruction

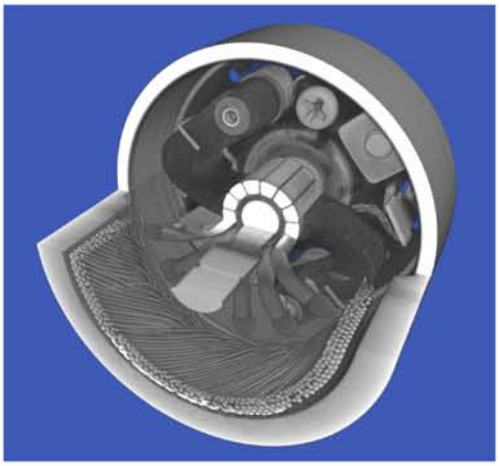
New Mathematics for Tomography

The TomoScope® and TomoCheck® computer tomography coordinate measuring machines were equipped with a new reconstruction library last year. This gives many advantages over the "old" mathematics. The especially smooth surface in the tomography results catches the eye, and of course has a positive effect on the measurement uncertainty for the component.



Detail left: Surface segment with the "old mathematics"
Detail right: Surface segment with the new method

This improvement is achieved by means of an intelligent artifact compensation, together with the image processing expertise of Werth Messtechnik. Calculations are also now performed more efficiently, so that the use of a single high-performance PC is fully sufficient for generating 3D point clouds from raw data.



View of the inside of a "tomographed" electric motor

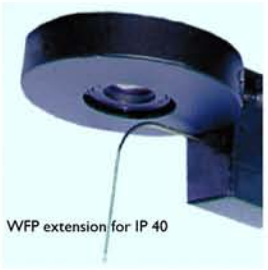
Another improvement in accuracy was achieved by integrating a correction for beam hardening artifacts in the reconstruction library. The correction is performed fully automatically during the measurement, using the actual workpiece characteristics.

Multisensors in Perfection

Magnetic Interface

The Werth magnetic interface enables great flexibility in the use of multisensors. It supports the reproducible pickup and placement of sensors or lighting fixtures. The required power and signal connections are integrated in the interface.

A component can be changed out manually or automatically, using an optional parking station. Secure three-point mounting, with an additional rotary lock, and the holding power of several magnets, ensures maximum reproducibility and secure seating.



All exchangeable auxiliary components can be used, such as the Werth Zoom lens attachments, the Werth Fiber Probe WFP, the 90° tilted mirror for sideways optical measurement, an additional transmitted light arm, and the contour sensor (Werth Contour Probe WCP).

The optical sensor IP 40 T, which can be used with the motorized Renishaw probe head, PH10M, provides also a magnetic interface and allows the use of the WFP fiber probe, a darkfield incident light illumination, and a transmitted light illumination.

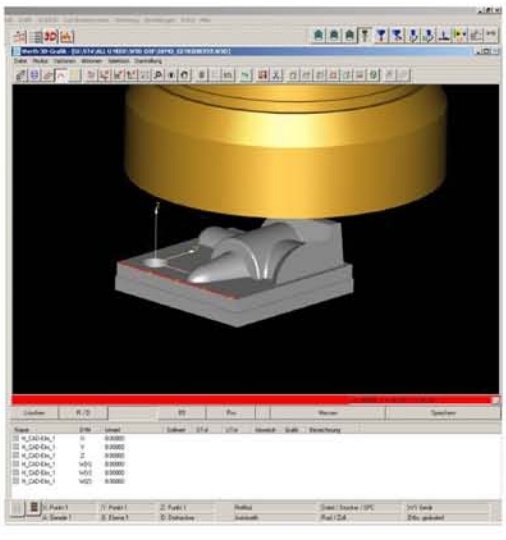
The improved architecture of the library also allows the implementation of many new methods for computer tomography. For example, a true ROI (region of interest) tomography has been implemented, in order to measure high-resolution details in the interior of the workpiece in the 3D voxel volume, even if the projected image of the workpiece does not fit in the field of view. This, along with other improvements, open new perspectives for precise measurement and for challenging inspection tasks.

Optical Measurement Using CAD Data

First Sample Inspections "Just in Time"

The WinWerth 3D CAD module has been expanded to include 3D CAD On-Offline functionality for image processing. The 3D CAD Offline function allows measurement sequences to be generated on the 3D dataset, before the first part has left the production line. In CAD Online mode, the CMM approaches the measuring points immediately after selection, and the desired elements are measured. This allows first sample inspection "Just in Time." With the integration of image processing, all sensors from the Werth multisensor family are supported. For image processing in particular, this means that any 2D standard geometric shape can be measured simply by selecting the patches on the 3D CAD model.

Measurement points can also be generated simply by double clicking on the CAD model. Depending on the selected measuring strategy, either an autofocus point is set directly at the click point, or an edge point at the nearest boundary curve is measured. For all measurements, the measurement strategy, illumination, and any image processing filters that may be needed can be selected.



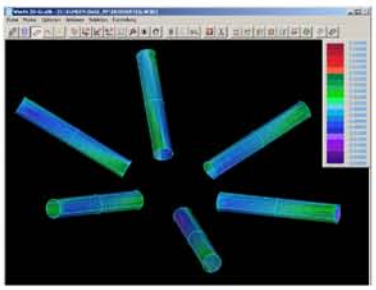
Offline simulation of the measuring program

High-Precision Measurement of Fuel Injectors Using Computer Tomography

A new Application

In the daily industrial routine, it is more and more common to find internal structures and features that are inaccessible using classical measurement techniques, but that must be fully captured and analyzed with high precision. In this area, computer tomography has become established in recent years as a non-destructive, complete 3D measurement process. This is available from Werth Messtechnik GmbH in many different types of machines, and can include optional multisensor technology.

For example, the measurement of fuel injector holes with a diameter of about 100 µm has set a new milestone for precision in coordinate measuring technology with computer tomography. Previously, high-precision data acquisition in injection holes required the use of the Werth Fiber Probe. With this microprobe, measurement deviations in the range of a few tenths of a micrometer were achieved for injection hole diameters. Initial comparative measurements between computer tomography and the fiber probe resulted in very small differences of about 2 µm. The very good reproducibility of CT measurements nevertheless suggested correction of the remaining systematic deviations. Using Werth Autocorrection, the systematic measurement deviations between the fiber probe and computer tomography have been reduced to about 0.5 µm.



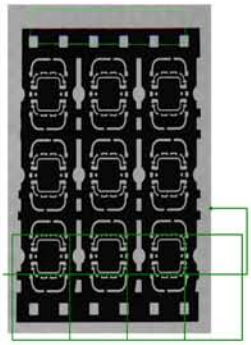
Color coded presentations of deviations of the injection hole diameters

Rastering "On the Fly"

Rapid Measurement and Raster Scanning

Using this function "On the Fly", the speed of rastering or measuring of complex 2D structures is significantly increased with constant "measurement precision." Image capture of the selected area is performed while the measurement axes are in continuous motion. The start and stop cycles that are normally required are avoided.

A flash is used to illuminate each measurement position, eliminating any blurring due to the motion. The entire measurement object, or individual areas, are generated and displayed as a complete video image after raster scanning and reconstruction. The individual video images are joined together to form a complete video image,



Resampling of single images

Measurement of the elements is then performed on this image. All actions can be easily recorded in the "teach in" process, and then executed in the CNC measurement run. For a raster area of 400 mm x 200 mm, using a 0.2x objective, the "On-the-Fly" mode requires only 20 seconds instead of the previous 2 minutes. This function is available for all Werth coordinate measuring machine with image processing sensors, such as the FlatScope.

Werth FlatScope - The modern scanner

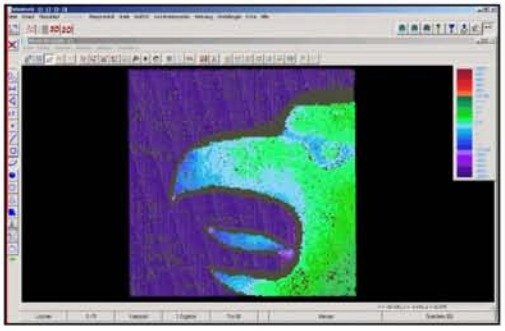
Topography Measurement Using Autofocus

3D Patch Captures Large Point Clouds

Back in 1999, Werth presented an autofocus technology based on the principle of variable focus. Using this functionality and current image capturing technology, it is possible to capture several hundred surface points simultaneously in a few seconds in one Z movement.

With "3D Patch", measurement points are distributed over a freely definable area, creating surface descriptions containing up to 250,000 points, within the measurement time for one conventional autofocus point. The data thus obtained can then be analyzed by the powerful WinWerth software.

For larger workpieces, several such measurements can be taken at different locations, one after the other, so that point clouds can also be captured for larger areas. In many cases, this is a low-cost alternative to a fringe projector or a laser line sensor.



Coin measurement with 3D Patch

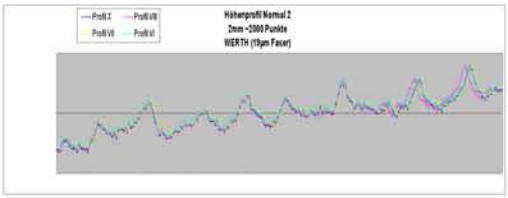
The process functions particularly well on surfaces that are orthogonal to the optical axis, but with the integration of a tilting and rotating axis, this orientation can be easily achieved.

Typical applications include: digitizing of small free-form surfaces, height measurement of soldering points, coplanarity of connector pins, embossment height or engraving depth of ID numbers, and spatial orientation of small surfaces (angles of catch hooks). This function is a valuable addition to almost any measuring machine.

what's new

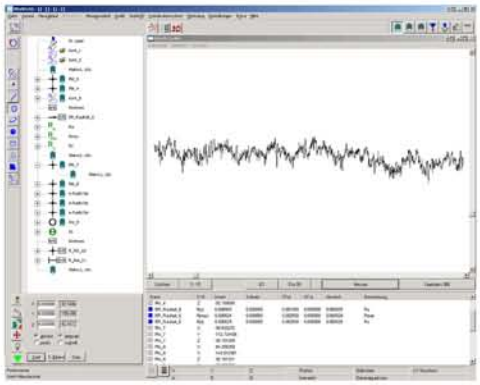
Roughness Measurement in Workpiece Coordinates

In addition to drawing dimensions, such as length, diameter, shape, and position deviations, Werth coordinate measuring machines can also measure roughness parameters, such as Rmax, Rz, and Ra. The clear advantages over roughness measurement machines include the precise positioning of the sensor in the workpiece coordinate system at the location to be measured, and the resulting reproducibility of not only the roughness coefficients, but also the roughness profile.



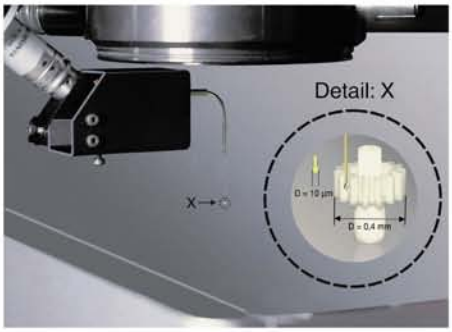
Reproducibility of the measurement with calculation of the roughness parameters

Potential sensors for this task are the Werth Fiber Probe WFP and the Werth Contour Probe WCP, or the non-contact Chromatic Focus Probe CFP and the Nanofocus Probe NFP. Roughness measurement that conforms to DIN standards is as simple as selecting the appropriate captured contour (the desired roughness profile), followed by calculation of the roughness parameters. The roughness measurements can be performed in combination with "normal" measurement tasks, on a single measuring machine, without the need for additional setups.



Roughness Measurement with WinWerth

Using the WFP, especially, vertical contour segments (such as vertical surfaces, cylinder surface lines in microbores, etc.) can be measured with very low probing forces. Comparative measurements of a roughness standard demonstrate very good correlation of the measurement with classical roughness measurement methods.



Werth Fiber Probe WFP

VDI Symposium for Coordinate Measuring Technology

Organized by the VDI/VDE and DIN committee for coordinate measuring technology, the VDI symposium "coordinate measuring technology" will be held from November 3rd until November 4th 2010 in Braunschweig. The symposium will focus on application reports about various areas of interest in coordinate metrology.

Subject areas include production-integrated measurement, measurement of microfeatures, and measuring with computer tomography. Presentations are planned in which Werth coordinate measuring machines are part of the presented solutions.

Registration and information on the symposium can be requested from VDI at berthold@vdi.de or from Werth (marketing @werthmesstechnik.de).

New Directives for Coordinate Measuring Machines

Several new sheets from the VDI/VDI 2617 and 2630 have been published. The most important changes have to do with the integration of computer tomography in coordinate measuring machines. Sheets 1.1 and 1.2, which were previously published, explain the fundamentals and terminology, and the factors that influence the measurement results. Sheet 1.4 shows a comparison with tactile and optical measurement methods.

In August 2009, the "Guidelines for applying DIN EN ISO 10360 for coordinate measuring machines with CT sensors" were published as drafts, with identical text, as Sheet 1.3 in the directive series VDI/VDE 2630, and as sheet 13 in the directive series VDI/VDE 2617, conforming to the existing standards in coordinate measuring technology. This sheet regulates the process for determining generally applicable, and thus comparable, specifications for probing deviation (shape and dimensions of the sphere) and length measurement deviations for coordinate measuring machines with computer tomography sensors. It must be emphasized that, due to the large number of permissible probing points, the determination of a sphere distance deviations is not sufficient as a length deviation measurement. Comparability with the classical measurement of end dimensions can be ensured only if the probing deviation is added in separately, or if a short length is measured bidirectionally in each direction. Acceptance as an ISO standard is the goal for this work.

Particularly in tomography, differentiation must be made between specifications and achievable accuracy on a particular component. The specification simply evaluates the properties of the machine when measuring under optimal conditions, with "cooperative" standard spheres. Testing for suitability of the measurement process for a specific feature must also be carried out on the specific component. A further planned sheet contains the determination of measurement uncertainty and evaluation of the testing process suitability of coordinate measuring machines with computer tomography.

The following sheets from VDI/VDE 2617 were also recently released:

Sheet 10 was approved for release. It regulates the acceptance and confirmation testing of laser trackers.

Sheet 11 was published as a draft, and regulates the determination of uncertainty of measurements on coordinate measuring machines due to balances of measurement uncertainty. This calculation method is based on the GUM (guide to the expression of uncertainty in measurement), and is an alternative, as are the simulation methods from Sheet 7, to measuring calibrated workpieces. (Page 8)

Sheet 12.1 was also approved for release. It highlights the special characteristics of tactile sensors for measuring microgeometries. Appropriate sheets are planned for optical sensors.

Fundamental changes were published with the new draft of ISO 10360 Sheet 2. Probing deviation is moved to Sheet 5, and new standards, such as laser trackers and spheres, are approved. The new coefficients R0 (repeatability), E0 (length measurement deviation without offset to the centerline of the Z axis), and EL (length measurement deviation with offset to the centerline of the Z axis) were introduced. When using standards made of Zerodur, additional measurements using standards made of steel-like material are required, in order to check the influence of the temperature compensation system.

Measure and Save

The Right Technology for Measuring Long Profiles has Many Advantages for Aerospace Supplier

PFW Aerospace AG, Speyer, specializes in conduit pipe, freight loading systems, and structural components for aerospace. In order to measure parts of nearly ten meters in length, both precisely and economically, the quality team invested in a Werth ScopeCheck MB. This 3D CNC multisensor coordinate measuring machine, from Werth Messtechnik, Giessen, is equipped with a flexible clamping system and provides precise, traceable measurement data with short setup times.

Complex systems of curved conduit tubes run through modern aircraft like veins from the wingtips to the engines. Various media run through them, which is why the conduit systems are made of different materials and have to meet special requirements. Minimal space requirements and maximum safety are the critical points that must be considered when developing and manufacturing these elements. For the specialists at PFW Aerospace, this is no problem. The company, based in Speyer in Rhineland-Palatinate, has many years of experience and is currently number one in the world in "conduit systems for aerospace." The range of services of this supplier, however, is much broader. It also includes the production of structural components, freight loading systems, and auxiliary tank systems. All of these aerospace products for Airbus and Boeing have one thing in common: they are subject to strict quality criteria that must be reliably checked and documented. This is no easy task. For example, it is difficult to measure particularly long elements such as roll conveyors for freight loading systems, or seat rails with drilled hole patterns.

Steffen Fellberg (left) and Thomas Groll (right) agree: "In Werth Messtechnik, we found the right partner."

Optical Coordinate Measuring Technology Makes an Entrance at PFW

Just two years ago, PFW Aerospace invested in cutting-edge optical coordinate measuring technology from Werth Messtechnik for measuring long profiles. With new orders, such as for the Airbus A400M, for which PFW Aerospace is supplying the entire freight loading system, including ramps, a much more flexible system was required.

Worldwide Success

The PFW Aerospace AG tradition goes back to the year 1913, when the company was founded under the name "Pfalz Flugzeugwerke" (Palatine Aircraft Works). After an eventful company history, 1996 was a key year: PFW Aerospace AG, which belonged to DASA at the time, was faced with a situation of being closed or dismantled. But the approximately 500 employees fought to keep their plant open. After a management buyout, they set the company on the path to success with a new strategy and lots of hard work. One important goal was to expand the customer portfolio, which was an impressive success. Today, nearly all significant aircraft manufacturers are customers of PFW Aerospace AG, which is based in Speyer and has many subsidiaries around the world.

The company earned about 190 million Euro in 2007, with about 1500 employees. PFW Aerospace is a worldwide market leader in the area of conduit systems for aerospace, and also produces structural components, freight loading systems, and auxiliary tank systems.

Finding a Competent Partner in Werth

The basis of the new measuring system is the Werth ScopeCheck MB, 3D CNC multi-sensor coordinate measuring machine, which is able to precisely measure large volume, heavy components in a production environment. For PFW, a six meter long, 13 ton granite block was added. A bridge gantry "floats" above this table on air bearings, and is equipped with a complete array of sensors.

Clamping the profile takes only a few minutes

Clamping the profiles, which takes only a few minutes on the new measuring system, is of great importance for reproducible results. Internal stresses and deformation would otherwise lead to imprecise results. On the new measuring system all long profiles are clamped using the same principle as on our profile machining centres. The long profiles can be measured today in one setup, on three sides, fully automatically. The Werth ScopeCheck MB is equipped with an optical sensor for this purpose, which measures the component vertically. The measuring machine also has two right angle lenses that allow measuring horizontally from both the left and the right sides. Altogether, there are three different light sources available for non-contact measurement. The optical beam paths are equipped with the patented Werth Zoom, with adjustable magnification and variable working distance. In order to perform three-dimensional measurements with the optical sensor, a distance sensor is integrated.

Extract of an article of QE 4/2009

NIM China Uses German Technology

The National Institute of Metrology (NIM for short) in Beijing has selected a high-precision 3D-multisensor coordinate measuring machine, model VideoCheck UA. The NIM is a state institution in China that, among other things, researches dimensional measurement technology. For a research project with the goal of "Measuring very small bore geometries", a specification was issued for a device with very high precision and flexibility. Thanks to the high precision and variety of the integrated sensors, and not least due to the patented Werth Fiber Probe WFP, which is exceptionally well suited for microbore measurement, Werth was able to obtain the contract.

The machine has a measurement range of 800 mm x 400 mm x 400 mm, and allows specification of a length measurement deviation of up to E_l =(0.15 +L/900), depending on the sensor used. The equipment includes the patented Werth Zoom, a telecentric image processing sensor with the Werth Fiber Probe (WFP), a PH6/TP200 touch trigger probe for tactile measurements, the nanofocus probe (NFP) for high-precision topographic measurement of very small structures, and the chromatic focus probe (CFP) for non-contact scanning of reflective surfaces. A fully integrated rotary / tilt axis, and an active anti-vibration system, round out this high-end device.

application

View in Several Directions

Multi-Sensor Machine Allows Two Measurements in One Setup

Measuring injection molded parts from the top and from the side in one setup has been impossible for medical device manufacturer Balda Medical, Bad Oeynhausen, Germany, until now. Multi-sensor machines from Werth Messtechnik GmbH, Giessen, Germany, solve this problem with optical, tactile, and laser technologies. A special optical sensor head, mounted on a rotary/tilting adapter joint, allows the optics to measure from several directions.

Medical technology is a broad term, covering a multi-faceted field, from implants, to various instruments, to large medical equipment. This is the case for Balda Medical, Bad Oeynhausen, Germany. It specializes in plastic technologies, specifically in automated precision injection molding of mass produced parts.

Managing Director Dr. Rolf Eilers notes the company's origins, which affected the choice of their niche. "When Balda Medical was founded in 2003, the Balda Solutions company still belonged to the parent company, Balda AG. This was a shooting star in the German injection molding industry for mass production, rapidity, and surface technologies." Mobile phone cases for every manufacturer were the main product. Because the company also had extensive expertise in mold making, the transfer of this existing knowledge to the medical field was a natural progression.

Since the beginning, Balda Medical has concentrated on subject areas in which production volumes are over 1 million, and that have high standards for design, surface technology, and precision. The initial products included, for example, a dry powder inhaler for asthmatics, and a lancing device for diabetics. Each of these articles consists of over 20 individual parts, some of which must fulfill challenging functions, and must therefore be dimensionally correct.

Dr. Eilers sees the company today as a system partner in B2B. "We have our own product development department. Concepts for complete products are created there, even if they will never bear the name of Balda." The company builds models and functional prototypes, and qualifies the associated machines and molds. The processes are then validated, so that the safety and function of the components, and the devices and systems made from them, are ensured, and this quality is documented for traceability.

Background:

Precision over the Long Term

In order to meet the high requirements for precision and long-term stability for the VideoCheck 250 and VideoCheck 400 machines, special design methods are required for the measurement table guideways. In order to better master the temperature problems, the entire measurement table is made of aluminum. Aluminum's high heat dissipation capacity minimizes the temperature differential in the device, and thus also the deviations. In order to prevent changes in stresses in the guideways due to expansion, a special loose-fixed bearing arrangement is used, which generates a preload using magnets and gravity. This guideway system, in contrast to the competition's solutions, is not statically over constrained, so it provides the lowest friction in the bearing locations, and the least backlash when reversing direction.

The long-term stability of the system is also supported in that the guideways are directly machined into the stage material without further adjustment in the assembly process. The guide surfaces are produced in a precision process, with straightness of less than one micrometer, then simply assembled. The quality of the mechanical parts is underscored by a 5 year manufacturer's warranty.

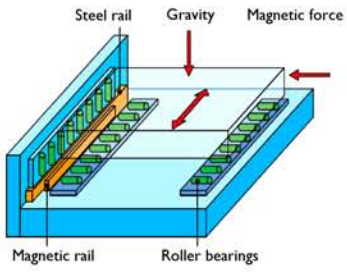
The processes are then validated, so that the safety and function of the components, and the devices and systems made from them, are ensured, and this quality is documented for traceability.

No Development without Measurement Technology

From development to production, measurement technology is an important part of the process chain. The requirements for an article, such as a lancing device, are stringent. The 20 or more individual components must work together when assembled. The tolerance chains to be met across several components are in the range of a few hundredths of a millimeter.

Fast, reliable measurements are also needed to improve production processes. Later, when the articles are produced in series, complete documentation is required to respond to returns if needed. Thus, there is no getting around an appropriately equipped and staffed measurement technology department. This was set up at Balda Solutions in the early years. Since the turn of the year 2007/2008, the former measurement technology group at Balda, including all personnel and machines, belongs to Balda Medical.

Thorsten Rabeneck has been working in measurement technology at Balda since 2001. Since mid-2008, he has managed this department, which also has three additional experienced employees. Three VideoCheck IP 600 multisensor coordinate measuring machines from Werth Messtechnik, Giessen, are located in his measurement room. They are gantry machines, with solid granite bases and air bearings and extensive sensors, tactile touch and scanning probes, and the laser sensor. They are used primarily for initial sample preparation for injection molded parts and for corrective and special measures. Two additional measuring machines are located in production, for series inspection, or In-Process Control (IPC). They are managed by the measurement technology department, which also generates the individual measurement programs. They are operated in production by trained personnel. Holger Zastrow, Quality Assurance Manager, whose department includes the areas of measurement technology, quality inspection, and quality planning, says, "The responsibilities in the quality assurance area are always in flux. Measurement technology, with its high-value measuring machines, takes on mainly analytical tasks."

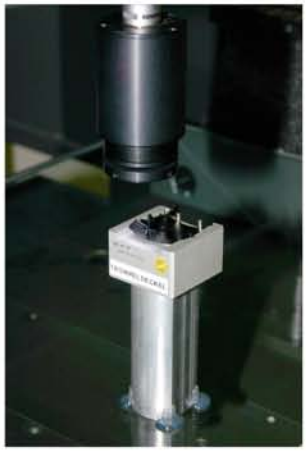


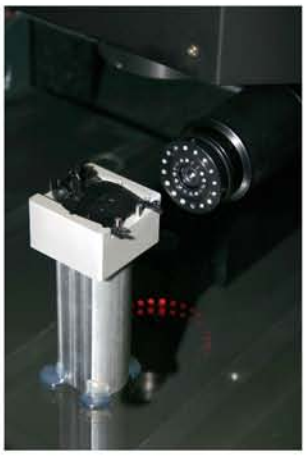
This includes standards, such as measuring against a drawing, for creating initial sample inspection reports. Systematic measurement during series production belongs to production, to a degree. The IPC data generated there are automatically maintained in the CAQ system for evaluation. If problems are found - in the tolerance chain analysis, for example - that cannot be accounted for at first glance, measurement technology is used once again. By using lab tests and subsequent measurements, the employees work together to track down the error.

Reproducible Measurement Results

When selecting measuring machines, Balda decided on Werth Messtechnik back in 1998. The VideoCheck IP 600 multisensor coordinate measuring machine proved to be ideal for measuring mobile phone cases. Additional machines were obtained in 2001 and 2004. In Thorsten Rabeneck's experience, "These measuring machines are very reliable, and the results are 100% reproducible. They are also very fast, and simple to operate and to program."

The close contact with the specialists at Werth, who continuously develop their technology and take on new challenges openly and without hesitation, was well received by the entire Balda measurement technology team. Werth Messtechnik and Balda have kept all three VideoCheck machines updated with the latest developments. For example, one machine was upgraded with a laser line sensor and a rotary axis to be more effective, particularly with regard to multi-point measurements that are compared to CAD data. Retrofitting the IP40 Werth sensor brought a particular advantage with a tiltable optical sensor.

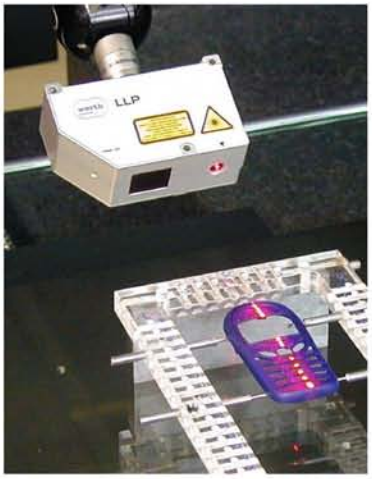




Using the tilting sensor optics, components can be measured from the top (left) and from the side (right) in one setup.

The impetus for this upgrade was a housing that was difficult to measure. The measurements must be taken optically, in the vertical plan view, while the datum reference can be measured optically only from the side. The part was previously measured in several orientations, changing over constantly with multiple setups, which led to imprecision. Only with the tiltable optic is a single setup possible for reliably addressing the measurement task and obtaining reproducible measurement results.

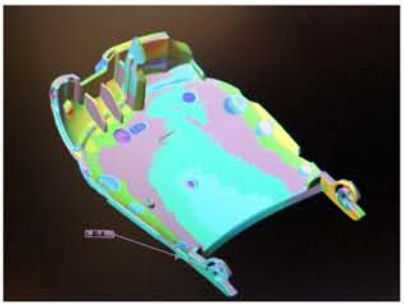
For some parts, dimensions need to be captured that cannot be achieved either with classical optics or classical tactile measurement. A 3D STL data set is now generated using the laser line sensor, and is then evaluated against 3D CAD data. This takes place in the WinWerth 3D CAD software module. The STL data is overlaid on the corresponding 3D CAD data set (nominal data) and automatically adjusted to fit.



Using the laser line sensor, free-form surfaces can be captured quickly, without contact.

Individual dimensions can also be extracted and section planes can be shown. Deviations are marked in color and can be seen at a glance. This color-coded presentation of deviations is required, for example, for the initial sample inspection report, to complement the typical Excel evaluation. For complex components, or multi-component systems, Balda Medical is turning more and more to the special capabilities of a TomoScope x-ray system.

The associated 3D STL data sets are generated by external metrology service companies, then processed and evaluated in the Balda Medical measurement technology department using the WinWerth 3D CAD module. The broad spectrum and rapidity of Werth Messtechnik, and the team's extensive experience in component measurement, have decisive advantages in information, time, and cost reductions for Balda Medical as well as for their customers.



Data for a sample part, captured by the coordinate measuring machine, are read into the software, along with the CAD data of the nominal part. The deviations between the actual and nominal data are displayed graphically.

Fast and Flexible

With the IP40 T sensor, Werth Messtechnik, Giessen, covers flexible measurement with image processing and rotary/tilting joints, even for large coordinate measuring machines. The compact sensor head with telecentric optics is mounted, using the automatic change out interface, on the PH6M probe holder, the PH10M rotary/tilting joint, and the PHS1 servo rotary/tilting head from Renishaw. It can be exchanged for a touch trigger or scanning probe system. Bright field incident illumination is integrated in the beam path. The 8-sector dark field incident illumination provides the ability to control the illumination direction. Using change out kinematics, the light ring can be exchanged for a Werth fiber probe WFP, allowing contact measurements of very small geometries with the lowest possible contact forces. The laser line sensor LLP, according to Werth Messtechnik, allows extremely rapid scanning of 3D workpieces with high point density. High precision of the measurement data is achieved, even for shiny and strongly absorbent surfaces, without prior coating with paint or other material. Integration in the Werth Multisensor concept also makes it possible to check parts using the line sensor in combination with other sensors (optics, probe, etc.).

news

3D Fiber Probe Project Completion

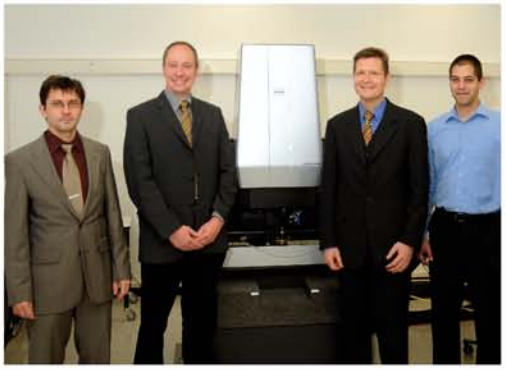
10 Years of Successful Cooperative Research between the Physikalisch-Technische Bundesanstalt (National Metrology Institute) and Werth Messtechnik GmbH

In November 2008, a meeting took place at the Physikalisch-Technische Bundesanstalt (PTB - National Metrology Institute) between the president of the PTB, the president of Werth Messtechnik GmbH, and the project teams of both organizations, to conclude the 3D Fiber Probe development project. Ten years of cooperation in the area of microprobes for multisensor coordinate measuring machines were brought to a successful conclusion. In the course of the event, a high-precision VideoCheck multisensor coordinate measuring machine from the Werth company was accepted by the PTB.

The Physikalisch-Technische Bundesanstalt and Werth Messtechnik GmbH agreed to continue their cooperation in the future.

Professor Dr. Ernst Otto Göbel (right), President of the Physikalisch-Technische Bundesanstalt, and Dr. Ralf Christoph, President of Werth Messtechnik GmbH, at the project closing celebration and machine donation.

Their emphasis will be on the area of optical 3D sensors for micro-applications, and aspects of multisensors and especially questions of traceability and accuracy will be addressed.



The project team: M. Andräs, Werth / Dr. U. Neuschäfer-Rube, PTB / Dr. F. Härtig, PTB / M. Wissmann, PTB (from left to right)

COMMENT

The Multisensor says …

We all would like to wish that it never happened: the crisis. But even if my sensors are all facing forward, toward the light, I have to comment about the snows of yesterday, for good or ill, as they are now melting but still have left a few patches of frost. Many people were really financially strapped. The automotive companies and machinery manufacturers had to be resilient. Of course, this had an effect on the manufacturers of measurement technology as well. For some, the winter of competition was too brutal to survive independently. The "multisensor club" grew smaller.

It is nice that purchasers no longer need to study as many proposals, as the number of providers is getting easier to manage. In some companies, the decision criteria have been simply reduced to the lowest price. Whether this allows the best, future-oriented technology to be purchased is a matter of some doubt.

With great pride, the Multisensor can look at the performance of its company, which has come through the "winter" in much better shape than the industry average, thanks to top technology and a clever market strategy. Several months remain in the memory as "nail-biters," however, even for this company.

For the future, however, the optimism of springtime prevails once again. Besides the general improvement in the weather, there is much to indicate that X-ray tomography, where my company has a top position, will continue to gain acceptance in industry. The same goes for micro and nano measurement technology , which are just now starting to be developed. I also consider it to be very important that I can capture a workpiece "on the fly". An important detail for direct application in the process chain, because speed is very important there.

I look forward to the future, full of positive expectations, and think that I will find a few more fallow niches for my many small sensors in the measurement technology marketplace.

Best wishes,

The Multisensor

Focus on Tooling

Werth Messtechnik and MT Microtool Cooperate

The two companies have recently pooled their activities in tool measurement and will operate under the name Tool MT GmbH. Werth Messtechnik GmbH, world leader in multisensor coordinate measuring systems and MT Microtool GmbH, the specialist in cutting tool measurement (drills, mills, indexible inserts and reamers) offer a perfect combination of high-precision, universal machines and 20 years of experience in tool measurement.

Dr. Ralf Christoph (right), President of Werth Messtechnik GmbH / Christopher Morcom, President of MT Microtool GmbH

Sales, service and development of the machines are managed together. The existing MT Microtool machines will continue to be marketed and developed. MT Microtool was founded in 2003 by Christopher Morcom and Thomas Klussmann, who have both worked for many years at leading companies in the tooling industry.

Together, Werth and MT Microtool offer new solutions for high-accuracy measurement of tools up to 300mm diameter, including application specific sensors such as image processing, laser, and probes featuring repeatability better than 1 µm and machine accuracy comparable to VDE 2617. The specially designed software for tool measurement has many unique features, is easy to use, and has communication interfaces to grinding machines such, Rollomatic, Anca, Saacke, Schütte, TTB, and Numroto.

Many well-known companies from the tool industry already use machines from both manufacturers. Several hundred machines have already been installed at companies like Sandvik, Kennametal, HAM, OSG, Niagara Cutter, Krupp Widia, SECO, Hitachi, Nachi, Wolf, and Mitsubishi Kobe Tool.

Credits

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