



Lateral Thinkers

by **Gerhard Maier** For more than 75 years, the name Emil Arnold GmbH & Co. KG has been synonymous with high-quality tools. Efficient quality assurance has been a critical aspect throughout that time. It requires a reliable partner who can help develop individually customized solutions. Emil Arnold relies on its long-term partnership with Werth Messtechnik for this, and it pays off – especially when combined with a bit of lateral thinking.

Today, Emil Arnold GmbH & Co. KG (Emil Arnold) and Arno Werkzeuge employ about 200 people in a 10,000 m² (107,639 ft²) operations facility. The cornerstone was laid in 1941 by Emil Arnold, who was a master technician at Bosch when he left to found his own company, Emil Arnold Lehrenbau, in Esslingen, Germany. His son Karl-Heinz Arnold turned this factory into a company for selling carbide tools in 1962 – now known as Arno Werkzeuge.

Christopher Morcom (left), managing director and shareholder of Tool MT GmbH, and Thomas Hermann, WinWerth software power user, inspect the specially developed clamping fixture.

Today, Emil Arnold is focused on the production of cutting tools made of various materials, as well as on complex fixturing projects. Of course the production of high-precision indexable inserts and cutting edges for a wide range of cutting tasks is still part of the mix.

„Mainly we produce parts for Arno Werkzeuge. These include indexable inserts, grooving tool holders, inside turning tools, and specialty tools. We also make machine components and assemblies for a few well-known companies,” explains Christian Scharthl, operations manager at Emil Arnold. With a total of 51 machines from well-known manufacturers such as Stama, DMG, Hermle, and Weiler, along with Studer, Schaudt, Agathon, and Haas in the grinding area, the equipment at Emil Arnold is state-of-the-art. Certified under ISO 9001:2015 and



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Christian Schartl explains: „Over the years, a close, trusting, cooperative relationship has grown. With Werth Messtechnik, we can develop and quickly implement individual solutions that are customized for our needs. We know that we can come to Werth with our ideas at any time, and the company will work with us to assess their feasibility. Above all, we are very satisfied with the accuracy of the solutions that Werth provides and with our communication.“

How well this works is confirmed by Christopher Morcom, managing director and shareholder of Tool MT GmbH: „It is just a pleasant experience to work with a medium-sized company. We can talk to each other personally and make decisions quickly. We can then work on implementing the ideas that we have developed together just as quickly.“



The Werth VideoCheck S multisensor coordinate measuring machine has a stylus system in addition to the patented Werth Zoom with Werth Laser Probe. Together with a specially developed clamping fixture, the measurements take only about half as long as the grinding cycle.

Photos: NCFertigung

Innovative Concepts

Tool MT GmbH came about as the fusion of Werth Messtechnik, one of the leading producers of multi-sensor coordinate measuring machines, and mt microtool GmbH, a specialist in measuring cutting tools. One result of this partnership is an innovative clamping fixture for Emil Arnold.

„The idea was to clamp the tool in a different orientation in order to be able to measure more quickly. Of course there are even more possibilities, such as an angle optic,“ says Christopher Morcom to explain the concept.

Switching from the side view for measuring outer contours to the vertical position for performing angle measurements can be done very quickly. Thomas Hermann from Emil Arnold's grinding shop explains how the whole thing works in detail for turning tools. He has explored the measurement of these tools very intensively: „First we measure the spatial alignment; then we rotate the tool and measure the profile contour optically. The profile of the neck of the tool is also captured, as it is very important that the smallest entry diameter be exactly right.“ This works because

as an A-class supplier for highly respected companies, Emil Arnold places great emphasis on reproducible quality at the highest level.

Of course there are no compromises when it comes to quality assurance, so the measurement of the tool products is entrusted to a long-standing cooperative relationship with Werth Messtechnik.

Long-Term Cooperation Pays Off

The first Werth profile projector at Emil Arnold was acquired back in 1988. The first Werth coordinate measuring machine (CMM) was purchased in 2001 and the most recent in 2015.

Christian Schartl:

„.... the optimal probe system can be loaded for various tool sizes.“

of the custom clamping fixture developed in-house, as Thomas Hermann confirms: „If I put the same part in the clamp, measure it, take it back out, and measure it again, I have very good reproducibility.“

The task definition was clear: the fastest possible measurements with maximum flexibility. To ensure smooth production flow, the measurement times should optimally be less than the time of the grinding cycle.

To prevent expensive scrap and enable high throughput, the measurement time must be shorter than the production time. The solution also had to be able to precisely measure about 150 different tool sizes and geometries that are produced in the grinding area. For this job, Emil Arnold uses a Werth VideoCheck S coordinate measuring machine with multisensor systems and a constant-tension guideway system. The multisensor systems provide the necessary flexibility.

Lasers for the Smallest Diameters

Besides conventional probe systems, the image processing sensor with integrated Werth Laser Probe (WLP, patented) can be used. This is ideal for Emil Arnold, as the smallest tool diameters to be measured are 0.6 mm. „Surfaces that we cannot reach with a measuring stylus are easy to measure with the laser distance sensor because its measurement spot is just a few micrometers in size,“ explains Thomas Hermann.

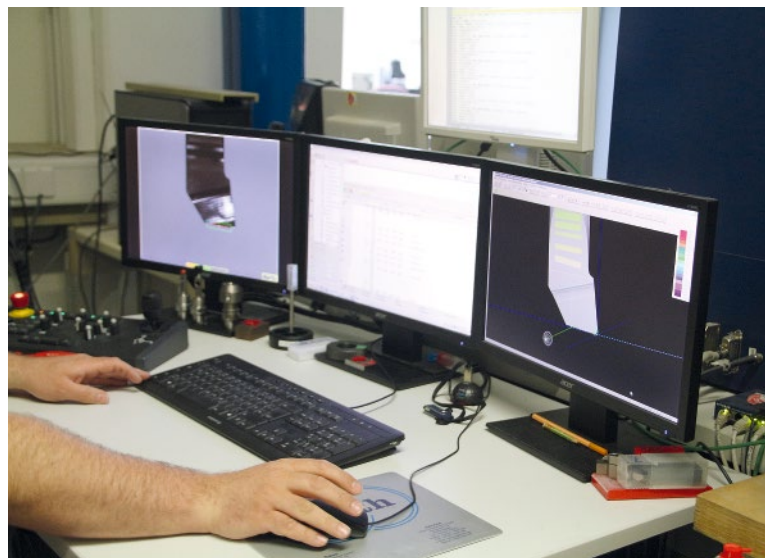
Christopher Morcom adds: „We offer over 15 different sensors. If the Emil Arnold tools were even smaller, that still would not be a problem for us, because we have the right sensors for that, too, such as the patented Werth Fiber Probe with a 20 µm diameter probe element.“

The various sensors can be changed in and out on the Werth multisensor system with no loss of measuring range. To reach very short measurement times, the set-up times for the user must also be kept as short as possible. „To do this, we expanded the changing

Emil Arnold manufactures tools with diameters as small as 0.6 mm, but Werth Messtechnik has the right sensors in its portfolio to measure even smaller tools.



WinWerth software, developed by Werth, can be expanded by users to meet their specific needs.



rack from the original three to six spaces. This means that the optimal probe system can be loaded automatically for various tool sizes,“ explains Christian Schartl.

Shorter Measurement Cycle

The result is that the measurement cycle is „less than the associated grinding cycle,“ says Thomas Hermann, who added a special time analysis to the measurement program in order to be able to check the actual results. „This is ideal for us because the expanded palette of probes means I can start the measurement program, let it run on its own, and go back to grinding work,“ he continues.



To quickly scan the outer contour at a high detail resolution, it switches to the patented Werth Zoom automatically. The working distance can be set between 20 mm and 220 mm so that collisions are avoided even with large-diameter tools. Werth Messtechnik also developed the associated measuring software. With WinWerth, Emil Arnold has a consistent software concept that allows seamless traceability of measurement results.

Individually Configured

According to Werth, creating individual configurations is user-friendly. The software is also being constantly developed and the latest version is always available to customers. „The software provides me with more options in every version. Support also works really well. If I have a problem, the hotline can

Cutting-edge grinding machines are used to produce the tools.

connect directly to the computer and help solve the problem,” says Thomas Hermann, who is very satisfied.

When the measurement program is being created, the software provides suitable suggestions, such as how a certain probe can be used to measure the desired surface.

Edges are detected reliably thanks to an intelligent image and contour filter, even for deformed or defective components. „Another great advantage is that we have a software structure that the user can program himself,” says Christopher Morcom, and Thomas Hermann confirms: „I can dig very deep into the measurement sequence. For example, I can even extract individual data, put it in a text file, and open it somewhere else. The measurement sequence is open enough for me to expand it.“

The software provides a good basis for what Emil Arnold envisions for the future. „It would be ideal if we could also network the program with the grinder and have one 3D dataset available for measuring machines and grinders,” says Christian Schartl, looking ahead. This is a project that Christopher Morcom is also very open to. After all, Werth has already implemented this kind of project. However, the machine manufacturer must also be brought on board of course. ■

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