

Innovation

Mitutoyo, which is still the biggest manufacturer of measuring instruments worldwide, looks back on turbulent times. The banking crisis resulted in a poor global economic climate, which also affected the organisation. “Recently, we were able to put this tiresome period behind us”, says Henk Slotboom, Sales Manager of Mitutoyo Nederland. Together with Marketing Manager Ron Meijer, he explains, exclusively for Mikroniek, the state of the affairs within the company. It is worth noting, so they claim, that Mitutoyo’s role as global metrology innovator has remained untouched. In addition, service – from general metrology training to calibration of measuring instruments – is becoming ever more important.

• **Hans Koopmans** •

In recent years, Mitutoyo has put a great deal of effort into preparing its organisation for the future. For instance, on 1 January 2010, a new European headquarters was established in Neuss, near Düsseldorf, Germany, in order to stimulate the further growth of the European sites. In addition, as of July, the warehouses of the European companies, including the one in Veenendaal, the Netherlands, were centralised in a new European Distribution Centre. The national warehouses, among them the one in Veenendaal, have subsequently been closed. “Both decisions result from the huge value that Mitutoyo attaches to customer satisfaction”, Slotboom explains. “Sales activities are coordinated efficiently from the European headquarters, from where technical support is

Author

Hans Koopmans of Tekstpertise works as a freelance text writer in Apeldoorn, the Netherlands. Mitutoyo is one of his clients.



Figure 1. Sales Manager Henk Slotboom (left) and Marketing Manager Ron Meijer of Mitutoyo Nederland.

and service

also provided. By centralising the stocks, we want to increase supply reliability and reduce delivery times. A practical target is that, by the end of 2010, we must be able to supply handheld measuring instruments within 24 hours. CNC measuring machines can now be supplied from stock as well, which is why they can be delivered considerably faster than in the past.”

Distribution model

An important policy change in the Netherlands is that the distribution model with hundreds of partners carrying brands including Mitutoyo in their sales programme has been abandoned. Instead, a select group of technical wholesale companies has been chosen to take care of retail activities. These companies are expected to provide a considerable specialised contribution such that they can offer adequate advice to their customers in the measuring sector.

Dual-use goods

Meijer: “It may be clear that the worldwide economic crisis had a significant impact on the sale of capital goods such as CMMs. As a result, Mitutoyo centralised the production of CMMs to Japan, which meant, for instance, that the CMM production facility in the Netherlands was forced to close at the end of 2009. Given that CMMs are what are known as dual-use goods, Mitutoyo has worked hard in recent years to set up a foolproof system in accordance with the so-called Wassenaar Arrangement.”

This Arrangement, the rules of which were tightened in 2008, addresses the export of dual-use goods – goods that can have a civilian as well as a military application. Every customer with whom Mitutoyo is doing business is screened on their use of the machine. The customer must show a ‘Letter of Assurance’ in which they guarantee that they will not resell the machine without consultation or use it for dubious purposes. Some customers see this as an awkward issue because the competitors – they say – do not ask for such a guarantee. However, under the Wassenaar Arrangement, this is compulsory for all manufacturers of dual-use products.

Market expansion

Slotboom and Meijer do not beat about the bush: as a result of the banking crisis, 2009 was, from an economic point of

view, one of the worst years in the history of the Japanese concern.

While they are gradually recovering, this situation is not helped by the current auctioning off of investment goods, including measuring equipment, at extremely low prices. However, the global trend is moving upwards, in Asia even more so than in Europe. A frustrating aspect of this change for the better is that all suppliers of measuring instruments, including Mitutoyo, have to deal with increasing delivery times due to fast-growing demand.

Slotboom: “The crisis has taught us not to concentrate excessively on measuring machines, but also to give manual equipment and other precision tools the attention they deserve. In addition, we have also broadened our market by penetrating new areas. The Medicare sector, for example, turns out to have a need for vision measuring systems as well, and we have developed a dedicated brochure for this marketing segment. Other new market segments are also emerging, such as manufacturers of solar cell panels. At the same time, we have to appreciate that our traditional market – the metal-processing industry – declined in 2009, while the number of suppliers of measuring instruments stays constant. As a result, we are fishing in a smaller pond with the same group of manufacturers. Another phenomenon that Mitutoyo has to deal with is the rapid growth in handheld tools launched with their own trademark or under private labels. While cheaper, of course, their quality is dubious – for the time being at least. However, quality is not a top priority for every customer.”

Automation

In the measuring instruments market, there is an undeniable trend towards automation. This not only applies to the machines – measuring processing is already to a large extent automatic – but especially to product handling. Several Dutch companies are carrying out projects in which (equal or unequal) products are transported from a warehouse over a pallet change system to the measuring machine for an automated good/fault indication. When such projects are completed, Mitutoyo can benefit fully from the expertise and products of Komeg, a specialist in clamping technology that became a member of the Mitutoyo concern several years ago; see Figure 2.



Figure 2. Clamping of a double-curved object with Koneg elements.

In the wake of the ongoing automation in the manufacturing industry, the supply programme was recently extended to include the Mach-3A 653 high-speed coordinate measuring machine, which can be integrated into a production line; see Figure 3. The machine has an integrated index table and because it is completely encapsulated it can work without any problems in rough production environments and in a wide temperature range from 5 to 40°C. Despite the high dynamics – a velocity of up to 1,212 mm/s and acceleration of 12,000 mm/s² – the length measurement deviation stays within 2.5 µm.



Figure 3. The Mach-3A 653 high-speed coordinate measuring machine can be integrated into a production line.

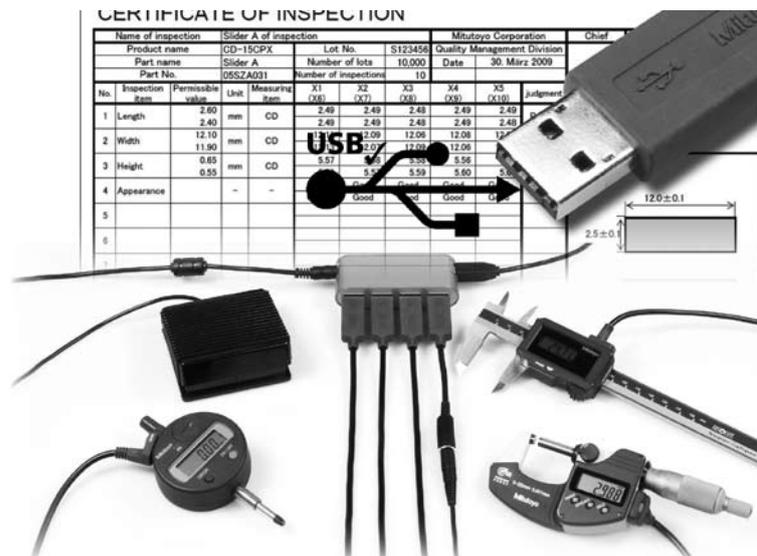


Figure 4. Every measuring instrument with a USB connection can be linked to a MeasurLink network.

Database system for measurement data

There also seems to be renewed interest in Statistical Process Control (SPC). Meijer: “After a period of popularity some ten years ago, interest in SPC has been waning for some time, but interest in statistics-based quality control is now growing again. You want to judge the process as well as the machine by means of only one parameter. In technical terms this means that there is a need for real-time data acquisition systems that produce the CP, process capability, and CM, machine capability, automatically.”

Adapting to this demand, Mitutoyo developed MeasurLink, a database system for measurement data. Every measuring instrument with a data connection, from caliper to measuring machine, can be connected; see Figure 4. MeasurLink, which was originally developed by Mitutoyo American Corporation, includes no fewer than seven types of package software (process monitoring, process analysis, inspection report creation, data acquisition in the inspection room, data acquisition on the shop floor, etc.). The user selects the most suitable combination based on budget and situation. It is also possible to start with one program and gradually extend it into a network.

As indicated, input of measurement data in MeasurLink is possible via cable connections, but also wireless. Last year, Mitutoyo introduced a radiographic transmission system for the reliable transmission of measuring data from manual measuring instruments to the computer, under the name U-Wave.

‘Painting without paint’

The third trend Meijer mentions is laser scan technology, which is emerging because systems based on it are becoming more affordable and accurate. Laser scan

equipment is often used in sectors like the automotive and the aircraft industries that use a lot of double-curved panels. Mitutoyo has introduced a mobile hand scanner in this field called the SpinArm M-series (Figure 5), which is a portable 3D coordinate measuring machine for easy inspection of small or large, possibly complex shaped objects. The series is available in three precision classes; every class has been released in four sizes. Handling of the device looks like ‘painting without paint’. The resulting points cloud can be used in Quality Control for comparison with a CAD model. An interesting side application is in the design area: a CAD model can be derived from existing objects without a drawing by means of reverse engineering. Research and development in this field is ongoing, meaning that you can expect Mitutoyo to develop and market more laser scan products in the future.

Increasing precision

“Throughout the metrology industry, you can see the limits moving upwards to a higher level of precision, from the micron to the submicron area”, Meijer continues. “Space technology, among others, is an important booster. We supply, for instance, roundness measurement instruments that work primarily in nanometers.” Slotboom adds: “The precision of our equipment is growing gradually. Some years ago the accuracy of a standard CMM such as the Crysta Apex C was 2.5 μm , now it is 1.7 μm . A non-contacting 3D measuring machine nowadays is more accurate than a CMM from a few years ago. This also applies to roughness and roundness instruments, which has consequences for the inspection and acceptance test of the machines: while gauge blocks, etc., were sufficient in the past, it is now necessary to use a laser interferometer. This makes higher demands on the skill and knowledge level of our Technical Support employees, which means that we constantly need to improve our know-how by means of additional training at national, European and global levels.”

In the Mitutoyo programme, a typical novelty that fits this picture perfectly is the UMAP-CMM (see Figure 6). This is an exchangeable, swivelling microprobe for 3D coordinate measurements, provided with a stylus with a diameter of only 100 μm . The microprobe is stimulated in such a way that it will oscillate in ultrasound resonance frequency. The oscillation is dampened when the probe touches the workpiece, which causes the deflection or amplitude of the oscillation to change. The detection of this



Figure 5. The SpinArm M 3D coordinate measuring machine for measurements based on laser scanning.



Figure 6. The UMAP-CMM swivelling microprobe may work with probe forces of only 1 μN .



Figure 7. The Quick Vision ULTRA 404 is twice as accurate as its predecessor.

change in oscillation ultimately results in the recording of the position coordinates as a measuring point. This functional ‘touch trigger’ principle allows for contact measurement of even the very finest details with an unbelievable degree of sensitivity. The contact forces may reach a level of 1 μN , which is scarcely measurable. Standard measuring heads apply gram-range forces to the workpiece.

Another example of increasing precision in equipment is offered by the Quick Vision ULTRA 404 (Figure 7), heralded by Mitutoyo as their flagship in image processing. Compared to the previous model the inaccuracy in Z-direction has been reduced by half: from 3.0 to 1.5 μm ; in XY-direction, the inaccuracy is a mere 0.25 μm .

Service

Mitutoyo’s primary activities are and will be the development and sale of measuring equipment. However, service is also becoming ever more important. The Mitutoyo Institute of Metrology (MIM) acts as a knowledge and training centre in the field of geometric measuring technology in the Netherlands and Belgium. There is significant interest in the courses on offer, which include drawing interpretation, product assessment, measuring technology and product quality, form and position tolerances for production employees, etc. (a Dutch language brochure is available). “Course registration is going well”, states Slotboom. Apart from these general courses and seminars, Mitutoyo also organises product training sessions, where users learn how to operate a coordinate measuring machine, for example.

Calibration

Another successful part of the range of services provided is the calibration service. The ISO/IEC 17025 standard describes the general demands for the competence of calibration laboratories. Mitutoyo Nederland carries out all calibration according to this standard, meaning that it has the right organisation and skills at its disposal to carry out sophisticated calibrations. In the meantime, Mitutoyo has been authorised to calibrate a steadily growing number of measuring tools and to provide them with an RvA certificate (Dutch Council for Accreditation, www.rva.nl). At present, Dutch customers are not the only ones to be issued with RvA-accredited calibrations, with all Mitutoyo’s European sales companies sending their inspection gauges to the Veenendaal laboratory for an internationally accredited calibration as well.

Slotboom: “Everything we sell we can calibrate in-house. This is important because companies that work according to ISO standards must be able to show an RvA certificate for the measuring instruments they use to inspect their products. Look at it like this: the Council for Accreditation has so much faith in us that they let us issue those certificates for almost all common measuring tools. While we carry out those calibrations in-house, we also do so on location at the customer’s site. After all, it is not always possible to transport a huge measuring machine or heavy surface plate.”

Information

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