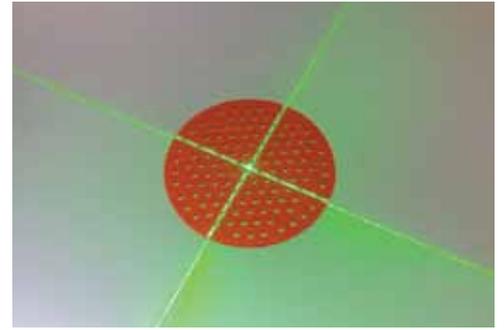
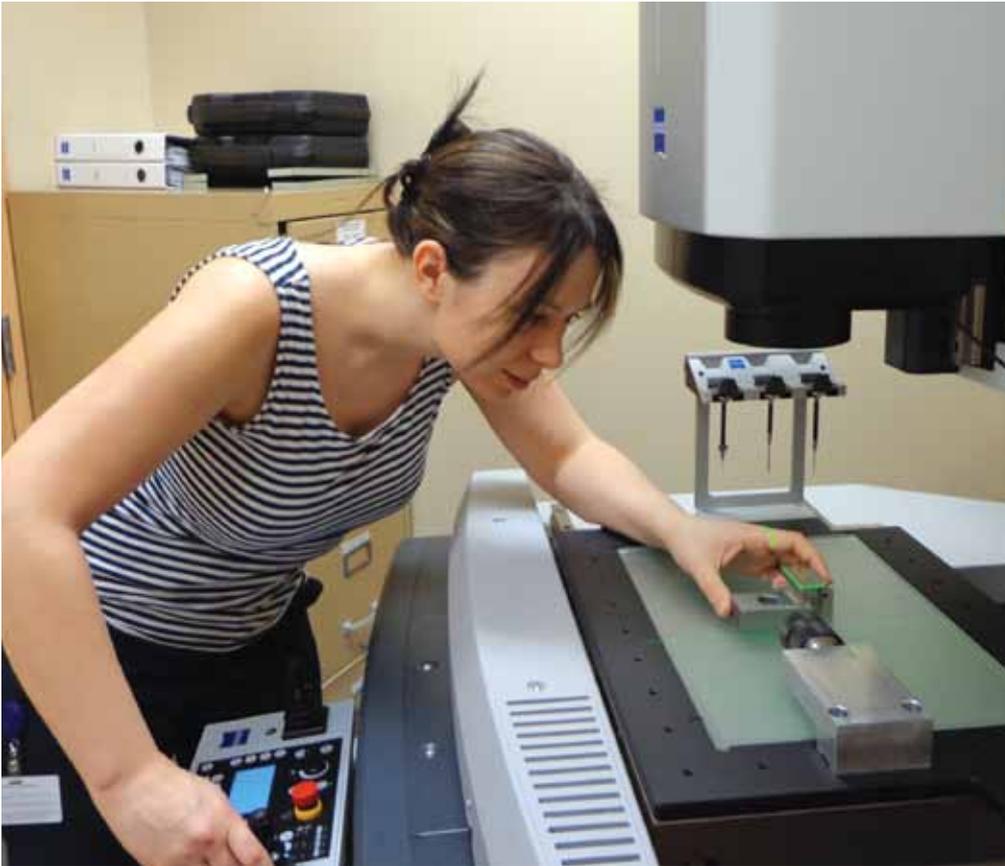


See Me, Feel Me

BY KIP HANSON



Sheila Selby, CMM programmer at Amphenol Canada Corp., aligns a fixture to the laser location on the Zeiss multi-sensor machine. Top: A cross hair laser aligns parts to avoid distortion from fixtures.

Using multi-sensor CMMs to measure critical parts pays off for two Canadian manufacturers

My granddaughter loves her Touch and Feel books. They're filled with fuzzy animals and gaily-coloured creatures. My grandson enjoys jigsaw puzzles, patiently maneuvering the pieces into place by sight and touch. Imagine him doing so while wearing mittens, or that darling girl reading those children's books with the bits of cloth and plastic shapes removed.

For the past thirty years or so, that's how shops have been inspecting their

parts—measure the hard features with a touch probe, and check everything else with non-contact optics and vision machines. Moving parts between two machines, however, wastes time and sacrifices accuracy.

Multi-sensor technology

Carl Zeiss Industrial Metrology LLC looks to change all that. The company claims to have integrated the functions of four machines—profile projector,

coordinate measuring machine, contour measuring instrument and microscope—into a single shop floor measuring device.

Long Phan is the product sales manager at Zeiss's Irvine, CA, office. He says the O-Inspect was designed for shops that need the best of all metrology worlds. "Multi-sensor machines are becoming increasingly popular. Medical, electronics, even oil and gas are calling for smaller and smaller parts, with features that can't be measured with mechanical probes. As a result, shops are finding there's a huge advantage in having a machine that offers tactile as well as visual measuring capabilities."

In these situations, says Phan, shops can utilize the O-Inspect's adaptive lighting and zoom lens for non-contact measurement, and then switch to Zeiss's Vast XX1 scanning sensor for taking individual points, multi-point form scanning and areas the camera can't see. With some features—deep ribs, and bores with long length to diameter ratios—a more high-tech approach is

needed. “White light provides a spot size of 12 microns, and can measure features impossible to reach with probes or cameras. It’s also an excellent choice for complex 3D structures, and glossy or transparent materials, which are sometimes difficult to measure.”

An optional scanning head about the size of a catsup bottle, white light scanning, or Coherence Scanning Interferometry (CSI), goes where no scanning has gone before, adding capabilities that take multi-sensing metrology to its limits. Whatever route you go, says Phan, part measurement is very application specific, and shops should consider carefully before investing in any metrology equipment. Multi-sensor machines, with their high degree of flexibility, make the buying decision somewhat simpler to make.

The right connection

Someone who agrees is Sheila Selby, CMM programmer at Amphenol Canada Corp. Prior to the purchase of the O-Inspect 322, the company was using optical comparators and hard gauging to measure military, aerospace and communications interconnect components at the company’s Toronto, ON, manufacturing facility. With 170 production people bringing in parts from a variety of equipment—screw machines, CNC mills and lathes, moulding machines and a tool room—Selby has a big job.

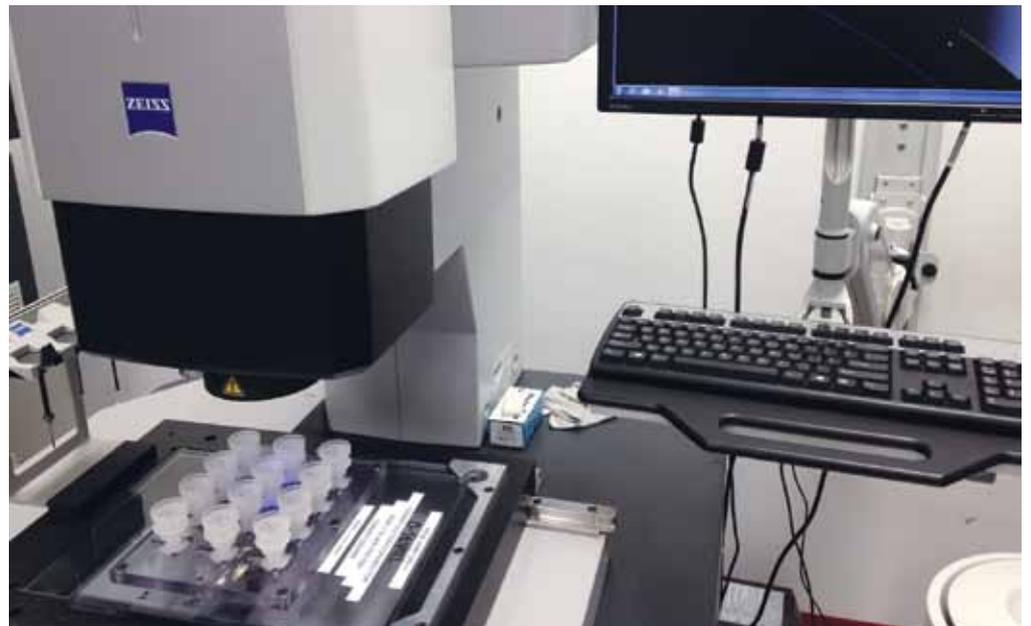
“Amphenol Canada specializes in highly engineered, often low volume custom solutions,” she says. “As a result, our parts and drawings are constantly changing to accommodate our customers’ needs. Tolerances are continuously getting tighter, and our

customers place heavy demands on us in order to keep up with their respective industries.”

Recognizing the need to beef up its process verification capabilities, the company began researching CMM solutions. Eighteen months later, it decided on a pair of machines from Zeiss—a multi-sensor O-Inspect for measuring small moulded parts and screw machined components, and a

example, I can take 5000 points on the surface of a 2 in. square part and get a visual graph of its flatness. I can probe undercuts, tall walls and other features not suitable for a vision system, then switch to optical measurement for areas too small for a stylus.”

The end result, says Selby, is a solution that allows Amphenol to continue providing its customers with the best possible products.



The Zeiss multi-sensor machine at OPHARDT Hygiene Technologies' facility in Beamsville, ON.

Duramax CMM for the CNC shop floor.

If the company had bought one more, it would have been a hat trick. Both of the machines have provided Amphenol’s production department with faster and more accurate process verification capabilities. Yet it’s also recognized that its newfound multi-sensor measuring ability offers a distinct advantage over mechanical measurement methods.

“With the O-Inspect, we can now measure part features that were previously difficult—if not impossible—to measure,” Selby explains. “For

Better Hygiene

Anyone who’s ever visited a public restroom has used this company’s products. OPHARDT Hygiene Technologies Inc., Beamsville, ON, designs and manufactures hand hygiene pumps for hospitals, restaurants, airports, shopping malls—wherever you are, its mission is to make the world a more hygienic place while conserving natural resources for a sustainable future, says OPHARDT manufacturing manager, Monika Laumann-Semenchuk.

It may appear to be a simple soap

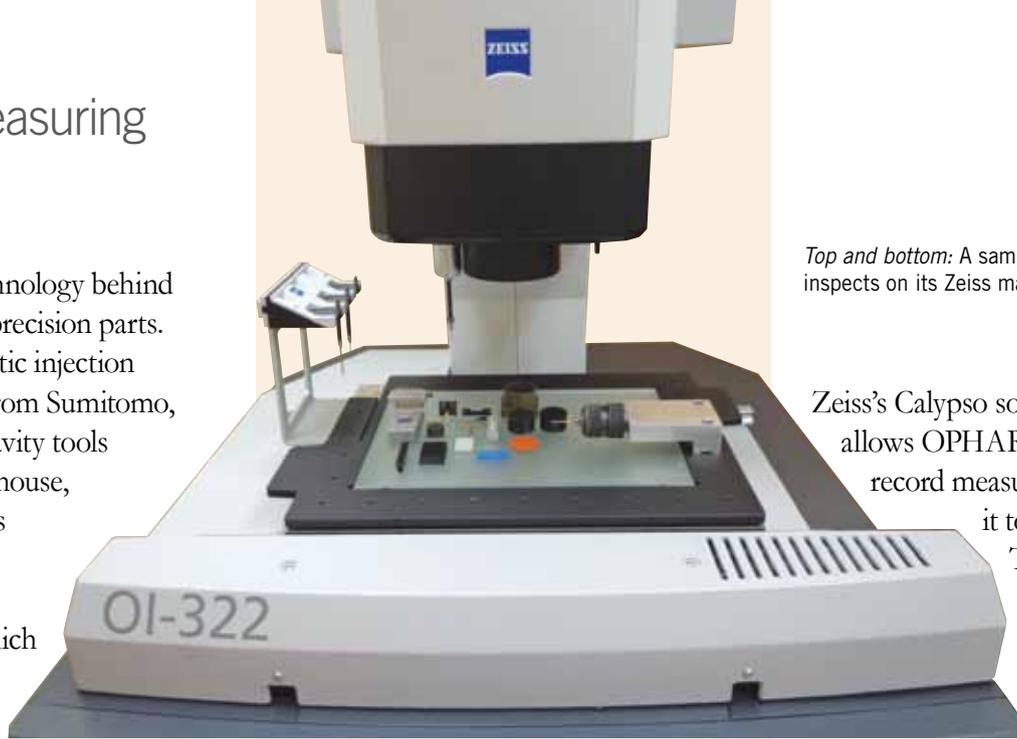
QUALITY | Measuring

dispenser, but the technology behind clean hands requires precision parts. Using 50-220 ton plastic injection moulding machines from Sumitomo, together with multi-cavity tools designed and built in-house, the company produces very complex and close-tolerance pump components, all of which have to be checked.

Semenchuk tells horror stories about the previous inspection machine. “It was very slow, and prone to in-process failures. You’d be checking the parts coming out of a 12-cavity mould, and right in the middle of the 5th part the machine wouldn’t know what to do—it would just sit there until someone came over and restarted the entire process.”

Worse, the annual calibration routine for that cantankerous CMM would take it out of commission for three days or more. Programming once took “a day or two, unless there were problems.” By comparison, the company’s new machine—a Zeiss O-Inspect 322—takes an hour or two to program, and less than eight hours for calibration. “It’s a dramatic improvement.”

This isn’t some Brand X bashing session. It’s an indication of how far metrology equipment has come since OPHARDT bought its last CMM. A big part of that is multi-sensing capability, together with faster electronics and more intelligent software. “Before the Zeiss machine, our quality control personnel would perform extensive caliper measurements and checks with hard gauges. They would then write down the results on a form, which we stuck in a filing cabinet.”



Top and bottom: A sample of parts Amphenol inspects on its Zeiss machine.

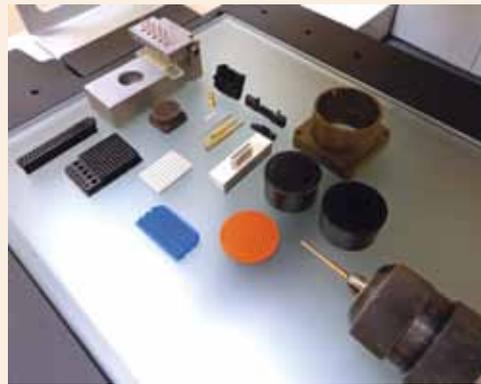
Zeiss’s Calypso software, by contrast, allows OPHARDT to electronically record measurement data and save it to a central server.

The result is quick and secure access to historical information for analysis, with no paper. As mentioned previously, new

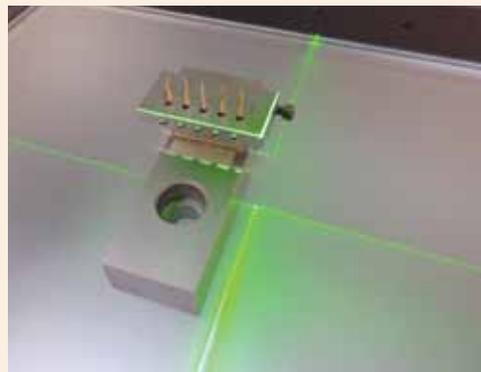
part programs are easy to create and modify. Semenchuk says soft, flexible features on small parts can be measured using a “birds eye view” and measured very quickly. Likewise, larger parts can be checked using just a few arc or line segments. And when needed, the touch probe is deployed, avoiding the necessity of relocating parts to a different measuring machine.

Overall, Semenchuk is thrilled with the O-Inspect 322. Her only regret is not having a bigger one—the machine’s 300 x 200 x 200 mm travels are a bit cramped for some of OPHARDT’s tools and fixtures. “You lose a little bit of measuring area because there are two probes on the same machine. The O-Inspect 442 has larger travels, and probably would have been a better choice for us.”

Problems like this are easy to fix—Semenchuk is already eyeing the next machine. If your shop needs a switch-hitting, super-accurate measuring machine, one that replaces that old hard-probe CMM and the even older shadowgraph sitting in the corner, maybe you should join her. **SMT**



www.amphenolcanada.com
www.ophardt.com
www.zeiss.com/metrology



Amphenol uses its Zeiss machine's laser to align parts and fixtures, one of which is seen here.

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