

Six-Axis Portable Metrology Does More than QC

Clinkenbeard draws advantages beyond the benefits to speed, precision, and design complexity



Mark Vance, advanced technical specialist at Clinkenbeard, demonstrates the capabilities of the Romer Absolute Arm.

For decades, Clinkenbeard — which specializes in rapid production of complex metalcastings and machined parts — has relied on traditional coordinate measuring machines (CMM) to verify dimensions and inspect complicated parts. Whether the part or casting was large or small it would be transported to the quality lab, where it was carefully set up for inspection. While this standard process worked, it wasn't efficient. Valuable time was lost moving the part and the potential for damage when re-setting the part into the machining fixture was increased. It was clear that the process needed to evolve.

Now, when time-to-market is more important than ever before, Clinkenbeard realized it needed to become even more efficient and effective at the whole process of manufacturing parts. Because buyers expect precision and fast results, Clinkenbeard decided it was time to invest in a portable CMM.

In July 2013, the company purchased a 6-axis portable, on-site metrology arm to augment its two CMMs (one manual, one programmable.) The Romer Absolute Arm allows Clinkenbeard to perform in-machine measuring and inspection of castings — providing the fastest turnaround times and productivity for customers, which is particularly valuable to aerospace manufacturers.

In the aerospace industry, manual blueline layout is still preferred by many large OEMs for inspecting castings. This is a tedious process and sometimes takes months to

perform on complex castings with hundreds, if not thousands, of measurable features. Using the Romer arm to confirm casting geometry prior to completing the formal blueline layout allows Clinkenbeard to get a jump on machining PSA (prior to sample approval) castings.

“We believe it's important to invest in the newest products on the market today,” explained Steve Helfer, Clinkenbeard general manager. “It gives us a competitive edge and allows us to offer the fastest turnaround times for customers.”

To operations performing five-axis machining, another important advantage of portable CMM is the ability to machine complex shapes in a single set-up with extraordinary speed. “The metrology arm provides even greater productivity by avoiding inspection set-ups and fixtures that traditionally would be required after machining,” according to Helfer.

The laser scanner on the portable arm is a particular benefit for finishing aerospace parts. The laser scanner allows the technician to examine the surface contours more closely than with a probe, which is important when looking at parts exposed to airflow. “As the laser sweeps across the part, information is collected in a matter of seconds,” Helfer said.

In addition to precision measuring, the arm can be used in other applications, including reverse engineering. This is particularly useful when capturing part geometry rather than tooling geometry due to shrinkage, and other dynamic changes that occur during manufacturing.

While there are many such quantifiable advantages to the arm, the foundry/machine shop soon discovered that the system also could be the means for sourcing new revenues.

“We found that other area businesses have a need for this sophisticated technology,” Helfer reported. “Because it's extremely portable, we can load the machine up and take it to area shops to conduct measurement services on location.”

After just 18 months, Clinkenbeard is enjoying the multiple benefits of its investment in portable metrology. “We are able to save a tremendous amount of valuable time on our shop floor. In the end, our clients are able to reap the benefits of this highly advanced technology,” said Helfer. 🍷

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