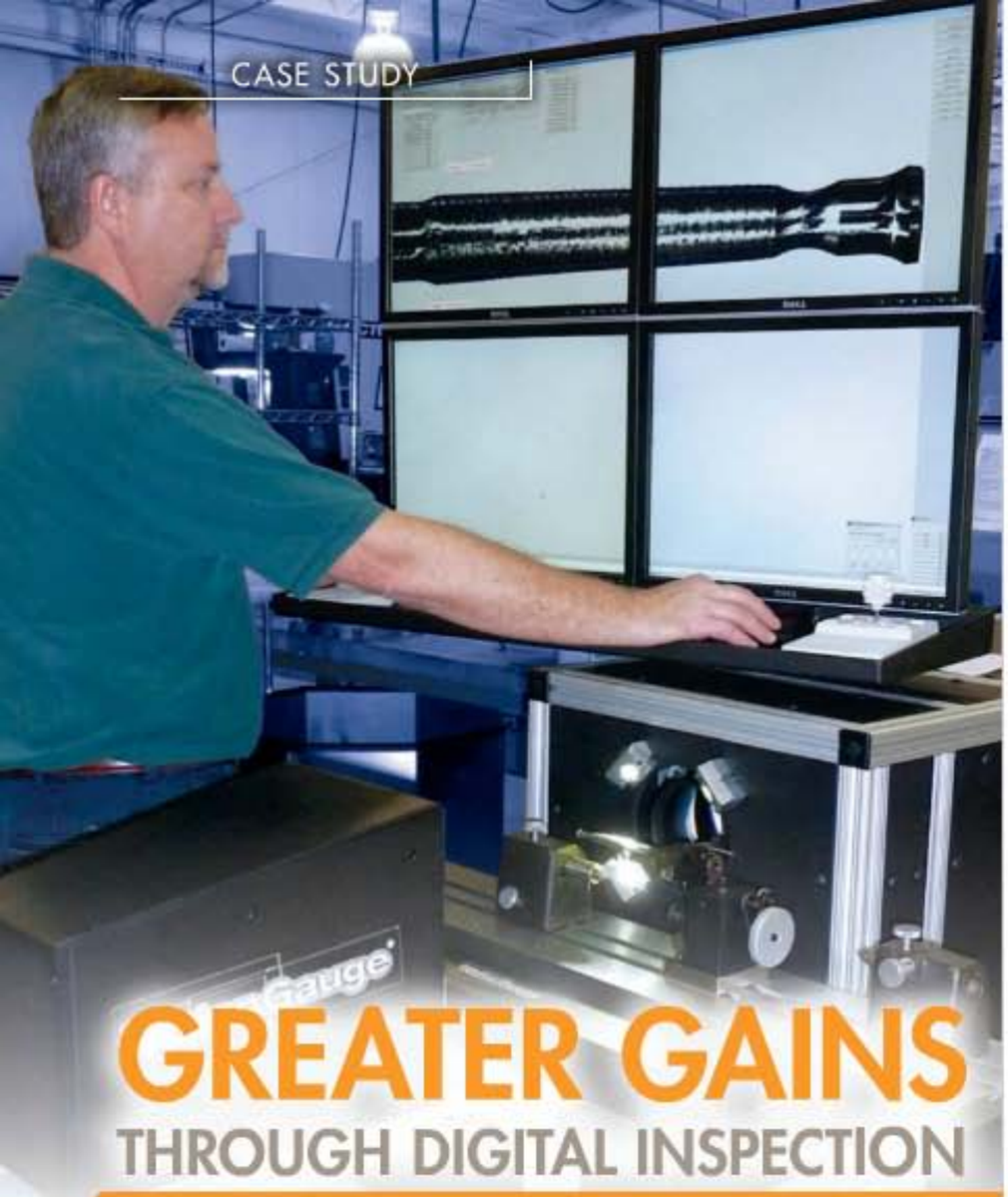

GREATER GAINS
THROUGH DIGITAL INSPECTION

Digital optical comparator makes the cut for growing orthopaedic cutting tools manufacturer.

Staying open minded to change can be a tremendous asset to business owners. Growing companies that integrate the latest technology in order to keep pace with evolving requirements can reap great rewards in increased productivity.

This has been the case for Oak View Tool Co. (OVT, Columbia City, IN). OVT manufactures state-of-the-art, quality cutting tools for the orthopaedic and industrial cutting tool industry. Matt Dahms, president of OVT, founded the company in 1996 as a carbide cutting tool regrind shop, and over the years, OVT has undergone several technology additions and upgrades which have allowed its business to grow.

Today OVT operates 24 hours a day, six days a week to manufacture its own line of carbide cutting tools developed for machining titanium cobalt chrome and stainless steel materials. OVT also works closely with medical OEMs, often at the design phase with product engineers, to develop cutting geometries required for OEMs' surgical cutting devices.

BENEFITS

- First article inspection was reduced from up to 1½ hours to only 10 to 12 minutes with the digital comparator.
- OVT has saved approximately $120,000 a year by using a digital comparator.
- With traditional comparators, it took two OVT operators approximately 20 minutes to change the lens. With the new digital optical comparator, lens changes are not required.

OVT selected a system configuration that includes 10X/20X/50X multi-mag optics capable of an accuracy of better than ±0.0001 inch and an extended 24-inch travel stage able to accommodate long parts. With this configuration, OVT can quickly and accurately inspect and measure the entire array of parts that they produce. *Source: Oak View Tool Co.*

A BREAK WITH TRADITION

To provide high-quality products that meet or exceed customer expectations, the part inspection process must be accurate and reliable. Dahms says, "As we were growing and expanding our manufacturing capabilities, we were finding that the traditional optical comparators we had been primarily using to check parts were not well suited to meet OVT's increasing requirements." OVT was not satisfied with the accuracy it was getting and also disliked the limitations of using overlays, also called templates or mylars.

Optical comparators require overlays to allow operators to verify that parts are in tolerance. Overlays are not well suited for quick turnover jobs and present a number of problems, which include the requirement to be physically stored and managed, repeatability challenges from operator to operator, including the possibility of generating errors due to operator subjectivity. In addition, overlays can be damaged, can only be used at a single magnification and require periodic re-calibration.

The accuracy of optical comparators also is often insufficient to meet today's ever-tighter tolerances. At OVT, they are typically meeting tolerances of 0.001 inch and less. Other limitations include the fact that 30-inch optical comparators have a large footprint, taking up a lot of floor space.

Also, optical comparators can only inspect parts that fit within their optical field of view. So, for example, a 10X magnification 30-inch comparator can only check parts that measure 3 inches or less against an overlay. At OVT this presented a problem. For example, when manufacturing reamers—which can be as long as 28 inches—they required a larger field of view.

Dahms wanted a better way to check parts. Hearing of the success that some of his own customers, large medical device and orthopaedic implant OEMs, were having with the VisionGauge digital optical comparator, Dahms looked into this instrument's capabilities and he liked what he saw during a demonstration. This led to OVT purchasing the digital optical comparator.

INCREASED PRODUCTIVITY THROUGH DIGITAL TECHNOLOGY

The VisionGauge digital optical comparator, developed by VISIONx (Pointe-Claire, Quebec, Canada) and distributed in North America by Methods Machine Tools Inc. (Sudbury, MA) is a fully-digital drop-in replacement for traditional analog optical comparators. It is available with the same range of magnifications and can accommodate the same part fixtures.

OVT selected a system configuration that includes 10X/20X/50X multi-mag optics capable of an accuracy of better than ±0.0001 inch and an extended 24-inch travel stage able to accommodate long parts. With this configuration, OVT can quickly and accurately inspect and measure the entire array of parts that they produce. Parts range from a submicron-based solid carbide substrate tool specifically suited for cutting cobalt chrome, titanium and stainless steel, to taper ball end mills.

VisionGauge offers benefits including the ability to work directly with computer-aided design (CAD) data, eliminating all of the problems having to do with the production, storage and management of overlays. Also, the CAD overlay "tracks the part" when you move the stage, allowing parts comparison to their CAD drawing across the entire stage travel, as opposed to just within the optical field-of-view. The digital comparator can be set up so that it automatically pulls up the correct overlay when the operator scans in the barcode on the router that accompanies the parts. Also, part changeover and part settings recall can be done with a single mouse click. The system's auto-align tool that automatically lines up the CAD data to the part in seconds.

According to Dahms, "In a job we just completed, first article inspection was reduced from up to one and a half hours to only 10 to 12 minutes with the digital comparator. Since our machines aren't running during first article inspection, every minute counts.

"Our recent purchase of the VisionGauge equipment has been a huge cost savings for us," says Dahms. "The use of electronic overlay vs. Mylar overlay is extremely efficient. We are able to compare a part to its CAD data in real-time and completely automated by using the CAD auto-align and auto pass/fail tools. The results are repeatable, accurate and completely operator independent, drastically reducing our inspection times. We estimate conservatively that we have saved approximately $120,000 this year by using the digital comparator."

Documentation is improved because the VisionGauge comparator can be used to capture a high-resolution image of a part with its CAD overlay, as well capture an image showing automatically computed deviations from nominal, the auto pass/fail result and measurements of critical dimensions and annotations. This image can be time/date stamped and easily linked to job and lot numbers. The VisionGauge also can export all of its measurements, statistics and results to other applications, such as Microsoft Excel.

With traditional comparators, it took two OVT operators approximately 20 minutes to change the lens. With the new digital optical comparator, lens changes are not required. Dahms says, "The ability to simultaneously have multiple electronic overlays and fixtures on the VisionGauge comparator for multiple part inspection, with no overlays or power lens changes, is extremely productive."

Due to its ease-of-use, the transition to the VisionGauge was simple and straightforward for operators. Dahms feels they are presently just scratching the surface of this machine's capabilities. He is certain that OVT will continue to increase productivity using the VisionGauge comparator as they keep using and learning more about the system.

"The addition of the state-of-the-art, easy-to-use VisionGauge digital optical comparator allowed us to substantially improve our quality control process, accuracy, reliability and throughput, which in turn will help us expand our business in demanding market sectors such as medical," Dahms says.

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