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Speedy Precision

A global producer of medical equipment finds that Sinumerik enables the rapid creation of highly specialized devices.

Stryker Corporation of Kalamazoo, Michigan, is a global leader in medical devices and equipment, from orthopedic implants to all types of surgical and patient-care devices. Its products are found in medical care facilities around the world. The Stryker Instruments Division has five facilities — in Kalamazoo, Texas, Puerto Rico, Germany, and Ireland. It produces surgical tools used primarily for orthopedic, spine, neurological, and ENT (ear, nose, and throat) procedures, plus minimally invasive interventional pain procedures.

High precision needs
Stryker must often make low quantities of its highly specialized System 6 power tools, which include high-precision handheld devices such as oscillating bone saws. The company uses a variety of substrates, including 300- and 400-series stainless steels, 6061 aluminum, and titanium, plus specialty materials such as Inconel, Nitinol, ALG alloys, and others. Assorted thermoplastics such as Delrin, ABS (acrylonitrile butadiene styrene), and Teflon, plus thermoplastic elastomers, are also machined here. Production at Stryker is strictly monitored for compliance to US Food and Drug Administration (FDA) standards.

The Experimental Group in Kalamazoo provides components to Stryker research and development engineers for testing and evaluation, including prototypes. As a result, Stryker maintains a variety of machine tools at its Kalamazoo facility, including three- and five-axis CNC machining centers and electrical discharge machines (EDMs).

Easy to program
Among the newest CNC machines in the Experimental Group is a DMG Model DMC 635 eco, a powerful three-axis vertical milling center with an 8,000-revolution-per-minute spindle and a 20-position tool changer, all run by the Sinumerik 810D CNC with ShopMill software. Supervisor Rich Mitchell explains, “We typically store a few programs on the CNC and keep our backlog of programs on a network drive. We take IGES or PRT 3-D files and can program directly from the digital content, using MasterCAM and now the ShopMill program. The Sinumerik 810D control receives excellent ratings from our operators and has fast become their control of choice.” He says the part and tool setup pages are intuitive and incorporate graphic depictions for specific data inputs, thereby reducing the learning curve. “Most of our guys had never used a
Siemens control previously, so it is ironic that this CNC is now their favorite. They literally line up to use it.”

Mitchell said that program transfer from the Stryker network back to the CNC is fast and simple. This is advantageous in the Experimental Group, where most jobs are one-offs or very small quantities. Operators write and run multiple programs through each CNC daily, saving time on entering and editing setup data on the machine. The department must produce extremely fast turnarounds, and Mitchell credits the Siemens CNC for facilitating this. “The Sinumerik numerical control has worked quite well for us with a manual touch probe and manual Z-axis presetter for tooling,” he says. “As we expand or replace current milling technology in our production, we will most likely transition to a Sinumerik 840D with a Renishaw touch probe and tool presetter to expedite setups.”

This machine joins multiple DMG TWIN 65 and TWIN 42 machining centers, each with an upper B-axis to complement the Y-axis and driven tools and create the contours and sophisticated geometries needed. These turning machines have Sinumerik 840D, which enables precise and transferable control of spindle and axis movement variations.

Reduced cycle times

Randy Carpenter, a senior project engineer for Stryker Instrument’s Production Group, says, “We run families of parts. One set of parts is run in 416 and 17-4 (grades of stainless steel) with 38 Rockwell hardness. We’re typically running dimensional tolerances down to the ten-thousandths, so it’s very precise work. Compared to the older machines and controls, we have tracked our cycle times in relation to our target Cpks and we are getting better than 20 percent reductions as a result of the DMG machines with Siemens CNC onboard. Plus, we already see the improvements in surface finish, owing to the smoother translations from line to line in the milling and turning programs.” Carpenter notes that his production department has achieved considerably higher changeover efficiencies, allowing more jobs to run per shift.

Sinumerik at Stryker

- Machining centers and a three-axis vertical milling center with an 8,000 rpm spindle and a 20-position tool changer
- Sinumerik 840D has helped improve surface finish
- Stryker is seeing a more than 20 percent reduction in cycle times compared to older machines and controls