Using CNC And Remote Monitoring On Machine Tools

Siemens Sinumerik 840D is the control of choice on turning, grinding, and turn/grind models, resulting in substantial savings for its customer and EMAG.

EMAG L.L.C. [1] is the U.S. subsidiary of a major German machine tool builder who specializes in machine tools for the production of automotive, off-highway, agricultural and oil field components. The company's equipment ranges from basic round part turning centers to large workpiece, five-axis machining centers, gear hobbing machines and alternative equipment such as laser welding and electro-chemical machining centers.

This wide variety of machine tools requires an assortment of control technologies to power and manage the motion. For one recent customer requirement, where a major agricultural equipment builder needed grinding, turning and turn-grind machines, EMAG looked to its longtime partner Siemens [2] for a standardized CNC solution.

CEO Peter Loetzner put it simply, "We needed to devise a control solution that would satisfy all the needs of the various machines we were supplying to this demanding customer, based on a common platform, to enable easier design, integration, start-up, commissioning on-site and training for our customer's operations and maintenance personnel."

After reviewing the entire line of CNC offerings from various suppliers, the decision was made to use the Siemens Sinumerik 840D CNC for all of the grinding, turning and turn-grind machines to be supplied. Collaboration was a key element in the decision-making process, as Loetzner explains.

"The control we selected offered great flexibility in application, which was very important to us and our customer. They were seeking a scenario that would allow considerable cross-training of their operators, who might run a turning center one day, then a grinding or turn-grind center the next." Loetzner further noted the control chosen offered his machine designers and the customer's production management team an enhanced remote monitoring feature, so changes could be made on the fly with very little downtime. As a result, over 20 machines of various sizes and styles can be monitored over a wireless network, enabling process engineers to see what the operator sees on each machine.

Furthermore, owing to the global capabilities of Siemens, Loetzner commented on the control's ability to function in U.S., German and even Asian factories with seamless data integration. Regardless of the machine tool's location, EMAG and its customer are able to monitor the performance of any particular machine and even

report comparative production data from one continent to another. Because it sells into every industrialized nation, EMAG "…works with its customers on every aspect of a job, from the order process to tooling usage, materials handling strategies to predictive maintenance. The cultural differences are substantial sometimes and the control must be programmed to adapt to such variations. We have been most satisfied with the help Siemens has provided to us, worldwide, in this area."

Those differences, he continued, must nonetheless be based on a common technology to streamline the integration of the CNC on the machines under construction.

Loetzner cited specifics from the project referenced in this story. "We were looking at a fairly diverse group of machines being supplied to the customer. Frankly, many of their operators were more comfortable with a CNC that is very popular in the American job shop community. However, we were able to demonstrate the immediate advantages of the Siemens control to them and they accepted our recommendations."

This value proposition, he said, hinged on the greater capability of the Sinumerik 840D to run different machine types, which translated into considerable savings on the training and commissioning side of the equation. Coupled with the remote monitoring and programming aspects of the Siemens control solution, the customer was convinced.

More than 75 percent of the EMAG machines at this particular customer are equipped with robotic devices, enabling a lights-out manufacturing scenario, another instance where the Siemens remote monitoring via Ethernet feature benefits both the machine tool builder and its customer alike.

Loetzner explains, "Remote monitoring of the machine tools can be done directly through the Sinumerik CNC in a one-to-one exchange between our customer and us. Alternatively, we can communicate with Siemens and our customer in a three-way exchange of machine data and cycle information, all protected through a firewall for security and customer peace-of-mind. That's important with all our major OEMs, of course."

Loetzner cited one customer in the agricultural machine building market, who's used the remote monitoring capability of the Sinumerik CNC on a wide variety of EMAG machines for over three years currently, with all data communicated through a single information network, accessible by both EMAG and the control supplier. Significant reductions in downtime, service calls and troubleshooting identification time have been achieved, translating into documented savings for everyone.

As a further advantage to the machine tool builder, the space reduction of more than 20 percent in the control, compared to competitive brands, meant a smaller footprint for the machine, further improving the workspace productivity of the EMAG machines for their customer.

Especially in brownfield applications, where a limited space is being utilized to

maximize production for an OEM, this physical space-savings combines with other advantages of the Siemens control, according to Peter Loetzner. These include reduced wiring and lower power consumption with the attendant lower operating temperatures, due to reduced ambient heat.

At this particular customer, the EMAG machines are used to produce gears, gear blanks, shafts and splines for powertrain applications. Gear hobbing and synchronous support grinding are among the advanced machining technologies performed here. Heavy, hardened steels are the most often worked substrates.

The specific control used on these machines is the Siemens Sinumerik 840D solution line, a distributed, scalable and open control for up to 31 axes of motion, incorporating the CNC, HMI, PLC, closed loop control and communications functions into a single NC unit. Sinumerik Safety Integrated further provides a comprehensive, yet efficiently packaged suite of personnel and machine protection functions, fully compliant with internationally-accepted standards.

Commenting on the competing brands of CNC often found in job shops worldwide, Loetzner noted that the Siemens communication architecture easily accepts input from such devices, owing to its ability to capture, standardize and transmit all data in a seamless manner through its legacy tracking. “This service is another example of a forward-thinking supplier, such as Siemens, responding to brownfield conditions in the marketplace,” he noted.

EMAG machines are used by the majority of American companies for the production of such products in the Agriculture, Earthmoving, Motorcycle and Automotive and subsequent leading TIER1 suppliers. The machine builder has had a presence in the American market for over 20 years and, according to Peter Loetzner, “…we’ve received great support from Siemens, both in Germany and in the United States, for on-site service, application engineering, parts distribution, remote monitoring implementation and communications between our customers and us.”

For more information visit www.emag.com *[1] and* www.usa.siemens.com/cnc *[2].*

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