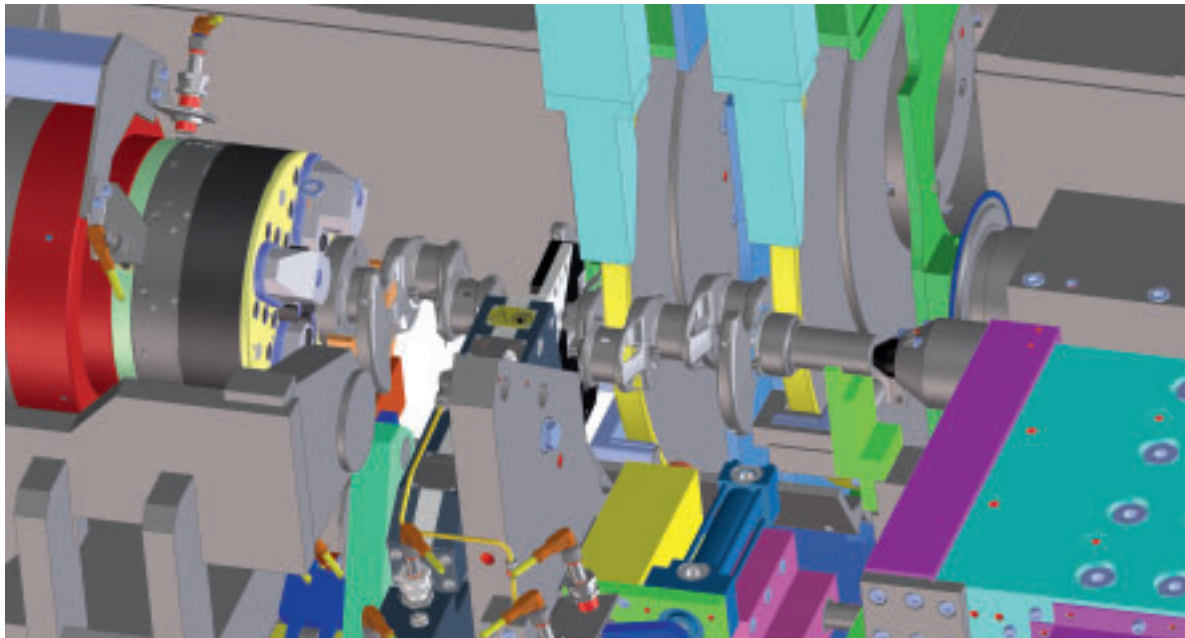


■ GST Gesellschaft für Schleiftechnik GmbH, Austria

# Higher Dynamics and Precision

During the retrofit of a machine group, GST greatly increased the efficiency of its grinding operation centers through the use of Sinumerik CNCs and Sinamics drives.



The centrally clamped crankshaft rotates at 90 revolutions per minute while the grinding discs track the motion of the pin bearings

**G**ST Gesellschaft für Schleiftechnik GmbH is an internationally recognized manufacturer of grinding operation centers for gear, crank and cam shafts. The reconditioning of an existing system at the Volkswagen AG plant in Salzgitter, Germany, consisting of three pendulum-stroke grinding machines represented a challenge for the retrofit division, which is a key business for the company. The conversion became necessary due to a changeover of the machines to new workpieces with a completely different geometry. On the pre-machining grinding machine and the two fine grinding machines, crankshafts were to be ground for a new generation of motors. The grinding disc needed to follow the movement of the pin

bearings while the centrally clamped crankshaft turned at 90 revolutions per minute.

The first goal was to greatly increase the power of the overall system as well as its output. This was not a trivial matter, even from the perspective of geometry. The required motions need to take place on five axes with great precision and very rapid acceleration. "To do this, the machines need generous power reserves in the drive area and high computing capacity in the control system CPU," explains Robert Promber, who was responsible for the retrofit as the sales project manager at GST. An additional requirement was seamless integration of the machines into the overall production line from a



**»Our ability to keep such a tight schedule can be traced back to the outstanding support we have received from Siemens during development and right up to commissioning.«**

Günther Hacker,  
CEO, GST Gesellschaft für Schleiftechnik GmbH

**In addition to the Sinumerik 840D sl, Sinamics drives increase the efficiency of the machines**

control technology perspective. Performance improvement and integration could not be achieved before the retrofit due to the existing application-specific control electronics of the machine.

### **Overhaul of the entire drive and control technology**

The overhaul of the machines was thorough and modeled in 3-D throughout the process. "The complete spindle and guidance system, the entire electrical system and the drive and control technology were overhauled," reports Erwin Sebek, the GST designer responsible for the project. "In the process, the drive geometry was extensively changed and the drive power of the linear motors was reinforced." According to the designer, the design tools for the motors were particularly helpful in this regard. "The overhauled machines are a prime example of Totally Integrated Automation (TIA)," emphasizes Mario Kahlig, the Siemens sales manager responsible for the management of the project. TIA offers users an integrated platform for the realization of automation solutions. It creates openness, connectivity and maximum interoperability across all plant components, allowing them to merge into an integrated system. "From the linear motors and servomotors to the Sinamics S120 drives to the Sinumerik 840D sl CNC system with Safety Integrated, all of the components come from one source. This greatly simplifies commissioning, diagnostics, and maintenance," adds Kahlig.

### **The open NC kernel provides additional functionality**

For GST, the open NC kernel was an important reason to use Sinumerik 840D sl. This allows programmers to make full use of the power of the control

system and develop additional functionalities that are subsequently added to the basic software as discrete software modules (compile cycles). With CRIP crank interpolation, for example, users have access to a cycle that was created for crankshaft machining. GST uses another compile cycle, the PROT module, for axis collision protection. The Sinumerik 840D sl also features considerable openness in regard to the user interface. "That's important because in the automotive industry, Transline has established itself as a standard that we as machine tool builders need to comply with," emphasizes Promber. "In contrast to turning and milling machines, machine programming in grinding technology is carried out almost exclusively through the input of variables. We developed our own images as input screens and integrated them seamlessly into the HMI."

"The machines were a first in more than one respect," reports GST CEO Günter Hacker. The machine builder explored the pendulum-stroke process and used linear drives for the first time in the history of the company. Just six months passed between the contract award in November 2009 and the customer starting full three-shift operation in May 2010. "Our ability to keep such a tight schedule in view of the given conditions can also be traced back to the outstanding support we received from Siemens during development and right up to commissioning," concludes Hacker. ■

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