

TimkenSteel

TOUTS AUTOMATION AND ROBOTICS IN FORGING APPLICATIONS

The forging industry is a key link between critical manufacturing segments — metal suppliers (both ferrous and nonferrous) and end user industries. Forgings, which appear in 20% of the products representing the Gross Domestic Product of the United States, are essential to the U.S. industrial economy, to its society, and to its national security, according to the Forging Industry Association (FIA).

In recent years the U.S. forging industry has undergone significant shrinkage associated with intense global competition, technological changes, and environmental and economic factors. Those companies that survived the industry downsizing emerged stronger and better equipped to face the competitive challenges of manufacturing today — escalating demands from customers, changing markets, global competition, and threats from competing manufacturing processes.

The forging industry looks forward to the business and technical challenges that will shape its future. Some of these challenges include higher levels of quality, a greater return on investments and a push toward smart manufacturing initiatives. 20 years ago, it would have been highly unlikely to find automation, robotic, and sensor technologies in the forging industry. In the last five to ten years, however, huge steps have been taken to radically change existing processes and optimize process modeling, controls, sensors and preventative maintenance in these areas.

In-Line Forge Press

One example of this is TimkenSteel, a producer of alloy steel products and services including standard steel grades as well as customized solutions. The company offers solutions in special bar quality (SBQ) bar sizes from 1" to 16" and seamless mechanical tube sizes from less than 3" to over 13". They engineer hundreds of carbon and alloy steel grades to meet the severe service requirements in oil and gas.

One area that the company has invested in recently is its automation capabilities. Ron Honaker, senior reliability/maintenance specialist at TimkenSteel, says that the in-line forge press at the Faircrest Steel Plant is completely automated.

"Most forgers use an operator to physically run their press; in contrast, our operator monitors both the bloom mill and the forge press from a pulpit and only intervenes if a problem occurs," Honaker says. "Our in-line forge press makes our work area safer because we do not have an operator directly involved with the forging process. Further, this technology allows us to be more efficient because we can run automatic cycle times at the press that match up with cycle times for the mill."

This kind of automation technology would not have been possible 15 to 20 years ago, according to Honaker. It allows TimkenSteel the luxury of achieving results at the plant that the organization couldn't have reached in the past.

Modern forge lines are tasked with not only handling the product from one stage to the next, but also with creating the most efficient and effective production process. "Sensors, for



example, are critical for material placement while processing the cast blooms and ingots," Honaker says.

The forge press only requires one operator to do what would take 4–5 employees to do with older technology. When facing industry challenges like skilled workforce shortages, this technology allows TimkenSteel to get the job done faster and more efficiently.

In turn, the logic built into the forge press keeps product being manipulated from damaging any equipment and does not require any human interaction with the actual product. This is critical in making the manufacturing facility safer and more efficient.

Another area that continues to advance for TimkenSteel is the company's modeling technology.

"We currently use modeling to look at possible end results when forging new products or chemistries. This technology also allows us to show customers how we can process the blooms or ingots for higher quality and enhanced sound centers," Honaker says.

Future Growth

The FIA believes that new knowledge must be developed and applied industry-wide through specific research and development that focuses on bulk deformation sciences and engineering technologies so that more cost efficient and higher performing products and processes are developed.

In addition, partnerships between the forging industry, federal laboratories, universities, and vendor companies must be formed to share information on integrated computational tools, advanced modeling, and automation techniques. It's obvious that automation and robotic technologies will continue to play a pivotal role in the future of forgings, gear blanks and raw materials.

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INSTALLS ALL-METAL HOT ZONE VACUUM FURNACE AND 14-FOOT AIR FURNACE

Solar Atmospheres recently installed another unique, all-metal hot zone vacuum furnace at its 1969 Clearview Road facility in Souderton, PA.

This is Solar's third all-metal hot zone furnace installation for their climate-controlled room. The additional furnace increases Solar's capacity for processing sensitive materials such as PH stainless, nickel-chrome based superalloys, titanium, and ferritic and austenitic stainless steels.



The unique placement of isolation valves, an all-metal moly/stainless steel hot zone, and a stainless steel chamber allows this furnace to attain the level of cleanliness mandated by the demanding aerospace and medical markets. The ability to achieve vacuum levels lower than 5×10^{-6} Torr produces clean, bright results without contamination. Additionally, this furnace incorporates Solar Manufacturing's latest SolarVac Polaris HMI control system for complete process automation.

Jamie Jones, president of Solar Atmospheres states, "The increasing demands for cleanliness levels in critical aerospace and medical applications, and the growth in these markets, paved the way for Solar Atmospheres to add capacity through this investment."

Additionally, the company recently installed a brand new, 14-foot long car bottom air furnace. The furnace was surveyed in accordance with AMS2750 Rev E and is uniform within $\pm 10^{\circ}\text{F}$ (Class 2). With a working zone measuring 60" wide \times 54" high \times 168" long, the furnace will be capable of handling workloads up to 30,000 pounds. A maximum operating temperature of 1400°F allows this furnace to accommodate the tempering of large tool steel components, as well as the age hardening processes of nickel-based alloys and precipitation hardenable stainless steels.

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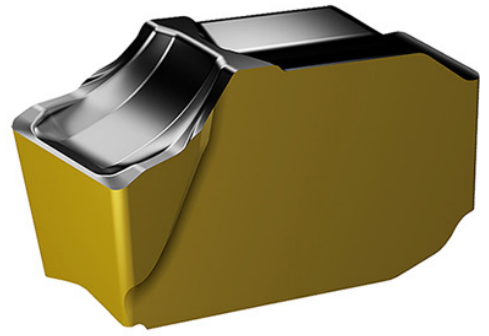
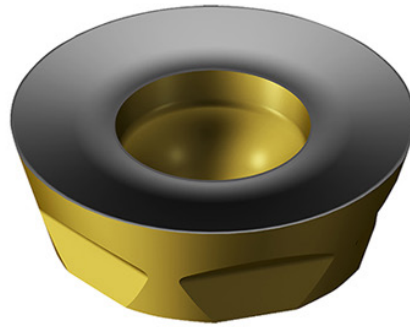
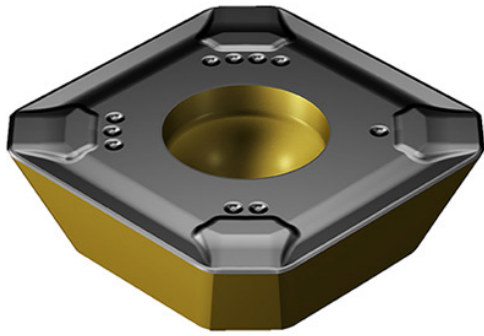



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CONCEPTS

GC4330 and GC4340, which feature a specially developed substrate, Inveio coating and enhanced post-treatment technology, allow users to enjoy substantially increased tool life and process security. Now, the extension of these grades to additional Sandvik Coromant milling concepts brings their advantages to even more machine shops looking to optimize the milling of steel workpieces.

“GC4330 and GC4340 have been purpose-designed to overcome certain issues when machining steel components,” states Karl Emil Holmström, global product application manager grades at Sandvik Coromant. “For instance, some hard and abrasive steels can promote wear along the insert’s flank face, particularly at elevated speeds and longer time in cut. What’s more, machining in unstable conditions as a result of compromised fixturing or long overhang increases the risk of chipped inserts. A further risk is thermal fluctuation during machining which, especially in wet conditions, can lead to crack formation and sudden breakages.”

Among the many design attributes of GC4330 and GC4340 is the optimized Inveio coating. Inveio is the technical breakthrough of uni-directional crystal orientation in the alumina coating layer that gives inserts a new level of wear resistance and tool life. Furthermore, the substrate of the grades delivers highly controlled grain size distribution for more reliable and predictable insert behavior.

GC4330 is a medium-hard grade

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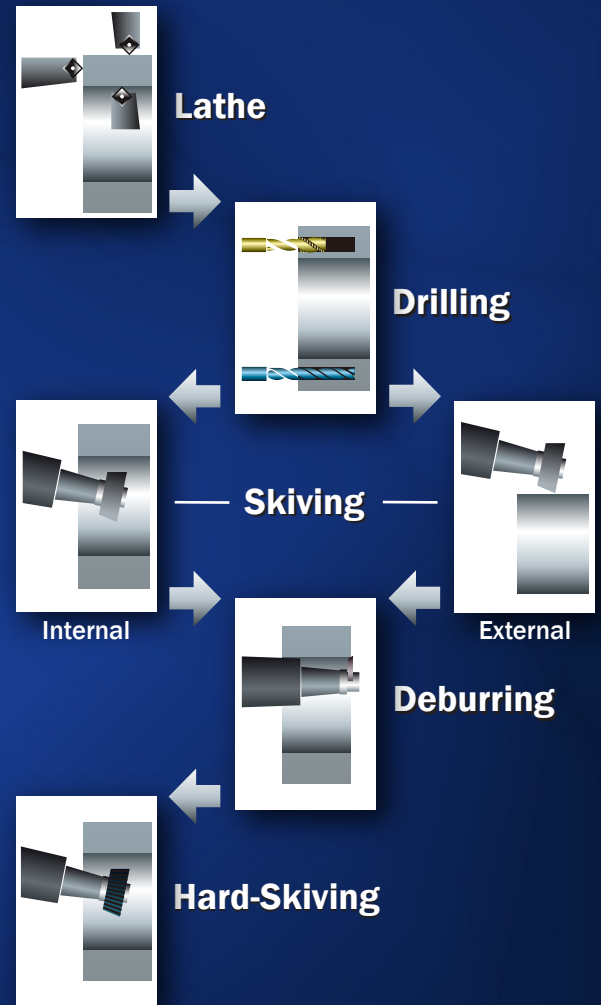


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for roughing to semi-finish face milling, with the tough GC4340 grade preferred for rough shoulder milling and groove milling. Both grades are now extended to the aforementioned CoroMill 245 and CoroMill 300, as well as the CoroMill 360 heavy-duty face mill, CoroMill 419 high-feed mill, and LPMH-PM plunge-cutter inserts.

In addition, GC4330 is available for the CoroMill 365 high-security face mill, while GC4340 can be applied to the CoroMill 216 ball-nose end mill

and CoroMill 415 small-diameter high-feed face mill, along with the CoroMill QD cutter.

This list adds to the existing availability of both grades for CoroMill 390 and CoroMill 490 shoulder mills, CoroMill 345 face mills, CoroMill 210 high-feed cutters, CoroMill 200 profile mills and CoroMill 331 for grooving and parting off.

For more information:

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KISSsoft

INTRODUCES 2019 RELEASE

The new *KISSsoft Release 2019* contains numerous new features, including *KISSdesign*, which provides the user with a tool that allows intuitive concept design on a system level. So, in addition to the elementary components (gear pair, bearing or shaft/bearing system), complete gears can now be designed in a separate module (Module KSD).

The main focus here lies on fast concept building, which is a great advantage — especially in the initial phase of a project. Further information about this new system program is available in a short video and web demo in September 2019.



Would you like to build different drivetrain concepts by yourself using the modeling tree and sketch functionality? Then register for the workshop on *KISSdesign* as part of KUM International 2019 on October 24 and create several kinematics together with our experts — starting from industrial gearboxes up to shifted transmissions.

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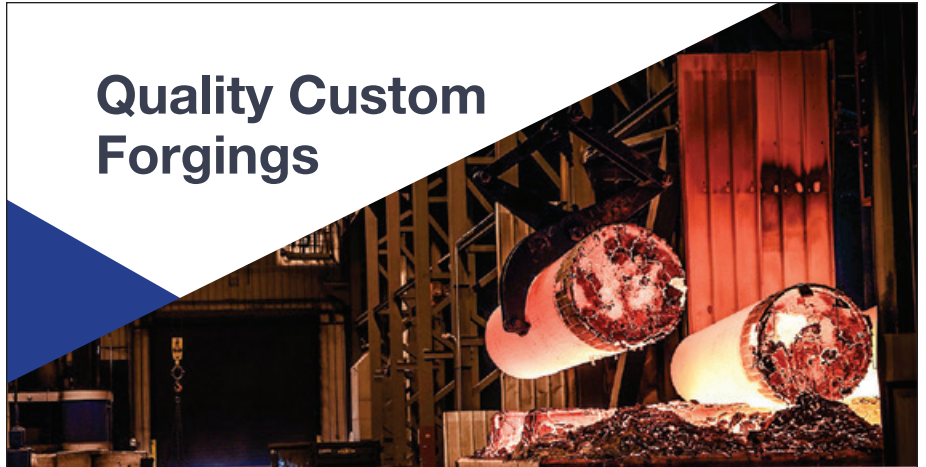
NUM is helping the Taiwanese machine tool company Chien Wei Precise Technology to develop innovative CNC grinding machines for manufacturing specialist gears used in robotics applications. Based entirely on NUM's latest-generation Flexium+ 68 CNC platform, Chien Wei's new machines are designed to speed the production of both involute and cycloidal profile precision gears. They are believed to be the first gear grinding machines on the market that are capable of handling both types of gear profile. There are two versions of the grinding machine, one for internal gears, the other for external gears.



According to Chien Wei's President, Mr. Lee, "We quickly decided that what we needed was a CNC system that fully supported gear grinding from the outset, so that our customers could simply input the parameters of the gear they wanted, with the CNC then controlling all aspects of the machine's dressing and grinding processes in real-time. NUM was an obvious choice, because of its proven expertise in CNC gear grinding applications. The company was also willing to collaborate in the joint development of the CNC system, which includes an application-specific HMI (human-machine interface) and various dedicated control functions."

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