

Star SU Uses Virtual Inspection and Cut Simulation

Recent changes in automotive technology include a move away from hydraulic to electric steering systems. For Star SU, that means much tighter tolerances in the manufacture of rack milling cutters at their Tawas, Michigan plant.

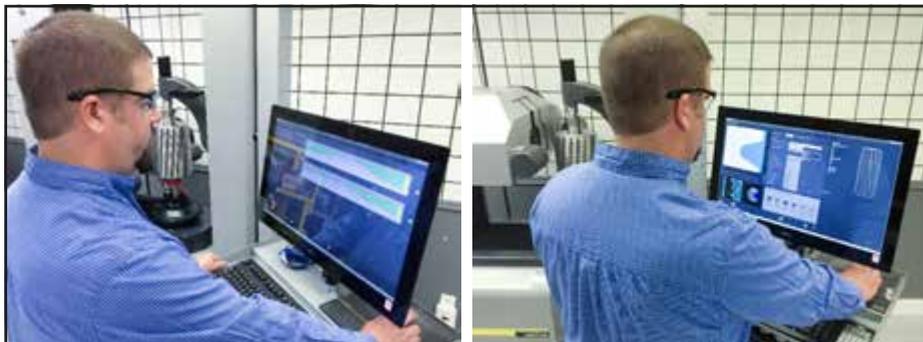


Generated tooth contour with simulated wire.

The Challenge

Today's steering systems contain highly engineered rack and pinion components. The complexity and precision of these components require cutting tool measurement techniques not found on standard inspection equipment.

Recently, Andy Kobs, Star SU cutting tool designer, met Werner Lueken, Zoller inspection product manager, at a



Andy Kobs, Star SU cutting tool designer. Setup of measuring program and reviewing measuring results.



Optical indexing of tool.

meeting of AGMA. They discussed the need for a special application to measure and inspect the rack milling cutters Star SU manufactures. Lueken offered a new solution in the form of measuring and inspecting the milling cutters visually, and to the micron, using the Zoller hobCheck system.

These milling cutters may have teeth in alternating patterns and asymmetrical forms, making elemental inspection difficult. To solve this, Zoller simulates the cut and develops a virtual rack template. The hobCheck allows Star SU to simulate the test on the rack before the tool leaves their plant.

Implementing the Solution

To satisfy the need for micron-level measurements, Zoller developed software for the hobCheck based on Star SU's specific requirements for measuring and inspecting rack milling cutters. With the hobCheck, Star SU can measure and inspect a cutter in about 20 minutes with extreme accuracy.

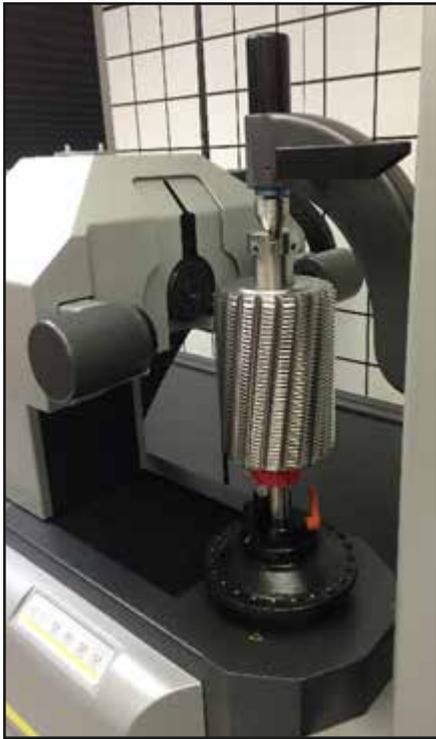
"It has allowed us to work in significantly greater detail — to the micron. We can do things we couldn't do before. Prior to getting the hobCheck, we used standard and specialized probing machines to measure rack milling cutters. Although very accurate, they did not output a composite of what the tool will produce. Now we have that capability," Kobs said.

The Future

Star SU is interested in adding more Zoller 3-D capabilities. Thomas Ware, product manager of Gear Tools said, "We also like the way Zoller uses graphics and other visuals that make using the machine easy and quick. Operators expect ease-of-use in equipment — more now than ever.

“Another application we are looking at is measuring and inspecting saw blade milling cutters that put the teeth in band saw blades. Those cutters aren’t easily manually checked. The cutter elements can be checked more accurately with the hobCheck,” Ware added.

Star SU offers RFID chips with their hobs and is working with Zoller to capture the tool information required by the customer. For example, after reconditioning, the dimensional changes in the tool can be downloaded directly to the customer’s machine via the RFID chip.



hobCheck with tool between centers.

Star SU’s manufacturing facility in Tawas, Michigan offers a full range of gear cutting and inspection tools to a broad range of gear tooth manufacturers. One application primarily serving the automotive industry is the steering rack milling cutters that cut racks for rack and pinion steering mechanisms.

The Zoller product portfolio encompasses tool presetters, measuring and inspection machines, and tool management software, which are demonstrated in our showrooms and on-site around the world.

The Zoller hobCheck universal measuring machine opens unprecedented opportunities for fully automated and economical complete measurement of

carbide or HSS hob cutters. All parameters are measured automatically through the intelligent combination of image processing technology. CNC axes and touch probes benefit from improved tool quality, shorter setup times during re-sharpening and complete documentation.

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For more information on the Zoller hobCheck universal measuring machine, follow this link: http://zoller.info/en/products/inspection_measuring/universal_measuring_machines/hobcheck



Zoller hobCheck Universal Measuring Machine.