

# CUTTING TOOL ENGINEERING®

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By Alan Richter, Editor

## THIS MONTH

*Cutting Tool Engineering* covers:

- An inexpensive gage for measuring a toolholder's change in taper diameter; and
- A highly porous wheel for high-speed grinding.

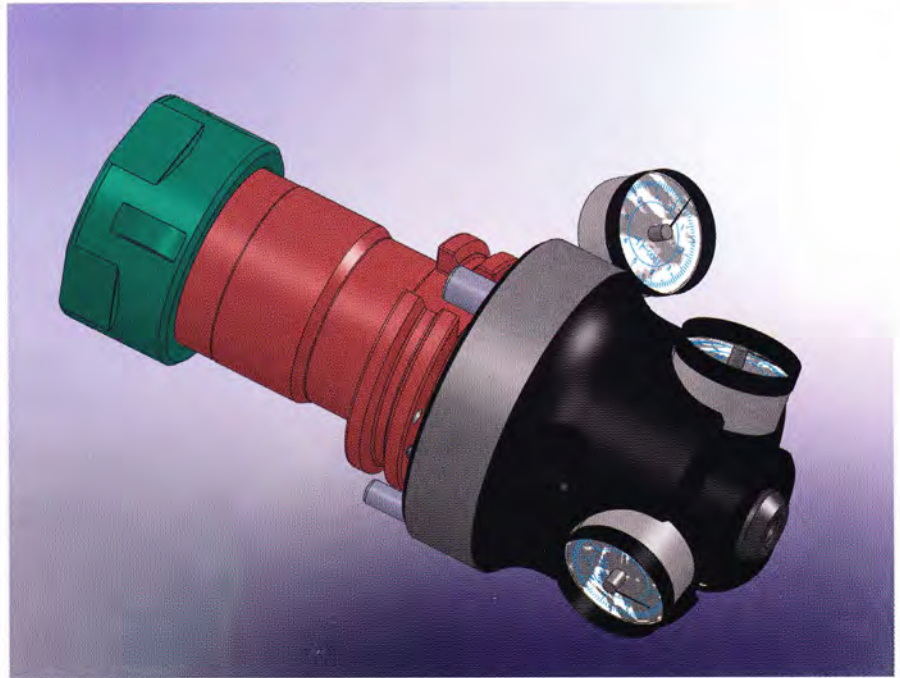
## FITNESS GAGE

Like the late comedian Rodney Dangerfield, retention knobs don't get no respect. Screwed into the threaded end of a flange-style toolholder to enable a machine tool's spindle to grip and accept the holder, the retention knob is often overlooked as a critical component in a metalcutting machine system. Nonetheless, the retention knob is crucial to successful machining because it links the toolholder and machine.

For successful machining, the retention knob must be properly secured in the holder—not too tight and not too loose. “The bigger companies have a problem with employees overtightening them to maybe 150, 200, 250 ft.-lbs., making sure a tool doesn't slip,” said John Stoneback, president of retention-knob manufacturer J&M Machine Inc.

He explained that overtightening causes the toolholder to swell slightly, preventing it from going entirely up the spindle and causing the holder's large end to wobble slightly during machining. After an end user removes the knob, the holder returns to its original size. According to Stoneback, the torque value to tighten retention knobs with no expansion of the toolholder shank is less than 30 ft.-lbs., too low to be considered adequate by most workers.

To calculate toolholder shank growth, J&M Machine designed and built the prototype Taper Shank Test Fixture, which the company says can detect diameter growth as small as 0.000003". J&M Machine then had Tensile Testing Metallurgical Laboratory, Cleveland, conduct blind tests on major brands of toolholders and retention knobs. The



J&M Machine

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retention knobs, which were lubricated with light oil, were checked at 20, 30, 40, 50, 60, 80, 100, 120, 140 and 160 ft.-lbs. “This testing proved that toolholders should be checked for expansion prior to their installation in the machines,” Stoneback noted.

Stoneback indicated that he expects the gage to be commercially available this year and cost about \$1,500.

He added that J&M Machine offers a new retention knob design that has features such as threads that start and end 180° apart to ensure proper balance and allows tightening to 100 ft.-lbs. without increasing the shank diameter. “There is a way to escape using the gage,” Stoneback said. “If you trust our testing, you can buy our retention knobs and set them at 80 ft.-lbs., which gives you a 20 percent margin and you don't have a problem.”

For more information, contact J&M Machine Inc., Fairport Harbor, Ohio, at (440) 357-1234 or visit [www.jmmachineinc.com](http://www.jmmachineinc.com).

## BUILT FOR SPEED

Depending on the source, VIPER is an acronym for Vitreous Improved, or Very Impressive, Performance Extreme Removal. The high-speed grinding process employs a machining center for creep-feed grinding primarily of nickel-base superalloys and was originally developed by integrated power systems provider Rolls-Royce plc and grinding wheel manufacturer Tyrolit.

Mori Seiki USA—one of three VIPER licensees and the only turning machine licensee—reports that it has recently taken the technology a step further by using a grinding wheel as a coolant reservoir. “Instead of aiming the coolant where the work is being done, we aim the coolant nozzle, which is very high pressure and high velocity, into the side of the grinding wheel to force the coolant into the porosity of the wheel,” said Greg Hyatt, vice president and chief technology officer for Mori Seiki's Machining Technology

*(continued on page 74)*