

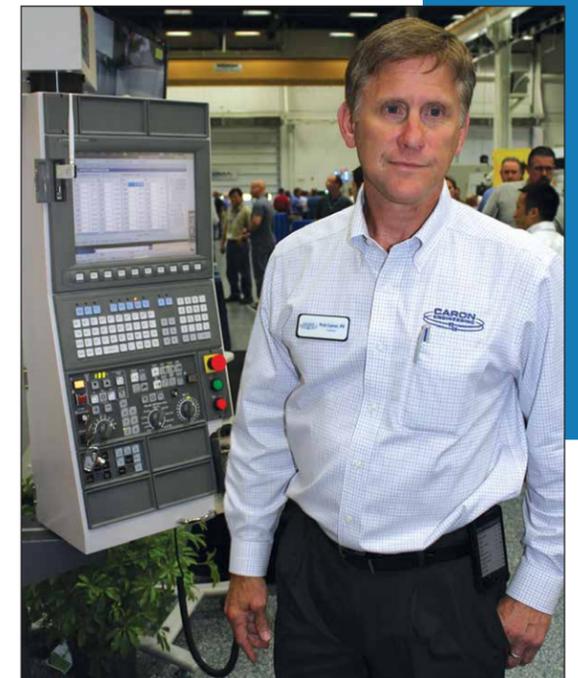
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slide to assess the machine tool for excessive impact, record bearing vibration for analysis, measure in-feed bar vibration to determine bar bending, and evaluate tool conditions.

All of the standard measurements found in the popular TMAC system: tool wear and breakage; adaptive feedrate control; spindle horsepower, including live tooling; and coolant temperature, flow, and pressure; are included in the TMAC-MP package.

The machine and cutting tool data can be viewed in a bar graph that shows tool condition and how much tool life has been expended. The information can be sent to any SQL (Structured Query Language) database. TMAC-MP can also send e-mail alarms to any Gmail or Yahoo account, and can even transmit text messages.

“Going forward we want to provide even more measurements and port the data out for analysis,” adds Rob Caron. “Currently, customers can view the data locally with a PC via Ethernet, and across a network. We’re developing a tablet interface right now. It’s a very exciting time to be doing what we do. The benefits to our machine tool builder associates and our customers are extremely helpful in the efforts to keep productivity up, tooling costs down, and scrap negligible.” ■



Rob Caron, President of Caron Engineering, explains his latest software development at The Robert E. Morris Company’s recent open house.

## TMAC-MP (Multi-Processing)

### Monitor Simultaneous Cutting Operations — Even on Multifunction Machines

CARON ENGINEERING INC. recently extended its flagship product line, TMAC (Tool Monitoring Adaptive Control), with the introduction of TMAC-MP. The addition of the letters MP (Multi-Processing) represents the development of one of this past year’s most significant advancements in tool monitoring software for the metal-working industry.

Now, multiple simultaneous-cutting operations on even the most complex CNC machines, such as Swiss type lathes and multitasking machines in all the popular configurations – lathes with milling, mills with turning, twin-spindle machining centers, three-turret turning centers – can be monitored and adapted automatically with this software. TMAC-MP was initially

launched about a year ago exclusively for Tsugami Swiss type lathes, and rolled out to all machine tool builders and customers this past January.

“Trends in machine tool design definitely drove our development of a new generation of our monitoring and adaptive control software for simultaneous operations,” says Rob Caron, founder and president of Caron Engineering. “Some of these machines have 2, 3, 4, or even more tools cutting at the same time. Further, customers were embracing these multitasking machine styles for the cycle time and productivity enhancing benefits they offer, and running them unattended, boosting their efficiency even more. They needed monitoring and adaptive control for each individual process.

We went to work to develop one comprehensive, centralized system that could look at many things at once.”

One of the greatest challenges in developing TMAC-MP, according to Caron, was to figure out how to monitor very small tools, such as 0.004-inch (0.1 mm) diameter drills. “One of our customers was machining tiny bearings with a 0.04-inch (1.0 mm) boring bar, taking 0.003-inch (0.08 mm) steps to cut it,” he says. To monitor these micro tools, Caron Engineering had to create entirely new strain sensors that are embedded into the static toolholders of small tools. Other additions to TMAC-MP are the 3-axis and single axis accelerometers used to measure vibration. These sensors can be mounted on any spindle or tooling