

N.H. Industrial Research Center and UNH Help Weare's Northland Tool and Electronics

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DURHAM, N.H. -- Everything gets worn with use, even machine parts made of case-hardened steel. In industrial applications, wear leads to repair and, often, lost productivity.

A small New Hampshire company, with help from the New Hampshire Industrial Research Center (IRC) and the University of New Hampshire, has developed a portable system that allows a particular type of repair to be done on site.

Northland Tool & Electronics (NT&E) of Weare offers worldwide service in rebuilding tapered spindles in milling machines. Milling machines remove metal in a very precise way, like a drill press, but can create cavities of different shapes, depending on the tool that is held in the spindle. Any metal part that has a cavity in it has probably been through a milling machine.

Eventually, the spindle gets worn and needs resurfacing in order to hold the tool tightly. Manufacturers using milling machines send worn spindles to NT&E for resurfacing. The spindle is repaired and returned, and then must be reinstalled in the milling machine and realigned. Turn-around averages two weeks, during which the manufacturer loses the use of the milling machine.

Joel Sletten, one of NT&E's owners, knew there had to be a better way to serve his clients. What if the repair could be done without removing the spindle from the milling machine?

He had an idea but knew he didn't have the expertise to design and build a prototype, so he turned to the IRC for help. The IRC, established by the state in 1992 to help small businesses create more jobs, provides technical assistance from the faculty at UNH, Dartmouth College or other educational institutions. The IRC recommends proposals for funding administered by the state Department of Resources and Economic Development.

The IRC has provided 120 similar technical assistance grants to New Hampshire companies to develop and apply technology to create new products, new product lines, new companies, and more than 2,000 new high-paying jobs. Executive Director Henry Mullaney says the annual economic impact of the IRC exceeds \$300 million.

The IRC recommended NT&E's proposal for a matching grant of \$57,000 two years ago. Ralph Draper, chair of the UNH Engineering Technology Program, served as project manager and found a designer and a machinist to help NT&E develop a prototype for its portable system. "If we don't have the talent on campus or the time, the first place I look for support is another institution such as the New Hampshire Technical Institute or another college," said Draper.

He found Robert Arredondo, professor of mechanical engineering technology at NHTI in Concord, who produced the prototype design last summer. And he found Ed Ferguson, owner of Ferguson Tool & Die in Deering, who built it. By January, it was ready for testing.

Enter UNH again. Robert Jerard, professor of mechanical engineering, allowed the use of the Fadal vertical machining center in his design and manufacturing laboratory for the first on-site test. The hydraulic lines were connected, calibrations were checked, the spindle was set in motion, and the NT&E Taper Grinding System, with its aluminum oxide grinding wheel spinning quietly at 15,000 rpm, was raised by tiny increments into the interior of the spindle. Ferguson, at the controls, stopped the process several times to make adjustments. Finally, it was ready and the resurfacing began. The engineers hovered. Observers held their breath. It worked

just fine.

"It's technically successful and now it's up to NT&E to make it a business success," said Draper. NT&E showcased its portable taper grinding system this spring at a trade show in Springfield, Mass. As a manufacturing solution that reduces downtime from two weeks to four hours, there was a great deal of interest, according to Draper, and NTE is now building a second unit to keep up with the demand for their on-site services.

"The IRC helped us bring this from the drawing board to field testing," said Sletten. "Once we complete the research and development phase, NT&E will introduce a new product that has applications worldwide."

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