

Triple Tap Life

A maker of vehicle components finds that a treatment process for taps produces dramatically longer tool life.

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The Team Industries production facility in Audubon, Minnesota, recently tripled the tool life for taps it uses to machine a cast iron hydraulic motor housing. Team is a manufacturer of chassis and power-train components for off-road and utility vehicles. With 11 tapped holes and an annual volume of 350,000 units, this one part number for the company accounts for nearly 4 million tapped holes per year. The improvement in tap life is significant.

That improvement also directly determines how much the company pays to achieve it. The Team Industries plant sends the taps out for treatment in a third-party process. That process is priced at 40 percent of the customer's resulting savings in tap expenditures, whatever those savings prove to be.

Better Than New is the Chattanooga, Tennessee company that provides this treatment. The treatment process is called "RF85," after an Oak Ridge National Laboratory test that documented an 85-percent reduction in friction. Previously, the treatment had been applied to surgical hand tools and to race-car components, but had seen little application in machining. Team Industries engineering manager Mike Selck learned about the process simply because the son of Better Than New's founder worked for a sister company to Team. He decided to submit some 5/16–24 taps for treatment.

He says, "When I got the tools back, I had to call to make sure the work had been done." The treatment does nothing to change the tool's appearance.

But it does change the composition of the tool's surface—and in this way it changes the tool's performance. Taps at Team Industries that once lasted for 900 parts began to last for 2,700 parts instead. Now, the RF85 tap treatment is a standard part of the motor housing part's production, and will eventually be standard for other part numbers too. The savings in tap expenditures are not even the only major source of savings, says Mr. Selck. In his plant's process, the treatment comes close to paying for itself just in the greater in-cut time that results from having to change taps less frequently.

Not For Carbide

The RF85 treatment is confidential, but the company describes it as a bath that encourages the addition of calcium, among other elements, to the alloy of the tool. The treatment is not a coating. Indeed, the actual coating on the tool, such as the TiAlN on the taps sent by Team Industries, is unaffected.

The company says the treatment doesn't work well on carbide. It works much better for steel. Further, because it is a friction-reduction enhancement, it delivers the greatest value in applications that are high in friction. For these reasons, the ideal machining application seems to be tapping—a high-friction process that extensively uses HSS tools. Tapping has been the focus of Better Than New's attention to machining so far.

For many shops, that's plenty. Tapping can be trying. At Team Industries, tapping has been the operation that most slows down machining, while taps are the tools that typically have to be replaced most often. Giving a try to a previously unknown surface treatment process was not difficult for Mr. Selck, because he had seen the plant try seemingly every other established solution in search of more affordable thread machining. The taps the plant currently buys—the ones it sends to Better Than New—represent the best value the shop has found after evaluating the relative price and performance of many different tools. Now, the plant buys fewer of those taps, paying 40 cents on the dollar instead.

Speed Needed

Mr. Selck says he has noticed that speed is significant. The treated taps are used on three VMCs and one HMC, and they realize the factor-three improvement on all four machines. But there is also a spillover tapping machine in the facility—a manual multi-spindle drill press with much lower spindle speed. Tap life improvement when the treated tools are used on this machine is not as great. Plant personnel assume the spindle speed difference explains why.

Accordingly, Mr. Selck hopes to turn up the speed on tapping. That will come next, he says. In addition to measuring how much tool life the shop can obtain at more aggressive tapping conditions, he also plans to apply the treated taps to other machined parts. One of these is a new part number coming from the same customer that receives the motor housings—a part that is likely to feature just as many tapped holes.