

Milling Tool Eliminates Need for Additional Equipment

New Cutting Tool Saves Truck Shaft Maker Time, Fixtures & The Cost Of A Second Machining Center

OWOSSO, Mich., July 2014 - Among the automotive parts they manufacture, Machine Tool & Gear pumps out over 112,000 truck shafts each year from its 70,000 square foot facility in Owosso, Michigan. These shafts are produced in a work cell built around a Mori-Seiki NH 4000 horizontal machining center. Recently a design change to one of the shafts created a challenge for MT&G Manufacturing Engineer Jeff Ochodnicky.

“The new shaft design includes flat areas to be machined that are 90° from the other operations, so they’re not easily accessible. The obvious solution is to use another machine to mill the flats, but that’s a major expense we wanted to avoid. Additionally, if we were to purchase another machine we would have to locate it elsewhere in the plant, because there is no room within the existing work cell, and reconfiguring the cell would be a major undertaking. So adding a second machine for this operation would involve taking the part out of the current cell, moving it to the new machine’s location, and installing new fixturing. When I added up the machine and fixture expenses, plus machine downtime, the additional labor costs to move set up and run the program, I was determined to find a better solution.”



“We decided to use 2, 90° milling heads to machine the flats instead. However we ran into a number of problems with the tool inserts, including excessive tool wear and unacceptable surface finish. Working with the insert supplier we tried different depths of cut, various inserts, spindle speeds and feed rates without success. Finally I called Phil Horn from local distributor PF Markey and asked for his help. He brought in Brett Kischnick, an Application/Sales Engineer from Horn USA.”



According to Kischnick, “The challenge was to mill a 1.500” long flat, .060” deep on a shaft using a .854” diameter cutter hanging more than 10” out of the spindle. Not an easy task, but one I felt we could accomplish with the right tool.



The cutter MT&G was attempting to use was a staggered flute design that caused pushing and pulling during the cut. After careful analysis it was clear that we should try a Mini Mill insert from Horn USA that would apply all cutting forces downward and free up the cut, utilizing a positive axial helix.”

“Since achieving a 30 micro surface finish without an additional step between 2 passes was a critical issue for this process, the next challenge was to eliminate even more cutting pressure by reducing the teeth in cut from 6 down to three, increasing the SFM, and making a rough cut first, leaving .002” for a finish pass. We also moved the finish pass away from the .060 tall side wall left from the rough pass. Because multi-directional tool pressure causes a poor surface finish, relieving the side pressure by just a few thousandths of an inch frees up the cut, which provides a better finish. These adjustments produced a 15 – 20 mico finish without adding a step between passes.”

“Brett kept fine-tuning until we achieved the goal” – Jeff Ochodnicky

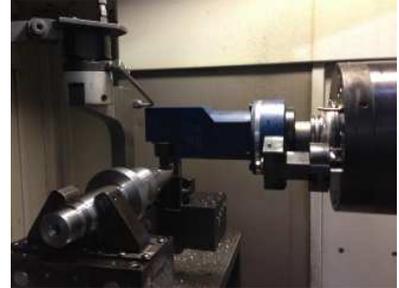
Production Series



Final running parameters:

- SFM =715
- DOC =.058 Rough & .002 Finish
- IPT = .004 Rough & .002 Finish

“I believed in the 90° milling head approach, but I must admit I was beginning to question myself until Brett showed up,” Ochodnický says. “It took a while to dial it in, but Brett kept fine-tuning until we achieved the goal. I’d never worked with Horn USA before, but I was very impressed with their knowledge and how they took the time to help solve the problem. As a result we’ve saved the expense of buying another machine tool and kept additional labor costs out of our process.”



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