

Making every minute count adds up to a \$12,000 savings: Dayton Forging & Heat Treating already knew the "rough," what it needed

Modern Applications News - Nov, 2006

"Bellying up to the bar," for Dayton Forging & Heat Treating, Dayton, OH, means making 1" width cuts in a steel bar 10' long and 28" in diameter. The company needed to increase efficiency in its lathe operations. That meant cutting an entire bar in just one pass.

Using conventional three- or four-jaw manual chucks, machinists had to pull bar stock from the lathe and flip it to machine the other end. The operation took 30 minutes out of the production cycle, making lost time expensive.

Dayton Forging needed a method of cutting long bar stock in one pass, Eric Wilson, vice president of the company, said.

"In our shop, we have one operator running two lathes. On one lathe, the operator spends most of his time tending the equipment as the part is machined," he said. "The second lathe is a straight bar run. The machinist sets a bar and starts the cut. The cut is very long, so the machinist concentrates on the first lathe's operation."

Chucking It All Away

In previous operations, machinists could only cut up to the chuck's jaw area. Then, the machinists flipped the bar and cut the remainder. That's where the 30 minutes was lost.

By switching to a Neidlein FSB 75 face driver from LMC Workholding, Logansport, IN, Dayton Forging now cuts the part in one pass. The machinist loads the bar, sets the cut, and lets it run. The machinist then spends time where needed.

Dayton Forging & Heat Treating is a job shop that also does commercial heat treating and forging. It stocks forged and rough-turned bars in common carbon and alloy grades. The company produces about 12 million pounds of forgings per year. It does saw cutting, machining, drilling, and heat treating of cut slices.

Turnaround times on slices range from same day to five days depending on part specifications and requirements. Dayton Forging's machining capacity includes more than 24 lathes and the capacity for processing large forgings up to 25' long.

With the new face driver, the company saves time getting a crane to the lathe, hooking up the bar, pulling it out, flipping it around, repositioning the bar in the lathe, checking the bar's straightness, and making the cut.

"A machinist had to set up an indicator, adjust the bar straightness to within a couple thousandths of an inch, and then run it," Wilson said. That meant manually adjusting and tightening each jaw of a four-jaw chuck.

"We turn about 500 bars a year, with half of them on the face driver lathe," Wilson said. "That's 250 bars. At 30 minutes per bar, we were losing roughly 125 hours per year."

The new face driver increases machinist's productivity, allowing the spindle to run for that 125 hours because the piece can be turned from end-to-end without pause.

"That saves us about \$12,000 a year in hourly costs," Wilson said.

Flats And Peaks

While Wilson and his company appreciate three-jaw chucks for some applications, "when we're turning a rough forging, a three-jaw chuck won't work, because there are small flats and peaks on the part that won't let the chuck properly grip the bar," he said. "Also we only can turn as much as we're gripping. So the more surface area we can cut, the better it is for production."

The Neidlein face driver is mounted on a 75-hp American Lathe. It can cut up to a 28" diameter part depending on where the feed and speed rates are set.

The company tries to avoid interrupted cuts when possible. It tries to make the roughing pass in one cut to avoid wear and tear on tooling coming in and out of the cut. Also, scale is hard, abrasive, and tough on the tooling.

"If we have to, we'll run an interrupted cut," Wilson said. The tooling can cope with that.

"But we'd prefer to hog the metal all off using one pass. We use a 1.5" tool cutter that allows us to take up to two inches off in a pass. Of course when we're talking about that big of a chip, we have to slow down to handle it," he said.

The difference between setting up the part using a chuck versus a face driver is minimal, Wilson said. For Dayton Forging & Heat Treating, it's a matter of making sure it has the right torque on the tail stock to load up the face driver and not overload it.

Face drive set up is quick because the operator doesn't have individual jaws to worry about.

"The tail-stock pressure is critical," Wilson said. "That's only one wheel versus four jaws."

No Squares

"Some of our cuts are not perfectly square. I don't know any large bars that are square," he said. "The stock face may be a couple of degrees out of square and the face driver can adjust for some of these irregularities. Absolute squareness has not been a problem. The benefit of this self-correcting compensation feature means that the machinist doesn't need a perfectly flat or faced part. A bandsaw cut is close enough."

"We're committed to a second face driver," Wilson said. "But, we're having Neidlein and LMC Workholding look at building a larger one for us."

"The larger face driver is more specialized than their current one, because it will have a dual-drive diameter on it," Brandon Morris, LMC Workholding, said. "It will have a bigger drive diameter for a greater range, and will be able to handle bars from 8" to 34". There will be 12 drive pins in it, but the machinist will only use one set of drive pins at a time for the bar diameter being turned."

More Bite

Dayton Forging is hard on drive pins. It uses double-chiseled pins instead of single-chiseled pins for better gripping strength and heavier cuts. The double-chisel pins provide more surface area into which to bite.

Mechanical face drivers generally allow turning applications to achieve increased flexibility through lower cycle times, turn both the small and large parts, and allow interrupted and heavy cuts.

Examples of parts cut using face drivers include automotive transmission parts, crankshafts, cam shafts, pinion gears, electric motor shafts, and axles up to 36" in diameter.

Dayton Forging & Heat Treating only does rough turning because its customers do the finish turning. Dayton customers make the cut bar-stock slices into a variety of products, including gears. Dayton produces semi-finished rolls, working with 1/16" tolerances for length and diameter. The company stocks steel bars and machines 1022, 1045, 1055, 4140, 4150, 4320, 8620, and 4340 grade steel. They stock bars from 12" to about 34" in diameter and usually 10' to 15' long random lengths.

"As long as the payback is there, Dayton Forging & Heat Treating will continue to use LMC Neidlein Face Drivers," Wilson said. LMC Workholding