

# File Under 'Productivity'

Multitasking machine helps manufacturer meet demands of changing market.

**D**atum Filing Systems Inc. consumes a lot of steel—about 20 tons daily. Most of it is sheet metal, which the company uses to manufacture filing and storage products.

The majority of the manufacturing processes the Emigsville, Pa., company performs involve forming. However, the amount of cutting it does is on the rise.

“Machining isn’t a big volume for us, but it is getting bigger every week,” said Datum’s machine shop manager, Doug Schreiner. One reason is the growing demand for mobile filing systems, which incorporate machined roller and drive components.

To help it meet the market’s demand for mobile, compact and secure filing systems, Datum recently acquired a CNC lathe with multitasking capabilities. The company has found that, compared to how it processed parts previously, the machine reduces handling time, speeds changeovers and is efficient for high- and low-volume part runs.

## On a Roll

Datum’s MobileTrak5 system has movable carriages that roll on four, or more, 4<sup>7</sup>/<sub>16</sub>"-dia., 1.625"-wide steel wheels riding on 1"-wide steel tracks. A series of chains, shafts and reduction gears are used for larger filing systems.

Initially, Datum contracted a local job shop to produce the wheels. But as



Datum Filing Systems uses a Haas SL-20 CNC lathe with live tooling and a C-axis drive to machine connector “donuts” and chain-tensioner components (inset).

volume rose beyond that shop’s capability, Datum decided to bring the task in-house. It bought a Haas SL-20 CNC lathe to do the work.

The machine has a maximum turning capacity of 10.3"×20", bar-diameter capacity of 2", 10-tool turret and 4,000-rpm, 20-hp spindle. To facilitate multitasking, Datum specified the live-tooling option, which includes a C-axis drive and 3,000-rpm, 5-hp spindle.

Schreiner said 60 percent of the lathe’s running time is devoted to producing steel wheels—about 500 every 2 weeks. The shop cuts 12L14 and

1215 steel, as well as some stress-proof 1144 steel.

“I try to stay away from 1018 because it’s hard to machine, from a surface finish point of view, even with carbide tooling,” Schreiner said.

Datum machines single-flange wheels, center wheels without flanges and, for larger carriages, double-flange wheels. These are further divided into idler, or manual, wheels and driven wheels.

The manual wheels are turned and then a 1<sup>1</sup>/<sub>2</sub>"-dia. hole is drilled in them to accommodate a bearing. After the

driven wheels are turned, Datum drills and bores a 3/4"-dia. hole. Later, a key-way is broached into them. Lathe time is 4 minutes per manual wheel and 3 minutes per driven wheel.

Each wheel begins as a 1.7"-thick blank cut from a 5"-dia. round bar. Datum machinists remove 0.75" of stock to achieve the specified 1.625" width. The blank is chucked in the lathe then faced and turned with CNMG-432 coated carbide inserts and dogbone-style, ball-end N12362-0400-RM profiling inserts. (Most of the shop's indexable tooling is from Sandvik Coromant Co.) Schreiner said he could machine the profile more aggressively with a diamond-style insert,



The lathe's 10-tool turret (above) is fitted with drills for axial (upper right) and radial drilling of steel wheels for filing cabinets.



Steel wheels await installation in movable filing systems.

but the tool tip would not cut the narrow 12° angle of the 0.118"-thick flange.

The bar is turned to 4.968", to true the stock, after which it is turned around in the chuck and machined to the 4/16" diameter of the wheel that rides on the rail.

In addition to wheels, Datum takes advantage of the SL-20's multitasking capabilities when producing small, complex components for the carriage drive mechanism. The parts include two styles of chain tensioners. One is made from hex stock that is turned and threaded, and the other is turned from round stock, has wrench flats milled on

one end and is also threaded. A full-form threading insert cuts the threads, and milling of the flats is done with a 3/4"-dia., insert-style endmill fitted in the live-tooling head.

Another multitasked-machined component, called a "donut," is a connector that mounts to a crank disk used to

move the carriage. The part is made from a 3/4"-thick section of 2"-dia. steel bar stock. A 3/4"-dia. center-hole is surrounded by three 4.1mm bolt holes.

The part also has three holes that are drilled radially. Two of these are the same diameter, 0.189", and accommodate a 3/16"-dia. spring pin. The third

### Downsized offices, privacy issues affect cabinet designs

You probably think that the move to the "paperless office" is rendering products such as filing cabinets passé. Well, you would be wrong.

Due to changes in data-management practices, cost-reduction efforts and laws regarding privacy, the market for specialized, secure filing and storage systems is growing. Datum Filing Systems has benefited from the growth. The company has been manufacturing filing and storage products, as well as office furniture, for more than 35 years.

Begun in 1968 as the Desk Top Filing Co., Datum outgrew its Farmingdale, N.Y., facility in 1992 and relocated to Pennsylvania. In 2001, in response to rising sales and the addition of new product lines, the company tripled the size of its manufacturing facility to 120,000 sq. ft.

Datum's products reflect the changing nature of business. The companies it serves are cutting costs by shrinking the size of their offices and staffs.

Datum has responded by designing and manufacturing space-saving filing cabinets. An example is a track-mounted

model that eliminates the need for aisles between cabinets. And, the company recently shipped three of its new Ez2 units to the White House. They feature shelving units that spin within a locking cabinet, giving the user access to twice the files in half the space.

In addition to space and cost concerns, laws relating to privacy are forcing businesses to replace open shelves with secure filing systems. The Health Insurance Portability and Accountability Act of 1996 mandates that hospitals and other health-care providers prevent inappropriate access to protected health information. Previously, a locked file room was considered sufficient security for patient records. Under HIPAA, though, each storage unit must be lockable. Datum offers a range of filing products that can be locked.

"We adapt and continually update with new products and don't try to live on the same thing we've done for 30 years," said Datum's machine shop manager, Doug Schreiner.

—B. Kennedy

## Well-formed operation

**D**atum Filing Systems' sheet metal shop operates three shifts daily. It has separate departments for punching, bending and welding, painting, assembly and shipping.

Many of the machines are grouped in cells, allowing one or two operators to produce complete components with minimal workhandling. A robotic cell is used to produce high-volume runs of parts.

Datum's advanced metalforming equipment includes a Salvagnini S-4 CNC turret punch press, which can process up to 10 tons of 5'x10'x $\frac{1}{8}$ " steel sheet a day. The machine's software enables it to maximize usage of each plate, boasting an average efficiency rating of 93 percent. Some of the plant's presses achieve bending tolerances as fine as  $\pm 0.001$ " and  $\pm \frac{1}{4}^\circ$ .

Datum's machine shop includes a Haas SL-20 CNC lathe, a Chevalier Bridgeport-type mill with a 3-axis CNC Anilam control, a manual Bridgeport mill, drill presses, a cutoff saw and two surface grinders.

The machine shop normally runs one shift a day.

—B. Kennedy

hole is 0.200" in diameter; it is tapped offline and accepts a  $\frac{1}{4}$ -20 setscrew. Schreiner said he makes the radial holes with screw-machine-length drills because of their rigidity.

The inserted drill that produces the  $\frac{3}{4}$ "-dia. hole in the donut is 0.687" in diameter. It is run into the part axially, off center, to create a 0.735"-dia. hole. The holder geometry and CNC program enable the peripheral insert to bore the hole to a diameter of 0.750" and chamfer the hole edge as the tool withdraws. When these operations are completed, the donut is parted off. It takes 2.5 min-

utes to machine each piece.

Without the multitasking capability, the part would have to be centrally drilled and bored to size on the lathe, then cut off. Next, the three bolt holes and the radial holes would have to be drilled on Datum's CNC mill. These operations would require a minimum of two fixturings.

Schreiner said machining the donut the traditional way "would take three times as long—easy."

### JIT Changeovers

Five years ago, Datum kept sizable inventories of completed components. Now, Schreiner said, "we stock very few day-to-day parts. The way things have changed, nearly everything we do is just in time."

The wheels take a relatively long time to machine, so they are, to an extent, run for stock. However, Schreiner said, "I'm not making a stockpile that's going to last 6 months. We forecast how many we are going to use in a certain amount of time. We run relatively lean."

The lean approach necessitates quick changeovers between parts, which is key to meeting JIT schedules. Programs are stored on the lathe, so switching from machining one style of wheel to another consumes less than a minute.

Changeovers from machining wheels to one of the smaller parts takes less than an hour, partly because Datum leaves certain tools in the turret at all times.

Typically, turning, facing and parting tools are always in the turret, said machinist Kevin Behne, adding that "there may be a profile-type cutter in it, too." Tools removed from the machine usually are left in their holders.

"We don't like to tear all the tools down," Schreiner said. "We'll leave them set up and with the setup sheet. That allows the operator to get his off-



Machinist Kevin Behne (left) and machine shop manager Doug Schreiner discuss the machining of a connector component.

sets to within 0.005" to 0.010" off the first piece. (Datum normally holds tolerances of  $\pm 0.002$ " on machined components.) After a couple of adjustments, he's up and running that part."

Schreiner voiced just one regret about the multitask machine: "I've wished sometimes that we had bought a bigger machine. Twenty horsepower with a  $\frac{1}{2}$ " drill is not enough. At 90 percent spindle load, I'm only going about half the speed possible."

Nevertheless, he and the rest of the Datum machine shop file their new multitasking machine under "productivity enhancement."

### The following companies contributed to this report:

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