

Make Your Own Replacement Parts

If you've always wanted to equip your farm shop with metal-working tools but didn't think you could justify the cost, think again.

For this exclusive FARM SHOW report, we tracked down farmers who make their own metal replacement parts using just-introduced mini-machine tools.

Some of the tools are combo machines that handle the job of lathe, mill and drill press all in one. Or you can buy tools individually for \$300 to \$1,000 each. For openers, a mini-lathe may be the best tool to buy first, experienced metal workers told us. Several farmers we talked to chose to make their own metal-working tools.

A typical mini-lathe can handle a chunk of metal up to about 6 in. in diameter and 1 to 1 1/2-ft. long, big enough for most on-farm repair jobs. If you want something to handle bigger jobs, farmers we contacted suggest scouring the market for used industrial-size machine tools. You can often find very good tools cheap, especially since many factories and machine shops are going to higher-tech computer-controlled tools. Known as "CNC" machines, they use a computer to precisely control tooling and can be used to turn out one perfect part after another.

Combo machine tools sell for \$700 and up. These smaller metal-working machines boast features found on big industrial machines, including power feed, quick-change tool holders, etc.

Here's more of what we learned from our visit with farmers already experienced in farm shop do-it-yourself metal working:

Robert Geer Jr., Ledyard, Conn.: He bought a Shop Task combo machine tool. He's used it on a number of farm projects, including a rock rake made out of old baler parts which was featured in the last issue of FARM SHOW (Vol. 24, No. 5).

"My 3-in-1 machine was made in China," he says. "I've used it for a lot of different projects. For the rock rake, I turned down the shaft on the gearbox with the lathe and recut a keyway with the milling machine. I also used it to mill out the pipe to mount bearings on the rake.

"I got this machine tool at a good price and it works fine. If I were buying one again, though, I'd probably spend a little more money and buy a Smithy. This one is very close to a Smithy in a lot of ways, but it's kind of primitive, too. From what I've seen, a Smithy is closer to a Bridgeport (industrial milling machine) in accuracy. For most farm shop jobs, though, my 3-in-1 is fine," he says.

Matt MacGuire, Galesburg, Ill.: Matt's a professional metalworker and world class welder who's the owner of several thousand dollars worth of metalworking tools and equipment. He has a big shop where he does machine work for select customers. He also studies new equipment and writes technical papers in his role as a consultant.

He owns machine shop quality tools for his own use, but he's worked with less expensive machines, too.

"Those small imported machines aren't anywhere near as good as used American machine tools from the 1950's, which you can pick up used. But they'll do the job in most farm shops," he says.

"Industrial-built U.S. machine tools were built to run three shifts a day for seven years — 36,000 hours — without a failure. If you can find equipment like that in good used condition, buy it. New machine tools coming in from Taiwan are not getting high marks



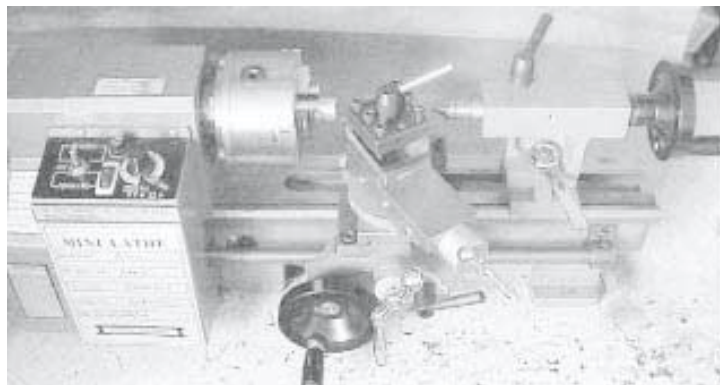
MacGuire resplined the steering gear from his Case 195 on his benchtop mill.

from farmer owners, even though. They're affordable, readily available, and relatively easy to operate," he says.

As an example of what can be done, MacGuire recently used his metal-working tools to rebuild a vintage Case 195 garden tractor he bought for his father. The front axle was cracked, the axle kingpin was badly worn, and the kingpin hole in the axle, which pivots on the tractor frame, was worn to an oval. He brazed and smoothed the crack. Then he built up the worn hole, adding steel to it by welding. After that, he milled it back round, but larger than original so that he could insert a teflon lined automotive bushing in it. Finally, he made a new kingpin from a piece of hardened steel shaft he found in a friend's steel rack.

MacGuire also rebuilt the engine on the tractor and reworked the steering column bushings and other miscellaneous components. Photos and details of the job can be seen at http://www.metalworking.com/dropbox/_2000_retired_files/.

MacGuire has some advice for anyone who's considering buying a shop full of machine tools to do commercial work. "If you're really going to make it a business, make sure there's room for you in the area. If you start taking business away from another machine shop in town, you may end



One of Harbor Freight's mini metal-working lathes.

up in a race to the bottom. If there's not enough business for two shops, if you can both do the same quality work, it will become a contest to see who will work the longest hours for the least money."

Ray Scott, Hoagland, Ind.: When it comes to machine tools for a farm shop, Scott agrees that the new mini tools are a great place to start.

"If you're a farmer who's looking to make an occasional repair, these small machines are probably just what you need," he says.

Scott is a professional machinist with a home shop where he does a lot of repair work for family and friends, nearly all of whom are farmers. "Cutting or recutting keyways is the most frequent repair I do in my shop with machine tools. You don't need an expensive machine for that," he notes.

Most of Scott's machine tools are full-size and were purchased used or picked up as salvage and later repaired.

Scott has three metal lathes, a Bridgeport vertical mill, a Milwaukee horizontal mill, an old horizontal shaper (which he says is rarely used), a surface grinder, a couple of band saws, electric and gas welders, cutting accessories, and miscellaneous tools.

Scott doesn't own a drill press. "I use the vertical mill as a drill press. Once you've used one of those, you'll throw your drill press away," he maintains.

As far as he's concerned, he's got just about everything he needs for do-it-yourself metal work. "One thing I don't have is the capability to cut metric threads," he says. "I'd have to buy the gears for my thread cutting tools to do that and I just haven't done it."

Scott warns against buying too many machine tools for a farm workshop. "If you think you're going to save a lot of money making all of your replacement parts you might be disappointed," he says. "Many times you can buy parts for newer equipment a lot cheaper off the shelf than you can make them. However, if you need a part that's no longer on the market — such as for a restoration project — that's a different story."

Charlie Foster, Sacramento, Calif.: He has several small metal lathes that he uses for a variety of shop projects, including scale model cannons.

His biggest lathe is a 10-in. Sampson, which he says is a little difficult to set up and use. Even so, it gets the job done. In addition, Foster has a couple of smaller ones, including a 3-in. Unimat that he uses mostly for small plastic work.

He's turned and bored at least eight cannons, including a 13-in. long 1/6-scale Civil War replica, made of brass. Another



Charlie Foster makes mini cannons on his benchtop machines.

Civil War model is 11 in. long.

One of his most ambitious projects was cutting down a section of steel shaft taken from a 17,000 hp electric motor. The steel was so hard his normal carbide cutters wouldn't work. "I sent off for some super hardened C-6 carbide cutters and they did the job," he says.

All of the cannons Foster has made are working models. "When I fire the big Civil War model, it sets off car alarms all around the neighborhood," he says. The smallest of his cannons shoot a ball about the size of a pea.

Foster grew up on a farm in Illinois. He says smaller metal lathes are just the right size for the type of machining that most farmers would have the time to do themselves. He also believes metalworking is a great skill to teach children.

"The small lathes are an ideal size for classrooms," he says. "They can be used to make toys, pens, punches, and a lot of other things that need only simple turning."

Another advantage of a metalworking lathe, Foster points out, is that it can be used to work wood, too. "A mini-lathe will cost around \$300. A good woodworking lathe will run almost that much, so it makes sense to me to spend the money on a mini-lathe."

And once you have a mini-lathe, you can make yourself a bigger lathe by investing a little ingenuity and time. "A lathe is the only tool that can make itself," Foster notes.

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The Difference Between A Lathe And A Mill

In case you're not familiar with them, here's the difference between a metal lathe and a mill:

A lathe shapes round or cylindrical parts (hubs, shafts, etc.). You can use a lathe to make axles or shafts, cut threads, smooth brake drums or rotors, etc.

A milling machine, on the other hand, removes material from any surface, either horizontally or vertically, but not cylindrically. It's used to cut keyways into shafts, cut holes, smooth surfaces, etc.