



Building a Giant BAND SAW MILL

Meeting the demand for natural-edge, wide-slab furniture for tables and countertops can push sawmills to the limit. Big chain saws with 60-inch bars are the go-to machine for sawyers on a limited budget, but they are slow, leave a rough surface, and the wide kerf turns a lot of valuable wood into sawdust. Some sawyers resort to quartering big logs lengthwise with a chain saw, milling the log a quarter at a time on a band mill, and keeping track of the pieces so the wide slabs can be reconstructed after drying.

To mill lumber for his furniture shop, Matt Cremona of Brooklyn Center, Minnesota, started out with a Panther chain saw mill and a Stihl 460 with a 42-inch bar. “Then I came into several large logs—36-inch to 60-inch diameter,” he recalled. “I looked at large band saws and found there wasn’t a whole lot of information on building them.” Rather than being discouraged, Matt saw an opportunity. “I thought it would be a good venture to build my own and make it a successful business, so I wound up building this giant band saw mill instead of using a chain saw mill.”

“I hadn’t done much mechanical work, and this was my second welding project,” Matt recalled. “I’d never built anything of this scale. It was a whole new learning experience. I started mid-August, and it was running by mid-December.” Matt made CAD drawings of all parts and carefully documented the process. “Thinking it through, designing it, building it, shooting and editing the video, and working up the



Above: Matt shows some of the slabs cut on his mill. They will go into a vacuum kiln when space becomes available; then he will surface them with a router. Bottom: Matt installs the chain drive system for raising and lowering the sawhead.

plans... now that I think about it, that was a major project in itself," he continued. "The whole process is a lot different when you're using a camera. It took more than three times as long to build it." A woodworker at heart, Matt had no desire to build and market sawmills, though he hoped to be able to market plans for others. "I know of 6 that have been completed, and there are several others that are in various stages of construction," he said. "So far, the feedback is that it works great. It's a no-nonsense saw. You spend the money up-front for good-quality parts and build it right, and you won't have all the problems that most people have with band saws."



A trailer with a pivoting arch on a winch make picking up this huge ash log a piece of cake.

What you will have is a 2-ton behemoth, with a 77-inch-wide cutting capacity (to cut a 6-foot-diameter log with a little "wobble room"). "The cost and quality of the mill depend on the skill and resourcefulness of the builder," Matt noted. He estimates that his mill cost roughly \$15,000 in materials, using all new steel. "A person who is good at scrounging could build it for considerably less," he added. While it takes a lot of precision cutting and fitting, he has built a number of adjustments into the design. "If you can't make it perfect, at least make it adjustable," he laughed. "It only took about four hours to true the wheels, set the guides, and level the head. It went a lot quicker than I thought it would."

Since the mill is too large to be easily portable, Matt designed it to use a 10-hp, 3-phase motor. "I run the motor off a VFD (variable frequency drive) phase converter," he explained. "That allows for a soft start and electric braking, which is important since without electric braking, that thing spins for at least 2 minutes after you shut it off!" In order to have an adequate throat clearance for quartersawing the slabs, Matt's mill uses 30-inch-diameter band wheels and a 25-foot-10-inch-long by 1-1/2-inch-wide blade. "A lot of the sawmill parts, including the band wheels, guides, idler shaft, and blade are available on-line from Cook's Sawmills," he noted.

To keep the machine as simple as possible, the only power assist on the mill is setting the head rig height. A hand-cranked winch powers the carriage feed, allowing Matt to walk alongside the mill to keep an eye on the cut and occasionally spray lubricant on the blade. Since the mill lacks hydraulics, Matt has come up with a number of innovative techniques, using a winch and skid plates to pull 5,000-pound logs off his trailer directly onto the mill, a farm jack to adjust the position of the logs, and, in many cases, muscle offload the massive slabs. It might take Matt the better part of a day to mill a single log, but the value of the slabs fresh off the mill may be several thousand dollars, and more than double that after kiln drying and surfacing. To save drying time, Matt sends the slabs to a friend who has a vacuum kiln, then surfaces the slabs with a router.



Above: Milling a big maple log on the mill. The 30-inch band wheels allow a throat for up to an 18-inch depth of cut. Right: Even the six-foot capacity of Matt's sawmill gets pushed to the limit cutting slabs like this one. The machine is designed to allow Matt to mill logs no other local mill can handle. His ships his slabs to woodworkers all over North America.





Having a little fun while testing the adjustable-blade guide rails. Can you do this on your sawmill?

Spinning up the blade of a sawmill for the first time always has its moment of suspense. Is it likely that Murphy's Law will kick in and throw the blade off the band wheels? Is everything properly tensioned, aligned, and reinforced to handle the stress? "I spent a lot of time building a mill that I hoped would actually work when it was finished," Matt recalled. "It did. It was absolutely flawless." Now, after having cut an estimated 20,000 board feet of lumber, he says he has made no adjustments or calibrations.

Matt's primary source of logs is "urban logging" and local tree services. He is on a first-name basis with arborists, city foresters, and land developers. He also checks Craigslist on a regular basis for trees and logs that landowners want removed. Silver maple is one of the bigger species, but he has slabbed white oak, red oak, cherry, and walnut. "We've got a lot of big trees up here," he observed. While many of the logs are free for the taking, they are not without challenges. Many are large diameter but have short stems and a variety of defects.

"Big and full of character," as Matt puts it. "Hardware is part of the game," he added (for an entertaining example, check out his YouTube video *The Most Steel I've Ever Cut Through*). "One thing that works in my favor is that these logs are too big for firewood. One log I picked up recently was from a street-widening project. No one had a chain saw big enough to cut it for firewood."

Loading up a 4-ton log and hauling it to the mill is a routine job for Matt. His homemade log loader is a steel arch that pivots over the back of a flatbed trailer. With the aid of an electric winch, he pivots the arch to lift one end of the log onto the back of the trailer, then reattaches the winch line to lift the other end of the log and slide it forward. His YouTube video of the process makes it look effortless. Plans for the log loader are also available.

Matt considers social media—a website and an active presence on Facebook and YouTube—to be an important part of his overall operation. "It's a full-time job," he noted. A majority of his sales are out of state, with most slabs being shipped to Ohio, California, and Texas. "Walnut sells well, but the logs are hard to get," he noted. "Everybody wants it."

APRIL WILKERSON

April Wilkerson of Texas Hills, Texas, decided to build a mill based on Matt's design for her wood-working business. "For a while now, I've been wanting to sell slabs to the general public," she explained. "We get a lot of mesquite and oak, pecan, cedar, hickory, elm, and some ash. Matt is a good friend and we decided it would be an awesome project to build." Her goal was to build the mill in just five days. April ordered 3,000 pounds of structural steel and spent two weeks cutting and drilling parts according to the plans. "Just the drilling and tapping holes took 2-1/2 days," she recalled. With everything ready for assembly, April, Matt, and a couple of friends (one a professional welder, and another an experienced steel fabricator) got down to business.

"I upgraded all of my bearings, my band wheels and my drive shaft, and guide rails, so some of the parts were a little different, and we had to work that out as we built it," April recalled. Progress came to a halt when the crew discovered that April had a "hoverboard" and everyone had to try it out with varying degrees of success. The



April and J.D. discuss the welds on her sawmill frame.

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crew ran into another snag when they discovered that the mill was about 2 inches too tall to fit through the shop doors. Removing the leveling feet gave them just a half-inch of clearance. Even with these delays, the team completed enough construction to cut the first slab just minutes before they had to leave for home.

April is pleased with the performance of the mill. “With the upgraded parts, it cost around \$16,000 for materials, but a prebuilt mill that size would have cost around \$75,000, and would not have been nearly as well built,” she noted.

Conclusion

Matt’s sawmill design is not for everyone, but it suits his needs. “My primary goal was to produce material that I wanted for my own projects, but a lot gets sold, too.”

When asked whether there were many changes between the prototype and the plans, Matt commented: “We just changed a few parts to streamline the build process but for the most part, it is exactly the same as the mill I built for myself.” Does he wish he had done anything differently? “Well,” he admitted, “I might have made it a little bigger. You really need that capacity for the crotches, and you can reach that width pretty easily. I haven’t run into anything too big for the mill so far, but I probably will, eventually.”

To learn more about the mill and see some of Matt’s other projects, check out his website at <https://www.mattcremona.com/>. ■



In just five days the team—(left to right) April Wilkerson, Johnny Brook, Matt Cremona, and J.D. Brewer—assembled the parts into a bare-bones working sawmill. April has since finished up the mill and now uses it to cut slabs for her wood business.

Dave Boyt has a BS degree in Forest Management and an MS in Wood Technology. He manages a tree farm (2006 Missouri Tree Farm of the Year), and operates a band saw sawmill.

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