

Linn Lumber Mill

If you've ever looked at band saw mills and thought you could save money by purchasing just the headrig and building your own track, you are not alone. The more mechanically inclined among us might even wish to just buy some of the specialized hardware and build the mill from a set of plans. Linn Lumber Mill offers these options and more.

Linn Lumber Mill's four models are available in any degree of completion—from sets of plans to kits to complete mills. The models range from the 160—capable of cutting up to 20-inch-diameter logs—to the 1900, which can handle logs up to a 36-inch diameter.

A Visit to the Factory

Linn Lumber Mill Company is located a few miles outside of Sweet Home, Oregon. Company owner Gary Boyd has designed and built sawmills since 1986. He took time out to discuss the mill and his ideas about building them.

"I've always been fascinated with sawmills," recalls Boyd.

"When I started out, I wanted to buy just the head and build the rest, but no one would sell me one. That's when I decided to start offering kits. It turned out I wasn't the only one who wanted to build from a kit!"

Boyd says he is always willing to work with customers who are building a mill from a kit or plans. "It takes the average person about 80 hours to build a mill from the kit. Some never call for advice while others have a question about every bolt hole." He continues, "I tell customers if they get stumped, just give me a call, and I'll walk them through it." Some of the builders modify the design to meet their needs and that's fine with



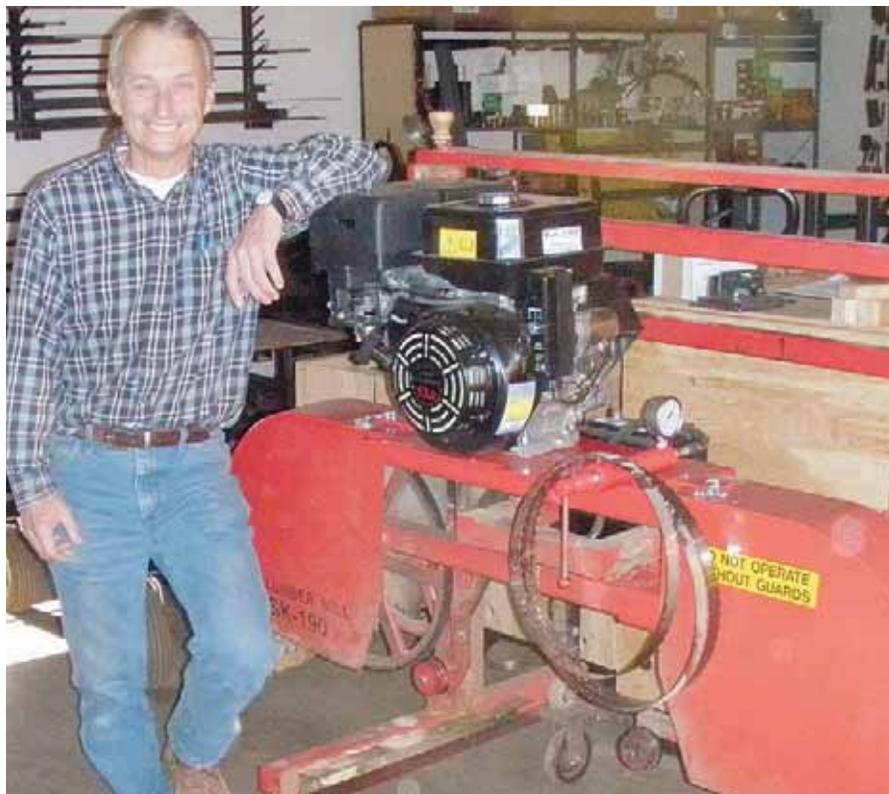
Using the spring-loaded clamp to hold the cant, the cleats are low enough to allow a final minimum cut thickness of 1 inch.

Gary. "A lot of them don't look exactly like I make 'em, but when you look at the guts, you can tell they're my design. We try to provide the building blocks."

Gary says he has built between 600 and 700 mills, but is not sure how many have been built from plans. He is currently backlogged by two months on the mills. His modest shop contains welding and machining equipment, jigs and fixtures, and half a dozen mills in varying stages of completion. His full-time employee, a welder, had gone hunting for the day. "I pretty much build as I get orders, but I never seem to get caught up." Alongside the shop is a mill he uses for demonstrations. He also lets local people bring logs and cut them on his mill. "Once they've cut a few of their own logs, they'll likely buy a mill." To encourage this, he applies the rental fee to the purchase price of a mill.

The Model 190A mill at Gary's shop can handle logs up to 16 feet 6 inches long, and 30 inches in diameter. He runs it with a single phase 7.5-hp electric motor. By his calculation that is equivalent to about an 18-hp gas engine, which he finds to be a good match to the

Gary Boyd takes a lot of pride in his work. This mill has been sent back for an upgrade. The wooden crates in the background contain components that are to be shipped to England.





The hand crank adjustment uses acme thread rods on both sides of the head rig and is geared for five revolutions per inch travel.



Pushing the blade through the wood requires only light pressure if the blade is sharp. The 7.5-hp, single-phase motor is the usual power source for this mill.

mill as it does not have the power loss of running a hydraulic pump.

The machine rests on the standard two, 10-foot sections of track. Gary sells additional track in 5-foot and 10-foot lengths, but the owner can, of course, fabricate track of any length from the plans. One thing missing was an axle so that the mill could be towed. "I don't want to be

responsible for the way people tow the mill down the highway," Gary explained. "The mill and track can be easily transported in the back of a pickup."

Under the "hood" the mill has a pair of 19-inch band wheels with tight-fitting V-belts. The largest (36-inch-diameter capacity) mill uses two V-belts to turn the band wheels.

All other models use a single belt. There is no need for an idler, since the blade stops when the sawyer idles the engine down. The blade-tensioning mechanism is a hand-cranked hydraulic piston with a gauge. Gary recommends the 1-1/4-inch Woodmaster "C" blade.

The carriage height adjustment on this mill is a hand crank geared to an acme threaded rod on each side. The gearing is set so that five rotations of the crank move the carriage up or down 1-inch. The blade height gauge measures the height of the blade above the bed with no allowance for kerf. Gary finds that he does not use it much once he starts cutting boards. "If you're cutting 1-1/2 thick boards, crank it 8 turns; 7-1/2 turns to get the 1-1/2, plus a half turn for the kerf. You don't have to look at the scale all that much."

The blade lube system is a one-gallon pressure sprayer that applies the lube directly onto the blade. The sawyer pumps up the pressure

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and gives an occasional spray on the blade as needed. Unless there is a problem with pitch buildup, however, Gary does not generally use it.

Blade guides turn on sealed bearings and have a backing collar. Since the saw guides push the blade down 1/4 inch to gain control, no bottom guide is needed. This allows for the last cut to be 1 inch. Although power feed is optional, Gary prefers pushing the mill by hand. One of the advantages of walking along with the blade is that the sawyer has a good feel for the way the blade is cutting and can adjust the cutting speed immediately whenever there is a problem. Gary described a customer who pushes the mill with one finger when the blade is new. "When he has to push with his hand, he knows that it's time to sharpen the blade."

For safety, the throttle control lever is located at the rear of the mill. The gas-powered mill has a centrifugal clutch which disengages when the engine is idling, and the motor on the electric mill stops when the throttle is not activated. Unfortunately, the carriage wheels have no brakes. If the mill is out of level, the carriage can roll down the track. This can be a problem if it happens while the sawyer is loading or turning a log.

Each cross brace on the mill has a pair of square tubing fittings for the clamps and stops. This allows easy clamping of logs as short as 30 inches long up to the full length of the mill. Clamps and stops of various heights are required, depending on the log. There is nothing to keep the sawyer from sawing into a clamp or log stop, but Gary assured me that "once you saw into one, you remember not to do it again." Clamps are spring loaded on a chain. While it requires some effort on the part of the sawyer to get tension on the spring, the clamps do hold the log securely.

Gary likes the simple approach to building mills. "We try not to make it complicated. There's nothing on the mill that you don't need.

We tell people that if they want a fast hydraulic mill there are a lot of mills out there like that."

While the mill can cut logs up to 30 inches in diameter and 16 feet long, there is still the issue of moving the logs. With no hydraulic log loader or turner, it is up to the

sawyer to find a way to handle the logs. "Most have a loader that they use to move and turn the logs," he told me.

A 20-minute drive brought me to the home of Shawn and Kathy Cook—owners of a Linn mill who had solved this very problem.



Shawn and Kathy Cook's Sawmill

Shawn Cook is a bridge contractor. His wife, Kathy, is a heavy equipment operator for the company. Their work has given them access to a great deal of salvage lumber. Old bridge timbers were used to make the base for their mill. They were also milling salvaged timbers into 2 x 8 lumber for a barn. When I arrived, they had an 11-foot-long cedar log on the mill, ready to slice. "This is a piece of cedar that came from a job," Shawn told me. Kathy added, "In Oregon we try to put logs to use instead of putting them in a landfill."

Shawn described their decision to purchase the Linn 1900A sawmill. "I wanted something that could handle a 30-inch-diameter, 26-foot-long log, because we have a lot of big timber on this place." He opted to purchase the headrig assembled, but built the track himself. "I shot it with a level, and everything was probably within 0.01," Shawn claims. Although he

hasn't encountered any serious problems in the two years he has run the mill, he has called Gary for advice from time to time. "Gary has always been helpful with advice on things like blades, adjustments, and small things like that."

Shawn chose to power his mill with a 10-hp, single-phase electric motor. "We talked about gas, but I don't like the noise. Plus, when we



Kathy has her board! She set this one aside to make a sign. Shawn cut the rest into 2 x 8s.

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Shawn sets the clamp. He says that the spring-loaded clamping system does a good job holding even the larger logs in place.

get to the end of the log, we can shut it off.” He also noted the lower operating cost of an electric mill. According to Shawn, 10 hp is plenty for even the 30-inch-diameter logs. “The only time I’ve had issues with it is when we try to force the blade through the log. For what I do, it’s not underpowered at all.” While Linn offers an electric

drive to raise and lower the carriage, the Cooks decided to purchase the less expensive hand crank, though Shawn is considering adding the power unit. “Sometimes, when I have to crank the carriage up 25 inches, I wish I had the electric crank. The nice part about the hand crank is that I can get it just where I want it.”

Shawn and Kathy discussed what they wanted from the cedar log. Kathy wanted a slab to engrave with “Cook’s Cabin” and hang in the entryway of their cabin. “We’ve got more ideas than we have time,” she said, laughing. Shawn decided to cut the rest into 2-inch decking for a barn he is building.

Shawn likes the spring-loaded clamps. “I just pull them as tight as I can and then release them. You won’t believe how well they hold.” Both the clamps and log stops come in sets of different lengths. The tall stops are beveled to provide a fence against which a log can be turned. He switches to the shorter stops once a log is squared. He cautions, “You’ve got to remember to put the stops down before you cut. One of them has a blade mark in it where I cut into it.”

It took Shawn 55 seconds to make the first cut, walking the mill down the log. Kathy pulled off the slab and set it aside—she had the wood for her sign. The rest of the

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SPECS

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Max length16 ft.
Extendable track5 ft. and
 10 ft. sections
Log bed material.....2 in. x 2 in.
 x 3/16 in.tubes
Frame materialwelded steel
Track3 in. angle iron
Band wheel diameter19 in.
Band wheel surfacetight-fitting belt
Band1-1/4 in. x 147 in.
Band tensioninghydraulic,
 with gauge
Carriage support material2 in. x 2 in.
 x 3/16 in. tube
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Lubricant tankpressurized
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Power (reviewed).....10-hp, 220V
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log and signaled to Kathy. She raised the bucket and smoothly turned the log against the stops.

When the log was finished, Shawn summarized his experience with the mill. "I like the machine and I like the way it works," he said. "We can just come home in the evening and saw up a few logs if we want to. It's a very basic machine. There are not a lot of parts to go wrong." "We might add an electric crank [for raising and lowering the carriage]," commented Kathy. "Other than that, I wouldn't change anything about it."

Would they recommend the mill for someone with similar cutting needs? "Absolutely," said Shawn, "especially for someone who has the means to load the log and roll it." ■

log would be Shawn's.

While Shawn and I talked about the sawmill, Kathy went to get the "log turner." In a few minutes a 312 Cat track hoe rumbled up to the mill. "One of the reasons we didn't

get a hydraulic mill was that we already had a way to load and turn the logs," Shawn yelled out over the din of the Cat's diesel engine. When the machine was in place, Shawn wrapped a nylon choker around the

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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