Dave Sager mounted a remote-controlled electric drive system on his bandsaw-type sawmill to make it run smoother and easier.

A 1/2 hp., 12-volt electric motor, geared down by a double sprocket drive, mounts on saw head frame. A second electric motor raises and lowers saw head.

"Small Changes" Improve Bandsaw

Dave Sager says his bandsaw-type sawmill is pretty standard except for several small changes he made that make it easier to use.

"I built the sawmill myself and the basic design is the same as many I've seen in FARM SHOW, except that I decided to put an electric drive on it," says Sager. "I have a remote control with forward and reverse and speed control for the drive. I can have the saw head barely moving while sawing. When it gets to the end, I can speed it up for return."

Sager designed the sawmill to cut 12-ft. boards with a throat large enough for a 22-in. log. He used 2 by 6-in. rectangular steel for the side rails and cross braces for the bed.

"I went with a $400, 15-hp. gas engine I had instead of the $2,200, 25-hp. engine people said I needed to buy," he says. "If the blade is sharp, the smaller engine has no problem driving it."

The drive makes the saw run smoother and easier. The saw head travels the length of the bed on spool wheels. They run on an angle iron edge mounted to the top of the side rails.

He mounted a 1/2 hp., 12-volt motor and a double sprocket drive on the saw head frame to drive a sprocket on a spool wheel. The double sprocket drive, with 1 large and 2 small sprockets, gears down the motor speed. Even greater control is provided by a circuit board wired to generate impulse current to the motor. It interrupts the steady drag that would otherwise burn out the motor and gives him variable speed.

"I adjust the cutting speed according to the bandsaw blade," says Sager. "It can take 2 min. to travel the length of the log more or less, depending on how sharp the blade is."

Sager picked up half a dozen, used, ½-hp. 12-volt motors for $100 and has put them to good use with the addition of the circuit boards**.** A second motor raises the head to start a new log.

"Instead of cranking it by hand, I can lift the head up 2 ft. in 10 sec. with the motor," says Sager. "It can be lowered with the motor, or I can drop it back down by pulling a pin."

Sager's modified log clamps alternate from either side rail and are easy to adjust. Each consists of a threaded rod with a hand crank on it. The rod is threaded through a nut welded to the inside lower edge of one side rail to a socket on the inside of the other side rail. A threaded bracket moves on the rod as the crank turns. A flat bar can slide up and down in the bracket until a set-screw type bolt with a turning knob locks it in place.

"The flat bar has a peg on the top that sticks out to either side," says Sager. "When a log is in position on the track to be sawn, I crank the rods until the bars with the pegs are tight against the log."

The clamps hold odd-shaped logs as well as straight ones. The flat bars can be set at any height on a new log and then adjusted downward as Sager removes material.

The clamps also work with another handy tool. If a log has excessive taper, Sager first raises one end with a scissors jack. He then locks it into place with the clamps.

"Raising the smaller end lets me take off the same amount of wood with each cut," explains Sager.

To make turning logs on the bed easier, Sager welded a bracket to a 4-ft. piece of 2 by 2-in. steel tubing with a 12-volt winch mounted to the top end. It can be raised about 4 ft. above the bed.

"When I want to turn a log, I raise the winch and put a half hitch on the log with a strap and roll it over," says Sager.

Since building the sawmill, Sager has cut up around 70 logs. He has a few changes in mind. Although he built the sawmill on a trailer, he finds he prefers a stationary setup. He also plans to add more clamps.

"I have 3 clamps on each side, but adding more would let me hold smaller logs," says Sager.

Contact: FARM SHOW Followup, David Sager, 15 Rosebush Rd., Stirling, Ont. Canada K0K 3E0 (ph 613 395-2173; david.sager@bell.net).

Two-wheeled, walk-behind tractor is operated by an electric motor from an old battery-powered floor scrubber.

Walk-Behind Tractor Converted To Electric

Converting a gas-powered, walk-behind, Planet Jr. BP-1 tractor to battery power was easy and low cost for Reid Allaway. He used an electric motor from an old battery-powered floor scrubber to replace the OEM 5 hp., 1-cycle gas engine. Doing so gives him precise control of infinitely variable speeds.

"The more I learn about electric drive systems, the simpler it all seems, and the variety of used motors available still astonishes me," says Allaway. "From an old floor scrubber to an electric scooter or a forklift or pallet truck, to a crashed Nissan Leaf, there are multitudes of parts donors out there for virtually any project."

Allaway says the floor scrubber motor was especially easy to work with because it is a permanent magnet DC motor wound for very low speed operation and reasonably high torque. He explains that motors wound for low voltage battery applications are typically best suited to battery-electric projects.

"You're better off scavenging parts from equipment that was originally battery-powered than adapting industrial DC motors designed for 90V operation," says Allaway. "AC drive systems for battery power are becoming more common, but the high voltages and needs for careful motor characterization and programming make them overly challenging. Don't go and buy a scrap yard Prius thinking it'll make a great electric tractor."

He explains that AC systems require a large inverter to make AC from the DC battery pack. It has to vary frequency and current to achieve variable speed and torque. DC motors simply require a controller that uses pulse width modulation to vary the voltage to the motor for variable speed.

To electrify the Planet Jr., Allaway stripped away the gas engine and mounts, fabricated a motor mount, battery cradle, covers for both, and a chain guard. He also assembled a lithium battery pack in an old ammunition can and modified an e-bike throttle for a trigger. The motor controller was a cheap eBay find, perfectly suited to the project.

"Cheap Chinese motor controllers are also available," says Allaway. "The control circuitry and wiring were dead simple, though I did have to hide a tiny DC-DC converter in my top junction box to get a stable 5V signal for the trigger."

Allaway built the battery pack from 88 small cylindrical lithium iron phosphate cells. They were assembled into blocks of 11 cells in parallel with 8 of the blocks connected in series to make a 24-volt pack that could store about 500 Wh of energy.

"I could have more storage capacity with newer cells, but I had these on hand," says Allaway. "The pack is protected and balanced by a battery management system that I ordered online."

Allaway used a coulomb-counter shunt to evaluate the battery state of charge and displayed it on a monitor tucked into the end of the battery case. He designed the battery pack to be removable, allowing him to build multiple packs if he wants more run time.

"It's like a handheld cordless tool, but 10 or 15 times bigger," says Allaway.

The Planet Jr.'s gas engine had been fitted with a planetary gear reducer on the output. The engine drove a belt with the first stage reduction and a belt tensioner serving as a clutch. The second stage reduction was a chain drive via a jackshaft from the belt drive. It dropped power to the freewheeling main axle and provided a significant reduction in speed.

"I replaced the first stage belt with a #40 roller chain, as I didn't need the clutch mechanism," says Allaway. "As soon as I release the throttle trigger, the electric motor spins down to rest."

In addition to precise, variable speed and elimination of gas and oil, Allaway points to low noise as another reason to go electric. He compares a decent electric drive system to having hydrostatic performance and power, but with more finesse at all speeds, better control and next to no noise.

"We also find our employees learn to operate electric tools and vehicles and become proficient more quickly," says Allaway.

Contact: FARM SHOW Followup, Reid Allaway, Tourne-Sol Co-operative Farm, 1025 Chemin St-Dominique, les Cedres, Que. Canada J7T 1P5 (ph 450 452-4271; info@fermetournesol.qc.ca; www.fermetournesol.qc.ca).