



Agitator folds up flat for transport. Elbow pipe hangs on bracket behind tractor.

## Manure Pump Ends Problems With Solids

Solids that settled out of liquid hog manure used to plug the lines on Eldon and Trent Winters' vacuum tanks. So the Iowa Falls, Iowa, team put together a simple device to stir up and chop solids before pumping manure into tanks. They no longer have to use the vacuum to load.

They started with an old Badger pit agitator that mounted on a tractor's 3-point hitch. It used a big propeller to stir up liquid. "It worked better in earthen pits, but we don't have any of those," says Trent.

They used the 3-pt. hitch and some of the structure of the old agitator, but replaced the propeller with a chopping/pumping cylinder that can be lowered straight down into their pits.

The cylinder is 15 in. in diameter and 6 in. deep. To make it, they cut two 15-in. circles out of a sheet of 1/4-in. steel plate. In the top one, they cut out the center and mounted a hydraulic orbit motor on it, with the shaft through the hole. In the bottom circle, he cut an 8-in. intake hole.

To make an impeller/chopper to mount on the orbital motor, they cut another 15 in. circle of 1/4-in. steel into four quarters and welded these perpendicular to a smaller circular piece, which they fitted to the motor's shaft.

When the hydraulic motor is powered up, the impeller circulates and agitates liquid, chops up chunks of solids that have settled out or floated to the top, and then pumps the homogenated liquid manure into the liquid spreaders.

"We don't have to use the vacuums on the spreader tanks to load them anymore," he says.

Liquids travel straight up from the pumping chamber through a 4-in. PVC pipe. At the top of this pipe is a 90-degree elbow with a fire hose connection on it where the line from the vacuum tank attaches.

Where the PVC pipe attaches to the cylinder, there's a valve that opens to let the ma-



To stir up pit, elbow pipe is attached to top of agitator-pump and material is pumped back into pit.



To fill a tank, elbow pipe is replaced by a hose. Homemade pump is so powerful Winters says he doesn't have to use vacuum to fill tank.

nure circulate in the pit. When closed, manure goes up the PVC pipe to be loaded. It's operated by a rod alongside the pipe.

Trent says the pump is made so it raises or lowers straight up and down. When it's removed from the pit, it folds together.

They say the actual cost of this agitator/chopper/pump was minimal since most of the materials used were found on the farm.

Contact: FARM SHOW Followup, Trent Winters, 14939 KK Ave., Iowa Falls, Iowa 50126 (ph 515 648-2145).



A winch pulls log into chomper. Shear blade cuts 80% of the way through log and then drags log forward, pushing the end against a fixed set of splitting blades. Once the log is split, the shear completes its cut.

## Automatic Processor Cuts, Splits Firewood

Making more firewood in less time was the main objective of Warren Aikins, Rainier, Ore., when he first designed his "Chomper" Firewood Processor several years ago. Since then, he has reworked and refined the machine to the point where he now produces several versions of it for sale through his company, Rainier Hydraulics.

The Chomper processes firewood from cut logs of any length. It uses a shear blade to slice logs into lengths from 12 to 20 in. long. All functions are hydraulic, including the winch that pulls logs into the processing chamber and shear.

Here's how it works: A winch pulls logs into the processing chamber. Once the log is loaded, a shear blade cuts 80 percent of the way through the log. Then the shear blade moves forward, pushing the log through a set of fixed splitting blades. Once the log is split, the shear blade completes the cut. As the split firewood falls forward, the shear blade raises up and moves back to begin the process again.

"What makes the design unique is the way the shear blade cuts only part way through the log and is then used as the mechanism for automatically feeding logs into the splitter," notes Aikins.

The splitting bar is adjustable so the operator can split cut wood into 4 or 2 pieces. An 8-way split attachment is optional.

Rainier Hydraulics makes four self-powered versions of the Chomper and one that is pto powered (requires at least a 45 hp tractor). The engines are needed only to power the hydraulics. Even the winch uses a hydraulic motor.

The largest has an 80 hp 4045D Deere diesel. A Perkins 104-22 45 hp diesel powers the second. Both of these processors can be set to operate automatically, cutting and splitting one log while the operator prepares to load the next one. These two larger, automatic versions can handle logs up to 16 in. or 14 in. in diameter, respectively. Each cut/split cycle takes 8 to 10 seconds, which means a 16 in. 16 ft. long log, cut at 16 in., would be processed in less than 2 minutes. Cutting into 12 in. lengths would add less than a minute to processing time. These machines can turn out 3 to 4 cords of wood an hour, depending on how quickly logs can be supplied to the Chomper.

The smallest self-powered model has a Honda 18 hp Twin V gasoline engine and is designed for logs up to 14 in. in diameter. The cutting/splitting operation is manual,



Splitting blades are adjustable to make 2 or 4 pieces. An 8-way splitter attachment is optional.

meaning the operator must run the controls for each cut/split. Cycle time is 5 to 15 seconds per cut/split, depending on the size of the log. A single operator can cut and split up to two cords an hour. This Chomper has the same specs as the pto-powered machine.

Aikins has a fourth self-powered version that will also handle a number of smaller limbs, stems or slabs at once, using either winch or gravity feed to deliver them to the shear blade.

Aikins says the Chomper has several advantages over other woodcutting and splitting systems.

"The shear blade will handle dirt and stones without dulling. In fact, the blade is self-sharpening, so you don't spend time sharpening saw blades," he says. "And since it doesn't use a saw blade, there's no sawdust to get rid of, either."

Prices range from \$8,950 for the pto model to \$32,500 for the largest self-powered Chomper. Belt conveyors to stack or load wood are available. Other options include trailer packages, fenders and lights, automatic engine shutdown system, and tachometer/hour meter for the engine.

Contact: FARM SHOW Followup, Warren Aikins, Rainier Hydraulics, Inc., P.O. Box 748, Rainier, Ore. 97048 (ph 800 457-9136; E-mail: chomper@aone.com; Web site: www.forestind.com/chomper).

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