Giant Big Bale Furnace Heats Four Farm Buildings

By Janis Schole, Contributing Editor

Since November, 2004, Wilfred Mollenbeck and his two sons have been enjoying money-saving heat from their home-built big round bale furnace.

It supplies heat for three houses, two hot-water tanks, and a large shop, for a total of 15,000 sq. feet.

They burn straw bales from barley, wheat and canary seed. "The canary seed bales seem to have more heat in them and burn cleaner but cleaning out the ashes is only a half hour job, and we've only had to do it once a month," Mollenbeck says. "We built a 20-ft. long scraper that attaches to our quick-tach loader. Once we have the pile scraped up in front of the furnace, we put the bucket back on, scoop it up, and haul it away."

The furnace was built from a giant 13,000-gal. fuel tank measuring 21ft. long and 13 ft. in dia. The Mollenbecks cut a hole in one end of the tank and inserted a 19-ft. long by 7-ft. dia. rail car tank inside. Then they cut the end off the 7-ft. tank, and used both tanks' end pieces to make a double-walled door to close off the end. The inner tank serves as the firebox and the space between the two tanks is filled with water.

"The door is the secret to the whole furnace. You want to be able to control the heat so it doesn't get too hot and boil the water out," Mollenbeck says. "There is a regular furnace blower fan built into the door. We put in automatic controls, which include forced air draft, and a damper. When it reaches 190° F, everything closes off. When the temperature gets down to 170°, it opens up again. Since the door weighs about 2,000 lbs., we took the big main axle from a Deere combine – it's about 8 ft. long - and used it to make the door hinge. This makes it easy to open."

According to Mollenbeck, most furnaces have an asbestos rope for a door seal, but he and his boys chose to use an all-steel seal, which is simpler and cheaper. It's a 1-in. by 1/8-in. flat ring that's spring-loaded, he says.

The door holds 100 gal. of water that circulates with the hot water inside the main chamber. The hottest water leaves the furnace through a 3-in. waterline at the top. It runs to a home-built heat exchanger filled with 200 gal. of anti-freeze, which in turn circulates to all the buildings. A 3-in., 1/2 hp pump circulates the water through the heat exchanger and back to the furnace.

"The heat exchanger is key to success of the furnace. It's a 42-in. dia. pipe that's 14 ft. long and 1/2 in. thick. The guts of it are made up of 1,000-ft. of 1-in. dia. pipe sections that are welded to two end plates. The water from the furnace boiler heats up the antifreeze in those 1-in. pipes, and 4 small 5-gal./min. pumps on the heat exchanger send the hot antifreeze to each building."

The ends of the heat exchanger are bolted on for easy access to the interior for inspection or repair.

The furnace is covered in a layer of 6-in. bat insulation and it's housed in a 14 by 24-ft. steel building to keep it out of the wind and protect the insulation from the weather.

This furnace is very clean burning, and Mollenbeck says it only smokes for the first 20 min. after he puts a bale in. On average, it requires one straw bale every 12 hours.

The 1-in. antifreeze lines run underground from the heat exchanger to truck radiators in the buildings, and are wrapped with foam insulation. The farthest house requires 700 ft. of line (there and back) and the family says the antifreeze temperature only drops 2 to 4° by the time it returns to the heat exchanger.

It took about a month to build the furnace, and another week to build the heat exchanger. Mollenbeck estimates that it cost about $10,000 for materials to build the entire system.

"We value the round bales we use at $14 each, so our fuel is costing us $28 per day. We expect the furnace will pay for itself in one winter," he says.

Wilfred Mollenbeck and his two sons built this big bale furnace from a giant 13,000-gal. fuel tank measuring 21 ft. long and 13 ft. in diameter, right. Heated-up water from furnace goes to heat exchanger in building on left.

They cut a hole in one end of tank and inserted a 19-ft. long by 7-ft. dia. rail car tank inside. After cutting the end off the 7-ft. tank, they used both tanks' end pieces to make a big double-walled door.

Heat exchanger, located in a separate building near furnace, is key to success of heating system.

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"Swing-Out" Chute Loads From The Ground Or Dock

"It lets me use my existing semi livestock trailer to load and unload cattle either from the ground or from a loading dock, completely eliminating the need for a separate loading chute," says LeRoy Stotts, Seiling, Okla., about the conversion chute he built on back of his semi-trailer. The LT Dock/Groundload conversion took first place in this year's National Farm Bureau inventions contest.

In transport position, the chute adds only 3 ft. of length to the trailer. It's built in two sections. One section mounts directly behind the rear door of the trailer and has a built-in ramp that's raised or lowered as needed for loading from docks. The other section swings over behind the first section on a hinge. It extends the ramp low enough to load and unload from the ground.

It takes less than 60 seconds to convert from dock loading to ground loading or visa versa. Just unhook the groundload section and swing it around to match up to the dock loading section.

Stotts says he came up with the idea after using a pot-type semi-trailer to load and unload cattle at auctions and also to deliver cattle to scattered pastures. "I was often frustrated because I needed a second person and a second vehicle to follow behind me pulling a portable livestock loading chute. Yet I didn't want to spend the money for a new groundload semi trailer.

"My dock/ground load conversion eliminates the need to spend time setting up a portable chute, backing the trailer up to it, and later reassembling the chute for transport," says Stotts. "Another advantage is that it works with a straight floor trailer or a pot-type semi-trailer, which has more hauling capacity than a commercial groundload trailer."

According to Stotts, the prices for semi trucks have been dropping while the prices for 1-ton pickups have been increasing. "Many ranchers are now buying good used semi trucks instead of buying 1-ton pickups. New commercial ground load trailers are expensive, and used ones keep their value so much that many people can't afford to buy them. On the other hand, in many cases you can buy a good 6-year-old semi truck for less than you'd pay for a 1-ton pickup. You can buy a used pot-type semi-trailer or straight floor trailer and then install my conversion kit for a lot less money. A lot of guys use their semi tractor to pull a grain trailer during harvest, and a livestock trailer later on."

The unit comes with new lights and DOT reflective tape and a top light package. Models built from either steel or aluminum are available.

Contact: FARM SHOW Followup, LeRoy Stotts, RR 2, Box 98, Seiling, Okla. 73663 (ph 580 922-4973; website: www.ltgroundload.com).

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