



Craig Stortz cut his corn drying cost by more than half last year using this bean residue burner. The burner preheats air going into his crop dryer.

## Bale Burner Slashes Drying Cost

Craig Stortz cut his corn drying propane bill by more than half last year with the help of a bean residue burner. The burner, which preheats air for his crop dryer, paid for itself more than three times over last fall alone. Stortz knows the savings were real because he dried about 10,000 bushels with propane alone right before installing the burner.

"We have about \$1,500 and a few days work into it," says Stortz, who designed and built it with the help of his 9-year-old-son, Tyler, and a couple of area welders. "It's rough, but it worked. I figured our fuel bill would have been \$10,000; instead it was \$5,000."

The burner consists of an 11 by 22-ft. fuel tank turned on its end with a door cut in it big enough to slide in large round bales of soybean residue. Two 1-ft. I-beams set perpendicular to the doorway with two more welded across them serve as a grate where the bale can rest.

Scrap corrugated tin forms a jacket around the outside of the firebox, capturing heat and directing it to the rear of the firebox and the hot air plenum.

The plenum was constructed by setting an old 12 by 12-ft. hopper bottom sand tank on its side. Stortz cut half moon shapes out of two sides of the tank to match the arc of the fuel tank firebox and slid it into place against the back side of the tank.

A plumber's son-in-law used tin to fashion a duct work cone from the outlet at the bottom of the sand tank to the round air inlet on Stortz's nearby crop dryer.

When Stortz fires up a straw bale and then turns on the dryer fan, air is pulled through the plenum. In addition to the radiant heating of air in the plenum from the exposed face of the firebox, hot air is also pulled from the tin jacket. A third source of hot air is a set of six 5-in. dia. cast iron pipes inserted all

the way through the firebox. With one set of ends exposed to the open air above the firebox door and one end in the plenum, air is also drawn through them and heated in passage.

An old furnace fan set on the ground near the door to the firebox adds needed oxygen to the burning soybean bale.

"The soybean residue burns at about 150 degrees by itself, but when I turn the blower on, it jumps to 240 to 250 degrees," reports Stortz. "The burner delivers 95F to 110F heated air to the crop auger. It doesn't take much propane to get it to 150 degrees for drying corn."

While Stortz could use wood or other fuel stocks, he prefers soybean residue. Not only is it easy to handle in large bales, it contains oils which speed the burn and leave little ash. Last fall, he burned five bales per 24 hours while drying 25,000 bushels of corn. The ash only needed to be removed once midseason.

Cleaning the firebox is easy. Stortz simply hooks onto the grate with his skid steer and slides it out the door. He then drives in with the bucket, cleans out the ash and pushes the grate back in.

The most complex aspect to the entire project was constructing the door itself. After cutting the doorway out, Stortz fashioned a door using angle iron for a frame and highway guard rails for the door panel. After setting the rails in place across the frame, he used a hydraulic jack to press them together. He then bolted them to the frame and welded a seam between each guard rail.

"A welder friend of mine warned me that a flat steel door would be subject to warping from the heat," says Stortz. "The curves in the guard rails give it extra strength and keep it from warping."

Nearly all the materials that went into the burner were items Stortz had around the farm.



Leroy Groening's home-built hydroswinging swath turner works much like a commercial hydroswinging mower - except that instead of mowing hay it turns the swath over.

## Hydroswinging Swath Turner

"It speeds up drying time and is more gentle on alfalfa than a rake," says Leroy Groening, Lowe Farm, Manitoba, about his home-built hydroswinging swath turner. The machine works much like the hydroswinging mowers on the market - except that instead of mowing hay it turns the swath over.

The machine has an 8-ft. wide pickup and a 10-ft. wide canvas and is entirely hydraulic-operated. Hydraulic cylinders raise and lower the machine and also swing it to the left or right side of the tractor. The cylinders mount on top of the hitch, which leads back over the top center part of the machine. Hydraulic motors are used to operate the pickup and canvas.

Groening is a custom hay grower and also raises some cattle on his farm. After swath-ing alfalfa, he uses his hydroswinging turner to fluff up the swath and turn it over at the same time.

"I built the machine last spring after baling hay for a neighbor who used a swath turner. I was amazed at how fast the alfalfa dried down, but I didn't want to spend thousands of dollars on a commercial swath turner so I built my own," says Groening. "The machine doesn't turn the swath totally upside down, but just moves it over for better drying. Another advantage over a rake is that it doesn't lose as many leaves."

"New Holland makes a swath turner but you have to straddle the swath with a tractor.

However, it can't swing to either side like this machine can. The hydroswinging feature definitely has advantages. In the field I can move the machine wherever I want it. When driving, I'm looking to the side which is much easier than having to look behind me all the time. I also use my hydroswinging swath turner in roadside ditches. I can drive on the road without having to go into the ditch."

He bought the main part of the machine at an auction from another farmer. That farmer had used an old swather to build the machine and fitted it to the 3-pt. hitch on his bi-directional tractor. It didn't have a hydroswinging hitch or any wheels on it. "I don't have a bi-directional tractor, just a small Deere 2-WD tractor, so I added wheels and the entire hydroswinging hitch to it," explains Groening.

He used 4 by 4 steel tubing to build the hitch and salvaged some parts from an old disker, including the pins that the hitch swivels on.

The orbit motors operate in series because there aren't enough hydraulic outlets on Groening's tractor for all the motors. "The canvas could be operated independently to throw the swath to either side, but then I'd need four sets of hydraulics to operate everything," notes Groening.

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Scrap corrugated tin forms a jacket around the outside of the firebox, capturing heat and directing it to the rear of the firebox where a 12 by 12-ft. hopper acts as a plenum, funneling hot air into the bin.

Now that he knows it works, he is planning to fine-tune it by building a better heat collector around the firebox. He also plans to put a thermostat on the firebox to control the blower and better regulate the burn.

Even if no changes are made before this

year's harvest, Stortz is satisfied with the burner. "Last spring we dried some corn and didn't use propane at all," he says.

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