

For today's news, see
www.dtnprogressivefarmer.com.

YOUR FARM • YOUR LAND • YOUR LIFE

The PROGRESSIVE FARMER

A SHOP FOR ALL SEASONS

Hot? Cold?
No worries.
Design features
in this farm hub
help you work in
comfort year-round.

PLUS

**Ag Confidence Index:
Hope on the Horizon**

**Growers Adjust To
Irrigation Restrictions**

**These Implements
Talk to Each Other**

Published
by



OCTOBER
2015

Weather PROOF

Energy conservation technology saves this farm family thousands of dollars in shop costs every year. **BY DES KELLER**

Jim Sladek has to pause for a moment when asked if he would do anything different in the construction of the farm shop/farm office he's used for more than three years. Then, he shakes his head "no."

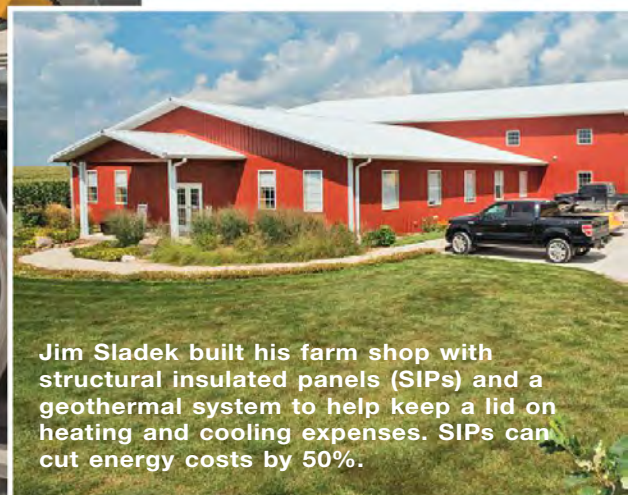
"Quite a bit of thought went into the shop, and so far, we're happy with how it turned out," says Sladek, managing partner of JCS Family Farms, near Iowa City, Iowa. "We went around and stole ideas from everyone else, things we liked."

Two of those ideas that have really paid off include building the shop with structural insulated panels (SIPs) and using a geothermal system to heat and cool the shop and offices. The 80- x 120-foot shop, with 20-foot-high ceilings, along with a 3,500-square-foot farm office, costs an average of about \$400 per month, year-round, to heat and cool.

"It's pretty amazing," Sladek says. "I kept track of our electrical expenses for the first 12 months. And that's with the shop at 72°F in the summer."

That's the power of using a building system that is up to 15 times more airtight than conventional construction and can reduce energy costs up to 50%. The closed-cell foam walls can also stop the transfer of moisture that can increase rust and corrosion.

WALLS IN A PANEL. SIPs are engineered and manufactured by Iowa-based Energy Panel Structures. Custom Builders, of Tipton, Iowa, were the contractors hired to construct the buildings. The SIPs essentially consist of two sheets of ¾-inch plywood bonded to, and sandwiching, 7½ inches of rigid foam plastic insulation.



Jim Sladek built his farm shop with structural insulated panels (SIPs) and a geothermal system to help keep a lid on heating and cooling expenses. SIPs can cut energy costs by 50%.



PHOTO: MARK TADE

The shop floor is well-lighted for the dark days of winter. The hydraulic door mounts both lights and two rows of windows—the lights provide overhead illumination when the door is raised; the windows bring natural light into the shop.



PHOTO: DES KELLER

Jim Sladek

Once on site, the 4- x 4-foot panels are locked together “kind of like puzzle pieces,” Sladek says. “The engineering to our site and our specifications took place before the panels arrived here,”

he adds. “It only took a couple of days for the building to be constructed.”

The shop walls have an R-value of 33, while the blown-on fiberglass ceiling insulation has an R-value of 40. The SIPs are covered on the interior with white fiberglass-reinforced plastic panels known as glass board. The covering is smooth and nonporous, and has no exposed fasteners, which makes it very easy to clean.

The shop’s floors consist of packed gravel and high-density foam insulation beneath 9 inches of poured concrete laced with rebar. Geothermal “radiant” tubes carry a mixture of water and propylene glycol.

EARTH TEMPERATURE. “It is important to insulate underneath geothermal lines,” Sladek explains. The radiant tubes under the floor are part of a system in which 36 additional lines travel out 200 feet away from the shop buried 16 feet underground. At that depth, temperatures remain between 52 and 55°F year-round.

Essentially, a geothermal system exchanges heat with the earth rather than the outdoor air to regulate temperatures indoors. “A geothermal heat pump doesn’t use combustion, it collects heat and moves it,” says Jake Rabe, of Rabe Hardware, Blairstown, Iowa, the

largest geothermal contractor in the state.

In winter, the fluid in the lines absorbs heat from the ground and carries it indoors, where it is compressed to even higher temperatures before being distributed through the radiant tubes. In summer, the system pulls heat from the building into the ground via those same buried lines.

A geothermal system has three main components:

► **A LIQUID HEAT-EXCHANGE MEDIUM.** This is the water-glycol mix that runs either horizontally or vertically underground.

► **A HEAT PUMP UNIT.** The Sladek system actually uses six heat pumps for efficiency—five for the shop and one for the office. A computer controls the heat pumps, depending on the need in the buildings.

► **AIR DELIVERY AND RADIANT HEATING.** The Sladeks use both an air-delivery system and in-floor radiant heating. The shop is warmed by the radiant-heat system in the floor. A forced-air unit heats and cools the farm office through runs of ductwork.

In considering the decision to use a geothermal system, Sladek found there were no in-between opinions. “Folks either really loved the geothermal, or they hated it,” he says. “What we found was that those that didn’t like it were working with systems that weren’t sized correctly to their particular structure.”

Jake Rabe agrees, adding that farms are ideal locations for the use of geothermal. “They have three things that help with justifying geothermal,” he says. “They have land, which makes it easier to run the lines, and they are well aware of their propane costs.”

The Sladeks also benefited from a federal tax credit to install the fuel-saving geothermal system, and they qualified for a USDA Rural ►





Jim Sladek and his son, Rob (right), spent hours and days planning their shop, liberally “stealing” the best ideas they found in other shops.
PHOTO: MARK TADE

A Great Place To Work

JCS Family Farms tried to use the best design features it could so this shop would serve as the farm’s hub for the next couple of decades. Here are some of the highlights.

► **SERVICE PIT.** An 8-foot-deep service bay gives employees plenty of room to work beneath machinery. The space is equipped with recessed lighting and shelves, as well as a

toolbox. A bumper several inches high runs around the opening of the pit on the shop floor to prevent forklifts or other vehicles from tipping into the hole. Sturdy mesh netting covers the opening to prevent workers from accidentally falling into the hole when

it isn’t in use. As soon as the lights in the bay are turned on, ventilation fans kick on to make sure the air down in it remains refreshed.

► **DRAINS INSIDE AND OUT.** Not only are drains inside the shop, but the Sladeks also had drains installed in

the concrete apron around the exterior of the building. When schedules are busy—particularly in the spring and fall—machinery work is as likely to take place on the apron as inside the building.

► **OIL SEPARATOR.** The drains lead to an oil separator, which filters out waste oil for proper disposal.

► **UNDER THE FLOOR.** There is a distinct lack of clutter on the walls of the shop at JCS Family Farms. Careful advanced planning allowed the farm to run electrical wiring, water lines and other utilities under the floor and up into the walls.

► **MORE LIGHT, MORE WORK SPACE.** A considerable amount of machinery work can take place on the apron around the building. Lights installed onto the doors provide illumination above the apron when the doors are open. “They allow us to have even more good work space,” says Jim Sladek, JCS Family Farms.



Energy for America Program (REAP) grant. This program provides guaranteed loan financing and grants for the purchase of renewable energy systems. Applications for REAP loans and grants are no longer being accepted this year.

Benefits from this program can be used for energy systems that use biomass or wind power, in addition to geothermal. Additionally, the Business Energy Investment Tax Credit equals 10% of the total expenditures with no maximum credit limit. This credit covers geothermal systems put into service after Oct. 3, 2008, and before Dec. 31, 2016.

As a result of this assistance, Sladek says the payback on their geothermal system is about two years—and would have been less than 10 years regardless. “It is really a no-brainer,” he says. ►



PHOTOS: DES KELLER

Remove That Extra “Glug”

While demonstrating how the Bulk Chem Way automated chemical mixing and dispensing unit works, Rob Sladek, of JCS Family Farms, explains his motivation for the purchase of this unit three years ago.

He gestures up to the metal racks holding several big, square chemical containers. One of them contains Corvus, the popular—and expensive—herbicide. “That’s about \$140,000 worth of chemical right there,” he says. “We had to get higher accuracy rates; we can’t risk numerous people glug-glugging it out by hand. Even a little extra glug is a big dollar expense.”

ROOM TO EXPAND. The Sladeks, of Iowa City, Iowa, are one of only a few farms in the country that dispense chemical batches using a computerized system that rinses tanks, measures and mixes batches with multiple ingredients, and dispenses them into nurse truck/tender headed to the field. This is a facility most commonly found at cooperatives and farm-service dealers.

“Agriculture retailers are considerably more efficient at mixing and dispatching tending equipment than most farm setups. Part of this difference is that they are all using an automated chemical-mixing system,” Sladek says.

The Bulk Chem Way system at JCS Family Farms can draw product from as many as 12 ingredient tanks. “We could probably add another six tanks onto that if we needed to without serious infrastructure changes,” Sladek says.

“This is a type-in-a-code-and-go” process, he explains. “We are able to have our tender drivers dispense their own loads. With proper oversight, the system can run as an unattended mixing station,” he notes. Codes representing prescriptions for particular fields are typed into the system on a control keyboard.

Once a batch code has been entered and the mixing begins, the sides of the tank are wetted down first “to reduce sticking,” he says. Ingredients can be set to mix in a particular order, if need be, but otherwise, the system follows “industry standard” practices in formulating the batches.

“We haven’t had any issue with thick, incompatible batches that had to be disposed of” because the chemical amounts used, or the chemicals themselves, were incorrectly mixed, Sladek says.

The system also produces an electronic application record that can be used to show active-ingredient use rates for the entire season. “I can see complete inventory levels without ever stepping foot in the mix shed,” Sladek says.

Dave Junge, Cedar Rapids, Iowa, developed an early version of Chem Way in 1979. While going to school in electronic engineering to work on space shuttle components,



PHOTO: MARK TADE

Junge became intrigued with the fertilizer-loading equipment being used at his part-time job. He turned his attention to that earth-based technology.

The Chem Way converts chemical rates to weight, “because all liquids change their density with temperature changes, so a cold chemical is different than a warm chemical,” he explains. Junge owns and operates Junge Control (jungecontrol.com) with his wife, Mary, from their facility in Cedar Rapids. To date, he has installed a Chem Way on two family farms, both in Iowa.

COMPLICATED BLENDING. There is great potential for sales to farms, Junge believes. “The blending process has gotten more complicated. Now that [glyphosate] doesn’t solve everything, there are multiple chemicals involved all at different rates.”

Sladek envisions stringent electronic recordkeeping requirements in the future pertaining to inputs. “We’ve always mixed as accurately as we can, but we all know if two people pour 3 ounces of corn syrup into a measuring cup, you’ll get two different levels,” he says. “We didn’t want that anymore; there had to be a repeatability about the process.”

Junge Control has already adapted the same type of chemical-mixing control to portable systems used by aerial sprayers and at golf courses. The system can also be adapted to manage the use of fertilizer, fungicides and micronutrients. Most of the company’s efforts now are spent “automating big fertilizer plants,” Junge says.

If the Sladeks had one wish for their system, it would be that it was located with their fertilizer storage, which is elsewhere on the farm. This would allow for the same electronic inventory monitoring they now have with their pesticides. The building housing the Chem Way was already heated, so it was ideal for chemical storage during the winter.

Junge Control sells various units, ranging from \$20,000 to \$60,000, with numerous configurations and intended uses. Junge Control customizes the system to the user’s needs.

As for the goal of higher accuracy, Sladek says they’ve hit the mark. “We’ve been able to [apply] the exact amount with sub-ounce accuracy over the three years we’ve had it.”

Does the system pay for itself? “We never purchased the Junge with the thought that in three years it would have paid for itself,” Sladek adds. “We think government regulation and oversight are coming, and we would prefer to be as prepared as possible.” ●



PHOTO: DES KELLER