



Interlocking connectors let you assemble PVC frames many times without using tools.

Snap-Together PVC Connector

"My father-in-law and I got the idea of making a floating boat cover out of PVC pipe," says Chad Days, Ashley, Ind. "We wanted a cover that would flex in the wind and waves without breaking.

"Initially we tried using glue or bolts to fasten the PVC but that made the frame too rigid." Instead, the men designed a new-style plastic connector made of 1 1/2-in PVC that slips inside the pipes and snaps in place by drilling a 7/16-in. hole in the receiver pipe.

The plastic connectors come in two types; a lock-block and a side clamp. The lock-block holds the ends of the pipe together and the side clamp allows right-angle connections. "The connectors hold the pipe together just like a vacuum cleaner attachment," says Days.

Using the plastic connectors you can assemble and disassemble any structure year after year without any tools. This is especially useful for boat covers that normally take up a lot of space. The PVC frames can also be used for carports and other light structure storage.

Boat cover kits come in sizes for everything from paddleboats to pontoon boats.

The canvas covers have snaps that secure them to the frame and have full zip-open



Boat covers float but bend in the wind to avoid breakage and tearing.

doors at either end.

PVC pipe connectors sell for \$2.85, for the side clamp and \$2.95 for the lock-block. Boat cover kits range in price from \$599 to \$2,399.

Contact: FARM SHOW Followup, Conestoga Covers, P.O. Box 129, Ashley, Ind. 46705 (ph 877 858-9847 or 260 281-2294; email: info@conestogacovers.com; website: www.conestogacovers.com).

Simple BioFilter Cleans Up Manure Odor

Dick Nicolai's pigs don't smell any sweeter than any other pigs, but you'll never hear a complaint about smells from any of his neighbors. That's because he vents his hog houses and the manure pits under them through a network of pallets covered with a mix of compost and wood chips.

"Since we set up our biofilter, neighbors have been constantly monitoring the site as they drive by and say they haven't smelled anything," says Nicolai, who began work on his system in 1997. "It takes out about 90 percent of the odor."

The simple system was not so simple to develop. After 27 years of farming, Nicolai was working on a Ph.D. at the University of Minnesota. At the same time, he was expanding his Hector, Minnesota hog operation.

"The toughest thing was getting the correct air flow and the correct mix of compost and chips," he recalls.

He installed a system of exhaust fans that pull odor down through the slats into the pits beneath the barns and then out laterally through air ducts. Wood pallets form an air plenum that distributes the odor-rich air beneath the chips and compost. Plastic netting with 1/2-in. grids on top of the pallets keeps the material from falling through.

Nicolai used a TMR feed mixer to mix wood chips and compost in a 70:30 to 50:50 ratio. The more chips, the less fan pressure needed to force the air up and through the biofilter. The mixer's side discharge auger was used to cover each row of pallets.

Nicolai recommends 1 sq. ft. of biofilter 1 ft. deep to treat about 10 cfm of air. Cost estimates for materials and labor run from \$150 to \$250 per 1,000 cfm.

"The major thing to think about is that biofilters are hard to retrofit," warns Nicolai. "Even if you don't want to install one yet, a few changes during construction will let you add one at a later time."

In addition to hay farming, Nicolai is now on staff at South Dakota State University. He is working to refine his biofilter.

"We have started work on a vertical



Filter has been under development for seven years and is said to eliminate 90 percent of odor.

biofilter," he explains. "We want to get down to a smaller footprint, something like an old double corn crib or a cylinder where we blow the air through the center and out the walls."

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Two-Tank Articulated Spreader

High capacity manure handling just got a whole lot easier, thanks to a new patent-pending design that ties two tanks together rather than using just one bigger tank.

Dennis Nuhn of Nuhn Industries in Sebringville, Ontario, is a manure handling equipment manufacturer who didn't want to sacrifice field accessibility in order to get larger spreading capacity.

"Bigger tanks usually mean steering problems and more weight on the drawbar. Field conditions have to be really good before you can get on them," he says. "My system hitches one tank behind the other. The tanks are linked with Kevlar-covered hoses and a recirculating pump, creating an articulated manure spreader unit. By going to a multiple axle configuration, we bring the weight down per axle and per tire. What you have is two equally weighted tanks that push each other instead of one big tank that is pushing you."

Nuhn says it is an integrated system and not just two tanks hooked together because

"Foolproof" Mailbox Stand

"If my homemade mailbox stand ever gets hit it'll just roll over without getting damaged. All I have to do is stand it back up," says Leonard Seltzer, who used an old 1-ton dual rear truck tire as a base for his wooden stand.

The stand consists of a pair of vertical 5 1/2-ft. long 2 by 6's that are clamped and screwed together. They support a pair of horizontal 3-ft. long 2 by 4's which support the mailbox. The vertical boards rest inside a pair of 10-in. high angle iron brackets, which are bolted to the lug nut holes on the wheel rim with four bolts.

Both sides of the stand are lined with reflectors, making the stand easy to see at night.

"It's a foolproof system," says Seltzer. "I got the idea when the highway department widened the road in front of my home. By bolting the bracket to the wheel I was able to avoid any welding to the rim."

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Heavy tire keeps mailbox steady, yet allows for easy movement when needed.

Pickup Step Fits Receiver Hitch

"Why jump or climb in and out of your truck bed when you can take two easy steps to access your cargo?" That's the question asked by the manufacturer of the Steplite tailgate step, which attaches to any Class III or IV receiver hitch. The Steplite mounts around the outside of the receiver so you can still insert a trailer hitch with the step installed.

Two rear-facing flood lights built into the Steplite provide better night vision while backing into a campsite or unloading firewood. Another red LED light bar adds an additional brake light. The Steplite attaches to 12-V power from a standard 7-pin socket.

The step is made from 1/4-in. steel plates with a 1/8-in. steel floor panel. The whole step is powder coated and protected by a 2 1/2-in bull guard tube. The stepping surface has a skid resistant rubber surface to make it safe in any kind of weather.

The Steplite sells for \$499.95. A version without lights sells for \$299.95.

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Step provides easy access while still allowing for hitching and towing.



Lights are available to make night-time work easier.



Photo courtesy Ontario Farmer

Kevlar-covered hoses provide the link between the two tanks.

limited opportunities to get on the land in the spring and fall due to weather conditions," Groenestege says. "We also have to travel further now to get the manure on the fields, so we find that the width of handling on this spreader is especially nice on the roads."

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