

## Versatile Tractor Fitted With Semi Truck Engine, Axle

By Bill Gergen, Senior Editor

When the engine and transmission on his Versatile 555 2-WD articulated tractor wore out, Dan McAmoil replaced them with the Cummins 855 cu. in., 325 hp diesel engine and 15-speed Road Ranger transmission out of an old Freightliner semi tractor. The steering system and articulation joints were also worn out, so he installed the truck's front steering axle, wheels and leaf spring suspension system.

To improve the ride even more, McAmoil mounted a hinge on front of the cab and a pair of air shocks, off a 1/2-ton pickup, on back. The combination allows the cab to "float" up and down with the terrain.

"No tractor can match this tractor's air ride suspension," says the Penokee, Kansas farmer. "I have a bad neck and back, and with the original tractor I could stay in the cab for only about two hours at a time. Now I can put in 10-hour days again.

"Also, this tractor is much more fuel efficient than anything I could buy. With light loads like drilling and pulling a sprayer, it uses only about one tenth as much fuel as my Case-IH 7130 Magnum tractor with comparable power. I'm sure that with heavier loads, like disking, it would start to balance out some. The Case IH tractor just has too many clutch packs and gears turning to get the fuel savings of my tractor's simple drive system. I think it takes 70 to 90 hp just to drive the Magnum down the road at 10 mph.

"The Versatile's transmission has just a straight gearbox, with no powershift transmission sucking power. Modern day conventional tractors have too many parasitic features such as mechanical front wheel assist and powershift transmissions. It takes 30 to 40 hp just to operate an 18-speed powershift

transmission, whether you're using it or not. Another reason is that the Versatile tractor's rear axle has a reduction in it, so I can run the engine slow and get almost twice as many acres per gallon of fuel as I could with a conventional tractor."

He bought the semi truck from a neighbor for \$2,000. The truck had caught on fire while hauling hay on its flatbed. The fire burned the cab but didn't damage the engine or transmission.

He cut 2 1/2 ft. out of the tractor's frame, removing the articulation joint, and moved the rear section forward and then rewelded the frame back together. The truck axle's spring shackles were bolted to the tractor frame. The truck's steering cylinder has a 2 by 8-in. stroke which makes turning a fast and easy job.

The semi truck wasn't equipped with power steering so he installed a 30 gpm hydraulic pump to provide power steering as well as to raise and lower any implements. The pump is belt-driven off the engine crankshaft with a U-jointed driveshaft. A proportioning valve divides oil from the hydraulic pump between the power steering and hydraulic system. He removed the tractor's original vertical exhaust muffler and replaced it with a horizontal exhaust pipe. The pipe extends horizontally from the turbocharger back over the tractor's right rear dual wheels. The exhaust system's length allows two power pulses from the engine at the same time, providing a chimney effect that helps empty out the engine cylinders and makes the engine more efficient.

"I use it with a 24-ft. Great Plains drill to plant wheat and milo, and also to pull an 8-ton fertilizer spreader and a home-built



Dan McAmoil replaced the engine and transmission on his Versatile 555 2-WD articulated tractor with a 325 hp Cummins diesel engine out of a Freightliner semi tractor.

sprayer equipped with a 60-ft. boom. It really works well," says McAmoil, who rebuilt the tractor two years and 1,700 hours ago.

"Versatile tractors were originally designed to use semi truck components, so the frame rail width on this tractor is identical to that of a semi truck which made it easy to fit everything together.

"The Cummins 855 diesel engine really runs nice. The tractor's original V-8 Cummins diesel engine had only about 210 hp. It ran at 3,200 rpm's and was so noisy that I had to wear ear plugs all the time. Now all I hear is a low rumble beneath my feet. The semi tractor's 855 cu. in. engine has extra power because it had been souped up beyond its normal specs by the previous owner."

McAmoil says the tractor was worth only about \$500 when he rebuilt it. "The pins and bushings in the articulation joint were worn

out and would have cost several thousand dollars to replace. My total cost, including miscellaneous parts such as hydraulic hoses and hardware, was less than \$4,000.

"Another reason I rebuilt it is that I wanted a short coupled tractor that could turn sharper."

McAmoil doesn't have a hood on the tractor yet, but says he plans to make one. He also plans to replace the tractor's rear axle with one out of a Versatile 850, which will allow him to use the tractor to do all his heavy tillage work. "The big Cummins 855 engine has so much power that in heavy tillage work, the tractor's original rear axle would soon be destroyed," he notes.

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## Wood Chip Furnace Burns With Zero Smoke

Vince Court built a wood chip furnace for his farm that works so well he's now building and installing furnaces for other farmers. His company, Grovewood Heat, has quickly gained a reputation for producing clean-burning furnaces that can handle a wide variety of biomass materials. The secret to his success is the system's high temperature and ease of operation.

"We prefer working with hot water systems because they are more efficient for transferring heat and because we burn at extremely high temperatures of up to 2,600 degrees," says Court.

His heating system has been tested to Oregon state standards, which are the toughest in North America, says Court. "They burn more than 97 percent clean with zero smoke, zero creosote and, in most cases, only 1 percent ash, regardless of fuel type," he adds. "It burns so hot that the wood virtually vaporizes as it goes in."

With hundreds of systems in place across Canada and the U.S., Court says he has never run into any organic material he can't burn. Fuels his customers use include wood or grass pellets, wood chips, saw dust, barley or wheat, even manure.

"We have a customer with a 10,000-sq. ft. horse arena and they were having trouble getting rid of manure," says Court. "Now they burn horse manure and sawdust and heat the arena and their home.

Each system is custom-designed to fit the needs of the customer. Costs range from \$6,900 for a home sized unit to \$69,000 (U.S. dollars) for a factory, school or office-sized unit.

The Bioblast furnace, as it's called, is built from components produced at five manufacturing plants around Canada.

It consists of a hopper with an agitator in the bottom that keeps chips or pellets from bridging. Hoppers as small as 2 by 4 by 4-ft. can be hand fed, while larger units can be automated. An auger runs from the hopper to the combustion chamber. At the combustion chamber, a burner head acts like a carburetor, mixing the right amount of fuel, heat and air to get a super clean burn.

"Our auger runs are at least 8 ft. long," says Court. "The length of the auger run is for safety. You want as much separation between the hopper and the combustion chamber as possible. Certain types of chips can burn back through the auger like tobacco burns back inside a cigarette paper."

As a safety check, Court hooks augers up to a water system equipped with a heat-sensing valve. If it senses fire creeping back through the auger, it releases water to slow the fire or put it out completely. In cases where power and water system failure are a concern, Court installs a 40-gal. reserve tank.

"We are very conscious of safety and have multiple backups," says Court. "If the system overheats, it shuts down. If the chamber overfills, it shuts down."

The Bioblast was designed for fuel in the 30 percent moisture range, but it will burn fuel at higher and lower moisture, thanks to the burner head. Burner heads are selected depending on fuel source, though a multiple source head can be ordered.

Boilers are designed specifically for the Bioblast system. Because there is no creosote,



Grovewood Heat has gained a reputation for producing clean-burning furnaces that can handle a wide variety of biomass materials.

site, the boiler can be built to be more efficient.

"With lots of wood boilers, you have to leave room for creosote to build up, and it will clog up around heat tubes, so you can't squeeze them too tight," explains Court. "We can make ours 20 percent more efficient in heat recovery."

Computer controls sense everything in the system, whether in standby or high heat mode. When the boiler hits a predetermined temperature, the system goes on standby. Airflow shuts down and the auger operates only periodically, just enough to keep coals burning in the combustion chamber and save fuel.

Court cautions that business has been booming so be patient when contacting him



"My wood chip furnace burns more than 97 percent clean with zero smoke and zero creosote," says inventor Vince Court.

for more information. Contact: FARM SHOW Followup, Vincent Court, Grovewood Heat, Pleasant Grove, Covehead, Prince Edward Island, Canada (ph 902 672-2090).