



Lon Jackson built this MF-70 tandem tractor from two 1961 Massey Ferguson 35 models. A home-built "articulation pivot carrier" couples the tractors together.

Beautifully-Designed Tandem Tractor Built From MF-35's

Lon Jackson's "MF-70" is composed of 2 1961 MF-35's that look like they belong together. Before retiring, Jackson was a chief program engineer for Boeing's Strategic Ballistic Missile Weapon System. The MF-70 combines his love of farming and his engineering expertise.

"I drove tractors like these starting at 7 years old," says Jackson. "When I was 9, my dad bought a new 1955 Massey Harris Ferguson TO-35, which I still own and have restored."

Jackson already had one MF-35 and found another to match. After extensive research, he created a design on paper that identified problems and solutions. The hand drawings were then entered into CAD files by a friend, Duane Davis. He did computer simulations to identify stress points and undesirable twisting. This led to further refinements, including thicker steel or added bracing.

Many of the major steel components were made by an area steel supply company. The CAD files were used to drive their plasma cutter. The trunion components and the articulation king pin, were fabricated by other vendors.

"Some of the cut steel pieces required further work to drill and tap holes, flatten large turn plates, mill grease grooves, smooth trunion bores, and so on," says Jackson. "This work was done with help of my friend Duane and his Bridgeport mill."

"The biggest challenge was the steering system," says Jackson. "I started out wanting to retain as much of the original design as possible, with the power steering pump on the back tractor and the steering wheel column doing the work. However, neither was up to the task of driving the large cylinders needed to articulate the new tractor."

Jackson ended up stripping out the steering systems along with the front axles and installing a Char-Lyn Orbitrol control unit. It provides manually-controlled hydraulic steering to the articulation pivot carrier that couples the MF-35's front to rear.

The carrier consists of two 18-in. dia., 1-in. thick steel control plates and incorporates a trunion design. A trunion is basically a shaft in eyelet mounts.

"It's a very necessary component to allow the 2 halves to be able to twist up and down independently of each other without putting undue stress on the articulation joint," explains Jackson.

An L-shaped bracket bolted to the differential on the forward tractor extends toward the following tractor. It houses 2 sets of eyelet mounts. Matching mounts on the underside of the lower control plate connect the 2 components with shafts. This provides the carrier with the ability to rock left and right over rough ground.

A matching round control plate is attached under the front end of the follow-tractor. When connected with a king pin, the 2 plates provide the left/right pivot.

The lower plate has arms to either side with clevis mounts. Hydraulic cylinders mounted to the rear axles of the follow-tractor connect with these mounts to steer the MF-70.

Steering complications rose again as Jackson attempted to fit the orbit motor under the dash. He had to modify the dash sheet metal, throttle linkage, steering column and steering wheel to make it work. New hydraulic hoses pulled hydraulic power from the lead tractor's auxiliary outlet to the motor and then to the control cylinders. This left the rear tractor hydraulics to be used for the 3-pt. lift.

Aside from steering, other controls between the 2 tractors were linked mechanically. Jackson used custom levers added to the rear tractor with control cables to the OEM levers on the front tractor.

"The front tractor clutch is controlled via a lever mounted near the operator position on the rear tractor," says Jackson. "This lever operates a master cylinder, which drives a slave cylinder on the front tractor, which via custom linkage activates the front tractor clutch."

A tachometer mounted on the rear tractor lets Jackson monitor the engine on the front tractor. He has full control of forward, reverse and all gears.

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Controls between the 2 tractors are linked mechanically.

Electric Pickup Debuts In Canada

Tesla gets most of the headlines when it comes to electric vehicles, but Havelaar, a company with operations in Canada, the Netherlands and China, leads the pack on electric pickups. The "Bison" is a fully-electric 4-WD mid-size pickup that delivers nearly 200 miles of driving on a single charge. Designer Tony Han and his team of engineers built and tested the prototype in just 12 months, introducing it to the public at Canada's Electric Mobility Conference on May 30, 2017.

Havelaar and Han say it's the safest pickup on the road, with a carbon fiber reinforced steel frame and class-leading torsional stiffness for better durability and handling. The dual-motor powertrain drives all 4 wheels. Bison's e-pickup™ concept uses advanced telemetry to deliver a superb driving experience, even in inclement weather. Bison has the power to deliver a 54 percent hill start and carry a full payload up a 21 percent grade.

Bison's interior is well-appointed with a center module entertainment, climate control, and navigation similar to any popular brand gas or diesel pickup. An auto writer who's seen the vehicle up close says the central touchscreen rivals those in a Tesla



New "Bison" all-electric 4-WD pickup can travel almost 200 miles on a single charge.

automobile. Bison's bed has 46 sq. ft. of exterior cargo space and 18 sq. ft. of lockable storage.

In 2018 Havelaar will test 100 Bison fleet vehicles with municipalities and utility companies in Canada. The vehicles are being built at Havelaar's prototype facility in Toronto. Ontario government officials are working with the company to locate a full-scale manufacturing facility so they can begin producing and selling the Bison commercially in 2019. Price, production, delivery and other details haven't been provided, although the company is taking purchase reservations on its www.havelaarcanada.com website.

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With sleek red paint and wood trim, Gregg Zillges's 13 1/2-ft. long, 2-seater motorcycle trike gets a lot of attention wherever he goes.

Hand-Built Trike Rides Like A Cadillac

Gregg Zillges's motorcycle trike looks like it came out of a custom shop showroom, with sleek red paint and wood trim. The 13 1/2-ft. long two-seater with a Cadillac hood ornament was built by his nephew Matt Englund "one piece at a time," Zillges says.

Though he told Englund he wanted it "long and gaudy," he got a classic instead. "My 87-year-old mother wanted to go to church on it so she climbed up on it and away we went," Zillges says. He managed to put 1,500 miles on the bike in 2017 after it was finished in late July.

In a detailed letter to the Wisconsin Department of Transportation to begin the licensing process, Englund describes how he built the trike starting with a 350 V-8 motor, TH350 turbo transmission, and the drive shaft and rear axle assembly from a 1985 Chevrolet truck. He fabricated a 1952 Dodge Desoto hood into a rear deck lid and made rear fenders that look like a 1978 Ford step side pickup, adding custom made fanned tail light assemblies.

"All tubing was bent using an air over hydraulic mandrel tube bender with properly sized dies in order to retain 100 percent of the DOM tubing's structural strength characteristics," says Englund. "Frame and front fork components were welded together using .030-in. copper-coated carbon steel ER70S-6 MIG wire

and a 75 percent argon/25 percent carbon dioxide shielding gas mixture.

"The biggest challenge was getting everything straight and lined up from front to back," Englund says. The extra length to accommodate a passenger seat makes the trike longer than normal.

Zillges purchased many parts on eBay and Craigslist and watched the bike take shape over five years with Englund building it in his spare time during winter months. After it was assembled, and it passed inspection for licensing, Englund took it apart to be painted.

It's been catching people's attention ever since.

"The first question people ask is 'where is the radiator,'" Zillges says. "It's in the back, and water runs through the frame. My nephew has an eye for art and how to keep a clean look."

The maple running boards, dash and engine cover made by Otacilio Berbert add to the trike's classy style, matched only by how it rides.

"It rides like a Cadillac, just floating down the road," Zillges says.

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