



Artist's rendering of ALA Engineering's cabless, autonomous feed wagon.

Autonomous Truck Boosts Feedlot Efficiency

ALA Engineering has a better idea for feedlots with their autonomous feed truck. It reduces feedlot labor needs, and the cattle benefit, too.

"Our truck does everything a normal feed truck driver can do, including navigating around the yard and traveling from the feed mill to the loading zone to the feeding zone," says Jacob Hansen, ALA co-founder. "Even before we reached full autonomy, our Driver Information System increased accuracy of the amount of feed fed to a pen and consistency of feed distributed along the pen by 30 to 40 percent."

Hansen explains that a driver typically makes one light pass with the feed truck and reverses for a second pass. As a result, cattle at the front end of a bunk are underfed, while cattle at the other end are overfed.

"Our system allows a single pass with extremely consistent feeding along the bunk," says Hansen. "Over the past year, we moved to full autonomy. We can now operate the vehicle without a driver and complete all tasks at the same or a higher level than an extremely competent driver."

"There's not much left from the stock feed truck," adds Hansen. "We've replaced every major system, from steering power delivery to braking, as well as the central computer and lighting. All have been replaced with safety-rated custom equipment to support autonomous driving."

For safety, the truck has a multi-level perception system for 360-degree coverage. The first tier consists of radar units with low

resolution but extremely high reliability.

"Radar can see from 3 ft. to three football fields away and tell us if something is there, although not what it is," says Hansen. "LIDAR is the second tier, providing much higher resolution and data capability (recognizing what's there). However, it's less reliable in rough weather conditions."

The third tier of perception sensors are cameras that register both visible light and thermal images with high resolution but poor performance in cold weather.

"All three operate in fair weather conditions, but if visibility is impaired, the truck will automatically slow down," says Hansen. "If a human driver can operate in the weather conditions, our truck can also."

The next step in the process for ALA is to bring the concept to market. "The truck that'll come to market has no cab," says Hansen. "It'll have a shortwave-based system for walk-behind control. This is necessary for going in or out of a storage area or a mill structure where the entire sky view is blocked, and GPS and satellite RTK correction is blocked."

"From the beginning, all the software, hardware and sensors have been developed with an ultimate goal," says Hansen. "We want to be able to deploy them toward other sectors, whether within ag or in mining or other industries."

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Ratcliff cut the 20-ft. lengths in half and rested them on treated plywood, cradled by 4 by 4s.

Culverts Converted Into Garden Beds

When Rick Ratcliff heard about some highly discounted corrugated HPDE culverts, he knew he would find a use for them. It took a few years, but today, the 30-in. dia. pipes are being used as raised garden beds.

"I have three that are just under 10 ft. in length in my greenhouse and plan to add more outside," says Ratcliff.

Putting the culverts to use has been easier than getting them in the first place. While discounted by about 60 percent from their full price, the 20-ft. long culverts were more than 400 miles away. With the help of a mobile generator and an 8 1/4-in. Skil saw, Ratcliff was able to haul them home.

"The saw had enough blade to cut through the culvert wall," recalls Ratcliff. "I was able to rip them down the seam line on each side and stack them for the trip."

Ratcliff cut the 20-ft. lengths in half to use them for the greenhouse raised beds and rested them on treated plywood, cradled by 4 by 4s. The plywood base sits on two layers of concrete block for height. Where they bump up to each other, he slipped 1 by 5-in. aluminum C-channel over the neighboring edges.

"I screwed aluminum angle irons to the outside edges of the beds and the ends and used 5/4 decking for the top edges," says Ratcliff. "I used a cardboard template to cut half circles of plywood for the ends of the culverts and ran 4-in. drain tile along the

bottom to ventilate the soil. I also drilled holes in the bottom of each ridge to drain excess water."

Ratcliff covered the drain tile in wood chips and then filled the beds with a soil mix that included compost made from food waste and litter from a chicken farm. In retrospect, he suspects the soil mix was too rich. The first year's crop was not what he hoped for.

"I planted tomatoes in it this spring," says Ratcliff. "I got lots of vegetation but not a lot of fruit."

He plans to add grass clippings and peat moss to lighten the mixture. He also notes that the carrot variety that grew 8 to 10 in. long in his outdoor garden beds was short and chubby in the indoor bed.

"I think the soil in the greenhouse beds may have been too warm for the carrots," says Ratcliff. "The air moves through the greenhouse but can get a bit warm."

While the first harvest might not have been up to par, Ratcliff is looking forward to developing outside raised beds with the remaining culverts. "I hope they'll avoid problems I have with perennial weeds with rhizomes like quackgrass and marehail," he says. "However, for use outside, I likely won't go to the expense of capping the sides."

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Beefed-up suspensions, bumpers, wheels, lighting and box features can be added to 3/4 and 1-ton Dodge Ram, Chevy, GMC and Ford pickups using a customized build package.

AGwagon Customizes Heavy-Duty Pickups

Farmers and ranchers wanting the ultimate in a tough, performance-driven, heavy-duty pickup can load up a new 3/4 or 1-ton Dodge Ram, Chevrolet, GMC or Ford Super Duty with nearly 20 jaw-dropping accessories. However, a customized AGwagon can top out at well over \$100,000.

AGwagon will beef up the chassis with

a 3-inch lift system, Fox elite performance shocks, an ultra-heavy-duty front bumper and super-sized wheels. Add a 15,000 lb. winch to the front and a 10,000 lb. winch to the rear, and you'll be a wrecker for rent to all your neighbors. Premium LED fog, bumper, back up and work lights illuminate in all directions. Bed accessories include a rugged cab rack,

tool mounting brackets and Rotopax tanks for DEF, water and diesel. The bed can also be set up with airbags for load leveling. An air compressor and a retractable hose reel are other handy options.

Interior cab accessories include an SSV 12V switch panel, custom floor mats, optional two-tone leather seats, a two-way radio and Starlink internet access.

The AGwagon idea was spawned by a partnership between Certified Agriculture Dealerships (CAD) of Westfield, N.C., and Fox Factory Vehicles of Trussville, Ala. Fox has been a long-time builder of customized vehicles for rock climbing, Baja racing and off-roading. Design features for AGwagon grew from ideas generated by a select group of farmers and ranchers who pooled their "dream" ideas.

"The most important benefit for owners is that each AGwagon can be customized to their unique needs and situation," says Pat Driscoll, CEO of the Certified Agriculture Group. Driscoll says farmers and ranchers can begin the AGwagon design process by visiting one of the 200-plus CAD members in the U.S. or by visiting agwagon.com. Fox will do the build-outs in Trussville, Ala.

Driscoll says the partnership chose the AGwagon name because the truck "captures

the defining characteristics of the original Cessna AGwagon aerial application plane, known for reliability, longevity and capability."

Jeff O'Connor, an Illinois soybean grower and one of the farmer-designers of the AGwagon, is pleased that CAD and Fox Factory chose to begin the design process by going first to farmers and ranchers, asking what they wanted and needed in a pickup truck to make it more functional and productive. He says the stepped-up durability, internet connectivity and LED lighting add-ons are real benefits for long workdays and nights.

AGwagons purchased from CAD members will include standard manufacturer's warranties plus a 3-year, 36,000-mile warranty on all installed components from Fox Factory.

Driscoll says any AGwagon purchase includes CAD's AgPack, a specialized package of discounts and rebates on inputs producers usually buy anyway. "If every one of the 23 AgPack benefits is executed to the fullest, it can add up to nearly \$40,000 in real operational savings. In 2023, the average savings redeemed per truck was \$14,828."

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