



13,000-sq. ft. growing barn made from shipping containers has three levels.

## Food Producing Barn Built From 14 Shipping Containers

Nico March says he became interested in shipping containers more than 25 years ago in San Diego when he observed the many ways the military was configuring them into movable command centers, bathrooms, kitchens, and more. The idea of creative uses for shipping containers kept rattling around in March's head, and today, he oversees the operation of "The Bark," an ultra-efficient, sustainable structure that incorporates 14 shipping containers 8 ft wide by 40 ft. long and an assortment of repurposed and recycled materials.

"It's too big to call a barn and too small for an ark, so we call it 'The Bark,'" March says. The 13,000-sq. ft. structure in southeastern Wyoming is used to grow an array of fruits, vegetables, mushrooms,

and fish on three levels. It also includes two separate basements that were dynamited out of solid granite. The Bark is focused on energy efficiency, with features such as solar panels, geothermal heating, cross ventilation, automatic windows, and heat-stack effects for cooling. These features reduce the building's reliance on non-renewable energy while also promoting a comfortable and healthy indoor environment.

Each container has its own function. The greenhouse produces fruit and vegetables and helps regulate humidity. A recirculating aquaponics system produces fish, while freshwater prawns provide algae control in fish tanks. Mushrooms are grown for food and carbon dioxide production, which helps other plants grow.

Recycled and repurposed materials are used throughout The Bark. Picture windows are made of 3/4-in. thick hockey arena glass panels, spiral staircases are made from catwalks, and wood from Wyoming snow fences cover interior and exterior walls. Aquaculture tanks and grow beds use IBC totes. Rock quarry conveyor belts are used for anti-slip flooring in the tack and feed areas.

Many of the building materials were acquired from Repurposed Materials, Inc. of Brighton, Colo., which has warehouses in five U.S. locations. "You'll find all kinds of crazy, offbeat industrial castoffs at our five warehouse locations," says Damon Carson, company founder.

March says The Bark project's goal was to build a self-sustaining building that could maintain itself with food and electricity and provide a place to live, work, and play.

Plants and vegetables grown in the Bark include numerous fruit trees (peaches, pears, navel and blood oranges, mangos), and produce (wasabi, heirloom tomatoes, basil, watermelons). Nutrient-rich water from the fish tanks is recycled to irrigate the plants and trees.

The Bark has a mudroom entrance, a gallery, a commercial kitchen, and a pantry.



March calls his building "The Bark" as its too big to call it a barn and too small to be an ark.

Its root cellar is kept at 55 degrees. A workshop and metal shop have a welding table, plasma cutter, and ample storage. There's an office and conference room and, for personal comfort, a swim spa and workout area. One container is a garage for RV storage, and another is the control room for water and power with both electricity and water emergency backup.

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Container structure is used to grow fruits, veggies, mushrooms, and fish.



Nonhof built a custom-tracked tractor with a hood, grille, and lights from an old Minneapolis-Moline tractor.

## Custom Tracked Tractor Built With Minneapolis-Moline Hood

Harlan Nonhof from Phillipsburg, Kan., built a custom-tracked tractor. The hood, grille, and lights came from an old Minneapolis-Moline tractor, and it's powered by a Kohler 2-cylinder air-cooled engine that drives two bi-directional hydraulic pumps. These power a hydraulic motor on each track. Overall, it weighs about 1,900 lbs.

Nonhof bought the MM hood and grille in 2007, dreaming of using it for a tracked tractor. Five years later, he began the build and completed it almost 3 years later, in late 2014. By early 2015, the track tractor was fully operational for a test run on his brother-in-law's farm. In the building process, Nonhof also constructed a hauling trailer and raised platform for working on it.

"I kept a list of every nut, bolt, piece of metal, etc. that I purchased," says

Nonhof. "The list has 332 lines (17 pages) with a total cost of \$6,818.75."

"I put a dozer blade on it that I bought with a John Deere riding mower. I had used the blade to move some soil in the yard to prevent rain run-off from getting into the house basement," he says.

Since its completion, Nonhof has entered his tractor in the Phillips County (Kan.) Fair and the parade for the 2015 Kanas Biggest Rodeo celebration. "I pulled the trailer with the tractor behind our 1970 Chevrolet Blazer," he says. I couldn't drive the tractor as the tracks would have damaged the street surface."

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## Company Aims To End Calf Horn Removal

By Lydia Noyes, Contributing Editor

Welfare Concepts is a New Zealand startup that aims to make life less traumatic for dairy animals. The company recently invented a medical alternative to disbudding, the process of removing the horn tissue of young calves.

Co-founders Richard Emslie and Richard Olde Riekerink are veterinarians with decades of combined experience working on farms and in research labs. They have patented an injection that prevents growth at the site on the skull where horn buds develop. They aim to enable farmers to control horn development within their herd without putting the animals through the removal process.

Disbudding is a safety procedure that prevents cows from hurting each other with their horns. It's a largely unregulated process that millions of animals go through each year. Typically, disbudding requires a hot iron to cauterize the tissue where horns would otherwise develop. Many animals will show pain symptoms for weeks. Some breeds of beef cattle are bred to remove horns altogether, but the genes for horn growth are closely linked with milk production, meaning they can't be omitted from the genetics and are an inevitable part of the industry.

While Welfare Concept's injection remains in the research stage, the team has achieved proof of concept and evidence that it works on calves. They plan to scale up operations to undergo clinical trials that can further prove the injection is safe and effective.



Welfare Concepts has patented an injection that prevents growth at the site on the skull where horn buds develop.

Assuming it passes regulatory guidelines, this injection may be commercially available within 3 years. Meanwhile, Welfare Concepts continues to innovate. The company has raised over \$3 million NZD for further innovation and has four new products in the works.

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