Robots build walls for homes using arms that scoop and move wet clay where hammers shape the final walls. Home shown is a rendering of clay home.

Building Houses Out Of Clay

New technology developed by Terran Robotics of Bloomington, Ind., is reviving the ancient craft of building houses out of adobe, which are bricks made from sun-dried clay.

"We wanted to bring automation to the construction industry," says Terran co-founder, Zach Dwiel. "But rather than using robots to build the same way people do, we looked for construction processes that had the lowest material costs. This led us to earthen construction materials known as adobe, also called "rammed earth" and "cob."

Terran custom-designed homes are built using clay that's on-site or nearby. "Our robots use the latest in computer vision and artificial intelligence to autonomously transform clay, sand, and straw into extraordinary homes," Dwiel says. The entire structure is built on-site and in one piece like it's from a large-scale 3D printer. The AI-controlled robot has pincher-type arms that scoop up and move heavy globs of wet adobe, placing them where hammers do the final shaping into 12-in. thick walls. When the walls are dry, they're heavy and durable.

The company builds the walls and works with local developers and builders to lay out a foundation and frame the roof, floors, windows, and other finishing. Dwiel says Terran's technology uses fewer materials than standard walls and reduces labor costs by replacing the work of at least four contractors. The construction method produces almost no waste and generates 80 percent less CO2 than walls built with standard construction materials.

"The materials we use, including clay subsoil, aggregate, and straw, are widely available and some of the most ecologically sustainable building materials on earth," Dwiel says. He adds that Terran's technology could work for farm shops, but would likely be more expensive at this time than standard insulated pole-barn construction. "In comparison, though, our walls have the advantages of being better insulated, providing a higher thermal mass (better for passive heating and cooling), and are bullet-proof and sound-proof (reducing sound entering and leaving the building, as well as sound reverberating inside the building).

The company is under contract to build an office and a home in 2023 and has set up a waiting list of prospective customers that can be secured with a refundable $100 down payment.

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Schisandra Berries Offer Medicinal Benefits

If you're looking for a new challenge, you might consider Schisandra berries, especially if you are interested in fruits with herbal and medicinal benefits. The perennial vine bears clusters of pea-size red berries and is hardy in Zones 4-8.

"It's not as vigorous as wild grapevine, but it needs support, even as simple as a single wire trellis," says Jesse Stevens, owner of Sy's Trees in Oxford County, Maine.

He starts plants from seed and sells 2 or 3-year-old plants. He also has a row of Schisandra in his 2-acre orchard that's filled with more than 100 species of woody tree crops, including exotic fruits and nuts, along with common fruit trees.

Schisandra is native to Asia and referred to as the Five Flavor berry because it's sweet, salty, bitter, pungent and sour. While some growers say they like the flavor of the berries and leaves, Stevens says it has a tart, piney flavor, and Schisandra fruit is mostly used by herbalists. The berries ripen in late summer or early fall, and he dries them for a tea additive and makes tincture for a mild tonic as an energy boost.

"I grow in a no-spray environment because I want to see what they do in typical conditions," he says. Schisandra is fairly easy to grow and bears fruit in 3 or 4 years. Its shallow, fibrous root system requires it to be in root-free soil with organic matter. Stevens uses deep mulch to keep the plant cool at the base.

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Though one Schisandra vine pollinates itself, Stevens recommends buying two plants in case one dies. He also suggests that people interested in new crops consider arctic kiwi, which is also a viny plant. It requires some shade and bears smooth grape-size fruit that tastes like kiwi.

He ships plants and bare roots in the spring and fall from his Maine orchard. Schisandra plants sell for $25. Email him for a list of all available plants and prices.

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Lilly Wahl pictured on her family's 1921 Farquhar steam engine.

Queen Masters Antique Steam Machines

As a young child, Lilly Wahl took naps on the water tank of the 1921 Farquhar that her father Mike Wahl was restoring. At 9, she stood on blocks of wood to drive it with his help. Now, at 20, Wahl knows how to stoke the fire, inject water, lubricate the engine, and operate a steam engine all on her own. Her passion and involvement in shows and steam engine education earned her the title of Queen of Steam at the Western Minnesota Steam Threshers Reunion from 2019-2021.

Wahl and her sister, Maddy, run the Farquhar at the Baraboo, Wis., show while their father helps run a sawmill. They're also involved in shows and associations in their home state (Wisconsin), as well as shows in other states.

"I joke that I have five dads and 20 uncles. Because of steam engines, I grew up with them, and there's a special bond," Wahl says.

In working with other steam engine enthusiasts, she has a deep respect for how technology has made work simpler as well as how people in the past made equipment with limited resources.

"A group of us are restoring a 35-hp. Minneapolis and we have to remake parts. How did they do it (in the past)? How did they cast these and put them together?" she wonders.

As a college junior, she realizes that she has gained many hands-on life skills because of her lifelong work with steam engines. If she could figure out a way to combine her business management degree with steam, it would be a dream job, she says.

"My passion is the educational components," Wahl notes. "One of my favorite parts is interacting with visitors so they know what they are looking at."

She encourages kids and people of all ages to go to steam schools such as the ones offered in Wisconsin and Minnesota. She credits the Minnesota Ladies of Steam (FARM SHOW Vol. 45, No. 2) for inspiring women to take an interest in steam.

People are also interested when they see how the equipment was used through demonstrations at shows of the old equipment threshing grain in the field or sawing lumber, for example.

"I plan to continue to go to shows and (in the future) bring my own kids to shows to experience it through their eyes," she says. "There's always a list of projects to work on."

FARM SHOW Followup, Lilly Wahl (lillywahl27@gmail.com); or Wisconsin Historical Steam Engine Association (www.whsea.org); or Western Minnesota Steam Threshers Reunion (www.rollag.com).

Poly Product Made From Wool

A new plastic product is made by combining wool with corn starch to make products lighter, stronger, harder and more durable. New Zealanders created the fiber-rich poly to add value to otherwise low-value rough wool, including bellies, sides and odd pieces.

Inventor Logan Williams was invited by the New Zealand Merino Company to help save the wool industry. It was costing more to shear the sheep than the wool was worth. He developed the Keravos process to combine wool and polylactic acid (PLA) from corn starch. Williams described the project's success in a talk at a New Zealand ag summit.

"The world uses 300 million tons of plastic each year," says Williams, Shear Edge. "We can take any wool and bond with any polymer to create pellets or powder. Any company can take our pellets and integrate them into their factory without changing anything."

Although the initial effort was with PLA, a biopolymer, the process can also use wool with any synthetic polymer. The Keravos process ensures that the wool fibers are encapsulated as a matrix within the polymer. As a result, the fibers do not permeate the surface of the end products, where they could biodegrade.

With parent company New Zealand Merino, Williams has established Shear Edge to market the pellets and the process. New Zealand companies are already making battens for high tensile fencing, kayaks, and even catamarans with the pellets. They are even being used for knives and calf feeders.

Shear Edge is making a fiber-rich poly product from wool.

"We have several brand partners who are overseas," says Thomas Nye, Shear Edge. "Any company with manufacturing ability globally can trial our wool blend composites, and we welcome contact."

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