

Exoskeleton Finds Use On Farm

Sarah Ballini-Ross admits that exoskeletons can be hot and awkward to wear and are far from perfect. At the same time, she and her husband, Tyler, wouldn't be without them. Whether handling tasks on their pastured livestock Rossallini Farm or picking up and delivering their grass-fed meat under their Oregon Meat label, the high-tech harnesses help with the heavy lifting.

"When I delivered 3 tons of frozen meat to customers this past week, my exoskeleton was like having a buddy in my pocket to do 40% of the lifting," says Ballini-Ross. "It helped as I packed 165 coolers with 50 to 75 lbs of meat each, three high, and later delivered them."

Exoskeletons are wearable suits that help support or boost what a person can normally do. They can make them stronger or improve movement. They come in a wide variety of types and designs.

For moving heavy boxes of frozen meat, Ballini-Ross used an Apex 2 exoskeleton.

"It works like back muscles," she explains. "When you bend over, it stores energy. When you stand up, it releases energy. It works like a system of levers to distribute force throughout your body."

Ballini-Ross and her husband have logged thousands of hours using dozens of occupational exoskeletons while trimming

hooves, building a high tunnel, installing miles of water lines, building fences, and completing other farm projects.

Her access to many different makes and models of the tools is due to her weekday job. When she and Tyler started their pastured livestock farm, she was working for Oregon's not-for-profit workers' compensation company. She saw firsthand the damage caused by hard, repetitive physical labor. She was also exposed to the benefits of exoskeletons and other evolving workplace technologies.

"I started using them on our farm to better understand them," says Ballini-Ross. "I've worn 55 different exoskeletons out of about 95 different makes and models just for supporting the back. On top of that are others made to aid specific body parts, such as arm exoskeletons for overhead lifting."

In 2023, she co-founded Evolving Innovation, a company providing safety technology and ergonomic solutions. When not presenting at conferences, she and her partner help companies and their employees find the exoskeleton that works for them.

Ballini-Ross notes that most exoskeletons are not ready for repetitive factory work involving lifting. However, transferring the technology to farm work requires the same thought process as in the factory.

"If there are other safer and easier ways

to get the job done, do them first," she says. "However, if there are jobs that are really beating you up, start looking for an exoskeleton that'll work the best for the job, the other equipment you use, and the animals that might be involved."

Some jobs, no matter how difficult, may not justify the cost, such as quick tasks that take only 30 seconds. Consider the activity and the pattern before selecting an exoskeleton.

"Exoskeletons are pretty expensive, running from \$800 to \$5,000 each, so try before you buy," she says. "Will it work getting in and out of a tractor, under insulated coveralls in cold weather, or when it gets 115 degrees in the sun?"

She advises checking out Exoskeletonreport.com when considering options. It provides a listing of exoskeletons currently on the market.

"We're seeing more interest from agriculture with its aging workforce," says Ballini-Ross. "The right exoskeleton can give a person some of their life back."

She notes that many owner/operators are not ready to retire, but their bodies are. Their bodies no longer have the same abilities they had 20 years ago. The biggest problem, she notes, is that young workers don't recognize the wear that's taking place until it's too



Exoskeletons are wearable suits that help support or boost what a person can normally do. They can make them stronger or improve movement.

late. While still young, she and her husband know better.

"I figure my exoskeleton can help my body continue doing what I want it to do," she says.

Contact: FARM SHOW Followup, Oregon Meat Co., 41354 Shindler Bridge Dr., Scio, Ore. 97374 (ph 503-970-2529; www.oregonmeat.com) or Evolving Innovation (sarah@innovatepnw.com; www.innovatepnw.com).



Each 30 to 40-second cycle produces roughly 6 to 8 cups of soil, representing about 40 cores.

Automated Soil Sampler Cuts Labor

Radicle Agronomics, a Precision Planting company, is preparing to beta-test a new automated soil-sampling system designed to make collecting representative samples faster, easier and less physically demanding.

The GeoKnife was developed entirely in-house and is designed to streamline one of the most labor-intensive tasks in agronomy.

"It's a product of years of innovation and meant to match the goals of taking a representative and quality soil sample," says Eli Sooneker, Radicle Agronomics' Product Support Lead. "It's made to save time, be more efficient, save people's backs, and eliminate manual sampling."

Currently designed to fit John Deere 835-series Gators, the GeoKnife will expand to other side-by-side UTVs in the future thanks to the company's mounting system, which uses a 2-in. hitch receiver and custom frame brackets. The unit measures 50 in. wide, 43 in. high, and 27 in. deep, weighs approximately 200 lbs, and is powered by a generator mounted in the UTV bed. A minimum 7,500-watt inverter generator with a 30-amp, 240-volt output is required.

The heart of the machine is a custom-built cutting-and-collection system.

"It looks a lot like a chainsaw bar, but it's not an off-the-shelf part," Sooneker says. "We wanted something proficient at excavating

the soil, scooping it up, and then throwing it into the collection cup."

To collect a sample, the operator positions the machine, starts the process with a push of a button, and the cutting assembly automatically lowers into the ground. The chain excavates a trench, captures a full cross-section of the soil profile, and deposits the material into a collection cup. Sampling depth can be adjusted up to 12 in.

Each 30 to 40-second cycle produces roughly 6 to 8 cups of soil, representing about 40 cores, significantly more than could typically be collected manually in the same amount of time.

Manufacturing is expected to begin in Morton and Tremont, Ill., with beta units entering the field this fall to assess how well the units handle residue and rocks. A broader market release is planned for fall 2027.

"We're still working out the marketing details, but the plan is to offer the GeoKnife as a sampling service through the Radicle Lab locations, loaning them out to growers and agronomists," Sooneker says. "We want the cost to be in line with other comparable samplers."

Contact: FARM SHOW Followup, Radicle Agronomics, Precision Planting, 23207 Townline Rd., Tremont, Ill. 61568 (ph 309-925-5050; info@radicle.ag; www.radicle.ag).



Reefinator benefits include improved soil moisture, nutrient retention and weed control.

Rock Crushing Machine Transforms Farmland

An Australian invention that specializes in transforming farmland made its American debut at the World Ag Expo in Tulare, Calif., this February. The automated rock-crushing machine, the H4 Reefinator, has improved crop yields, increased stock-carrying capacity, and boosted land values for many Australian growers.

Developed by former farmer Tim Pannell, founder of Rocks Gone, the nearly 10-ft wide H4 Reefinator is pulled by tractors with over 400 hp at approximately 6 mph. It features a leveling blade, multiple hydraulic tines, and a ribbed drum that digs up to 24 in. deep. When filled with water, the machine weighs a heavy 30 tons.

The company plans to demonstrate the Reefinator to U.S. farmers over the coming months.

The latest Rocks Gone model uses integrated automation technology that eliminates the need to manually adjust depth in changing soil conditions. The Depth Master system, compatible with ISOBUS and GPS-equipped tractors, automatically calculates speed and load and adjusts depth up to 50 times per second.

Operators set the desired depth and make manual adjustments only when needed. This system improves both crushing performance and operational efficiency.

Adrian Carr, Rocks Gone's Business Development Manager, highlighted another advantage.

"Digital maps will show where the digging depth was insufficient. Rather than making extra passes over the whole area, users can concentrate on some areas and not on others."

Rocks Gone also uses automated robotic fabrication to produce precision hard-facing replacement parts.

"Our latest multifaceted robot system uses a dynamic process to produce extremely consistent results," says Tim Pannell.

Farmers using the Reefinator are experiencing multiple benefits, including improved soil moisture, nutrient retention and weed control.

"The rock gets crushed into silt-like particles, which are very valuable, in addition to reducing the impact on seeding machinery. Better rooting depth and development is achieved, and soil moisture and nutrient retention improve," notes Pannell.

Interested customers are encouraged to visit the Rocks Gone website for more information or to request a demonstration.

Contact: FARM SHOW Followup, Rocks Gone, 5 Baldwin St., Kewdale, WA 6105 (ph +61 477 985 293; sales@rocksgone.com.au; www.rocksgone.com.au).