



Design By What You Can Find: Farmer-built Assistive Technology

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Pipe-foam Insulation Grips

Hand arthritis, grip strength impairment, carpal tunnel



Tractor Grab Bars



A grab bar as shown below can be simply made by flattening the end of a pipe, bending it in a 'u' shape, and drilling holes in the flat to match your tractor bolt holes (and orange paint!).



Porch Lift

A cable winch used to raise a platform 4-feet high. How do we address safety issues with out clients when they 'design by what they find'? What if a child was under the platform as it lowered? What if a cable breaks?



Multiple Equipment Access Lift



Safety?

Low-profile Harvest Cart: mobility



Vegetable harvest carts allow workers to plant, weed and harvest low-profile vegetable crops from a sitting position. Growing flowers, strawberries, green beans, peppers, asparagus and many others require the farmers to move along rows stooped over or on hands and knees. Working in such positions all day long is both painful and unhealthy. This one is 4 2x4's screwed together and wheelbarrow wheels with a bleacher seat for back support.

Tractor Fishing Boat Swivel Seat



A swivel seat from a fishing boat has been installed on a lawn tractor. David outfitted this tractor with a sprayer and chemical tank so he can control weeds in his blueberry fields. A wood panel provides posture support.

Beehive Deck: Mobility & Back Pain

A boat dock serves as a raised deck around beehives. It elevates the beekeeper to reach tall hives without straining arms, or to stand at ground level to reach low hives without bending their back.



Utility Vehicle Grab Bars



Steel frame concocted to provide grab bars for transfers and a step up to the vehicle deck.

Rolling Low Profile Worktable

David can use the drill press and chop saw from his wheelchair. He can move it close to the project he is working on.



Stand-up Planter: back pain



To compensate for his back problem, Ellis Clark of Janesville, WI, uses PVC pipe of various lengths and diameters to plant his tilled vegetable garden, which includes onion sets as well as seeds. Standing up and straddling the row, he simply pushes the pipe down into the soil a little past the desired depth, drops the seed/set down through the pipe, then lifts the pipe straight up, which causes the dirt to cover the seed/set.

<http://www.agrability.org/toolbox/?solution=947>

<https://standnplant.com/>

Trailer-mounted manlift platform



Bob mounted this Life Essentials manlift platform on a trailer that he can move around with his Kawasaki Mule. He can park it close to the tractor, walk from the Mule to the manlift, and raise himself up to the operator station. A fold-down 'bridge' was added so he can walk safely from the platform to the tractor seat without stepping over gaps.

Walking Therapy Railings



Bob built channels to force his feet to point forward as he does walking therapy. His incomplete spinal cord injury causes his feet to twist sideways and strain his knees. He walks back and forth on this platform with hand railings to strengthen his muscles without straining his knees.

Torso Balance & Air cleaner



Don has muscular dystrophy so his torso slumps forward. He figured out that wearing a backpack with 11 pounds of weight in it helps hold his shoulders back while he is working in his farm shop. He also built an air cleaner cabinet with a shop vac inside and furnace filters on the sides to control dust and improve his breathing. The shop vac draws air through the filter and blows clean air out the duct in top of the cabinet.

Pumpkin or Melon Lifter



Oliver helped Sonya figure out how to bend the tines on a pitchfork and add a side handle so she can harvest pumpkins and squash without bending down and lifting.

Stand-up Walker



Don modifies walkers with adjustable height armrests and hand grips. He adds large wheels as needed for rough terrain.



Crowding Tub and Swing Gate

Duane built his own crowding tub and swing gate from cattle panels and posts. His cattle walk regularly through the system between feed and water. When he needs to do herd health work, he sets up the headlock, calls the cattle in, and closes the gate behind them. He can squeeze them to the headlock with the green gate.



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Cab Feet Turntable

Jerry made a turn-table for his feet to help him rotate as he transfers from his tractor seat onto the manlift seat without twisting his legs.



Engine Hoist Manlift



Jerry modified an engine hoist to lift him into his tractors. He used a 12V hydraulic power unit and hydraulic cylinder. A bucket seat with seatbelts pivots on the end of the hoist with a parallel linkage so it remains level as he raises up. A helper rolls the hoist near to the tractor so Jerry can make the transfer.

Seatbelt Button Tab



A tab screwed onto the seatbelt button allows it to be released by pressing with the palm of a hand.

Self-draining Water Lines



Watering livestock in winter is simple for Colin. He turns on the hydrant at the up-hill end of the pipe and the water fills the first pen's trough. He shuts off the valve to the first pen, and it forces the water farther down the pipe to the next trough. He works his way down until all the troughs are full and then shuts off the hydrant and re-opens all the valves. The pipes are all sloping downhill and naturally drain to prevent freezing.

Walk-in Feeder



Vernon built a gate on the end of his cattle feeder so he can walk in with pails to feed grain. This is easier than walking through the cattle pen and lifting the pails overhead to pour them into the feeder.

Raised garden beds

Camp Liberty used old bridge timbers to build raised garden beds for veterans.



Fold-up Combine Ladder



Joe hinged a lightweight ladder to his combine, so he has sloped steps closer together. He flips the ladder up with a rope while driving.

Bud Box



Cattle naturally want to escape from where they came into a pen. A bud box is a pen where you close the entrance and open an exit gate next to it. The exit gate leads to a chute and trailer or headlock. The cattle naturally flow the direction you wish.

Chicken Coop manure tray



Tiffany has a sloped manure tray under her chicken roosts. It catches at least 50% of the manure from the hens. Doors to the outside open and the manure is easily scraped from the tray into a tractor loader for hauling away with minimal shoveling.



Feed Trough Cover Lifter

Aaron uses a series of pulleys and cables to raise and lower the cover of his feed trough all from one place without straining his back. He plans to install a powered winch.



Outdoor Walker Cart



After his traumatic brain injury, Caleb started using a greenhouse cart as an outdoor walker. It supports his balance and enables him to carry loads around the farm.

Trailer Crane

Nate mounted a crane on the side of his trailer so he can deliver bulk bags of fertilizer to his customers. He cannot hand unload small bags due to his muscular dystrophy, but he is now able to do his own deliveries.



Extended Tractor Step



To reduce the distance between the ground and the first tractor step, the farmer bought a commercially available truck step and bolted two pieces of flat steel to either side. The farmer then bolted the step to the existing tractor step.



Grab Bars: Zero-turn mower



In order to get back on his lawnmower, the farmer fabricated grab bars out of square tubing and pipe. He bolted the grab bars to the ROPS and frame of the zero-turn lawnmower. He can pull himself up with the bars and they help to improve balance while standing.

Warehouse Steps



The farmer could not use the ladder on the combine anymore and found some warehouse steps that allowed him to regain access to the combine. The combine backs up to the steps and allows the farmer to get on or off with a less steep slope.

Wheelchair Ramp for Tractor



The farmer built a wooden wheelchair ramp into a natural slope of the ground. The front of the ramp has a piece of plywood that slides onto the platform of the tractor to allow the farmer to get as close as possible in the wheelchair. The farmer can then transfer into the seat of the tractor. The wheelchair and plywood extension are then slid away from the tractor. When dismounting, the plywood has to be pulled onto the platform of the tractor, and the wheelchair moved closer.

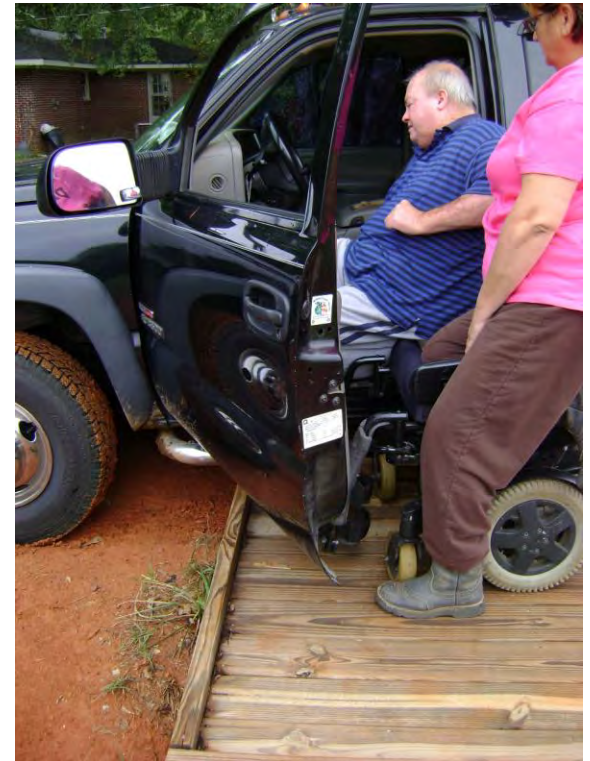
Hand Controls for Tractor



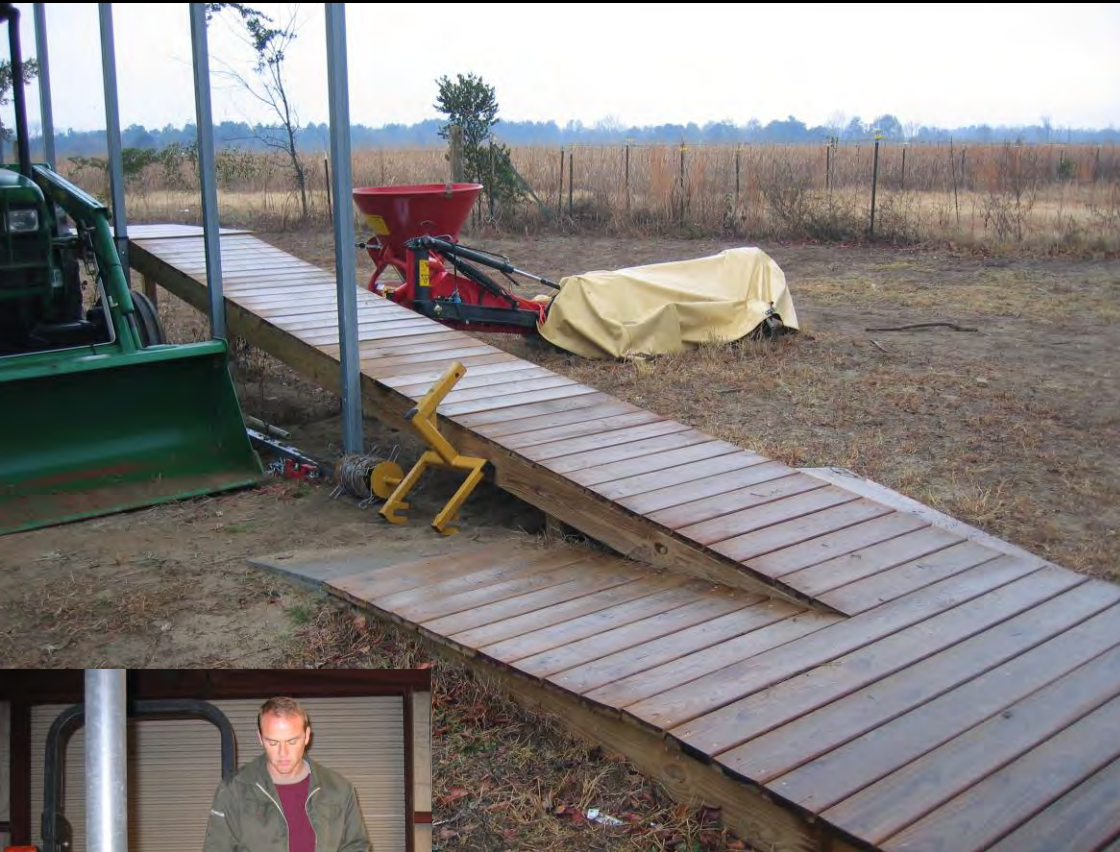
The farmer made his own hand controls for his hydrostatic tractor. The control levers are made out of standard pipe and are hinged at the bottom. To connect the pipe to the hydrostatic pedals, the farmer used shift rod linkages that can be bought off of Amazon. He bent the shift rod linkages to get the angles needed for the hand controls.

Wheelchair Ramp for Truck

The farmer built a wooden ramp to transfer easier into his truck from his wheelchair. After driving around the farm or getting stuff in town, the truck can be backed up to the ramp to transfer back into the wheelchair.



Wheelchair Ramp for Tractor



The farmer built a wheelchair ramp to transfer from the wheelchair to the tractor fender and then into the tractor's seat. We fabricated a footrest to keep the farmer's feet in place while transferring.



Sprayer Boom



The farmer has a sprayer that only has the handheld wand sprayer. He made a boom for the sprayer that allows him to attach it to the back of his UTV and spray a wider area. The boom is made out of PVC pipe and fittings. The hose with the spray nozzles is attached to the PVC using U-bolts.

Fence Line Feeder

The farmer made his own fence line feeder by using commercially available bunk feeder tubs and building frames out of wood. The fence line feeders allow the farmer to feed his calves without going into the pasture. It also allows him to travel on the concrete path.



Grow Barrel



Grow barrels have become popular with our farmers because they reduce the bending over required. You cut slits in a 55-gallon food-safe drum and inset 2x4 in the slits while heating up with a propane torch. Once the holes are opened up, place a PVC pipe with holes drilled in it for a slow-release waterer and fill it with soil.



BBQ Trailer

Our farmer built a BBQ Trailer with a ramp for his wheelchair. An electric winch raises the ramp. He also fabricated an electric stirrer for his Brunswick stew.



Grain Bin Shaker



Feed gets stuck in the grain bin, and the farmer has to beat on the bin to get the feed to come out. He built a shaker by bolting a motor with an unbalanced weight to the bin. The motor is powered by a rechargeable battery pack that works with his drills. He controls the system by a momentary switch.



Fence Holder



When installing long runs of fencing, the fence would bend in the middle. The farmer built a holder out of wood. Two 2x6s bolt together to keep the fence from bending. The base rests on top of the ground and slides as the fence is tightened by the stretcher.

Water Spigot Turn-off

It can be hard to shut off a water spigot if you have arthritis. This turn-off tool is made to work with water spigots that have a spoked knob. It is made from a wooden dowel and two machine screws spaced apart to fit in the spokes. It reduces the force needed to shut the water off by applying a lever action.



Spring Loaded Gate Latch



The farmer made a spring-loaded gate latch using a gate hinge, a piece of rebar, spring, and a bolt. The latch allows the farmer to quickly go into the feeding area without having to wrap and unwrap the chain.

Questions and Discussion

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