



Innovation Showcase

2024 “Outstanding Innovation” Winner

Hydraulic Equipment Trailer Ramps

Submitted By:

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Description:

This innovation adds hydraulic cylinders to existing SCDOT backhoe trailers. The hydraulic system controlling the ramps is tied in to the existing 12 volt system on the trailer. A control panel with buttons to raise and lower the ramps was added to the side of the trailer. Raising and lowering the trailer ramps can now be done with the push of a button.

**How does this Innovation benefit SCDOT?:**

Ramps without hydraulic assistance are very hard to raise and lower by one person, and usually requires two people. This innovation will cut down on pinch point and back injuries, as well as workers comp cases. This will allow for many safety related issues to be avoided. Safety chains will still be used for worst case issues. The trailers have an enclosed 12 volt hydraulic power unit mounted in the tongue of the trailer. It is operated from a single 12 volt battery that is charged from the tow vehicle through a standard trailer connector. Hydraulic lines run from the power unit to the cylinders on the ramps. The ramps are modified with cylinder mounts. The cylinders are similar to what is found on snow plows to raise and lower the plow blade(s). With the standalone 12 volt system, the ramps are fully functional at all times, even when a tow vehicle is not connected to the trailer.

Hydraulic Ramps Parts List

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- (2) Hydraulic cylinders 3" bore x 12in stroke tie rod
 - (Tractor Supply #1265633)
- (1) Double acting hyd. power unit 12 volt DC
 - (WW Grainger # 36NE09)
- (1) 5" Muffler clamp (to mount power unit)
- (1) 12v Marine battery
- 14 Gauge wire to wire the switch
- 2" Square tubing
- 1" Cold roll to fabricate pins
- ¼" Sheet steel to fabricate box for power unit between tool box and header
- (2) 3/8" Hydraulic hose to run to power unit to rear of trailer
- (4) 3/8" Bulk head fittings
- (2) 3/8" Tee's
- (4) 3/8" Hydraulic hoses from bulk head fittings to cylinders
- (1) Diode trio or relay to charge battery
- (1) Battery tie down

Hydraulic Ramps Installation Instructions

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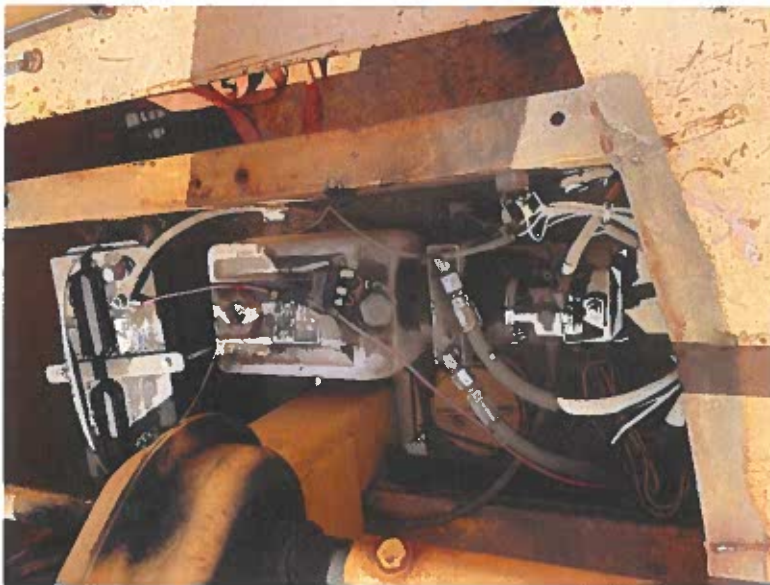
- With ramps in vertical position, ramps should both be even about half way between a 12:00 and 1:00 position.



- Place jack stands under ramp frame and remove helper springs.
- Using the existing helper spring mounts, place fully extended hydraulic cylinder head mount to ramps using $\frac{1}{4}$ " x 2" square tubing, $\frac{1}{2}$ " x 3" flat bar, drill 1" holes and mount to tubing.
- Fabricate 1" pins for ramp mount.



- Install ¼” sheet steel in the front of the trailer tongue and mount power unit and battery.



- Run 2 hydraulic hoses from the power unit to the rear of the trailer



- Install Hydraulic Tee's for each cylinder.



- Use bulk head fittings to pass through rear frame.



- Measure for the hydraulic line from the bulk head fittings to cylinder leaving room for movements.
- Hook hydraulic cylinders.



- Place up-down switch on side of trailer clear of the ramps.



- Using accessory power to charge battery, one terminal should be **HOT** when the key switch is in the **ON** position and **NO** power. When ignition is turned off, it should power the trailer ABS.
- Mount diode in-line to prevent back-feed.



- With both ramps fully raised at the same height, weld in a hard stop for ramps to set tight against. If ramps are loose when fully raised they will rattle and damage the steel structure!



- Add safety chains to existing mounts with safety clasp hooks.

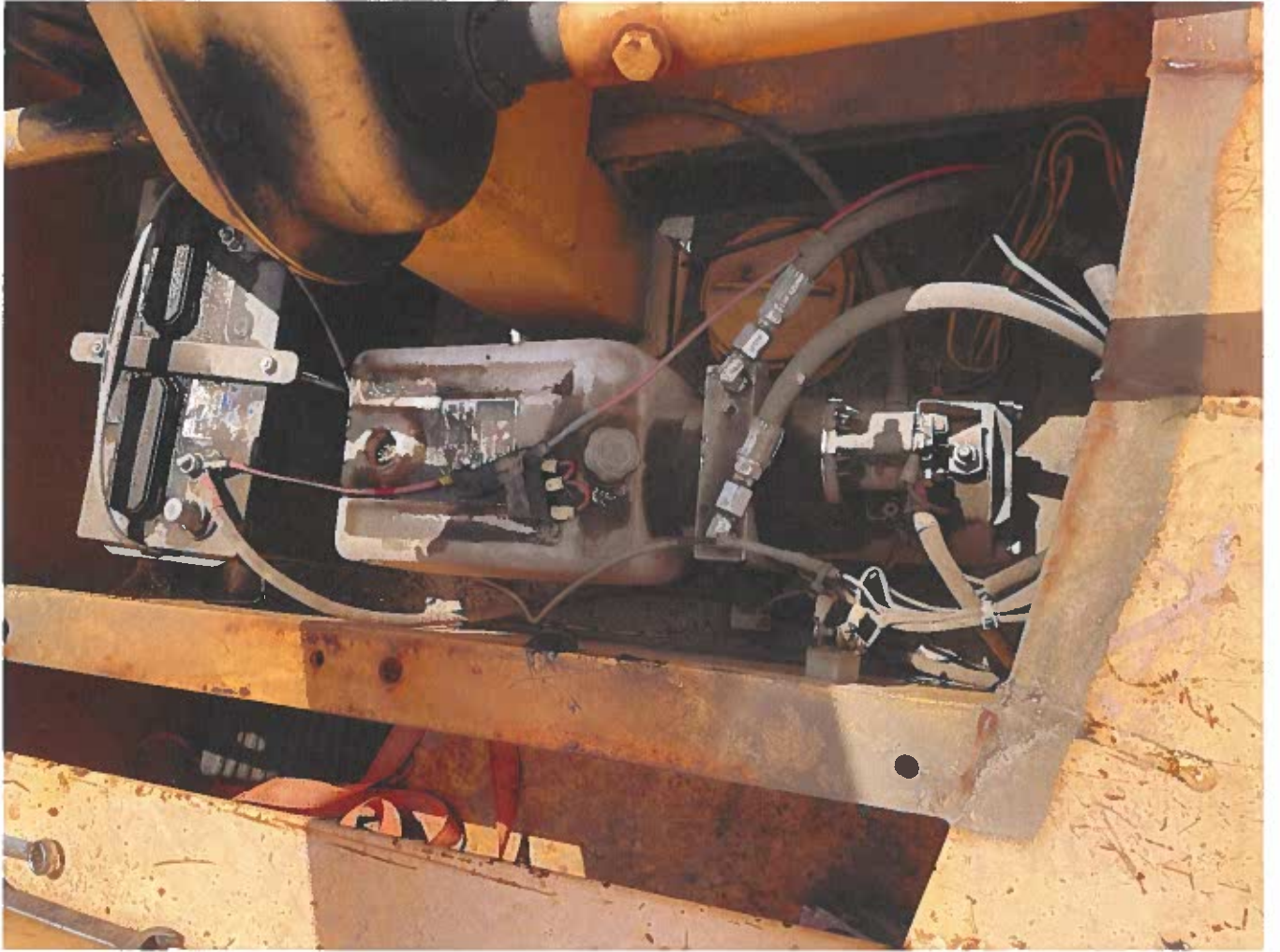


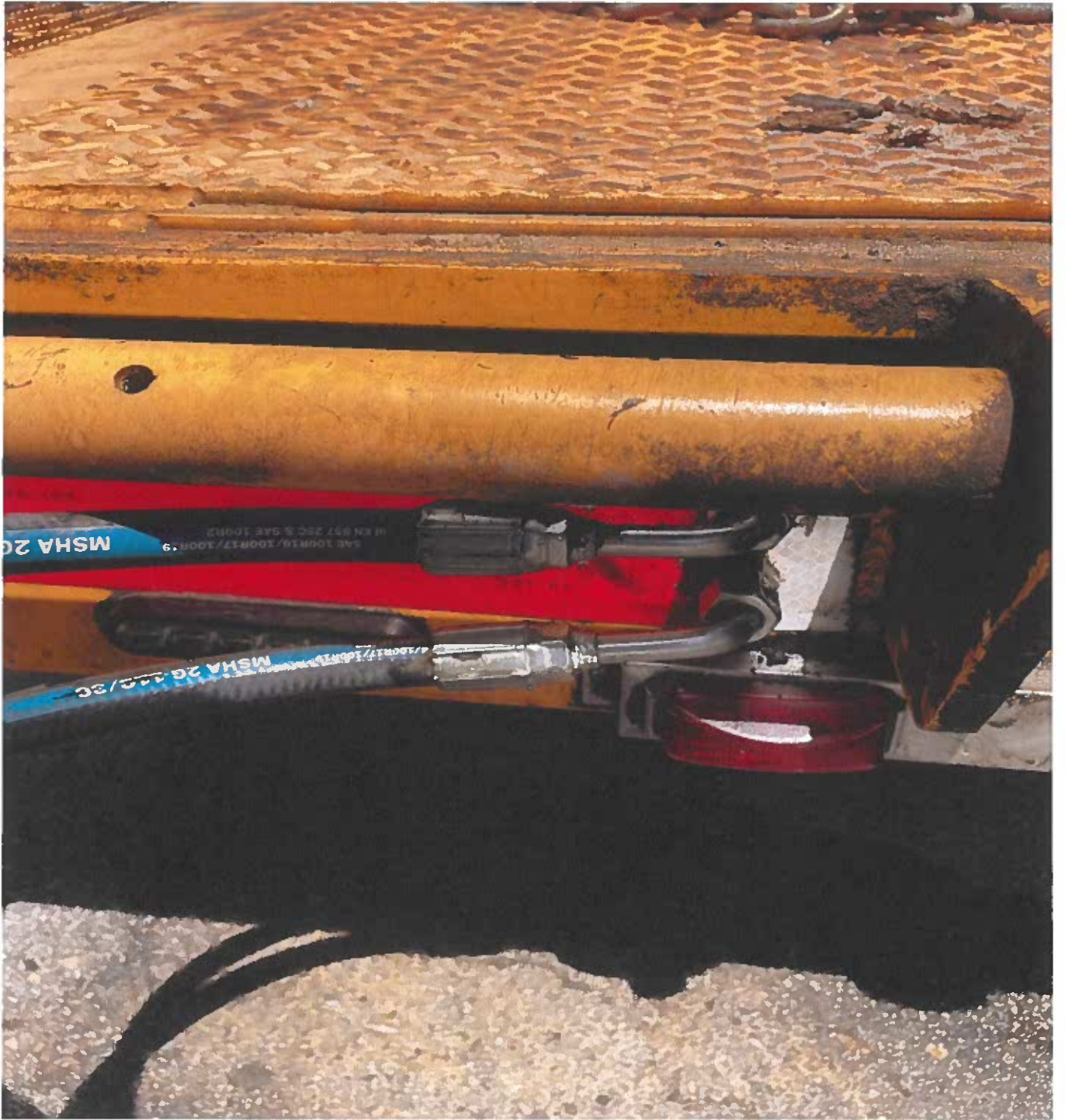
- Fill pump with Dexron III as air bleeds from the system, **KEEP RESEVOIR FULL.**
- Fabricate cover power unit.
- Enjoy using pain free ramps at the push of a button 😊



















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