

# Remote Operated Manure Pump

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## Current Problem:

In today's fast paced farming there is a growing demand for efficiency. Hauling manure is a time consuming process and efficiency is lost when the operator has to manually switch pump valves to load.

## Our Mission:

Our mission was to improve the convenience and efficiency of manure loading by offering the ability to remotely change modes from agitate to load.

## Deliverables:

- Working model of remote controlled manure pump
- Wiring schematic of system
- Hydraulic schematic of system
- Comparison of remote system versus manual operation
- Project budget.

## Project Application:

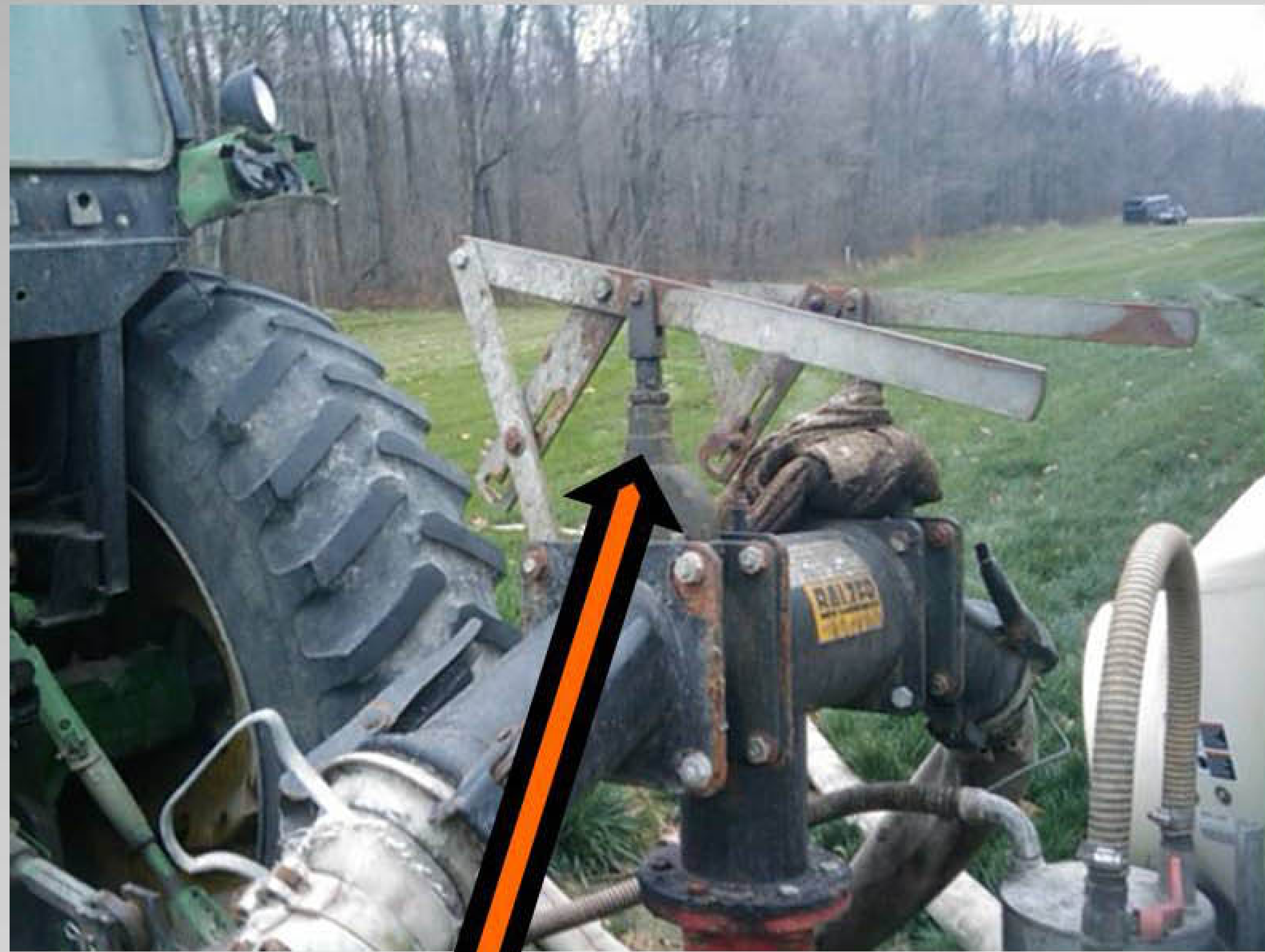
This remote controlled manure system was designed for the Balzer Doda pump, but can be retrofitted for any type of manure pump.

\*With this system we have found many applications around the farm that could be controlled remotely



# Manure Handling Problems

- Slow loading time
- Costly Manure Spills
- Operator Fatigue
- Manure valves difficult to operate with aging pump



Aging manure valve that has to be operated manually which is difficult to change position

## Manure Spills are a frequent problem

- Increased regulations on CAFO
- Larger manure pits and lagoons
- More volume being moved



Manure spill from over filling tank

## Our Plan of Attack

- ❖ Develop ideas for a remote operated valve and how to move the valve
- ❖ Designed, built, and tested a remote operated hydraulic valve
- ❖ Comparison of manual versus remote operation

## Building Process



Remote Receiver and wiring in weatherproof box



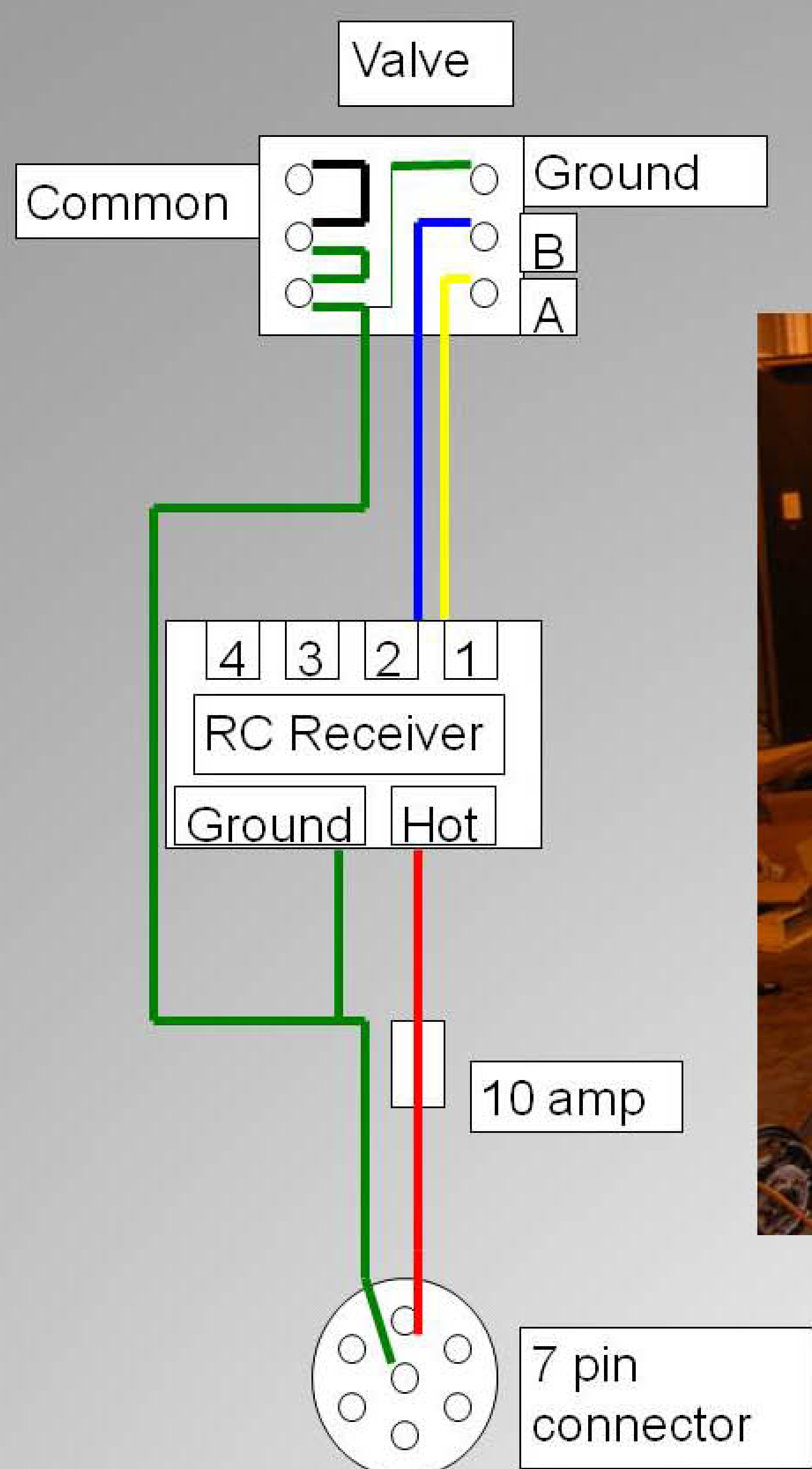
Electro hydraulic valve used to control hydraulic cylinders



Mounting the cylinders to the manure valves



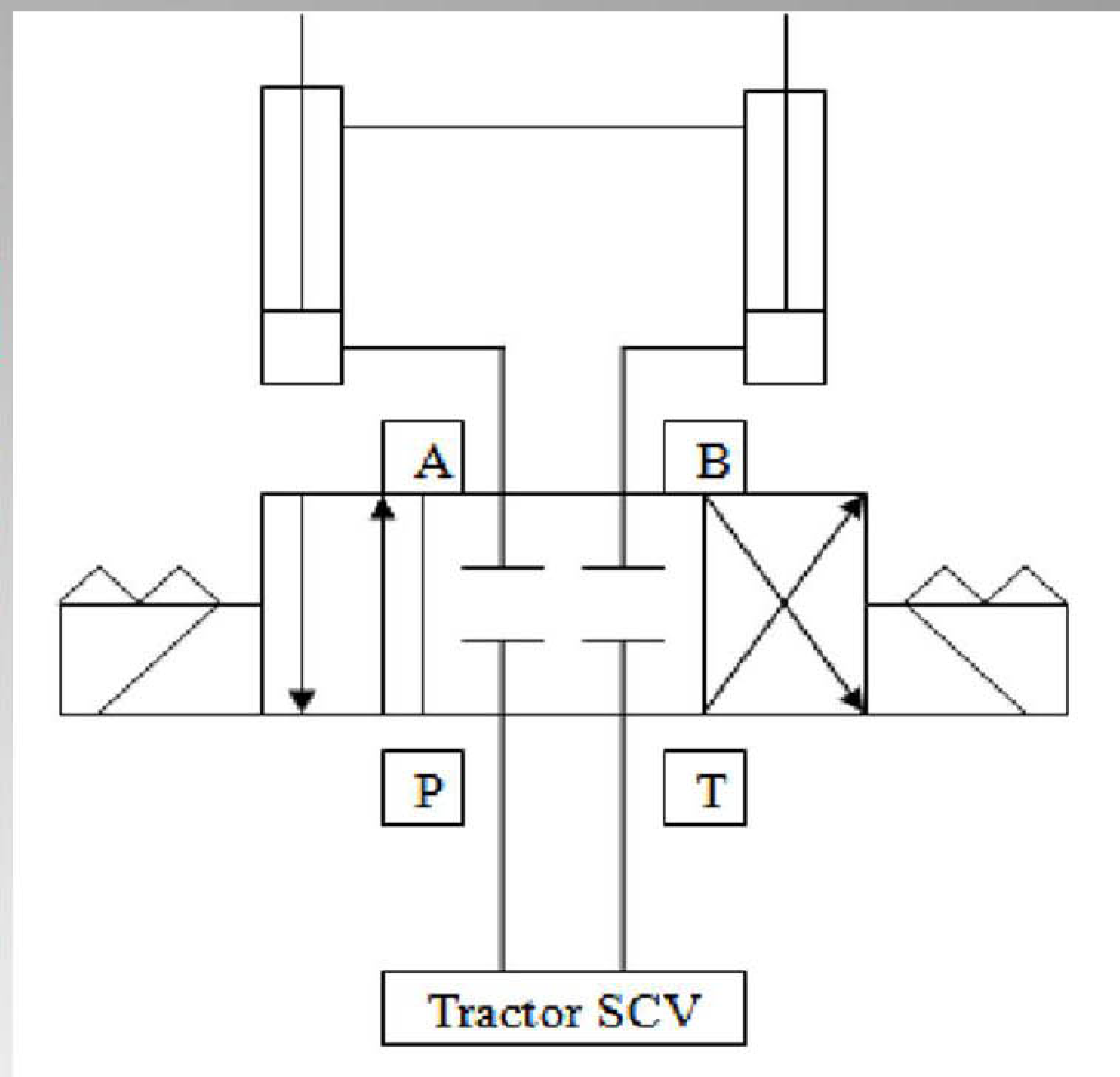
# System Wiring and Plumbing



Schematic of wiring

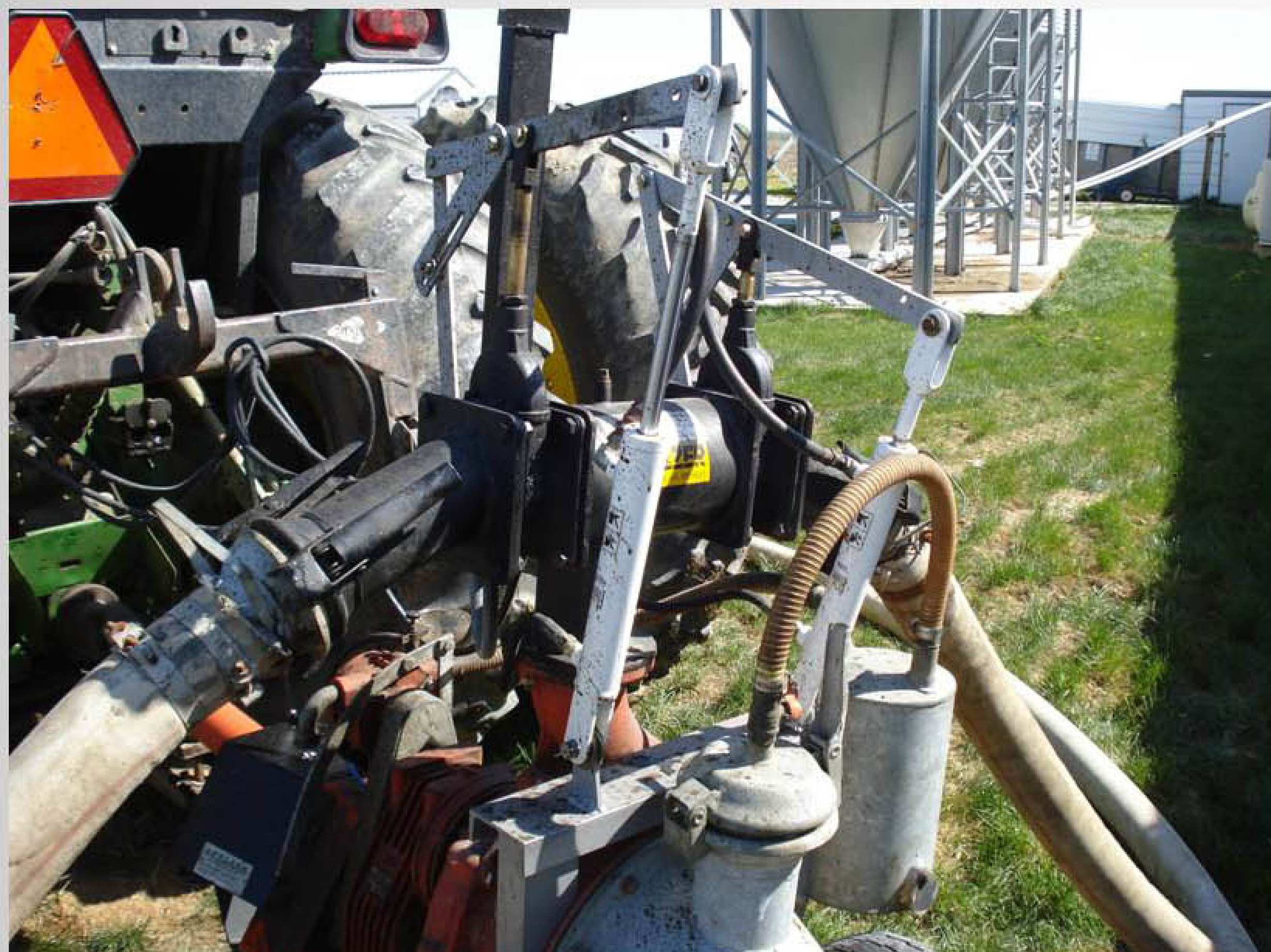


Plumbing the hydraulic cylinders



Hydraulic Schematic

# System Testing and Evaluation



Manure pump in operation pumping manure



Two members of the group testing the valves

	Normal	With RC System
loads per day **	33	38
tank size(gallons)	6000	6000
<b>productivity (gallons a day)</b>	<b>198000</b>	<b>228000</b>
dollars per gallon *	\$0.008	\$0.008
<b>earnings per day (dollars)</b>	<b>\$1,584.00</b>	<b>\$1,824.00</b>
<b>Additional Earnings per day with RC system</b>		<b>\$240.00</b>

It takes only 3.5 days to pay for the system

\* this is the lower end of the custom rates for hauling manure can be as high as .011  
 \*\* Loads per day is an actual figure for the normal system(11/15/09) avgering 17 min/load  
 \*\*\*These figures are based on a 9.5 hour day  
 We found that it takes an average of 2 minutes less per load by eliminating walk time to the pump

## Cost of Project

Remote Receiver	\$95
Electrohydraulic valve	\$145
Hydraulic Cylinders	\$306
Hydraulic Supplies	\$148
Wiring Supplies	\$82
Steel	\$30
Paint	\$15
Misc Hardware	\$19
<b>Total Cost</b>	<b>\$840</b>

# Special Thanks To Our Sponsors

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