

An Improvised 28 ft Dish Mount

wb2byp
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Improvised 28 ft Dish Mount

- This presentation goal: Idea generation to encourage others
- Traditionally minimal documentation of other installs
- Difficulty in finding surplus commercial positioners
- Importance of imagery - more conveyed information
- Similar-to designs: K5SO, N2IQ
K9SLQ (N8CQ)
K2UYH, K1CA, K2CBA
VK3UM
- Commercial Dish installations – RA facilities
- Tapping the Local / Extended Ham community
- Sense of history – contact everyone for lessons learned

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Improvised 28 ft Dish Mount

- Dish is a Model 350 28 ft (8.5 m) DS Kennedy circa 1957
- Weight 1410 lbs (with homebrew frame 4000 lbs)
- 6 petals and 2 center sections plus feed booms
- Wind load calculations
Approx 23000 lbs force in an 80 MPH wind
- Tower Rohn 84X – 850 lbs, 20 ft (6' buried, 14' exposed)
- Concrete Calculations
8' x 8' x 4' lower block with 12' x 12' x 2' top
Shaped to resist forces trying to turn over
 $3300 \text{ lbs/yd} \times 20.1 \text{ yd} = 66330 \text{ lbs}$

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- Frame – welded $\frac{1}{4}$ thick 2 x 6 steel contacting 20 bolt points ($\frac{3}{4}$ " SS bolts) on the existing aluminum frame
Longest piece was 242" (speedymetals reference)
- Elevation Articulation – 48" x 2.18" dia solid SS hinge pin held with 4 bearing flanges (centerless grinding reference) to 48" x 48" x $\frac{1}{2}$ " plate welded to frame
- Azimuth Bearing – formed by two 48" square $\frac{1}{2}$ " steel plates held apart with 6 non-articulating steel wheel assys centered by a spindle formed from telescoped steel tubing 7.5" dia $\frac{1}{2}$ " thick outside and 6.25" dia $\frac{1}{2}$ " thick inside
- Counterweight - presently not counterweighted beyond frame
Ideal location is off existing frame
Hydraulic ram lift worst case 2000 lb
- Stow assumptions – Natural safe stow is birdbath position

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- Azimuth Motor – large Prop-Pitch motor
9600:1 gear ratio
12VDC from garden tractor battery
Position instrumented with a drum suspended from a 5/8" threaded rod parallel to spindle driving US Digital model A2 absolute encoder
Serial data to shack W2DRZ decoder/display
- Elevation Actuator – double acting hydraulic cylinder w/ 40" range based on design notes from K1RQG
Fluid Power Inc. CF CMDHN CILSOB 40.00
Automatic Transmission Fluid – cold wx
Surplus Center/Northern Tool/McMaster Carr
K5SO/K1RQG/K2DH similarities
Position instrumented with gravity driven absolute encoder inclinometer A2T

24VDC relay system at dish for remote actuation – manual joystick control in shack

Tower Section



Rohn 84X



Tower Installation



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Concrete Base



Concrete Base



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Concrete Base



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Concrete Base



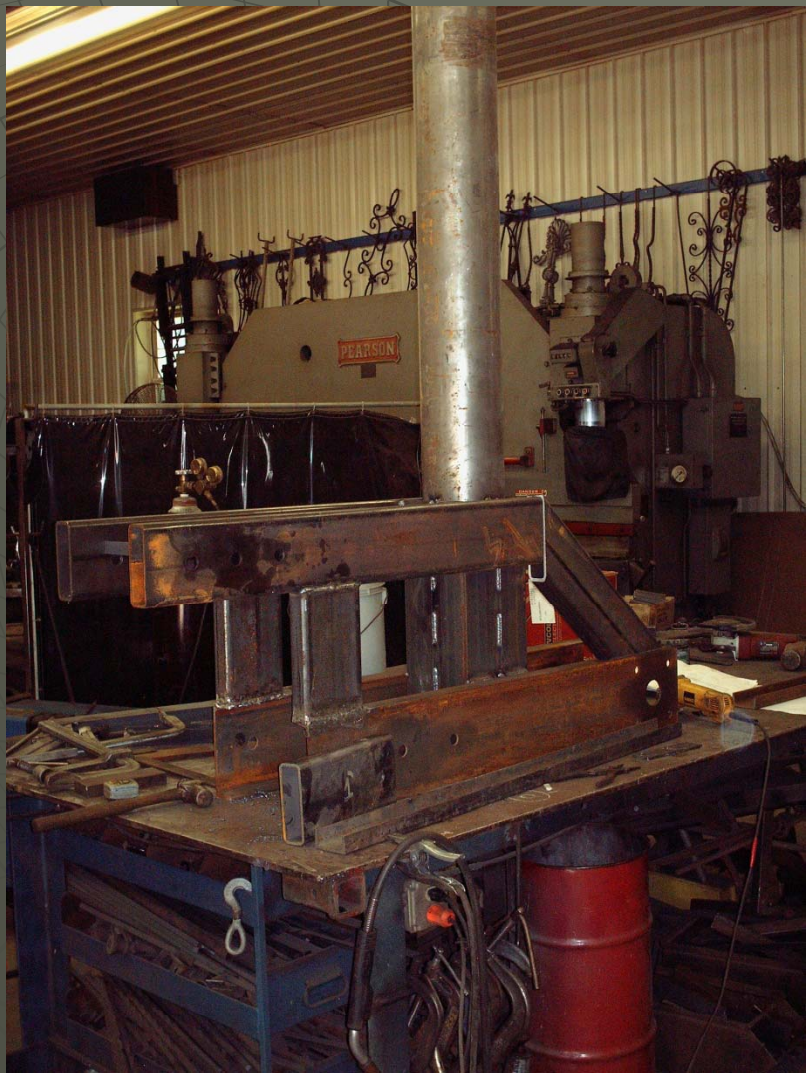
Tower Top Plate



Tower Top Rotation Joint



Elevation Frame



Elevation Frame



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Azimuth Spindle



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Azimuth Bearing Surface



Dish Sections



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Placement of Dish for Frame Construction



Access to Dish Top and Bottom



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Frame Construction



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Frame Construction



Frame Construction



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Frame Construction



Installation of Tower Top Collar



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Installation of Azimuth Spindle



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Hinge Pin Installation



Lift and Prepare for Feed Booms



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Lift and Prepare for Feed Booms



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Turn Over to Install Feed Booms



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Turn Over to Install Feed Booms



Turn Over to Install Feed Booms



Turn Over to Install Feed Booms



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Install Feed Booms



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Install on Tower



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Attaching Frame to Elevation Arms



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Attaching Dish Frame to Elevation Arms



Attaching Dish Frame to Elevation Arms



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Elevation Hinge and Azimuth Bearing



Elevation Hinge and Azimuth Bearing



Installation Crew



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Hydraulic Cylinder Installation



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Hydraulic Cylinder Installation

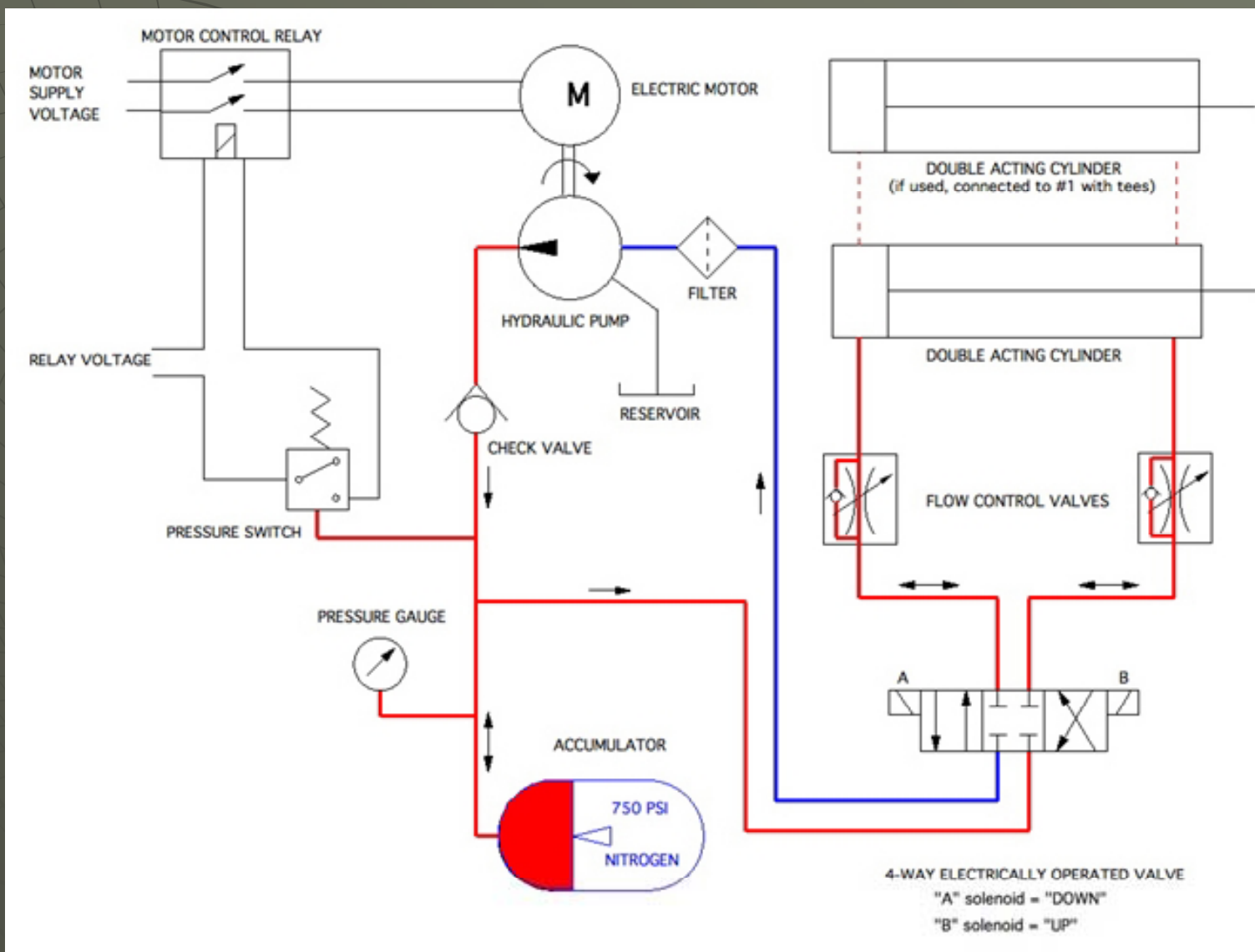


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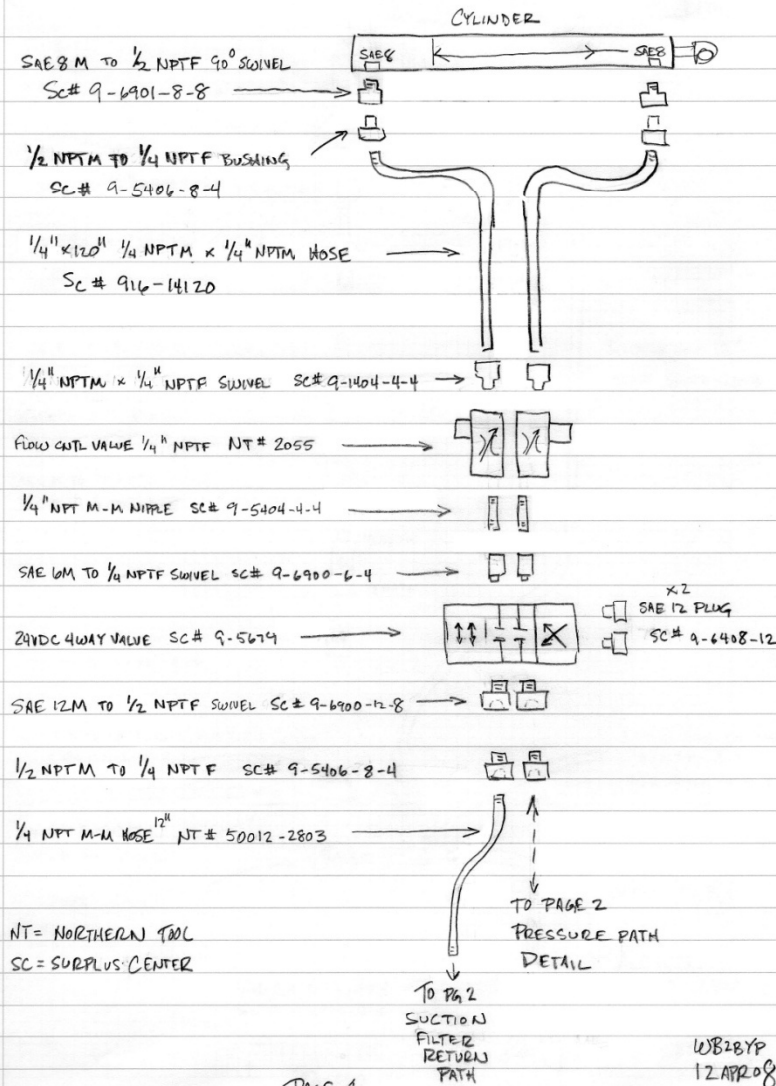
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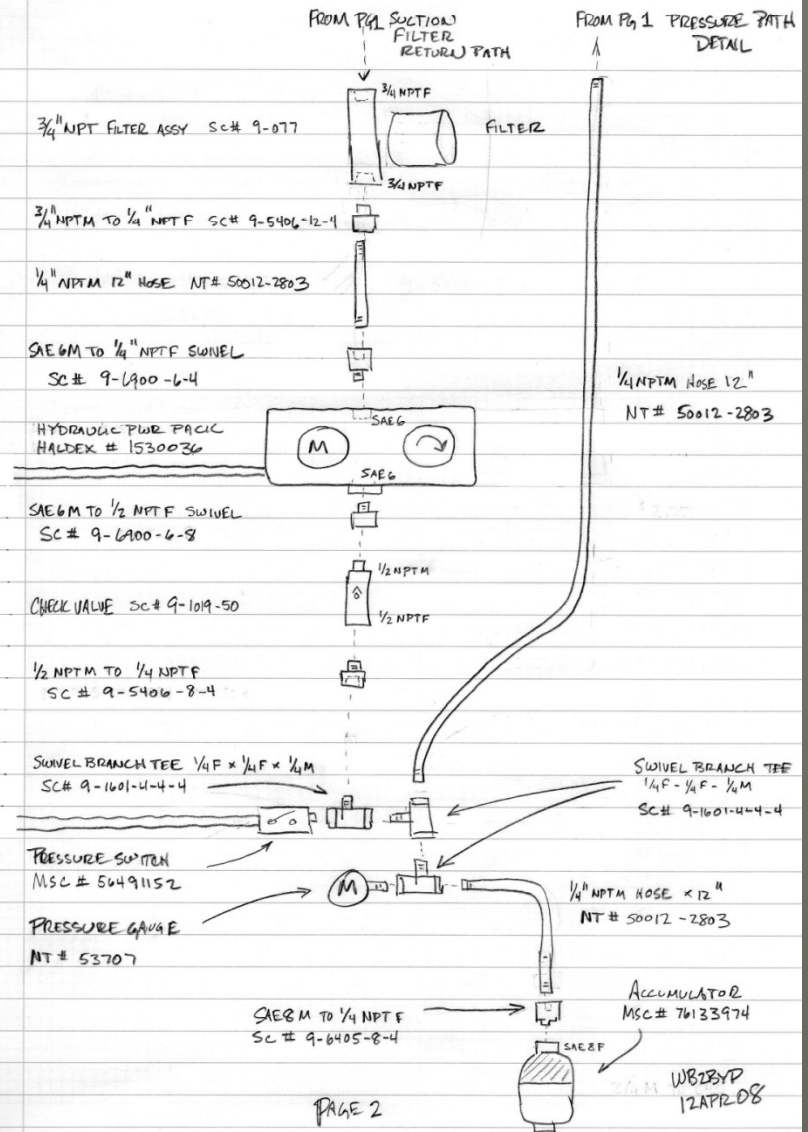
K1RQG Hydraulic Schematic



Hydraulic Components

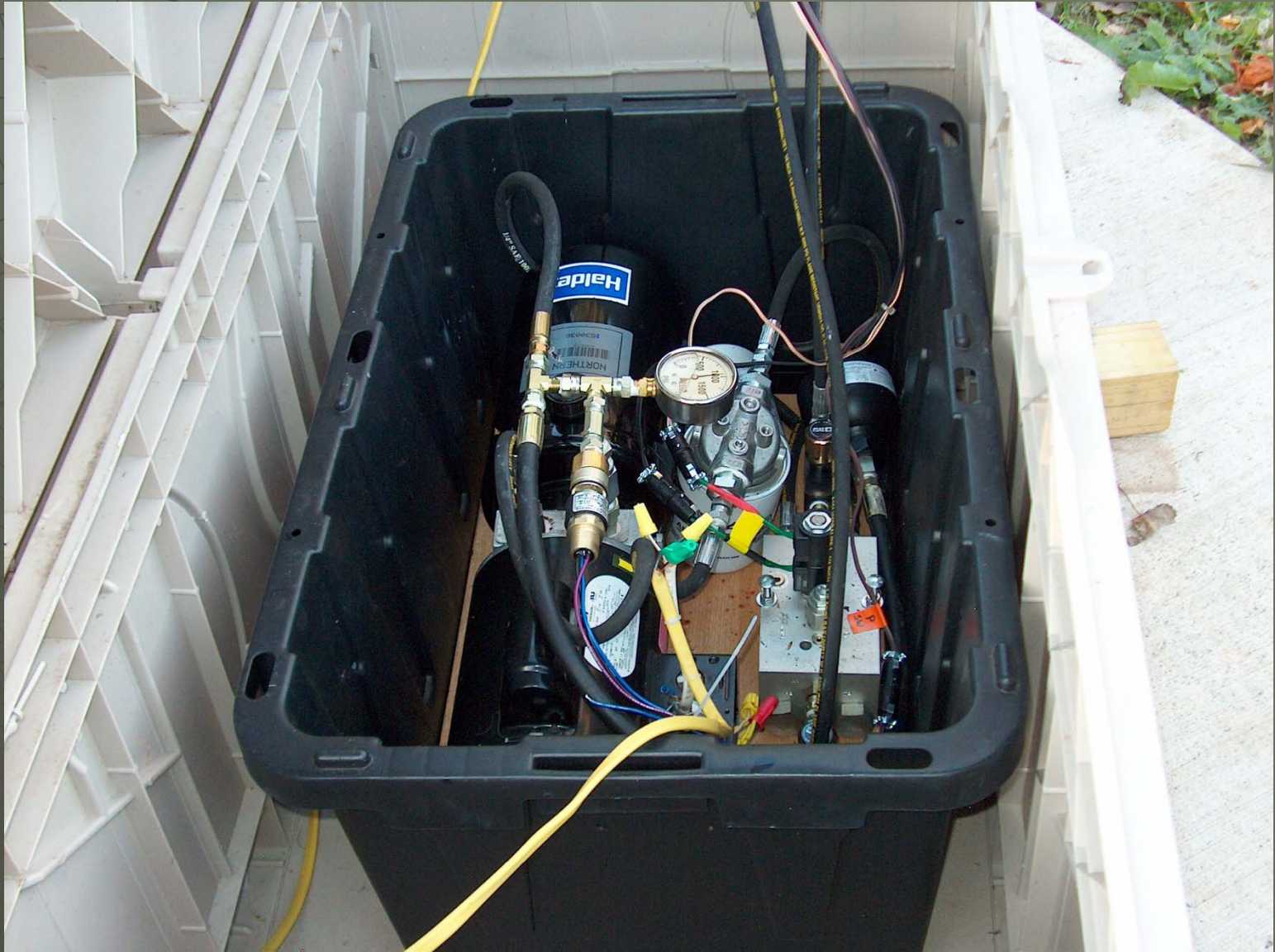


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Hydraulic System

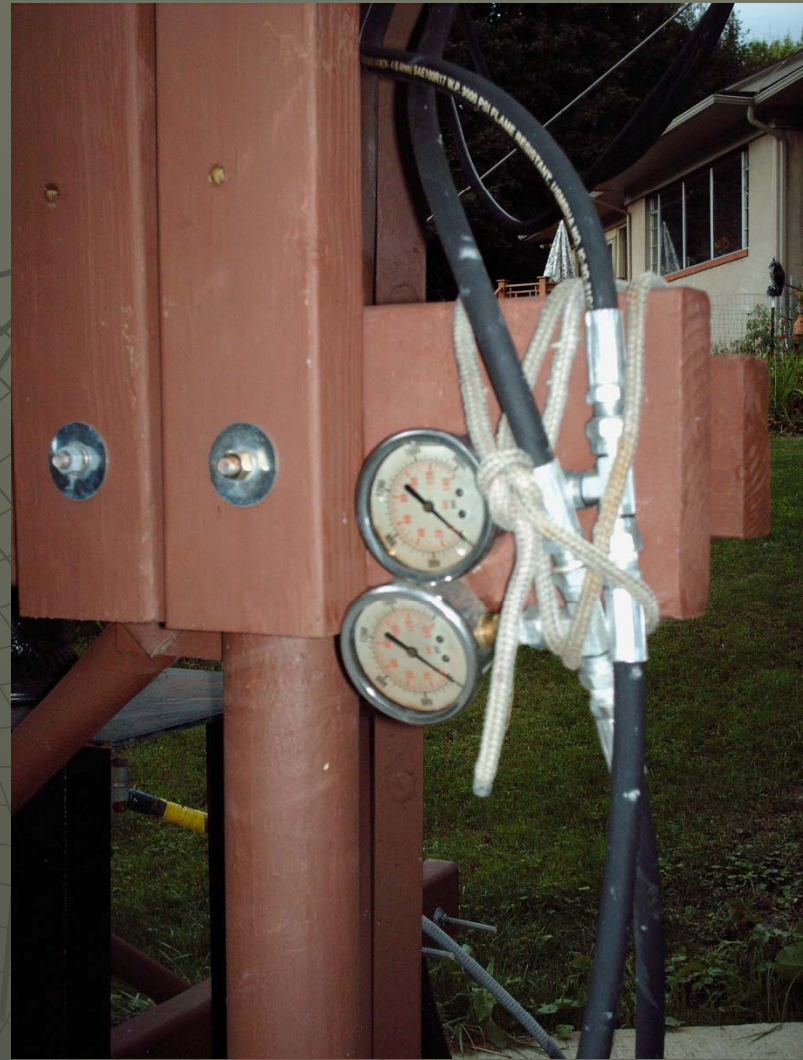


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Hydraulic System



Hydraulic Cylinder Installation



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References:

- <http://www.k5so.com/>
- <http://www.k1rqg.com/>
- <http://www.surpluscenter.com/>
- <http://www.mcmaster.com/>
- <http://www.usdigital.com/products>
- <http://www.speedymetals.com/>
- <http://www.w2drz.ramcoinc.com/index.htm>
- <http://www.centerlesstech.com/>

Lessons Learned

- Welder could have shortened the tower vs. bury in concrete
- Counterweight location – design of the frame to incorporate



- Two hydraulic cylinders would reduce concerns of tip failure
- Updating the spindle end to incorporate universal joint

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