

Parabolic Trough Tracking System

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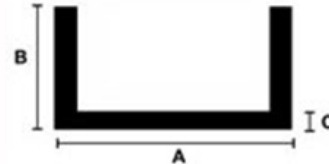
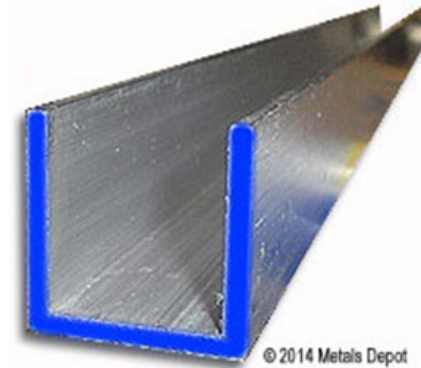


Introduction

- Objectives completed:
 - Purchased a chain to connect the sprockets
 - Purchased four tires along with four spacers to attach the tires properly
 - Decided that our current gearbox is in a working state
 - Gearbox has been professionally cleaned
- Declared objectives:
 - Purchase trim to enclose the edges
 - Purchase a material and adhesive to seal holes in the reflective surface
 - Estimate and purchase the ideal motor and control box assembly
 - Look into the current wheel assembly situation
 - Estimate the amount of fencing needed to surround the trough at its new location

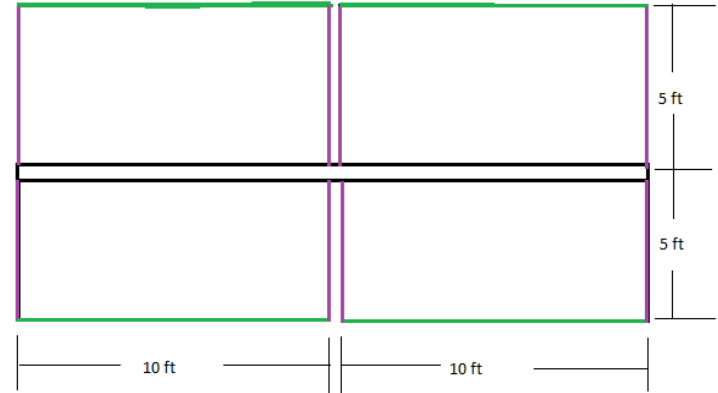
Trim

- 6063-T52 Aluminum Channel (Sharp Corners)
 - Cheaper than plastic.
- Stock Number: C311418
- Dimensions:
 - Width(A) = 1.25"
 - Legs(B) = 1.25"
 - Web Thickness(C) = .125"
 - Leaves 1" as the inner width.
- Adhesive: Loctite PL375 Heavy Duty
 - Cost: \$2.40 per bottle
 - Estimating 3 bottles
 - Total cost: \$7.20



Trim Perimeter Calculations

- Figure shows the lengths of trim needed.
- The perimeter calculation:
 - $P = 4(10 \text{ ft}) + 8(5 \text{ ft}) = 80 \text{ ft}$
- Covers all open areas.
- Short segments of trim will be used on curved edges
- Found on MetalsDepot:
 - 5 Sections cut of 16 feet in length: \$206.40
 - Shipping: UPS ground delivery: \$13.98
 - Total: \$220.38



Material to Cover Damaged Surface

- Mylar
 - Cheap
 - Reflective
 - Can be used to cover holes in parabolic surface and water damaged spots

- Found on Amazon.com
 - 2 mil 25ft X 4ft = 100 ft*ft
 - Cost: \$20.02



Motor Replacement Information

- 56 C Face Motor.
 - Need to know how much horsepower.
 - What is the voltage? Most likely 90V or 180V.
 - DC motor drive speed (RPM) can be adjustable to whatever the parabolic trough needs.
- Repair old motor \$120-\$130.

Wheels

- Three wheels were replaced perfectly in good shape.
- One wheel caster broke in the process of replacing the tire.

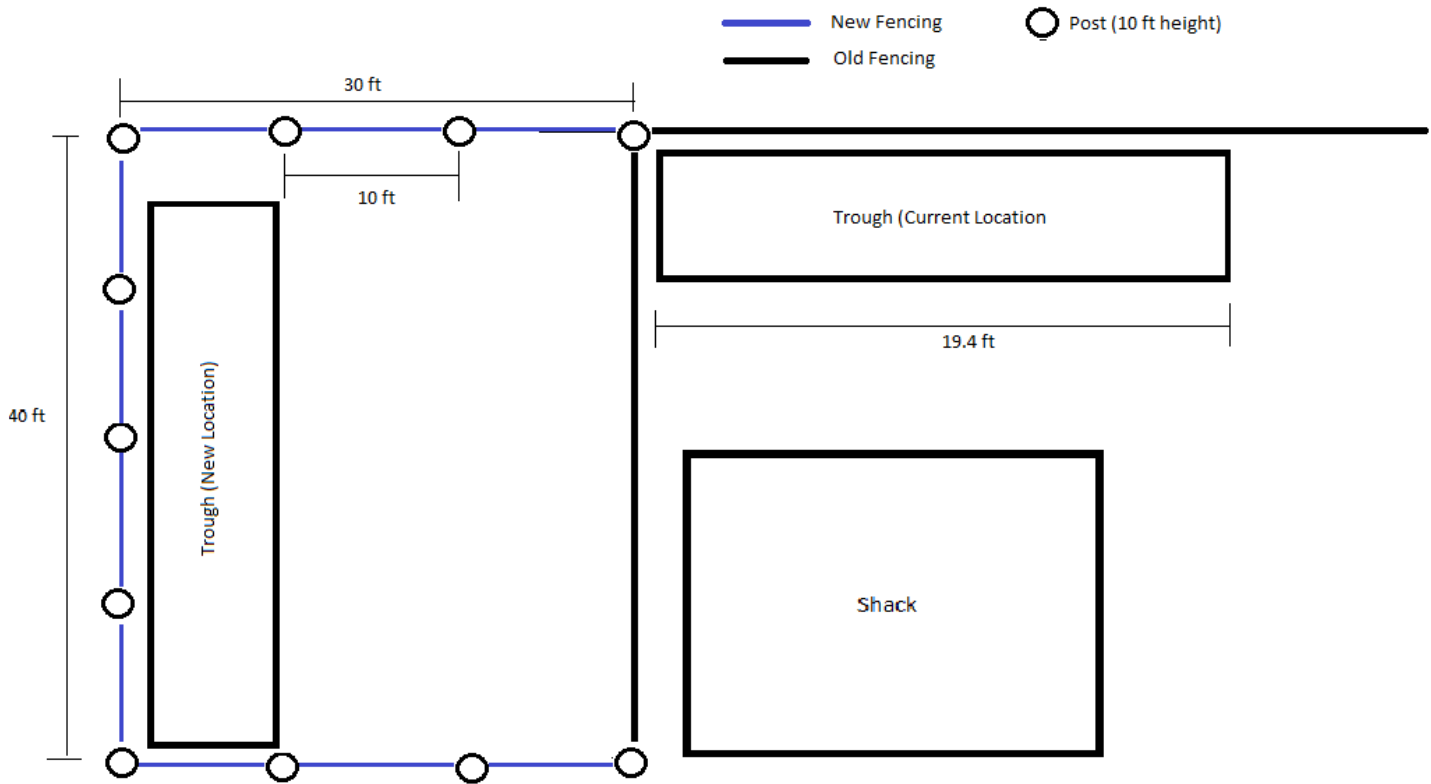
- Options:
 - Ordering a caster/wheel assembly and keep one wheel as a spare (\$65.99)
 - Replace all casters, return previously purchased wheels.
 - \$65.99 each X 4 casters = \$263.96
 - Weld the failed caster and use the wheels previously purchased (\$0.00).



Fencing

- By expanding the area of the solar shack, we can have more room to work on and test the parabolic trough in the appropriate orientation.
- The needed height of the fence: 8 ft
- The needed height of the post: 10 ft

- Based on measurements:
 - 70 ft of chain-link fencing needed



70' - 96" high 9 GA. GALVANIZED (2" Mesh) CHAIN LINK FABRIC Fencing

QTY.	PART #	ITEM	AMOUNT
70	CL969	96" 9 GA. GALVANIZED (2" Mesh) CHAIN LINK FABRIC @ 4.79 /Ft. =	335.30
4	PP158DQ40252	1 5/8" X 21' DQ-40 PIPE TOP RAIL @ 42.42 /Ea. =	169.68
2	PP278DQ40126	2 7/8" X 10'6" DQ-40 PIPE POST @ 55.18 /Ea. =	110.36
6	PP238DQ40126	2 3/8" X 10'6" DQ-40 PIPE POST @ 40.28 /Ea. =	241.68
2	BB278	2 7/8" REGULAR BRACE BAND @ .77 /Ea. =	1.54
14	TB278	2 7/8" REGULAR TENSION BAND @ .67 /Ea. =	9.38
2	PSRE158	1 5/8" PRESSED STEEL RAIL-END @ 1.49 /Ea. =	2.98
6	PSET238158	2 3/8" X 1 5/8" PRESSED STEEL EYE-TOP @ 3.21 /Ea. =	19.26
2	PSDC278	2 7/8" PRESSED STEEL CAP @ 1.55 /Ea. =	3.10
3	TRS158	1 5/8" SLEEVE @ 1.42 /Ea. =	4.26
50	STW99	8 1/2" 9 GA. STEEL TIE WIRE @ .13 /EA =	6.50
50	STW79	7 1/2" 9 GA. STEEL TIE WIRE @ .13 /EA =	6.50
16	CB516114	5/16" X 1 1/4" CARRIAGE BOLT @ .34 /Ea. =	5.44
1	TW9GA	9 GA. 10# (170') SMOOTH TENSION WIRE @ 15.04 /ROLL =	15.04
50	HRS9GA	9 GA. STEEL HOG RING @ .028 /Ea. =	1.40
27	PREMIX	60LB BAG SACK PREMIX @ 3.76 /Ea. =	101.52
		MATERIALS TOTAL:	\$ 1033.94
		8.446% STANDARD TAX:	87.33
		TOTAL:	\$ 1121.27

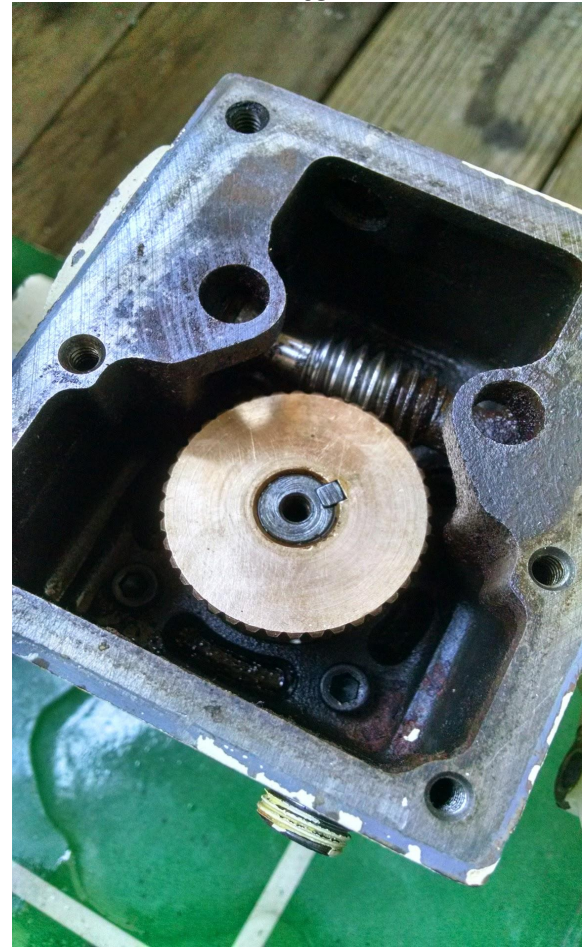
Gear Box

- The gearbox was taken to Coconino Auto suppliers in Flagstaff, AZ, and cleaned professionally from the rust and oil.
- The cost was 35\$
- New gasket cost: \$8
- Gear oil- 75W 90: \$8.50

Before



After



Before



After



Before



After



Conclusion

- 80 feet of aluminum trim; Total = \$220.38
- Mylar to cover the holes; Total = \$20.02
- Adhesive: \$7.20
- Caster/wheel assembly:
 - Replace one caster; Total = \$65.99
 - Replace all casters; Total = \$263.96
 - Weld the failed caster; Total = \$0.00
- 70 feet of chain link fence; Total = \$1,121.27
 - \$700.34 for just chain link fence and posts.
- Gearbox:
 - Cleaning; Total = \$35.00
 - New Gasket; Total = \$8.00
 - Gear Oil - 75W 90; Total = \$8.50

QUESTIONS?