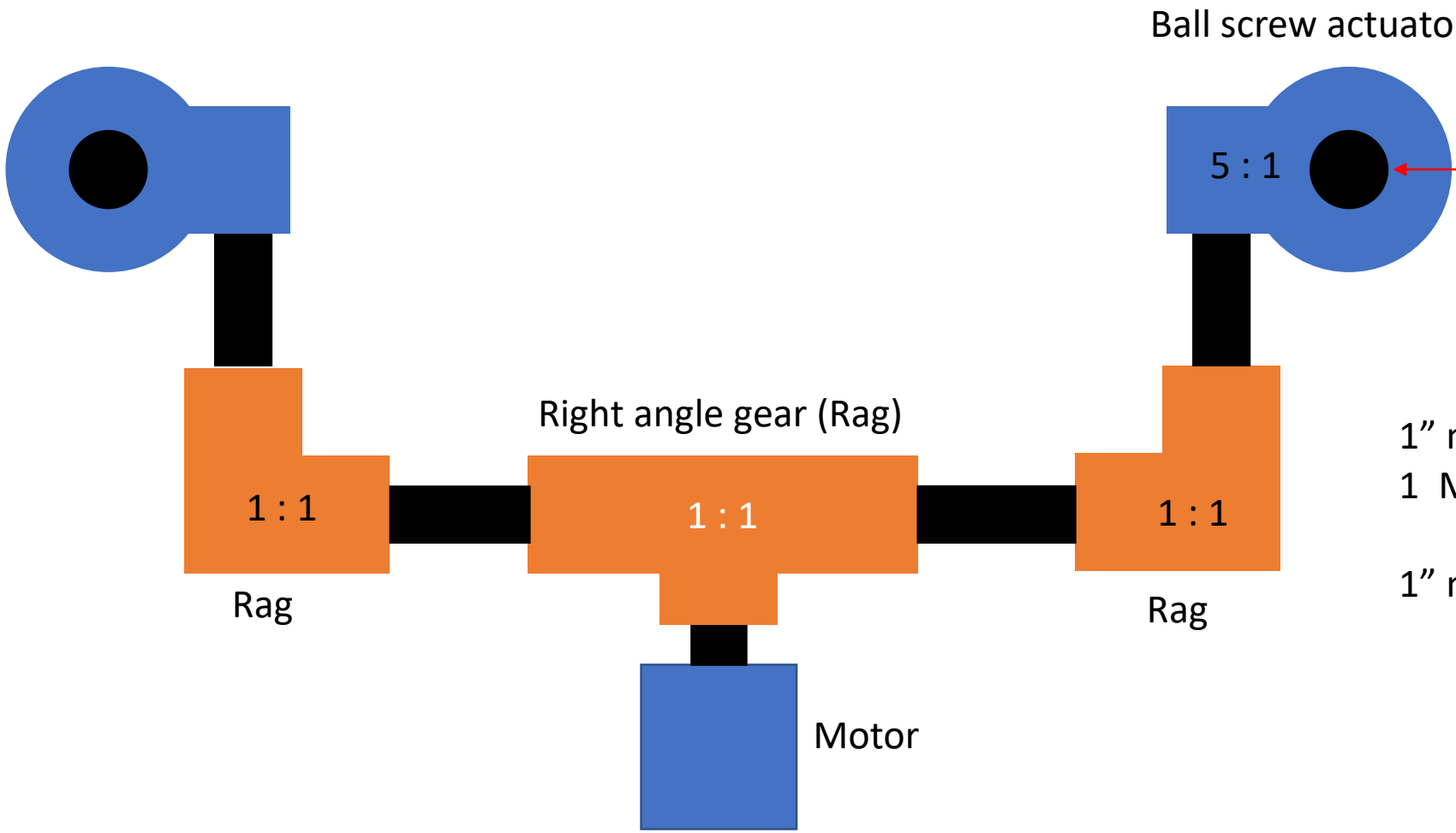
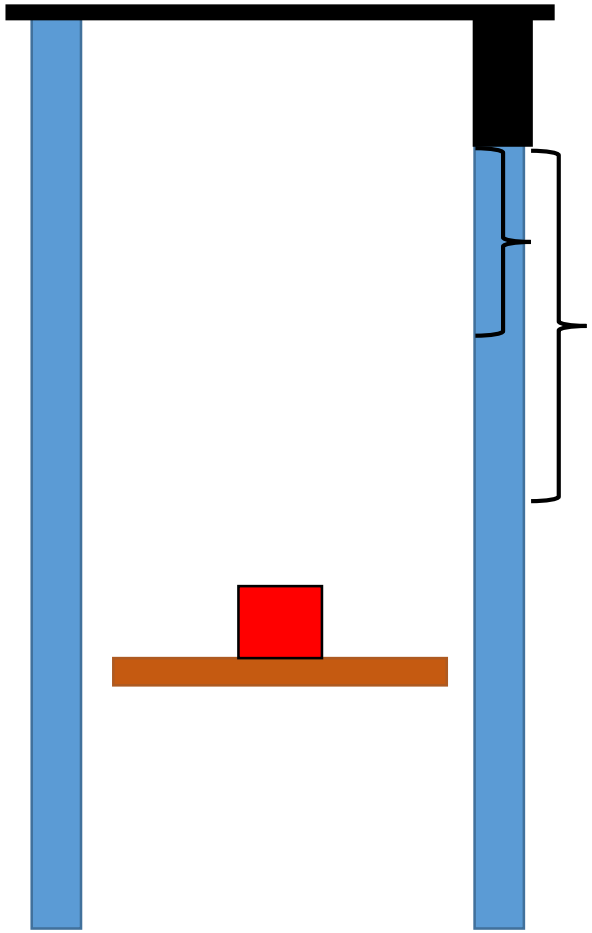
Step count – ADC- length relationship



1” move of the platform = 25 rev (motor)
1 Motor revolution = 200 steps

1” move = 5000 steps

Test 1” move = 5000 steps



Move the platform to a top location

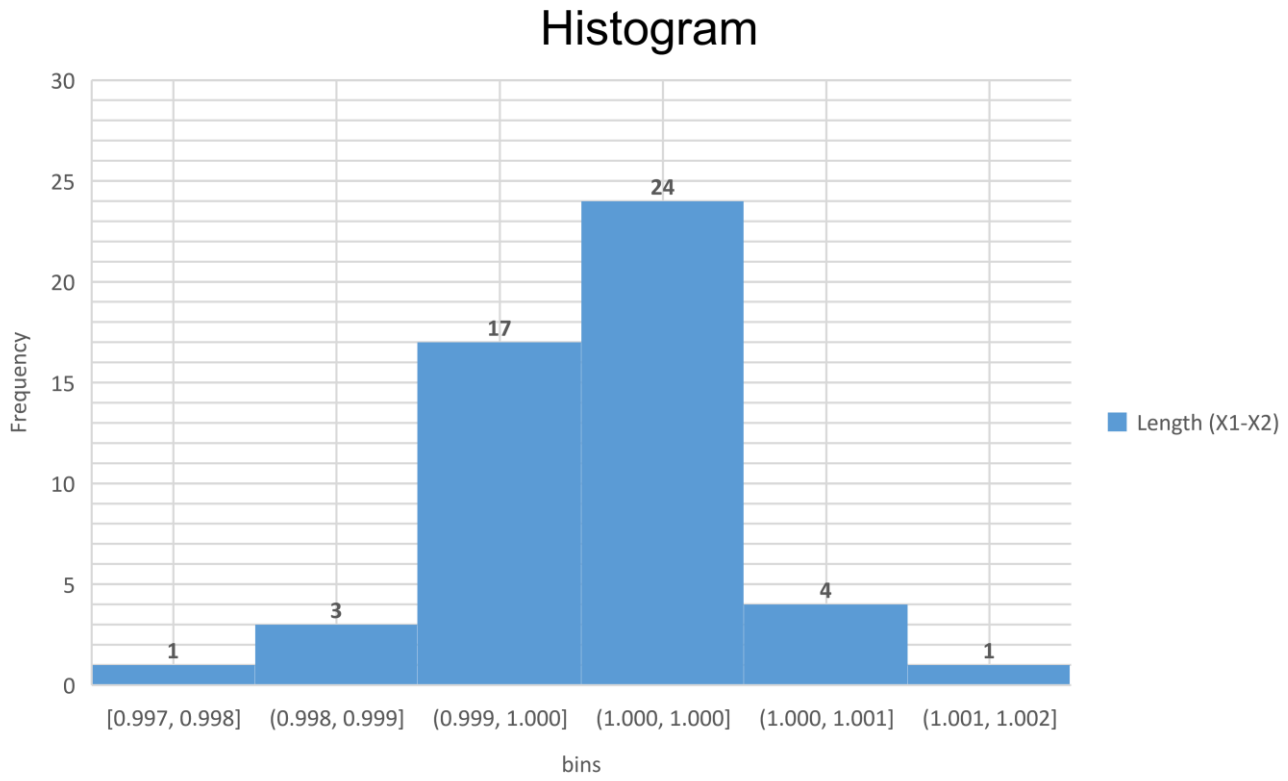
1. Move down 100 steps to remove backlash
2. record initial distance , Hard stop - platform
3. Move 5000 steps Down
4. record final distance , Hard stop - platform
5. Move 5100 steps Up
6. Repeat 50 times

Measurements are taken using a Vernier caliper (Accuracy 0.001”)

Results

First 20 readings

X1	X2	Length (X1-X2)
1.930	2.930	1.000
1.932	2.931	0.999
2.931	1.933	0.998
1.932	2.931	0.999
2.931	1.932	0.999
1.931	2.930	0.999
2.933	1.933	1.000
1.932	2.931	0.999
2.932	1.932	1.000
1.932	2.932	1.000
2.931	1.932	0.999
1.932	2.932	1.000
2.933	1.933	1.000
1.932	2.932	1.000
2.932	1.933	0.999
1.932	2.932	1.000
2.932	1.932	1.000
1.932	2.931	0.999
2.932	1.933	0.999
1.932	2.932	1.000
1.932	2.932	1.000
2.932	1.933	0.999

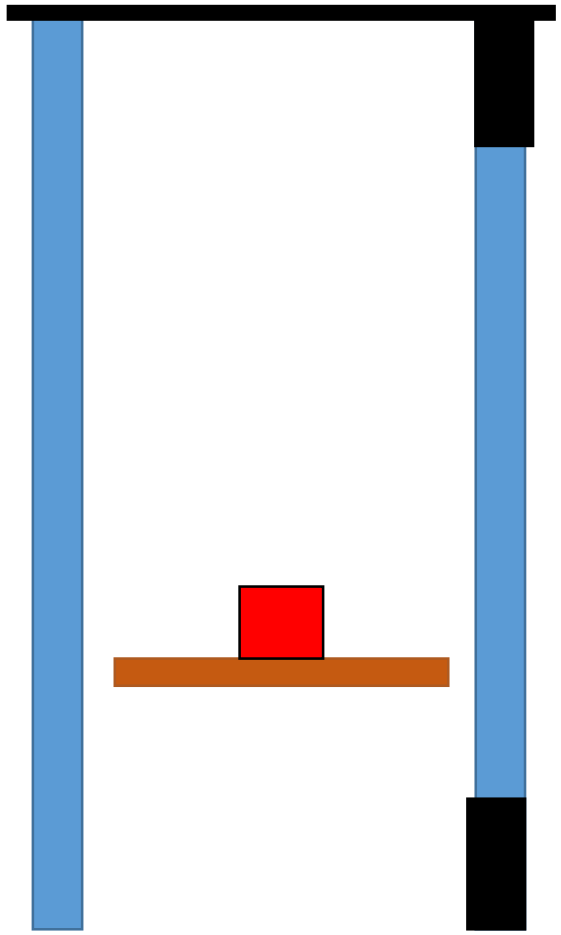


Mean : 1.000 ” **Error : 0.002”**

5000 steps of the motor = 1.000 ± 0.002 inches

- 5000 steps = 1.000 ± 0.002 inches
- Accuracy is better
- If we can fix a reference point on the lifter, can calculate the required steps accurately.

ADC – Step count relationship



1. Move the platform to the top hard stop
2. Set step count =0
3. Move the platform to the bottom hard stop

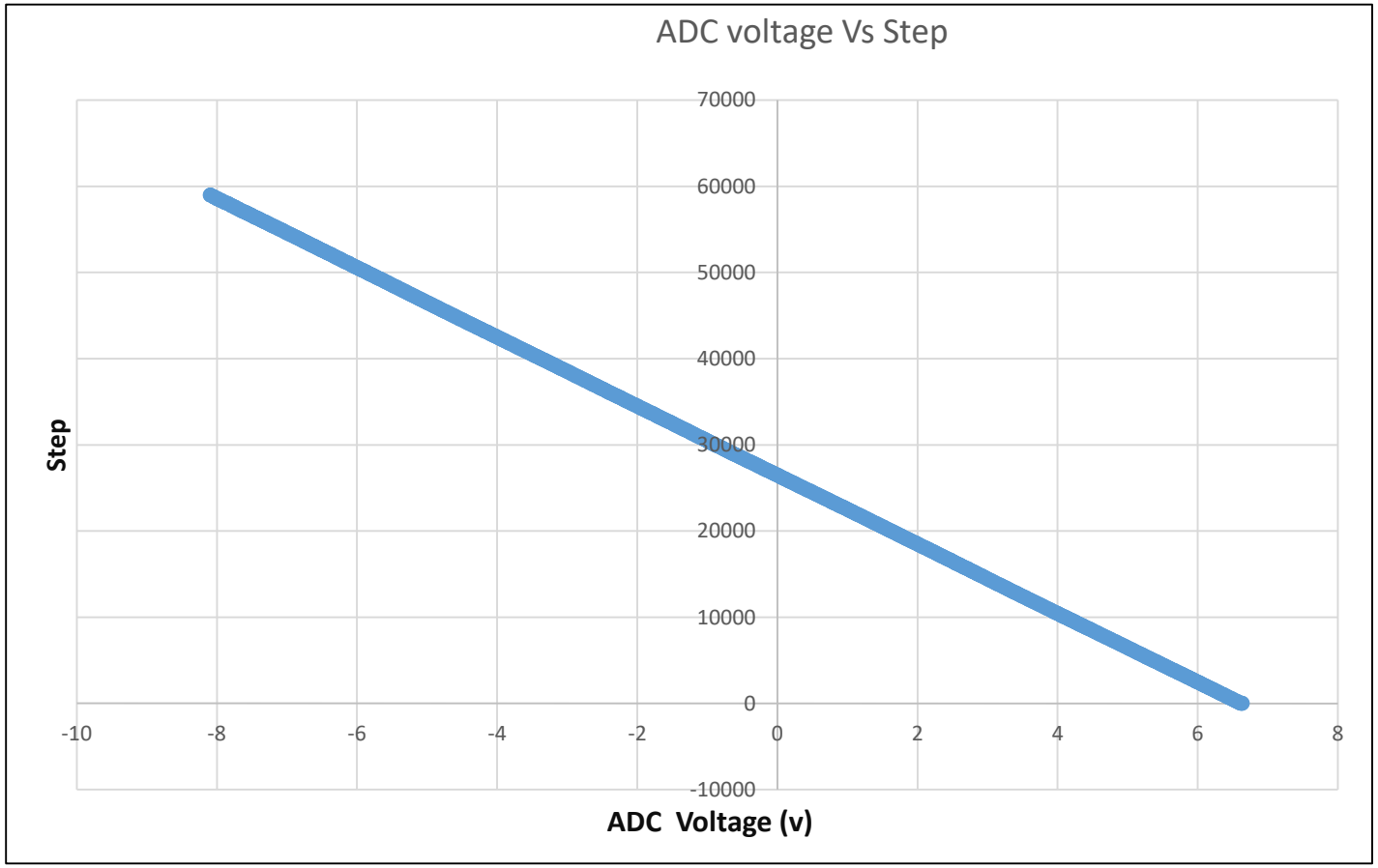
while

Recording the step count and the ADC voltage

3. Repeated 8 runs

Around 1100 data points were recorded in each run

ADC voltage vs Step count : Graph 1



Trend Line equations

$Y1 = -4009.3x + 26494$

$Y2 = -4009.4x + 26496$

$Y3 = -4009.4x + 26490$

$Y4 = -4009.3x + 26490$

$Y5 = -4009.7x + 26631$

$Y6 = -4009.8x + 26631$

$Y7 = -4009.6x + 26627$

$Y8 = -4009.5x + 26627$

Summary

- Strong relation between the ADC voltage and the Step count
- 5000 = 1.000 ± 0.002 inches
- Therefore, we can make a solid function to determine the physical position of the lifter table using ADC/Step count

Thank You