Studying Wheat Displacement Patterns in Lodging.

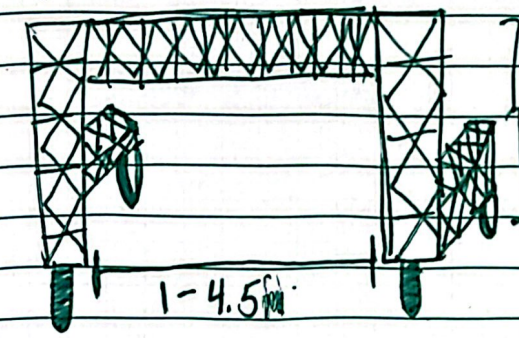
Model Basis

Cart

#1 single row suction.

* clamps after

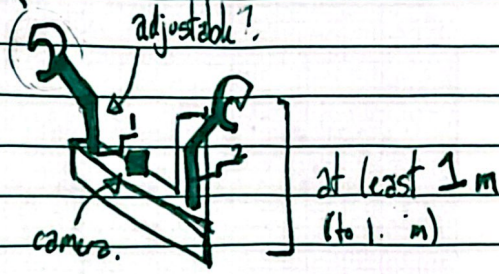
#1 - Grippers.



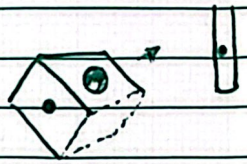
1m roughly.

1m roughly

1 - 4.5ft



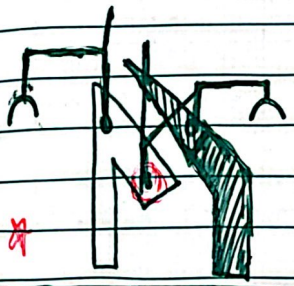
1. Threaded joint? , pins? →
2. vice? pins?



* pins for both may be the easiest *

* Trough easiest mechanically (pull & release, displaces head enough for it to oscillate.)

* Clamps in similar style to WCF cart (big RC car), Hangs from one side of cart
* should be able to fit in small version of cart.



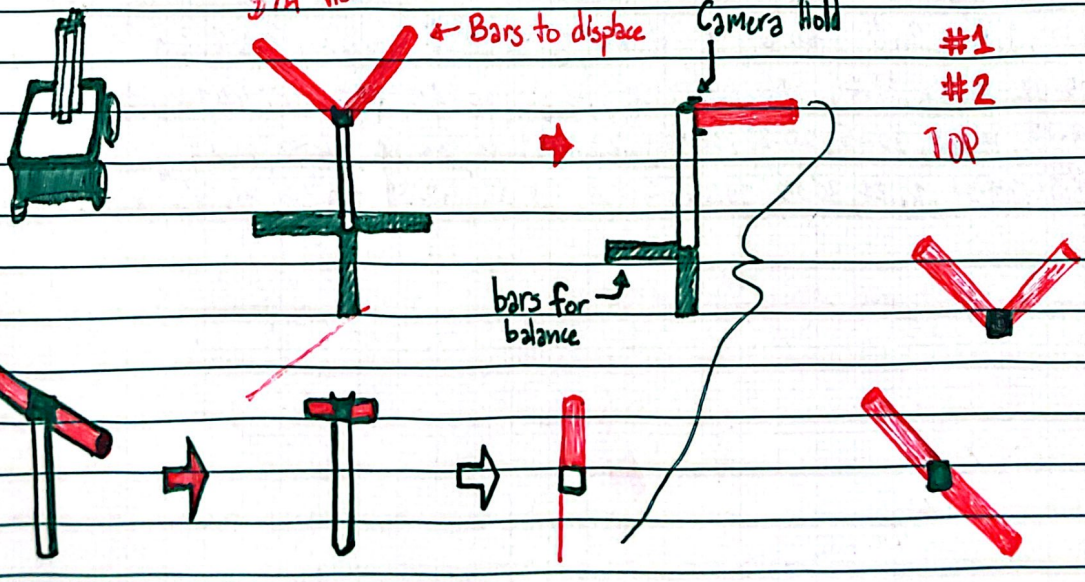
* shaded region accounts for possible protection for data? too complicated

→

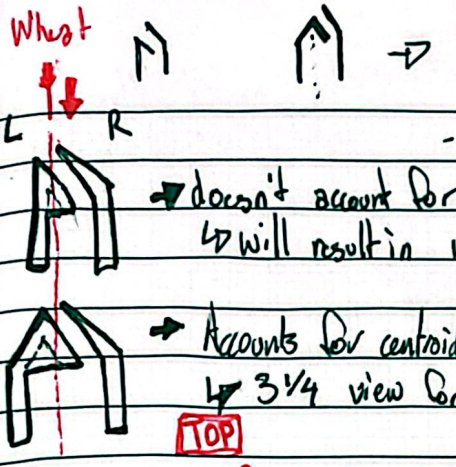
* draw to scale. , location of camera

Tiny Cart

* part slides down * similar to how certain camera stands work. * fall back :),



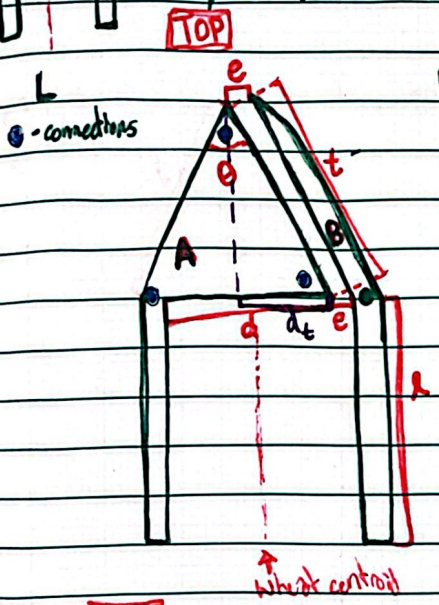
2. oscillation § +1 ...



→ triangle top w/ centroid lining up w/ stem rest position ↳ oscillation
↳ find angle which ends w/ the best horizontal motion (not front-back

↳ doesn't account for L-oscillation, centroid is bent further away w/ negative
↳ will result in wheat hitting the apparatus.

→ Accounts for centroid moving beyond initial frame, stability may be an issue ↳ turning of
↳ 3¼ view for plants (distinguish between plants & still have an oscillation view) the kind



Variables ★ Solid connections between A & B required, so e doesn't vary

d - displacement · 2, should be slightly large to account for rogue oscillations

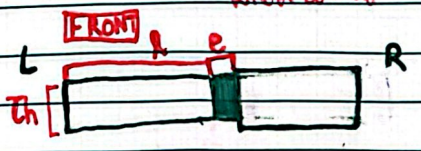
ℓ - length of duration of oscillation → cart speed & oscillation time into account for total distance

e - size of opening allowing stems in, large enough to grab a couple of stems, but small enough to limit the # of stems looked at (at once)

θ - angle of displacement for the stems. → must be such a size that allows for mostly side-displacement (not front & back)

t - length required to achieve only side motion. Long enough to not distort stem or motion

Th - Thickness of displacement apparatus - thin enough to replicate point force. thick enough to displace (not cut)



Possible material uses
- laser cut pieces (wood or metal)
- bend metal sheet
- cardboard :D

★ requires a lower coefficient of friction so stem doesn't stick to causes forward motion

Creating the Apparatus

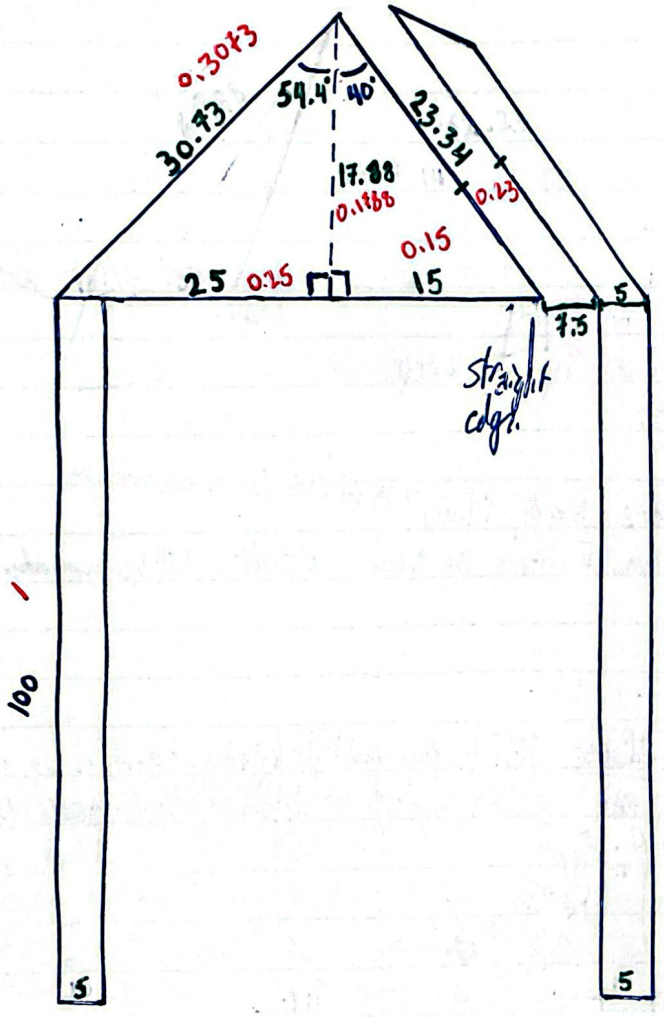
1. Test varying θ, t, e → for now ignore e
2. Test varying d (minimum 0.1m → max 1 m)

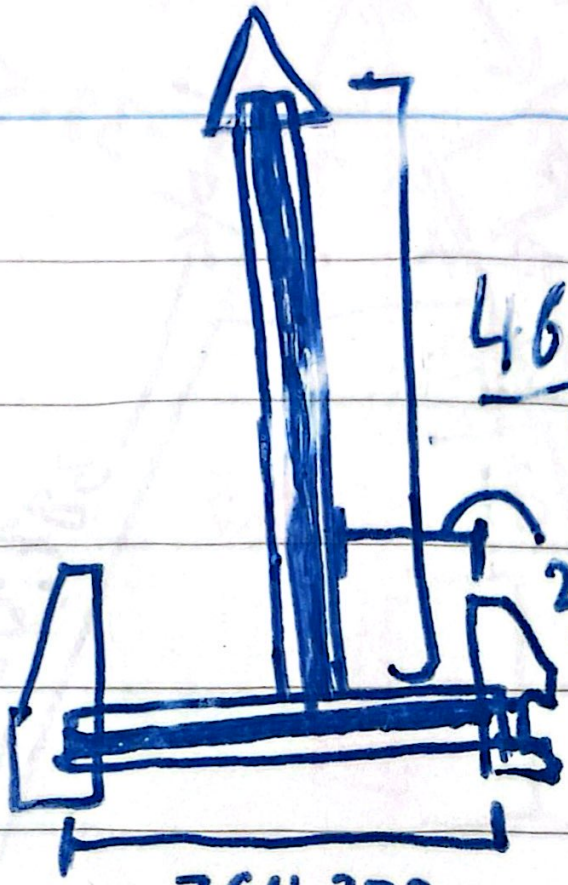
1. θ < 90 → 90° grabs too easy → pushes back & forth on stem.
θ = 45° seems promising ★ 45°?
d start at 80cm
↳ t = 13.7 ~ 14 cm

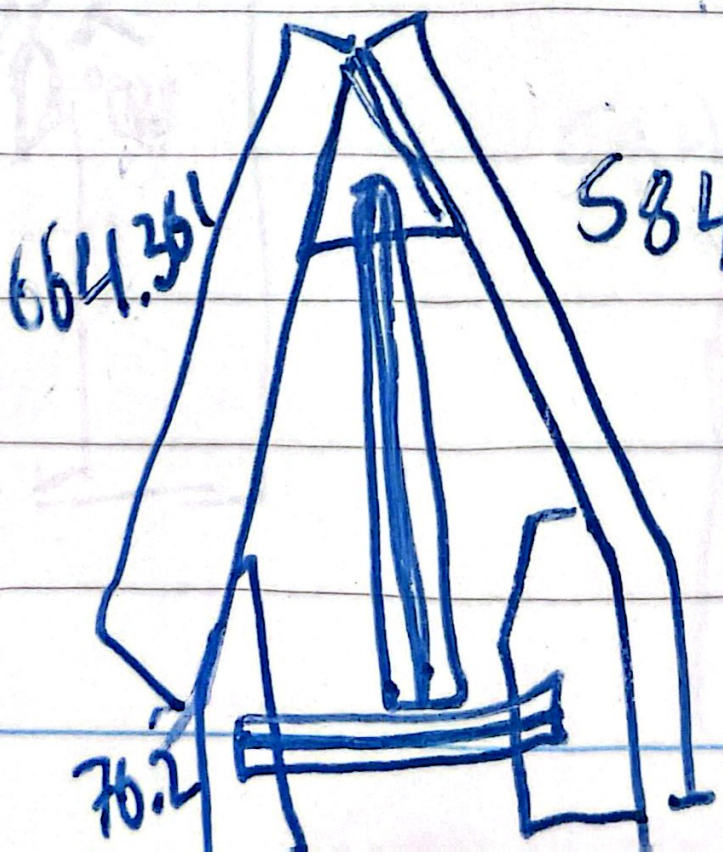
→ t depends on d_t, d_t must be large enough to give significant force.

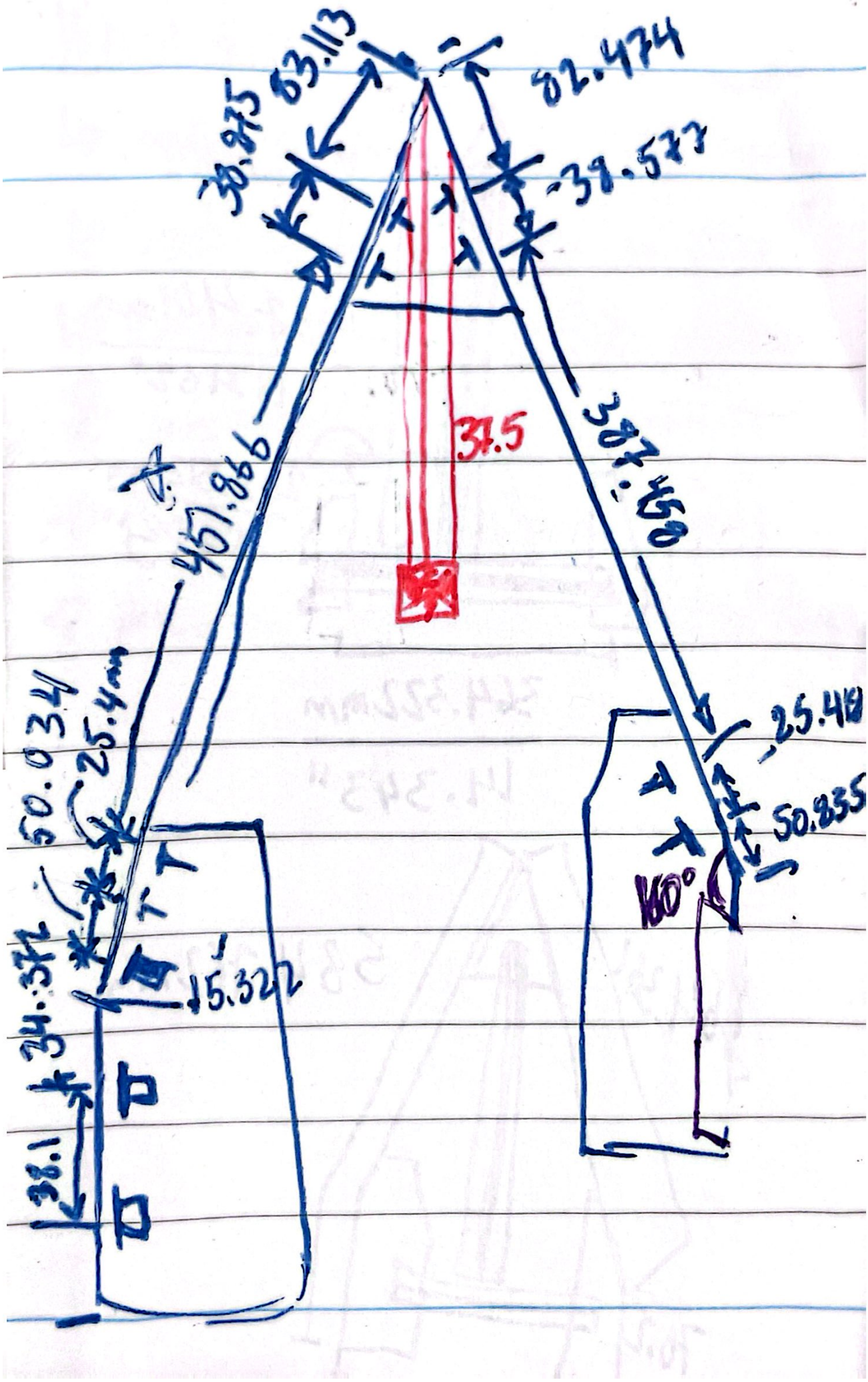
★ Front pyramid/triangle does not need to have equal sides
↳ depending on constraints for protrusion

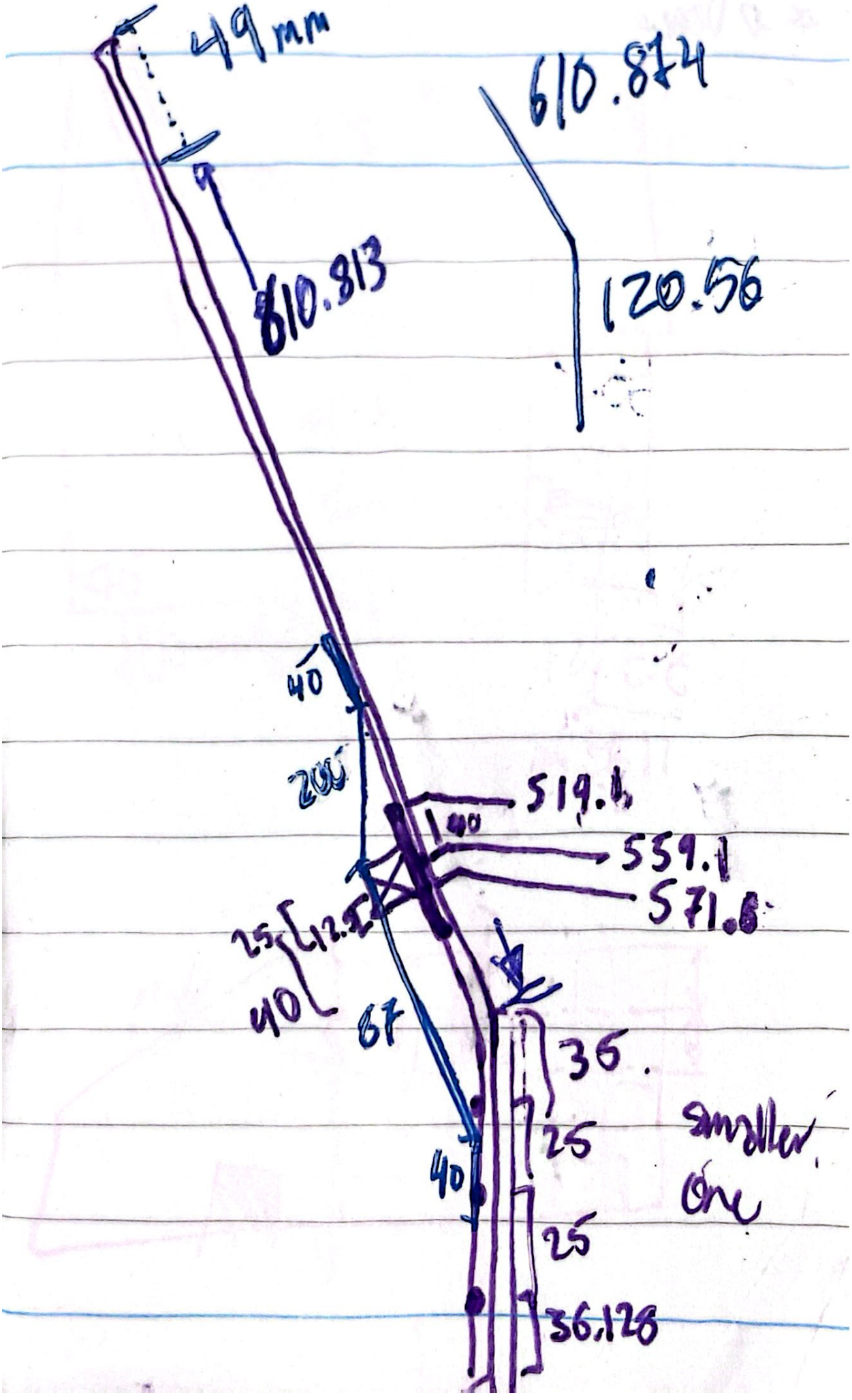
(in cm)








30.875
63.113
82.424
38.573
37.5
457.866
387.650
50.034
25.4mm
34.372
15.322
38.1
25.48
50.835
180°


49 mm
610.874
610.813
120.56
40
200
519.4
140
559.1
571.6
25
12.2
40
87
35
25
40
25
36.128
smaller
one

Camera mount:

Casing that clips on top & bottom & screws into place & screws into 8020