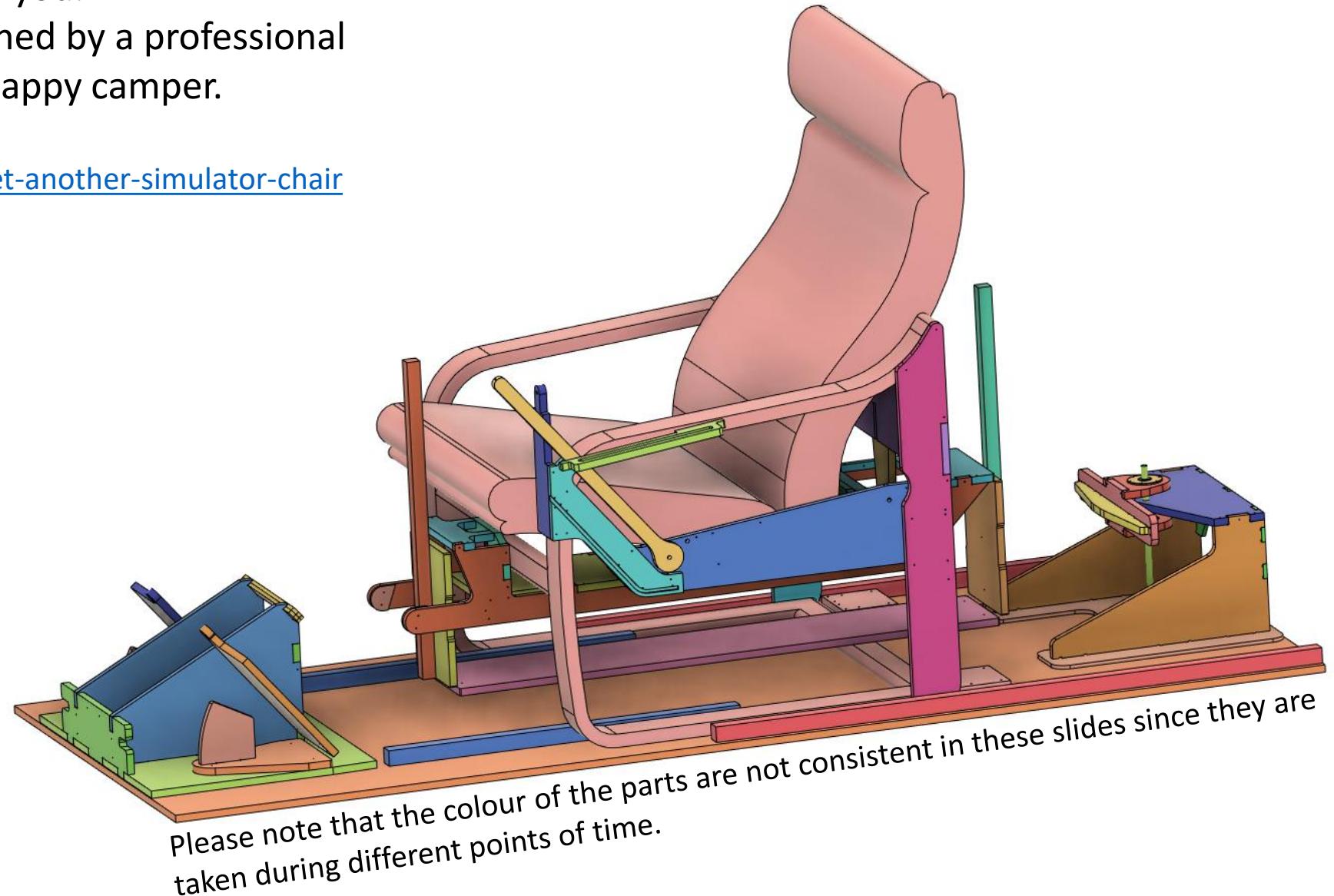


This document is intended to inspire how to assemble the Yet-another-simulator-chair. If you do it in any other manner, way or method it is not wrong. As long as it works for you.

Do note that this is not designed by a professional designer, it is designed by a happy camper.

<https://github.com/speedbird620/Yet-another-simulator-chair>



Please note that the colour of the parts are not consistent in these slides since they are taken during different points of time.

Warnings



Pre-drill
the hole!

Pre-drilling a hole is because the material may crack when a screw is applied.



Not too
long!

Use of a too long screw may penetrate the plywood and poke hole in either floor, humans or animals.

These warnings may be applied to more places than indicated in this document.

Usage of your own judgement is mandatory.

Design and information

This guide has been inspired by the instruction pamphlets from LEGO and IKEA.

However, it's very hard to mimic their instructions. But at least I tried.

Whenever you find an information gap, please let me know: avionics@skyracer.net

The pieces are designed great care not to be mixed up or mounted. The design has these principles:

- Pieces only fit in one direction
- Or they are unidirectional

Name	Count	Sum = 12
A1	1	
A2	2	
A3	2	
A4	2	
A5	1	
A6	1	
A7	1	
A8	2	

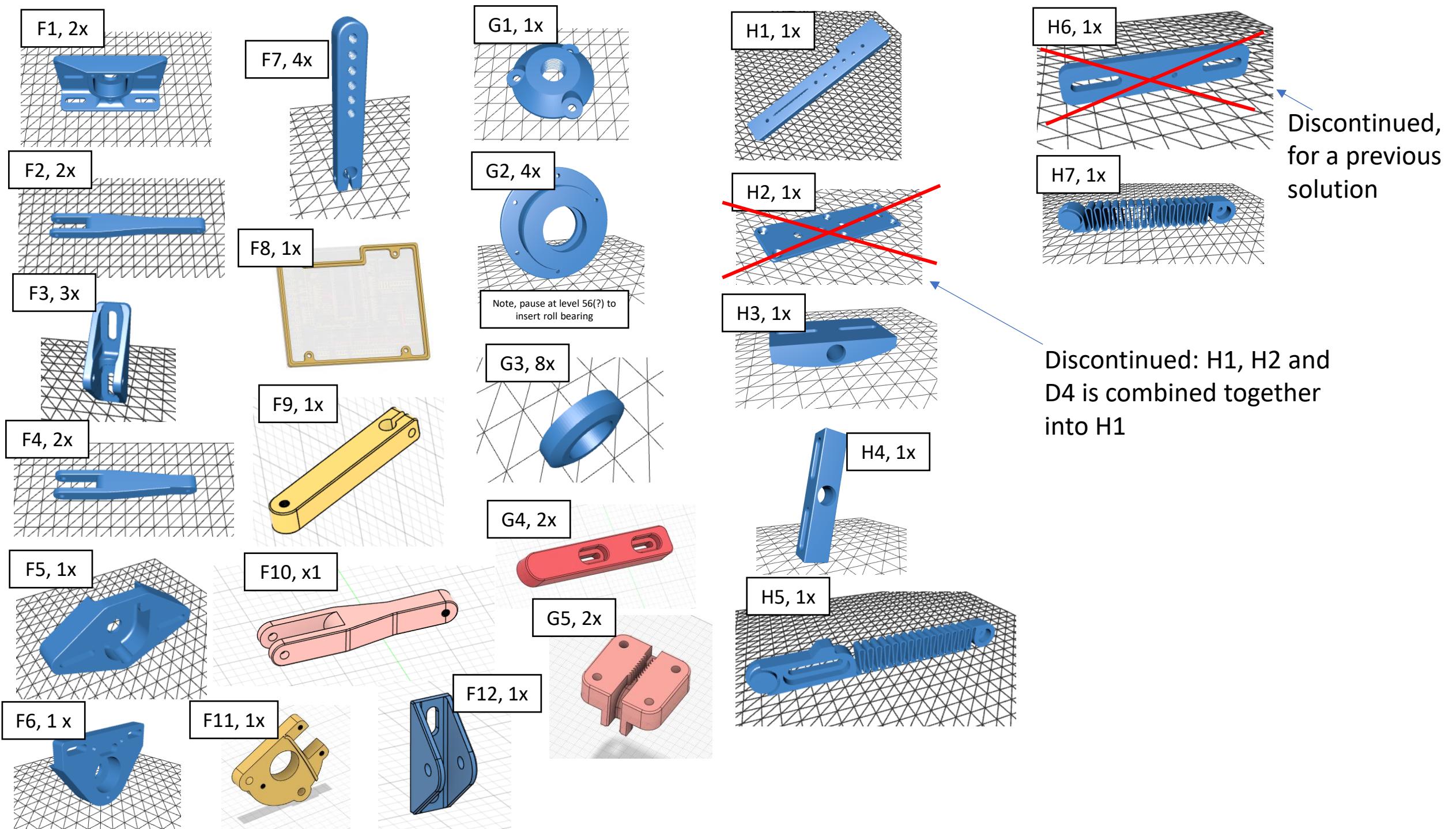
Name	Count	Sum = 15
B1	2	
B2	1	
B3	2	
B4	1	
B5	1	
B6	2	
B7	1	
B8	2	
B9	2	
B10	1	

Name	Count	Sum = 5
C1	2	
C2	2	
C3	1	

Name	Count	
D1	1	
D2	1	
D3	1	
D4	1	
D5	1	

Name	Count	Sum = 15
E1	1	
E2	2	
E3	1	
E4	1	
E5	1	
E6	2	
E7	1	
E8	4	
E9	2	

Redesigned, will be
3D-printed instead



Step 1, preparations

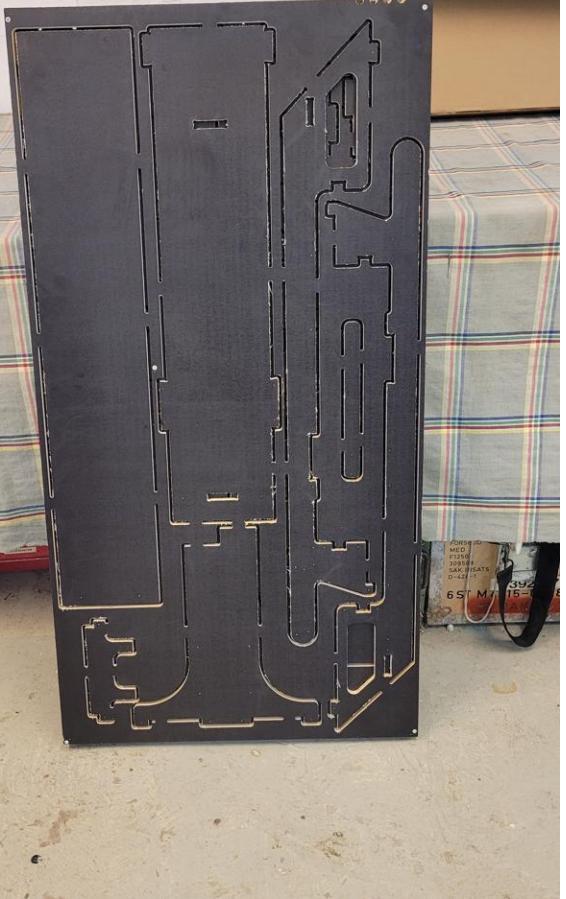
1. Plywood cutouts
 - a) Cut out plywood according to dxf-files on Github, or
 - b) Order a set of plywood cutouts*
2. 3D-print outs
 - a) Print out the stl-files, or
 - b) Ask a friend to print out the stl-files
3. Get the stuff on the hardware store BOM-list (Bill Of Material)
4. Get the stuff on the electronics BOM-list (Bill Of Material)
5. Order PCB's for Arduino Leonardo* or get or build yourself an adapter board
6. Gather the tools, a few good friends and start the build
7. Optional: have a look at this assembly guide afterwards

*avionics@skyracer.net

Tools

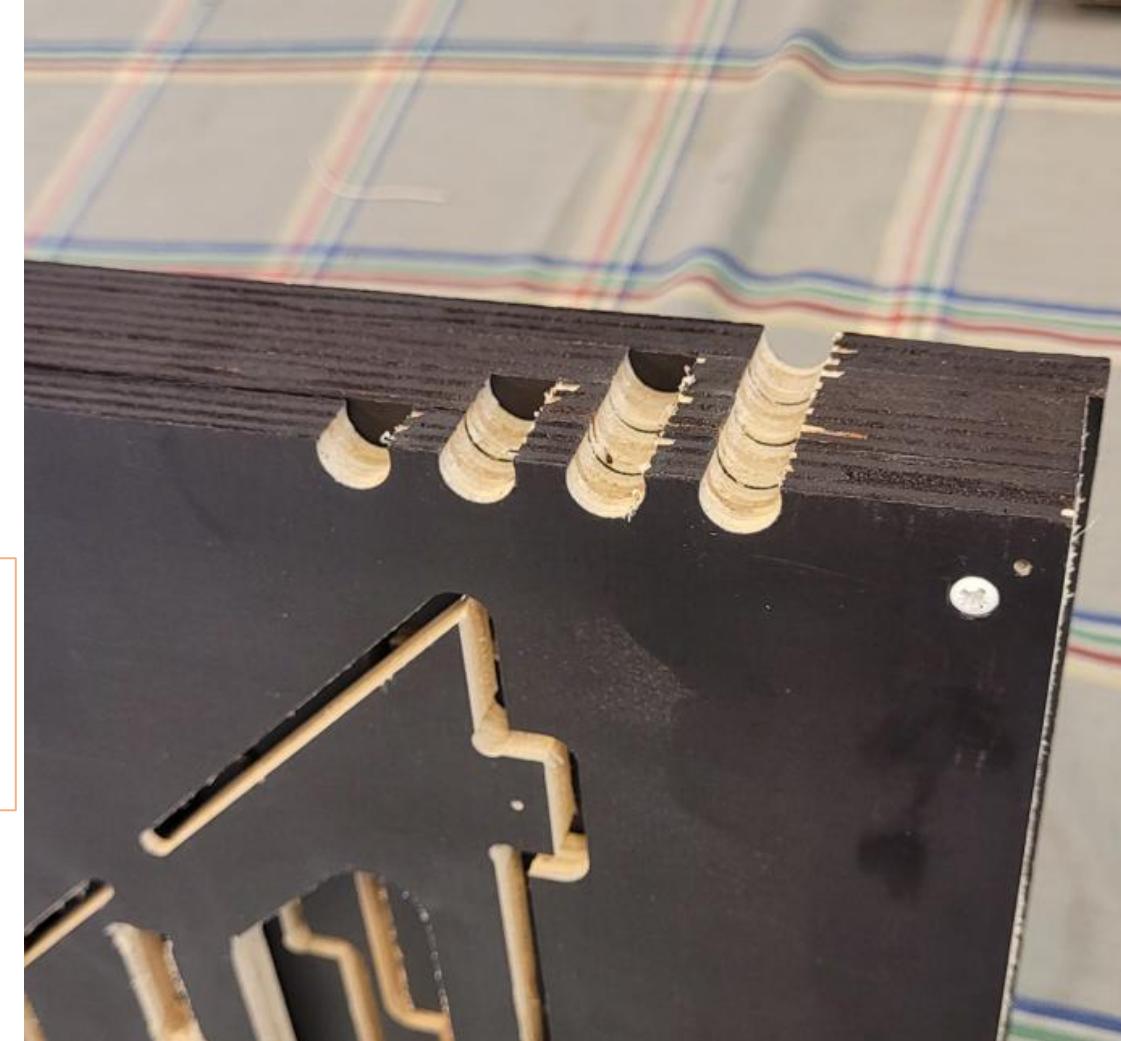
An incomplete list:

- Jigsaw
- Electric drill
- Most kind of manual screw drivers
- Drill bits:
 - T10
 - PZ1, PZ2
 - PH1, PH2
- Ferrule crimp tool
- Wire cutter
- Drills:
 - 2 mm
 - 4 mm
 - 6.5 mm
 - 10 mm
- M4 thread tap
- Wood file
- Ear protection
- A few cases of foaming drink



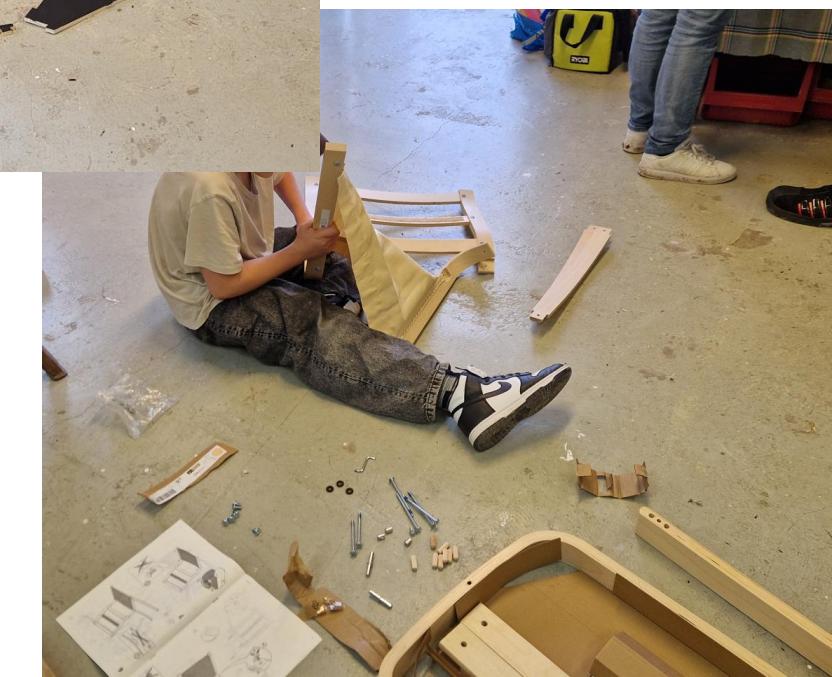
The cutouts consists of
4 plywood boards
(1200 x 620 x 12 mm)
screwed together.

Each plywood board
has a different number
of semi circles in order
to identify the boards.



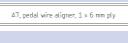


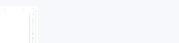
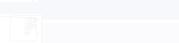
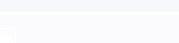
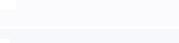
5 screws from each side. 10 in total placed in the corners and in the middle.

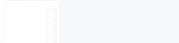
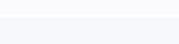


Step 2, front pedals

...

Name	Count	Sum = 12
A1	1	
A2	2	
A3	2	
A4	2	
A5	1	
A6	1	
A7	1	
A8	2	

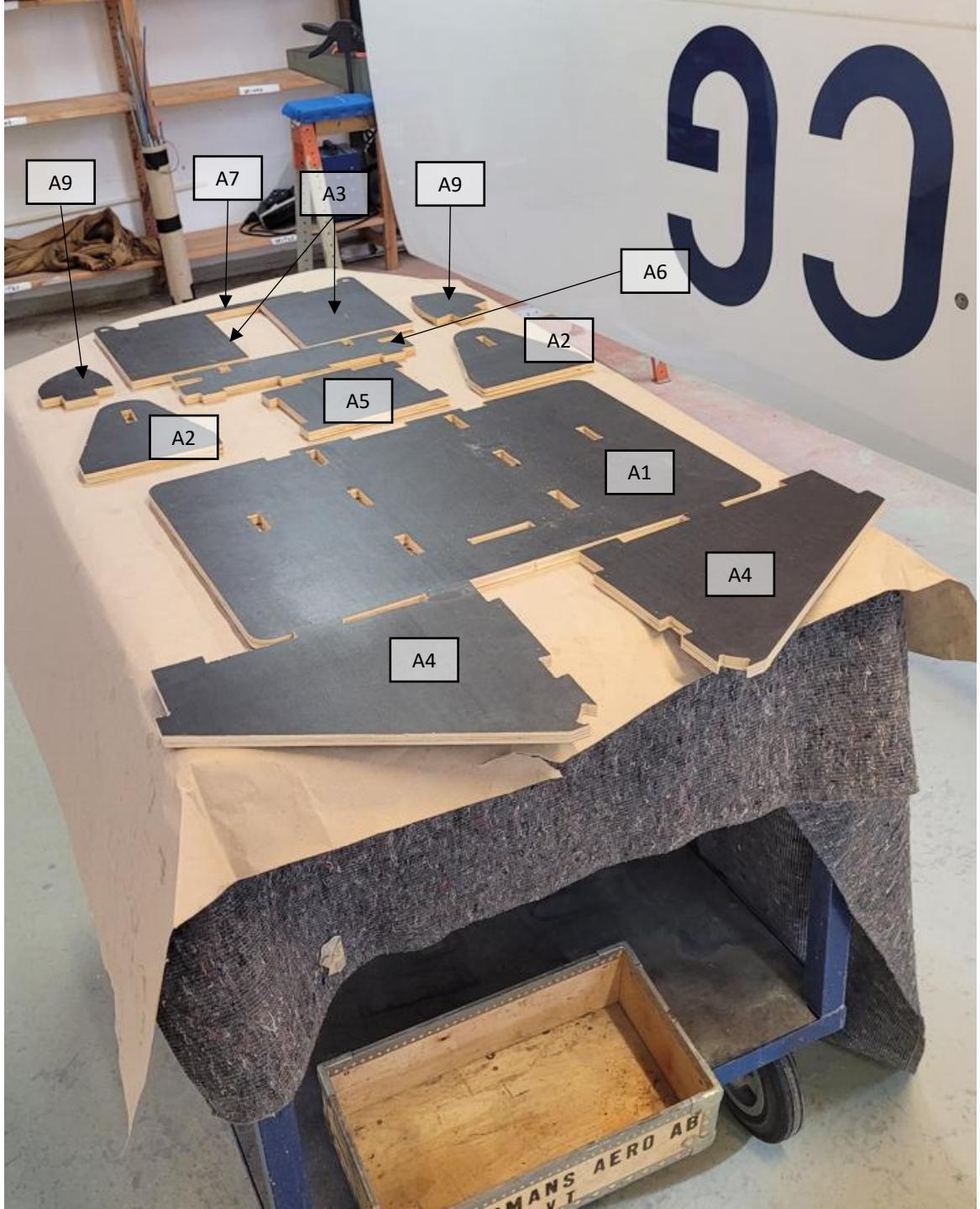
Name	Count	Sum = 15
B1	2	
B2	1	
B3	2	
B4	1	
B5	1	
B6	2	
B7	1	
B8	2	
B9	2	
B10	1	

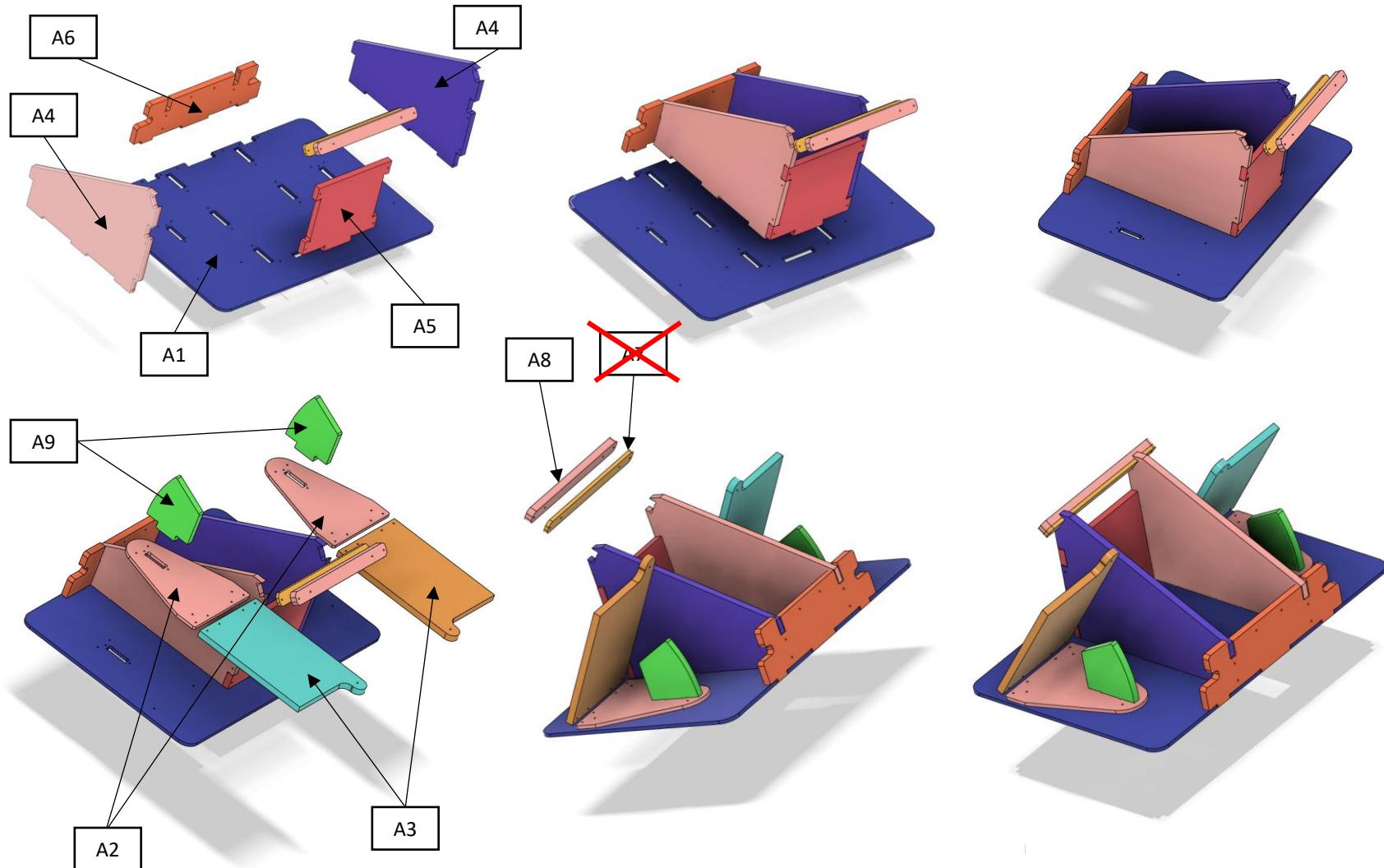
Name	Count	Sum = 5
C1	2	
C2	2	
C3	1	
Name	Count	
D1	1	
D2	1	
D3	1	
D4	1	
D5	1	

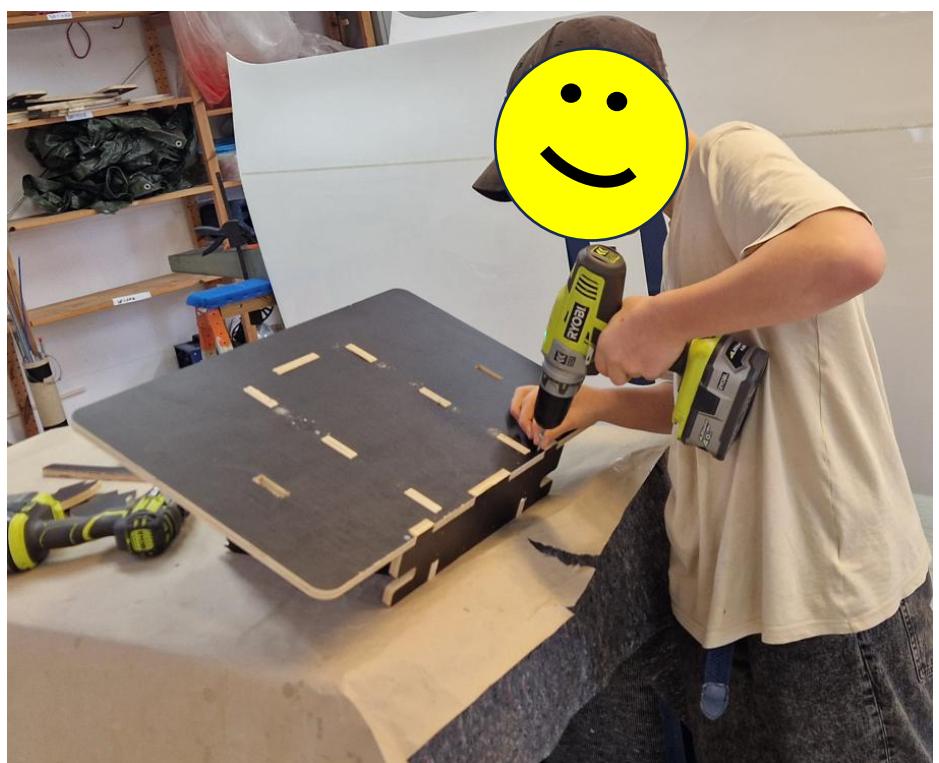
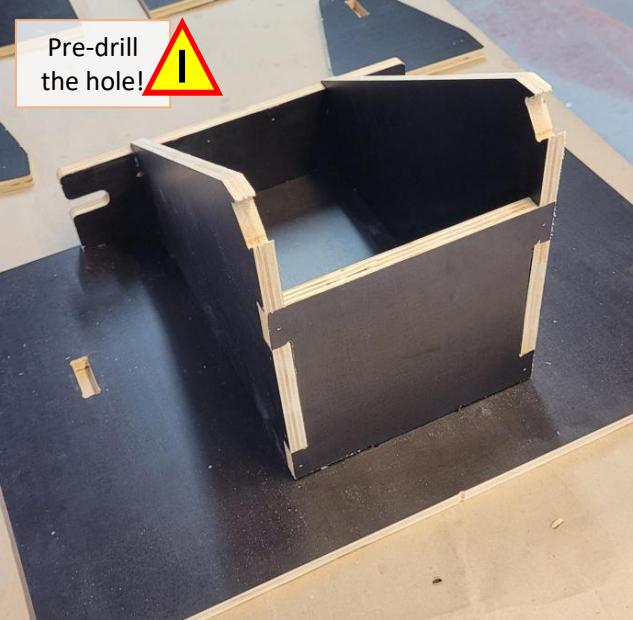
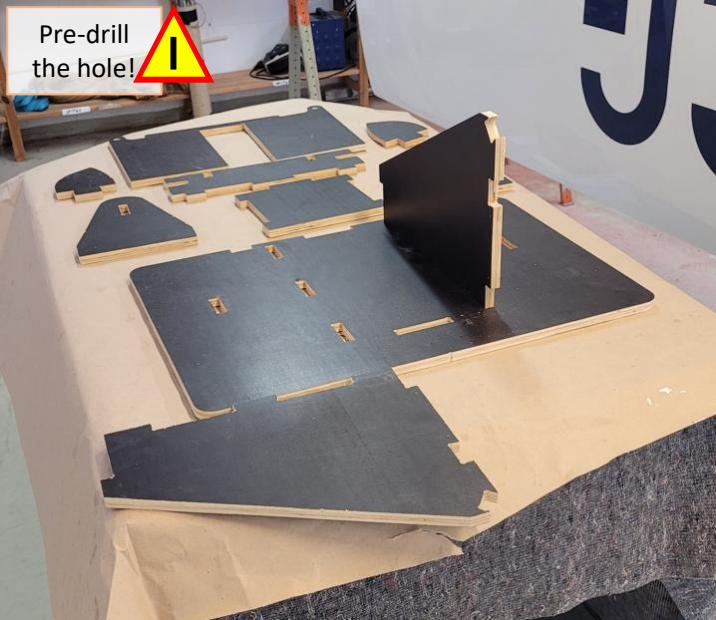
Name	Count	Sum = 15
E1	1	
E2	2	
E3	1	
E4	1	
E5	1	
E6	2	
E7	1	
E8	4	
E9	2	

Redesigned, will be
3D-printed instead



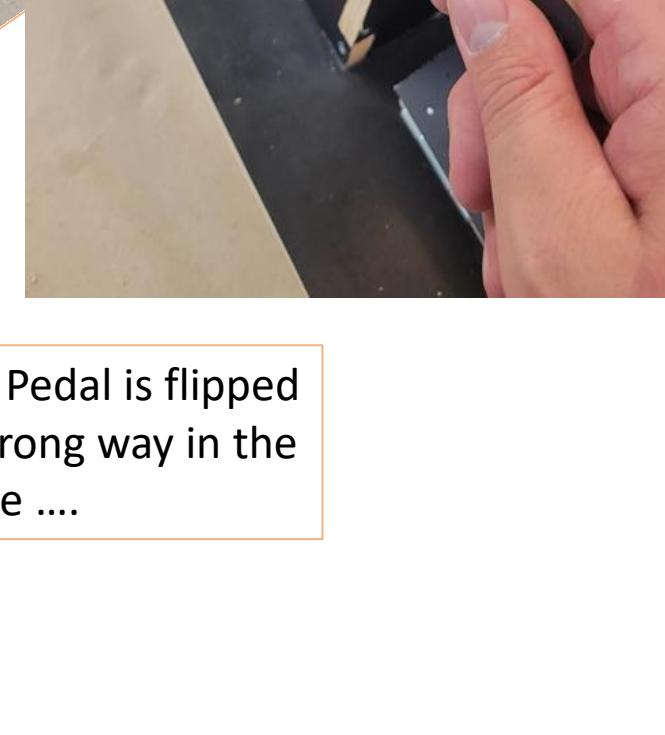
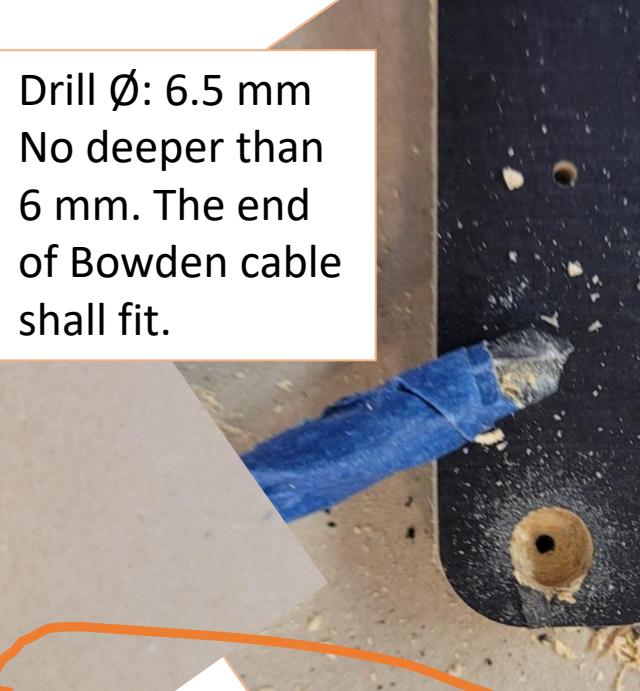








Note: the supplied screws are too long. Use other screws or shorten them by sanding the tip.



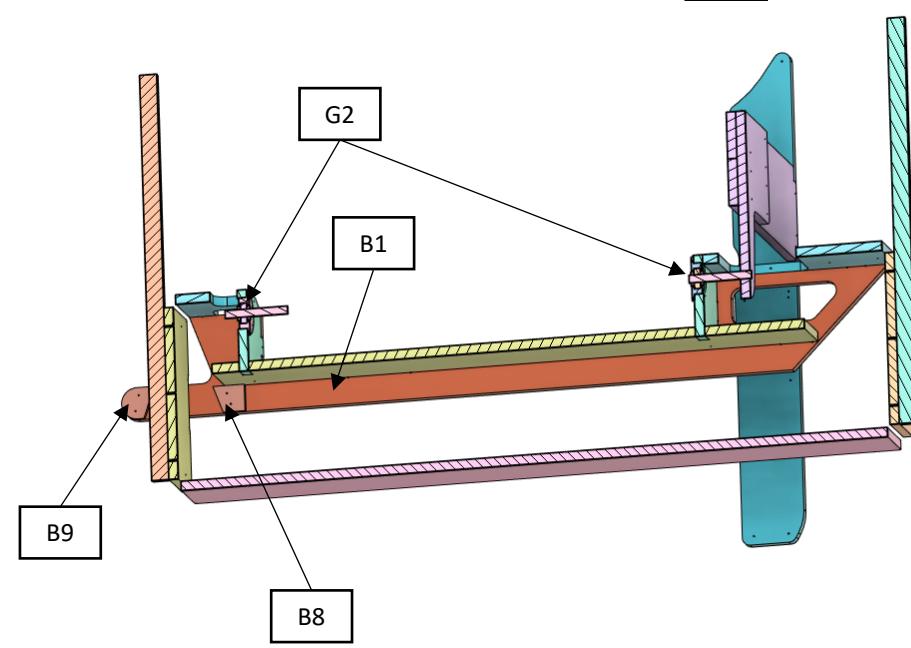
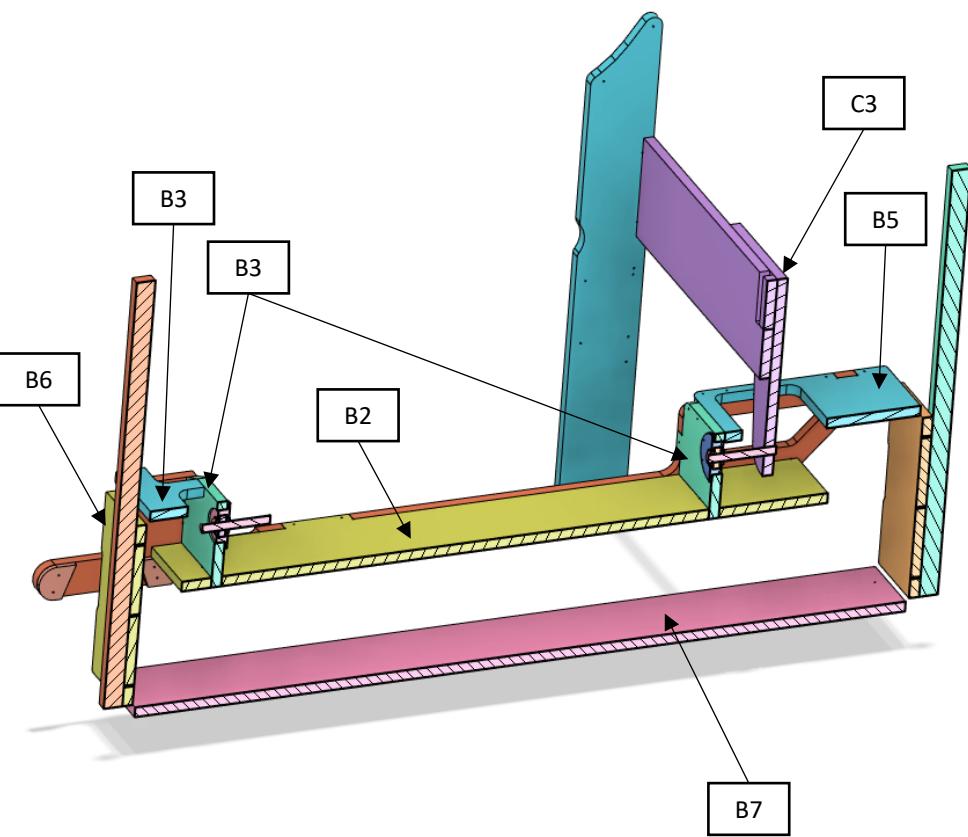
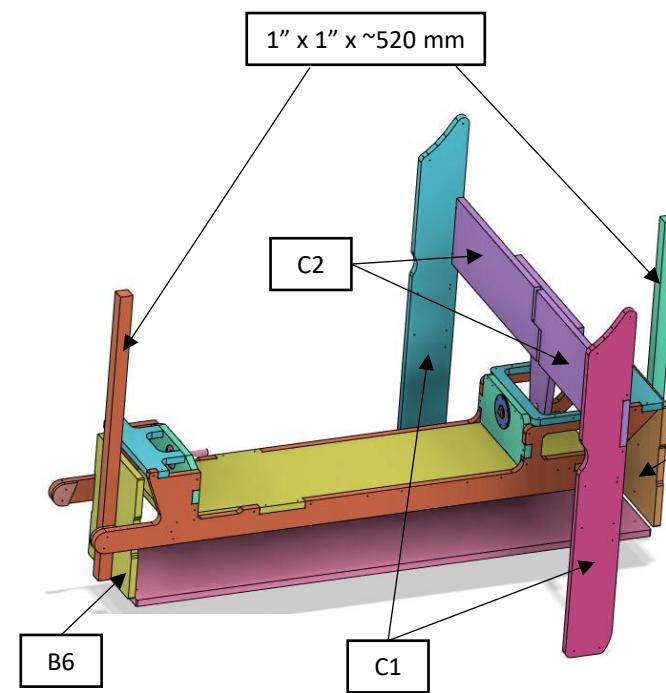
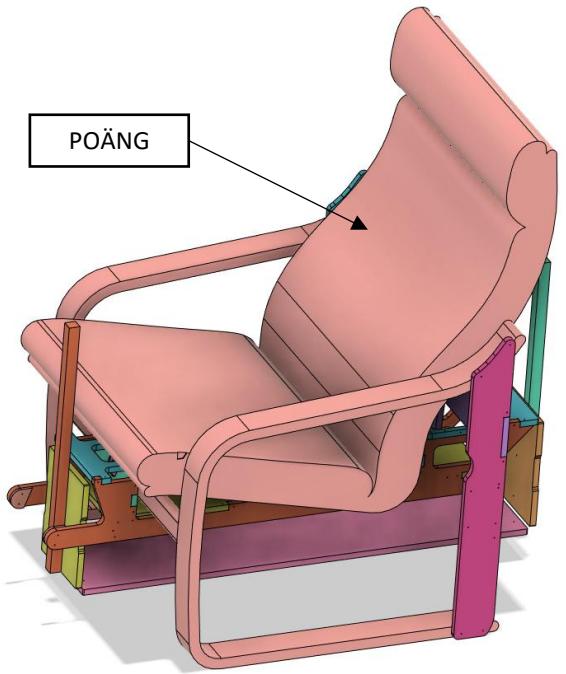
Drill Ø: 6.5 mm
No deeper than 6 mm. The end of Bowden cable shall fit.

Pre-drill
the hole!

Note: Pedal is flipped
the wrong way in the
picture

Step 3, control assembly

...



Name	Count	Sum = 12
A1	1	
A2	2	
A3	2	
A4	2	
A5	1	
A6	1	
A7	1	
A8	2	

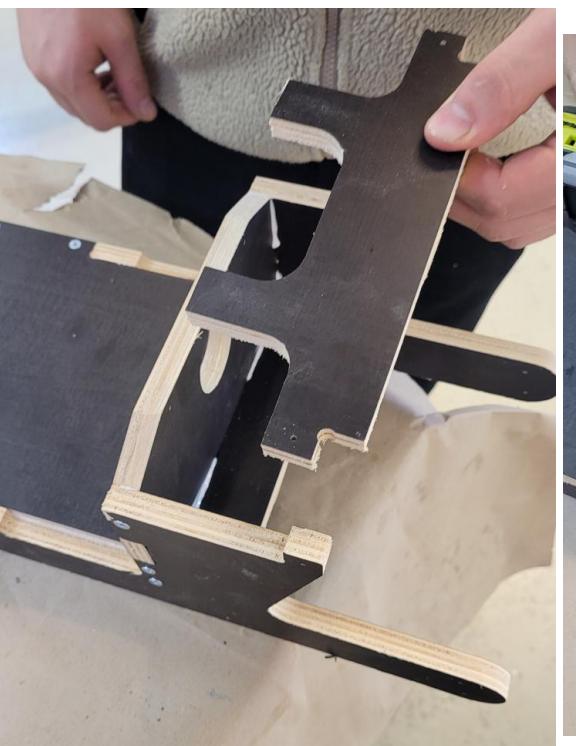
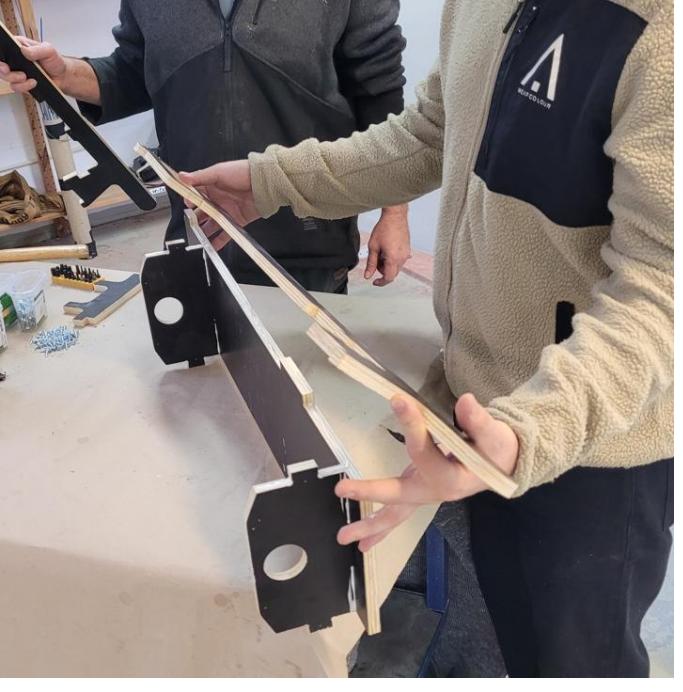
Name	Count	Sum = 15
B1	2	
B2	1	
B3	2	
B4	1	
B5	1	
B6	2	
B7	1	
B8	2	
B9	2	
B10	1	

Name	Count	Sum = 5
C1	2	
C2	2	
C3	1	

Name	Count	
D1	1	
D2	1	
D3	1	
D4	1	
D5	1	

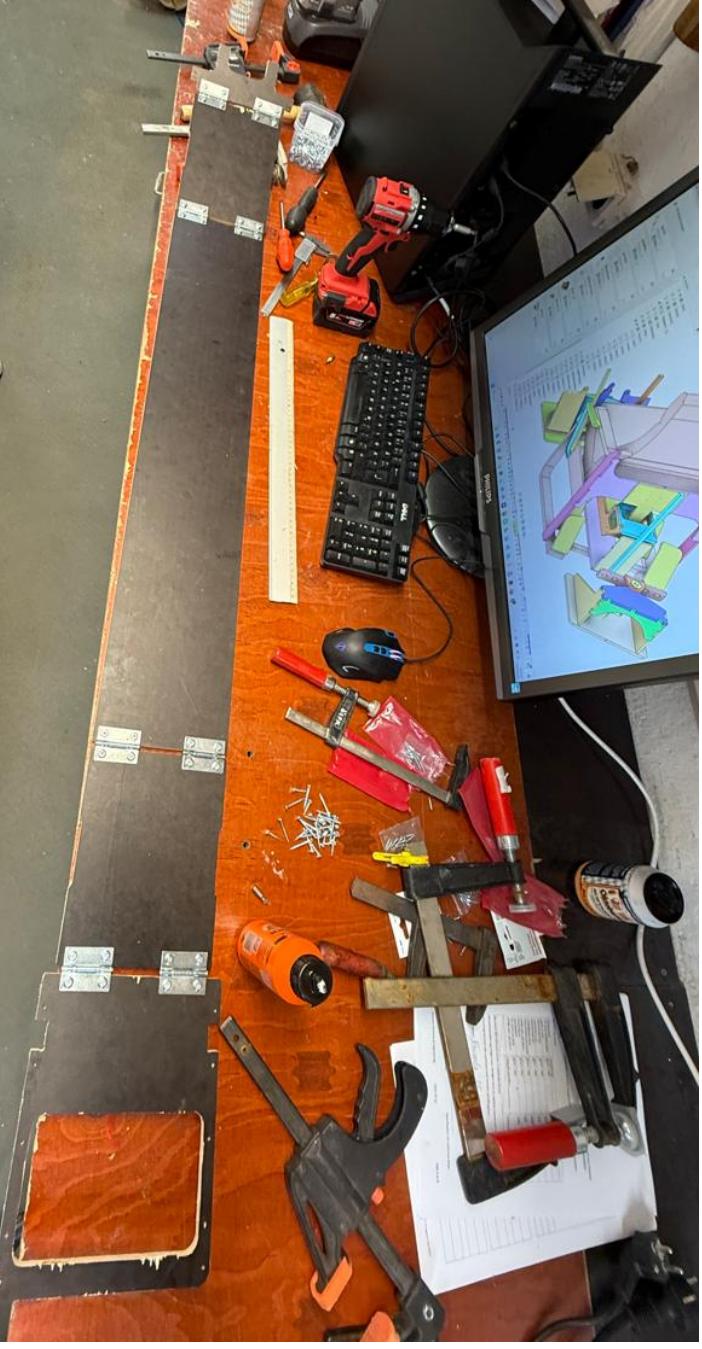
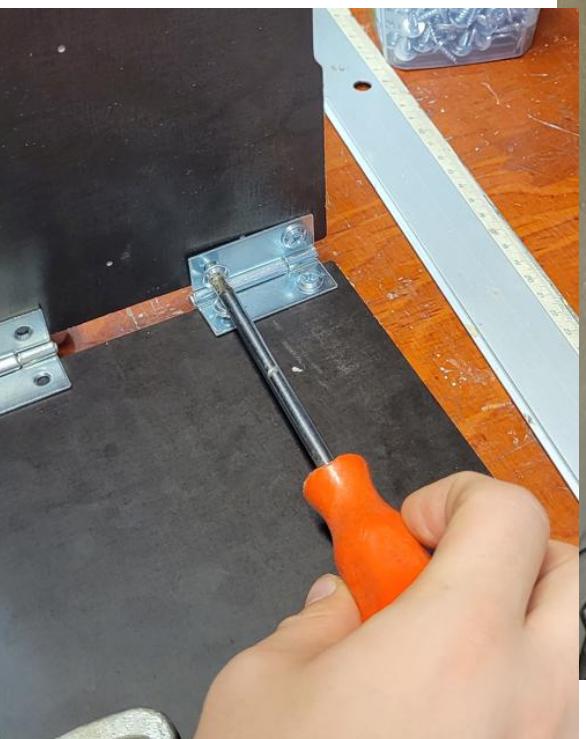
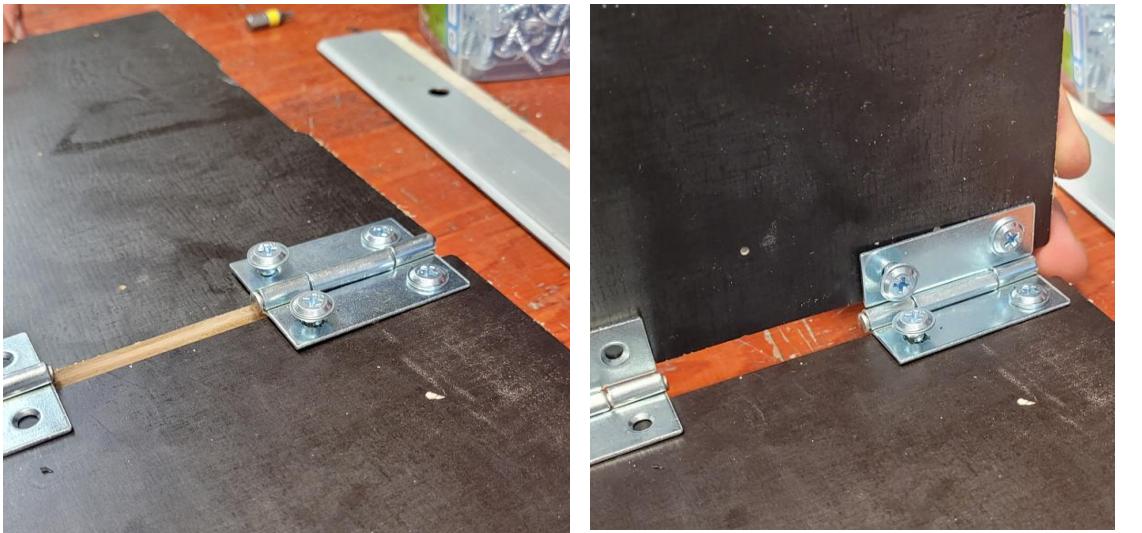
Name	Count	Sum = 15
E1	1	
E2	2	
E3	1	
E4	1	
E5	1	
E6	2	
E7	1	
E8	4	
E9	2	

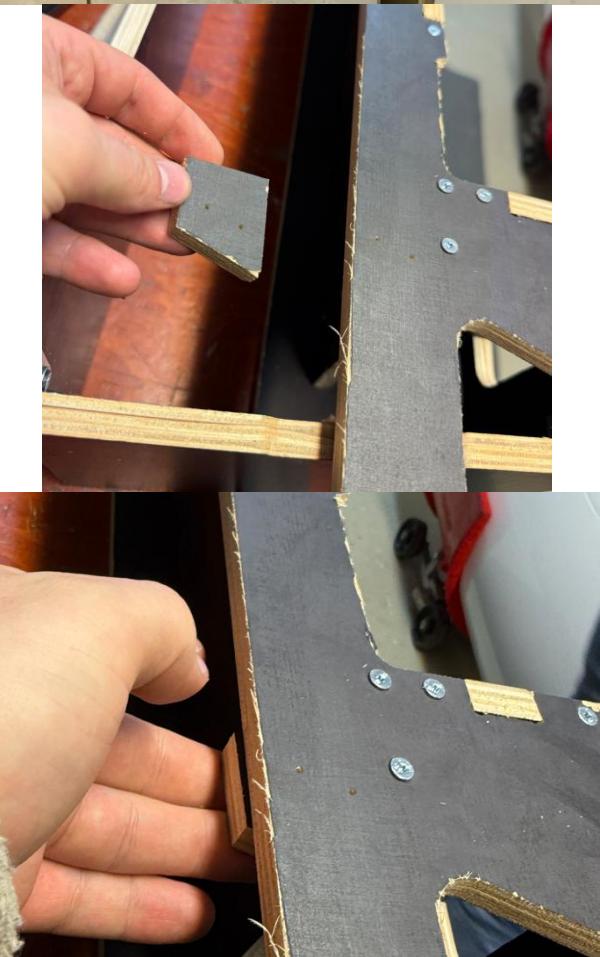
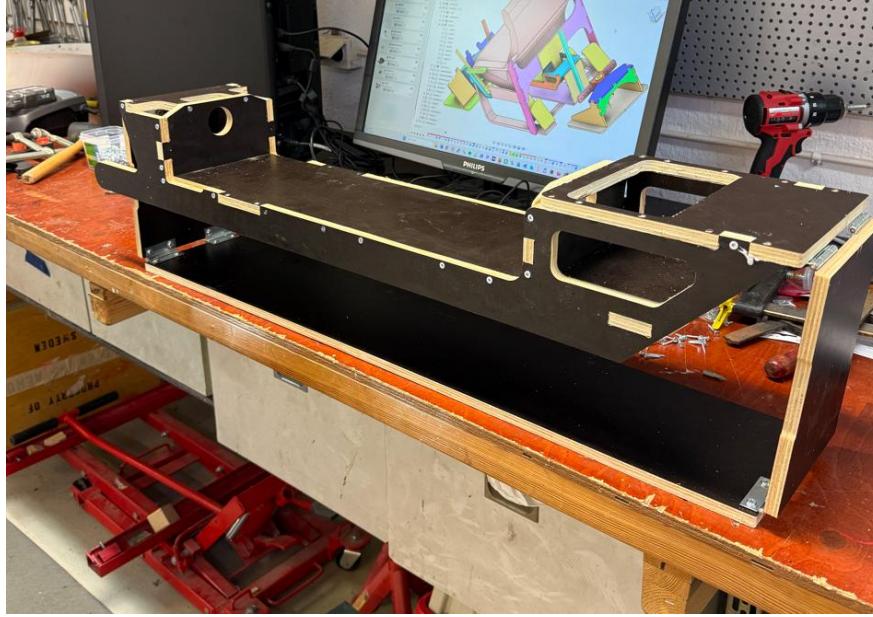
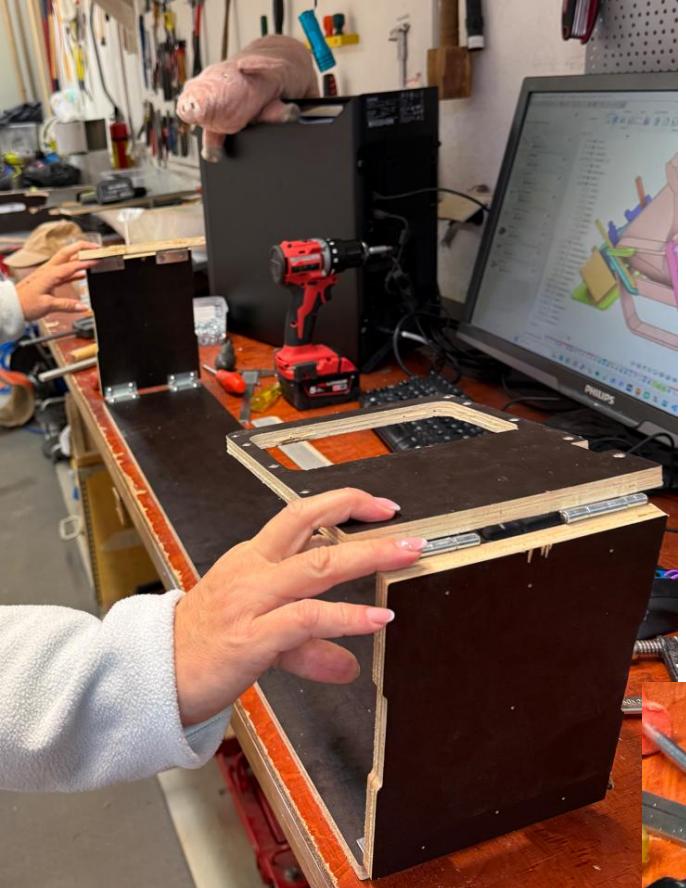
Redesigned, will be
3D-printed instead





Tighten the screws on the hinges at 90° in order to align the hinges

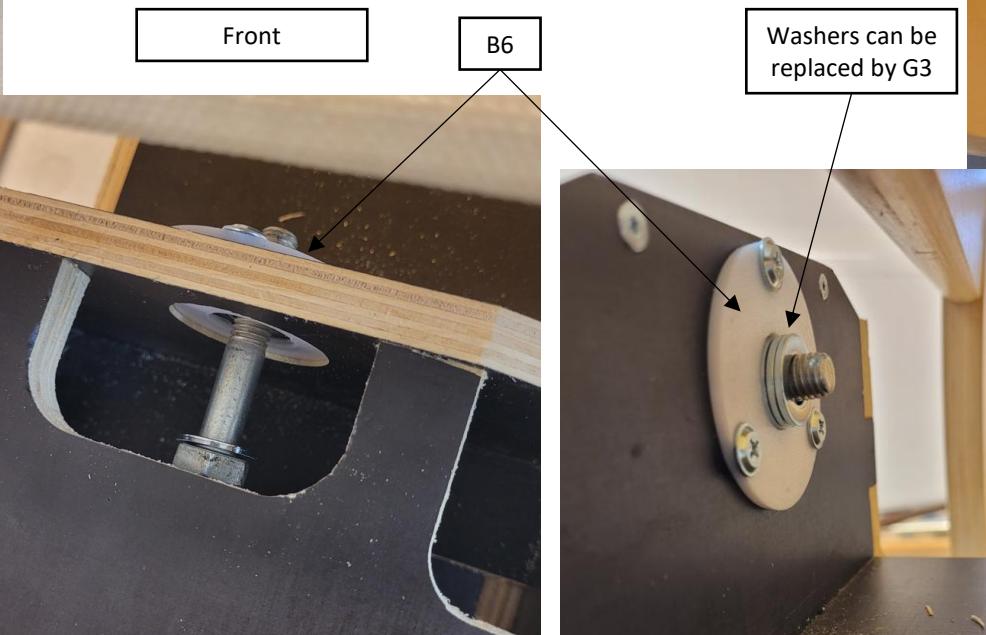
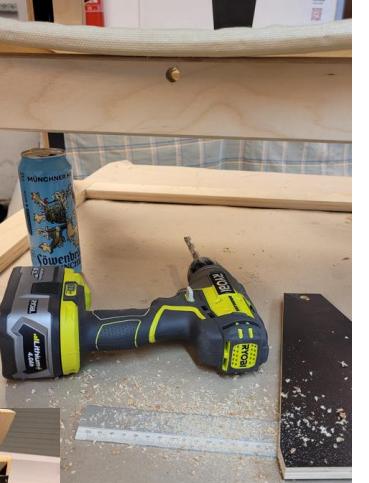
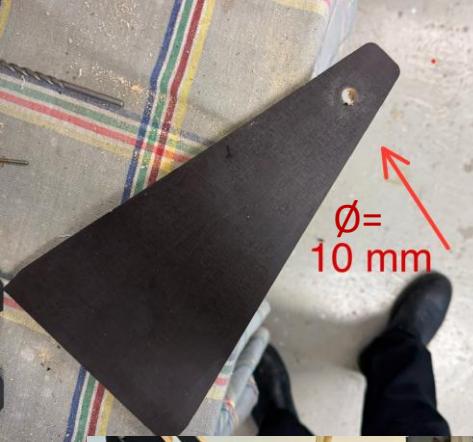


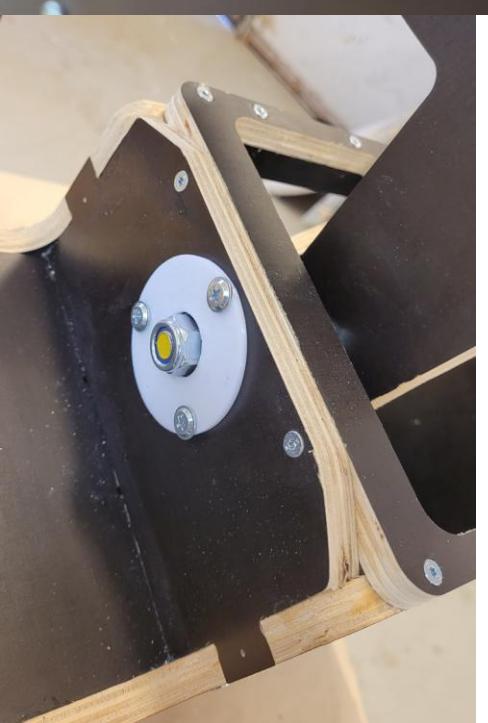
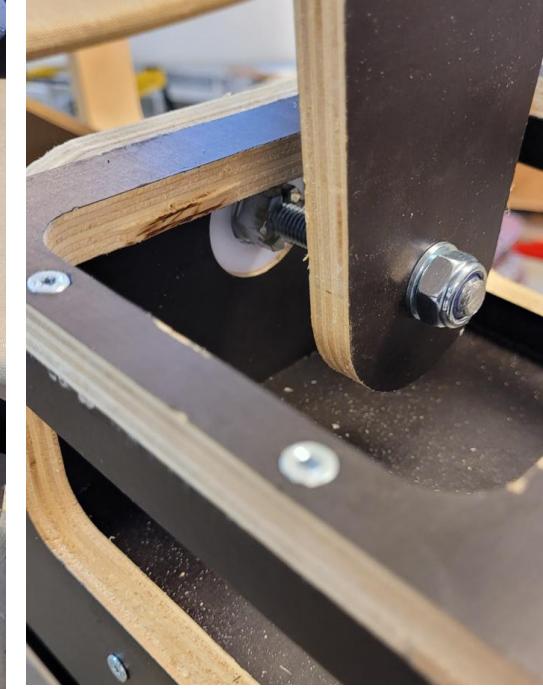
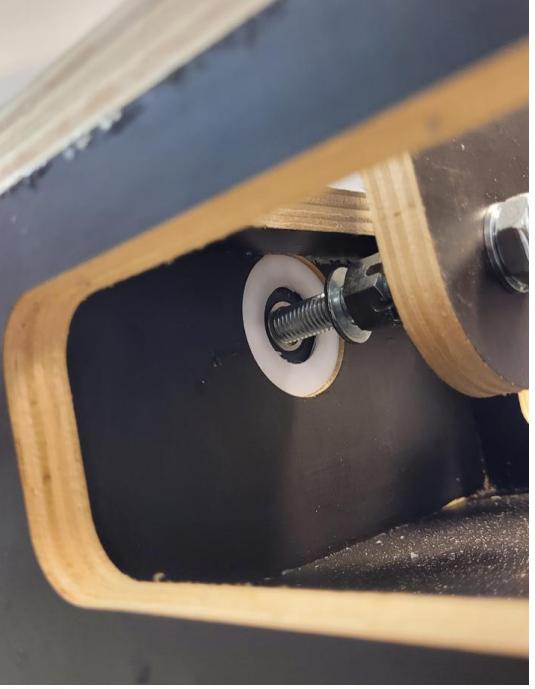
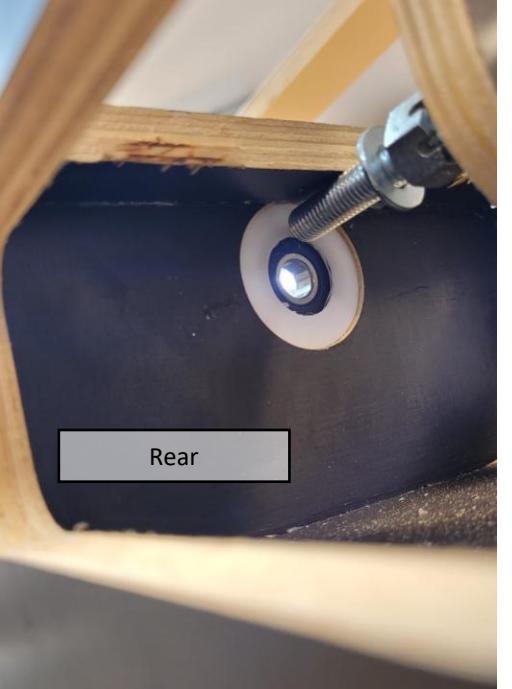




Indeed, it looks like
a container ship

Oops. A design flaw was found when assembling the prototype. The parts has been updated since then.





Name	Count	Sum = 12
A1	1	
A2	2	
A3	2	
A4	2	
A5	1	
A6	1	
A7	1	
A8	2	

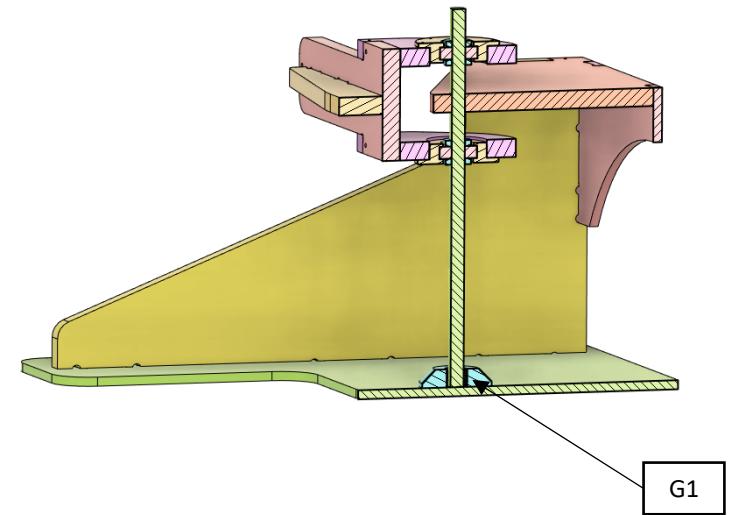
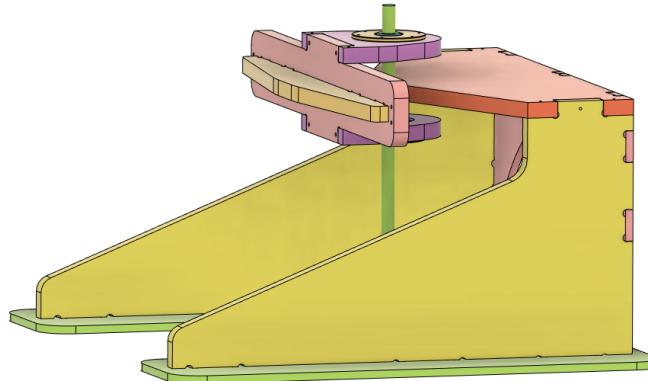
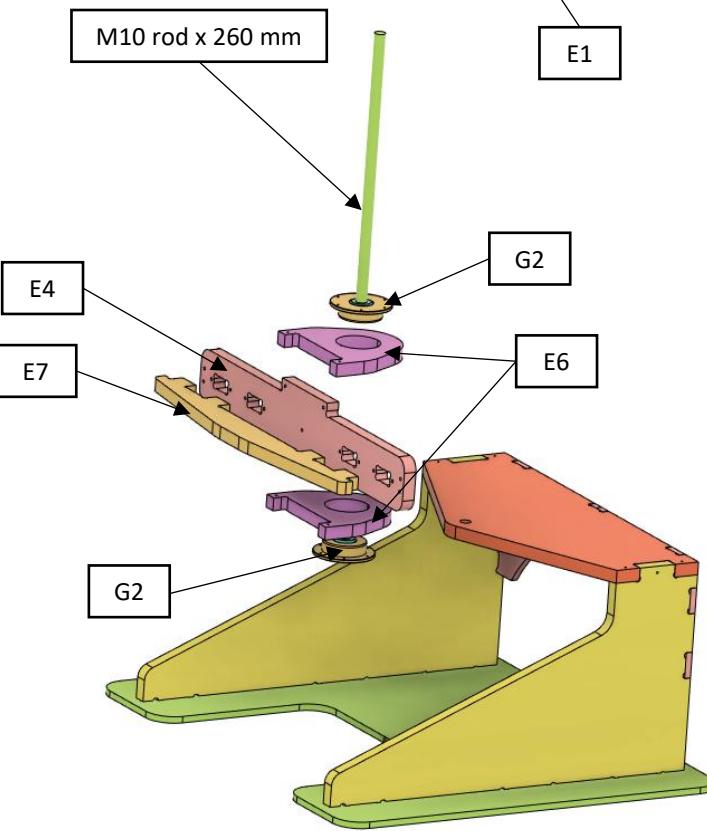
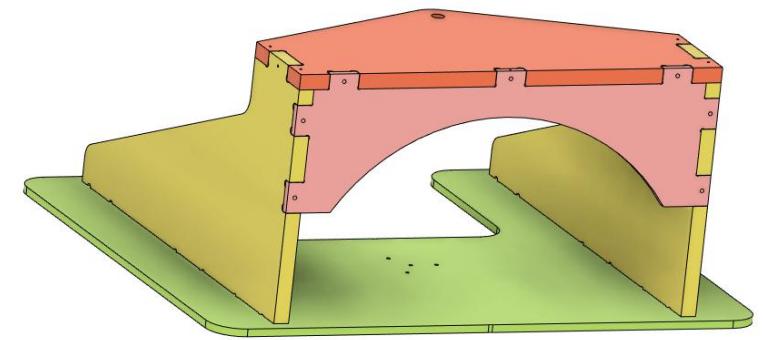
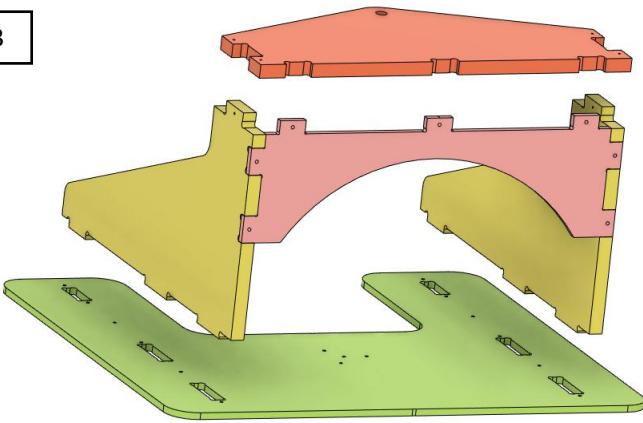
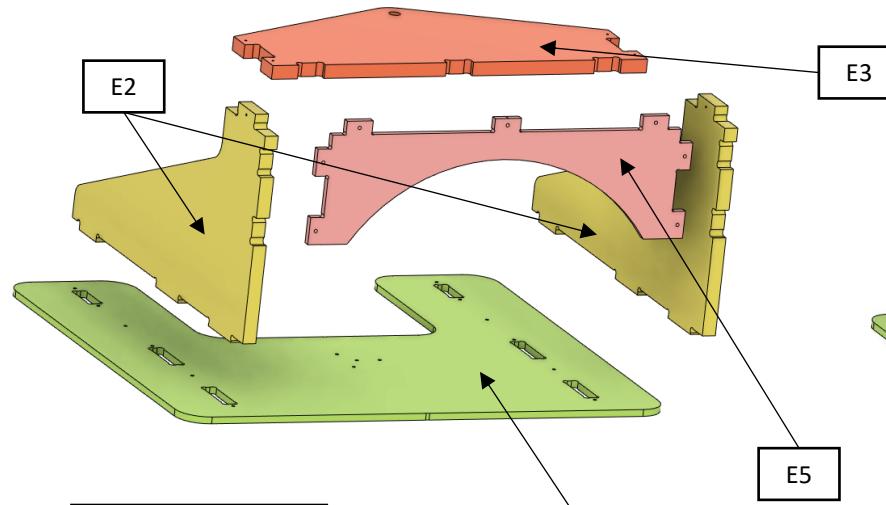
Name	Count	Sum = 15
B1	2	
B2	1	
B3	2	
B4	1	
B5	1	
B6	2	
B7	1	
B8	2	
B9	2	
B10	1	

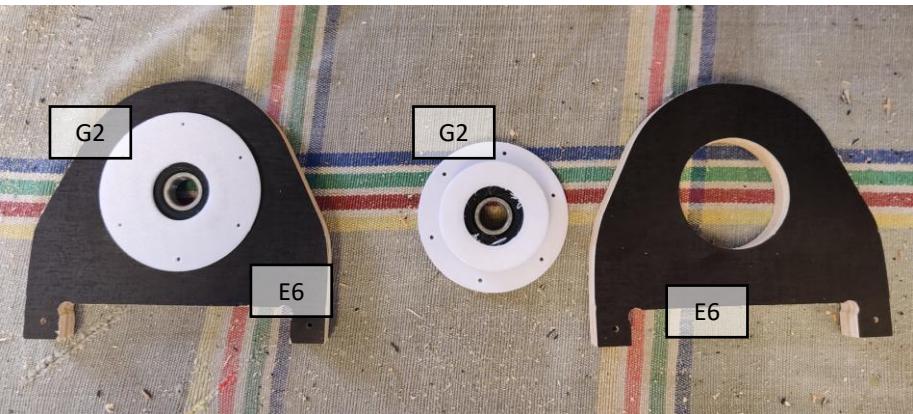
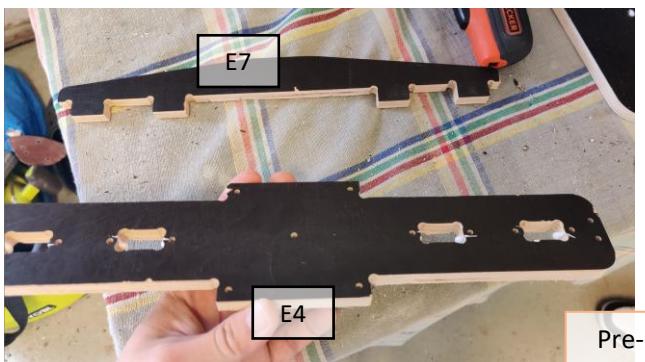
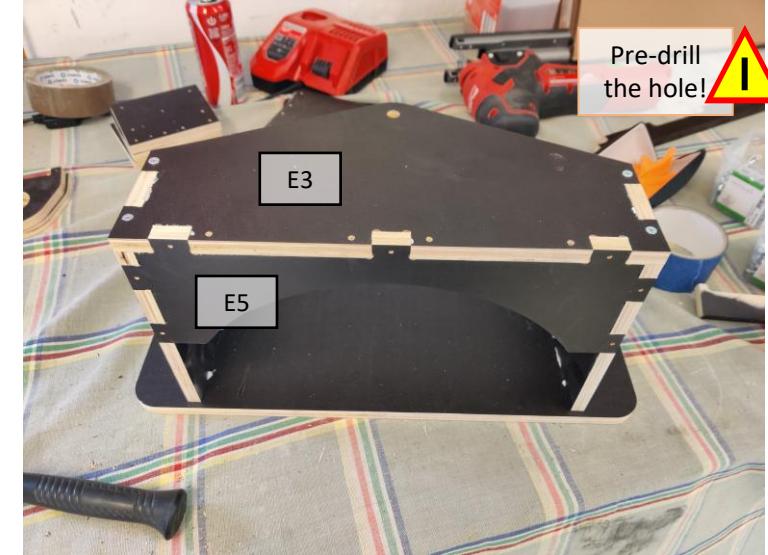
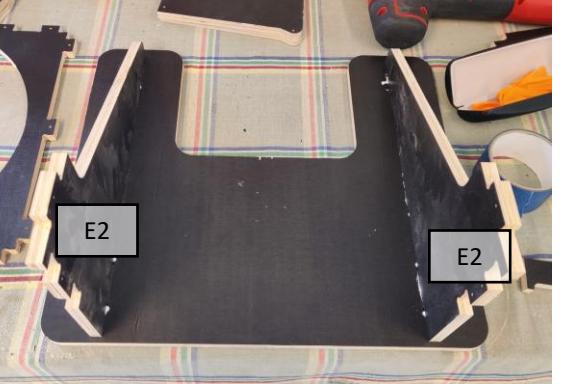
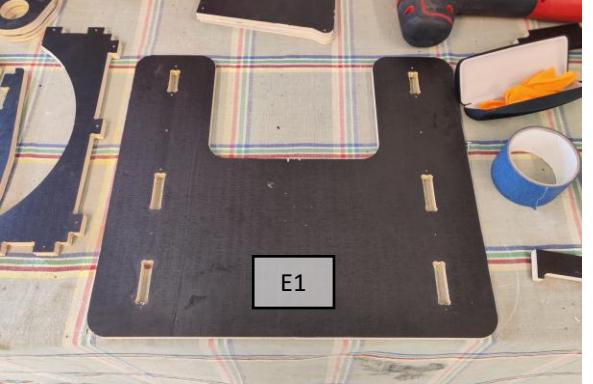
Name	Count	Sum = 5
C1	2	
C2	2	
C3	1	
Name	Count	
D1	1	
D2	1	
D3	1	
D4	1	
D5	1	

Name	Count	Sum = 15
E1	1	
E2	2	
E3	1	
E4	1	
E5	1	
E6	2	
E7	1	
E8	4	
E9	2	

Step 4, rear pedals

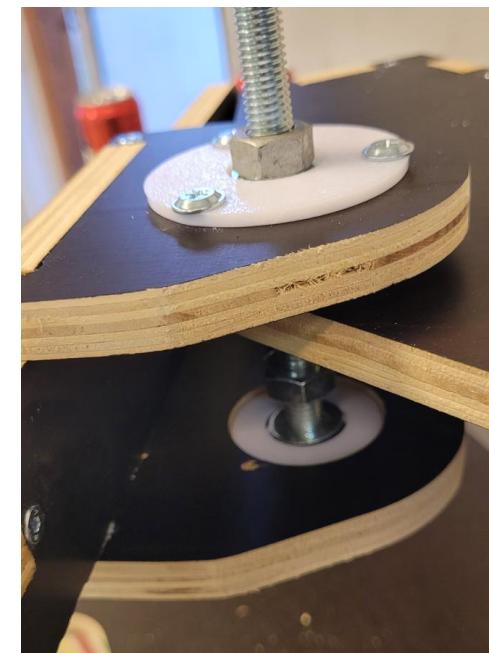
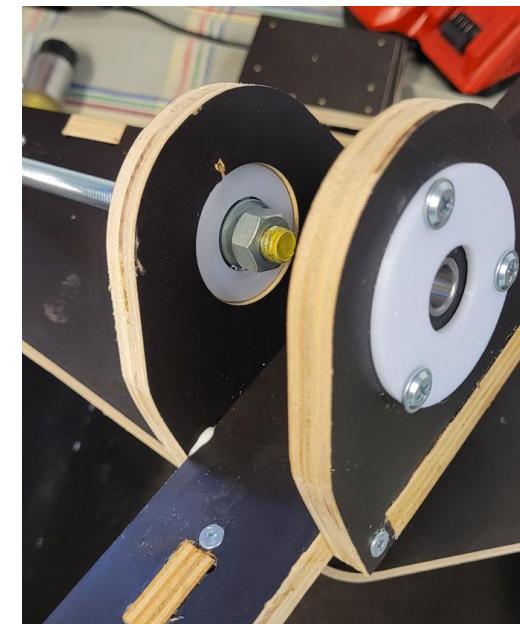
Redesigned, will be
3D-printed instead

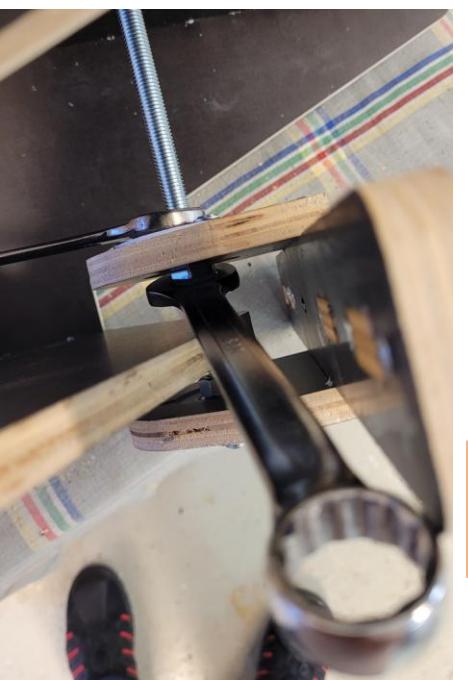
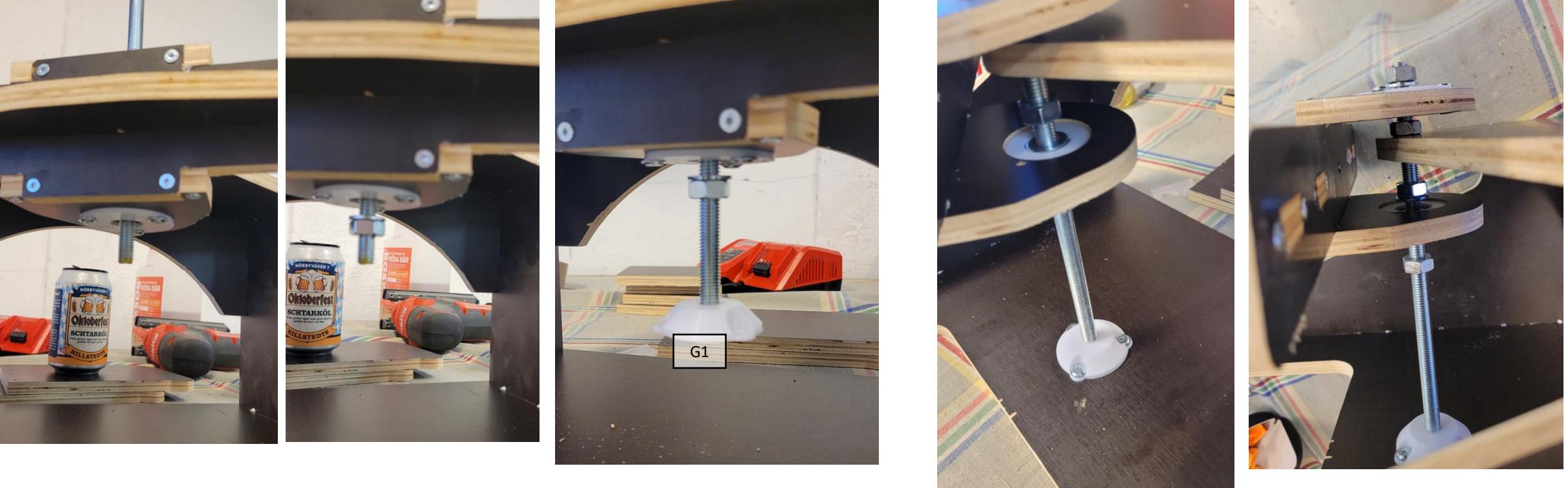




Make sure the screws of G2 are on outside in case it needs to be replaced ...

Measure proper length of M10 rod

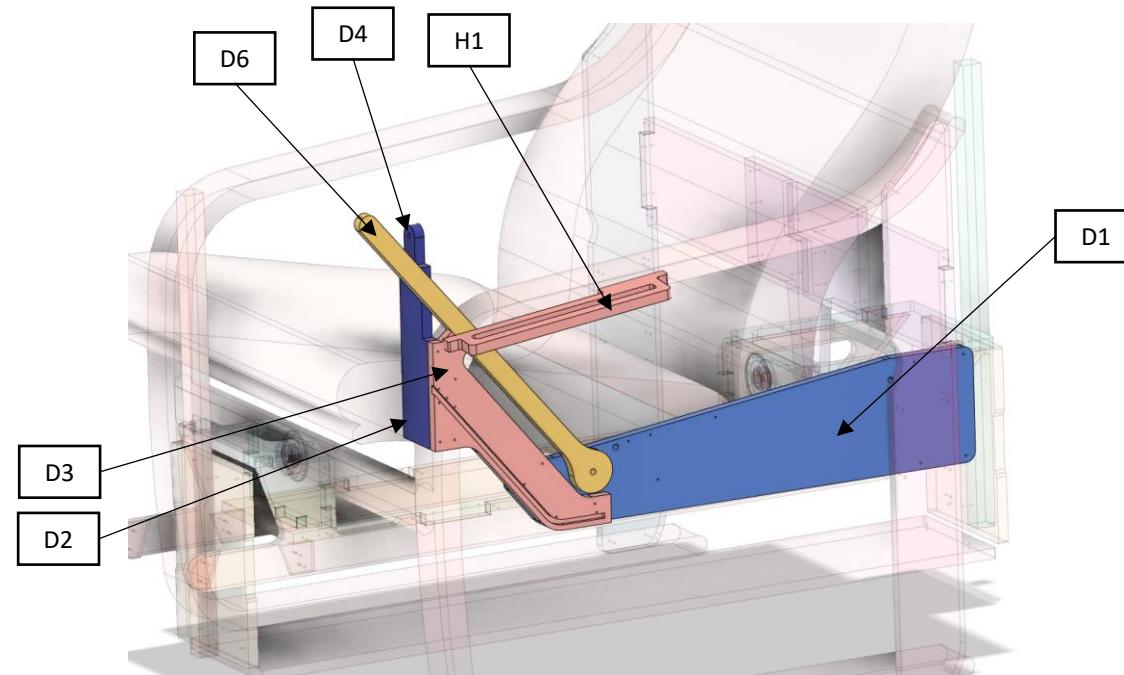


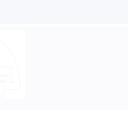


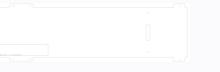
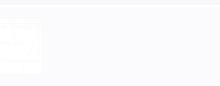
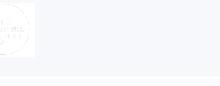
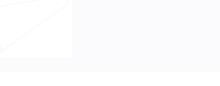
Tighten all
4 nuts.

Step 5, chair and side

...



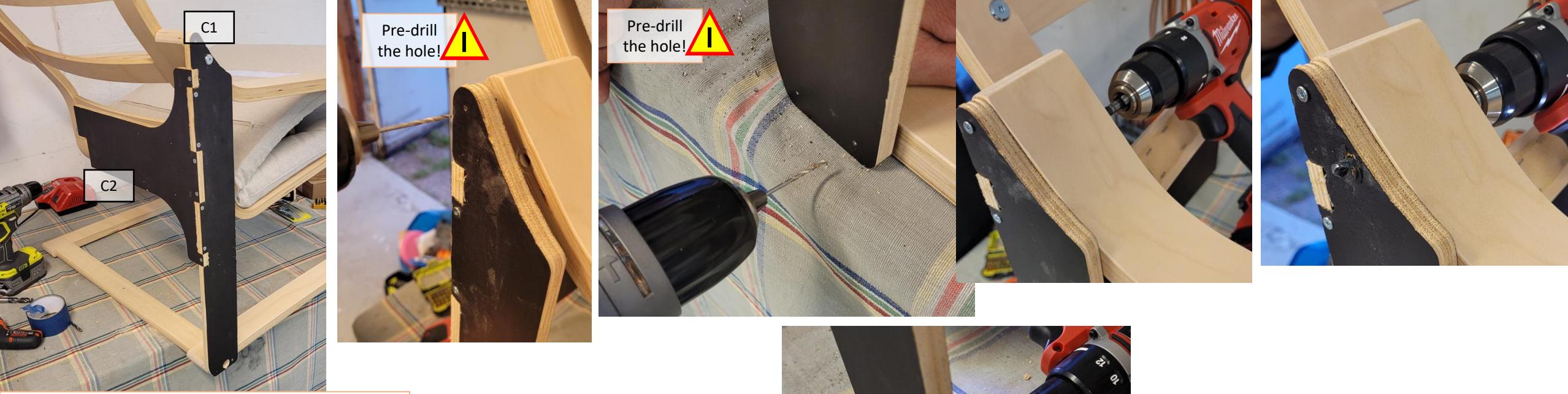
Name	Count	Sum = 12
A1	1	
A2	2	
A3	2	
A4	2	
A5	1	
A6	1	
A7	1	
A8	2	

Name	Count	Sum = 15
B1	2	
B2	1	
B3	2	
B4	1	
B5	1	
B6	2	
B7	1	
B8	2	
B9	2	
B10	1	

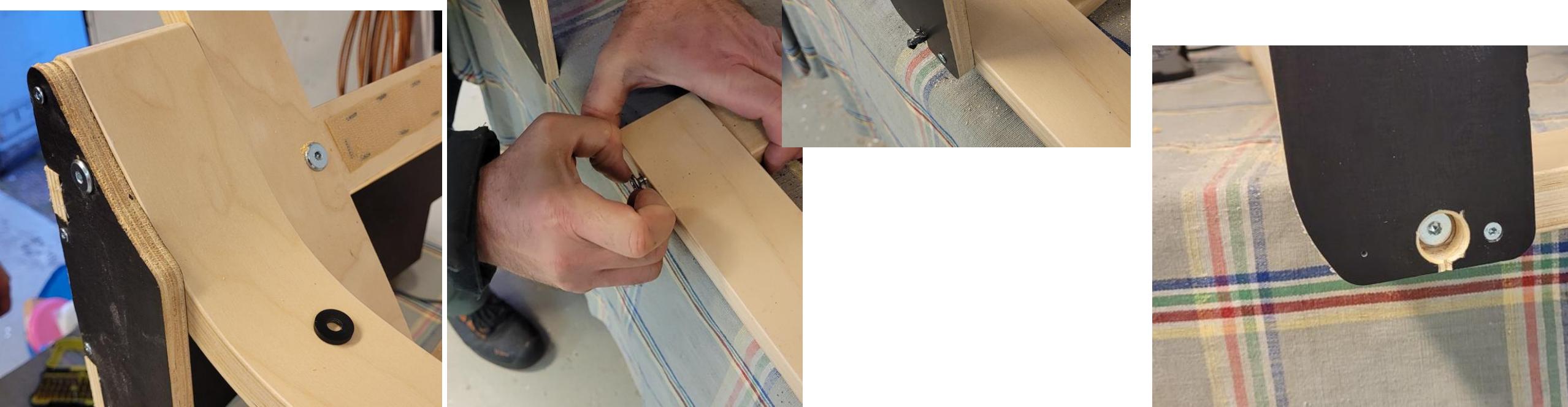
Name	Count	Sum = 5
C1	2	
C2	2	
C3	1	
Name	Count	
D1	1	
D2	1	
D3	1	
D4	1	
D5	1	

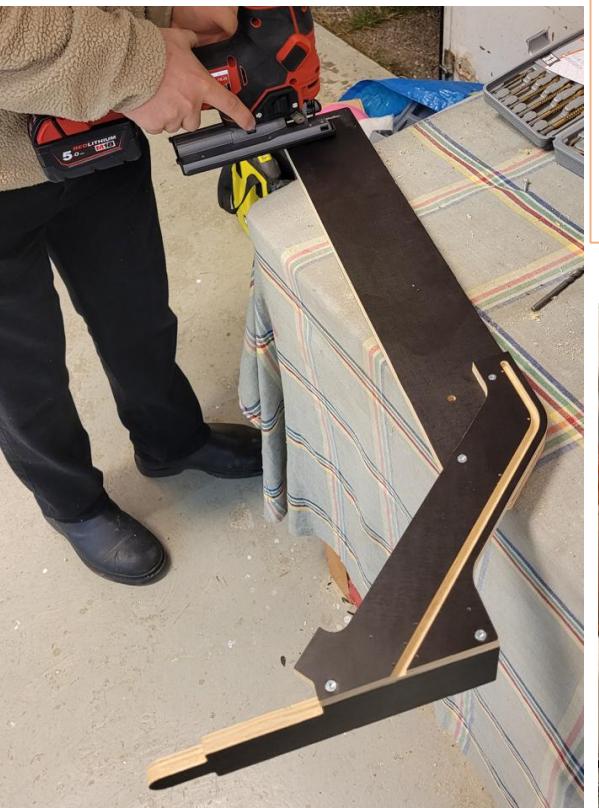
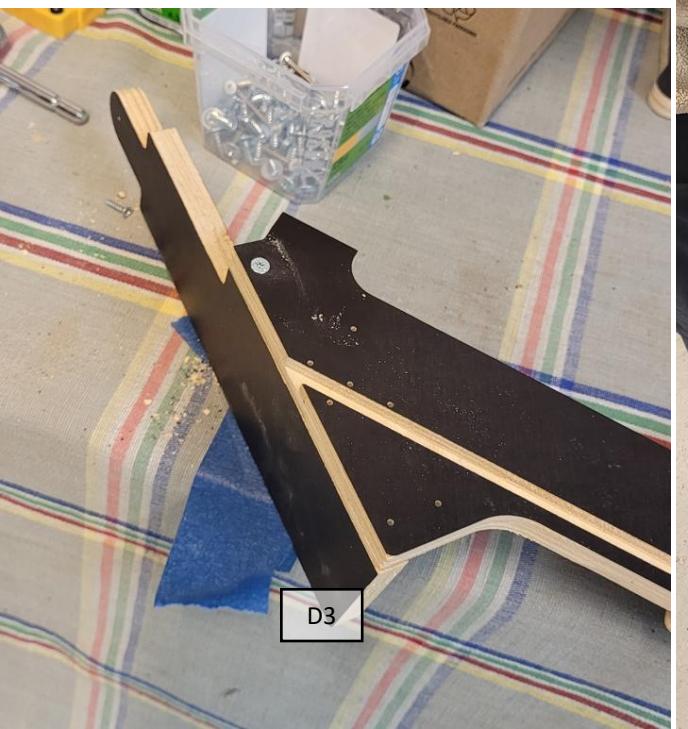
Name	Count	Sum = 15
E1	1	
E2	2	
E3	1	
E4	1	
E5	1	
E6	2	
E7	1	
E8	4	
E9	2	

Redesigned, will be
3D-printed instead

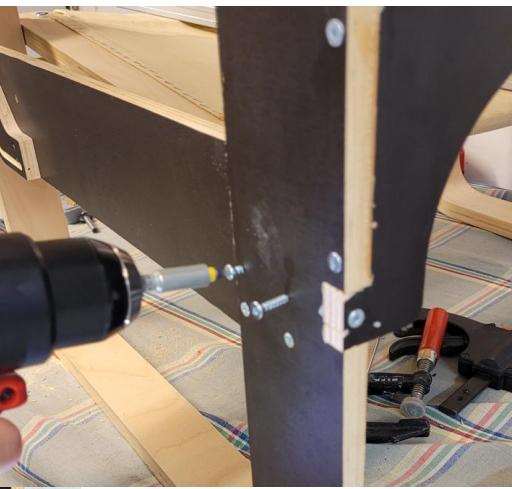


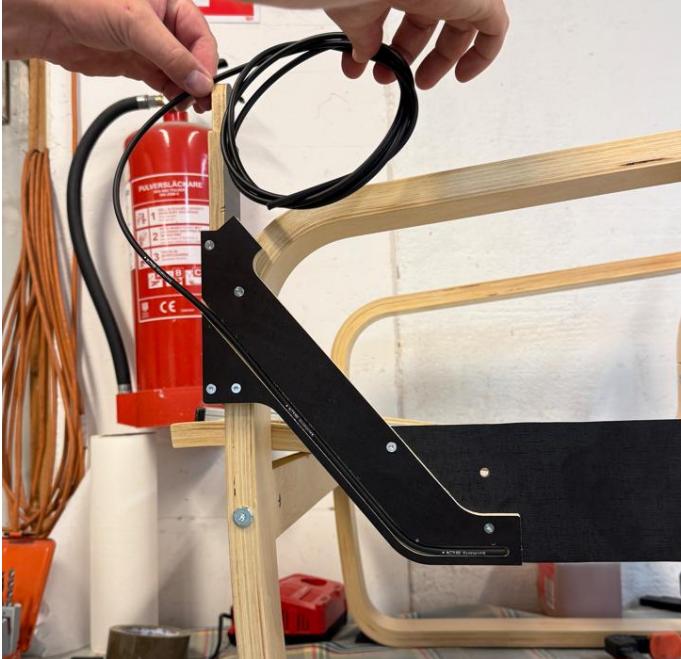
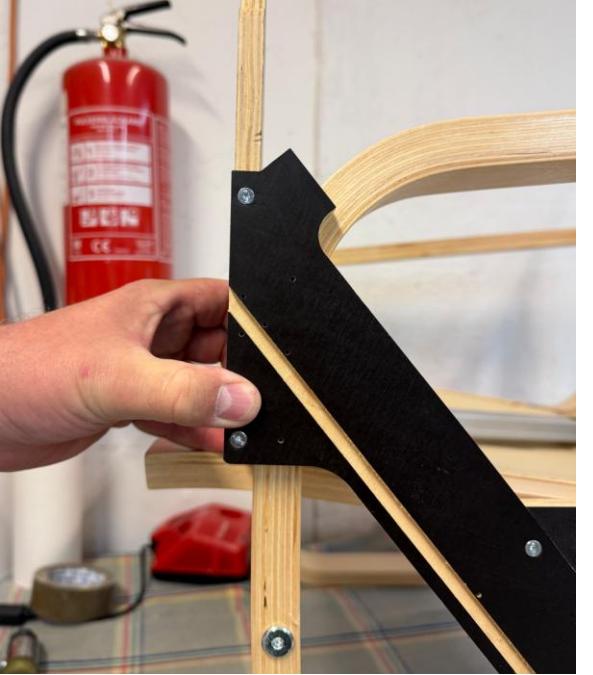
We forgot to take pictures, but assemble C1 and C2, both sides.



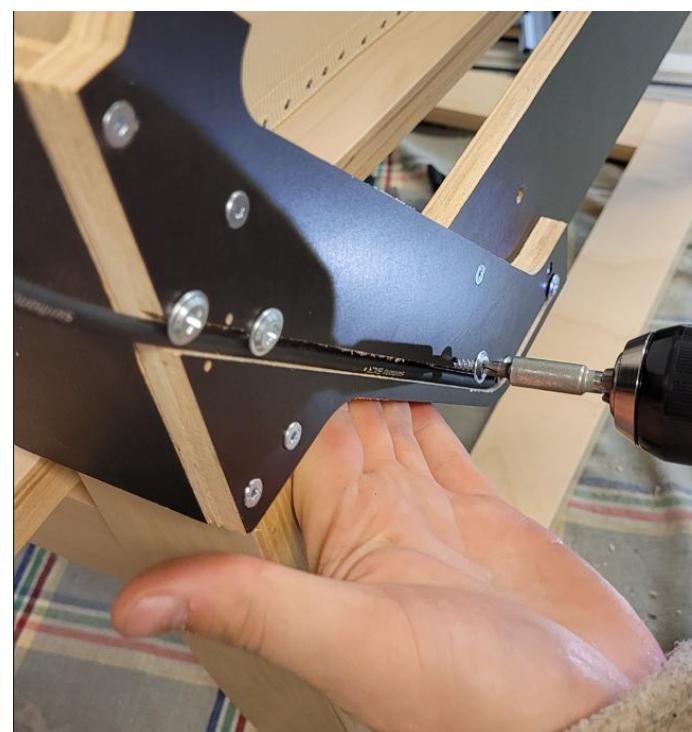
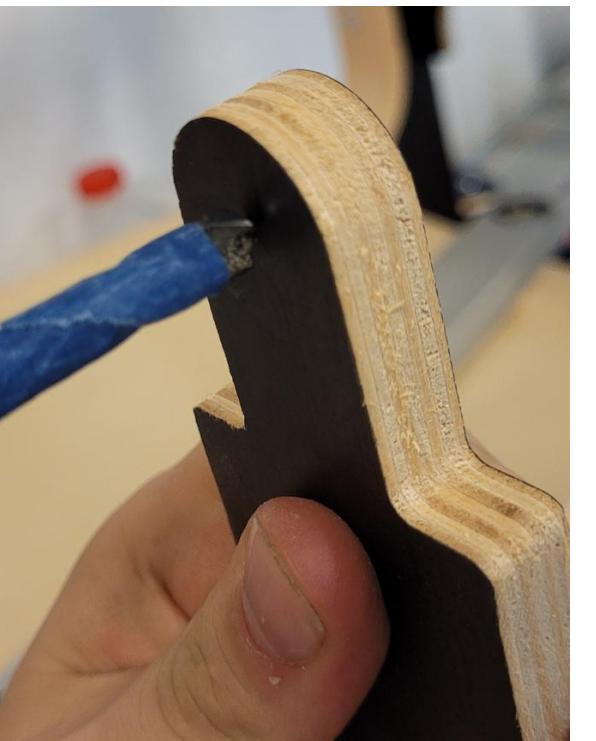


D2 may be a bit
too long. Adjust
at your own
discretion



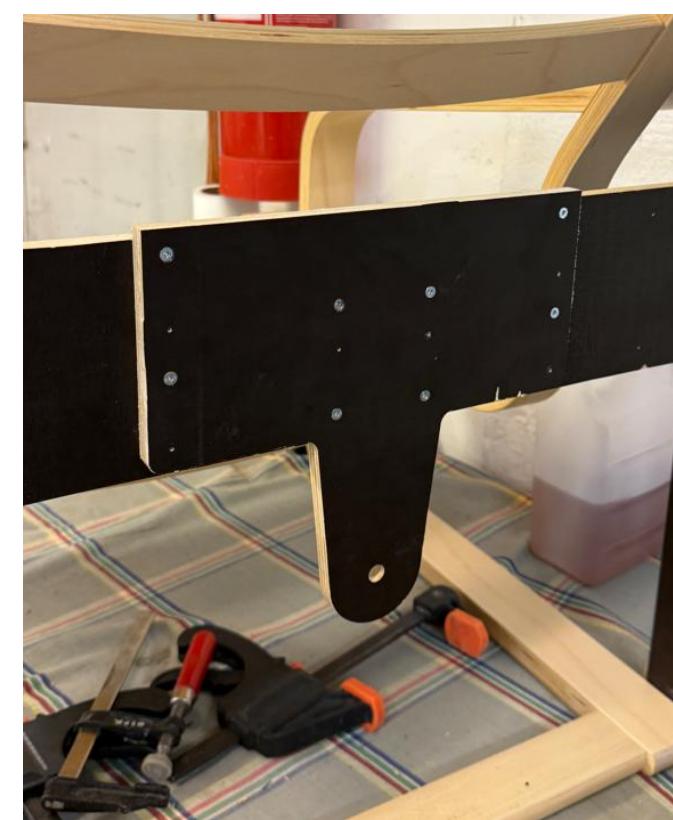
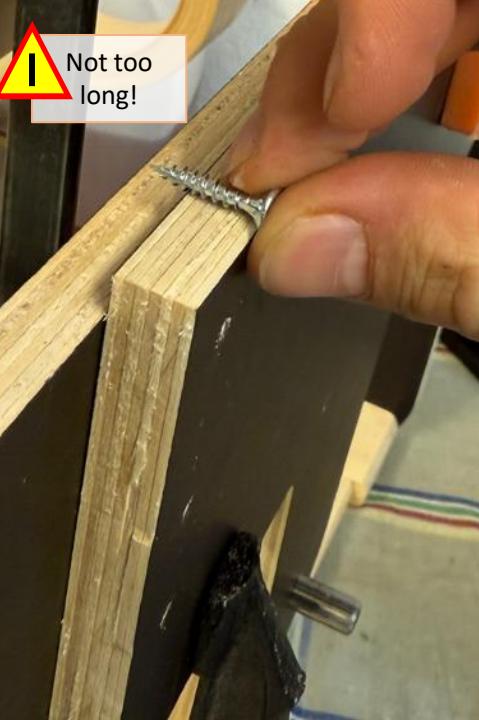


Drill Ø: 6.5 mm
No deeper than
6 mm. The end
of Bowden cable
shall fit.

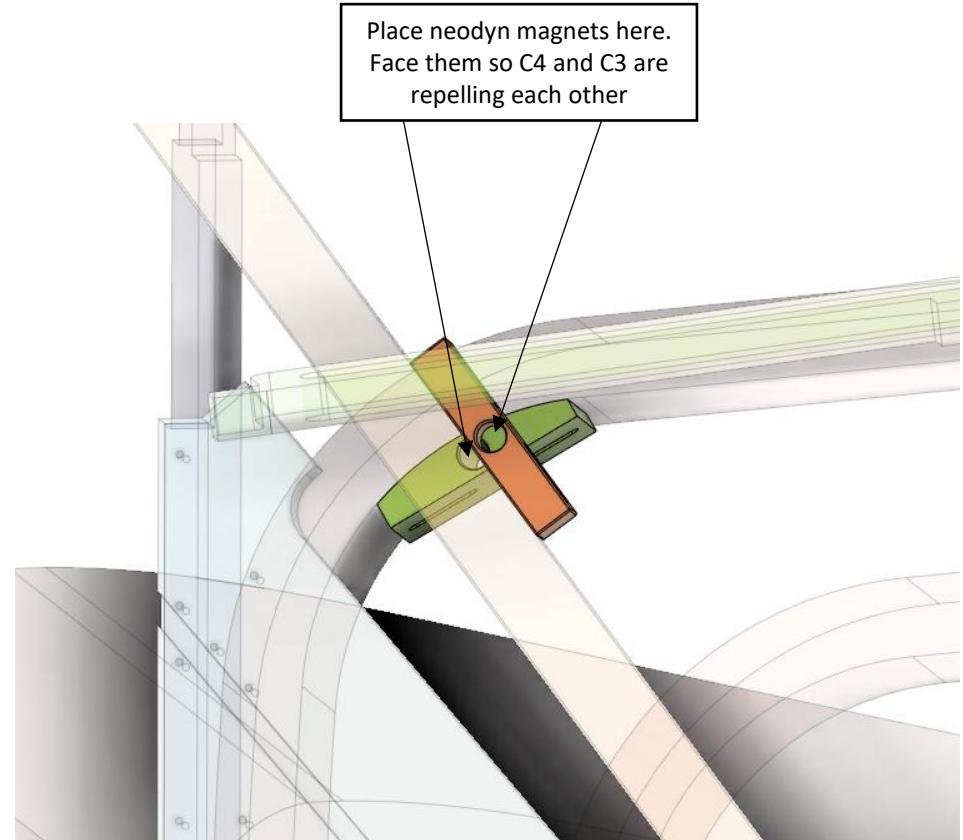
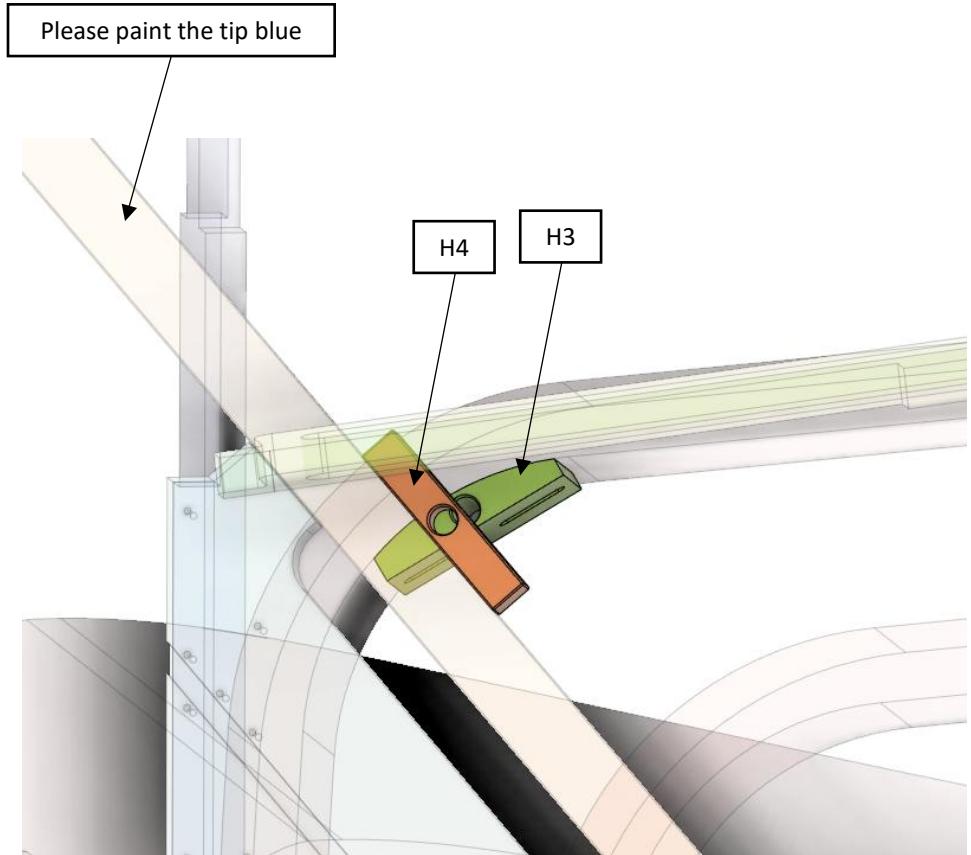
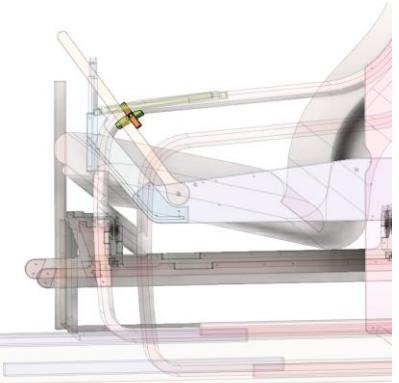




Find the center.

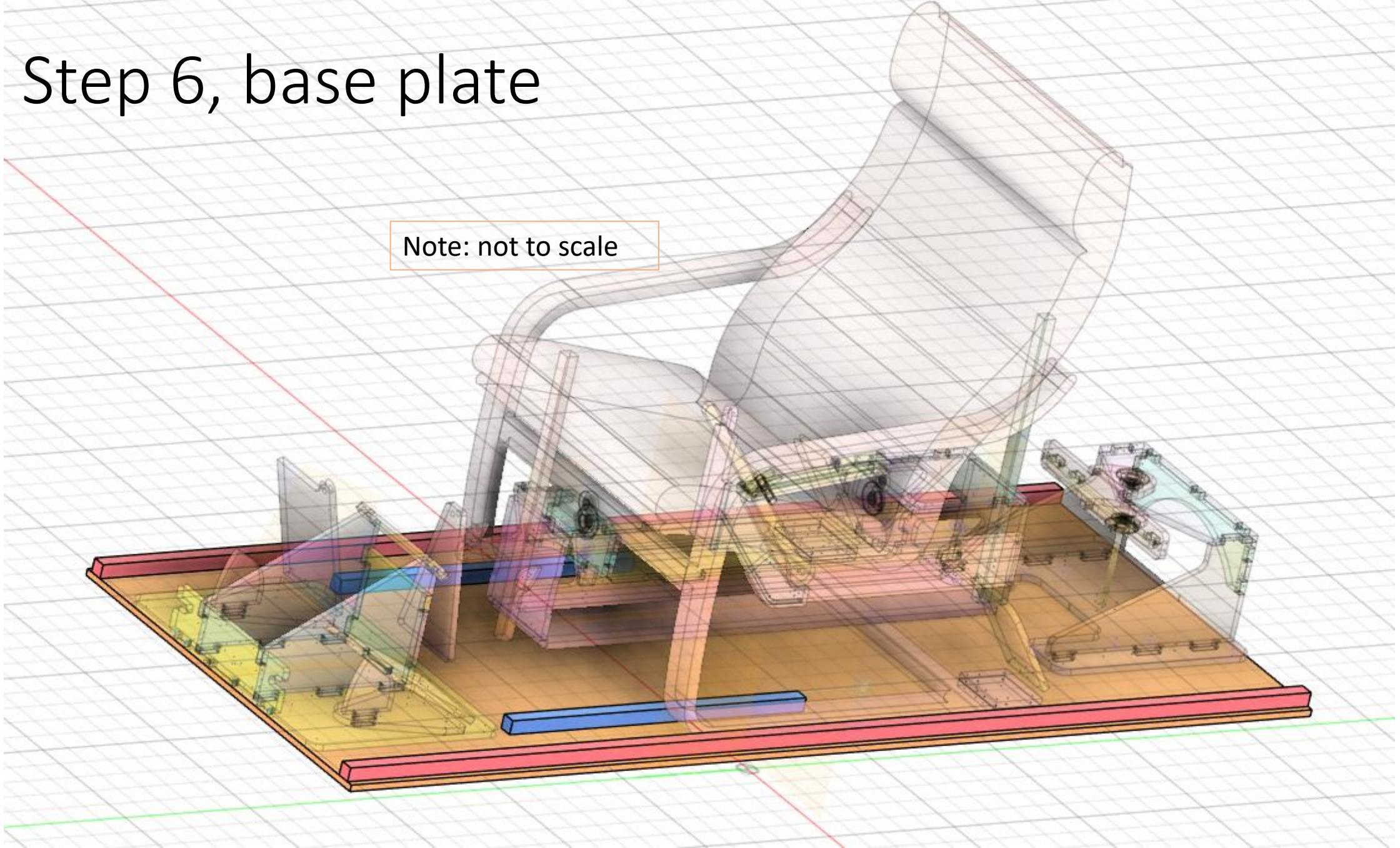


This is to simulate the air brake leaver lock.



Step 6, base plate

Note: not to scale



Name	Count	Sum = 12
A1	1	
A2	2	
A3	2	
A4	2	
A5	1	
A6	1	
A7	1	
A8	2	

Name	Count	Sum = 15
B1	2	
B2	1	
B3	2	
B4	1	
B5	1	
B6	2	
B7	1	
B8	2	
B9	2	
B10	1	

Name	Count	Sum = 5
C1	2	
C2	2	
C3	1	
D1	1	
D2	1	
D3	1	
D4	1	
D5	1	

Name	Count	Sum = 15
E1	1	
E2	2	
E3	1	
E4	1	
E5	1	
E6	2	
E7	1	
E8	4	
E9	2	

Redesigned, will be
3D-printed instead

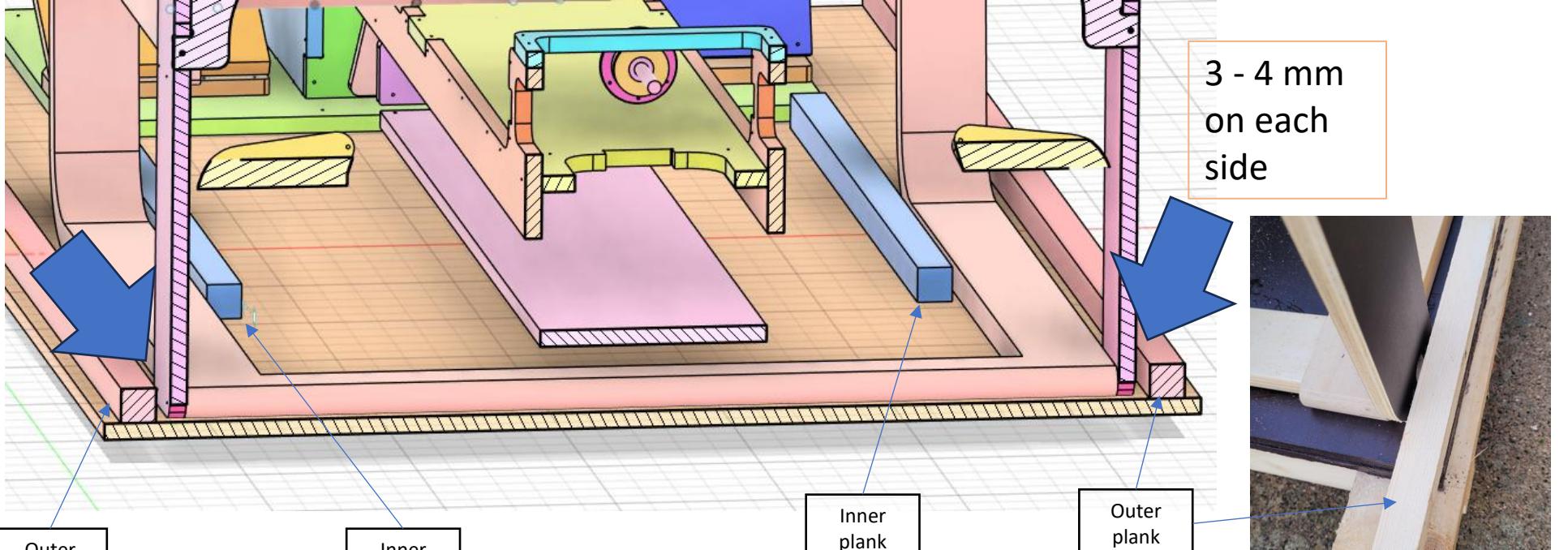


Mount front pedals to the front aligned in the centre.



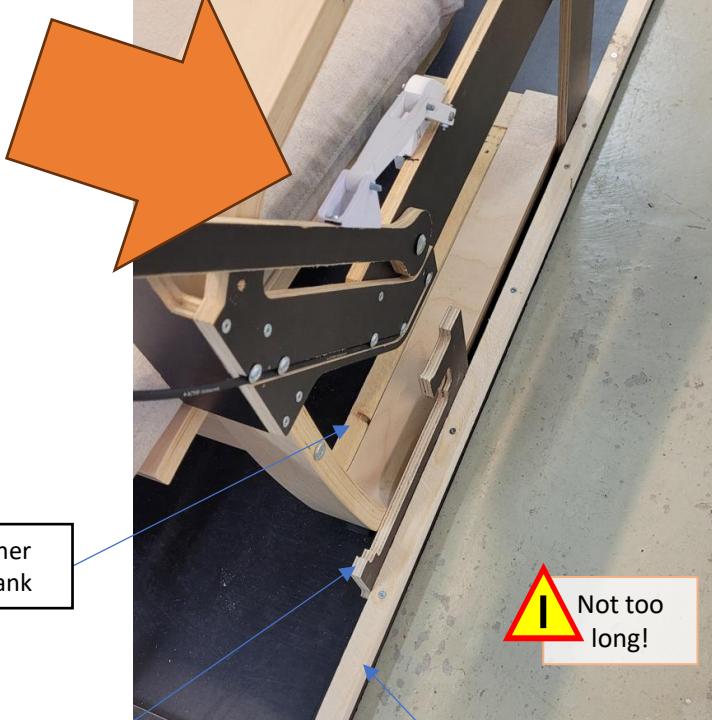
Since the base plate shall be on the floor, make sure the screws are in adequate length. If they are too long they will damage the floor.







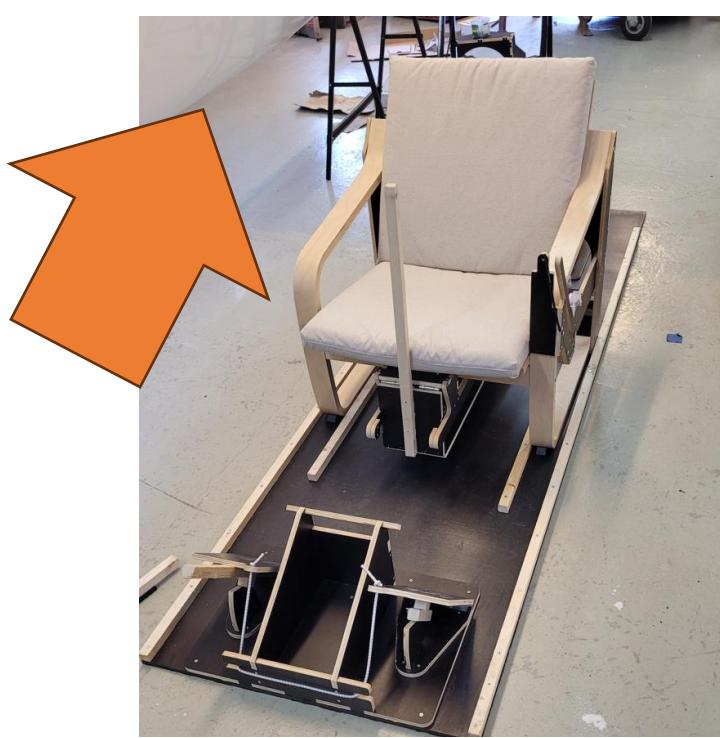
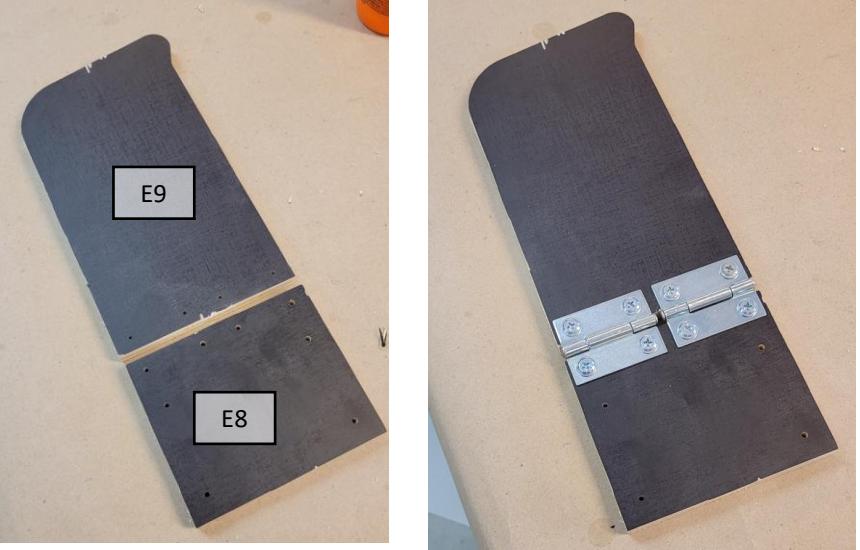
1. Mount outer planks.
2. Push chair to front to simulate a short pilot.



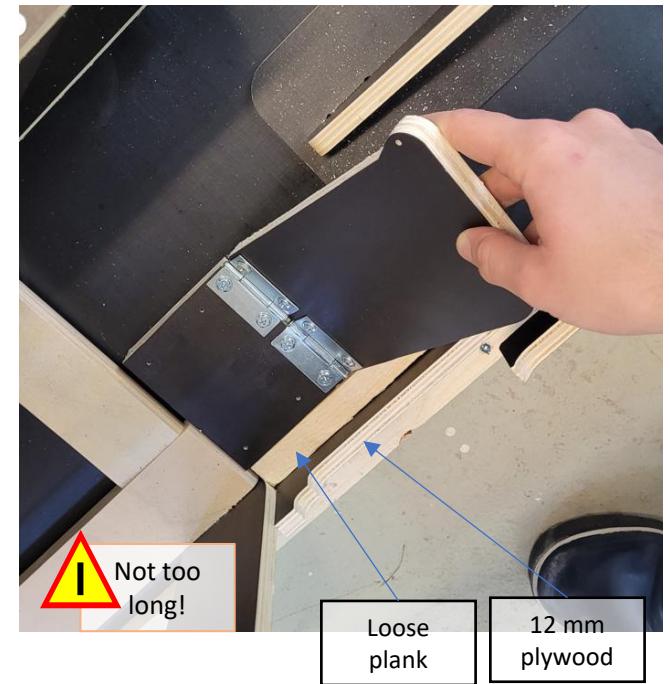
3. Place a 12 mm piece of plywood between chair and outer plank.
4. Push the chair firmly against outer plank.
5. Screw down inner plank to base plate.



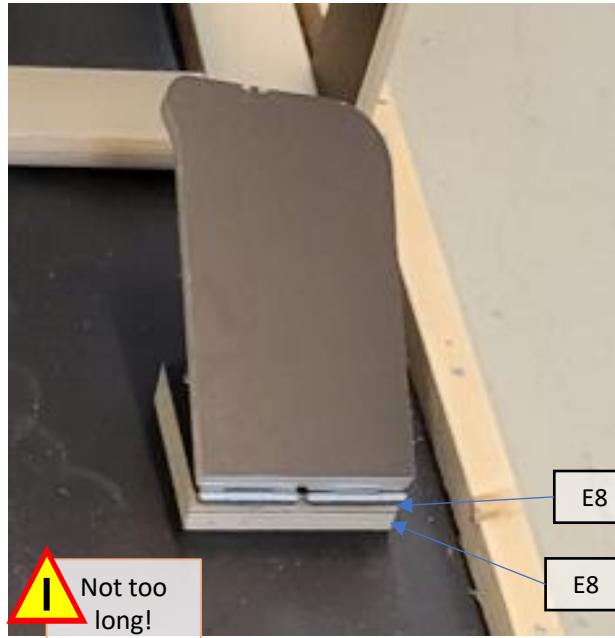
- To the same thin at the other side:
6. Place a 12 mm piece of plywood between chair and outer plank.
 7. Push the chair firmly against outer plank.
 8. Screw down inner plank to base plate.



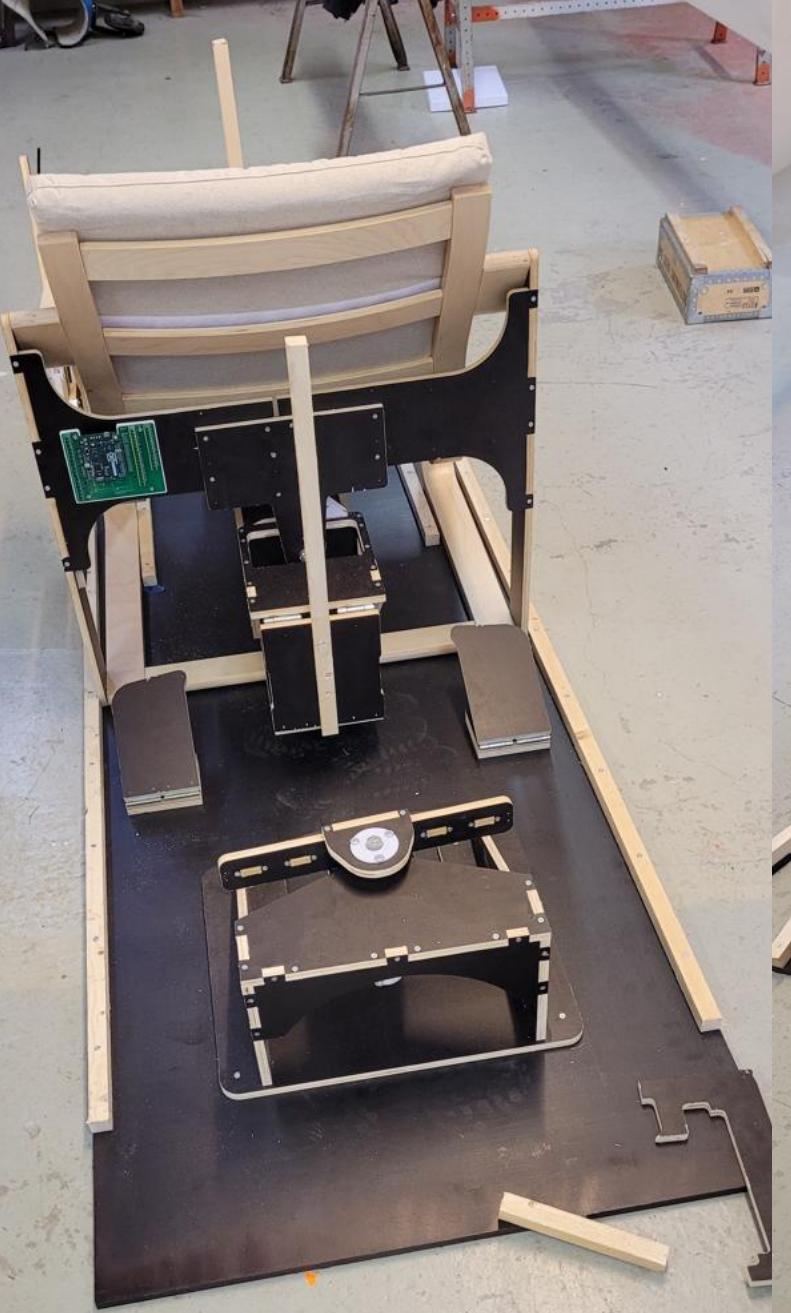
Push chair to back
so a very long
basket player pilot
sits comfortably.



Place E8 approx. 37
mm from outer plank.
($37\text{ mm} = 12\text{ mm}$
plywood and a
leftover piece of
outer/inner plank)

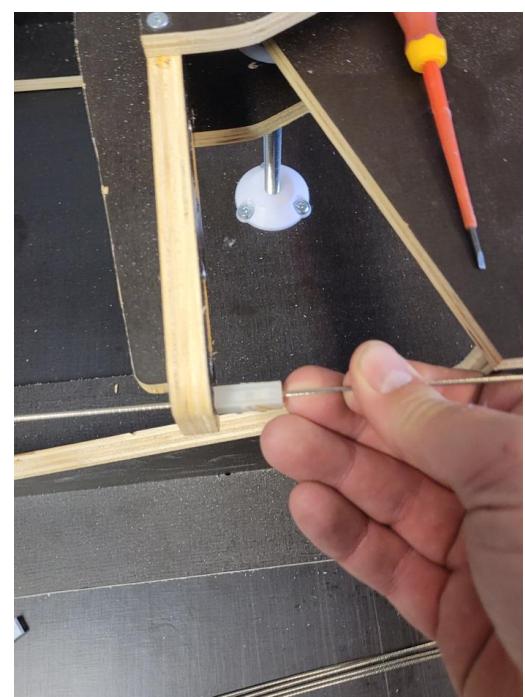
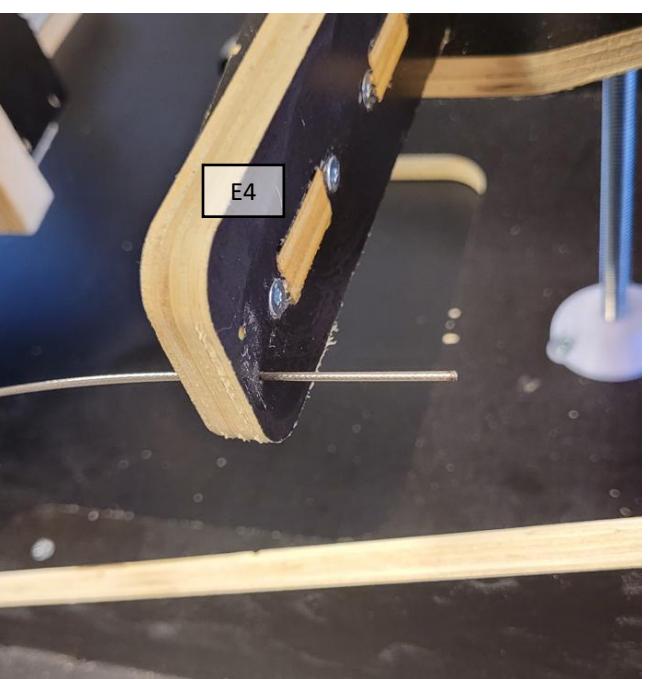
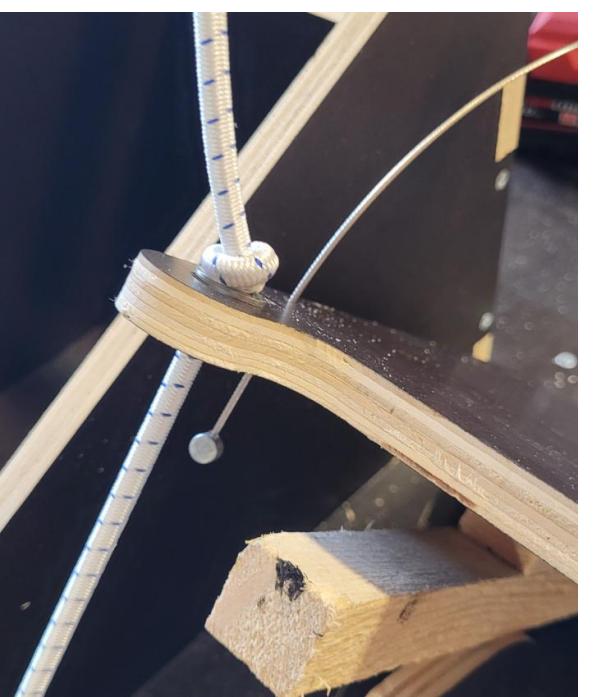
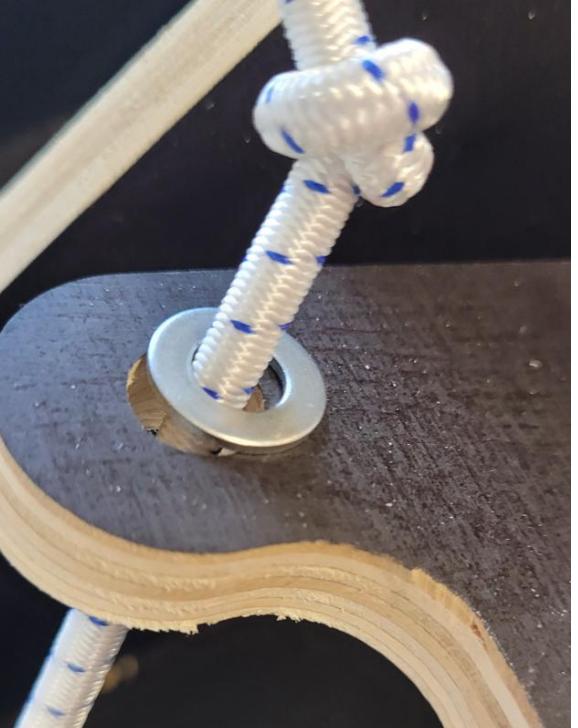


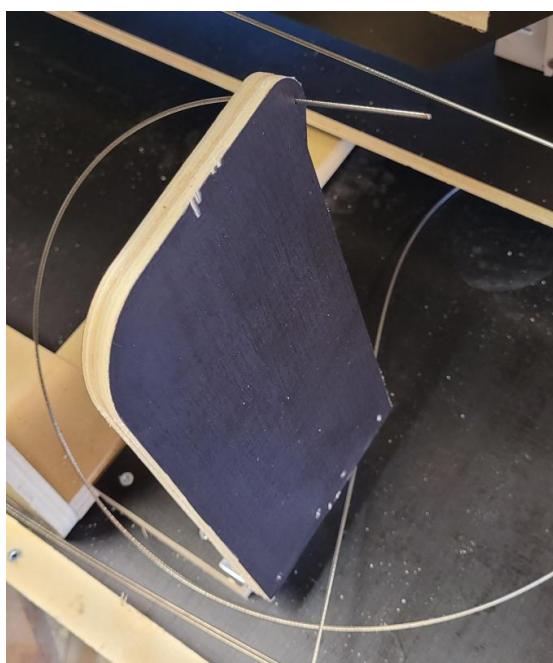
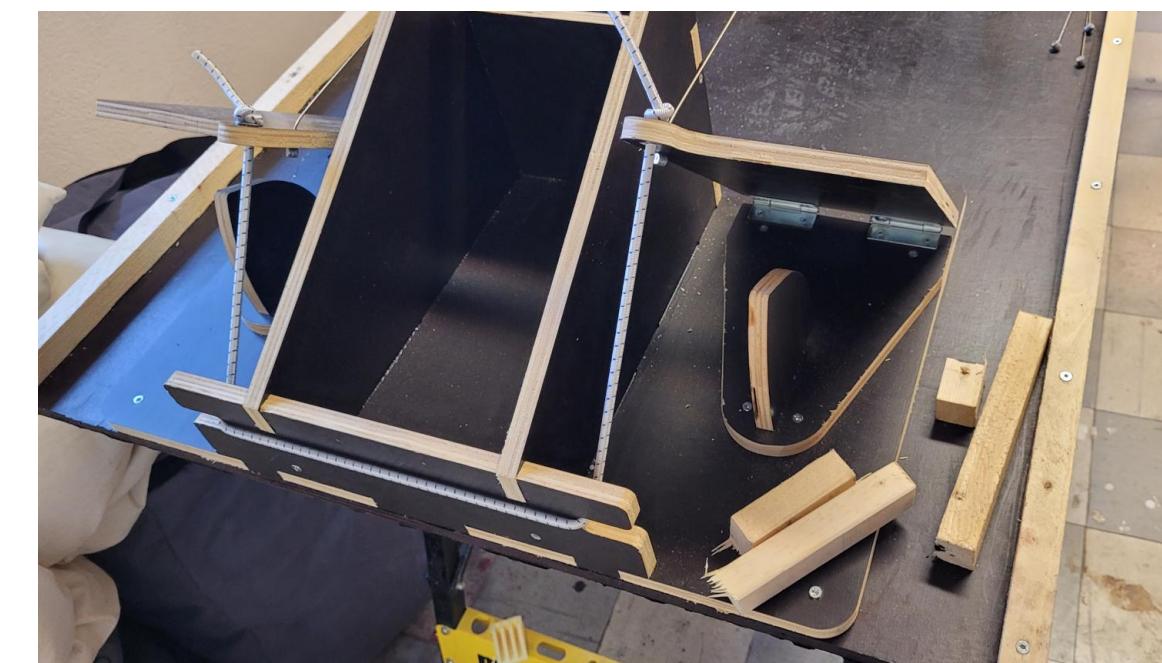
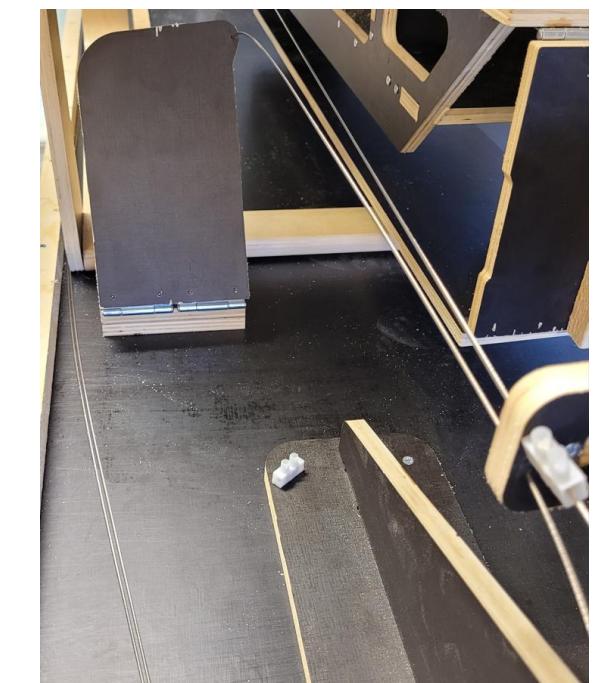
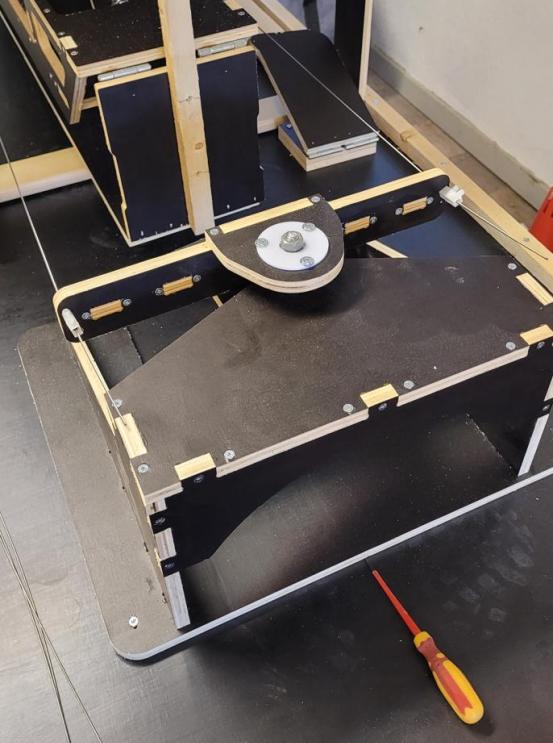
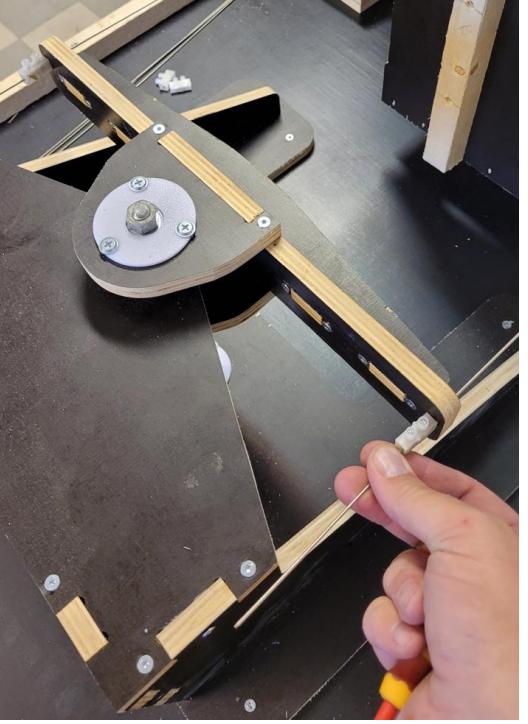
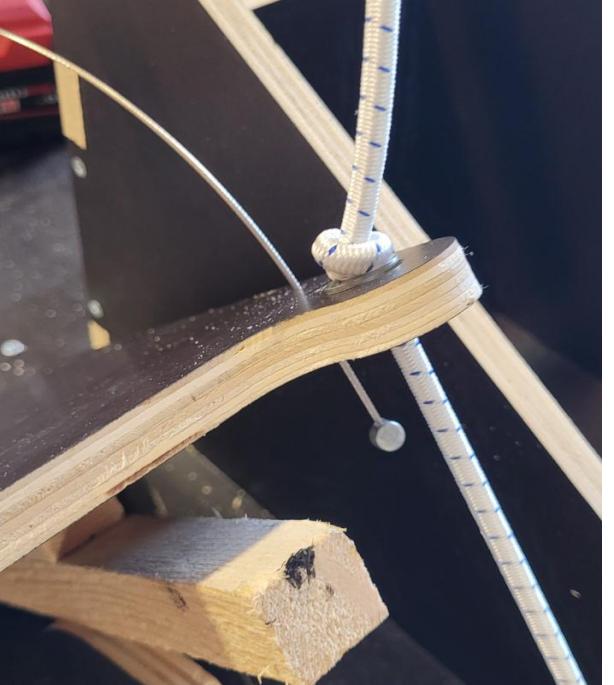
Note: 2 x E8 on top
of each other!

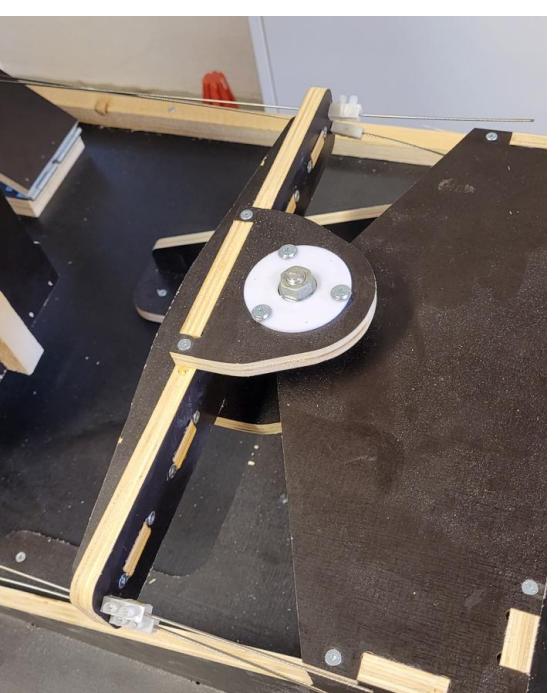
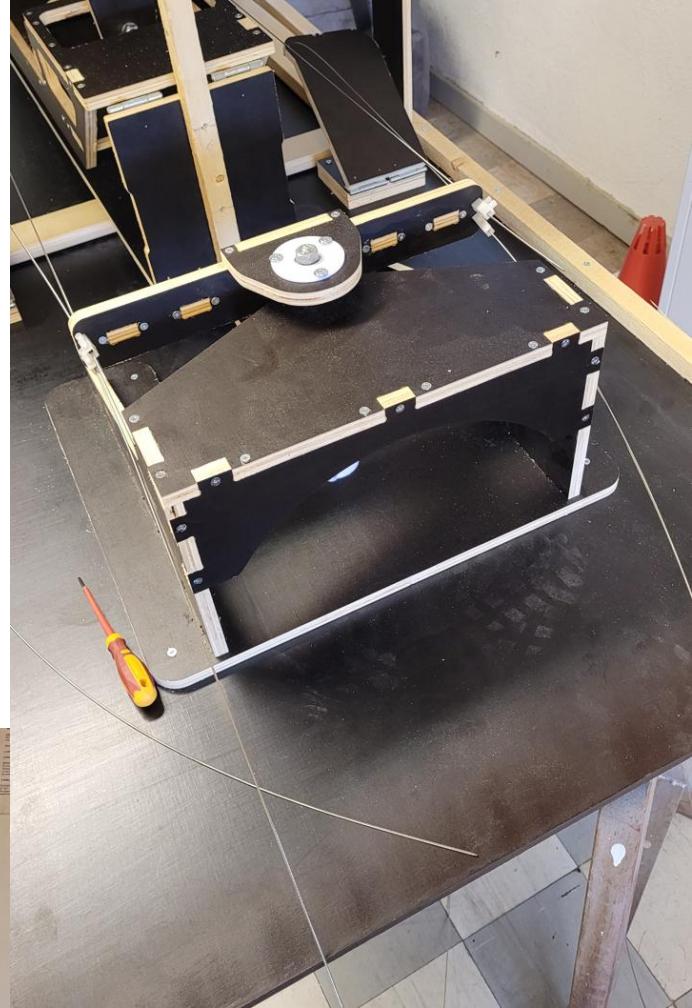
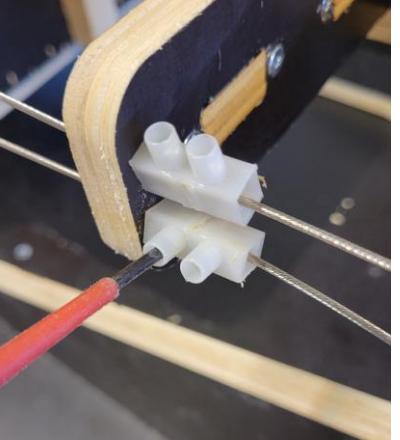
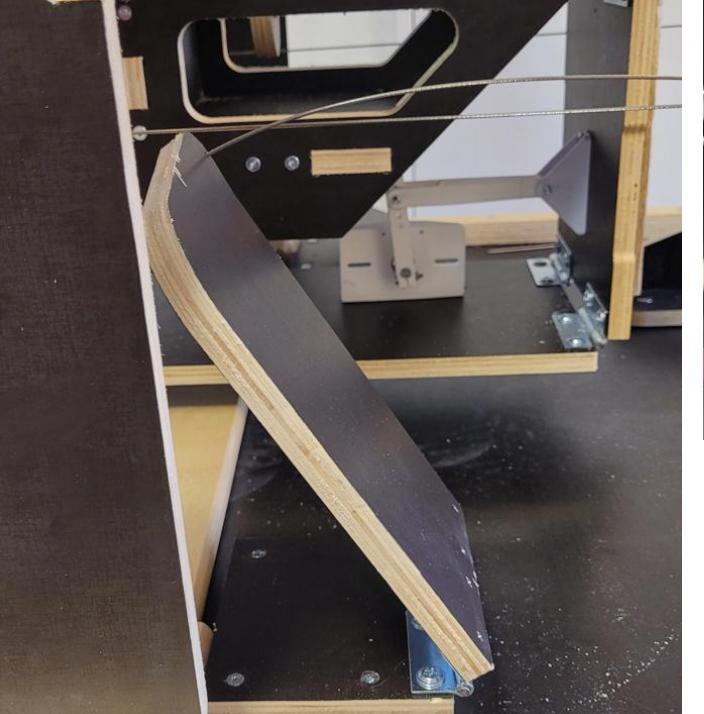
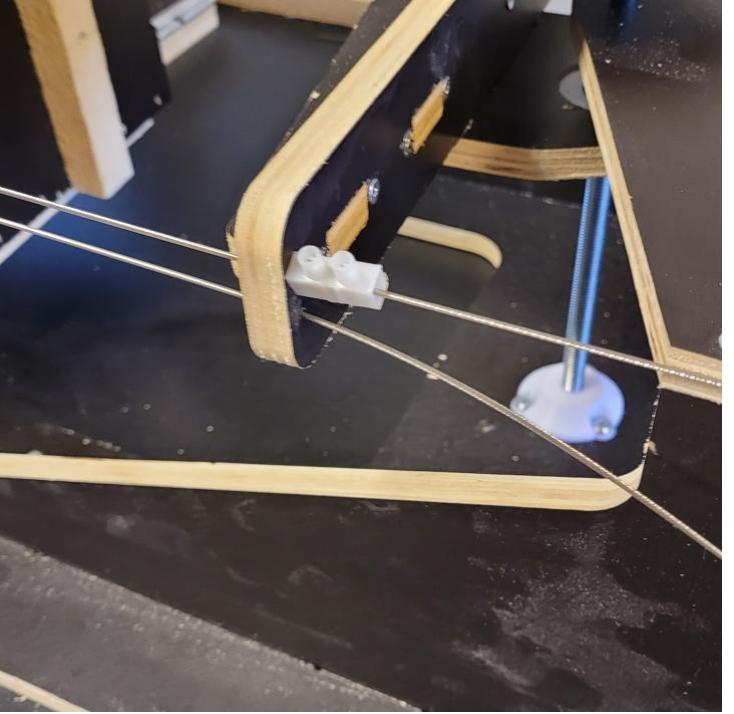


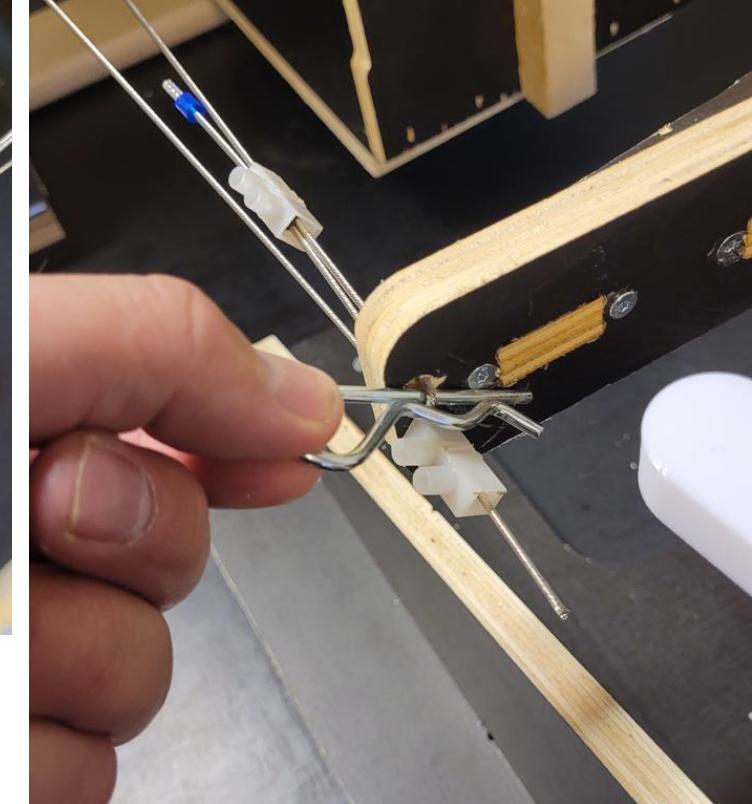
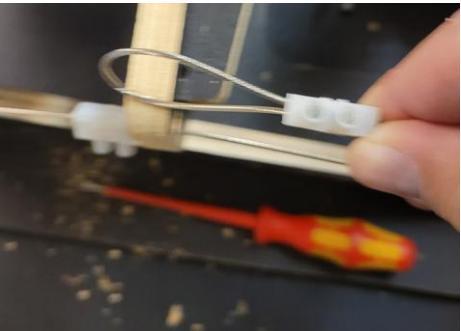
Step 7, wires and rubber bands

...

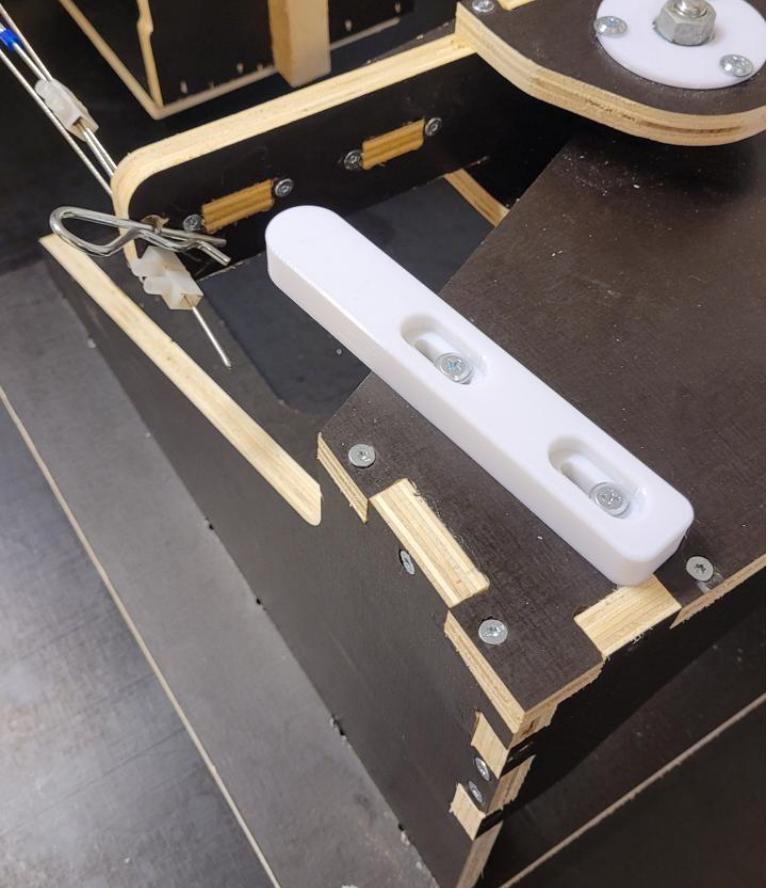




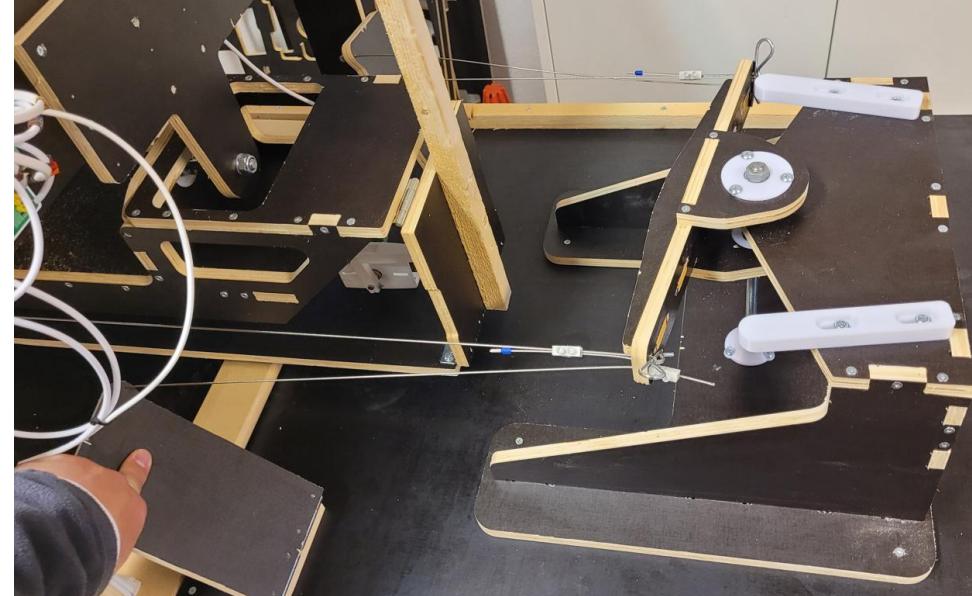
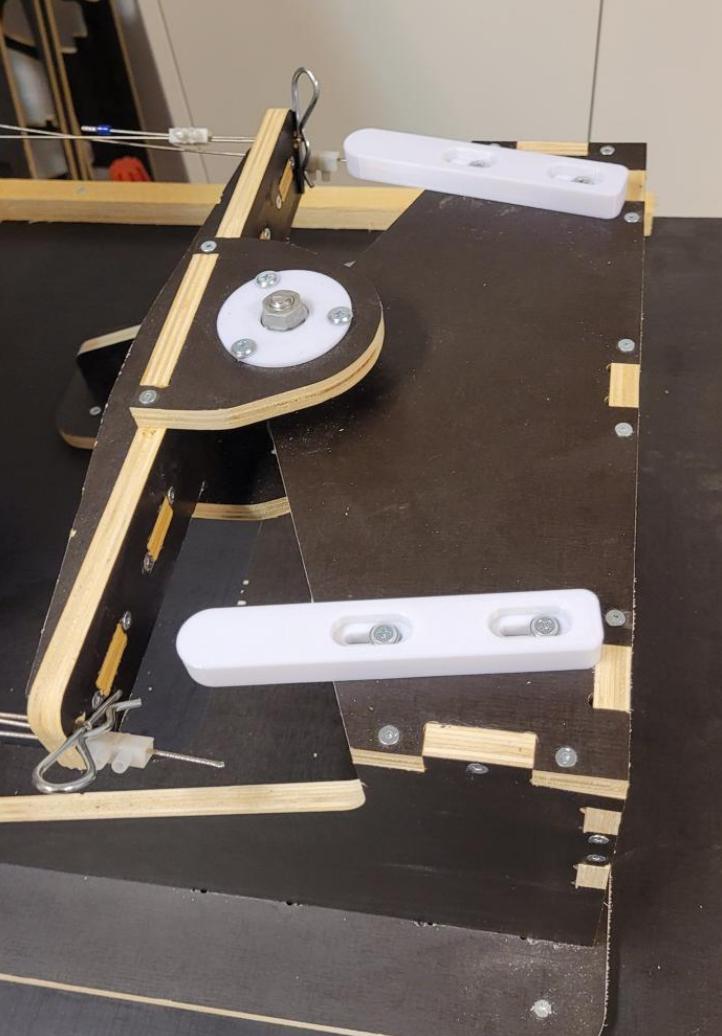


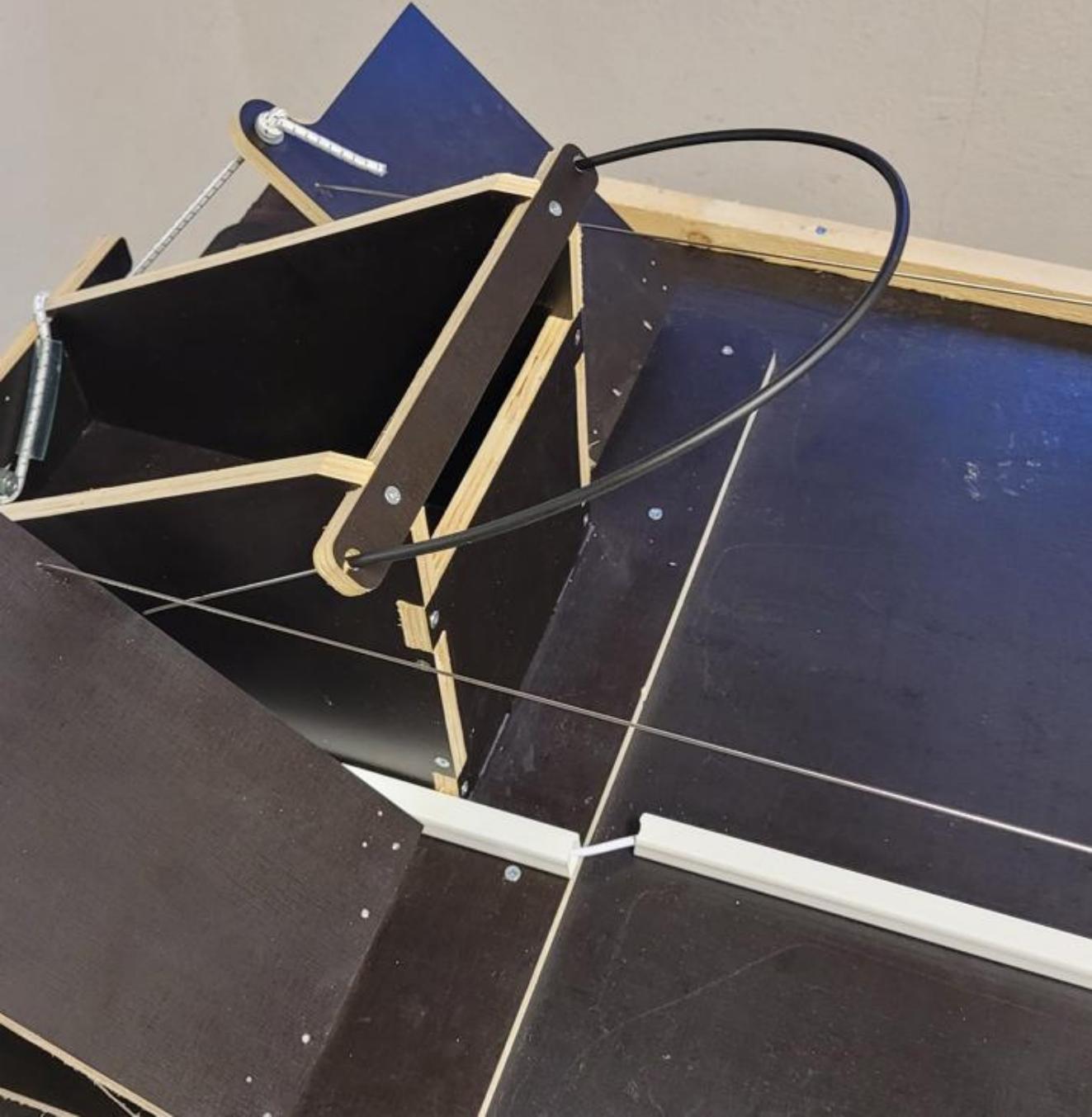


A modification to be able to more easily separate the chair from the base.

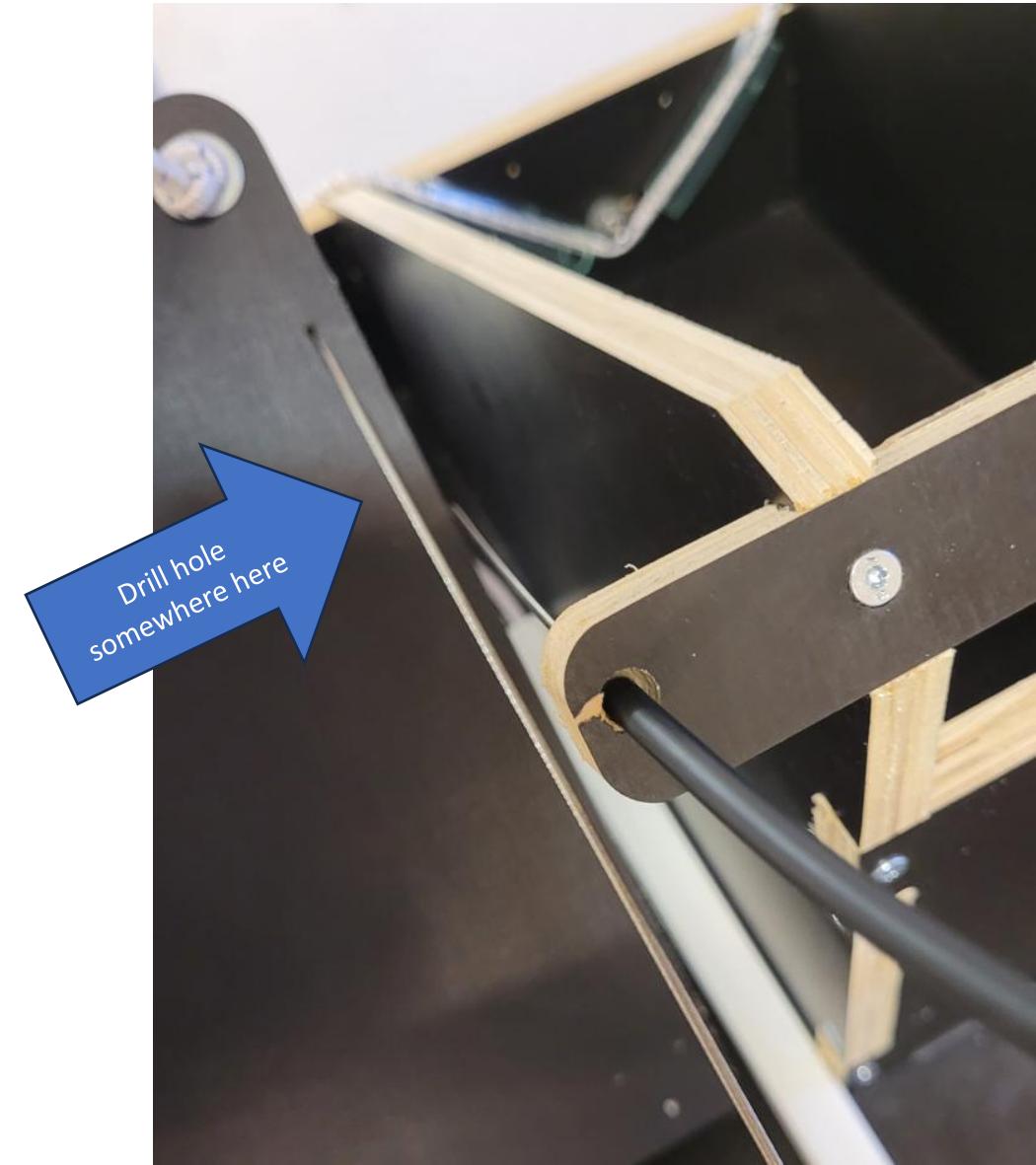


A modification for better feeling
when using the rear pedals.





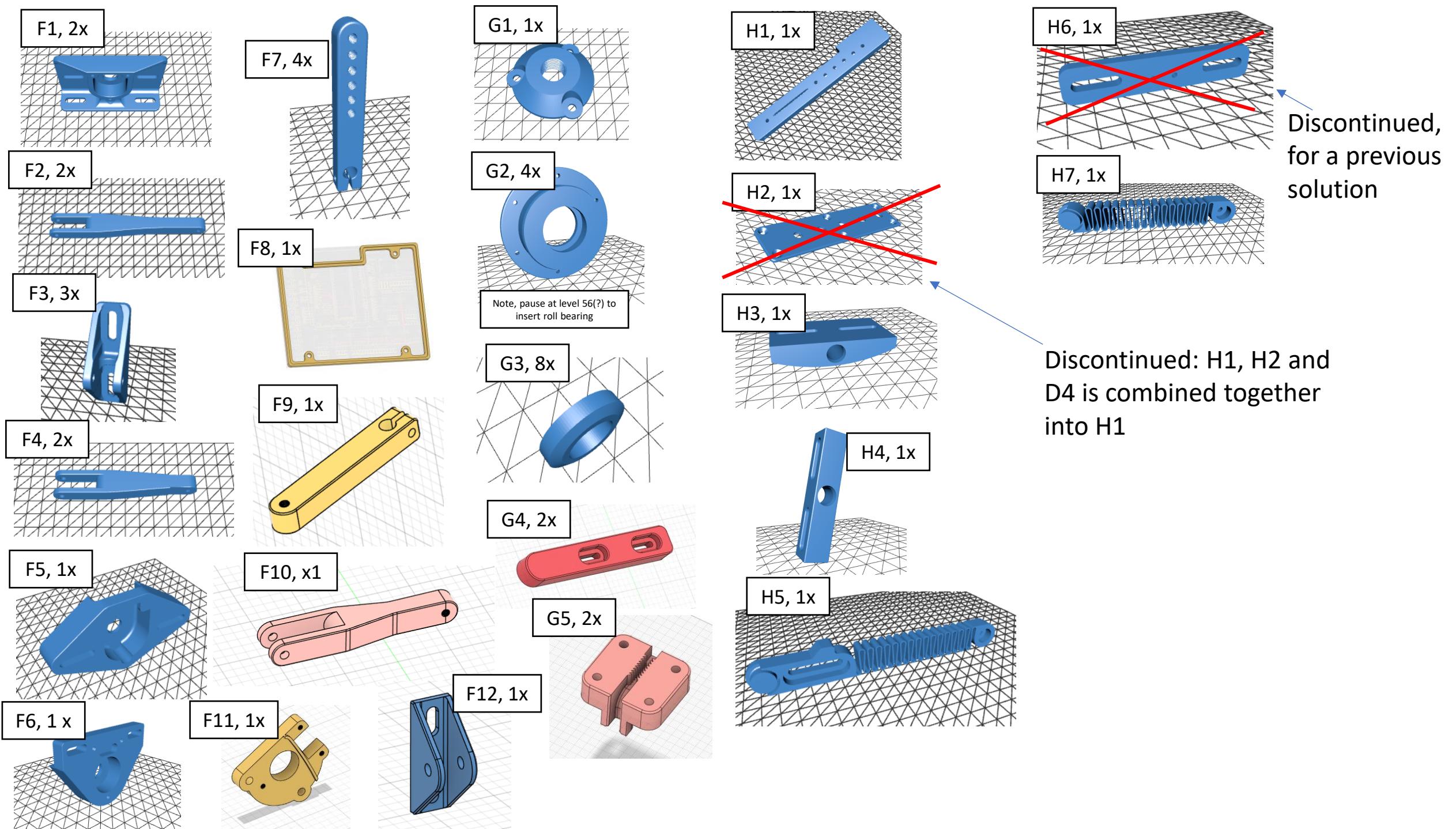
In case you opt out of dual control.
Connect the two pedals with a wire
like shown in the pictures.

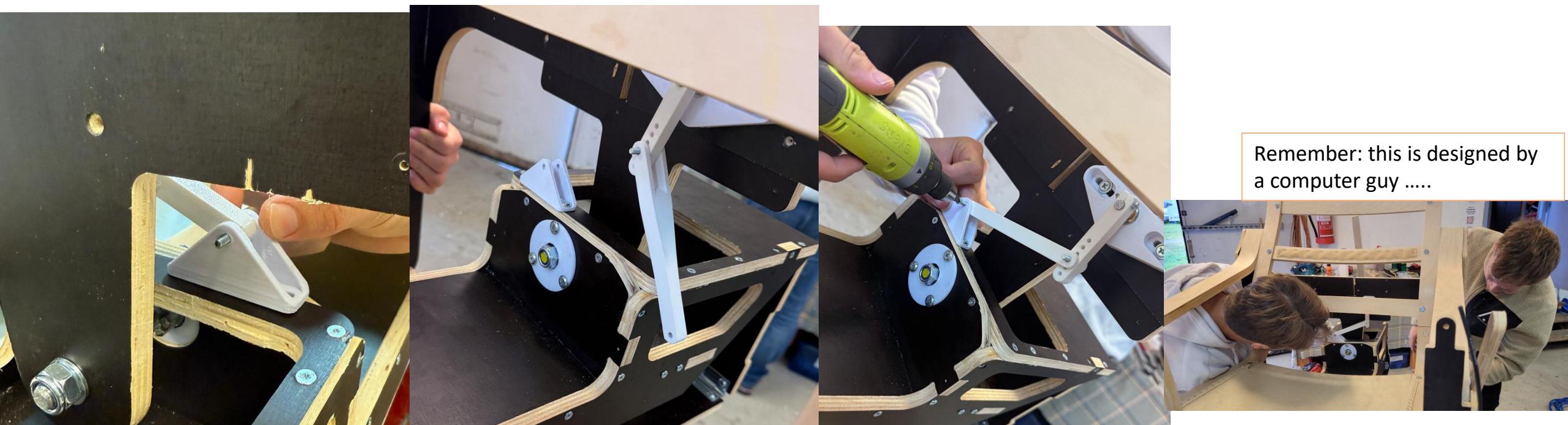
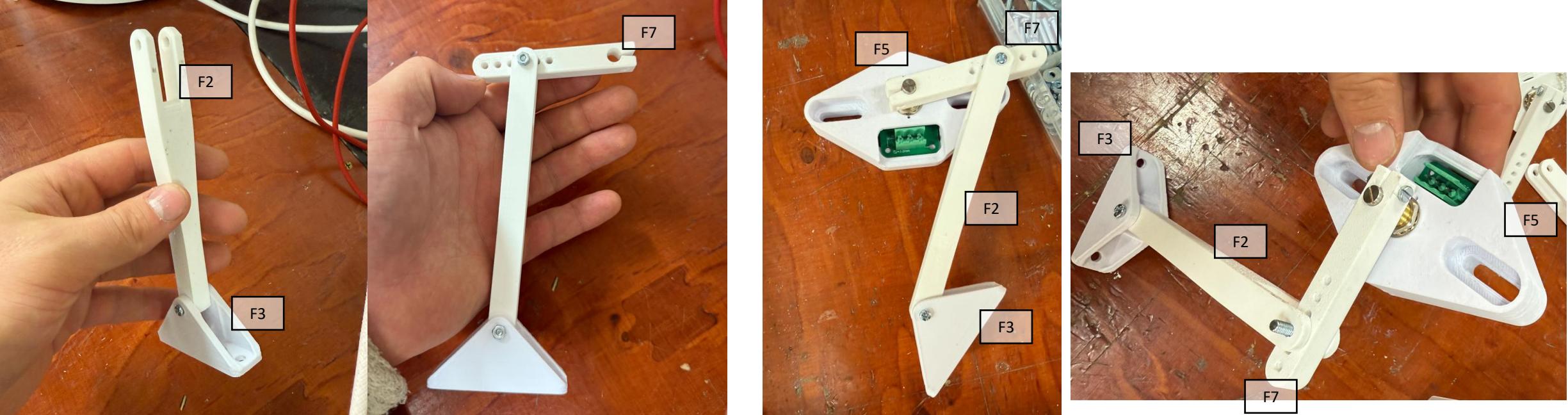


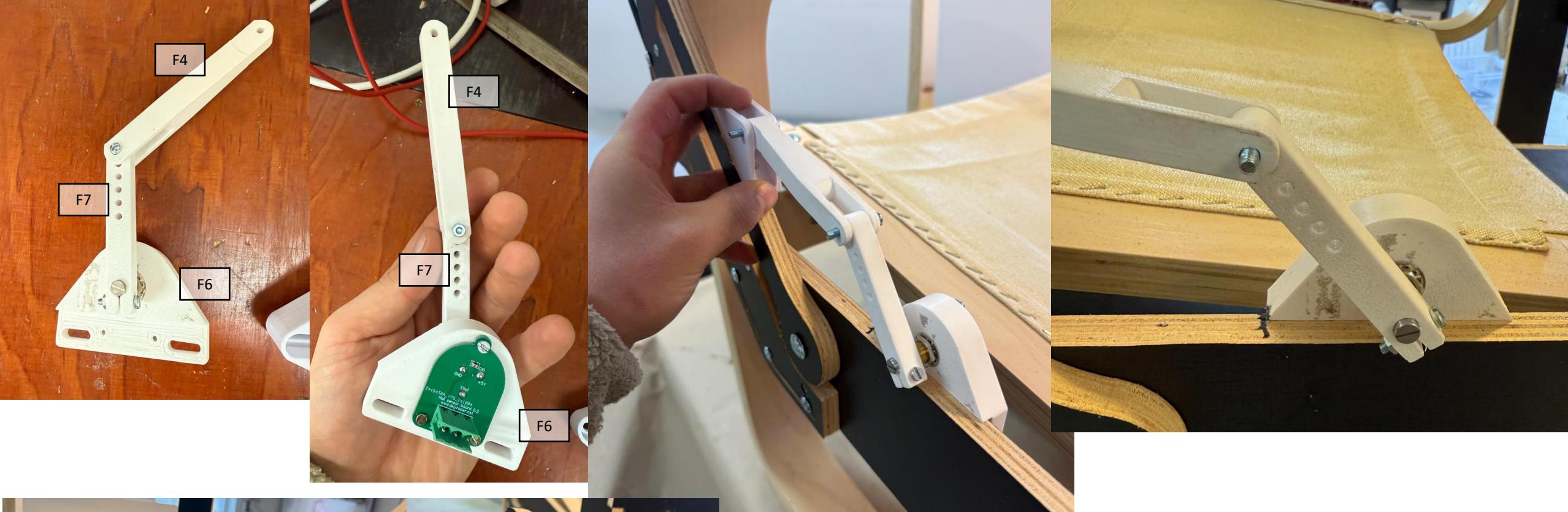


Step 7, the electronics stuff

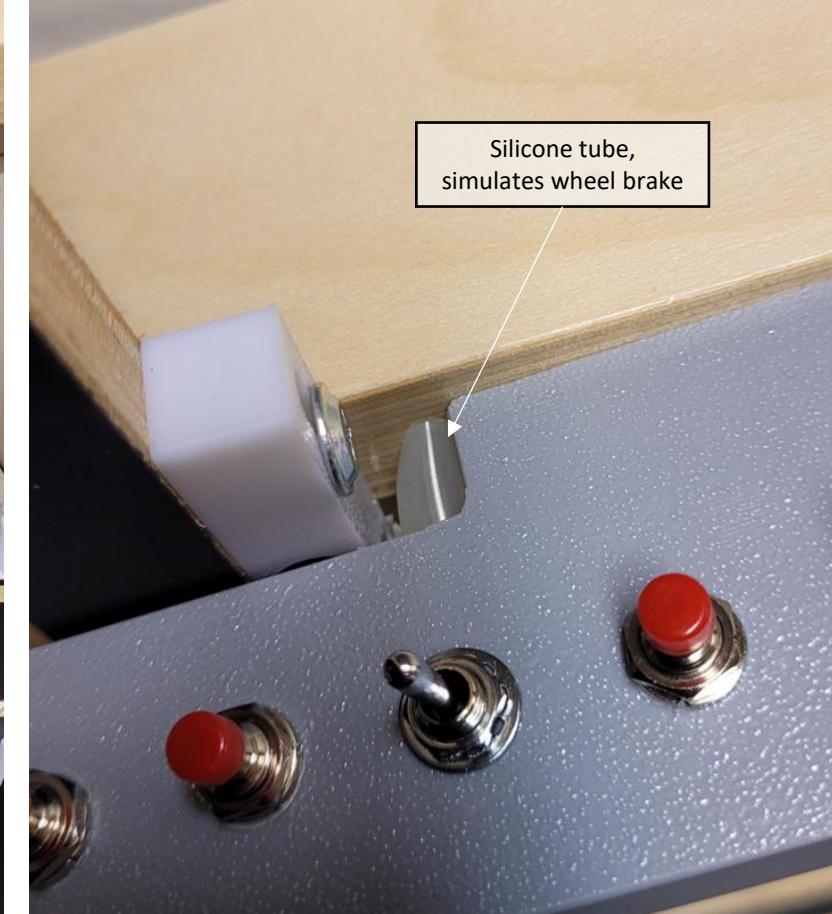
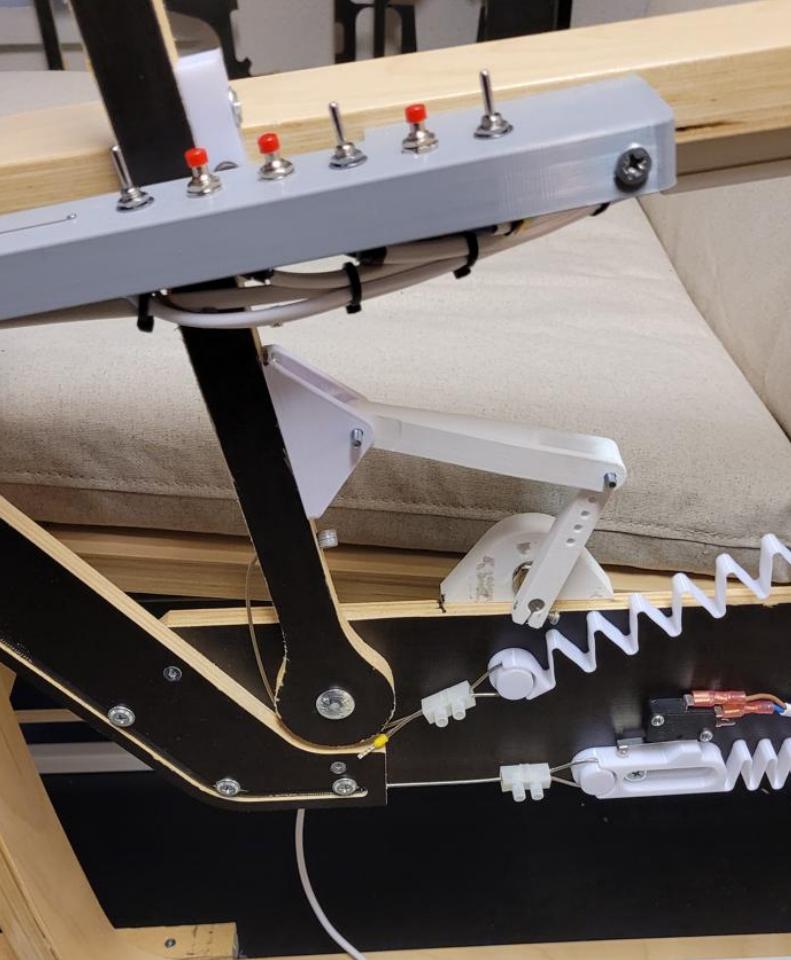
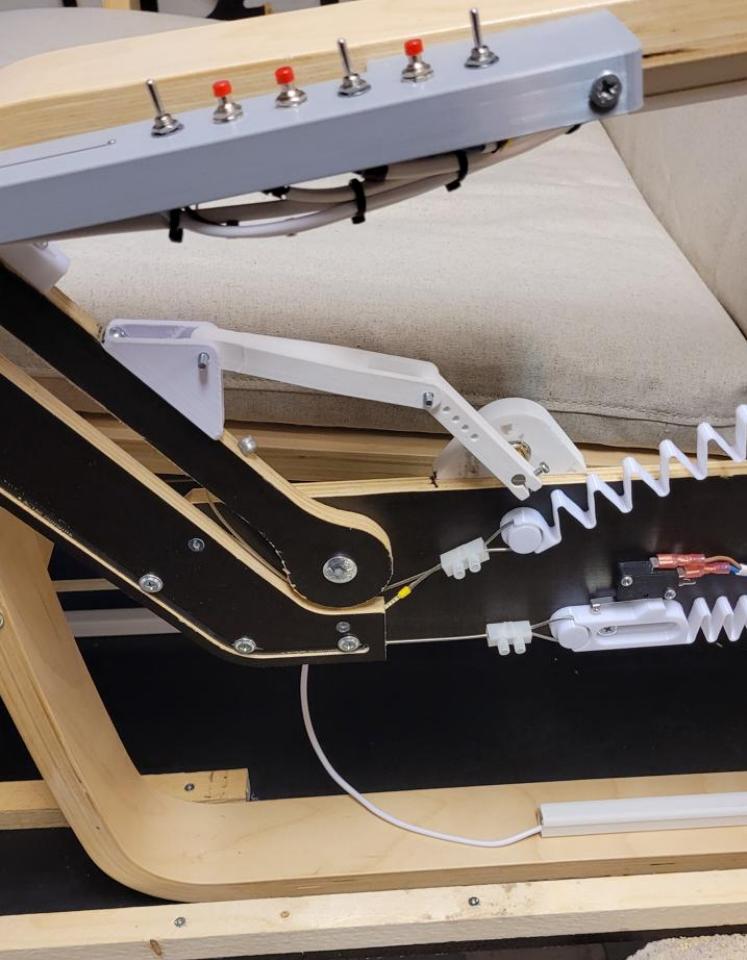
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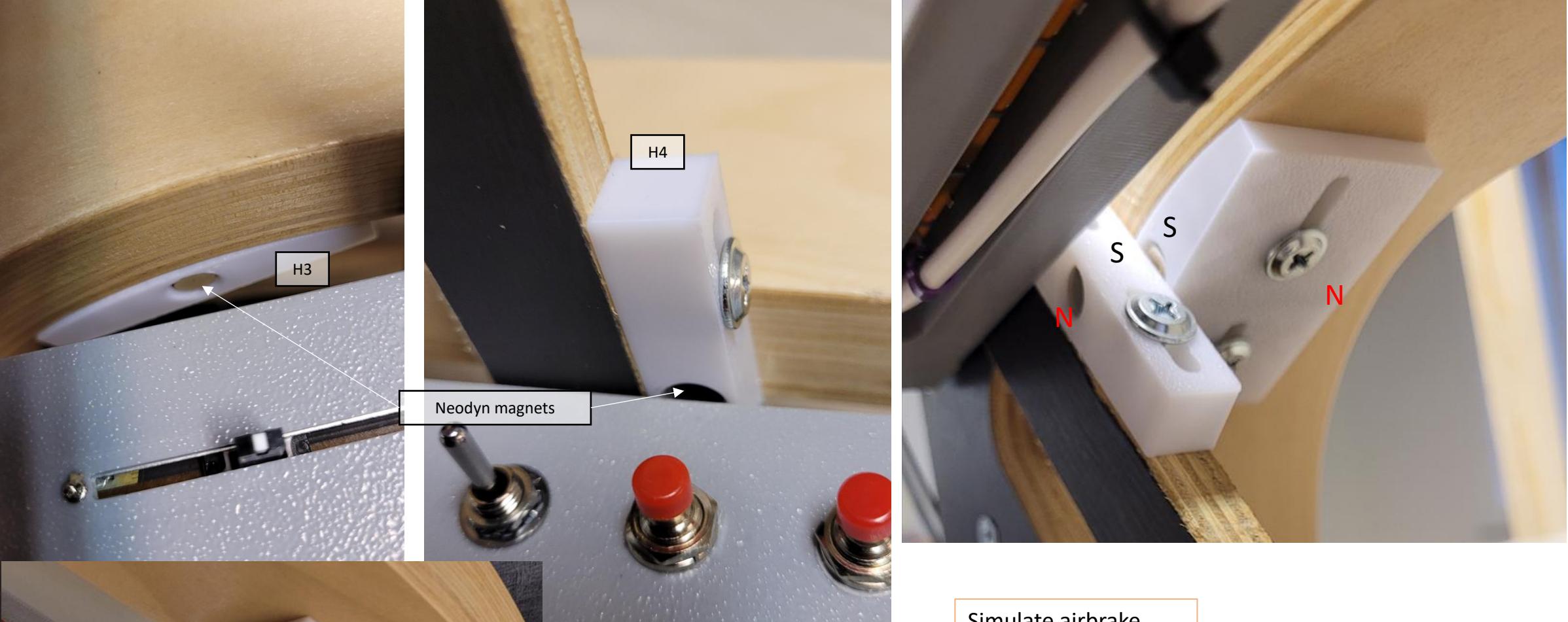




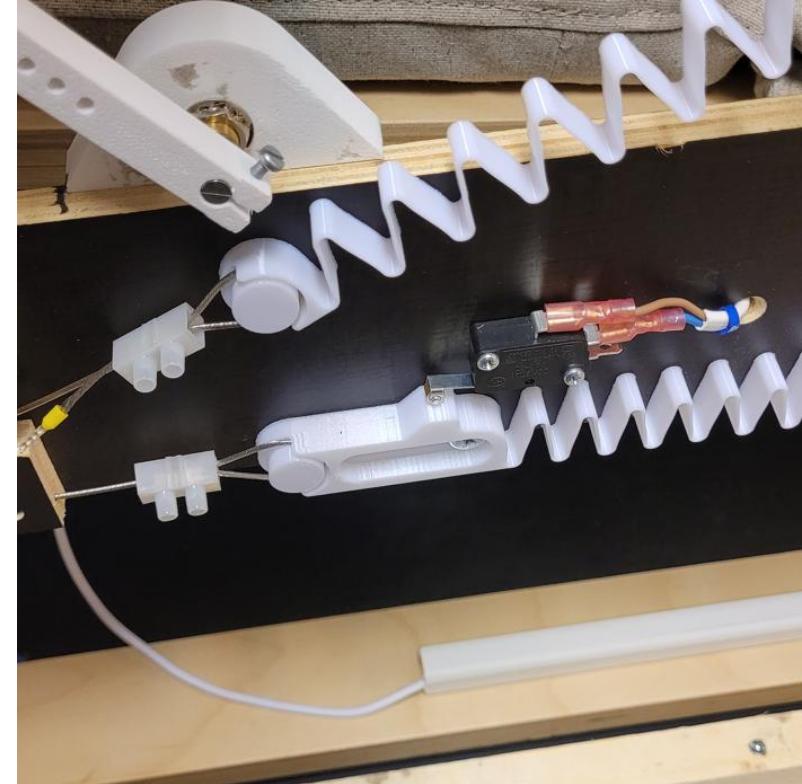
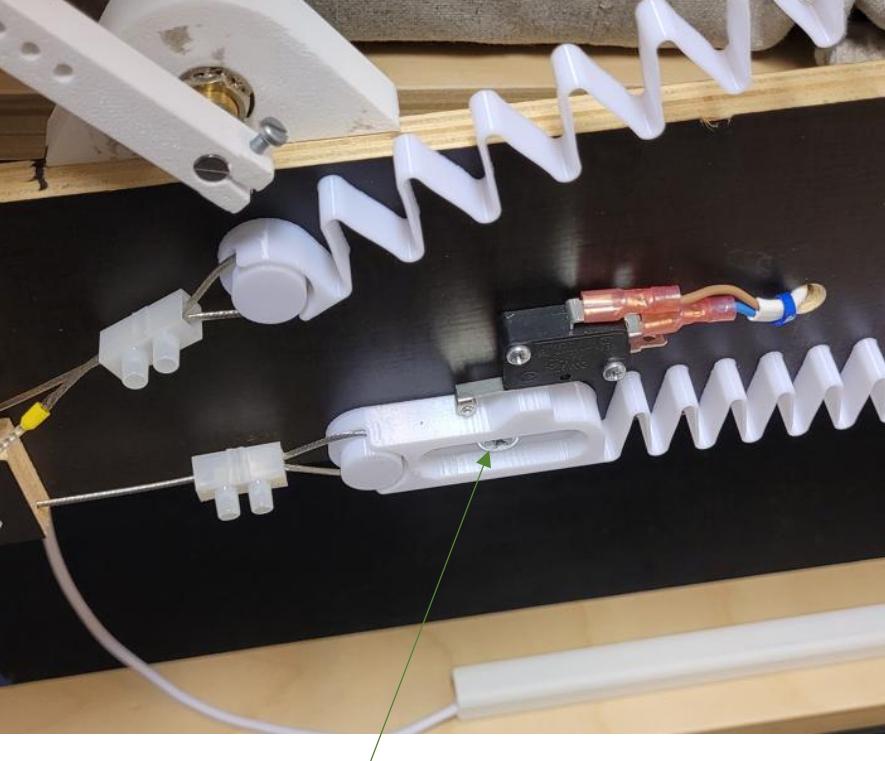
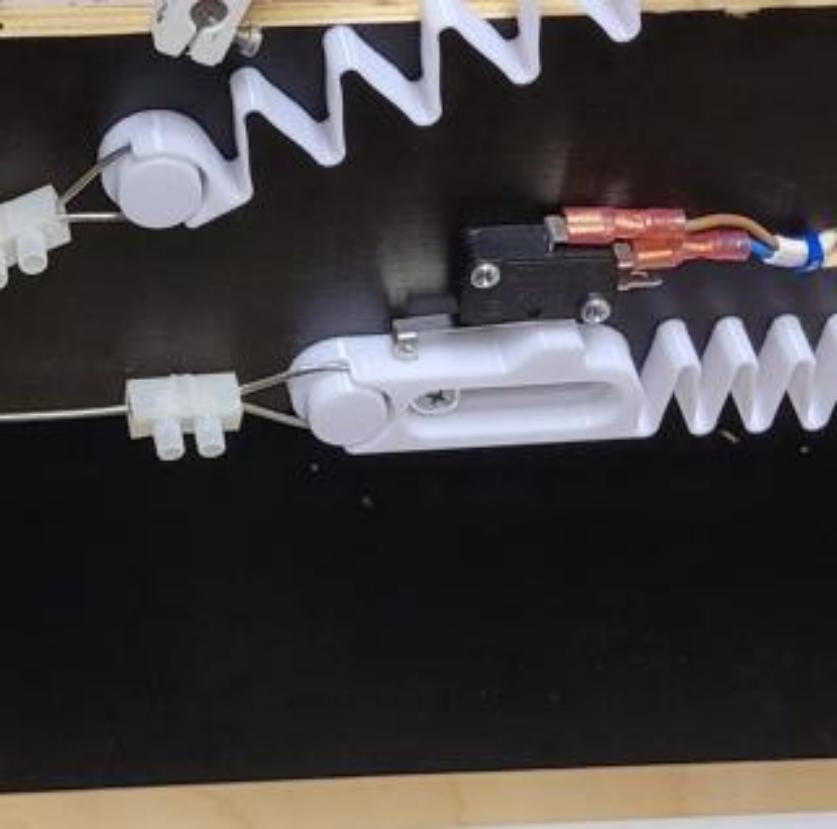




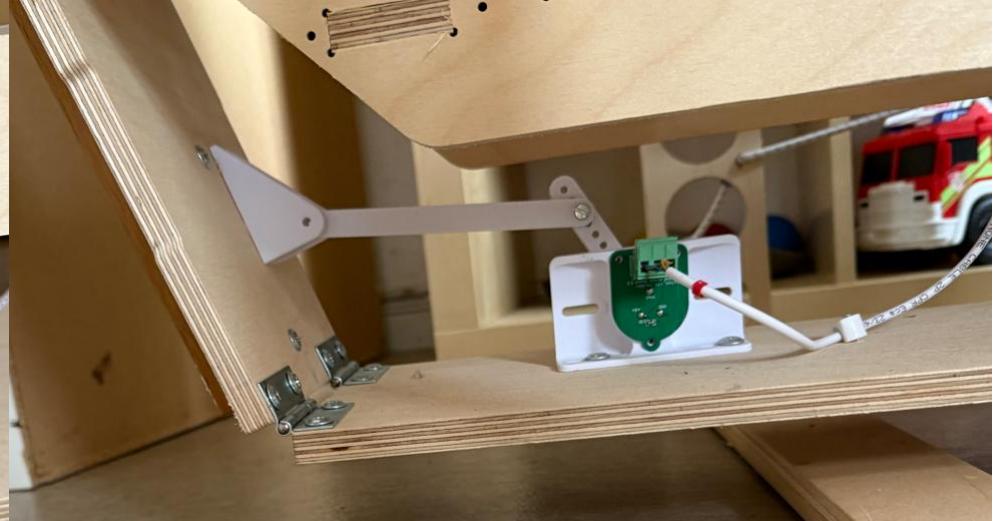
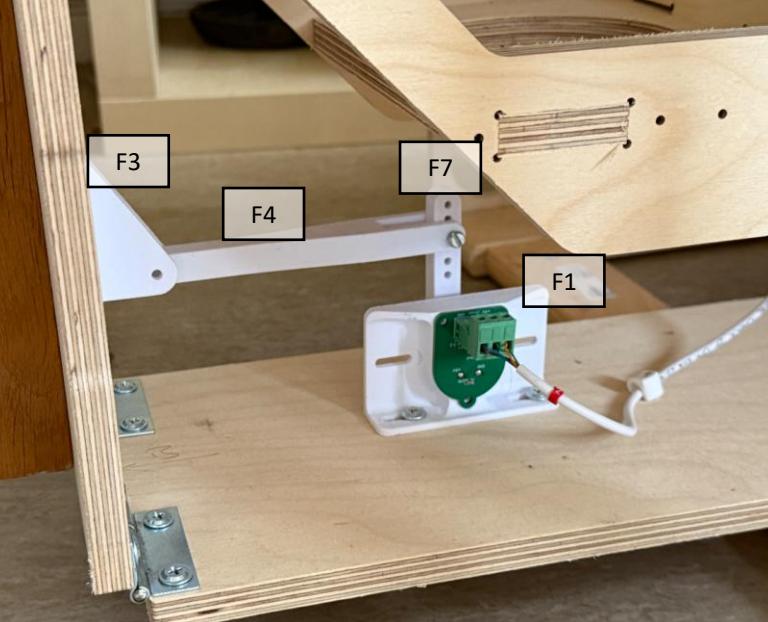
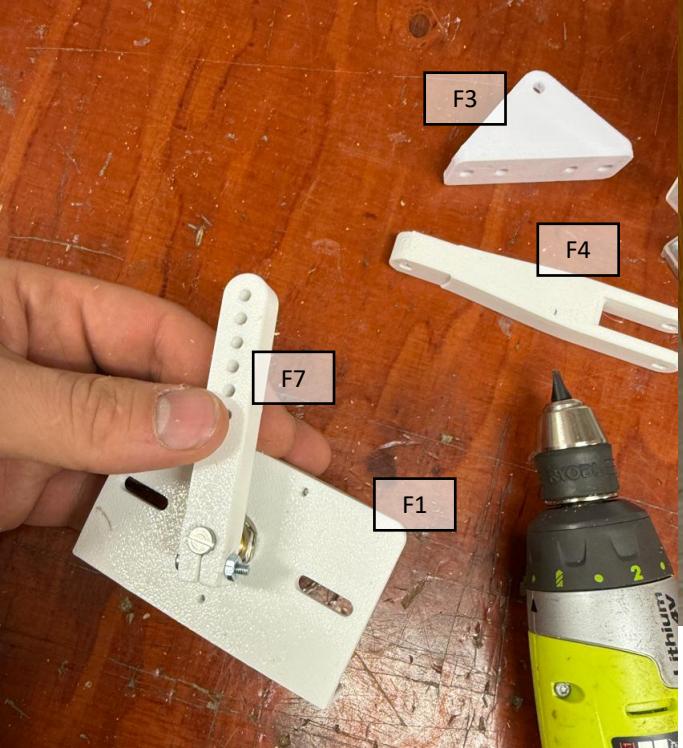


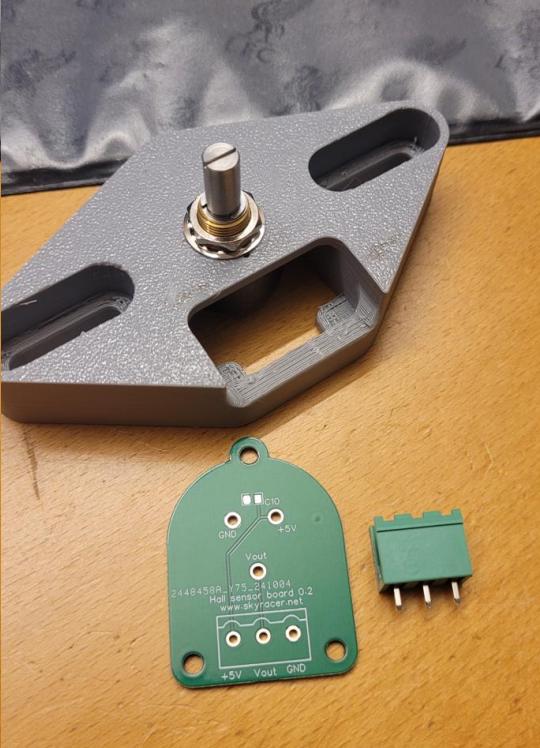
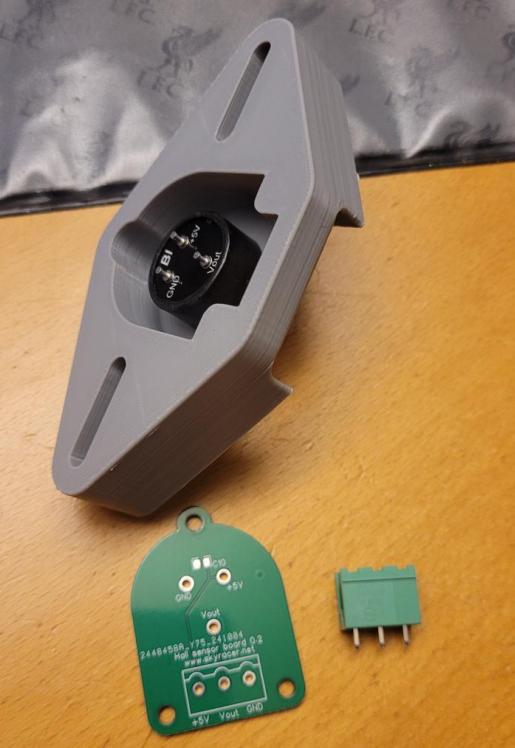


Simulate airbrake
overlock: magnets in
H3 and H4 shall repel
each other

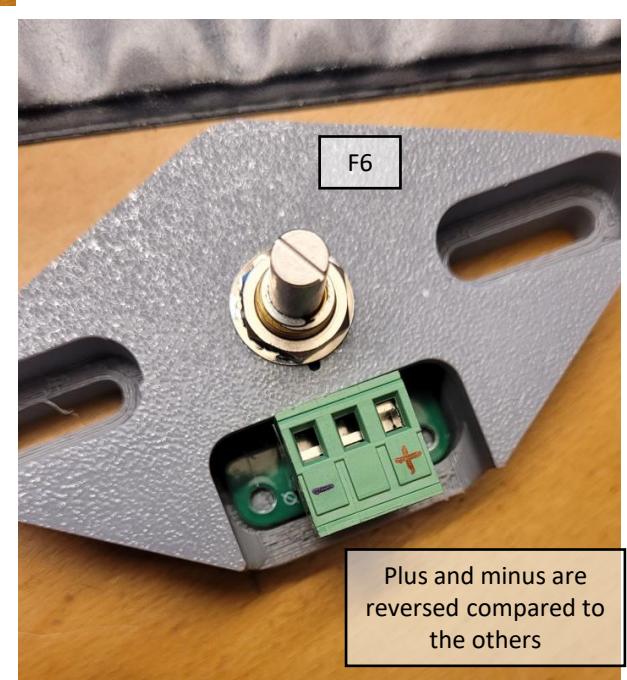
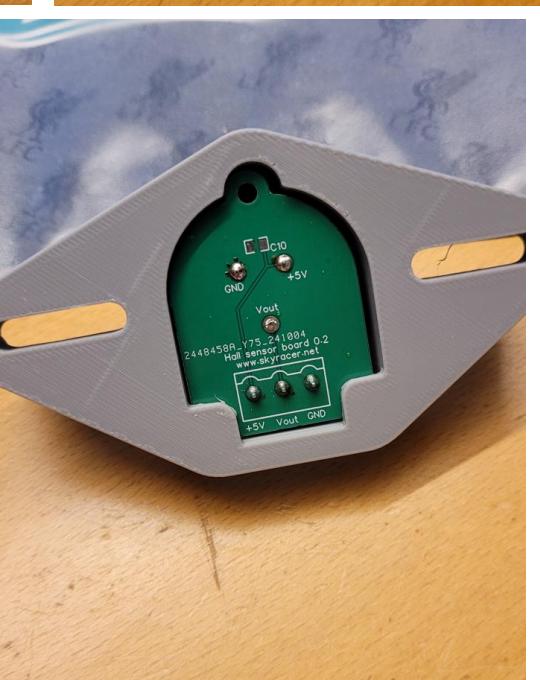
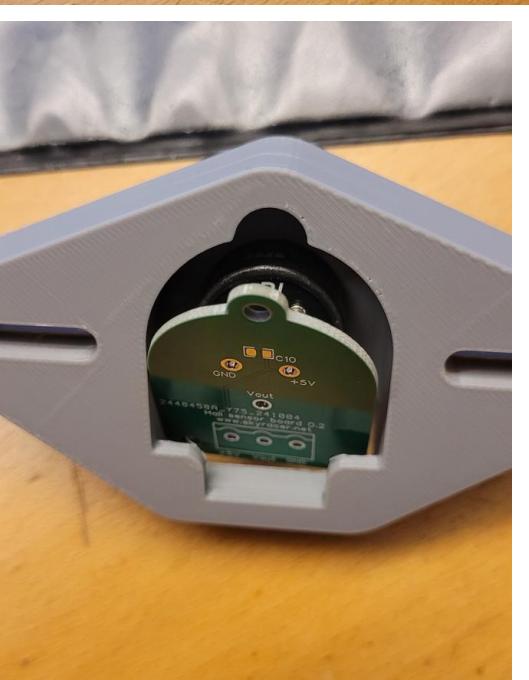


When pulling the tow release, tighten this screw for tight operation.

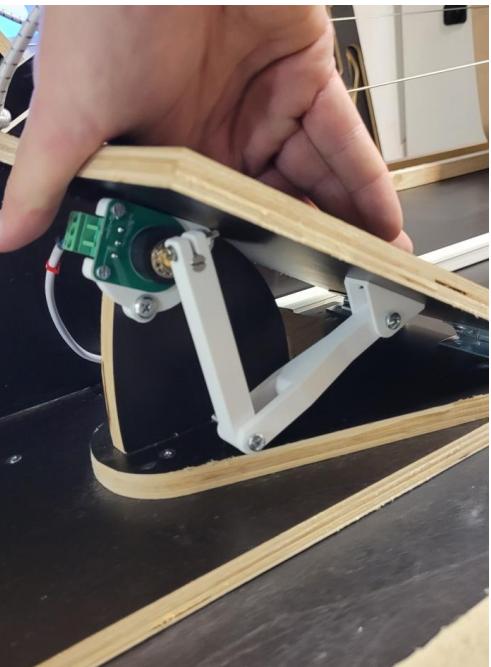
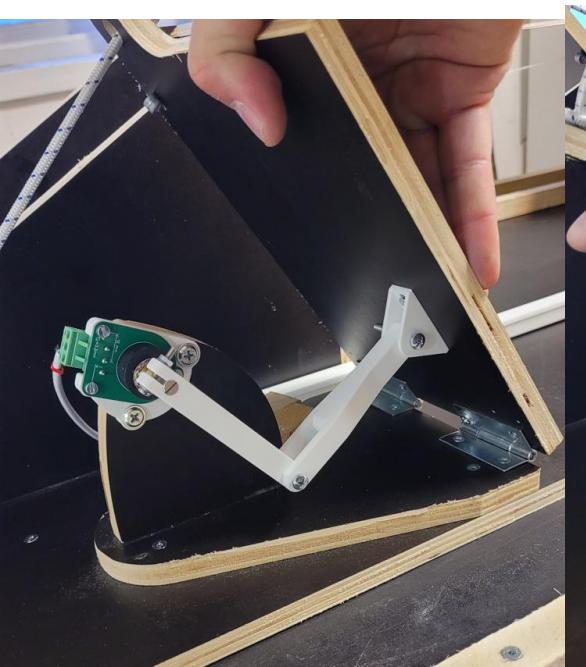
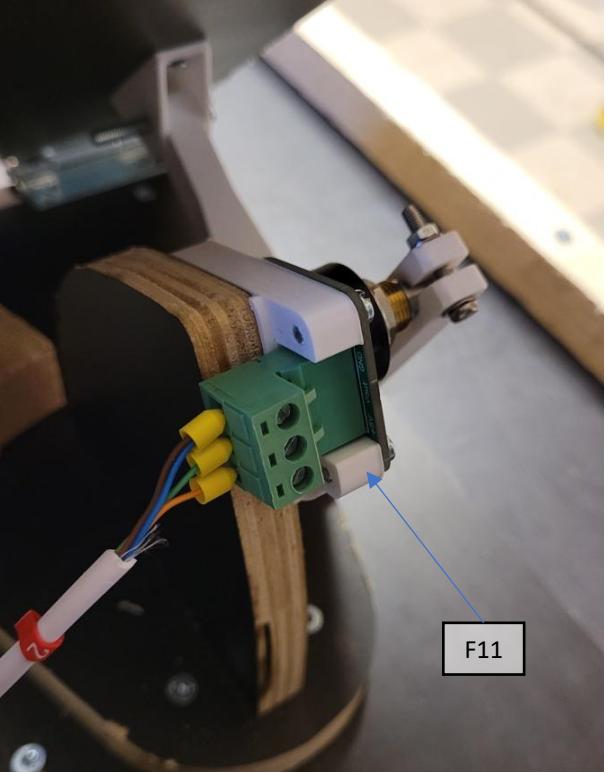
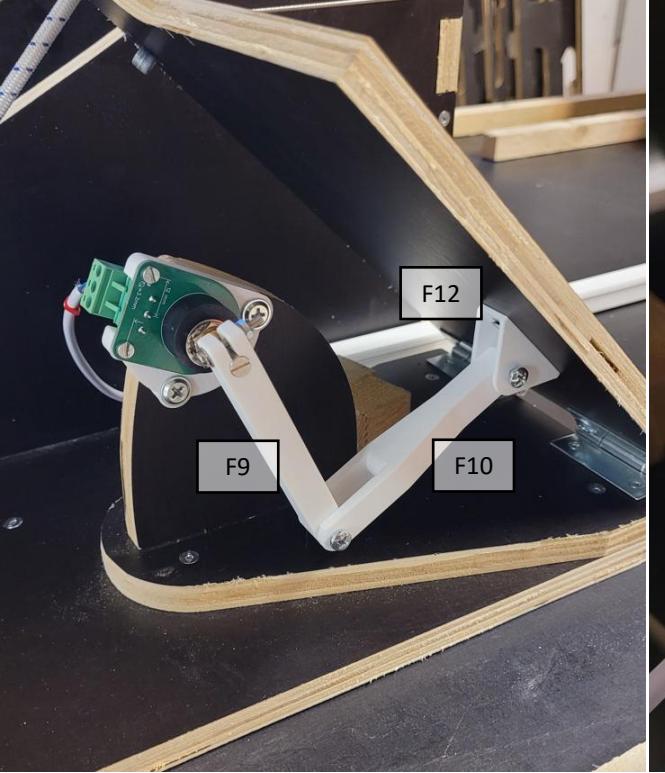


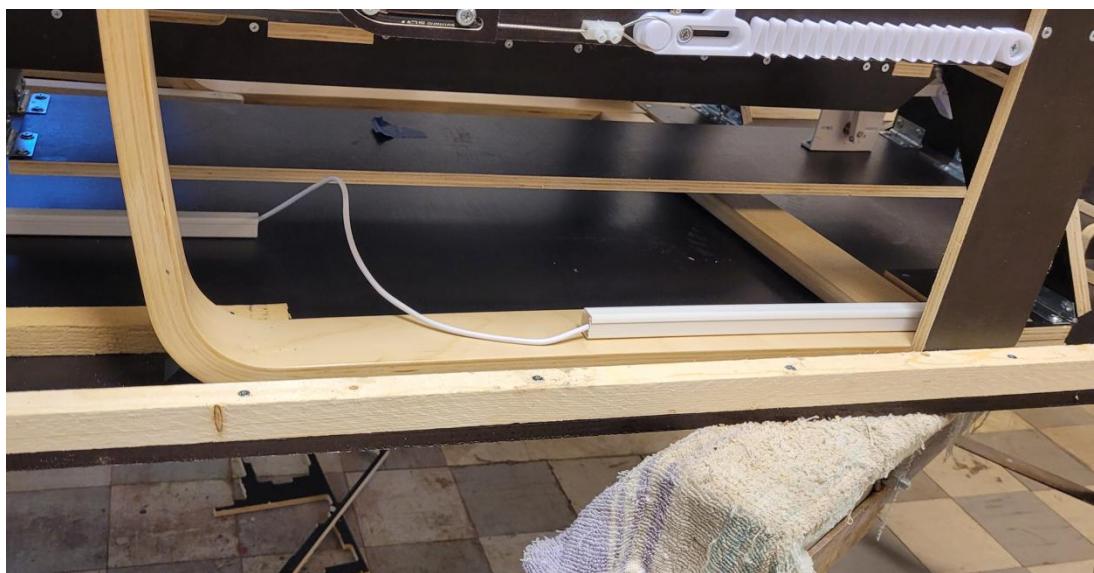
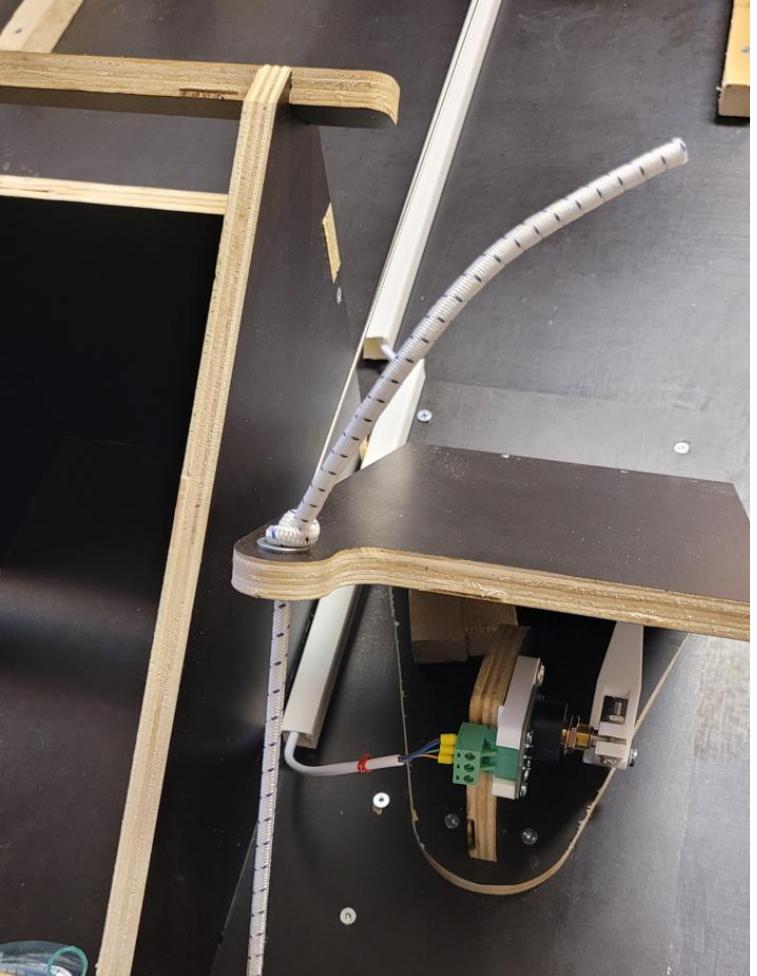


Sorry for this design. F6 is the only hall sensor bracket with this complex mounting procedure.

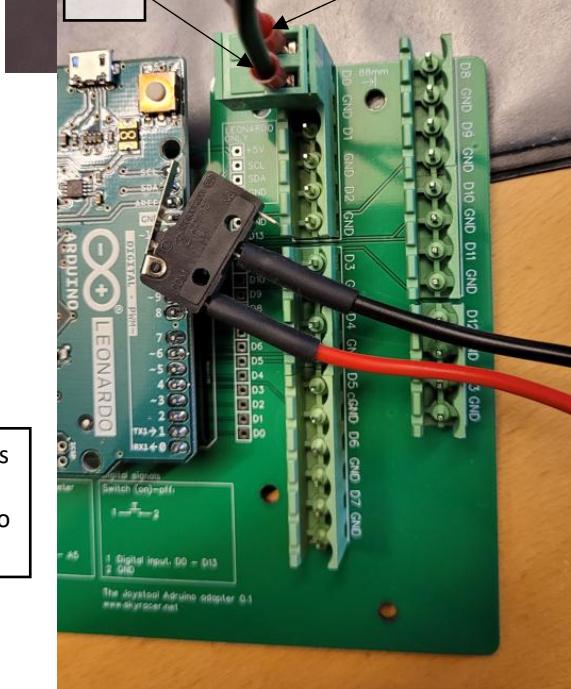
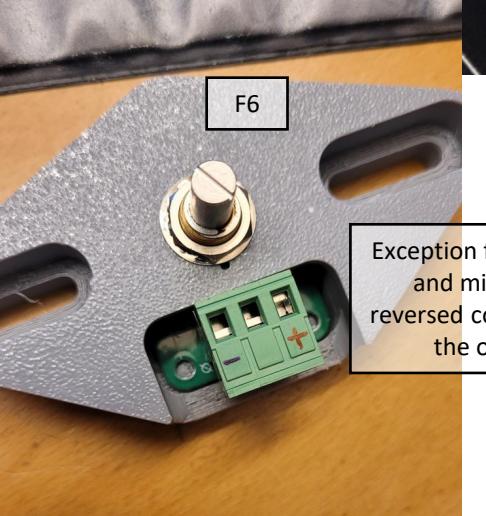
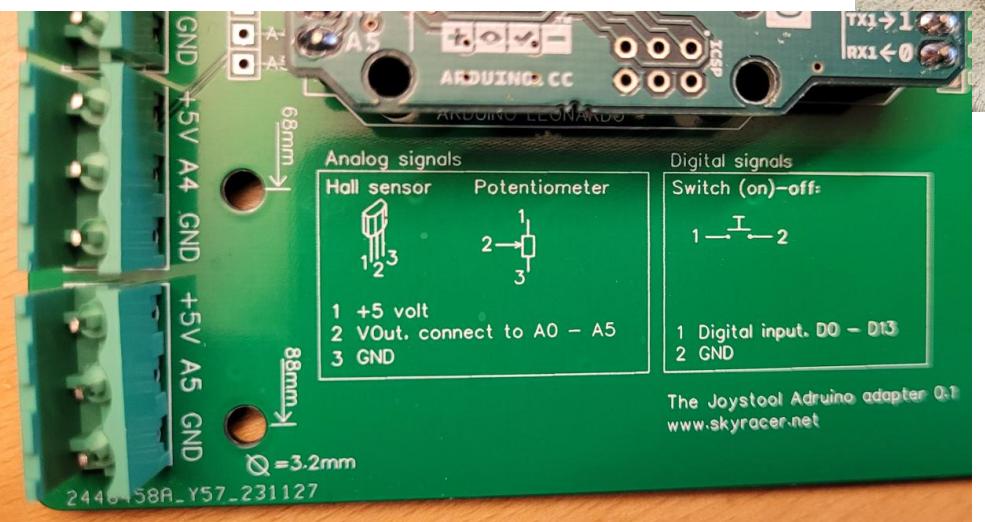
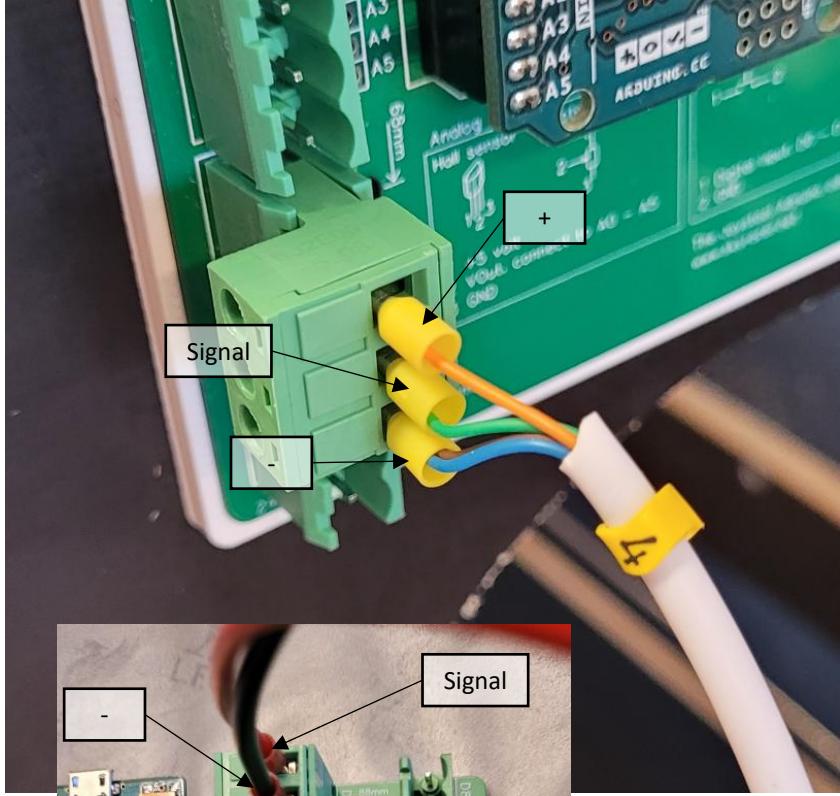
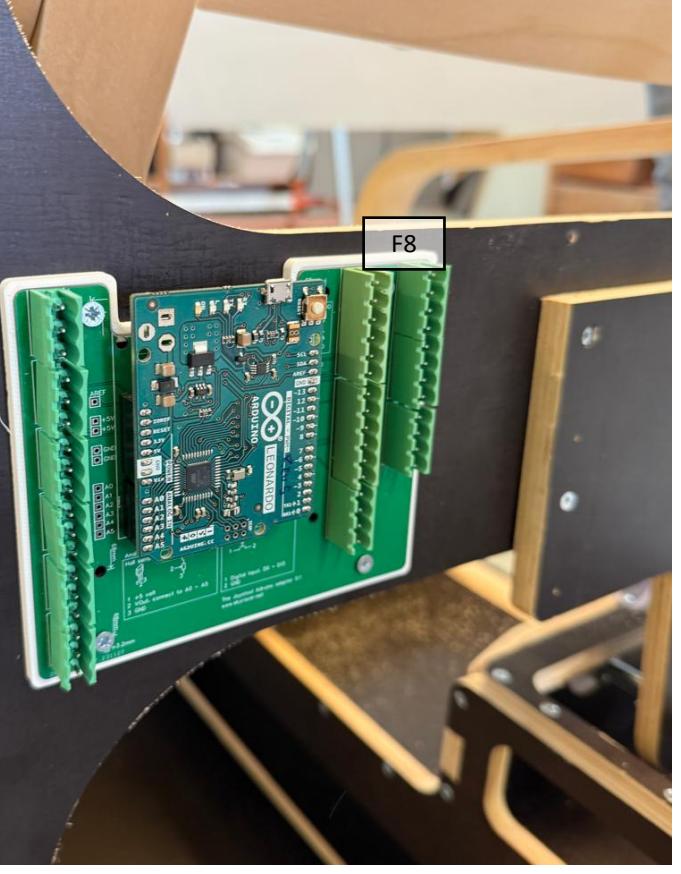


Plus and minus are reversed compared to the others





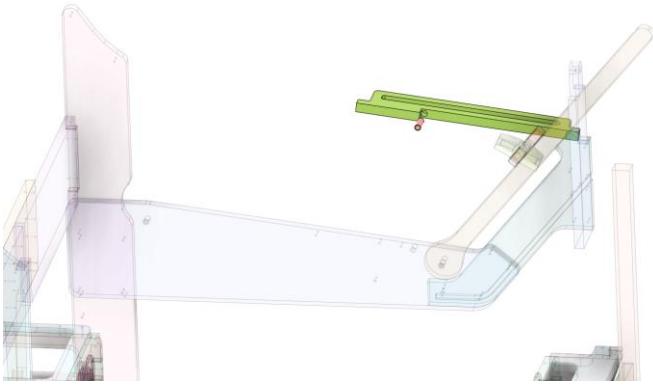
Cable tray for the cable from
pedals to the Arduino.
(Not sure if this is a good
solution.)



Calibration

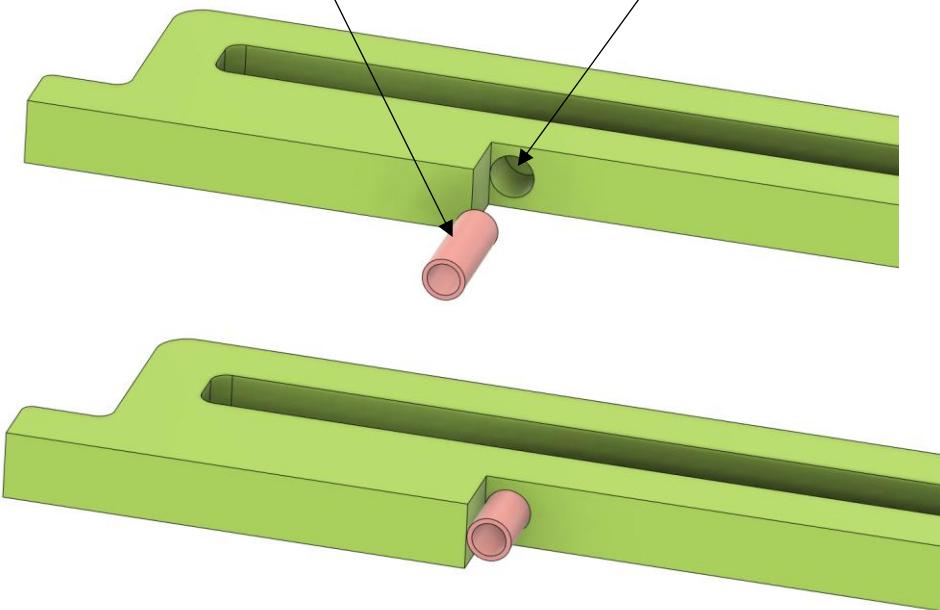
To be continued ...

Simulating wheel brake



8mm PVC tube

Drill a hole 8mm diameter



When deploying full airbrake, the PVC-tube will be compressed and simulating the wheel brake

