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Manufacturing instructions For Natik

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DESIGN PROCESS // INTRO

INTRODUCTION

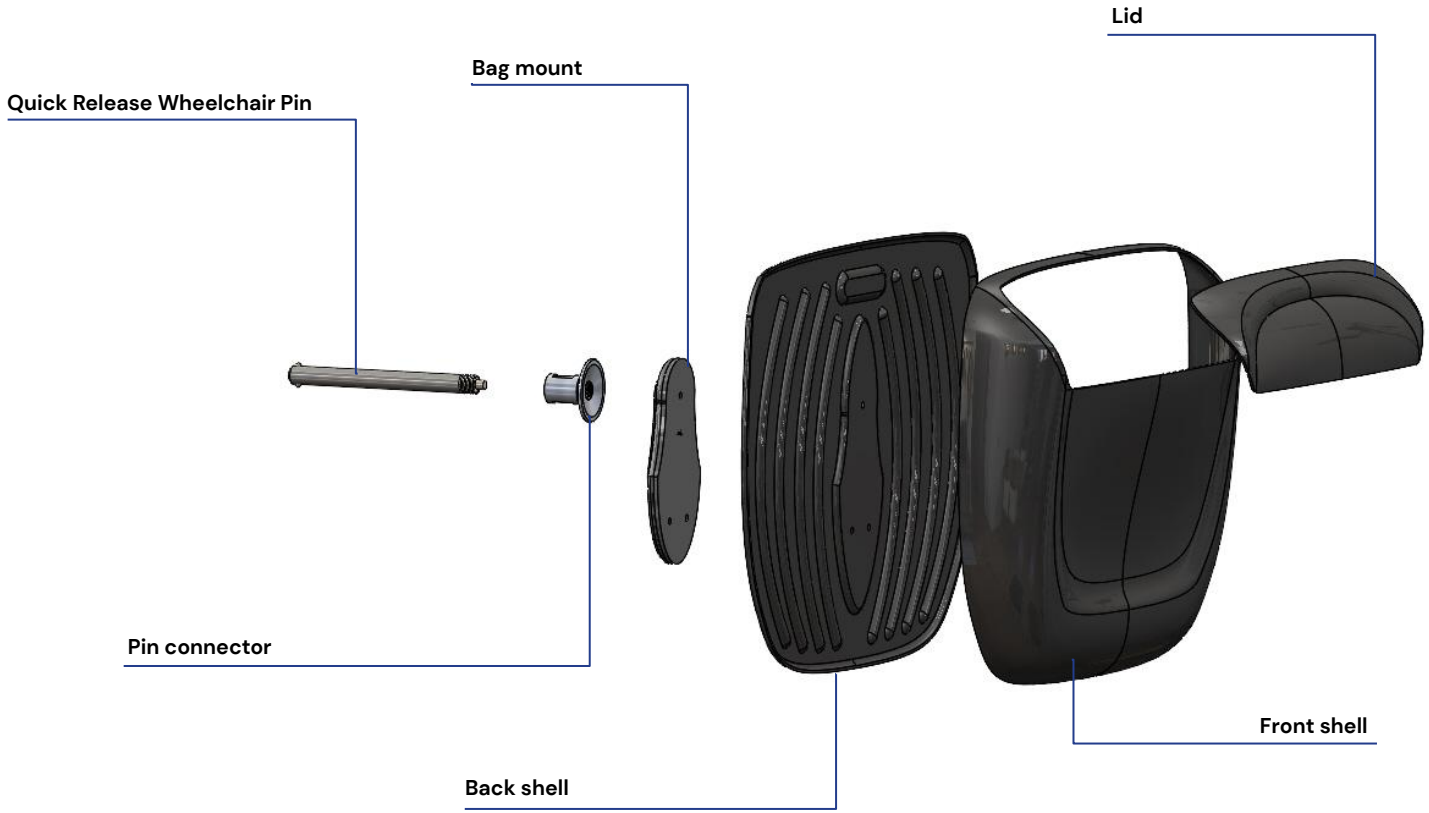
Natik is a wheelchair bag that was custom designed and made for Nati, which is a manager at the “Etgarim” organisation in Israel.

Nati lacks storage space while moving around with his chair and traditional back mounted bags are not comfortable for him, and also shifts the balance point of the chair backward and can cause Nati to flip.

“Natik” is a bag that was designed to solve all those issues, it is mounted on the wheel’s quick release pin and supplies quick attachment and access.

BOM

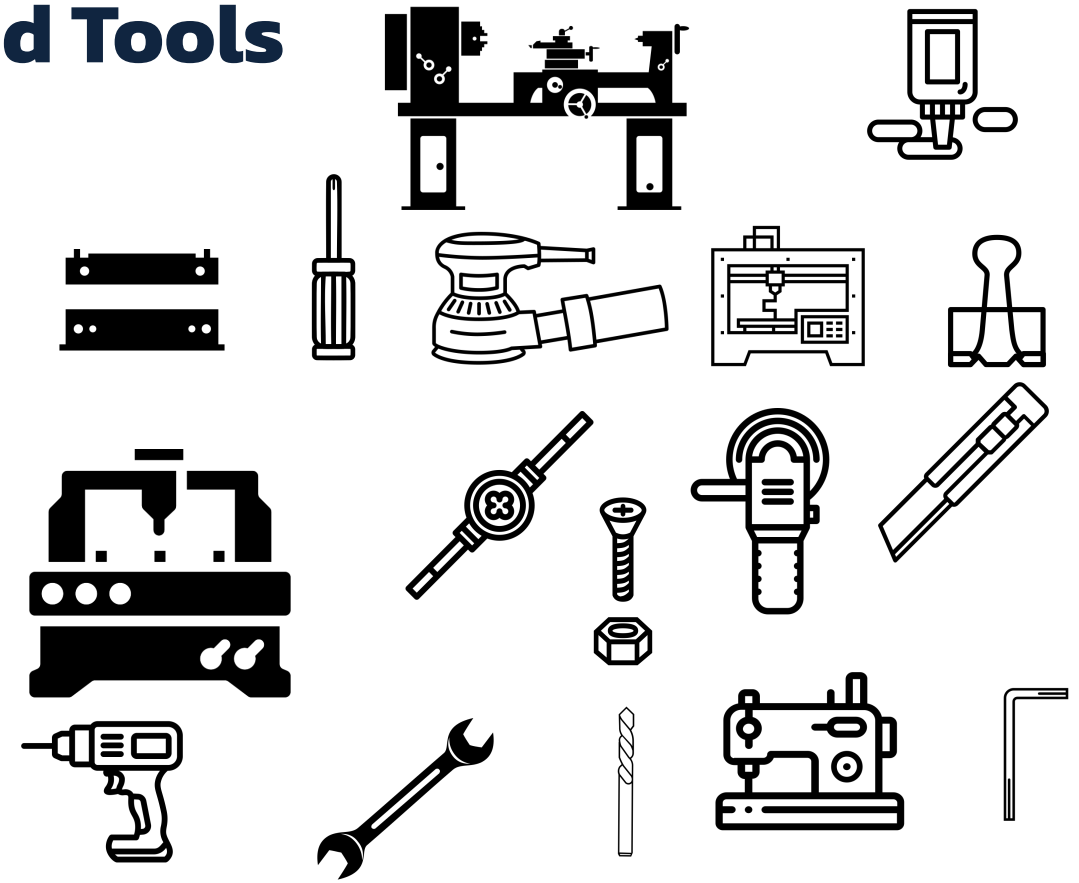
Part	Material	Production method	Amount	Notes
Front shell	ABS 2mm Zipper 8mm Zipper stop	Vacuum forming & sewing	2 2x1.25M	Min size recruitment for ABS sheet 73.5x55
Back shell	ABS 2mm	Vacuum forming & sewing	2	Min size recruitment for ABS sheet 73.5x56
Lid	Lycra EVA 2mm Zipper 5.5mm Paspul	Vacuum forming & sewing	2 2 2x0.5M 2x0.75M	Min size recruitment for EVA & lycra sheet 73.5x56
Pin 1/2 inch 130mm	Stainless steel		2	Quick Release Wheelchair Pins 1/2 inch 130mm (Ready made - Store bought)
Pin connector	7075 Aluminum rod Set screw M4 4mm	Turning - Lathe	2	Min D=45mm L=90mm
Bag mount	PETG Filament M4x4mm Countersunk screw M4 Nyloc nut	FDM 3D printing	2 6 6	Only Prusa


Lid
Bag mount
Quick Release Wheelchair Pin
Pin connector
Front shell
Back shell

Machines and Tools

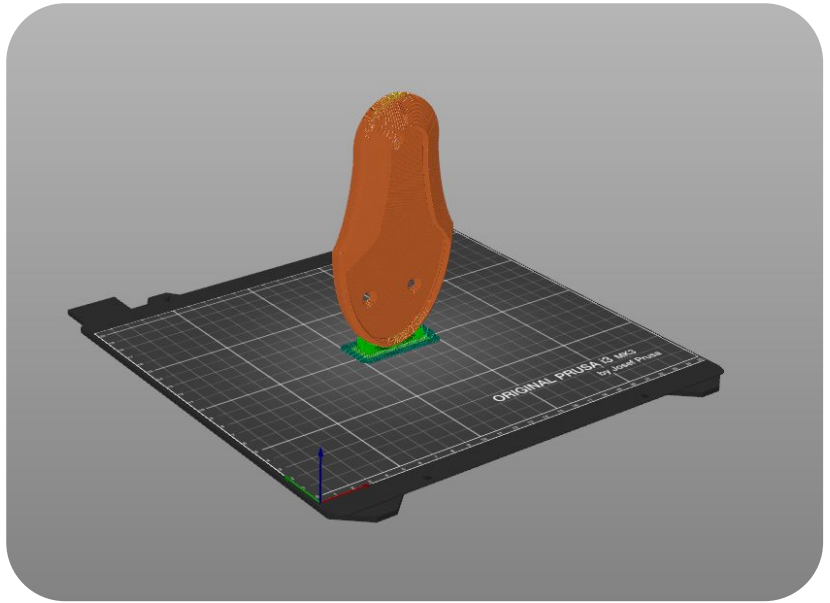
Machines:
CNC table
Vacuum forming machine
Sewing machine
Metal lathe
FDM 3D printer

Tools:
Drill
Box cutter
Clips
½"-20 UNF Tap
Orbital Sander + 120 grit paper
Philips screwdriver
Wrench 7mm
Hex key 1.5mm
Moist rag
Spray glue "3M super 77"
R21 glue - type MP2



Step 1: 3D printing

Material: Petg/Nylon/Nylon+carbon
Perimeter: 4
Layer height: 0.15
Infill: 100%
Brim: 5mm



Step 2: Pin connector for wheel axle

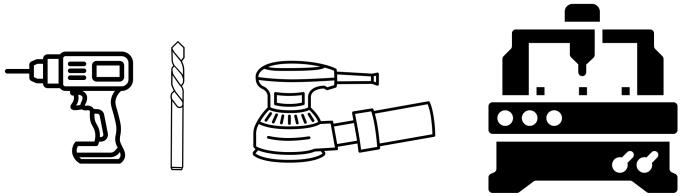
Process:
Follow the technical diagram, Incase of CNC manufacturing use STEP file.

Material:
7075 Aluminum rod D=45mm l=90mm

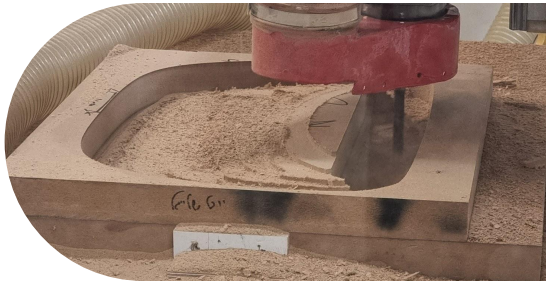
Tools:
Tap ½"-20 UNF
Tap M4

Files:
PDF
Step

Step 3: Mold production



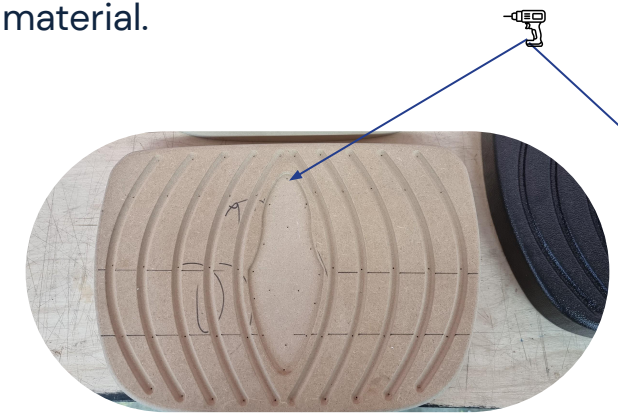
Process:
a. Create molds using a CNC machine.
b. Sand the molds with 120-grit paper to create smooth finish.
c. Use the supplied drill pattern file to drill 1.5mm holes to allow the vacuum to pass throw gaps and valleys of the mold.

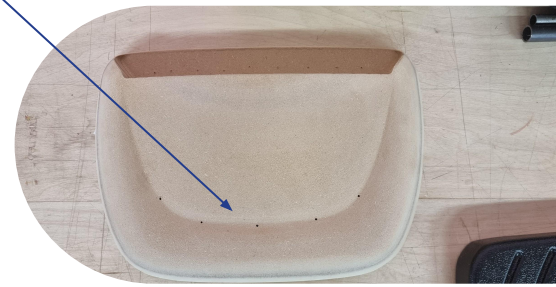


Material:
MDF or other medium heat resistance material.

Tools:
Orbit Sander
Sandpaper 120-grit
Drill
Drill bit 1.5mm

Files:
Front shell
Back shell
Lid shell
Drilling marks





Step 4: Materials preparation for vacuum forming

Process:
a. Spray glue one side of the EVA sheet.
b. Spread the Lycra fabric on to the glue **Without stretching.**
c. Repeat process on other side.

**Clean the ABS sheets from dust and other particles.

Materials:
Lycra 75x55cm x2
EVA 2mm 75x55cm x1
ABS 2mm 75x55cm x2

tools:
Moist rag
Spray glue “3M super 77"

Step 5: Vacuum forming and plastic cutting

Process:
ABS: Heat up at 500 °C for 90 Seconds
EVE+Lycra: Heat up at 500 °C for 40 Seconds

Post processing:
- Cut ABS leftover material with a knife.
- Cut EVA+Lycra sandwich leftover material with scissors.

Step 6: Zipper connection and paspul connection

Process:

a. Sew the 8mm zipper to the edge of the front and back shells – **Make sure the two sides are aligned.**

b. Sew the 5.5mm zipper to the lid opening of the front shell, and the lid it self – **Make sure the two sides are aligned.**

c. Sew a paspul on lid opening zipper and lid zipper – Use a paspul guide or clips.

d. Insert zippers heads into place and lock with zipper ends

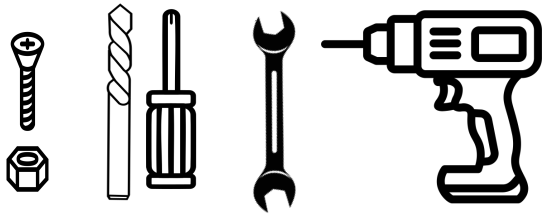
Material:

Front shell
Back shell
Lid shell
zipper 8mm
zipper 5.5mm
zipper stop

Tools:

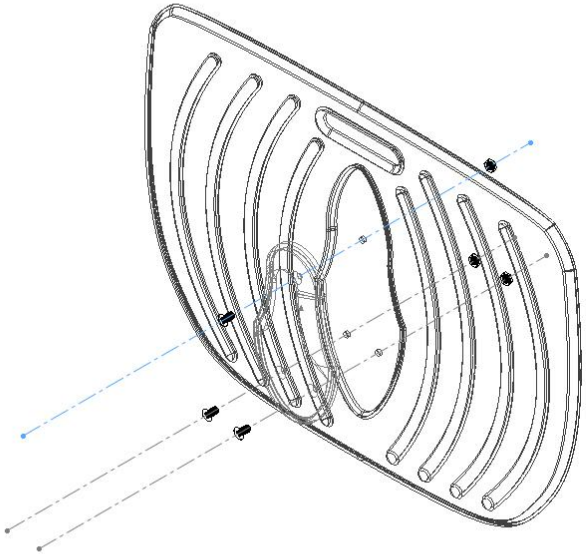
Sewing machine
clips

Step 8: Bag mount assembly

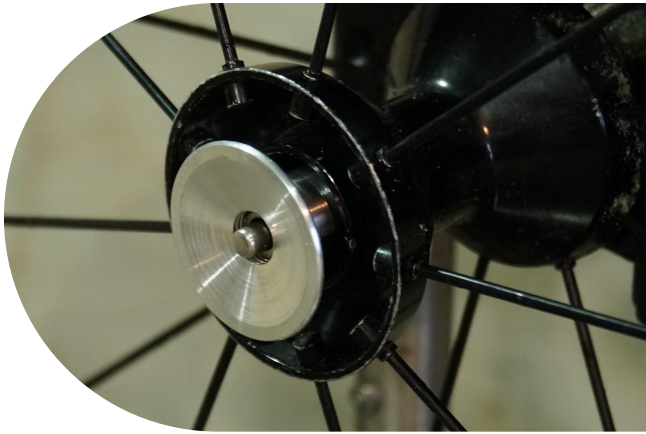


Material:
Bag mount x2
Back shell x2
M4x4mm countersunk screws x6
M4 nyloc nuts x6

Tools:
Drill
Drill bit 4mm
Philips screwdriver
Wrench 7mm



Step 9: Adjusting pin connector



Process:

a. Screw the connector on to the quick release pin.

b. Adjust size to fit original pin.

c. Tighten the 4mm set screw to.

Material:

Pin connector x2

Quick release wheelchair pins 1/2 inch 130mm x2

Set screw M4 4mm x2

Tools:

Hex key 1.5mm


Enjoy

SEE THIS VIDEO OF OUR PROJECT

THANKS!

Do you have any questions?

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