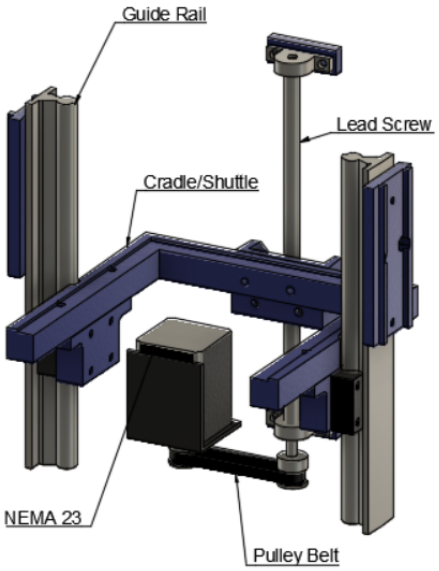
Router Lift Test Report
02/05/2022
Testing operators : Juan, Alex, Rainer

Test	Pass/Fail	Notes
Range of motion test	Pass	At all speeds and a **2:1** and **1:1** belt ratio, the lift exhibited full range of motion and could reach repeatable positions Cradle exhibited asymmetrical rising, one side would raise then the other would lag behind/
2.5KG lift test	Pass	At lower speeds on **2:1** ratio and mid range speeds at **1:1** ratio, cradle could lift **2.5kg** of mass (with asymmetrical rising)
5 KG lift test	Pass	At lower speeds on **2:1** ratio and mid range speeds at **1:1** ratio, cradle could lift **5kg** of mass (with asymmetrical rising)
7.5 KG lift test	Pass	At lower speeds speeds at **1:1** ratio, cradle could lift **7.5kg** of mass (with asymmetrical rising)
10 KG lift test	Fail	Even at a **1:1** ratio with **low RPM**, **10kg** load could not be raised Issues included tooth skipping at belt drive and refusal of NEMA shaft to spin



Fault summary :

- Asymmetrical cradle rise at **at cradle arms/linear guide**
- Belt skipping/stutter at **problem at pulley wheels**
- NEMA motor can't lift >7.5kg (**problem at NEMA**)
- Varied belt tension **problem at pulley wheels**

Troubleshoot plan

Wobble on cradle

- Install SensorRecord or Sensor Data Recorder on phone
- Take off linear bearing extenders
- Place phone on lift and record gyro data
- Replace MDF spacers with split ring spacers and re attach linear bearing extenders
- Place phone on lift and record gyro data
- Loosen and tighten split rings
- Place phone on lift and record gyro data

Troubleshooting 04/05/2022

- With washers spacing the linear bearings, there is a maximum angular deviation of 4 degrees, with all spacers the cradle returns to level (approximately zero degrees) on rest, thus cradle wobble is not detrimental to router function (see *Cradle Stability Testing 05_05_2022*)

Belt jumping and varied belt tension

- Use larger washers or metal plating to better space lock motor into place
- Use spring to keep NEMA taught (Requires 3D printed bracket)
- Use spring tensioner wheel to keep belt taught

NEMA can't handle > 7.5kg

- Use power drill with torque settings to test torque requirements of belt driven screw
- Directly connect NEMA to lead screw (will require motor mounting point)
- Lubricate Lead screw
- Check if motor controller is driving the motor with the programmed current limit
- Increase the voltage to drive the motor - evtl. More power

Troubleshooting 04/05/2022

- Screws at nut housing overtightened which caused compression on lead screw