

[Ri3D 2020] The Ohio State University

Intake Subsystem Memo

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Followup:

What went well:

- When we did get it to work, it scored in the low goal well

What went wrong:

- Balls escaped
- Harvester broke

What needs improvement:

- Handling of fuel cells, fuel cell flow along the ramp
- The high goal was more rewarding
- Harvester deployment could be better
- Harvester toughness could be improved

Mechanism Specifics / Improvements

Mechanism Description: The purpose of the intake subsystem is to collect, store, and release power cells through the front of the robot.

- **Harvester**
 - The intake mechanism contains several wheels on a shaft that rotates to maneuver power cells up onto the ramp.
 - Two mecanum wheels are used on each end of the intake shaft, directing power cells towards the three, 4 inch green compliant wheels, positioned in the center of the intake shaft. The green compliant wheels push power cells to the rollers above the ramp.
 - Passively falls at the start of the match
- **Ramp**
 - Made out of 2 pieces of 5051 aluminum sheets and bent at 135 degrees outward to create the walls. 4.5 inches tall and 4 inches wide floor on each piece.
 - Two rollers: one at the end of the ramp near the release gate and one where the intake harvests the power cell.
 - 1 tight polycord loop in the middle of the roller. 2 loose poly cord loops at equal distances between the ends and sides.
 - A guide system, a piece of flat material with slots to hold the poly cord loops in place to prevent jumping.
- **Gate**
 - The gate is a piece of 5051 aluminum that is angled inward (recommended to not angle it past 60 degrees inward)
 - Piston actuated, pivots on both sides and connected to the ramp.

Technical Specifications:

- 5051 Aluminum Sheet Metal
- 1032 Screws/Nuts
- ¼ -20 Bolts/Nuts
- 1" x 1" 6063 Tubing
- **Harvester**
 - 2 x 4" Mecanum Wheels
 - 3 x 4" Green Compliant Wheels (25A durometer)
 - #25 Chain
 - 2 x 18 tooth ½" Hex Sprocket
 - Googly Eyes for added fun
 - 1 x ½" Hex x 0.201" ID ThunderHex (cut to length)
- **Ramp**
 - Quick-Connect Hollow-Core Round Belting
 - Aluminum Connector for Quick-Connect belting
 - Heat Shrink
 - 1 x REV NEO Brushless Motor 1:1 Gear Ratio
 - 1 x REV Spark MAX
 - 2 x ½" Hex x 0.201" ID ThunderHex (cut to length)
 - ½" Hex ID Clamping Shaft Collar
 - Custom Shaft Mounts(See CAD files)
- **Gate**
 - 1 x Piston

Suggested Improvements:

- You may see that our gate release has two parts but it would be better to make it in one part.
- Having the gate release powered would increase your ability to play defense without risking damage to your intake system

Gallery

Our CAD files are available at <https://github.com/firstroboticsosu/2020-CAD>.

