

# P20011: Wheelchair Accessible Restroom

Modern day public restroom facilities are expected to be accommodating for a variety of people. The restrooms, as well as the toilets themselves, should provide all users with the necessary means to go to the restroom in an efficient, organized, and timely manner. Despite this, some people who currently use wheelchairs are still encountering issues when using wheelchair accessible restrooms with trips taking upwards of 1 hour.

## Use Cases

User needs to use the restroom

User Transfers from Wheelchair to Toilet

User goes to the restroom

User removes clothing

User puts clothing back on

User Transfers from Toilet to Wheelchair

User Leaves Restroom

### Customer Requirements:

- A device that is safe to use with little risk of fall
- A hygienic transfer process not requiring users to touch the toilet seat
- Compatible with both public and private restrooms

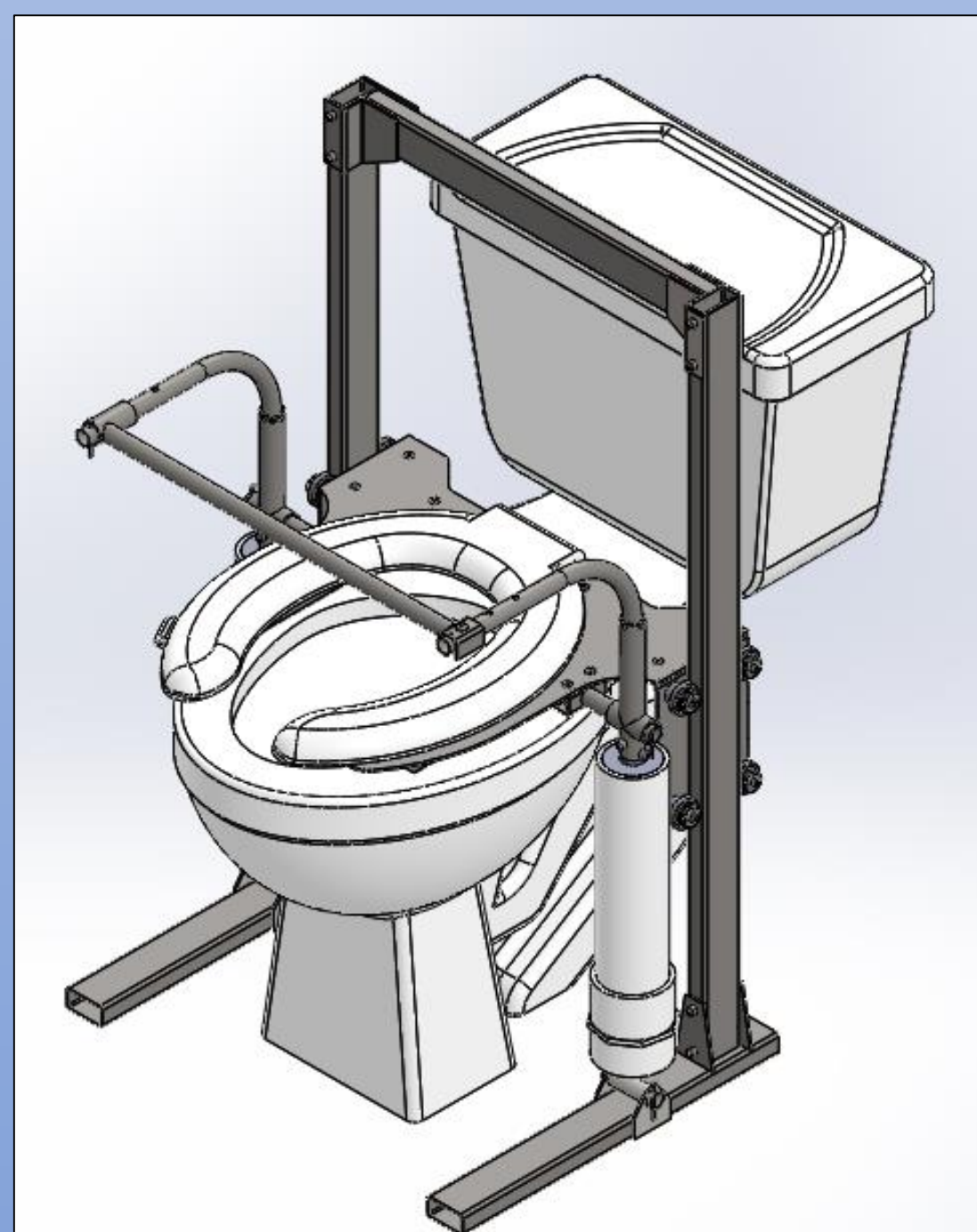
### Engineering Requirements:

- Adjustable seat height starting at 17 in. and raising to a max of 27 in.
- Able to operate between 25 and 105 PSI
- System supports a weight of 400lbs
- System seat can raise to full height within 60 seconds

**Testing:** Tests developed to analyze the stability, safety, and cleanliness of this system

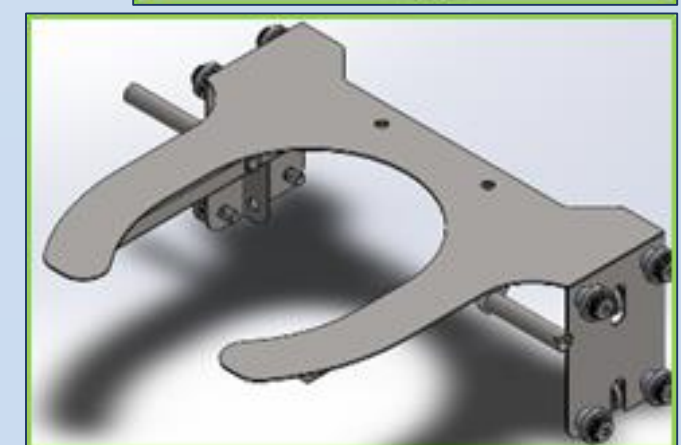
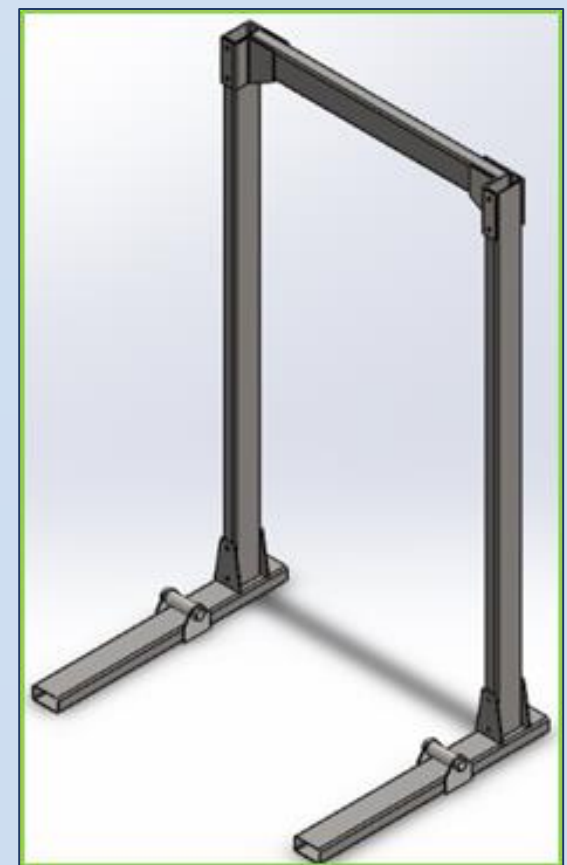
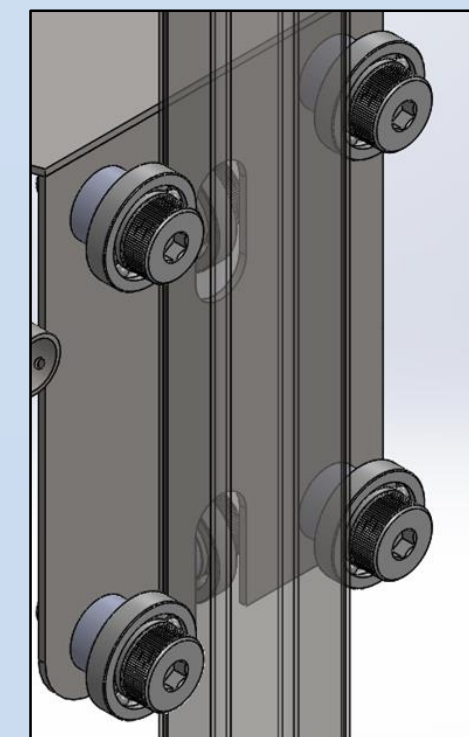
1. Test the hydraulics system lift and lowering functionality
2. Test the maneuverability of all moving parts
3. Test the ability for the function system to operate under various loads
4. Test how easily the system can be cleaned

## Completed Design



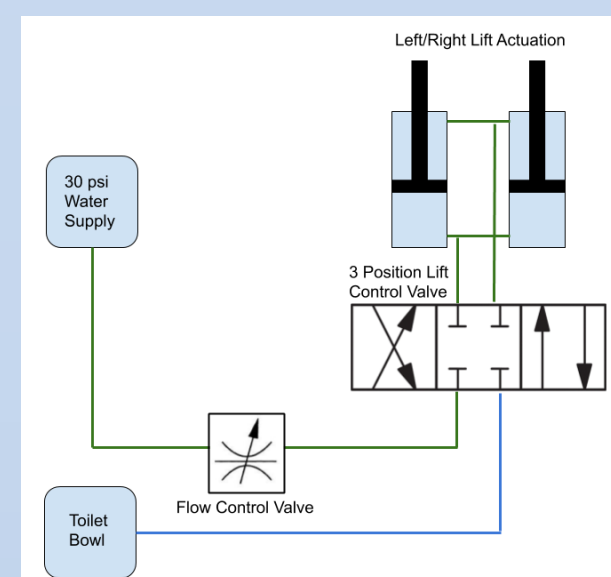
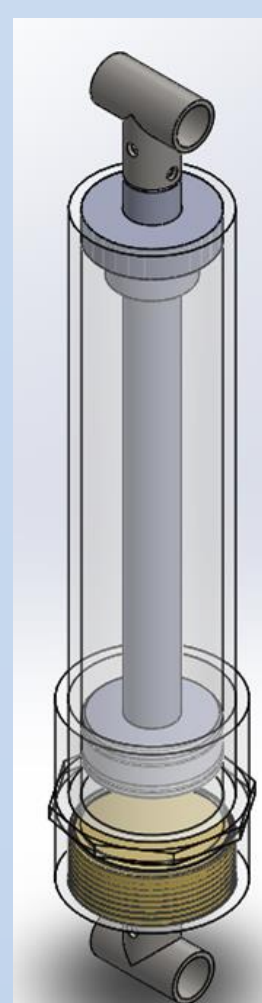
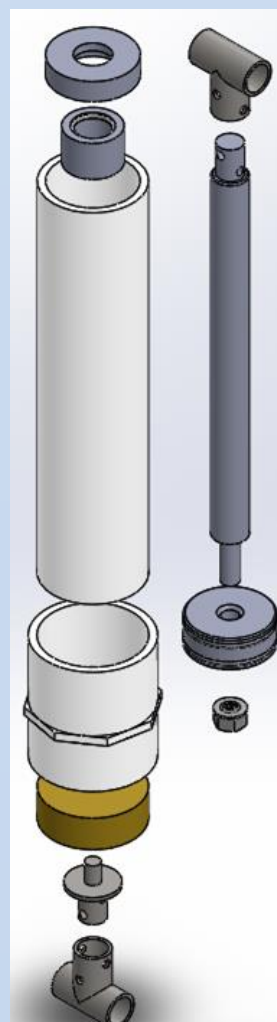
### System Base

- Steel construction provides high strength and stiffness while maintaining a relatively low profile
- Seat rides on bearings for smooth motion while lifting



### Hydraulics System

- 2.5" diameter piston provides enough force for 95th percentile user
- O Rings sized for smooth actuation
- PVC used for corrosion



### User Support

- Arm supports have been designed to rotate 180 degrees to support users during transfer
- A torso support bar was designed to latch onto the arm supports to reduce the risk of fall



### Pictured from left to right:

Kristina Klishko – Mechanical Engineering

Marlon Naveda – Mechanical Engineering

Daniil Sushko – Mechanical Engineering

Christina Eker – Biomedical Engineering

Samantha Destremps – Industrial and Systems Engineering

**RIT**

Kate Gleason  
College of Engineering  
Multidisciplinary  
Senior Design



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