

## PRODUCT DEFINITION

### OBJECTIVE

The main objective of the Ergo-Can is to safely and securely hold a 13 gallon trash bag while removing the strain of lifting the trash bag out of the trash can. Our group also wants to ensure that prices for our product stay low without hurting the quality of the design. The Ergo-Can aims to make taking out the trash easier for everyone. This includes people with back problems and those who have trouble lifting heavy objects.

### CUSTOMER REQUIREMENTS

Potential Customers:

- elderly
- shoulder issues
- back issues
- those who find taking their trash out difficult

Survey Results:

- easy to clean
- inexpensive
- able to hold a standard 13 gallon trash bag
- front double doors
- easy to access and remove
- multiple color options

### ENGINEERING SPECIFICATIONS

1. Capacity of 13 gallons
2. Height of 3 feet
3. Hold 20 lbs
4. Last a minimum of 5 years
5. Maximum temperature of 100 °F
6. Minimum temperature of 32 °F

### COMPETITION

Other existing products include:

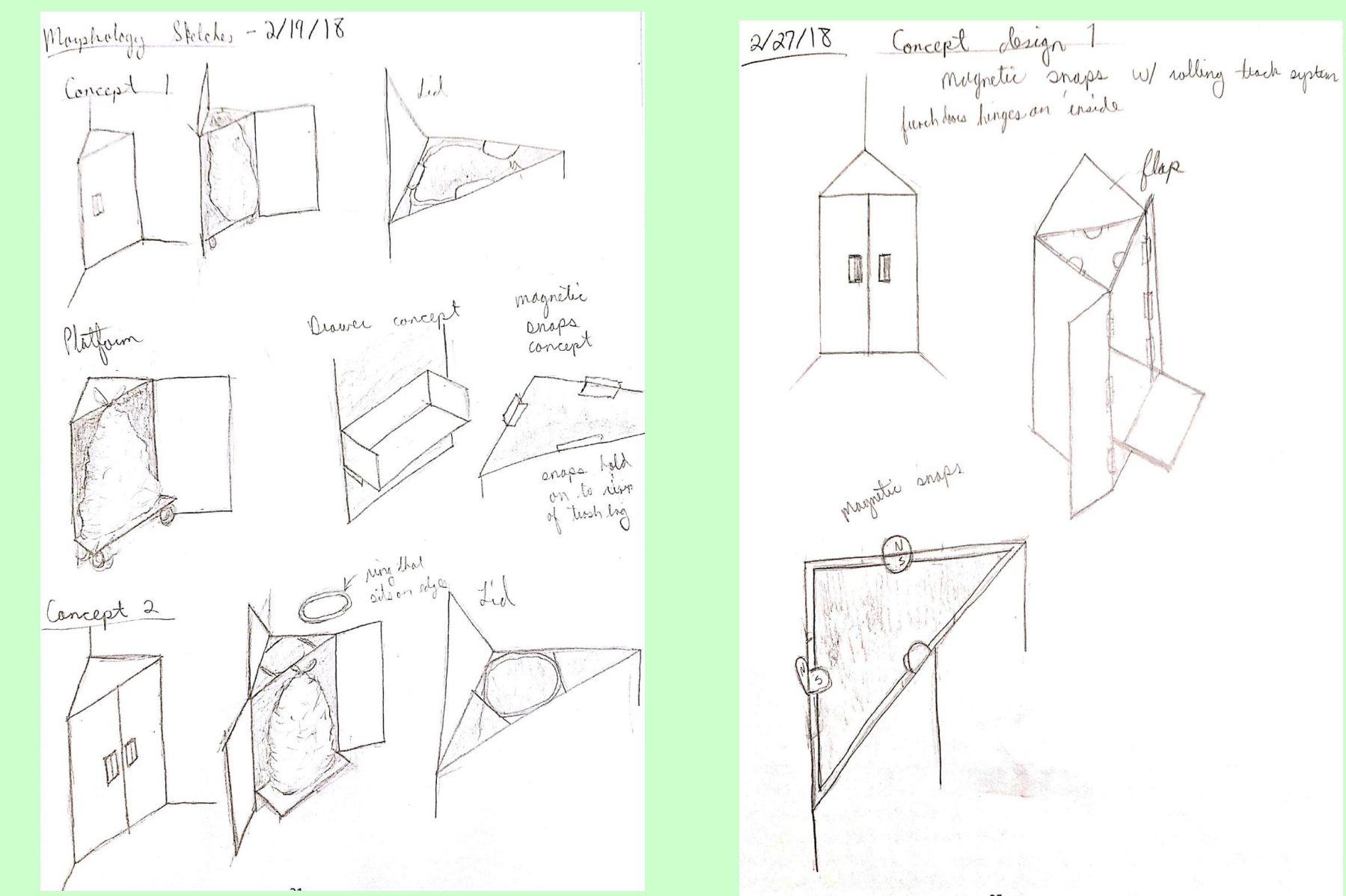
- Hefty 13 Gallon Step-On Trash Can
- Rubbermaid Step-On Wastebasket
- Spectrum Ellipse Slim 13 Gallon
- Nine Stars Automatic Touchless Motion Sensor Oval Trash Can
- Honey Can Do Step Trash Can

All of these trash cans failed to meet our customer requirements.

The cans we evaluated from Hefty and Rubbermaid were the only ones able to match our design in standard size and cost efficiency. The trash can from Nine Stars was the easiest to clean and we wanted to design our can to exceed them in this category. We tried to find a design that would meet all the benchmarks we specified.

## CONCEPTUAL DESIGN

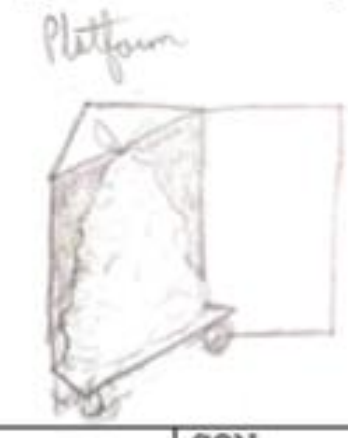
### CONCEPT SKETCHES



Concept sketches from E. Lynch's design notebook.

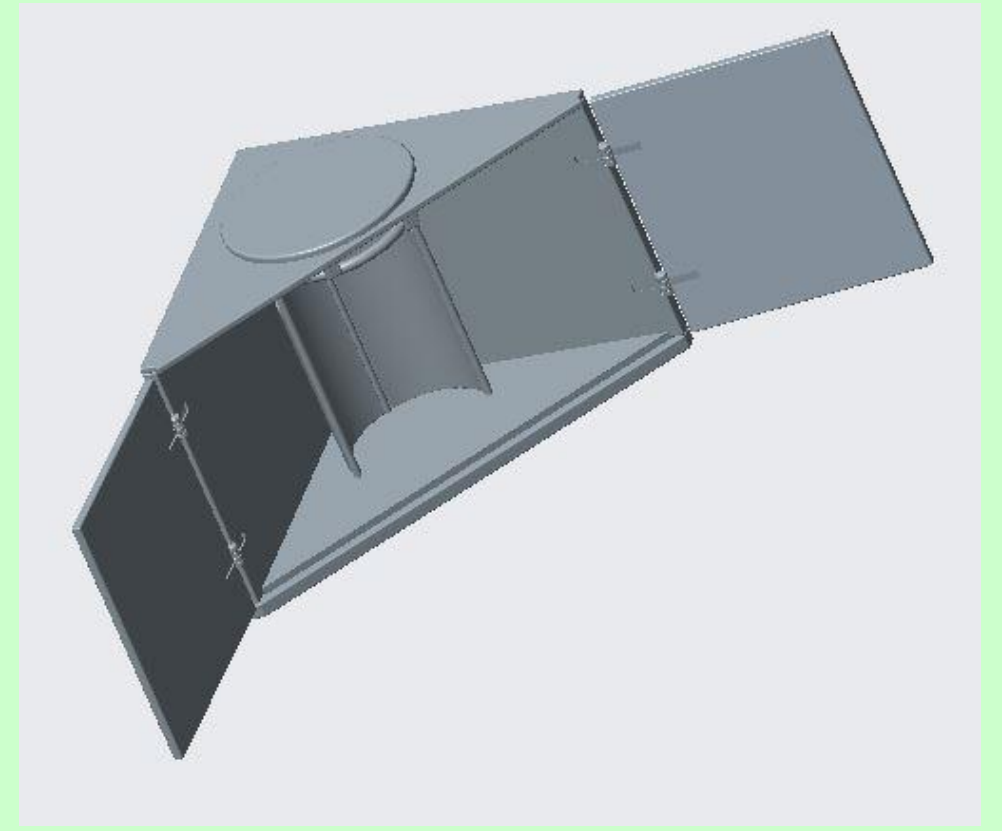
### CONCEPT EVALUATION

We met as a team to evaluate our design concepts. Each of us went through our concepts, brainstormed, and pointed out the flaws in each idea. We narrowed down the concepts to a few final designs. Our final concepts were agreed upon by everyone without the need to vote.

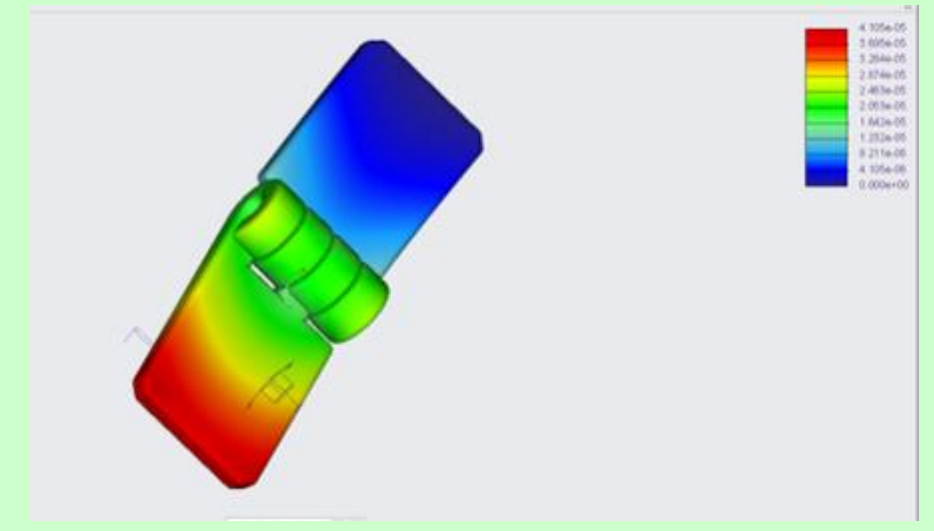
PRO/CON Analysis	
Design Organization: Revengineers	Date: 2/26/18
Topic of PRO/CON Analysis: Triangular trash can with single side door and rolling platform	
	
<b>PRO:</b> <ul style="list-style-type: none"> <li>• Door will be flush against wall when opened</li> <li>• With platform, user would be able to wheel trash bag almost anywhere</li> <li>• Platform would prevent user from lifting bag out of can</li> </ul>	<b>CON:</b> <ul style="list-style-type: none"> <li>• User could hit knees on door while opening it</li> <li>• The bottom section of the trash can would have to be removed to allow the bag to wheel out, hurting structural integrity</li> <li>• Bag could slide off platform without any edges</li> <li>• User could pinch fingers with the wheels</li> </ul>
Team member: Elizabeth Lynch	Prepared by: Elizabeth Lynch
Team member: Maya Garcia	Checked by:
Team member: Caleb Willey	Approved by:
Team member: Daymond Craddock	
The Mechanical Design Process Copyright 2008, McGraw Hill	Designed by Professor David G. Ullman Form # 11.0

## PRODUCT DEVELOPMENT

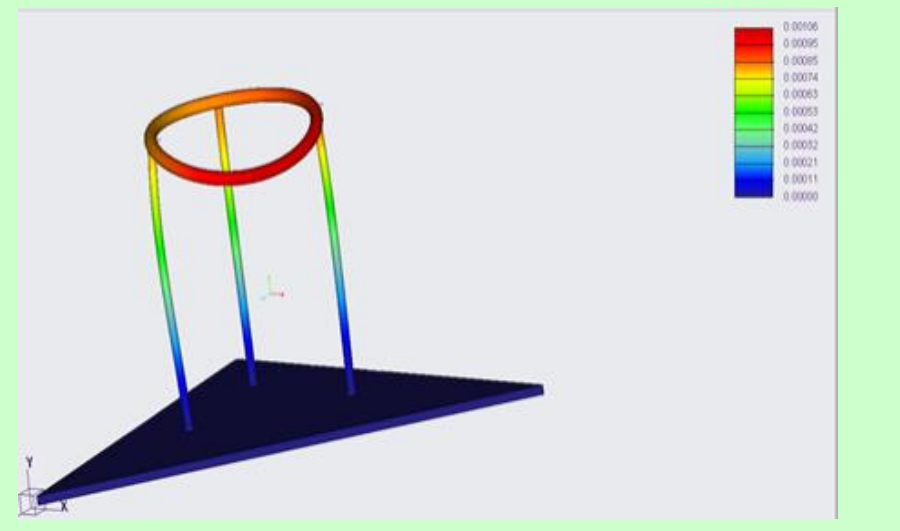
### ASSEMBLY DRAWING



### PRODUCT TESTING



Door hinge, specifically designed for Ergo-Can by D. Craddock.



Ergo-Can's trash bag holder.

Ergo-Can displacement test used a 20 lbf downward force applied to the hinges and trash bag holder to understand how they would manage under heavy loads. The greatest displacement occurred on the hinges, where the force was applied (colored in red). Despite this, displacement for the hinge was only  $4.105 \times 10^{-5}$  inches and 0.00106 inches for the trash bag holder.

## CONCLUSIONS

The Ergo-Can fulfills all of the customer requirements and engineering specifications. The design of our product allows for the use of a 13 gallon trash bag, opens from the front, and uses a sliding platform in order to ease the user's strain of lifting the trash bag upward. While our original design incorporated the use of wheels for the platform, we decided to use a sliding platform so that the product would be more usable for multiple consumers. With low stress and displacement values during testing, the Ergo-Can proves to be designed to stand up to rigorous use.

## RECOMMENDATIONS

If we could have built a prototype then we could have performed the tests we simulated in the CAD software, and see how the components actually behaved. We also could have determined how effective the design is for reducing the difficulties of manufacturing, while continuing to keep all of its intended purpose and movements.