

DESIGN PROJECT I: COFFEE MUG

Project Background and Introduction:

- Every year, there are many hand injuries that involve finger amputations
- Those with finger disabilities have difficulty with many daily activities, including drinking from a mug
- Our design team was given the objective of developing a mug that these people can easily use

Mission Statement:

Product Description: A coffee mug in which a person with one finger can use

Primary Market: A person with one finger

Secondary Market: People with other disabilities

Assumptions: They have stability and can use the mug correctly

Stakeholders: People with one figure/disabilities

Customer Needs and Rankings:

- First created the five first-layer attributes
- Eighteen second-layer attributes
- Used the Analytical Hierarchy Process to rank the attributes
- Sample AHP
- 10 most important attributes

Relative importance of needs (AHP):

1. Stable (0.163)
 - **Balanced weight** (0.039,0.241)
 - **Good grip** (0.084,0.517)
 - Hard to spill (0.039, 0.241)
2. Easy to Use (0.319)
 - **Lightweight** (0.111, 0.348)
 - Handicap Accessible (0.020, 0.063)
 - **Portable** (0.154, 0.483)
 - Microwaveable (0.020, 0.063)
 - **Easy to store** (0.057, 0.178)
3. Practical (0.319)
 - Insulated (0.032, 0.100)
 - **Cheap** (0.096, 0.300)
 - **Simple** (0.160, 0.500)
 - Easy to clean (0.032, 0.100)
4. Aesthetically Pleasing (0.036)
 - Sleek (0.00605,0.168)
 - Good looking (0.0199,0.554)
 - Functional Size (0.00605,0.168)
 - **Fits in cupholders** (0.03996,0.111)
5. Durable (0.163)
 - **Shatter proof** (0.122,0.750)
 - **Long lasting** (0.0408,0.250)

	Lightweight	Handicap Accessible	Portable	Microwaveable	Easy to Store	Total	Weight
Lightweight	1	5	1	5	3	15	0.348
Handicap Accessible	0.2	1	0.2	1	0.333	2.733	0.063
Portable	1	5	1	5	3	15	0.348
Microwaveable	0.2	1	0.2	1	0.333	2.733	0.063
Easy to Store	0.333	3	0.333	3	1	7.666	0.178
Total						43.132	

Concept Generation:

- Lightweight
 - Thin walls
 - Hallowed walls
- Portable
 - Small handles
 - Small overall size
- Cheap
 - Cheap materials
 - Small volume
- Simple
 - Easy to carry
 - Easy to drink from
- Shatter-proof
 - Ceramic/Plastic
 - Strong materials
- Long lasting
 - Scratch-proof coating
 - Sturdy build
- Good Grip
 - Rubber inside handles
 - Tighter handles
- Fits in cupholders
 - Extended base
 - Slim handles
- Easy to Store
 - Simple shape
 - Shorter size
- Balanced Weight
 - Wide base
 - Evenly weighted handles

Concept Selection:

[illegible]

Prototype and Testing:

- Two handles makes it easier for the disabled to carry around
- Thin walls makes it lightweight
- Strong materials decreases the chance of shattering when dropped
- Small, thin handles make the mug portable, easier to carry, and lighter



I learned a lot through doing this project, such as teamwork, time management, and the engineering design process. The difficulties involved concept generation, having multiple concepts and communicating with my teammates.

