

ME, ECE, BE Capstone Design Programs

Team 42: Innovations in Life Jacket Design Competition

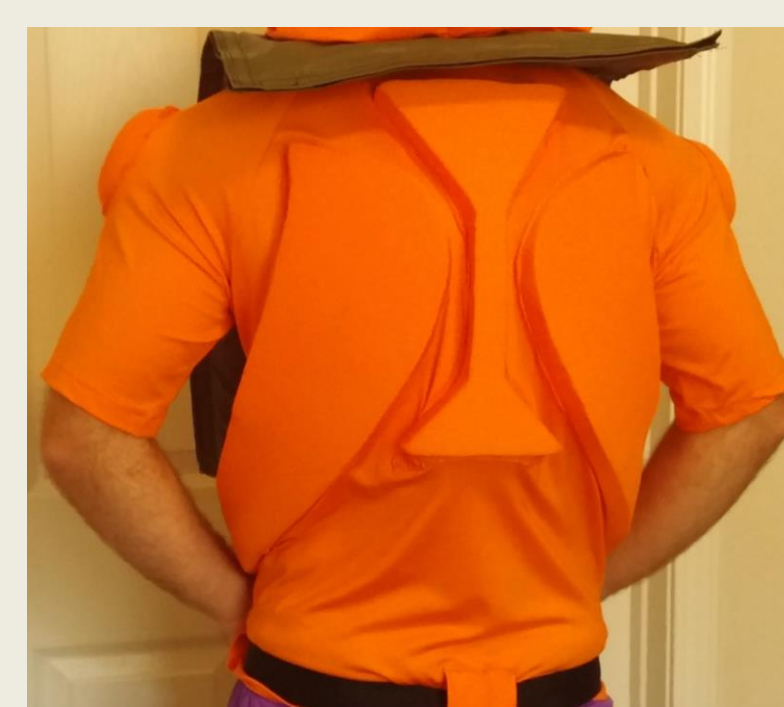
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Hybrid Shirt Objectives- Bayou Bengal Buoy

- To design an innovative, safe, affordable, comfortable, and visually appealing life jacket
- To win the Boat U.S. Foundation Innovative Life Jacket Design Competition



3/4 View

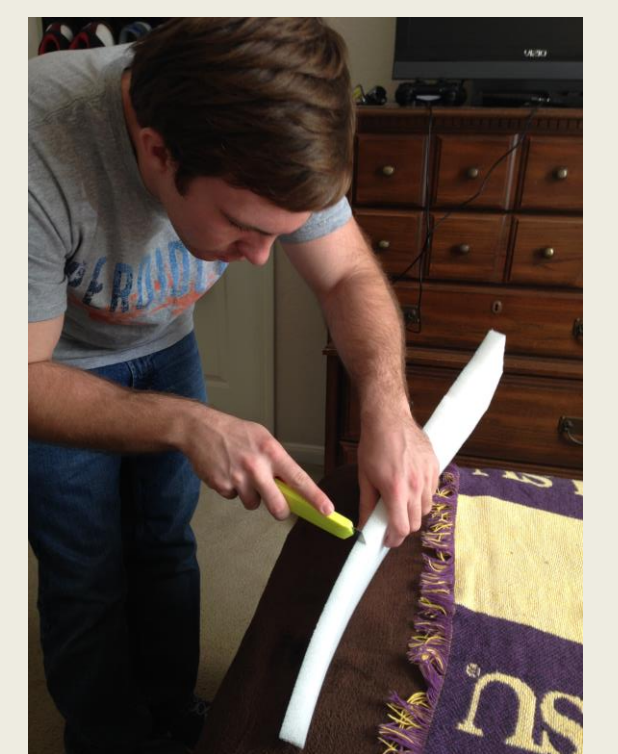


Back View

Safety

- Hood provides UV protection from the sun
- Inflation bladder should be checked every three months for leaks
- CO2 cartridge should be replaced annually
- Strap and buckle around the waist provides a secure fit
- Reflective tape provides visibility from over 1 km away

Manufacturing



Material Testing Results

Performance Nylon Weathered Specimen Tensile Test		
Specimen	Breaking Strength (lbs)	% Loss
Salt Water Exposed Average	33.5	6.2%
UV Exposed Average	39.775	-11.2%
Control Average	35.7	N/A

Tensile Test-Thread		
Specimen	Breaking Strength (lbs)	% Loss
Salt Water Average	2.275	5.2%
UV Average	2.23	6.9%
Control Average	2.4	N/A

Stitch Tensile Test	
Sample	Breaking Strength (lbs)
Shirt to shirt	71.5
Shirt to Nylon	72.2
Bladder to Nylon	59.3
Bladder to Nylon R	60.1

Human Testing Results

- Righting test-Tests if the life jacket is able to turn the user upright
- Drop test-Tests flotation of life jacket with human subject

System Description/Product Architecture

- Foam is placed such that it contours the body and allows for good user mobility
- Gaps between the foam allow for the user to bend over with ease
- Maximum foam thickness is 1", which allows for good user mobility

The inflatable bladder provides 25 lbs of buoyancy force

A polyethylene foam with a density of 4.0 lbs/cu.ft provides 14.5 lbs of buoyancy force

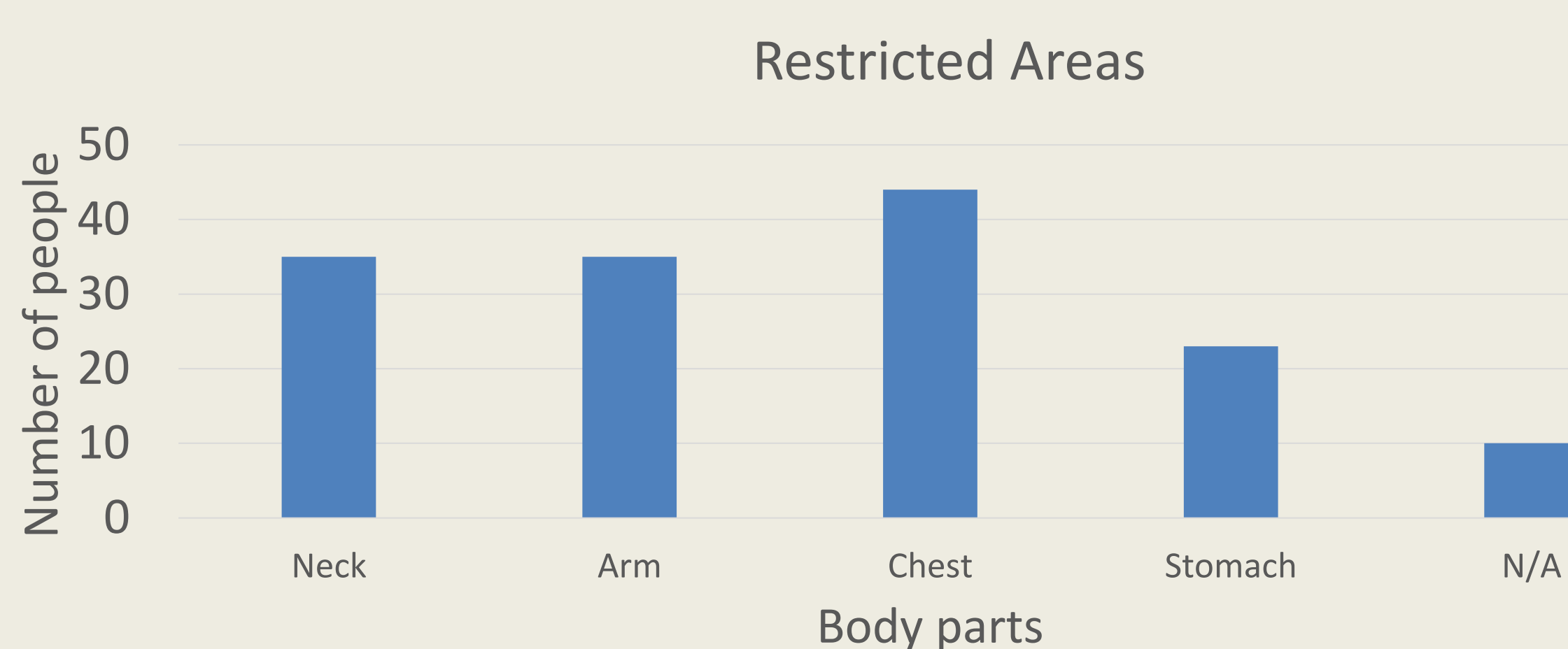
Shirt is constructed of a nylon/spandex blend that provides both comfort and ventilation



Front View

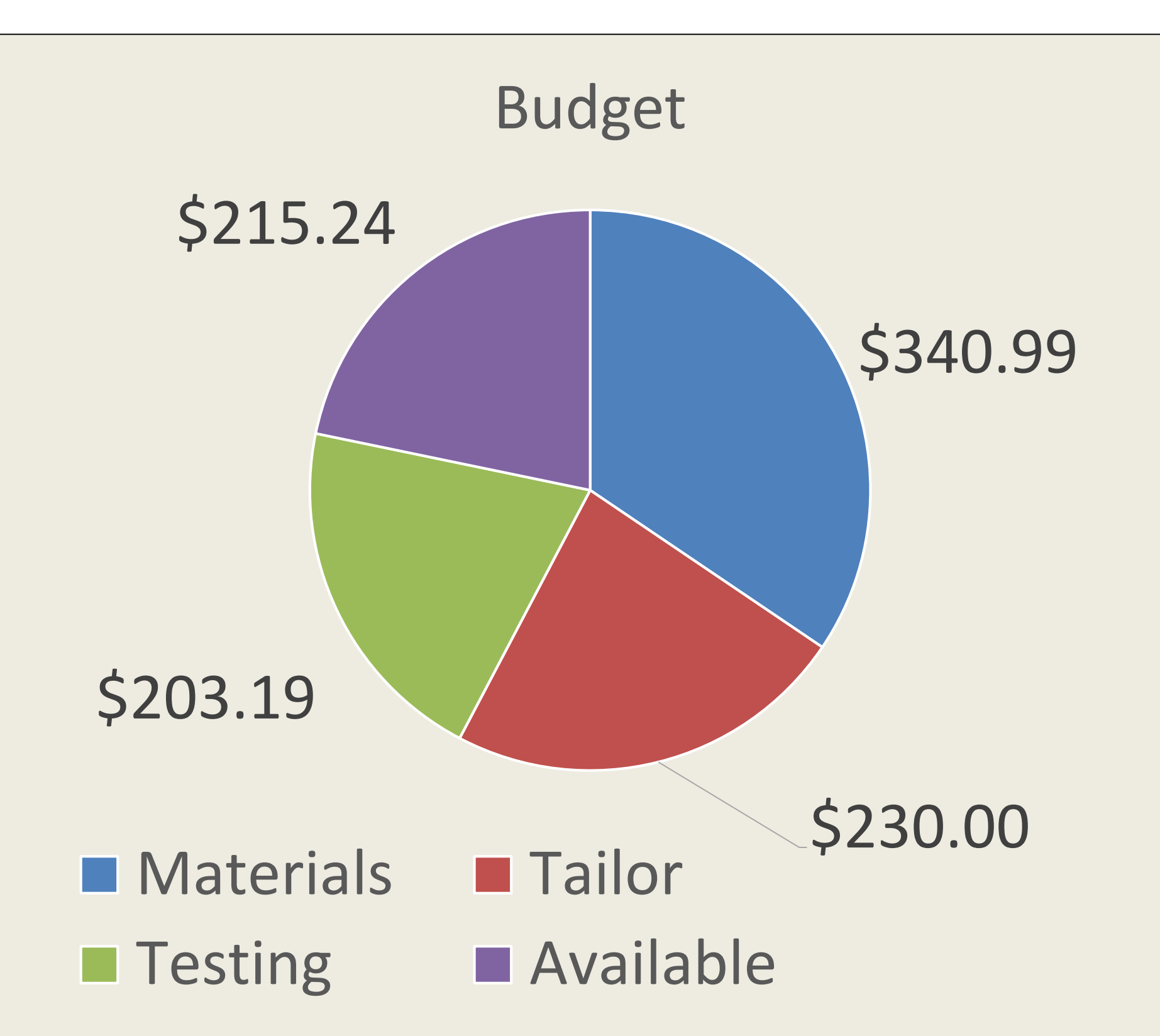
Background

Approximately 100 people were polled on whether or not their life jacket allowed easy movement and where they felt most hindered by it



Engineering Specifications

- Provide 10.5 lbs of buoyancy force when deflated
- Provide 22 lbs of buoyancy force when inflated
- Have a positive moment with respect to the front of the jacket
- A minimum of 62 in² reflective material



Conclusion

- It cost \$56 in materials to make one Bayou Bengal Buoy life jacket
- We exceeded our goal of inherent buoyancy by 4.0 lbs of buoyancy force
- Our jacket flips the user most of the time