IPRO 310

Designing and Building Active and Passive Prototypes for Assisting Blind Swimmers.

Team Structure

Faculty & Advisors
- Dr. Ken Schug
- Dr. David Gatchell
- Dr. Frank Lane
- Fiona Daay
- Shital Patel

Passive Device Team
- Jodi Warns (Team Leader)
- Arun Sood (Sub-team Leader)
- Lisa Reed
- Neha Padwal
- Sunny Sajjad

Active device team
- Hsuen Yew (Sub-team leader)
- Daniel Chiu
- Jan Teves
- Lorne Turrentine
- Sikander Soleja
- Vaibhav Gupta

Importance of the Project

- According to AFB, 1.3 million people in the US are legally blind
- 10 million visually impaired people in the U.S
- B/VI do not feel safe or secure when exercising
- Existing devices don’t facilitate independence

Our Mission

"Provide a safe, effective, and reliable assistive devices for visually impaired swimmers, to improve their independence"

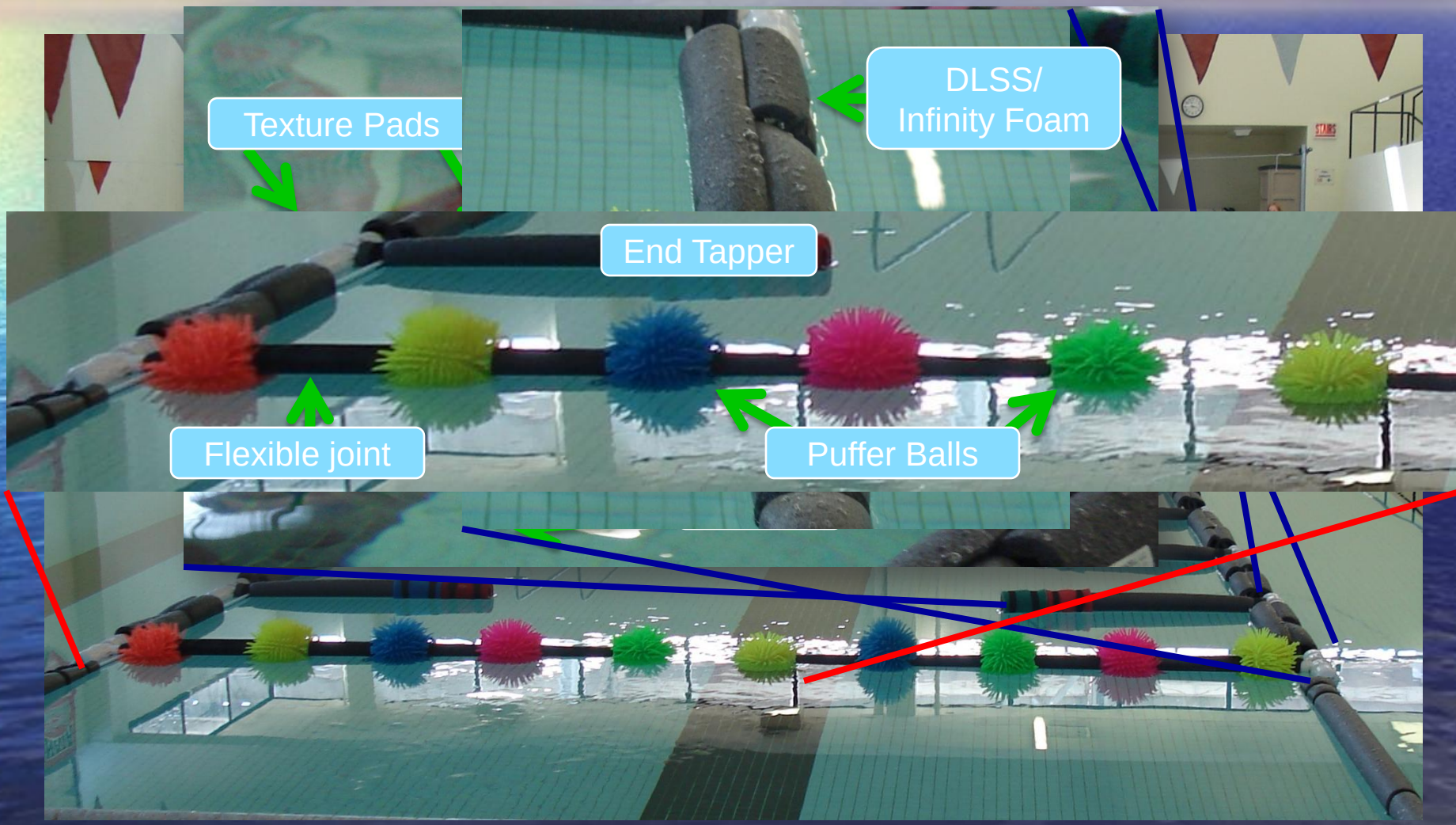
Passive Device Team

-by Jodi Warns

Current Methods

- Using lane dividers
- Hiring guides

Existing Device



Problems

- End Tappers Degraded
- Transportation and storage device
- Lack of Adjustability
- Overall durability

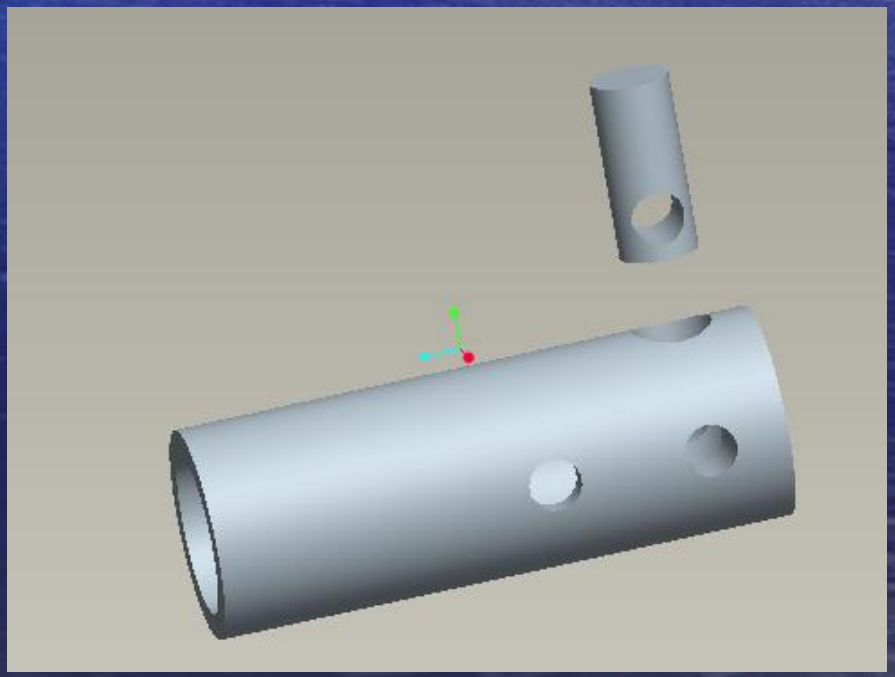
Objectives

- Improve T connectors to I connectors
- New materials for end tappers
- Perform Materials Test
- Redesign Storage device
- Modify existing device to test in Janesville, WI at the WCBVI (Wisconsin Center for the Blind and Visually Impaired)

Solutions

T/I-connector

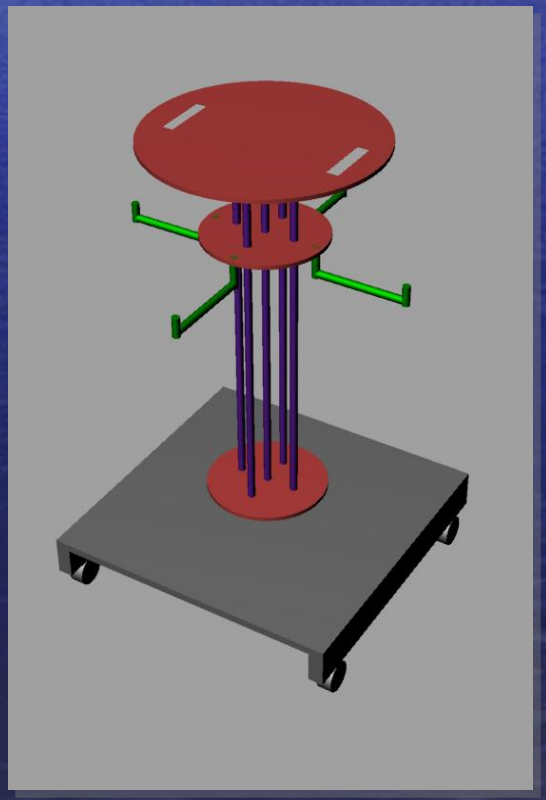
- Single piece design
- Spring lock
- More adjustable
- Two spring design



Solutions

Storage Device

- Conceptual
- Vertical



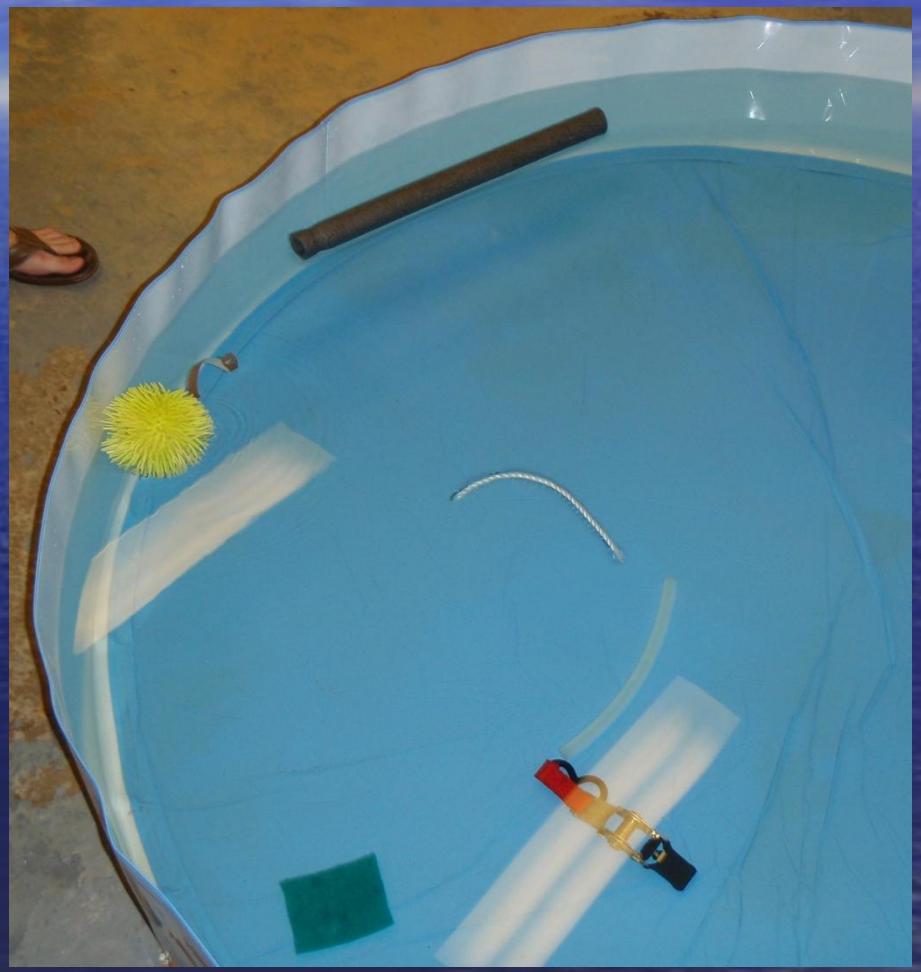
Solution

End Tappers

- Inflatable floatees
- Wiffle balls
- Bath loofahs
- Bells

Example of Materials Test

- Test new materials in children's pool
- 10 day test using 2x the chlorine concentration of a regular pool



Active Device Team

-by Hsuen Yew

Active Device

-Stand-alone self powered device

-Uses tactile feedback

-positive & negative

-Attaches to the swimmer

-Alerts the swimmer about obstacles in the pool

Existing Device

- Snorkel
  - Sound transmitted through bone conduction
  - Based on Swimp3 concept
  - Verbal feedback

Problem

- Device was not tested as a whole system
- The existing device doesn’t facilitate goal of independent swimming
  - Need an operator
- Not User Friendly

Objectives

- Design and build a working prototype using:
  - Feedback from potential visually impaired swimmers
  - Exploration of new technology
- Improve the Existing device:
  - Swimmer independence
  - User Friendliness

Key Milestones

- Explore the technology available in the market (Technology Factor)
- Gather B/VI user Feedback (Human Factor)
- Select technology that best suit user's need (Tech + Human)
- Build & Test working prototype

Solutions

- Explored various technologies available in the market based on:
  - Current uses
  - Cost
  - availability
  - maintainability

Technology/Concept Explored

- Parking sensors, ultra sound
- GPS, triangulation
- Perceived Sound Guidance, RF/RC
- LVDT
- Invisible Fence
- Camera tracking

The Next Step

- Coming out a survey to determine B/VI User's need
  - Light House & School For Blinds
- Build working prototype based on potential user's feedback
- Test & Improve prototype

Conclusion

- Build a new design using feedback from swimmer and bring it up to WI to see if the blind swimmers like it or not.

Questions?