

Rowing biomechanics for lower extremities

Date: 2/8/2023

Client: Jill Thein-Nissenbaum, Tricia DeSouza

Advisor: Dr. John Puccinelli

Team:

Team Leader: Neha Kulkarni (nnkulkarni@wisc.edu)

Communicator: Simerjot Kaur (kaur26@wisc.edu)

BWIG: Emily Wadzinski (ewadzinski@wisc.edu)

BSAC: Allicia Moeller (aamoeller@wisc.edu)

BPAG: Colin Fessenden (ckfessenden@wisc.edu)

Problem statement

Many college rowing athletes, particularly women, are susceptible to lifelong lower back or hip injuries due to disparate weight distributions on each leg while rowing. This issue can be addressed through gathering real-time data on athlete biomechanics, but this data is often difficult to obtain. Collection and analysis of biomechanical data will enable athletes to adapt their technique towards better performance, and will assist coaches and trainers in preventing injury. The client, Dr. Jill Thein-Nissenbaum, has tasked the team with creating a force plate system that can collect biomechanical data from rowers' lower extremities. The team's goal is to create a wireless sensor system in the rowboat that will capture load distribution during time of use and will assess lower extremity asymmetry to establish risk stratification. Additionally, the team aims to translate the force plate system into a user-friendly interface that will enable coaches and athletes to understand essential biofeedback information, thereby improving both performance and safeguarding against potential injuries.

Brief status update

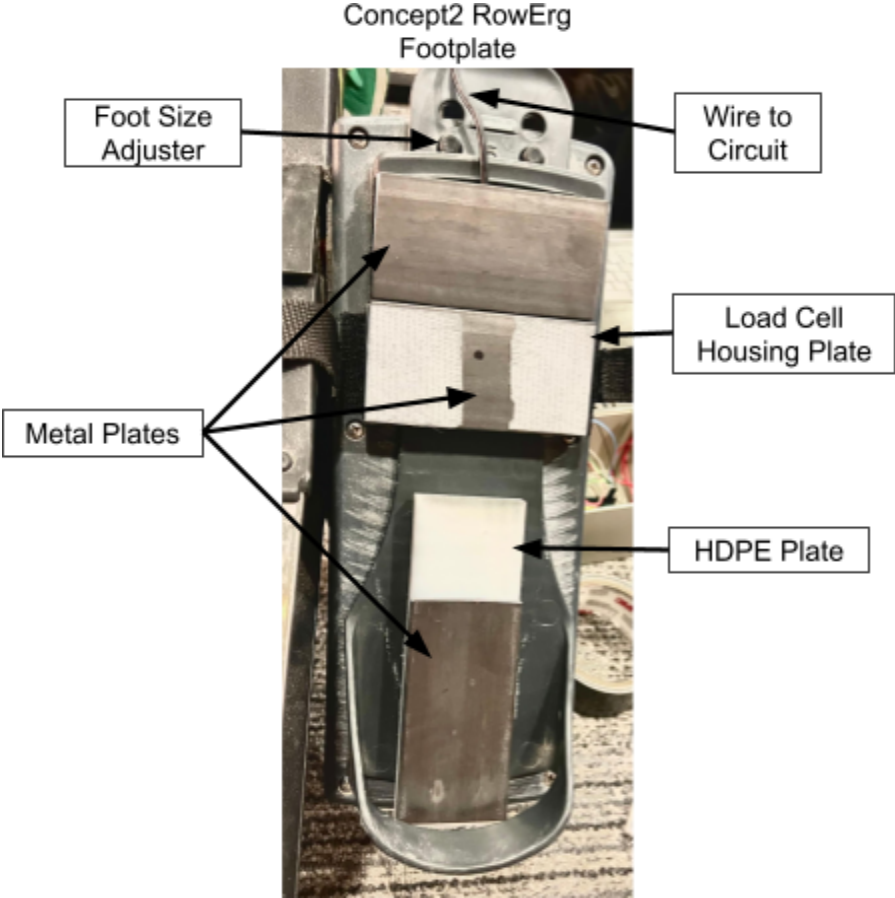
After meeting with the client at the boathouse, the team has been focused on updating the Product Design Specifications to be more specific to the feedback received by the client, specifically concerning the display. In addition, the team has been conducting research on different design components in preparation for creating the design matrix.

Difficulties / advice requests

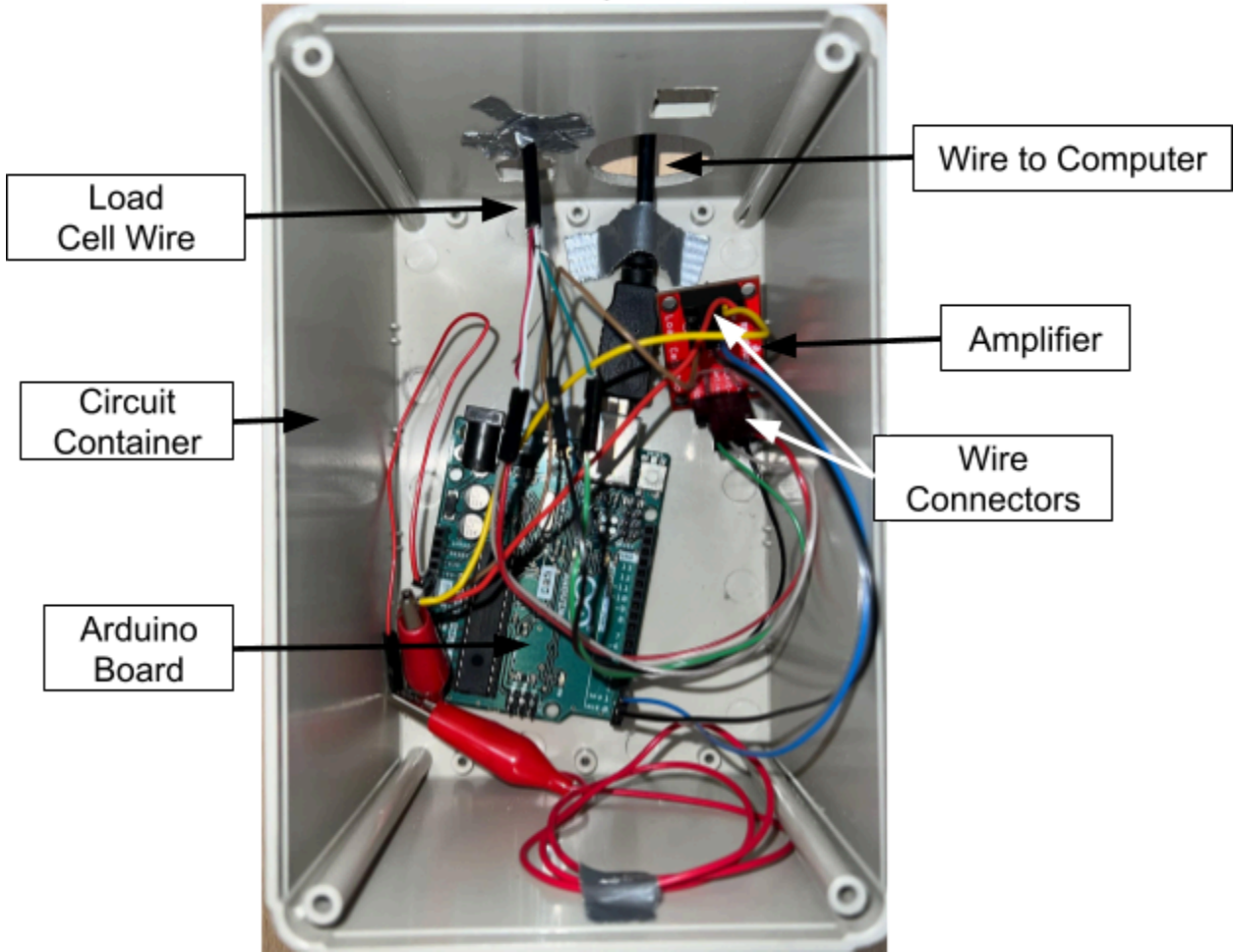
The team is having difficulties finding load cells on the market for use in our design that also fit our budget. We would like to order materials sooner rather than later, but are wondering where the best places to look for load cells are.

Current design

Final design from last semester:



Circuit Components



Materials and expenses - None yet

Item	Description	Manufacturer	Mft Pt#	Vendor	Vendor Cat#	Date	#	Cost Each	Total	Link
Category 1										
									\$0.00	
									\$0.00	
Category 2										
									\$0.00	
									\$0.00	
								TOTAL:	\$0.00	

Website																	
Update		x															

Filled boxes = projected timeline
 X = task was worked on or completed

Previous week's goals and accomplishments

- Neha: Research on ethical considerations and design components
 - I researched HIPAA to see which covered entity we are and the rules we need to follow for electronic data storage.
 - I researched how to interface Arduino with Python, and a potential graphical user interface we can create with Python using the Tkinter library.
- Allicia: LCD display research.
 - I researched various Arduino-compatible LCD displays.
- Emily:
 - Researched many different types of load cells to use this year instead. Updated PDS with new design requirements based on load cell findings.
- Colin:
 - Researched functional components for the device to contribute to the PDS.
 - Researched NCAA standards for collegiate rowers in terms of practice limitations.
- Simmi: Research on athletic testing standards and circuitry.
 - I found a standard on athlete testing equipment that outlines guidelines for strength testing
 - I continued looking at how to combine load cells onto one microcontroller
- Team previous goal: Define project scope and understand client needs.
 - Meet with Jill and Tricia at the boat house and discuss project scope for this semester.
 - Build out a project schedule for the semester and divide up aspects of the project.
 - Decide what kind of force transducer we want to use for the next iteration of the force plate.

Activities

Name	Date	Activity	Time (h)	Week Total (h)	Sem. Total (h)
Allicia	2/8/2024	PDS, Display research	4	4	9
Neha	2/2/2024	Work on PDS + Research	1	1	6
Neha	2/4/2024	Work on PDS	1	2	7
Neha	2/7/2024	Work on PDS	1	3	8
Neha	2/7/2024	Research	2	5	10

Colin	2/7/2024	PDS, Research	3	3	8
Simmi	2/1/2024	Preliminary research	4	4	9
Emily	2/7/2024	PDS research	4	4	9