

Safe Shower Solution for Below-the-Knee Amputee

Progress Report 2

September 14 – September 18, 2026

Client: Mike DeGrave

Advisor: Dr. Murphy

Team:

Sam Dudek - dudek4@wisc.edu (Co-Team Leader)
Ben Willihnganz - bwillihnganz@wisc.edu (Co-Team Leader)
Claire Matthai - cematthai@wisc.edu (Communicator)
Katelyn Williams - kmwilliams37@wisc.edu (BWIG)
Kimberly Jarrard - kjarrard@wisc.edu (BPAG)
Marcus Wentzel - mfwentzel@wisc.edu (BSAC)

Problem Statement

Below-the-knee amputees are unable to wear their prosthetic in the shower, as most prosthetic legs are not waterproof and are prone to corrosion and slippage. This forces individuals to either remove their prosthetic and shower while seated, or attempt to stand on one leg using unsafe workarounds - both of which carry significant fall risk. The objective of this project is to design a device that gives below-the-knee amputees the autonomy to safely enter, stand, and bathe in the shower without their prosthetic, restoring independence and reducing injury risk during a daily activity. This project is being developed in partnership with Mike DeGrave, a below-the-knee amputee whose personal experience with this challenge is the driving inspiration behind the work.

Brief Status Update

This Tuesday we met with our client, his wife, and his daughter to discuss the intricacies of the project. We got all of our current questions and answers about the project including the dimensions of the shower, his current steps for getting in and out, his likes and dislikes about other products, and more. We have also attained videos showing our client using the iWalk. We used this information to guide research for our PDS, which we have completed as a team. During the process of the PDS, we have kept testing in mind and also confirmed that we at some point will be able to meet the client for testing.

Difficulties / Advice Requests

N/A

Current Design

N/A

Materials and Expenses

Item	Description	Manufac-turer	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	

Goals

Major team goals for the next week

1. Compile team design ideas incorporating information from competing designs and other client information from the client meeting.
2. Gather as a group to go over design ideas and assemble a design matrix.
3. Improve team knowledge through research.

Next week's individual goals

- Sam Dudek
 - Continue research on competing designs, waterproof prosthetics, and different materials
 - Use Product Design Specifications to brainstorm ideas for our prosthetic in our clients specific environment
 - Start designing and developing a matrix with future designs
- Ben Willihnganz
 - Continue research into design considerations for preliminary ideas.
 - Utilize client feedback into directed research to further PDS documentation.
 - Utilize the PDS for ideas for materials and other design aspects.
- Claire Matthai
 - Continue research on existing products for waterproof prosthetics and materials for wet/corrosive environments
 - Communicate with client to find a meeting time for our introduction/questions

- Brainstorm 1-3 shower prosthetic designs
- Katelyn Williams
 - Continue research on waterproof prosthetics and common materials used in them
 - Research prosthetic designs that don't contact the distal end of the residual limb
 - Brainstorm potential designs based on client feedback and Product Design Specifications
- Kimberly Jarrard
 - Continue updating the Product Design Specifications based on new information gathered
 - Use the Product Design Specifications to brainstorm initial designs
 - Research potential materials and different components of the prosthetic
- Marcus Wentzel
 - Take into consideration the information we received from our client meeting for brainstorming potential designs
 - Begin researching materials and designs that match our clients needs
 - Have 3 design ideas made

Timeline

Task	September				October					November				Dec	
	4	11	18	25	2	9	16	23	30	6	13	20	27	4	11
Project R&D															
Brainstorm	X	X	X												
Research		X	X												
Prototyping & Fabrication															
Testing & Validation															
Deliverables															
Progress Reports		X	X												
PDS			X												
Design/Decision Matrix Criteria															
Prelim Presentation															
Show and Tell															
Final Poster															
Meetings															
Client			X												
Advisor	X	X	X												
Website															
Update	X	X	X												

Filled boxes = projected timeline

X = task was worked on or completed

Detailed Accomplishments

We gathered questions for our client in our internal kickoff meeting. We have started communication with our client to find a meeting time. We have begun our research entries to understand and empathize with our client and his situation.

Previous Week's Goals and Accomplishments

- N/A

Activities

Name	Date	Activity	Time (h)	Week Total (h)	Sem. Total (h)
Sam Dudek	9/16/26	Researched multiple standards that relate to our clients needs and the future project.	1.5	4	7.5
		Utilized that information to draft the first portion of our PDS including our problem statement, client requirements, physical and safety requirements. Went over the PDS and cited our sources.	2		
		Met with the client to ask questions about his situation, needs, and ideas for the project.	.5		
Ben Willihnganz	9/16/2026	Researched standards and specification to consider when designing the shower prosthetic	2.5	5	8
		Connected with the client to discuss project specifics, took notes on the meeting and incorporated information into different sections of the PDS	1		
		Established better understanding of the project through writing, editings, and reading through the PDS	1.5		
Claire Matthai	9/15/26	Facilitated client meeting and guided	0.5	3.5	6.5

	9/15/26	conversation using prepared questions to gather design requirements and client requests. Researched academic articles and medical device standards to complete the weight, materials, and aesthetics sections of the PDS.	3		
Katelyn Williams	9/14/26	Researched competing designs to begin to draft certain sections of the PDS.	1	3	5.5
	9/15/26	Met with the client to gather more details regarding his shower set up, ideas, and design requests.	.5		
		Utilized client feedback to continue researching material types and update the PDS.	1.5		
Kimberly Jarrard	9/15/26	Reviewed questions answered by the client during the client meeting.	0.25	2.25	4.75
		Updated specifications on the PDS document based on information received from the client.	1		
	9/16/2026	Continued working on the Project Design Specifications.	1		
Marcus Wentzel	9/15/26	Met with client to gather more information on his situation, concerns, and goals with this project	.5	3.5	6
		Work on the Project Design Specifications	2		
		Research a competing design	1		