

Safe Shower Solution for Below-the-Knee Amputee

Progress Report 4

September 25 – October 1, 2026

Client: Mike DeGrave

Advisor: Dr. Murphy

Team:

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Ben Willihnganz - bwillihnganz@wisc.edu (Co-Team Leader)
Claire Matthai - cematthai@wisc.edu (Communicator)
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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 week we created our preliminary presentation and practiced as a team to be ready for Friday. Late in the week we also met with our client online to go over the Design Matrix and get our clients final input on our design. He agreed with our final design and thought it was the best one after looking through all 11 of the designs. He had other requests which we logged and will make sure to account for in our preliminary report and fabrication.

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. Meet as a team to review preliminary report requirements, assign sections, and set clear deadlines.
2. Start to brainstorm ideas for fabrication, testing, and material procurement for our final preliminary design

Next week's individual goals

- Sam Dudek
 - Complete my section of the preliminary report and do a final check over before turning in
 - Help use our clients feedback to create our final design
 - Start brainstorming material procurement and fabrication for our design
 - Possibly meet the client in Green Bay to get specific measurements and meet him
- Ben Willihnanz
 - Research and write the preliminary report using feedback from presentation and from client
 - Look into materials alternative to aluminium that is still cheap, but more durable and scratch resistant
 - Brainstorm ideas for how to create a completely modular design
- Claire Matthai
 - Present preliminary presentation with team
 - Complete my section of the preliminary report
 - Look into other material options for the leg (stainless steel and titanium, specifically)

- Brainstorm fabrication methods
- Katelyn Williams
 - Present preliminary design presentation with team
 - Brainstorm and research design materials based on final design and client feedback
 - Finalize my section of the preliminary report
 - Potentially coordinate meeting with client in Green Bay for dimensions
- Kimberly Jarrard
 - Present preliminary design presentation with the team
 - Continue brainstorming designs and materials based on client feedback
 - Complete the preliminary report
 - Plan meeting date with client
- Marcus Wentzel
 - Present our preliminary presentation on Friday
 - Update the final design with the preferences and suggestions from our client
 - Finalize the materials for the prototype, and look into ordering them vs 3D printing them
 - Complete the preliminary report

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	X											
Research		X	X	X											
Prototyping & Fabrication															
Testing & Validation															
Deliverables															
Progress Reports		X	X	X											
PDS			X												
Design/Decision Matrix Criteria				X											
Prelim Presentation															
Show and Tell															
Final Poster															
Meetings															
Client			X	X											
Advisor	X	X	X												
Website															
Update	X	X	X	X											

Filled boxes = projected timeline

X = task was worked on or completed

Detailed Accomplishments

This week, our team focused heavily on preparing for our preliminary presentation by assigning individual sections and sharpening our delivery through both independent practice and collaborative group run-throughs. We also met directly with the client to review our initial designs, gathering valuable feedback and detailed notes to guide our next set of revisions.

Previous Week's Goals and Accomplishments

- Sam Dudek
 - Complete my section of the preliminary design presentation, and review each section to polish before turning it in
 - Continue to research and focus on means of fabrication for this device after getting feedback from the client
 - Gather specifics on material, ways to distribute weight, and other topics to address faults in our final designs matrix score
- Ben Willihnganz
 - Complete individual section of the preliminary design presentation
 - Facilitate a team meeting to discuss presentation specifics and go over presentation expectations for the advisor team
 - Review the preliminary presentation for errors and correct it based on advisor feedback
- Claire Matthai
 - Complete my section of the preliminary design presentation and practice with the team
 - Continue researching materials for the final design
 - Share design ideas with the client and receive feedback
 - Redraw my design idea with measurements for the final design matrix
- Katelyn Williams
 - Finalize my section of the preliminary design presentation and look over to enhance any details
 - Adapt my initial design sketch to a professional format for the design presentation
 - Continue to research materials to be used and how the manufacturing process would work
- Kimberly Jarrard
 - Complete my section of the preliminary design presentation
 - Continue to improve our 3 designs based on the client's feedback and additional research
 - Finish "Intro to Machining" and get shop access
- Marcus Wentzel
 - Meet with the team to discuss the preliminary design presentation
 - Learn more about the preliminary design presentation and its requirements from the 300s
 - Gain our client's feedback on the 3 design ideas to see if he has a preference and continue research based on that

Activities

Name	Date	Activity	Time (h)	Week Total (h)	Sem. Total (h)
Sam Dudek	9/26	Research more background information to input into our preliminary presentation	1	3.5	14.5
	9/27	Work on my portion of the presentation and create the initial script	1.5		
	9/30	Help facilitate meeting to decide who is doing what for the preliminary presentation and meeting with client	1		
Ben Willihnganz	9/29	Scaled the PDS for the most important relevant information to use for the preliminary presentation	1	3	15
	9/29	Completed my portion of the preliminary presentation	1		
	9/30	Met with team and client for information on designs and practicing for presentation	1		
Claire Matthai	9/29	Communicated with client via email to find a meeting time and shared details regarding viewing the preliminary presentation.	1	3.5	14.5
	9/29	Created the title, overview, and problem statement slides of the preliminary presentation and practiced my section.	1		
	9/29	Updated my design drawing with measurements and typed labels	0.5		
	9/30	Met with the team and client to go over the team's design ideas and receive their input.	1		
Katelyn Williams	9/28	Completed my portion of the	1	2.5	12

	9/29	preliminary design presentation and practiced presenting. Redrew my preliminary design to a more professional drawing with typed labels and measurements, then inserted into the design matrix and presentation.	0.5		
	9/30	Met with team and client to go over design matrix, final design selection, and any preferences in material or design choices.	1		
Kimberly Jarrard	9/29	Completed the preliminary design presentation slides and updated the design matrix	0.5	2	9.25
	9/30	Practiced my portion of the preliminary design. Read through meeting notes from the client meeting	1.5		
Marcus Wentzel	9/28	Updated design by typing out all labels and including rough estimates for measurements	0.5	2.5	11.5
	9/29	Work on my designated section of the preliminary presentation	1.5		
	9/30	Look over the meeting notes and update the next steps portion of the preliminary presentation	0.5		