

Title: Gait Trainer with Treadmill (Step Masters) 200/300

Date: 10/31/2025 - 11/06/2025

Client: Amanda Pajerski

Advisor: Dr. Ashton

Team:

Grace Neuville, Leader, geneuville@wisc.edu

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Problem statement

A woman with a significant mobility impairment due to a seizure disorder requires support while walking because of seizure risks and poor postural strength. She has a Rifton Pacer Gait Trainer which has allowed her to resume walking outdoors; however, it is unsafe to use in winter. It is crucial for her to be able to use the gait trainer for daily walks in order to maintain her muscular strength and mental health. The solution is to design a transfer device that will allow her to use her gait trainer on a Horizon T101 treadmill to give her the opportunity to maintain her muscle conditioning when weather conditions are not favorable. The transfer device will need to allow the gait trainer to be wheeled onto the treadmill and secure the wheels in position so it cannot fall off the side while she's walking. It will need to hold the weight of the gait trainer, the user, and one caregiver, totaling to 173.6 kg. It will need to be easy for caregiving staff to use, taking no more than 5 minutes to assemble, under 22 kg, and have the ability to fold in order to maintain the functionality of her living environment.

Brief status update

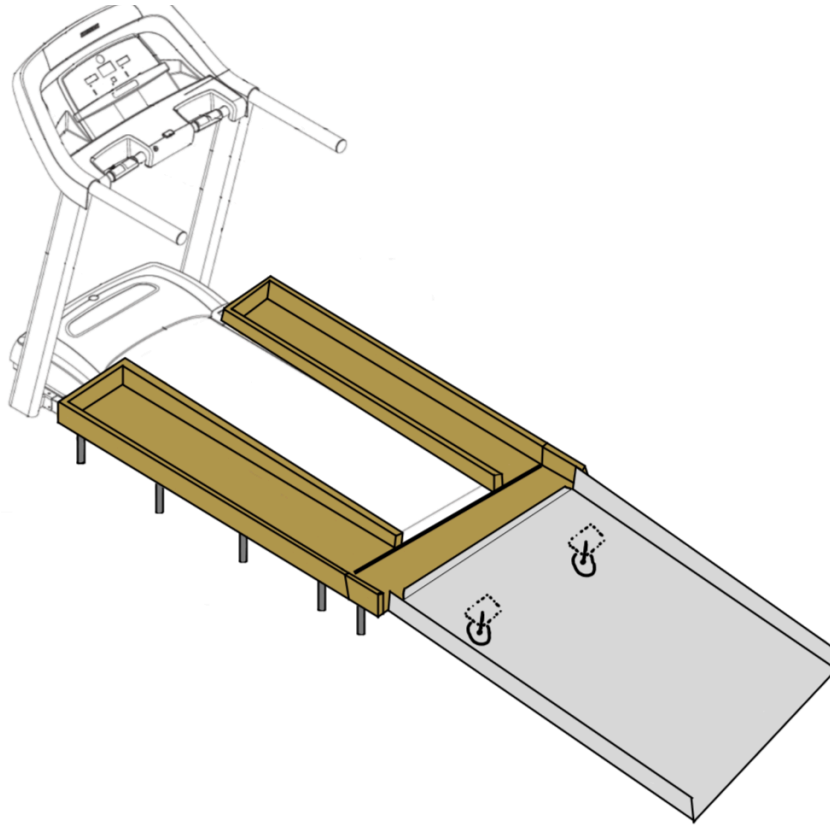
The team performed a finite element analysis (FEA) on the side tracks and determined that 0.75 in. thick wood fastened to the sides of the bases would provide the optimal strength for the sidewalls. Aspen hardwood was selected and purchased from Home Depot for this purpose. The boards were then cut to size (0.75 × 3 × 51 in and 0.75 × 3 × 55 in) and secured to the base with 4 screws (per side) and wood glue. Additionally, wheels for the ramp were purchased from Home Depot to be attached to the ramp next week.

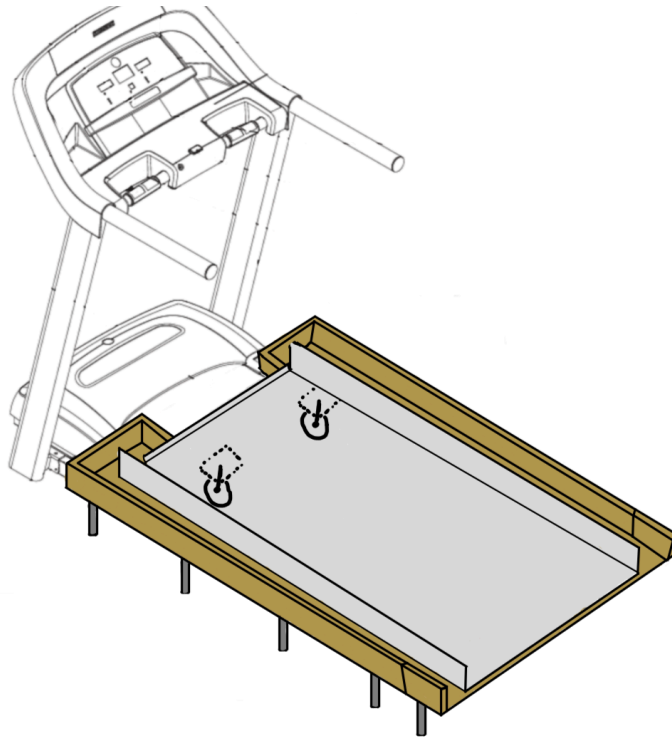


Current state of side tracks in the fabrication process.

Difficulties / advice requests

Current design





Materials and expenses

Item	Description	Manufacturer	Mft Pt#	Vendor	Vendor Cat#	Date	#	Cost Each	Total	Link
Requested for Purchase										
								TOTAL:		
Purchased										
Wheels	Red Polyurethane 3" Rigid caster wheels	Everbilt	4120 424E B	Home Depot	074523 212042	11/5	2	11.37	22.74	Red Caster Wheels
1 x 4 Lumber	Two 55" Aspen boards and Two 52" Aspen boards were purchased.	N/A	2070 5905 4	Home Depot	100000 5744	11/2	18	\$2.17	\$39.06	1 x 4 Aspen Boards
2x10 - 8ft Lumber	Premium Southern Yellow Pine for side track base	N/A	8524 81	Home Depot	852481	10/22	2	\$8.35	\$16.70	2 x 10 - 8 feet SYP
1x5 - 6ft Lumber	Common Board for side tracks.	N/A	2057 3868 9	Home Depot	100163 8967	10/22	2	\$4.94	\$9.88	1 x 5 - 6ft Whitewood

Ramp	5' L x 36" W Aluminum Threshold Ramp (10" max rise)	Silver Spring	N/A	Discount Ramps	STR-536	10/21	1	\$329.99	\$329.99	Aluminum Ramp
Adjustable Leg Supports	4 pack adjustable height center support leg. Adjusts from 7.2" to 14.8"	Signature Home	SDB1 305-3	Home Depot	3283660 91	10/21	2	\$35.05	\$66.59	Adjustable Height Legs
								TOTAL:	\$484.96	

Major team goals for the next week

1. Finish assembling side tracks
2. Attach wheels to ramp
3. Complete an initial fitting and testing of the device on the client's treadmill
4. Determine how to attach device to treadmill

Next week's individual goals

- Grace
 - Complete testing at client's house
 - Update solidworks model with changes to the model
 - Research different attachment methods
- Sierra
 - Brainstorm ways to attach side tracks securely to treadmill
 - Complete testing at client's house
- Julia
 - Complete testing at client's house
 - Look into attachment method for the wheels
- Sara
 - Assist in completing side tracks fabrication
 - Brainstorm wheel attachment methods
- Katelynn
 - Research and source and appropriate lacquer for the wood base
 - Submit purchase requests for the ramp handles and any mechanisms needed for attachment points.

Timeline

Task	Sept			Oct						Nov				Dec	
	11	18	25	3	8	10	17	24	31	7	21	20	28	5	10
Project R&D															
Empathize	X	X	X												
Background...	X	X	X												
Prototyping						X	X	X	X	X					
Testings						X			X	X					

Deliverables															
Progress Reports	X	X	X	X	X	X	X	X	X	X					
PDS		X	X	X	X	X	X	X	X	X					
Design Matrix			X												
Prelim Presentation				X											
Prelim Deliverables				X	X										
Show and Tell									X						
Final Poster															
Final Deliverables															
Meetings															
Client	X	X	X			X									
Advisor	X	X	X	X	X	X	X				X				
Website															
Update	X	X	X	X	X	X	X	X	X	X					

Filled boxes = projected timeline

X = task was worked on or completed

Previous week's goals and accomplishments

Last week the team began working on fabrication of the sidetracks. The wooden bases and side walls were jointed, planed, and cut on the table saw to the measurements needed. After talking with fabrication staff, they are concerned with the thinness of the side walls being able to support the force from the wheels if they were to come into contact with the side walls. The team will conduct FEA to determine if this is the case, and will determine next steps. A solution to this problem will be to screw the side walls onto the side of the base for greater surface area. However, more wood would need to be purchased in order to do this. Additionally, the ramp was purchased and delivered. The team conducted a quick analysis of the integrity of the ramp. The team believes that the ramp can be easily lifted with two people, and will be able to rest on the side tracks without slipping.

Activities

Name	Date	Activity	Time (h)	Week Total (h)	Sem. Total (h)
Grace Neuville	9/7/2025	Wrote problem statement	0.5	2	29.5
	9/7/2025	Researched ramp standards	0.5		
	9/7/2025	Worked on timeline in progress report	0.5		
	9/8/2025	Researched portable ramp designs	0.5		
	9/16/2025	Worked on my section of the PDS	1.5	1.5	
	9/24/2025	Refined the suitcase ramp design	0.5	1.5	
	9/24/2025	Researched importance of gait trainers	0.5		
	9/25/2025	Worked on the design matrix	0.5		

	9/29/2025	Worked on my section of the preliminary presentation	0.5	3.5	
	9/29/2025	Created a treadmill part in solidworks	2		
	10/2/2025	Created final design drawing	0.5		
	10/2/2025	Worked on final design section of preliminary presentation	0.5		
	10/6/2025	Researched testing methods	1	3	
	10/6/2025	Worked on testing section of the preliminary report	1		
	10/7/2025	Met with Fabrication staff	0.5		
	10/8/2025	Revised preliminary report	0.5		
	10/9/2025	Researched aluminum availability and created a new design idea	1	6	
	10/10/2025	Researched design alternatives and created a new design idea	2		
	10/15/2025	Helped create CAD model of the side tracks and performed load testing	2		
	10/16/2025	Updated CAD model	1		
	10/16/2025	Updated notebook with the side tracks solidworks data	1.5	2.5	
	10/18/2025	Determined how to conduct simulation testing with multibody and multimaterial parts	1		
	10/26/2025	Helped with updating the sidetracks solidworks model	2	8	
	10/27/2025	Helped with fabrication of sidetracks	2		
	10/29/2025	Worked on SoldiWorks FEA of sidetracks	3		
	10/29/2025	Helped with fabrication of sidetracks	1		
	11/3/2025	Helped with fabrication of sidetracks	1.5	1.5	

Name	Date	Activity	Time (h)	Week Total (h)	Sem. Total (h)
Sierra Loosen	9/8/25	Brainstormed questions for client meeting	0.5	1	24.5
	9/8/2025	Researched ADA compliant ramp dimensions	0.5		
	9/14/2025	Research relating to the importance of physical activity and current designs of	1.5	4	

		portable ramps			
	9/14/2025	Completed assigned sections of PDS	1.5		
	9/18/2025	Proof read and formatted PDS	0.5		
	9/18/2025	Individual preliminary design brainstorming	0.5		
	9/20/2025	Refined individual preliminary design idea	0.5	2	
	9/21/2025	Wrote descriptions for design matrix criteria	0.5		
	9/24/2025	Helped finish design matrix	1		
	10/1/2025	Brainstorming for final design	0.5	1.5	
	10/2/2025	Preliminary presentation prep	1		
	10/4/2025	Updated PDS	1	3	
	10/6/2025	Individual work on preliminary report	1.5		
	10/7/2025	Research on prefabricated ramps	0.5		
	10/14/2025	Brainstorm design with prefabricated ramp	1	3	
	10/15/2025	Work on dimensions and SolidWorks	2		
	10/20/2025	Researched more stable adjustable legs	0.5	2	
	10/22/2025	Discussed design/purchasing materials with Dr. P, provided transportation to Home Depot for lumbar purchase	1		
	10/22/2025	Began brainstorming for fabrication plan of side tracks	0.5		
	10/27/2025	Helped with fabrication of side tracks	2.5	5	
	10/29/2025	Helped with fabrication of side tracks	1		
	10/30/2025	SolidWorks model of ramp	1.5		
	11/3/2025	Side tracks fabrication	1.5	3	
	11/4/2025	Updated side tracks fabrication protocol	0.5		
	11/5/2025	Returned wheels and purchased new ones at Home Depot	1		

Name	Date	Activity	Time (h)	Week Total (h)	Sem. Total (h)
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Julia Shefchik	9/8/2025	Wrote questions for client meeting	0.5	1.5	27
	9/8/2025	Reviewed given information on pacer gait trainer and treadmill to answer client questions	0.5		
	9/11/2025	Researched material options	0.5		
	9/14/2025	Further research on aluminum as a potential material	0.5	3	
	9/17/2025	Formatted and contributed to the team PDS document	1.5		
	9/17/2025	Researched the treadmill and gait trainer the client uses	0.5		
	9/17/2025	Edited the problem statement	0.5		
	9/19/2025	Individual preliminary design and research to inform design	1	4	
	9/21/2025	Help format preliminary design presentation	0.5		
	9/22/2025	Refined preliminary design	0.5		
	9/24/2025	Refined preliminary design using client feedback	0.5		
	9/24/2025	Wrote design matrix discussion and contributed information for design 1	1.5		
	9/26/2025	Begin brainstorm for preliminary design presentation	0.5	1.5	
	10/2/2025	Prepare for preliminary design presentation	1		
	10/5/2025	Set up design meeting and inform staff of project	0.5	2	
	10/7/2025	Meet with design staff	0.5		
	10/7/2025	Individual work on preliminary report and revising	1		
	10/12/2025	Created new design folding	1	3.5	
	10/13/2025	Wrote questions for client meeting	0.5		
	10/14/2025	Created new design with prefabricated ramp	1		
	10/14/2025	Search for materials and hardware	0.5		
	10/16/2025	Talk with design staff	0.5		
	10/19/2025	Find leg alternatives for tracks design	0.5	2.5	
	10/20/2025	Review procedures in SolidWorks	0.5		

	10/22/2025	Search for adjustable leg models and start designing model in SolidWorks	1.5		
	10/24/2025	Design legs in SolidWorks	2	6.5	
	10/25/2025	Finish legs in SolidWorks	1		
	10/27/2025	Begin Fabrication of sidetracks	2.5		
	10/29/2025	Continue Fabrication of sidetracks	1		
	11/3/2025	Continued fabrication of sidetracks	1.5	2.5	
	11/5/2025	Begin sanding and detaching sidetracks	1		

Name	Date	Activity	Time (h)	Week Total (h)	Sem. Total (h)
Sara Mlodik	9/9/2025	Brainstormed/looked over client meeting questions and progress report	.5	1.5	21.5
	9/11/2025	Analyzed the 2024 project process in the team notebook and found areas for improvement	1		
	9/14/2025	Finished analyzing the 2024 project process and notes and wrote questions for the upcoming client meeting	1	4	
	9/14/2025	Completed assigned sections of PDS	1.5		
	9/18/2025	Made a design sketch, a ramp model, and brainstormed specific questions for the design team	1.5		
	9/19/2025	Researched the background information on gait trainers	1	2.5	
	9/23/2025	Refined preliminary design #1 into preliminary design #2	.5		
	9/24/2025	Worked on slides and notes for the Preliminary Presentation	.5		
	9/24/2025	Helped finish design matrix	.5		
	9/26/2025	Brainstormed design ideas and telescoping legs	.5	1.5	
	10/2/2025	Worked on slides and notes for the Preliminary Presentation	1		
	10/6/2025	Individual work on preliminary report	1	2	
	10/9/2025	Research on material and design alternatives	1		

	10/12/2025	Brainstorm and sketch proposed new design	1	2	
	10/12/2025	Create model for proposed new design	1		
	10/17/2025	Sketch the team new design with dimensions	1	1.5	
	10/20/2025	Research adjustable legs	0.5		
	10/26/2025	Helped with updating the sidetracks solidworks model	2	5	
	10/27/2025	Woodshop Training	1		
	10/27/2025	Helped with fabrication of side tracks	2		
	11/3/2025	Side tracks fabrication	1.5	1.5	

Name	Date	Activity	Time (h)	Week Total (h)	Sem. Total (h)
Katelynn Johnson	9/9/2025	Brainstormed questions for client meetings.	0.5	1.5	25
	9/9/2025	Reviewed previous group's final report and client comments.	0.5		
	9/10/2025	Reviewed BPAG resources and funding options.	0.5		
	9/16/2025	Reviewed NIOSH lifting guidelines and other safety research relating to caregiver safety.	1	3.5	
	9/17/2025	Completed assigned sections of the PDS and Progress Report #2	1		
	9/18/2025	Used information gained from client meetings to brainstorm designs.	1.5		
	9/21/2025	Researched how the gait trainer wheel locks operate, and brainstormed how to allow the best access to these locks while the gait trainer is elevated with wheel tracks.	0.5	2.5	
	9/21/2025	Updated my preliminary design to account to reduce design weight, and to make the folding process easier.	1.5		
	9/22/2025	Researched pre-existing aluminum ramps that could be modified for the design.	0.5		
	9/26/2025	Set-up budgeting and materials tracking system after reviewing additional BPAG resources and guidelines at BPAG	1	2	

		meeting.			
	9/30/2025	Edited slides for our preliminary presentation	0.5		
	10/2/2025	Practiced for preliminary presentation.	0.5		
	10/7/2025	Individual work on preliminary report	0.75	2	
	10/8/2025	Individual work on preliminary report	0.75		
	10/8/2025	Investigated BME department funding opportunities.	0.5		
	10/12/2025	Research for new design	1	5	
	10/13/2025	Sketched out new design	0.5		
	10/14/2025	Research for new design	0.5		
	10/15/2025	Sketched out new design	0.5		
	10/16/2025	Sourced Preliminary Fabrication Materials	1.5		
	10/16/2025	Submit BME department funding request	1		
	10/21/2025	Coordinated BME funding and purchase requests.	1	1.5	
	10/22/2025	Updated budgeting documentation to reflect purchases and changes to design.	0.5		
	10/27/2025	Updated purchasing information and documentation.	0.5	5	
	10/29/2025	Constructed a 3D cardboard model of our design for show and tell.	3		
	10/30/2025	Designed a slideshow to support the team's 60 second pitch for show and tell on Friday.	1.5		
	11/3/2025	Assisted with the fabrication of the side tracks.	1	2	
	11/3/2025	Woodshop training	0.5		
	11/6/2025	Updated purchasing information and documentation.	0.5		