

ACCESSIBIBIKE

Making a solution for those who can not bike



HELLO!

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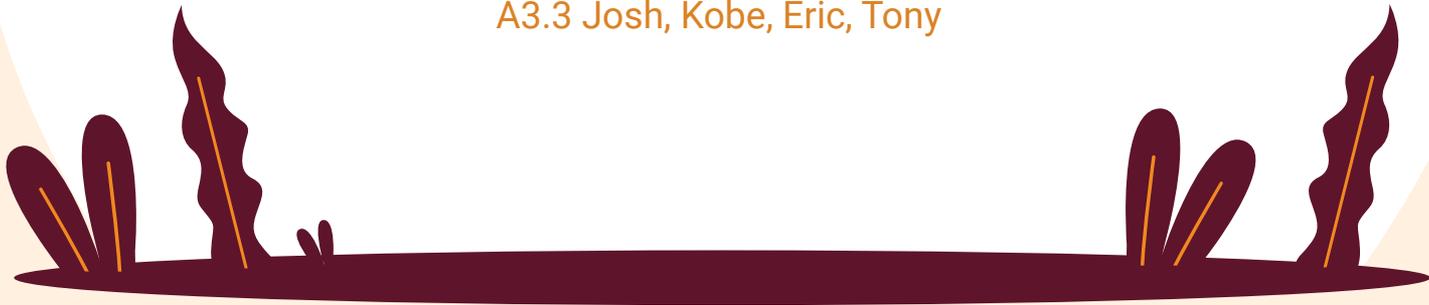


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Our build product for Design
Day



ABOUT US

Engineering students taking GNG 2101



SUMMARY

- Client meeting: we got need statements
- Need statements: practicality, safety and appearance
- Client feedback: not satisfied, we did it one more time
- Prototype manufacturing process: controlling the price of the materials ensure the quality of the product
Enhancing the customer experience
- Business model and economics: selling to retail stores, individuals, and groups that have a need for it
Available features should also include freight

“Life is like riding a bicycle. To keep your balance
you must keep moving”

—ALBERT EINSTEIN



02

THE CLIENTS

Who they are and
Why they want our help

ABOUT THE CLIENTS

Two ladies who have very limited mobility who want to enjoy the biking experience

- Big on feeling safe
- Easy to use
- On a platform in front of their helper

Their wheelchair



They want a solution that they can use when it's nice outside



CUSTOMER NEEDS

User Statement	Interpetated Need Statement	Group
The device attaches to the bike or uses the user's mechanical wheelchair	An attachable item to the bike that the helper can push the user around. Or make a product to attach a regular bike to a mechanical wheelchair	Mechanical aspects
Light to carry around and for the client to push	Must be light and durable so the helper can carry it around and be able to push it with the user on	
Easy for the helper to control	Lightweight steering with wider wheels and three wheels to distribute the weight	
Long use life with little to no wear and tear or maintenance	Simple and mechanically simple to reduce the maintenance needed	

Must feel safe while touring around	Needs to be a safe and secure ride, with straps to keep the user in place. Have locked breaks for when loading.	Safety features <input type="text"/>
We would like it to be red and make it look good with a <u>cool design</u>	Visually appearance is <u>important</u>	User design Preferences
Lights to be seen	Have front and back lights with reflectors around the bike frame so other people can see them	
Must be easy to get in and out of the bike	Easy for the user to get in and out of	Usability
Use it when it's nice outside	Be durable and strong to withstand sunlight and road elements	

PRODUCT REQUIREMENTS

- Attach to a normal bicycle
- No effort from wheelchair user
- Durable material
- Wheelchair in front of the bicycle
- Safety features
- Have full control of bicycle
- Lightweight
- Used for summer/spring seasons
- Colour red

SPECS

- Weight Capacity
- Total Mass
- Ease of Mounting
- Steering Angle

TARGETS

- <150 kg
- <35 kg
- <2 mins
- 35° *

WHAT IS THE PROBLEM TO SOLVE?

EASY OF USE

Simple to manufactured
And
Easy to set up

AFFORDABLE

Had to stay under budget
But
Still use strong and light
materials



PROBLEM STATEMENT

Our device helps **wheelchair users** navigate Ottawa's trails with ease. The platform holds a wheelchair while the **user's helper** can then **push them**. The carriage is **easy to operate** and makes the user feel **safe** with its advanced safety features.

SOME MAIN CONSTRAINTS



TIME

We had limited time to design and build our product



MONEY

Materials are not cheap



SOLUTION

Had to be a physical prototype



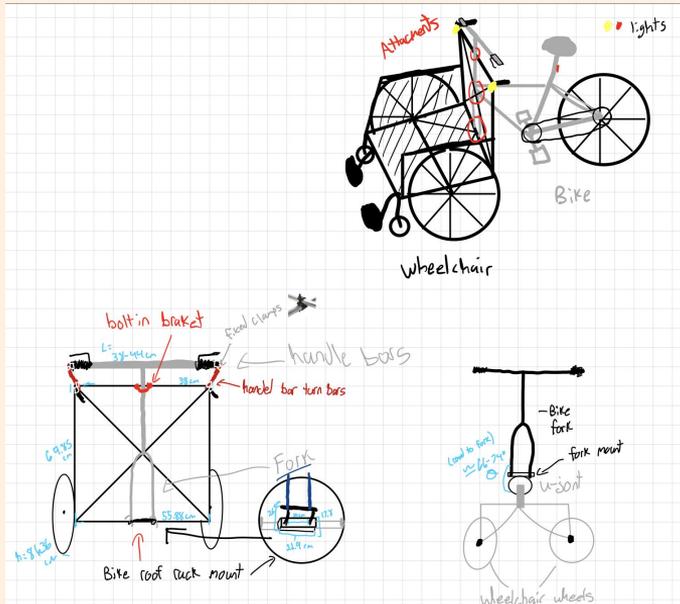
03 PROTOTYPES

Our solution

DECISIONS MADE

We decide to focus on the clients safety, need/wants and go for the harder solution

Initial design



Initial prototype

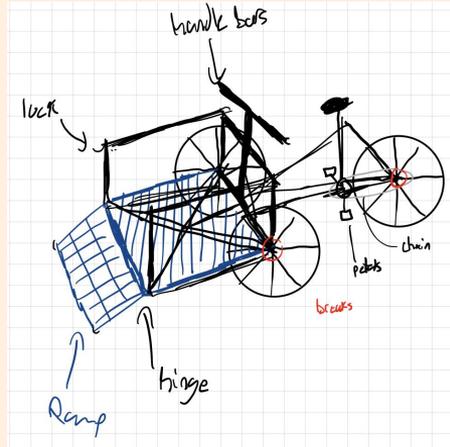


BENCHMARKING

Company	Clever Tricycle-Machinery Factory	Christiana	Riese & Mueller
Product			
Price(CAD)	1288.52	3190.00	12059.00
Dimensions(mm)	2180*850*1100	2080*870*1170	2490*Width depends on the front box*590
Weight(KG)	75	29	27.5
Power	Electric powered	Human powered	Electric powered
Material	Strong steel	Stainless steel	unknown
Wheels	3	3	2

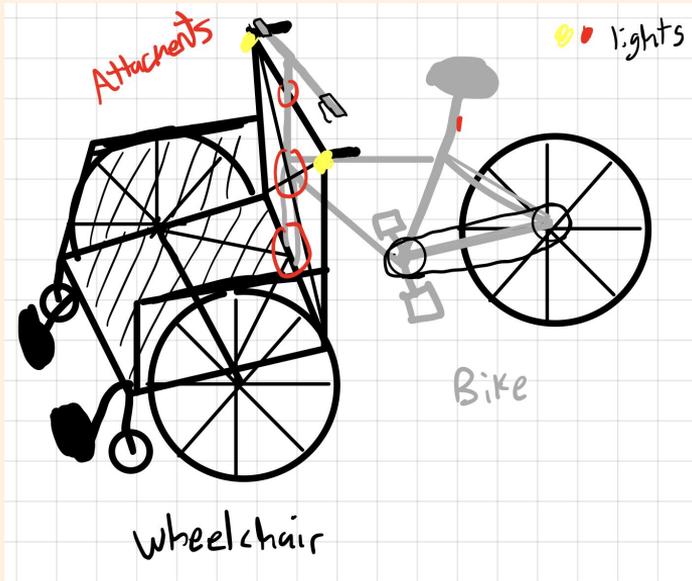
OUR PROTOTYPES

From Sketches to CAD files



SOLUTION OPTIONS

Old design

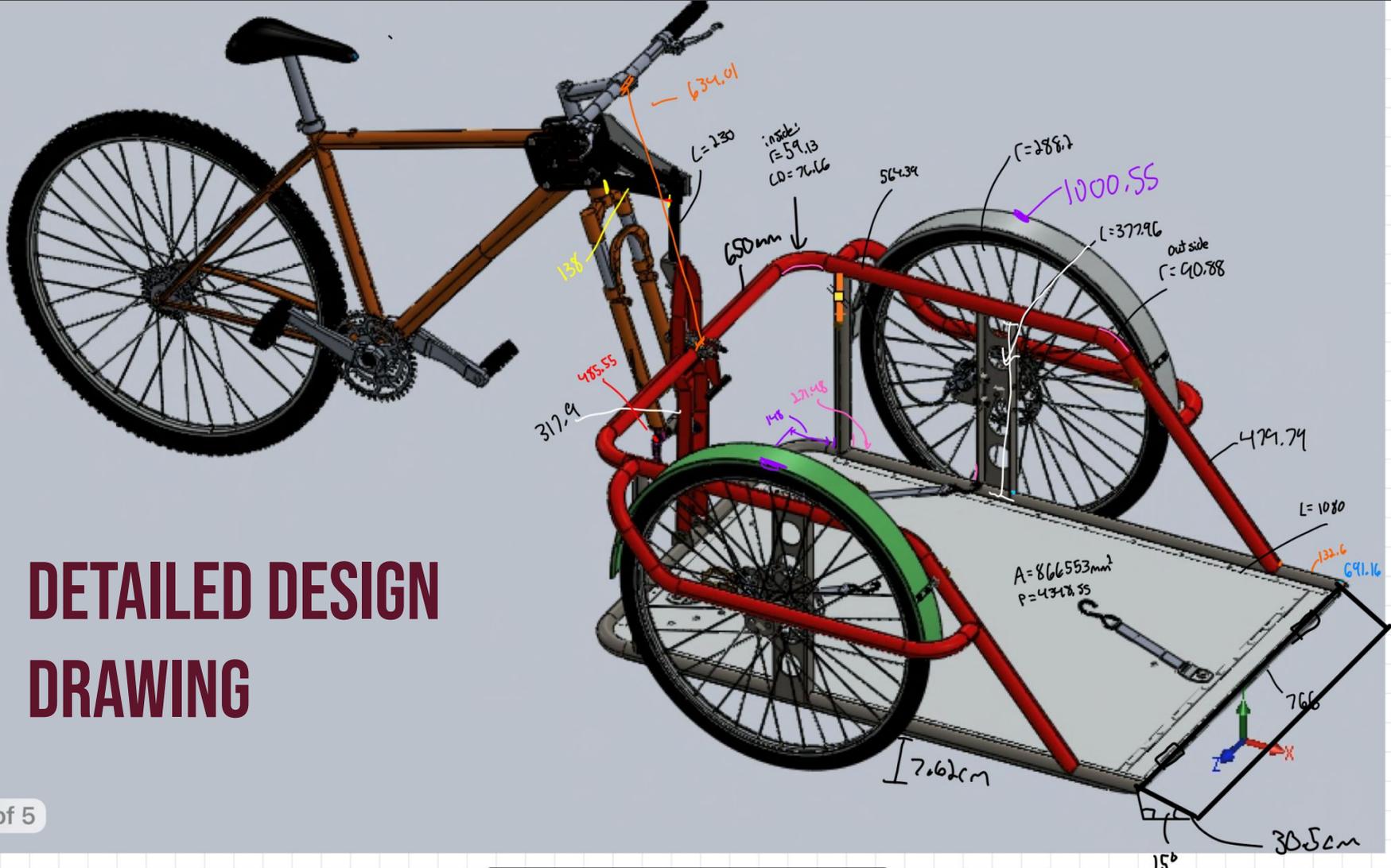


New design



CHOSEN OPTION





DETAILED DESIGN DRAWING

TIMELINE OF OUR DESIGN

1ST CLIENT MEETING

Got information on their needs/wants



2ND CLIENT MEETING

Learned they did not like our initial design



3RD CLIENT MEETING

Clients approved our updated design



INITIAL DESIGN

Made design choices based on what we learned

SECOND DESIGN

Made a new design with their feedback on safety

PHYSICAL PROTOTYPE

Made our final product



04 FINAL PRODUCT

Our physical product



Attached to
front of bike

Travels in this
direction

KEY DECISIONS MADE DURING THE PROJECT

1. Alteration of initial design to accommodate client's requests

- Clients were not comfortable with the initial attachment concept, so they requested a platform

2. Decision of final product's complexity

- Due to budget and time constraints, we had to compromise on what our final product would be like

BENEFITS OF OUR PRODUCT



SAFE

User feels safe as they are strapped down in a closed carriage



RELIABLE

Simple function that requires no maintenance



EASY TO USE

Takes 2 minutes to attach bike



STRONG

1 inch steel tubing



MEETS ALL NEEDS

All client's needs and wants are met with our design



STORES OUTSIDE

Can be stored outside all year around

OUR BUSINESS MODEL

- Manufacturer constructing products
- Sell them to dealerships or retail stores, to the public
- Sell to physical rehabilitation hospitals
- Sell to assisted living communities
- Universal to any bike and wheelchair
- Lower price compared to other similar products
- Revised product line (offload version, electric version, etc.)
- Stay with zero-emissions
- Use optimal materials for both the environment and the product

ECONOMICS REPORT

Variable Costs

Cost	Amount
Raw material cost per unit	\$157.15
Development team salaries	\$850,000
Manufacturing team salaries	\$650,000
Building maintenance and upkeep	\$85,000

Break-even Point

Period	Cash Flow Out	Units Sold	Net Present Value
Year 1	1,585,000+157.15 per unit	25,000	5,513,750 out 5,553,750 in
Year 2	1,585,000+157.15 per unit	35,000	7,085,250 out 7,775,250 in
Year 3	1,585,000+157.15 per unit	63,000	11,485,450 out 13,995,450 in

Income Statement

Revenue/Income (3 years)	Amount
Revenue per unit	\$222.15
Revenue per units sold (123,000/3 years)	\$27,324,450
Total Revenue	<u>\$27,324,450</u>
Goods sold expenses	Amount
Cost per unit	\$157.15
Cost per units sold (123,000/3 years)	\$19,329,450

Total expenses for goods sold	<u>\$19,329,450</u>
Operating expenses (3 years)	Amount
Total development team salaries	\$2,550,000
Total manufacturing team salaries	\$1,950,000
Total building maintenance and upkeep	\$255,000
Total operating expenses	<u>\$4,755,000</u>
Gross profit (3 years)	\$7,995,000
Operating income (3 years)	\$3,240,000

OUR GOALS / FUTURE PLANS



FINISH PRODUCT

With complete
ramp/stand, tie-downs



GIVE TO CLIENTS

So they can use it and
provide feedback



DOCUMENT

So others can pick
up the project



EXPAND

Sell to more clients
in need

LESSONS AND TAKEAWAYS



CLIENTS

Sometimes it can take several prototypes to settle on a good final design



COMPROMISES

Sometimes, despite all best intentions, compromises have to be made

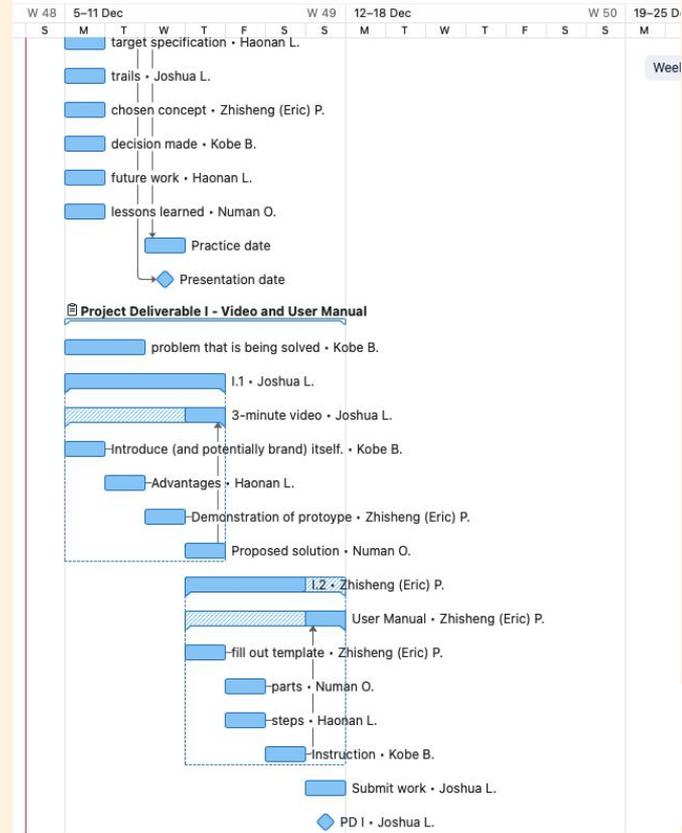
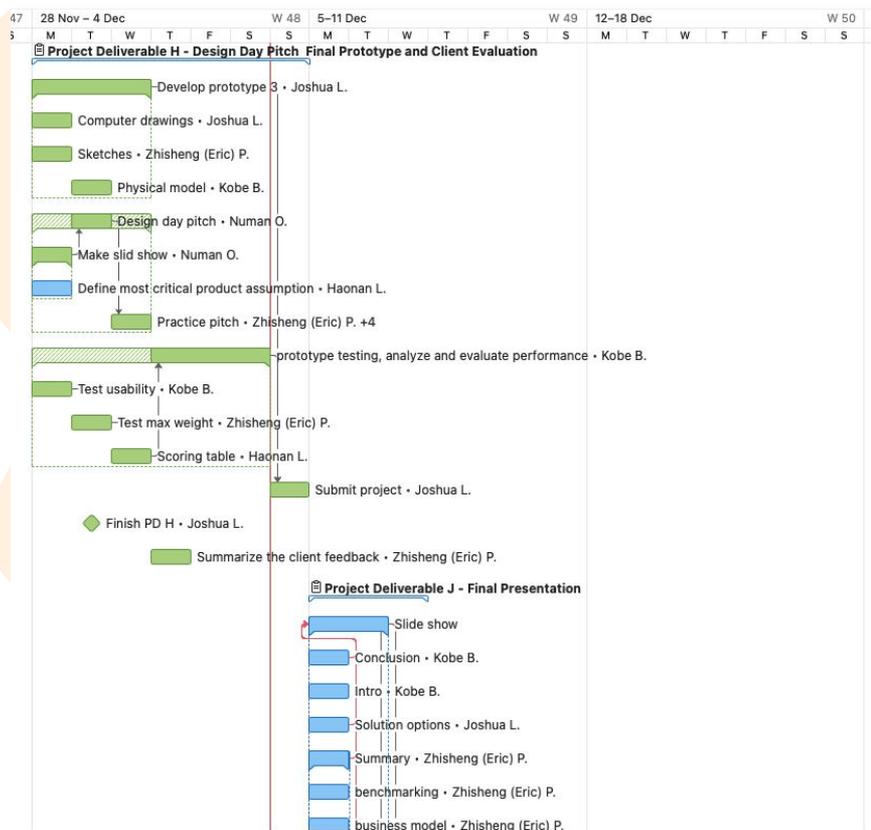


TEAMWORK

To achieve the best possible result, a team must utilize each member's strongest skills



WRIKE SNAPSHOT



THANK YOU FOR LISTENING

Any questions?

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