PD E - PROJECT PROGRESS PRESENTATION INCLUSIVE BIKE

By: Group A2.4

KEY COMPONENTS OF OUR PROJECT DELIVERABLE TO DATE

- CUSTOMER NEEDS
- BENCHMARKING

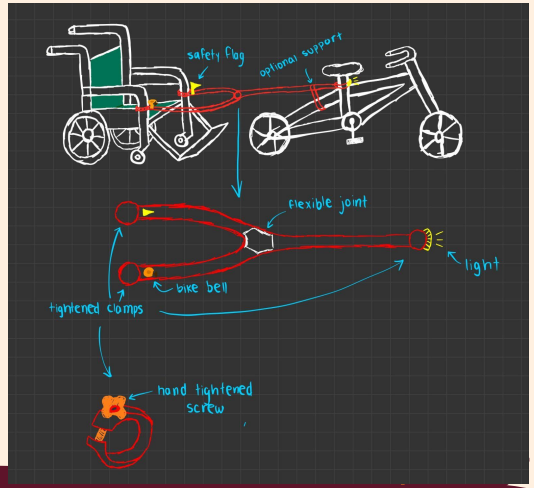
Metric	Need	Metric	Importance	Units	Product 1	Product 2	Product 3	Product 4	Product 5	Product 6	Product 7
1	8	Cost	3	$ (CAD)	380	5345	115	7210	8250	5525	5875
2	11	Attachment Weight	3	kg	6.6	39.4	3.2	64	N/A	45	58
3	9	Maximum User Weight	3	kg	45	125	32	200	120	N/A	120
4	10	Footprint Size	2	cm^3	270 354	N/A	6261	1 447 160	2 341 350	1 966 500	731 880
5	1, 2	Maximum Safe Speed	5	km/h	N/A	N/A	N/A	N/A	N/A	N/A	N/A
6	4	Assembly Time	3	mins	5	3	7	2	2	5	4
7	7	Aesthetics	2	Subj	7	5	7	9	9	5	7
8	1	Material Tensile Strength	4	MPa	400	655	655	400	655	400	400
9	2	Visibility (distance)	5	m	N/A	N/A	N/A	N/A	N/A	N/A	N/A

#	Needs	Importance
1	The device allows the rider to be moved in a safe manner	5
2	The device and users are visible at night time	5
3	The device is able to help move the wheelchair in slightly bumpy or hilly terrain	3
4	The device is assembled quickly and simply	3
5	The device has the wheelchair user sitting at the front	4
6	The device does not require permanent modifications	5
7	The device is aesthetically pleasing	2
8	The cost of the device does not surpass the maximum budget allocated for this project	3
9	The device is able to support the user's weight	3
10	The device is compact in size	2
11	The device is lightweight	2
12	The bike and device assembly can be an alternate means of transportation to the wheelchair	1

- TARGET SPECIFICATIONS
- CONCEPTS
- DECISION MATRIX

Metric #	Metric	Units	Marginal Value	Ideal Value	Reasons
1	Cost	$ (CAD)	200	150	This is based on the budget limit in the project description that was provided to us, as well as benchmarking current products on the market.
2	Attachment Weight	kg	6	4	This is based on benchmarking the current products on the market.
3	Maximum User Weight	kg	50	90	This is based on the average weight of an adult.
4	Footprint Size	m^3	1	0.5	This is based on the client's request to have a compact device.
5	Maximum Safe Speed	km/h	10	15	20 km/h is around an average to slow cycling speed. We picked these values by taking into account two people being cycled around by one person.
6	Assembly Time	mins	15	5	We took into account the client's experience with tools and general assembly.
7	Aesthetics	Subjective	6 out of 10	9 out of 10	This is subjective, as it is based on the opinions of the client and the design team.
8	Material Tensile Strength	MPa	300	400	This is based on the Ultimate Tensile Strength (UTS) of steel, which is a material that we could potentially use for the design of the device.
9	Visibility (distance)	m	15	20	This is based on the braking distance of a vehicle in a typical residential area.

	Metrics							Score
Concept	Cost	Attachment Weight	Maximum User Weight	Footprint Size	Maximum Safe Speed	Assembly Time	Aesthetics	Out of 35
B.B #1	4	4	3	3	3	4	2	23
B.B #2	3	4	4	4	3	3	4	25
B.B #3	4	4	3	3	2	4	2	22
G.G #1	2	2	5	2	3	5	5	24
G.G #2	3	4	3	4	3	3	3	23
G.G #3	3	3	4	4	3	3	3	23
K.Z #1	4	4	3	4	2	4	4	25
K.Z #2	2	2	5	2	3	3	4	21
K.Z #3	4	4	3	3	2	4	3	23
M.M #1	3	2	4	2	3	4	3	21
M.M #2	3	4	4	4	3	4	3	25
M.M #3	4	4	2	4	2	4	3	23
Y.Y #1	3	3	4	3	4	3	3	23
Y.Y #2	3	3	2	3	2	4	2	19
Y.Y #3	1	1	5	2	2	2	5	18



INITIAL PROJECT PLAN

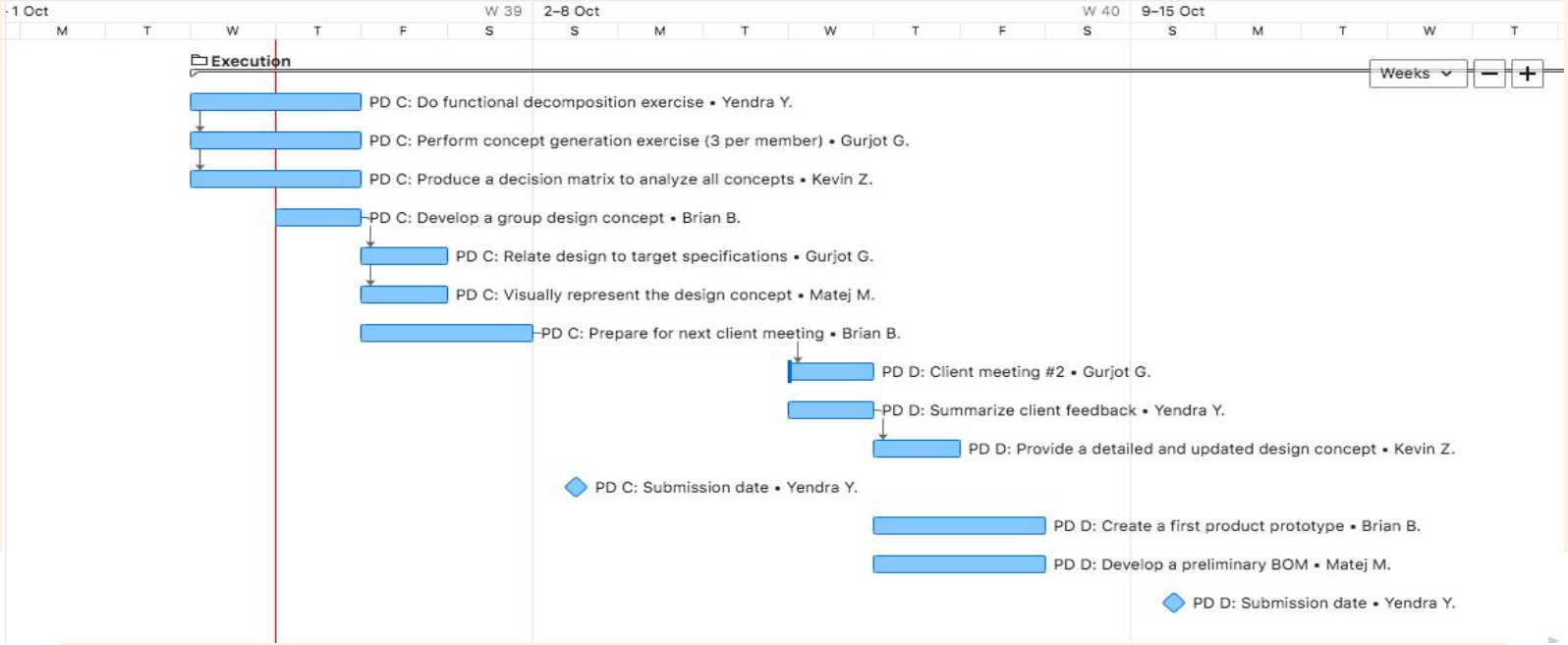

wrike

A2.4 - Inclusive Bike

Share

List | Gantt Chart

All active tasks | By Predecessors | Expand all | Collapse all | Snapshots



A2.4 - Inclusive Bike

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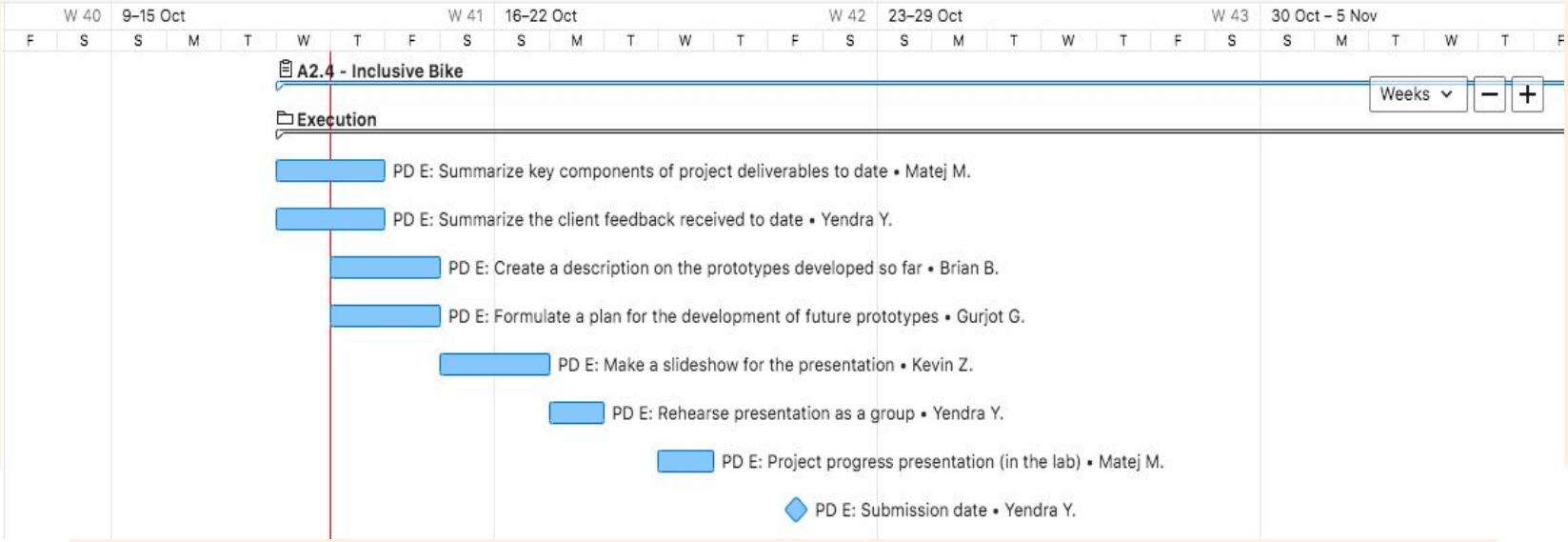



COMMUNICATION

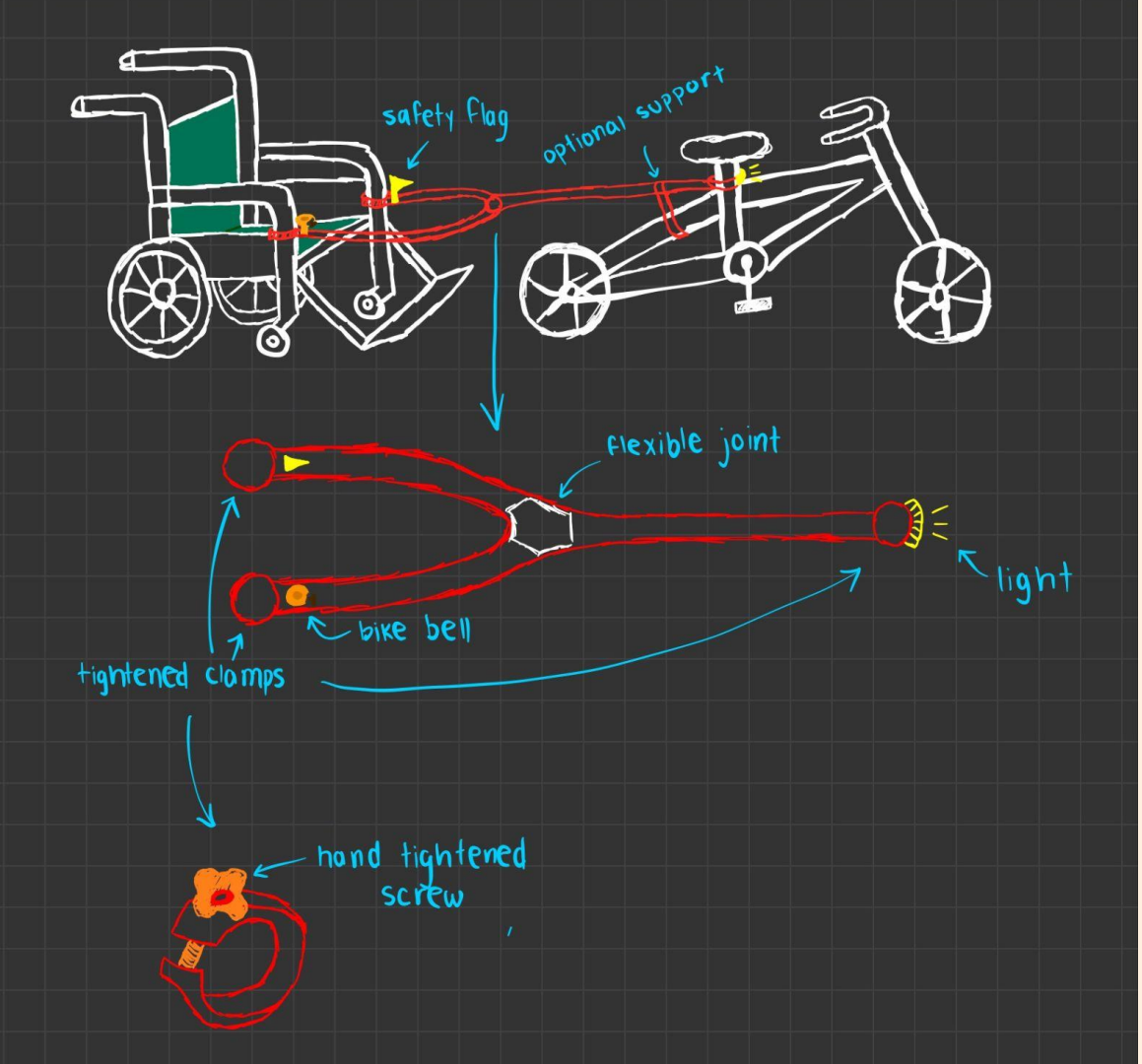
CLIENT FEEDBACK AND CHANGES/IMPROVEMENTS TO OUR DESIGN

FEEDBACK RECEIVED

- No preferred biking area
- No preferred bike models or types
- They are not sure about the model and dimensions of their wheelchair
- Their wheelchairs have seat belts

FEEDBACK RECEIVED

- They appreciated that we offered them a variety of options
- They stressed again that they want the design to be safe and sturdy
- They are fine with sitting behind the bike

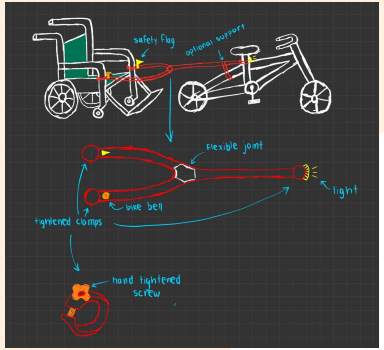


- THEY LIKE OUR DESIGN
- THEY WANT MORE ACCESSORIES
- THEY WANT THE DEVICE TO BE FOLDABLE

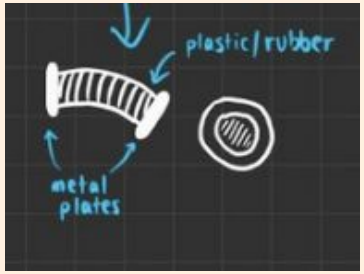
FUTURE PROTOTYPES

PROTOTYPE DEVELOPMENT PLAN MOVING FORWARD

- After talking to our client we will continue to implement their feedback into our future prototype.
- So far we have created a low-fidelity and used this to create our latest prototype which was medium-fidelity.
- Our plan moving forward is to create a medium-fidelity prototype by using our previous prototypes and feedback from our TAs and clients.



COMPONENTS OF FUTURE PROTOTYPES



- We will improve our “flexible joint” component.
- We will also implement our final design for the back-end of the main frame.
- We will update our prototype so that it includes specific dimensions; this will allow us to implement our final physical prototype.
- For our physical prototype we will create four components: main frame, flexible joint, clamps, safety accessories.

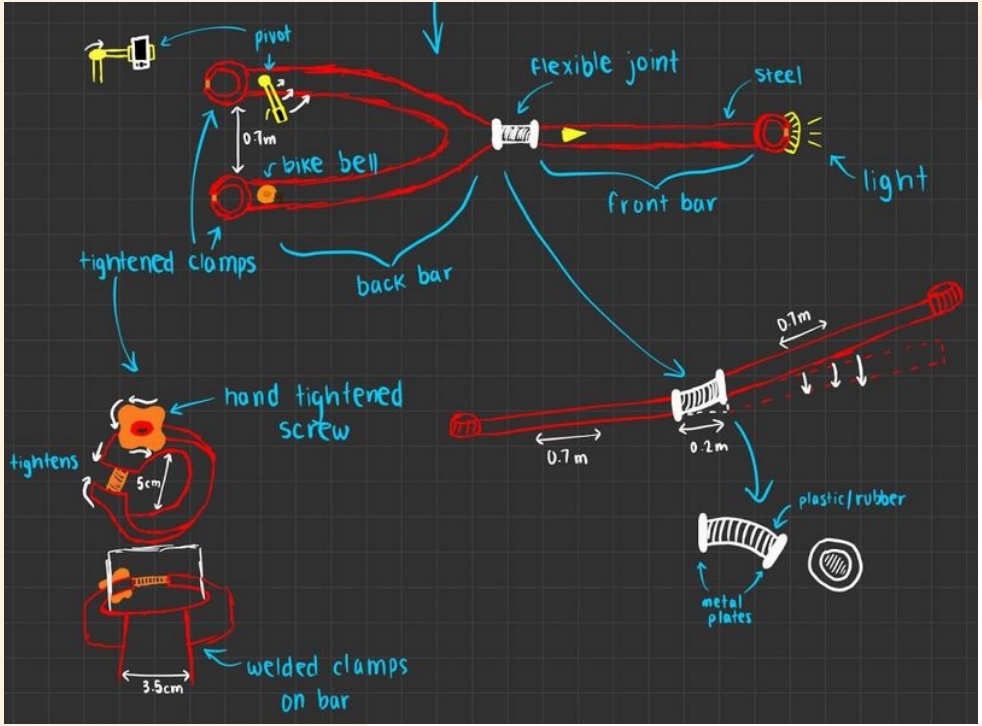
OUR PROCESS TO ACCOMPLISH THIS

- Our first step is to update our drawing design. This is so we can visualize what we need to update on our current prototype and not go in blind.
- After that we will test our prototype again and consult with our client, team or TAs on any issues we may face.
- We will finally take all of this feedback to create an updated prototype that we can replicate into a physical prototype that our client will be able to use.
- Researching for materials will also have to be done to implement our physical prototype.

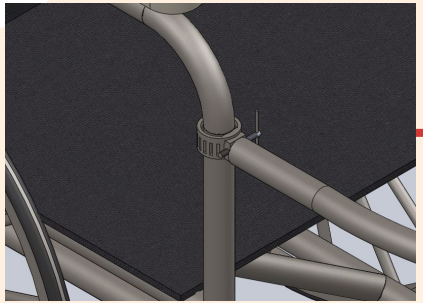
PROTOTYPES

REVISED SKETCH

- Detailed sketch based off client feedback
- Hand tightened clamps
- Flexible joint

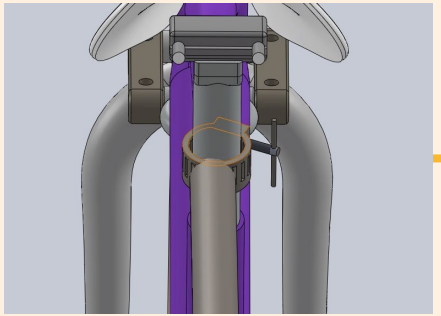


INITIAL ANALYTICAL PROTOTYPE



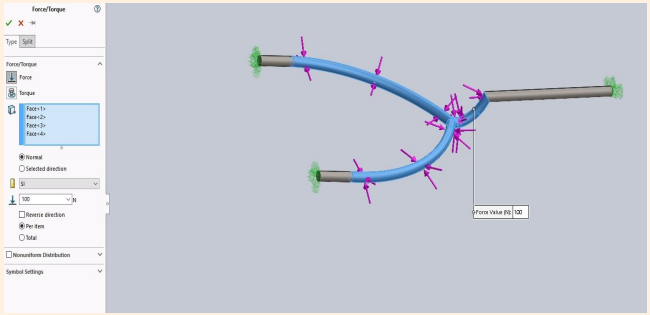
WHEELCHAIR FIXTURES

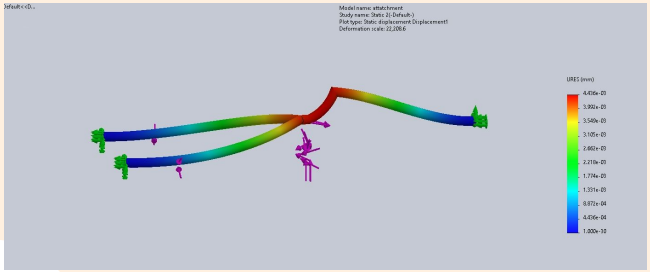
TOP VIEW



BIKE FIXTURE

INITIAL ANALYTICAL TESTING

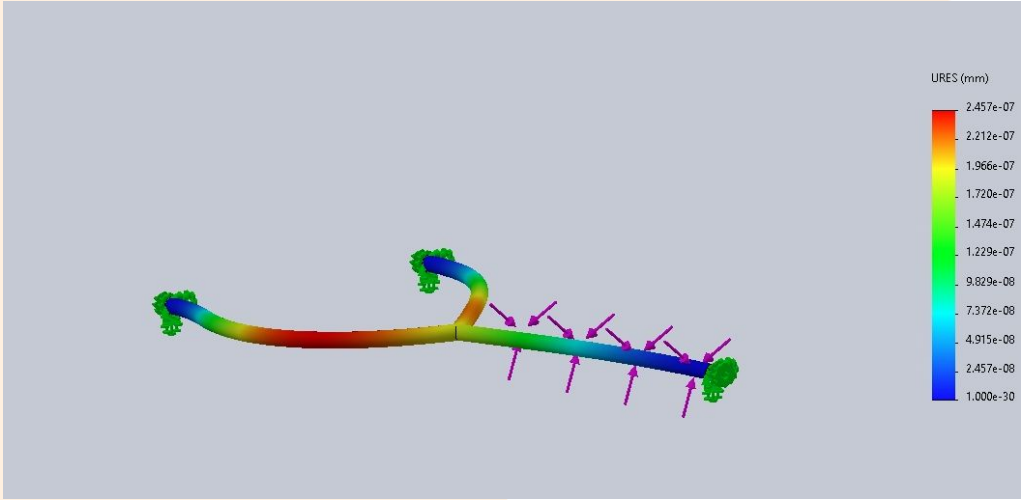


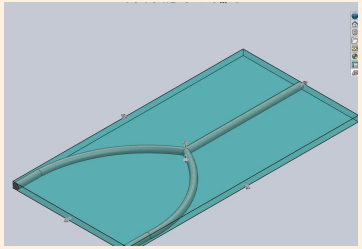


- Testing of device frame at 100N force
- High stress in central joint
- Plastic deformation
- Testing at 50N force produced similar results

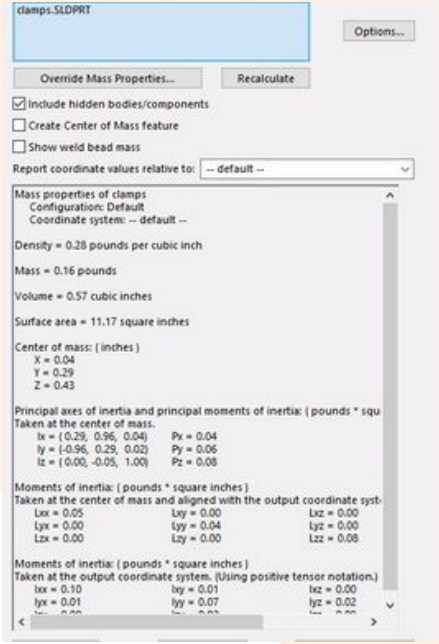
INITIAL ANALYTICAL TESTING - STRAIGHT BAR DESIGN

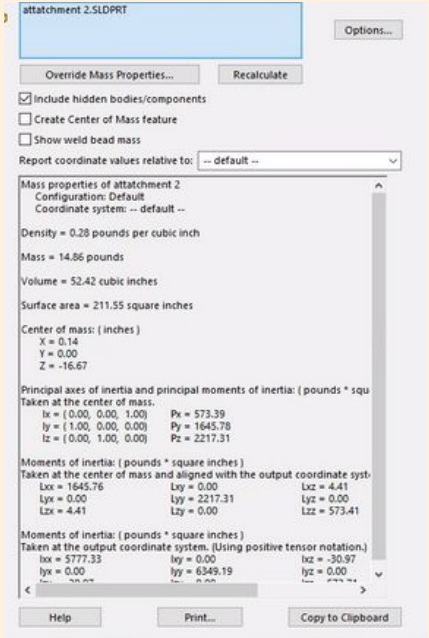
- Removed the center joint
- Same initial test conditions
- No more plastic deformation





ANALYTICAL TESTING REFLECTION





- Could be some inaccuracies
- Slightly over the marginal weight value 6kg
- Within the volume target spect
- Could use weldments tool for future use

CLIENT 3 MEETING PLAN

CLIENT MEETING PLAN

SHOW THEM OUR PROTOTYPE

SHOW THEM OUR PROGRESS ON SAFETY MECHANISM

ASK FOR UNKNOWNS

Preferred positions for accessories?
Wheelchair dimensions?

LET THEM MAKE COMMENTS ON WHAT THEY LIKE/DISLIKE

THANKS FOR LISTENING

Do you have any questions?

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