

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

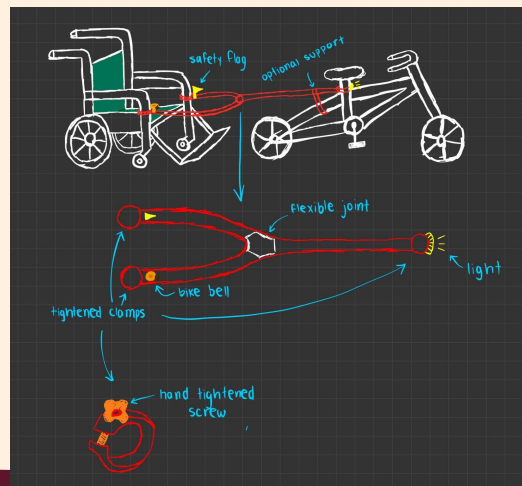
#	Needs	Importance
1	The device allows the rider to be moved in a safe manner	5
2	The device and users are visible at night time	5
3	The device is able to help move the wheelchair in slightly bumpy or hilly terrain	3
4	The device is assembled quickly and simply	3
5	The device has the wheelchair user 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 ²	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.

Concept	Metrics							Score
	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



The background features a light beige color with large, white, organic, wavy shapes. In the top-left and bottom-right corners, there are dark brown silhouettes of tropical leaves, including a prominent monstera leaf with its characteristic holes.

INITIAL PROJECT PLAN



wrike

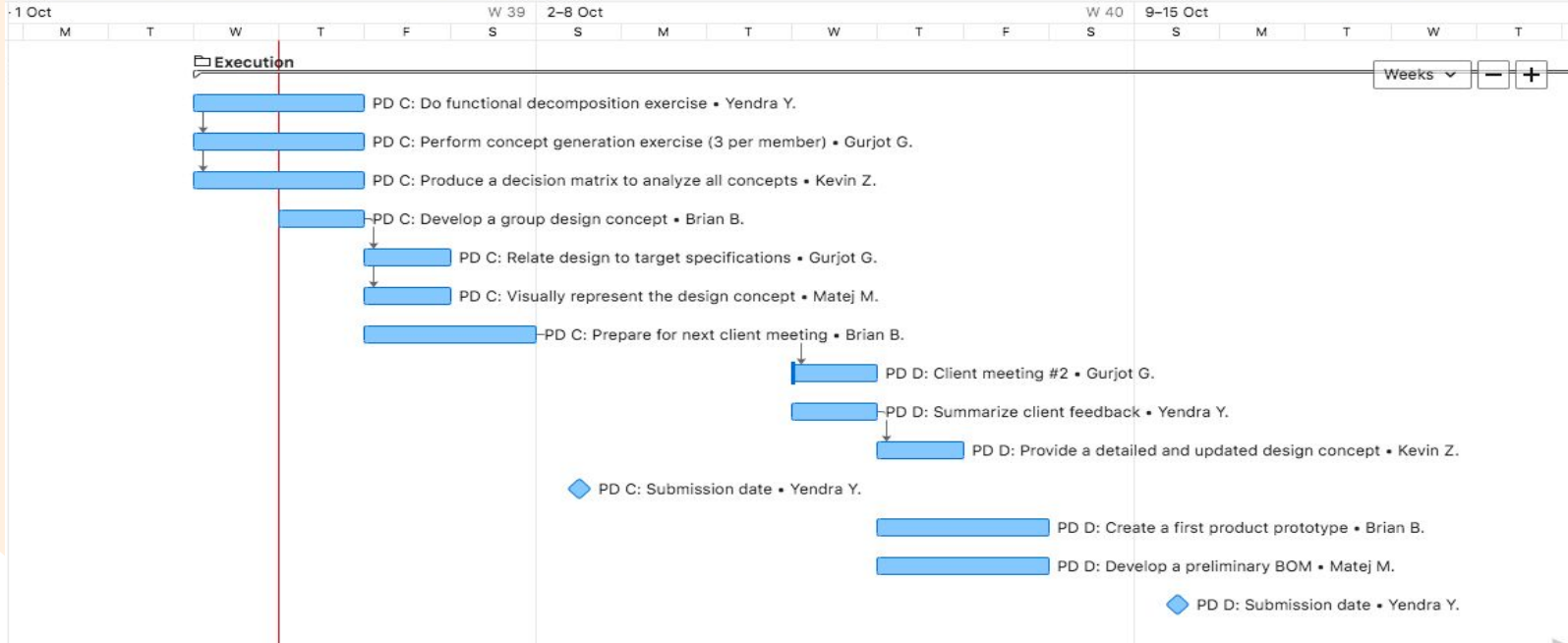
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Share [icon] ...



List Gantt Chart +

All active tasks By Predecessors Expand all Collapse all [icon] [icon] [icon] [icon] [icon]








Snapshots [icon] [icon]



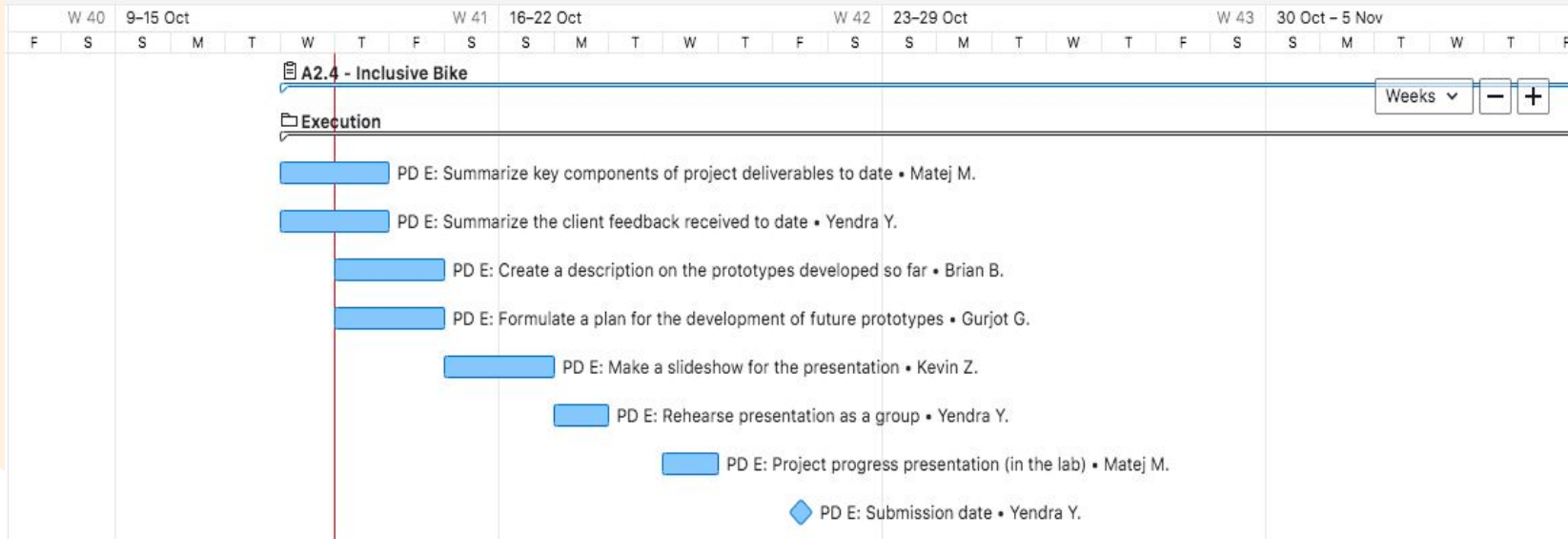
A2.4 - Inclusive Bike

Share  

List  Gantt Chart   

All active tasks  By Predecessors  Expand all Collapse all     

Snapshots  





COMMUNICATION

The image features a light beige background with large, white, wavy organic shapes. In the top-left and bottom-right corners, there are dark brown silhouettes of tropical leaves, including a prominent monstera leaf with its characteristic holes. The central text is in a bold, dark brown, sans-serif font.

**CLIENT FEEDBACK AND
CHANGES/IMPROVEMENTS TO OUR
DESIGN**

FEEDBACK RECEIVED

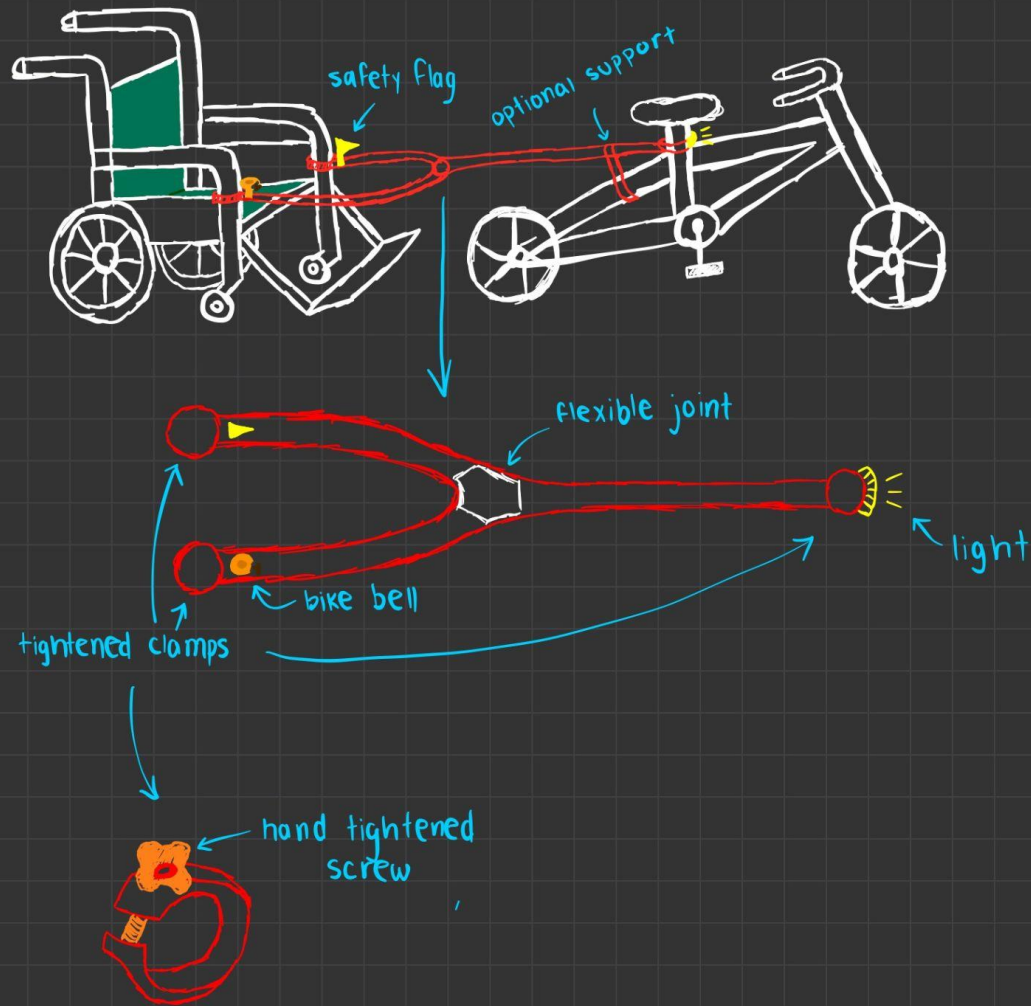
- No preferred biking area
- No preferred bike models or types
- They are not sure about the model and dimensions of their wheelchair
- Their wheelchairs have seat belts



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





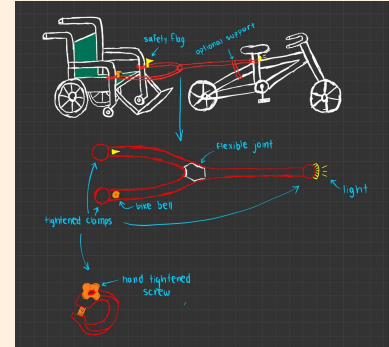
- THEY LIKE OUR DESIGN
- THEY WANT MORE ACCESSORIES
- THEY WANT THE DEVICE TO BE FOLDABLE

The image features a light beige background with large, white, wavy organic shapes. In the top-left and bottom-right corners, there are dark brown silhouettes of tropical leaves, including a prominent monstera leaf with its characteristic holes. The text 'FUTURE PROTOTYPES' is centered in a bold, dark brown, sans-serif font.

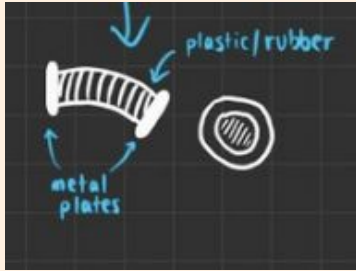
FUTURE PROTOTYPES

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

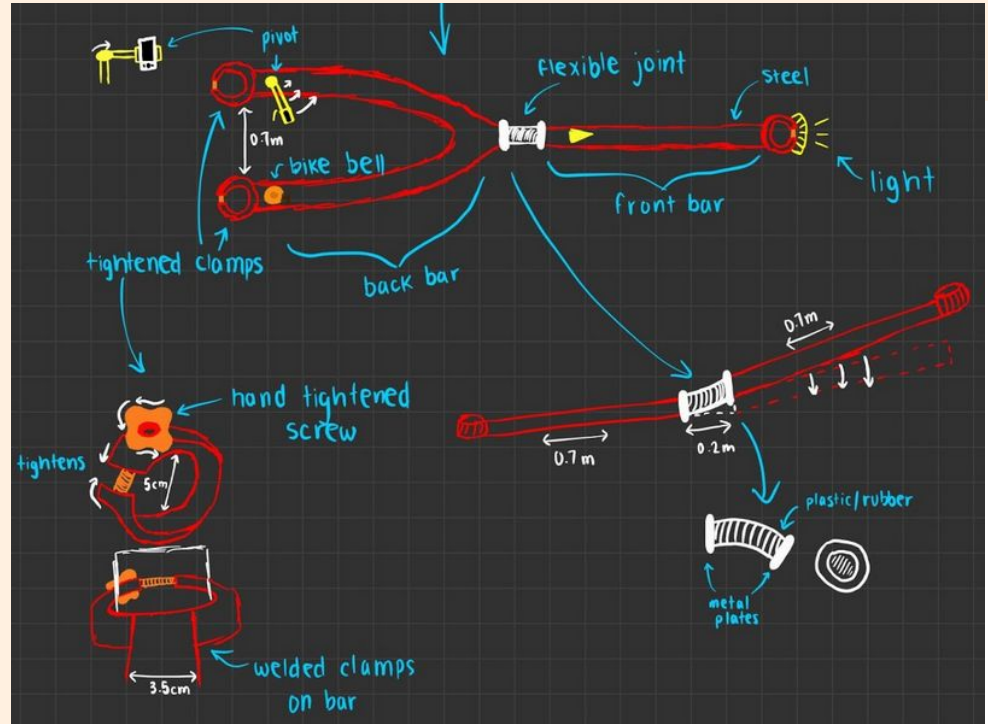
- Our first step is to update our drawing design. This is so we can visualize what we need to update on our current prototype and not go in blind.
- After that we will test our prototype again and consult with our client, team or TAs on any issues we may face.
- We will finally take all of this feedback 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.



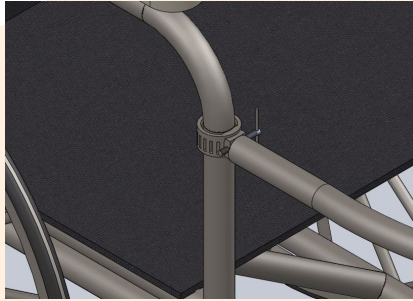
PROTOTYPES

REVISED SKETCH

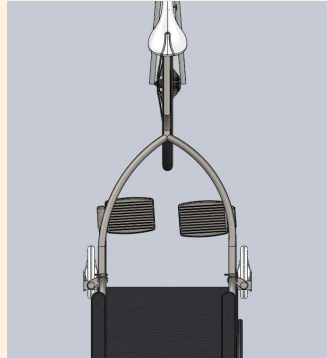
- Detailed sketch based off client feedback
- Hand tightened clamps
- Flexible joint



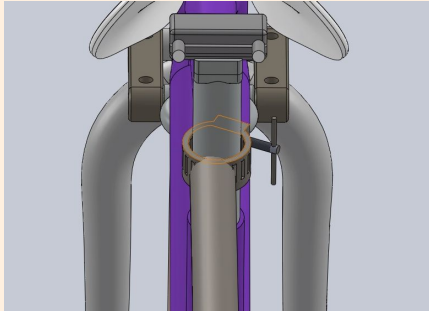
INITIAL ANALYTICAL PROTOTYPE



● WHEELCHAIR FIXTURES

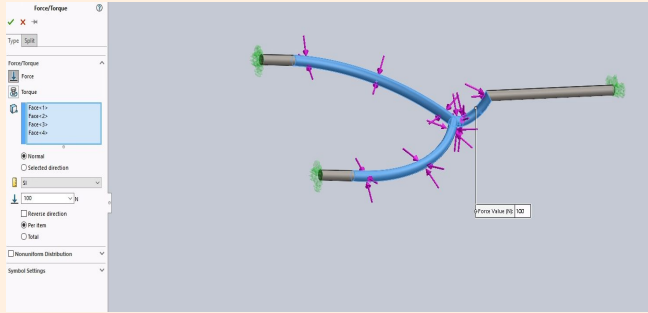


● TOP VIEW

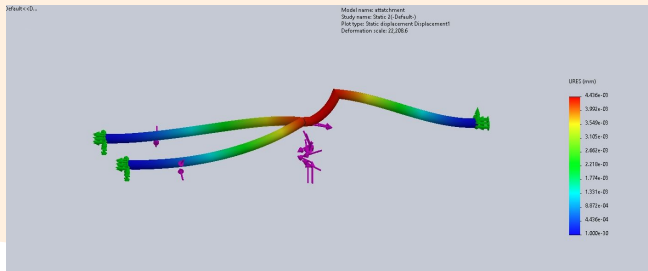


● BIKE FIXTURE

INITIAL ANALYTICAL TESTING

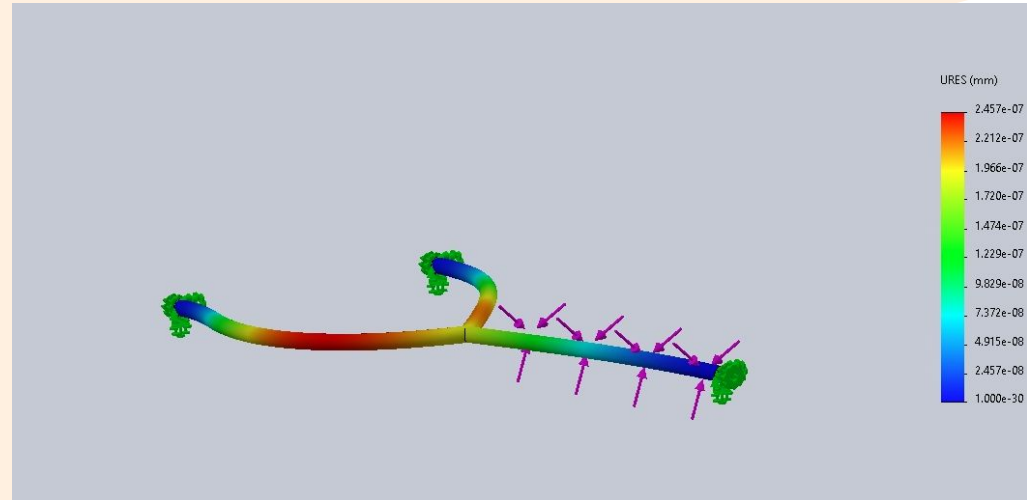


- Testing of device frame at 100N force
- High stress in central joint
- Plastic deformation
- Testing at 50N force produced similar results

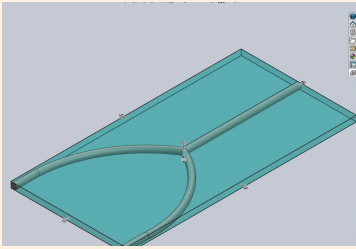


INITIAL ANALYTICAL TESTING - STRAIGHT BAR DESIGN

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



ANALYTICAL TESTING REFLECTION



clamps.SLDPR1

Options...

Override Mass Properties... Recalculate

Include hidden bodies/components
 Create Center of Mass feature
 Show weld bead mass

Report coordinate values relative to: -- default --

Mass properties of clamps
Configuration: Default
Coordinate system: -- default --

Density = 0.28 pounds per cubic inch
Mass = 0.16 pounds
Volume = 0.57 cubic inches
Surface area = 11.17 square inches

Center of mass: (inches)
X = 0.04
Y = 0.29
Z = 0.43

Principal axes of inertia and principal moments of inertia: (pounds * squ
Taken at the center of mass.
Ix = (0.29, 0.96, 0.04) Px = 0.04
Iy = (-0.96, 0.29, 0.02) Py = 0.06
Iz = (0.00, -0.05, 1.00) Pz = 0.08

Moments of inertia: (pounds * square inches)
Taken at the center of mass and aligned with the output coordinate syst
Lxx = 0.05 Lyy = 0.00 Lzz = 0.00
Lxy = 0.00 Lxz = 0.00 Lyz = 0.00
Lxx = 0.00 Lyy = 0.04 Lzz = 0.00
Lxy = 0.00 Lxz = 0.00 Lyz = 0.08

Moments of inertia: (pounds * square inches)
Taken at the output coordinate system. (Using positive tensor notation.)
Ixx = 0.10 Iyy = 0.01 Izz = 0.00
Ixy = 0.01 Iyz = 0.07 Ixz = 0.02

attachment 2.SLDPR1

Options...

Override Mass Properties... Recalculate

Include hidden bodies/components
 Create Center of Mass feature
 Show weld bead mass

Report coordinate values relative to: -- default --

Mass properties of attachment 2
Configuration: Default
Coordinate system: -- default --

Density = 0.28 pounds per cubic inch
Mass = 14.86 pounds
Volume = 52.42 cubic inches
Surface area = 211.55 square inches

Center of mass: (inches)
X = 0.14
Y = 0.00
Z = -16.67

Principal axes of inertia and principal moments of inertia: (pounds * squ
Taken at the center of mass.
Ix = (0.00, 0.00, 1.00) Px = 573.39
Iy = (1.00, 0.00, 0.00) Py = 1645.78
Iz = (0.00, 1.00, 0.00) Pz = 2217.31

Moments of inertia: (pounds * square inches)
Taken at the center of mass and aligned with the output coordinate syst
Lxx = 1645.76 Lyy = 0.00 Lzz = 4.41
Lxy = 0.00 Lxz = 2217.31 Iyz = 0.00
Lxx = 4.41 Lyy = 0.00 Lzz = 573.41

Moments of inertia: (pounds * square inches)
Taken at the output coordinate system. (Using positive tensor notation.)
Ixx = 577.33 Iyy = 0.00 Izz = -30.97
Ixy = 0.00 Iyz = 6349.19 Ixz = 0.00

Help Print... Copy to Clipboard

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

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CLIENT 3 MEETING PLAN

CLIENT MEETING PLAN



**SHOW THEM OUR
PROTOTYPE**



**SHOW THEM OUR PROGRESS
ON SAFETY MECHANISM**



ASK FOR UNKNOWNNS

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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