Deliverable A:

Team Contract Instructions

Your team contract template is divided into three major sections:

1. Establishing team procedures, member role and responsibilities, and role rotation system
2. Identifying expectations
3. Specifying the consequences for failing to follow these procedures and fulfill these expectations

Since the basic purpose of this team contract is to accelerate your team's development, to increase individual accountability for team tasks, and to reduce the possibility for team conflict, make your contract **as specific as possible**: (a) specify each task as detailed as possible, (b) specify each step in a procedure or process as detailed as possible, (c) specify the exact person(s) responsible for each specific task, (d) specify the exact time and exact place for completion or submission of each task, (e) specify member role and responsibilities as well as the weekly role rotation system in your project team. The more specifically you describe your team expectations, roles, and procedures, the greater chance you have for a successful team experience.

Use the Team Contract template to discuss and finalize your team roles, procedures, and standards. Complete, sign, and submit a **copy** of your finalized contract on Brightspace.

Once your team contract has been developed, your team is ready to begin work on the project. However, you may soon find that your team is not working as well as you had hoped. This is normal but needs to be attended to immediately. Perhaps your team is simply not following the established contract procedures or roles as strictly as it should, or perhaps you need to change some of the procedures or roles as outlined in your contract. Call a team meeting immediately to discuss and resolve the challenges your team is facing; do not delay. Seek guidance from your TA or professor to resolve any conflicts a soon as possible if your team cannot resolve the issues on its own. Do not be afraid to seek help if necessary. The goal is to have the most positive team experience possible.

TEAM CONTRACT

GNG1103, Section # _____ **Team #** 12

Team Members:

1) Sara Buzdugan

2) Adam Murnaghan

3) Carl Adam

4) Spencer Terryberry

5) Meso Ezirim

Team Procedures

1. Day, time, and place for regular **team meetings**:

   mondays @10h00

2. Preferred method of **communication** (e.g. e-mail, cell phone, Facebook, Brightspace Discussion Board, face-to-face, in a certain class) in order to discuss the project and to inform each other of team meetings, announcement, updates, reminders, problems:

   face to face + instagram

3. **Decision-making policy** (by consensus? by majority vote?):

   majority vote

4. Method for setting and following meeting **agendas** (Who will set each agenda? When? How will team members be notified/reminded? Who will be responsible for the team following the agenda during a team meeting? What will be done to keep the team on track during a meeting?):

Collective job + responsability
+ Shared drive

5. Method of **record keeping** (Who will be responsible for recording & disseminating minutes? How & when will the minutes be disseminated? Where will all agendas & minutes be kept?):

↳ Shared google drive

6. Member role and responsibilities, and role rotation matrix in the project team: To foster the development of a diverse skill set among your project team members, it is expected that each member contributes to all facets of the project, rather than specializing in a single area. One effective approach to achieving this objective is to implement a weekly role rotation system within the team, providing each member with the opportunity to experience and perform the various roles and responsibilities. To facilitate this process, please refer to the "**Role Rotation Matrix of Members**" document and generate a role rotation matrix for your project team members below.

Team Expectations

Work Quality

1. **Project standards** (What is a realistic level of quality for team presentations, collaborative writing, individual research, preparation of drafts, peer reviews, etc.?):

→ try your best all the time + ask for help if needed!
(helps us stay organized & on top of everything)

2. **Strategies** to fulfill these standards:

→ commenting + suggestions from peers available
→ ask questions if stuck - don't be shy, don't wait until last minute

Team Participation

1. Strategies to ensure cooperation and equal distribution of tasks:

→ follow rotation schedule
(preference each week for needed tasks)

2. Strategies for encouraging/including ideas from all team members (team maintenance):

→ equal opportunity for everyone

3. Strategies for keeping on task (task maintenance):

→ following an agenda
(created by us)

4. Preferences for leadership (informal, formal, individual, shared):

→ shared : cooperation is key

Personal Accountability

1. Expected individual attendance, punctuality, and participation at all team meetings:

Zoom + inperson unless cannot at all join

2. Expected level of responsibility for fulfilling team assignments, timelines, and deadlines:

→ do your job

3. Expected level of communication with other team members:

→ pretty good communication,
constant updates on all

4. Expected level of commitment to team decisions and tasks:

→ pour your heart + soul into it

Consequences for Failing to Follow Procedures and Fulfill Expectations

1. Describe, as a group, how you would handle **infractions** of any of the obligations of this team contract:

→ check in + if not raise to higher power

2. Describe what your team will do **if the infractions continue**:

→ get booted / talk to higher power

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a) *I participated in formulating the standards, roles, and procedures as stated in this contract.*
b) *I understand that I am obligated to abide by these terms and conditions.*
c) *I understand that if I do not abide by these terms and conditions, I will suffer the consequences as stated in this contract.*

1) _____ date 2024-01-17

2) _____ date 2024-01-17

3) _____ date 2024-01-17

4) _____ date 2024-01-17

5) _____ date 2024-01-17

* This template was adapted from
https://cns.utexas.edu/images/CNS/TIDES/teachingportal/**Team_Contract**.doc

Deliverable B:

Needs identification:

- The jig can be reusable
- The jig is quick to install
- The jig is user-friendly
- The jig can withstand dust
- The jig needs to be low-cost
- The jig can be adjustable
- The jig needs to be durable
- The jig needs to be precise
- The jig needs to be universal for different doors

Problem Statement:

A need exists for door manufacturers to quickly and easily install a flush bolt into a wood-plated steel door with a device that is reusable, dust-resistant, adjustable, and cost-effective for owners.

Needs	Importance
• The jig can be reusable	4
• The jig is quick to install	3
• The jig is user-friendly	3
• The jig can withstand dust	3
• The jig needs to be low-cost	2
• The jig can be adjustable	5
• The jig needs to be durable	5
• The jig needs to be precise	5
• The jig needs to be universal for different doors	5

Deliverable C:

Needs	Design criteria	Importance (1 to 5)
The jig is reusable & durable	Durability Rigidity	4
The jig is quick to install & is user-friendly	Maneuverability Simpleness Reliability	3
The jig withstands dust	Operating Conditions : Dusty	3
The jig is low-cost	Cost ($)	2
The jig is adjustable and universal for different doors	Versatility	5
The jig is precise	Precision (in)	5

Benchmarking (based on internet research) :
Based on the product closest to ours in terms of needs and specifications :

- Made of rust resistant aluminum
- 7” flush bolt fixture
- Contains micro length adjustment to accommodate for variations in hardware length

Constraints:

	Specification	Relation	Value	Unit	Verification
1	Weight	<	10	lbs	testing
2	Cost	Approx.	100	$	estimate
3	Operating Conditions: Dusty	=	yes	N/A	testing
4	Clamping Size	between	1 ¾ - 2 ¾ (intervals of 1/4	inch	analysis
5	Precision	<	1/32	inch	analysis
6	Durability	>	1	year	testing

Functional requirements :

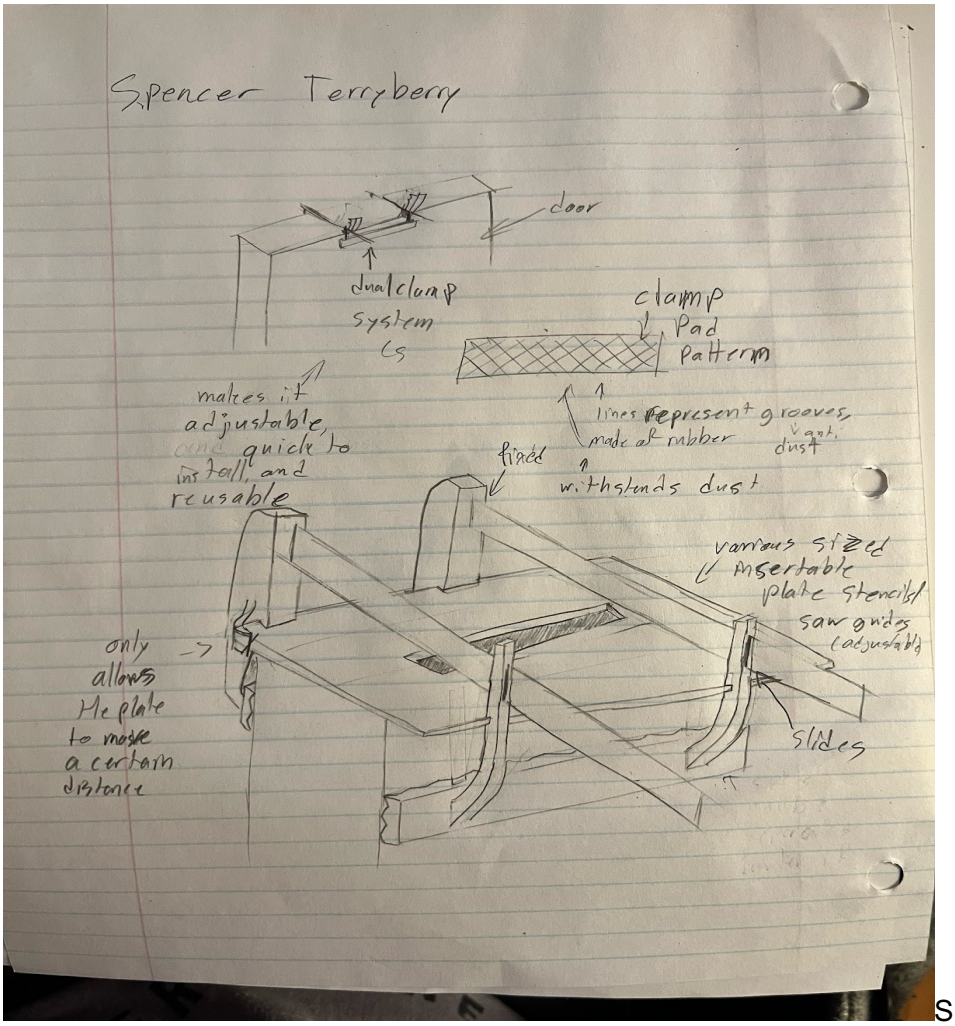
	Specification	Relation	Value	Unit	Verification
1	Versatility	=	yes	none	test
2	Easy installment	<	10	min	test
3	Rigidity	=	yes	none	test
4	Simpleness	=	yes	None	Test
5	Longevity	=	yes	none	estimate/test

Non-functional requirements :

	Specification	Relation	Value	Unit	Verification
1	Aesthetics	=	yes	None	Test
2	Corrosion	=	yes	None	Test
3	Safety around the hands	=	yes	None	Test
4	Reliability	=	yes	None	Test

Reflections:
The client meeting put the needs of the design project into perspective by bringing to light the specific requirements that are needed for the proper construction of the new product. This is to say, the presentation brought the importance of a dust-proof, adjustable jig to light. No changes to the needs list have been made.

Deliverable D:

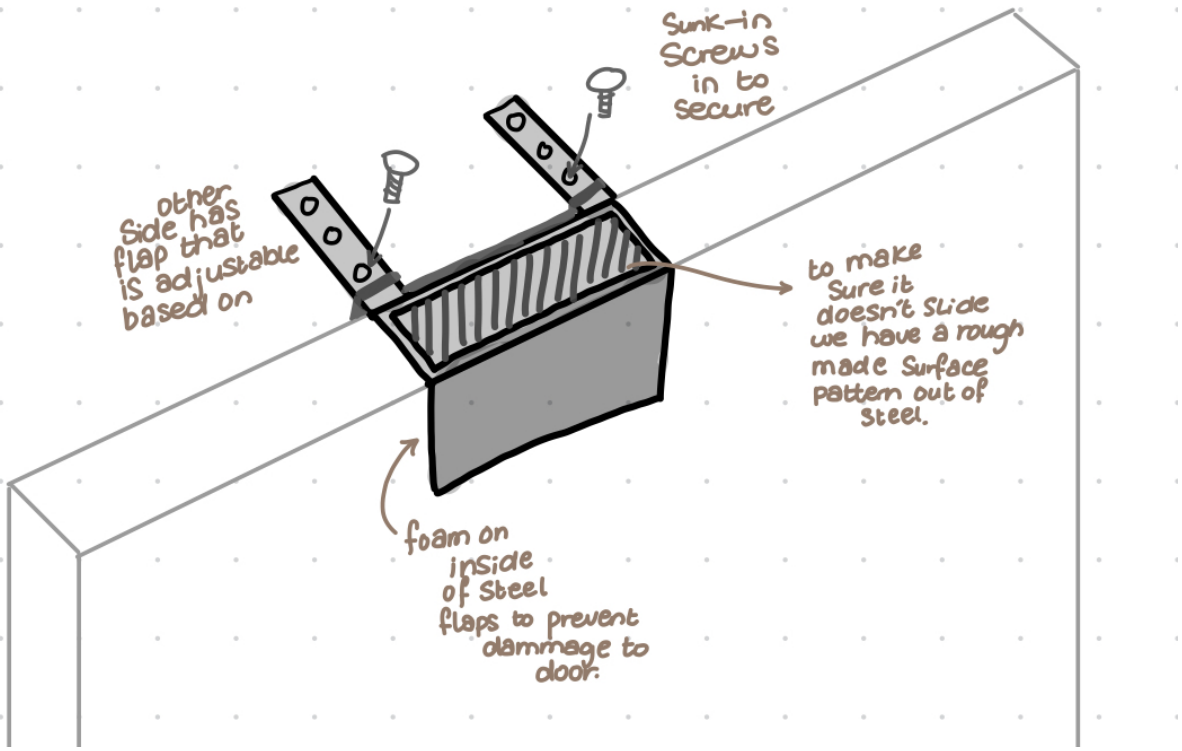


Spencer's ideas

Need	Sub-solution
reusability/durability	Aluminum construction. Will also make it light
Quick installation	Dual clamp mounting. Slides on, uses either notches or friction to be held in place
Withstands dust	Doubly grooved pads allow channels for the dust to move out of the way of the wood? Rubber? Think of shoe pad
Low cost	Certain sections can be re-made in house
Adjustable	Insertable plate stencil sets allow for differently sized doors to have a specific set of guides to work with. Will be removable and replaceable. One plate acts a pilot hole and jigsaw guide, the other acting as a router guide.
Precision	Microadjustment screws to fine tune the position of the guide

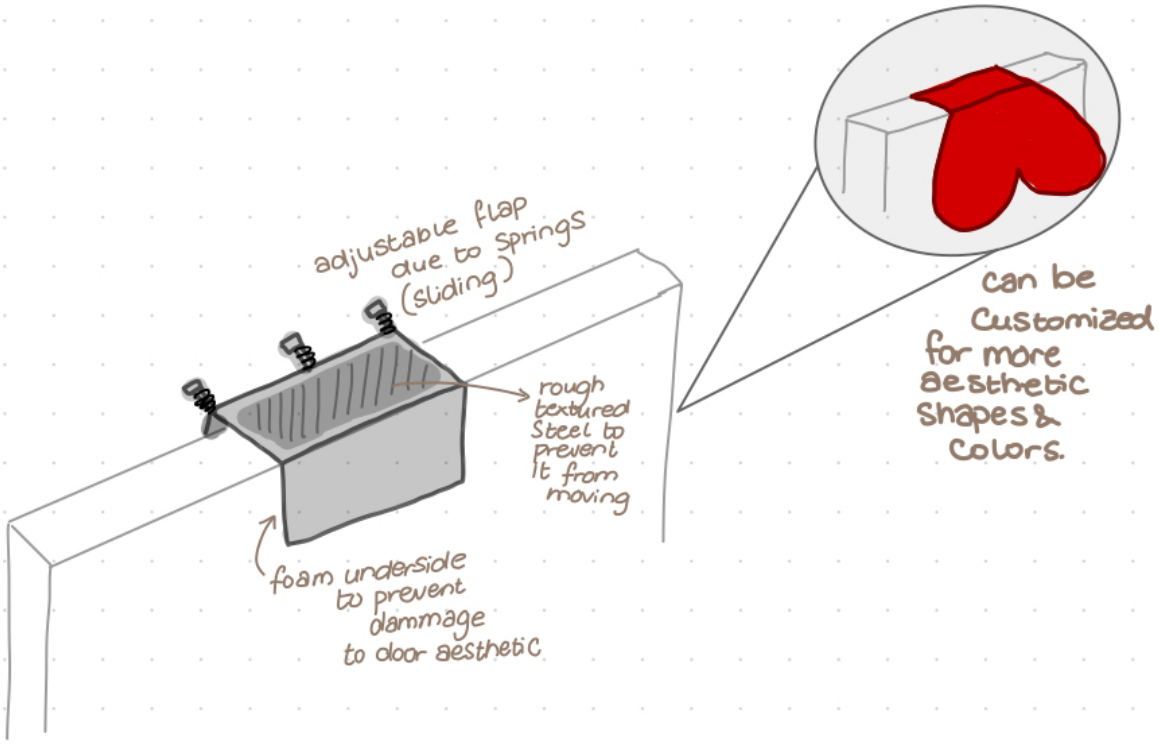
Sara's Ideas

Idea 1:



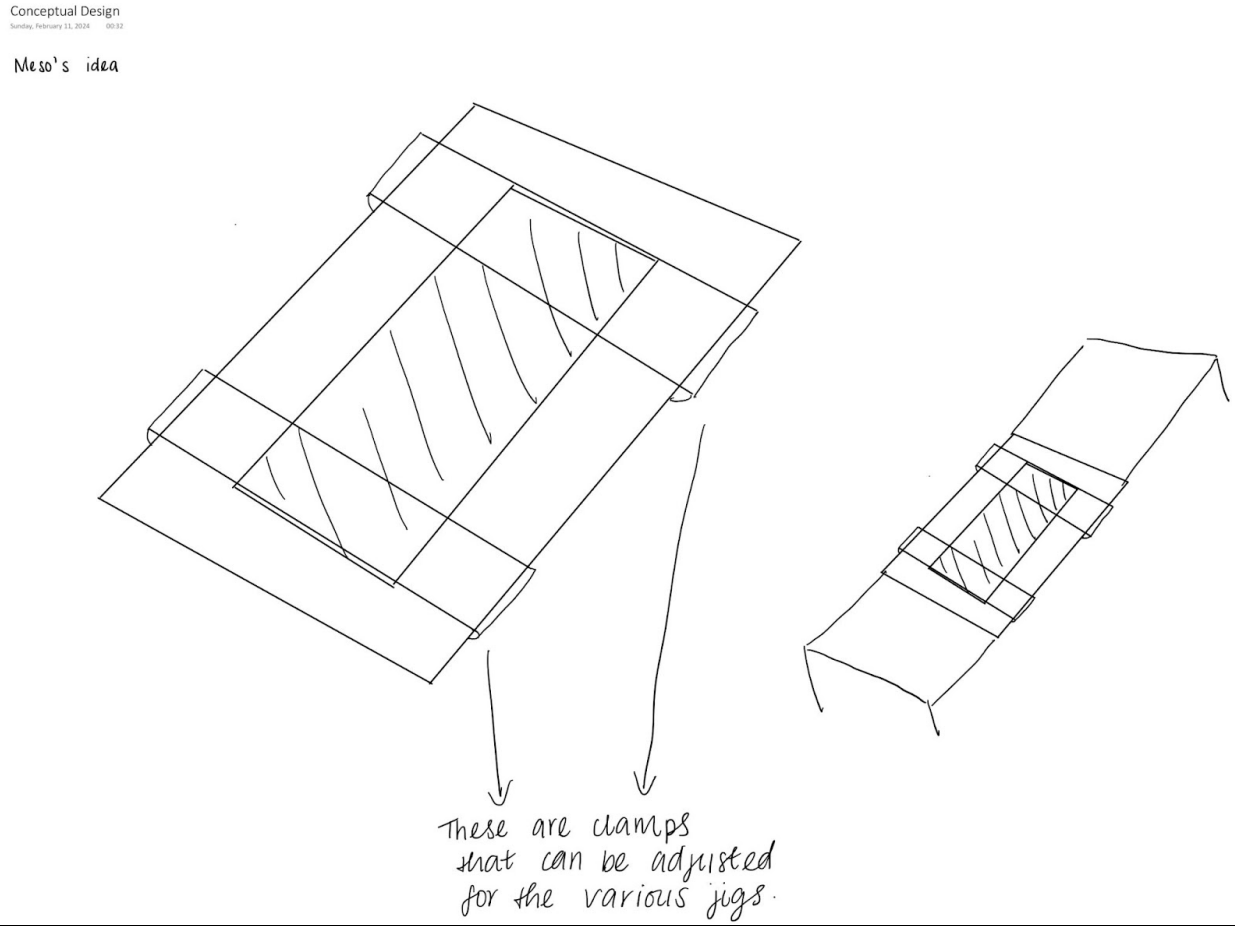
Need	
reusability/durability	Recycled Steel as we want it to be rigid and not too malleable. (i feel like aluminum would bend too easy) (it being eco friendly for being recyclable)
Quick installation	All you need is a screwdriver! Takes less than a minute to install as all you need is to screw in the screws to the desired width (holds the adjustable flap in place)
Withstands dust	Steel withstands dust very well and can be easily wiped off and cleaned in seconds.
Low cost	Certain parts can be easily replaced at home!
Adjustable	Screw holes with a moving flap to adjust to the most common door styles.
Precision	Various screw holes for adjustment make it precise.

Idea 2:



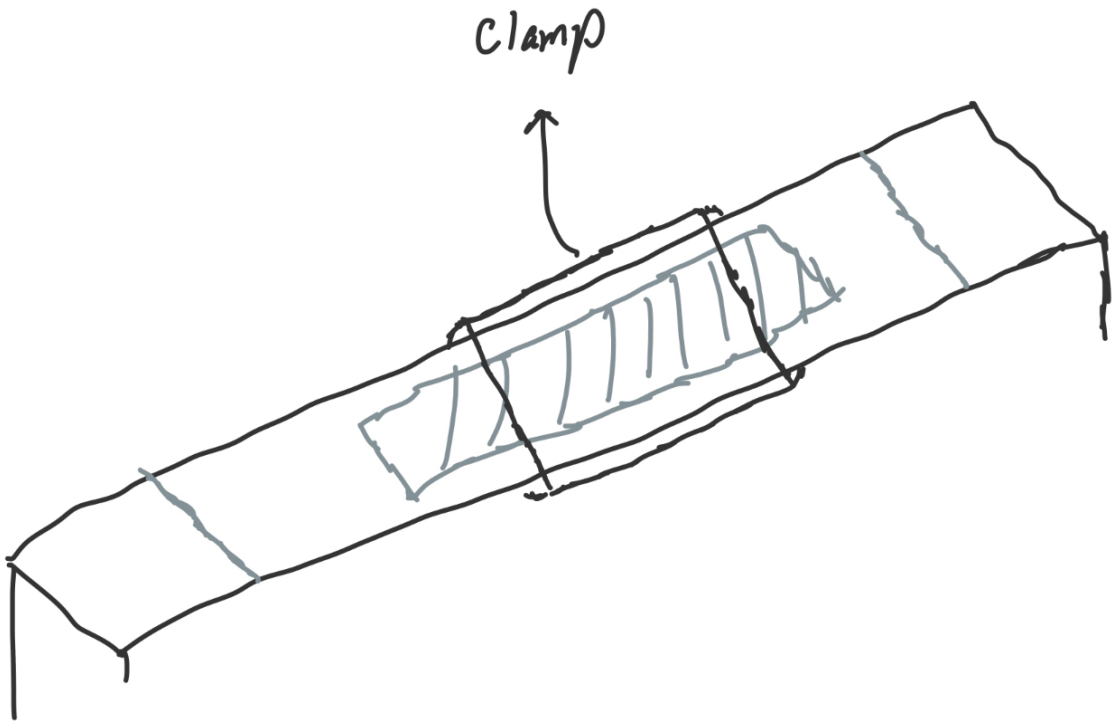
Need	
reusability/durability	Recycled Steel as we want it to be rigid and not too malleable. (i feel like aluminum would bend too easy) (it being eco friendly for being recyclable)
Quick installation	The springs make it super easy, all you need to do is stretch the springs and slide it on. No need for screws or a hassle.
Withstands dust	The steel is able to withstand dust, and can easily be wiped off and cleaned in seconds.
Low cost	Simple design, no need for fancy gadgets. Only steel flaps, paint, and some springs.
Adjustable	The springs let customers use the device on all door thicknesses. No pre-set thicknesses in the design.
Precision	Precision is immaculate due to springs - basically molds to door width!

Nmesoma's Idea



Need	Sub-solution
reusability/durability	Wood because it is flat and stable.
Quick installation	Place the jig on top of the table, get the movable clamps, and adjust it to the length. Once done, clamp under and tighten with the screw.
Withstands dust	It withstands dust but not too much so it should be cleaned once in a while.
Low cost	Wood is a low-cost material.
Adjustable	Clamps are movable.
Precision	The precision is good for the vertical lengths but might not be too effective for the horizontal as there are no clamps for the horizontal.

Adams design:

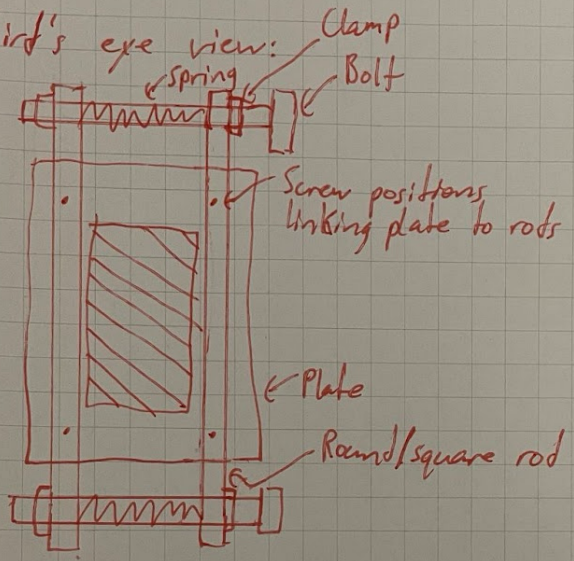


Need	
Reusable/Durable	wood(flat, solid)
Quick installation	Place the clamp on the jig to where it is needed and tighten with a screw.
Withstands dust	Very easy to clean with a simple wipe.
Low cost	A simple piece of wood, very cheap
adjustable	The clamp can be moved anywhere
precise	Covers a pretty big portion and with multiple screw holes, should fit pretty well.

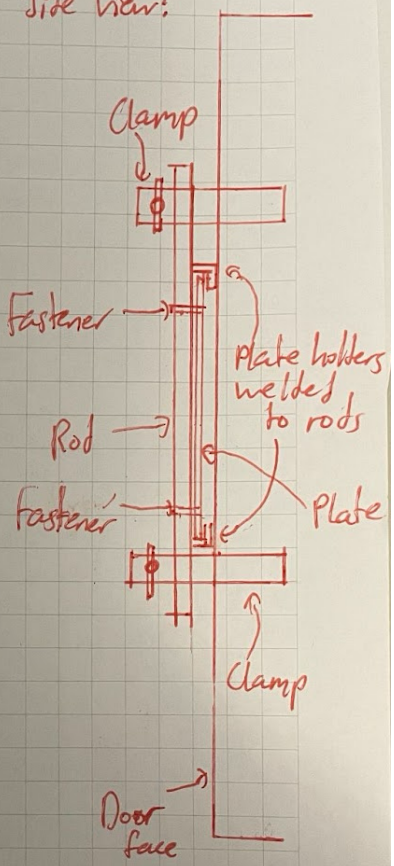
Carl’s idea :

Carl's idea:

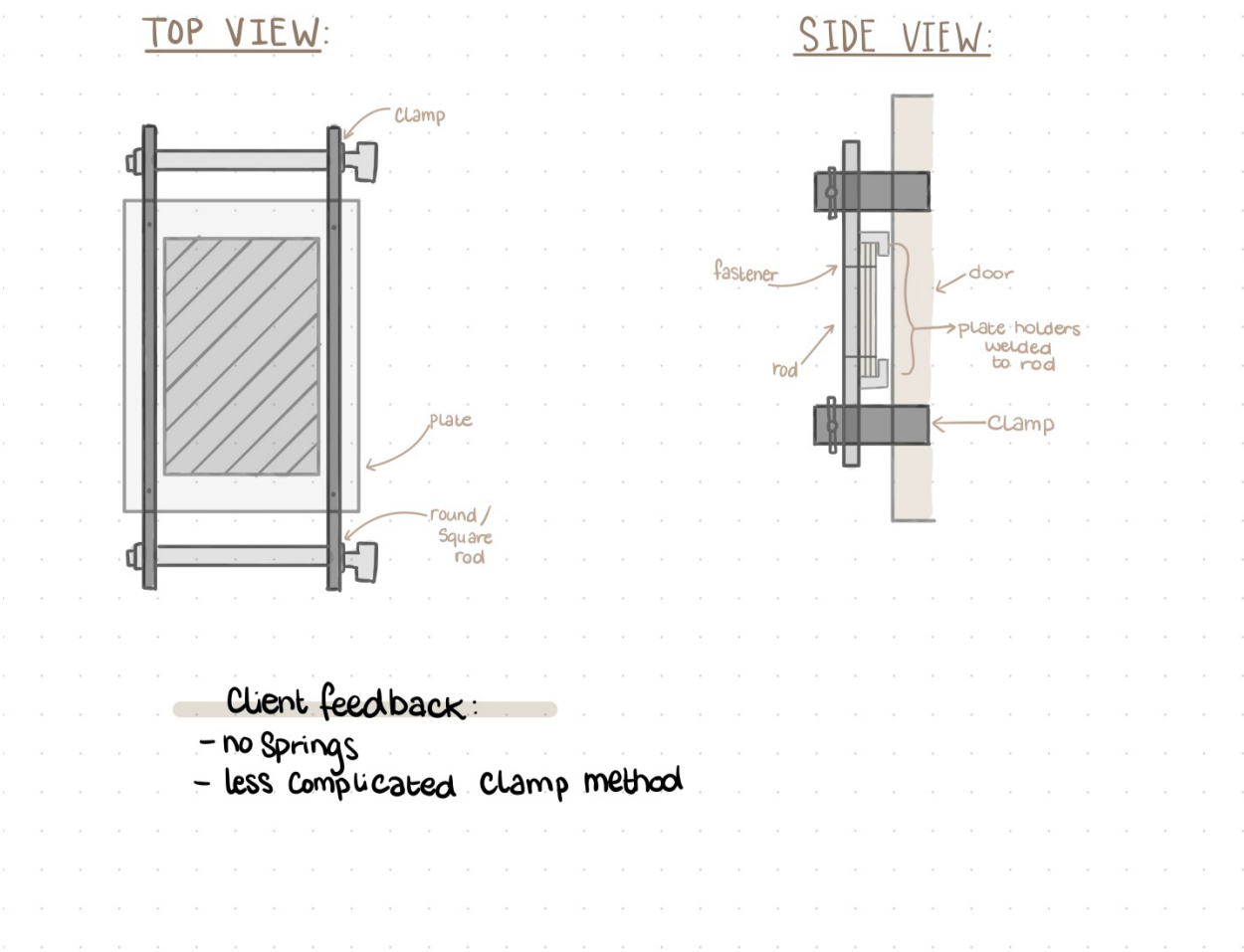
Bird's eye view:



Side view:



Deliverable E:



Adjustments to our original design:
Following our second client meeting, we got feedback on the design where the client had mentioned that springs being incorporated was a bit of an impracticality, as well as the double clamp and bolt fixture mechanism. After some tweaks, we came to this design which is very similar to our first prototype, except, without the spring and double clamp system- keeping the jig as simple as possible.

Raw materials need for the design:
Sheet metal (stencil plates) -
Threaded bolts & wing nuts
Rubber sheet for padding
Metal rails for mounting the plates
Pins for securing the plate (...?)

Products	Company	Price	Website
Sheet metal	Canadian Tire	$14.99	https://www.canadiantire.ca/en/pdp/sheet-metal-0475780p.0475783.html?
Threaded Bolts	Amazon	$9.99	https://www.amazon.ca/uxcell-M5x40mm-Socket-Partially-Threaded/dp/B01IVQTR1W/ref=sr_1_2_sspa?crid=11VT2QL0JRC1Y&dib=eyJ2IjoiMSJ9.fZUdcWQ7r-se7k1Dlu4q-TOrONfpQQGthzElzAaUzyjWZqzc38SuSloH0wl14X8UnPK1mYEQXEO6QvcLWpVlqE39tkt0-TPqzdM9cic8PO_kW_0XcE9ye1lgSzRqbupO2IcgzKMlZNyGjrruX4EnOwo7cQHEm1pxx9PDi1ToRx8ss8B4OKCmWo5ZuUs2WCfCUIxIkkNS1ftRbW_qdt5EZUBulhXq1xnSSqwnfln26cSQMc_oIxMrtSCzcdeBc.VehFzNinlhLVqHHO5m6ngcv0JUfkS6bAm7rcoXOOlTk&dib_tag=se&keywords=threaded+bolts&qid=2-spons&sp_csd=d2lkZ2V0TmFtZT1zcF9hdGY&psc=1
Wing nuts	Amazon	$23.99	https://www.amazon.ca/Hilitchi-100-Pcs-Butterfly-Assortment-Stainless/
Rubber sheet	VUAOHIY	$14.99	https://www.amazon.ca/Neoprene-Warehouse-Stripping-Flooring-Support
Metal rails	Made from sheet metal	Reference above	
Pin rods	Amazon	$17.99	https://www.amazon.ca/Linear-Motion-0-394x15-748-Hardened-Printer/

Prototyping schedule :

Test	Test Objective	Basic test Method	Description	Estimated Duration
1	Build quality (working parts)	Assembly of components	Ensure that the first prototype can fit together properly	3 hours
2	Clamp efficiency	Clamping onto various surfaces	Ensure the clamp system is reliable	1 hour
3	Plate insert accuracy	Operation of the rails	Securing the plates inside the rails of the jig ensures the measurements will be reliable and repeatable	30 mins
4	Full assembly functionality	Complete operation of each of the feature in tandem	Ensuring the clamping system and plate securing system both functions properly	1.5 hours

Deliverable F - prototype and client feedback

Group 12: Meso, Carl, Spencer, Sara, Adam, Mimmim

March 3, 2024

Abstract

This deliverable highlights the applications of our client's feedback on our design. We review what comments were made, and look at how we will use this information to improve our original design. This report also presents the first prototype that will be brought to the client meeting.

Table of Contents

1. Introduction

Going into the more physical aspects of the design process, with prototyping, we look back at our client feedback from our

2. Client feedback

Following the client meeting we had the opportunity to review the feedback from the client, specifically highlighting our key features in the jig design.

Looking at our key features: Our interchangeable stencil plate idea was approved, citing in-house reproducibility and ease of reuse as key positives for the system. The main concern, however, was the requirement to keep the stencil centered, so a main focus in the testing stage will be ensuring the clamping system keeps the plate centered on the door. Another main design choice was the clamping system, where it was proposed to use springs to provide the force required to keep the jig attached to the door. The client was very critical of this choice, citing the fallibility of springs in designs that undergo large amounts of stress, during regular wear over time, accidental physical damage to the springs, and in hyper extension such that the spring stretches far beyond its elastic maximum.

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1. Springs

During the meeting we had presented our idea of using springs to improve the precision of the clamping mechanism, however, the client had expressed their concerns on the practicality of using springs daily.

Although the springs would offer a unique characteristic to the jig, it was brought to our attention that springs are frustrating to work with for the workers - it might be hard to expand the spring if it's too strong, nevertheless if it's a weak spring, it will break easily and ruin the jig. A balance between the required amount of force to properly clamp onto the door the jig is mounted upon and the minimum force required to operate the jig would be very difficult to find. This difficulty would be exacerbated by factoring wear over time to the jig. As the jig would be continually used, the springs would weaken over time due to the elastic metal bending beyond its elastic maximum while compressed. Springs often bend over time, even without overwork due to the lattice structure shifting and changing even with the slightest of pressure applied, so over time the spring would become less and less effective.

2. The clamping system

Before the client meeting we had a system that consisted of a spring, a clamp, and a bolt. Post meeting, it was agreed upon that the spring would be unneeded, and potentially detract from the structural integrity of the final design. Instead, a threaded bolt clamp design will be implemented to make the main usage be twisting the clamp shut, after manually situating the jig in place.

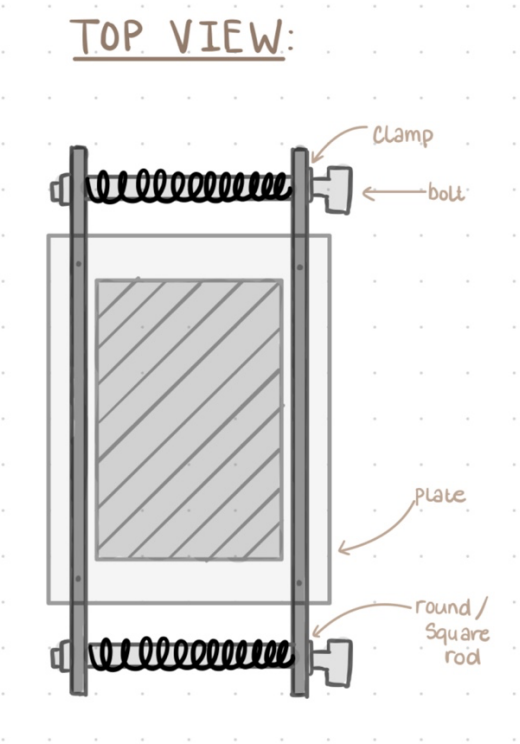
3. Interchangeable plates

One of our key features, as mentioned, is the interchangeable plate system. Plates will be cut out of sheet metal in-house, using a laser cutter. The stencil cut out will be centered on the plate ensuring that both the routering and the hole cutting is completely centered. Rubber padding can be added to the bottom of the plate if needed to further prevent any scuffing on the door siding.

3. Changes to the jig design

Following this meeting, we have taken the time to adjust our original ideas, and take the client's opinions and suggestions into account.

Figure 1: our old design



This is where we will highlight our new additions to the jig

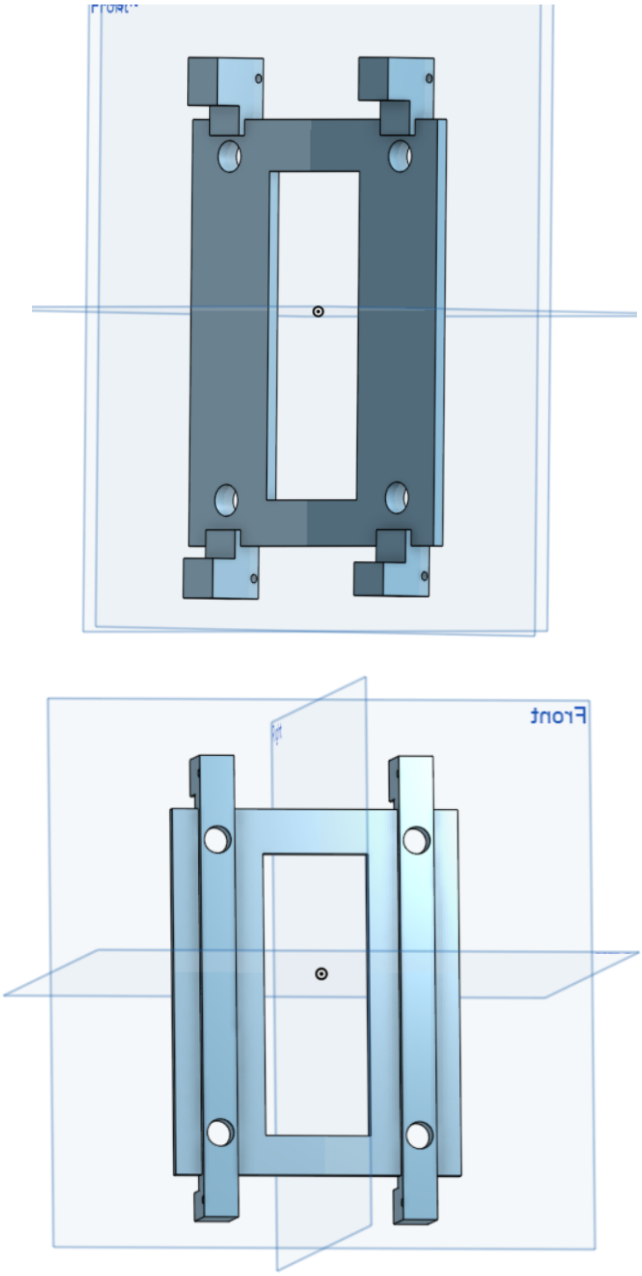
1. Simplifying our design with the removal of the spring

In section 2 we highlighted the impracticality of having springs incorporated in the design. Our solution for this was to take the advice provided by the clients "make it simple"

2. Simplifying our clamping system

Originally we had a 3 way clamp, bolt and spring system,The spring system has been removed from the design to make it more reliable.

Figure 2: prototype in CAD of our updated design



4. Test plan for prototype II

Test	Test Objective	Basic Test Method	Description	Estimated Duration
1	Clamping efficiency	Clamping onto various surfaces	Ensure the clamping system stays reliable and doesn't fail	3 hours
2	Finding materials	Evaluating properties of different materials	Ensure that all the materials used for next prototype work well together	2 hours
3	Evaluating bolts	Using the bolts needed on the system	Ensuring that the bolts function well with the system	1 hour

5. Conclusions and Recommendations

As we've taken all the feedback into careful consideration, we have found solutions for each element of constructive criticism.

As we head into the week of prototyping and soon into testing, we will continue to strive to make our jig as perfect as can be.

Trello board :
https://trello.com/invite/b/hmKESwby/ATTI4d54727cc4981dd71186ce9edd4b93b34ED435FD/gng1103-project-group-12

Deliverable G - Prototype II and Customer Feedback

Group 12: Carl, Sara, Spencer, Mimmim, Adam and Meso

March 10, 2024

Abstract

This deliverable highlights the applications of our client's feedback on our last prototype. We review what comments were made, and look at how we will use this information to improve our original design.

Table of Contents

1. Introduction

We will discuss the changes made to the last prototype as well as the feedback received from it. We will also include the test plan for the next prototype.

2. Last Prototype

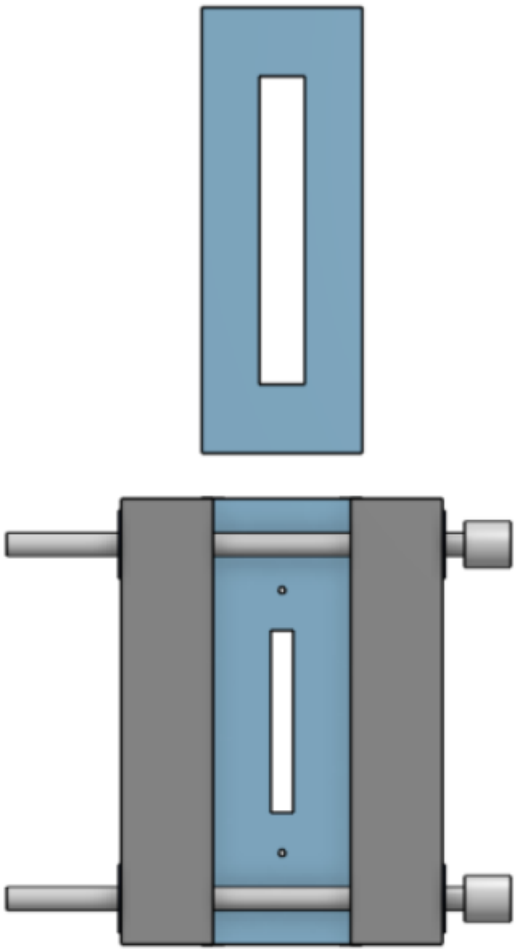
1. Testing the prototype

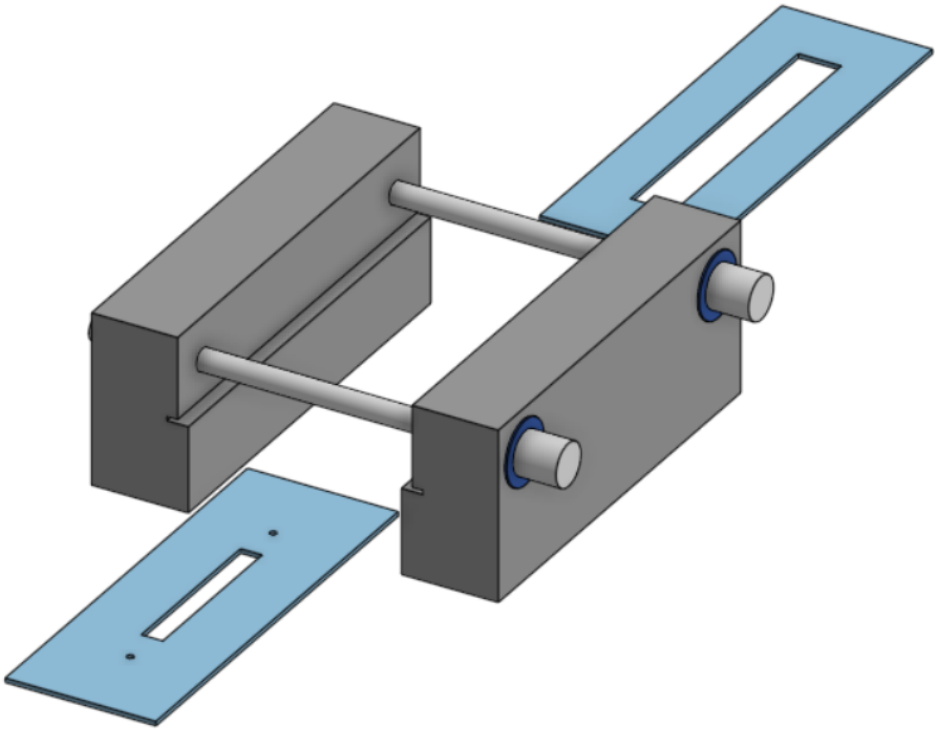
We did not make a physical prototype of our old design, but based on the CAD design, the system seemed well intact and connected. The clamps seemed to be efficient and we could easily replace the plates. Although the old design functioned well, it required a high cost of materials and complexity for its structure.

3. Changes made to the last prototype

Following the meeting, we modified our previous jig design based on suggestions from the client. There was a complete overhaul of the initial system and an entirely new system was proposed, which the group voted in favor of. Figure 1 below shows that new system.

Figure 1: Prototype I

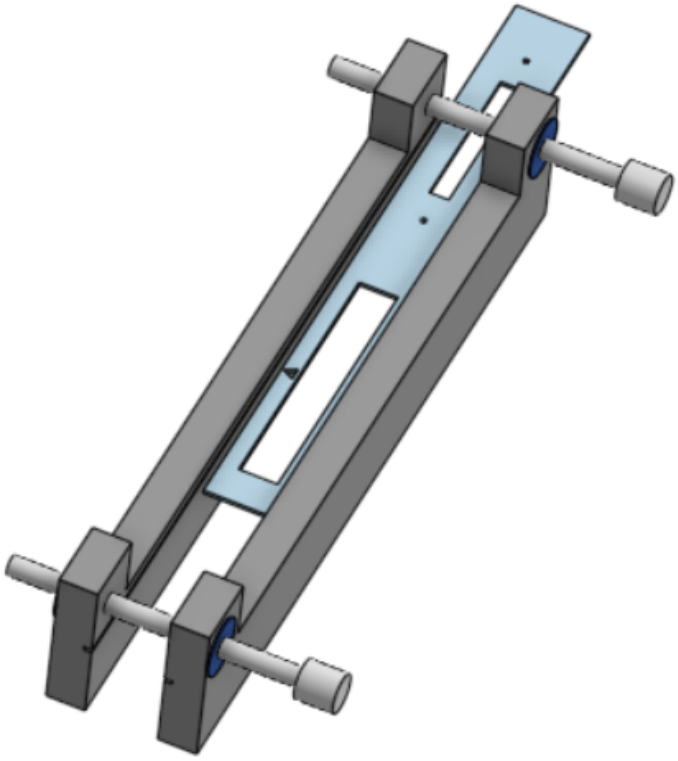




While the client liked the initial idea of the stencil plates, they had a few suggestions to boost ease of use and simplicity. Their first recommendation was to combine the two plates together. This has been implemented fairly easily, by creating a new plate with both stencils/guides on either side of said plate. The combined plates will allow the operator to grab the right-sized plate and immediately start working without having to also find the corresponding other plate. This will ensure components are also readily available for any job quickly, as the assembly of the clamp will be equally fast. The new prototype is also

longer, as to ensure the handheld router can rest on the jig yet still be able to reach each side of the router stencil. By elongating the jig, pressure is also dispersed further across the door wood, reducing the chance of marking up the door. The final plates and the jig will have a marking that allows operators to measure the tip of the door to the center of the hole guide/router stencil, engrave size reminder text on the face of the plate, and potentially a secondary locking mechanism to ensure no lateral movement of the plate. However during the trial period, the main rail-plate system is functional, the clamp can attach to various sizes and shapes of surfaces securely, and the functionality of the metal hardware is smooth and easy to operate.

Figure 2: Prototype II



4. Test plan for Prototype III

Test	Test Objective	Basic Test Method	Description	Estimated Duration

1	Locking mechanisms	Bolts/screws inserted in the plate	Ensuring that the plate absolutely stays in place while in the slider	1 hour
2	Determining type of metal sheet	Benchmarkin-g	Finding out what type of metal sheet would be the best to work with	1 hour
3	Ease of assembly	Hands-on assembly	Testing how quickly and easily the clamps and plates can be assembled	45 mins
4	Durability test	Stress testing	Give the prototype repeated stress to test the durability	1 hour

5. Conclusions and Recommendations

After considering all of the feedback and recommendations, we have made the necessary changes to the old jig.

The plan for this week is to begin developing and testing prototype III.

Trello link:
https://trello.com/invite/b/hmKESwby/ATTI4d54727cc4981dd71186ce9edd4b93b34ED435FD/gng1103-project-group-12

Deliverable H - PROTOTYPE 3 AND CUSTOMER FEEDBACK

GROUP 12: Sara, Spencer, Mimmim, Adam, Carl, and Meso

March 24, 2024.

Abstract

This deliverable focuses on the third prototype, discussing its design and any modifications made since the previous prototype

Table of Content

1. Introduction:

This deliverable discusses the design of the third prototype. We will go over the changes that were made in detail, as well as how they were made.

2. Analysis and results:

Finishing our third and final prototype, we look back on the first two to reflect on what needed to be changed and why. From the beginning, our plan was to have our jig made out of metal to be as durable as possible. This is something we stuck to, all the way from the beginning to now, with the last prototype.

As the jig will be subject to a lot of pressure, dust, and is required to stay durable, sheet metal was the perfect fit. Even after doing basic testing of our prototype, we were pleased to confirm that our choice of using sheet metal was indeed a good choice. We layered two pieces for reinforcement, and for our rail (for the interchangeable plates) to be completed, which showed to have very limited movement/ bend when tested. We then added wooden blocks secured by metal brackets that were welded to the sheet metal to provide the securing force to the jig and door. Salvaging the bolts and washers from the last prototype, we plan to fasten the two jig ends together to create the clamping effect that is required. Also, to improve the stencil plate's design from prototype II, a fully aluminum plate was cut to test the durability of the official plate.

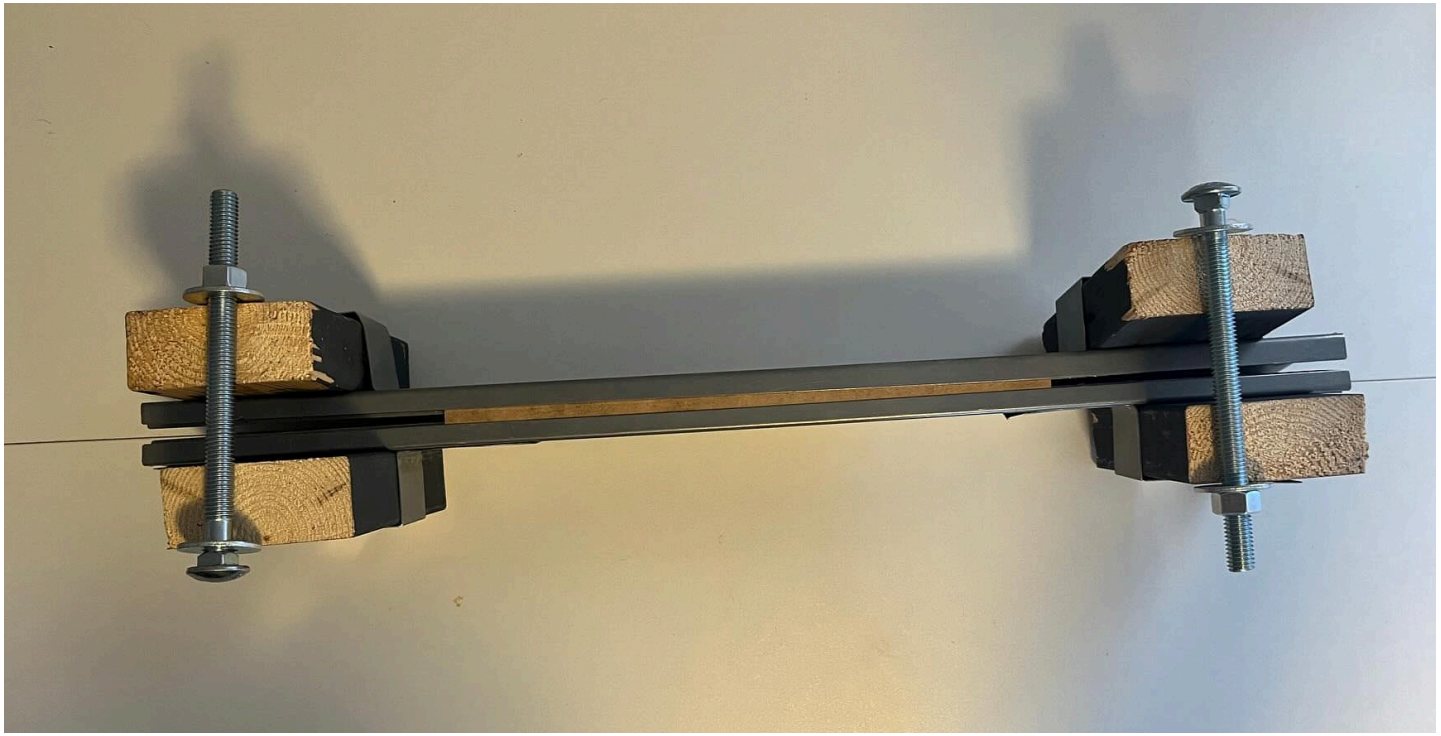
The main aspect of uniqueness we had throughout the entire project was the interchangeable plates for the different door thicknesses. This was the particular feature that acted as the star of the show, and we worked around the rest of the jig to perfect the mechanism for this plate.

The Jig's rails now provide an appropriate amount of friction to hold the plate in place, resisting more movement than is required. In fact, after testing the clamp's holding power, It has been determined that the jig rail will need to be loosened slightly to reintroduce a level of plate movement when the jig is not tight. Also, a degree of warping in the clamp has arisen due to the presence of excessive heat from the welding. This means that during the modification of the jig for the final presentation, the jig will need to be bent into shape, to ensure a proper fit of both the

jig onto the door and the plate into the rail. Not depicted within the photos are the cushions glued onto the jig to properly ensure a snug fit on the door while also protecting the door from wood to metal damage.

Feedback from the client during the first few client meetings included suggestions to simplify our design which originally consisted of a 3 way clamping mechanism. Such a clamping mechanism also included springs which would potentially cause complications when trying to install, therefore we took the feedback from the client and simplified our design to a single clamp. However, on a note of positive feedback, the client's main appreciation of our jig design was our innovation of the interchangeable plates for simplicity.

Below we have attached a few photos from the construction and assembly of our final prototype.



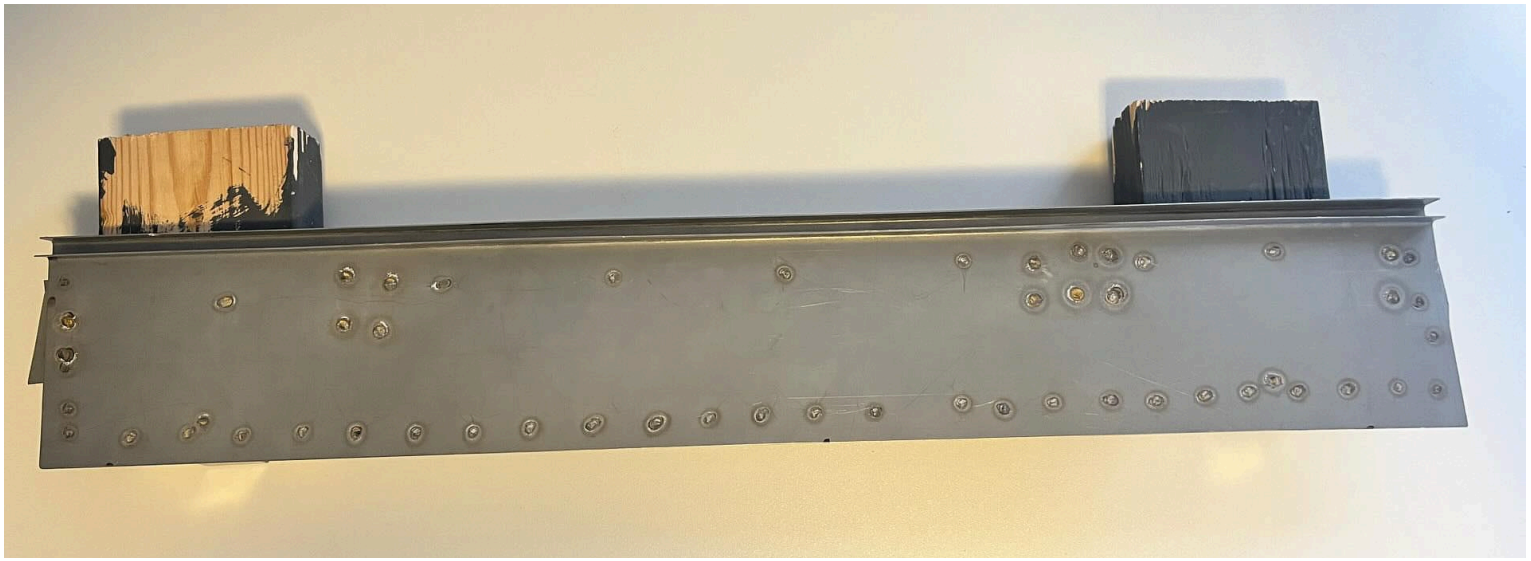


Figure 1: Final Prototype

3. Conclusion

As we have completed our testing and prototyping for the jig design, we can conclude that our choice of material and design will have it be the most durable in the conditions at Ambico. Although we did face a bit of an issue with attaching the blocks of wood as noticed above, they

aren’t completely centered, and this would need to be changed and made slightly more precise for the product that is actually going to be sold.
Overall, the execution of the rail for the plate was adequate and it came together very well as a whole.

Trello link:
https://trello.com/invite/b/hmKESwby/ATTI4d54727cc4981dd71186ce9edd4b93b34ED435FD/gng1103-project-group-12