**Project Deliverable G- Prototype II and Customer Feedback**

GNG1103 - Engineering Design

**Faculty of Engineering - University of Ottawa**

**Group 11:**

Matthew Chau

Oluwadamilola Olaifa

Sadeem Mahmood Zahid

Fiyin Eyenike

Ayaz Mohammad Saad Nayeck

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# Introduction

The objective of this deliverable is to advance the development of the jig by creating the second prototype. Drawing upon the valuable feedback from our third client meeting, as well as insights from the testing phase of our initial prototype, we aim to elevate the functionality and performance of the jig. This prototype will leverage the foundation established by the first prototype, thus aiming for greater fidelity and comprehensiveness.

# 2.0 Client Presentation Feedback

During our pitch presentation to AMBICO Ltd, we showcased our initial prototype and provided a concise overview of the essential components incorporated in our design. While presenting our list of materials for the prototype, the client informed us of the availability of imperial fasteners that are stocked in AMBICO. Additionally, our client acknowledged our grasp of the project’s objectives and commended our prototype as a promising starting point for the solution.

# 3.0 Prototype

## 3.1 Prototype Objectives:

* Create a physical prototype to scale through scrap MDF and spare rods/nuts
* Test the current prototype for feasibility
* Determine future test plan
* Find areas of improvement

## 3.2 Prototype Images:

|  |  |
| --- | --- |
| 1. |  |
| 2. |  |
| 3. |  |
| 4. |  |

## 3.3 Analysis of Critical Components:

|  |  |
| --- | --- |
| **Critical Components:** | **Purpose:** |
| “Knob” & Threaded Rod | The knob and threaded rod allow for both tightening and loosening of the clamps, as well as adjustment of the platform. These clamps facilitate changes in the platform's position on the door side surface, providing flexibility in adjusting the back-set. |
| Platform | The platform serves as a guide for the router during the process of installation for the flush bolt. It has a cutout measuring 6.75'' x 1'' to meet the client specified dimensions of bolt. |
| Thread Holders | The thread holders attached to the side of the platform act as essentially a holder. The hammered in hex nut allows for the threaded rod to move freely. |
| Inscribed Measurements | Measurements are needed to exactly measure the back-set required or needed for a door. In this prototype, the measurements were lasered in (can be seen in picture 3). They are very faint unfortunately. |

# 4.0 Prototype II Test Results

|  |  |  |  |
| --- | --- | --- | --- |
| **Test ID** | **Test Objective** | **Images** | **Results** |
| 1 | Determine stability of clamping system. |  | Prototype II jig is able to be securely fastened to a wooden door. There is no slippage or signs of breaking.  The jig is not flush to the door, and there is a noticeable tilt.  Result likely due to lack of foot pads to keep screw ends flat to door surface. |
| 2 | Check ease of adjustment of clamps. |  | After jig is secured to doorframe, adjustments can be made by tightening and loosening the screws.  Adjusting the screws is a simple and easy process.  Difficult to have accurate adjustments as screws are not flush to the surface and measurements are faint and difficult to read. |

# 5.0 Prototyping Test Plan – Prototype III.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Test ID** | **Test Objective (Why)** | **Description of prototype used and of basic Test Method (What)** | **Description of Results to be recorded and how these results will be used (How)** | **Estimated duration of test** |
| 1 | Determining if the clamp attaches properly to the door | Observe the jig as it is clamped to different doors | Results will be recorded as either “success” if jig attaches properly when used or “failure” is it doesn't. | Approximately 10-30 minutes  Date: March 11-15  To be done by: Fiyin |
| 2 | Determining if the clamp is stable and doesn't break | The prototype will be clamped on different doors around the campus. | Results will be recorded as either “success” if clamp doesn't break when used or “failure” is it breaks. | Approximately 10-30 minutes  Date: March 11-15  To be done by: Dami |
| 3 | Determining the accuracy of the measurement of the jig | Place the jig on a door and use the measurements as you would do if you were measuring a real door in the factory. | Results will be recorded as either “success” if jig can be used accurately for the measurements required or “failure” is it doesn't. | Approximately 10-30 minutes  Date: March 11-15  To be done by: Matthew |
| 4 | Determining if the cutout is straight and centered properly when clamping. | Observe the jig clamped on a door to see if cutout is straight and centered. | Results will be recorded as either “success” if cutout is straight and cantered when used or “failure” if it is not . | Approximately 10-30 minutes  Date: March 11-15  To be done by: Sadeem |

# 6.0 Bill of Materials

## 6.1 Prototype I Bill of Materials

|  |  |
| --- | --- |
| **Component/Expense** | **Cost** |
| Onshape Subscription | $0.00 |
| **Total:** | **$0.00** |

## 6.2 Prototype II Updated Bill of Materials

|  |  |
| --- | --- |
| **Component/Expense** | **Cost** |
| MDF Jig Platform & Protrusions | $0.00 |
| Brunsfield Screws x2 | $0.00 |
| Brunsfield Hex Nuts x2 | $0.00 |
| Brunsfield Rubber Nut x2 | $0.00 |
| Makerspace Laser Cutter Usage | $0.00 |
| Onshape Subscription | $0.00 |
| Inkscape Software | $0.00 |
| **Total:** | **$0.00** |

## 6.3 Prototype III Bill of Materials

|  |  |  |
| --- | --- | --- |
| **Component/Expense** | **Cost** | **Link** |
| Makerspace 3D Printing | $0.00 |  |
| Paulin 1/4-inch-20 Steel Hex Machine Screw Nut - Zinc Plated | $0.35/each x 4 | <https://www.homedepot.ca/product/paulin-m8-1-25-class-8-metric-hex-nut-din-934-zinc-plated/10001285213> |
| Paulin 1/4-20 x 10 mm Knife Inserts Zinc Plated | $1.34/each x 2 | <https://www.homedepot.ca/product/paulin-1-4-20-x-10-mm-knife-inserts-zinc-plated/1000129443> |
| 1/4-20 Thread Knobs | $3.20/each x 2 | <https://www.leevalley.com/en-ca/shop/hardware/jig-and-fixture-parts/61652-1-4-20-thread-knobs?item=00M5621&utm_source=free_google_shopping&utm_medium=organic&utm_campaign=shopping_feed&srsltid=AfmBOooFy2otWdcp-ylc3zZ2w3gfd3JL88mN9AvHzdJNeTsrYJzfZIgaKGU> |
| **Total:** | **$10.48** |  |

## 6.4 Client Bill of Materials

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| --- | --- |
| **Component/Expense** | **Cost** |
| 3D Printing  OR  In House Sheet Metal Machine | $2.00/hour ~ $20 (worst case)  OR  $0.00 (+ cost ¼ in sheet metal steel/aluminum) |
| Paulin 1/4-inch-20 Steel Hex Machine Screw Nut - Zinc Plated | $0.35/each x 4 |
| Paulin 1/4-20 x 10 mm Knife Inserts Zinc Plated | $1.34/each x 2 |
| 1/4-20 Thread Knobs | $3.20/each x 2 |
| **Total:** | **At most $30.48** |

# 7.0 Project plan

## 7.1 Task list

|  |  |  |
| --- | --- | --- |
| Status | Task | Person |
| DONE | Drawing the platform on Onshape | Sadeem, Matthew, and Ayaz |
| DONE | Drawing the clamp extensions on Onshape | Sadeem, Matthew, and Ayaz |
| DONE | Designing the laser cut drawing in Inkscape | Sadeem |
| DONE | Laser cutting the platform | Sadeem |
| DONE | Laser cutting the clamp extensions | Sadeem |
| DONE | Assembly of the prototype | Sadeem |
| DOC | | |
| DONE | Introduction | Oluwadamilola |
| DONE | Presentation Feedback | Oluwadamilola |
| DONE | Prototype | Sadeem |
| DONE | Prototype test plan | Fiyin |
| DONE | Bill of Materials | Matthew |
| DONE | Project Plan | Ayaz |
| DONE | Conclusion | Oluwadamilola |

# 8.0 Conclusion

Our presentation to AMBICO Ltd. served as a pivotal moment in refining our project trajectory. The client’s valuable insights and suggestions underscore their commitment to the seamless implementation and practicality of our design. This deliverable marks a significant milestone in our solution, showcases images of the initial prototype, offers an analysis, and outlines a detailed plan for testing.