Project Plan and Cost Estimate

The Doors

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Abstract

This document outlines the finalized product design and plan for the wooden door hinge jig. It contains a list of necessary materials and estimated cost for the product, a plan for the development of prototypes, as well as possible risks associated with the jig and contingencies to aid in mitigating these risks. The purpose of this document is to present the finalized jig design and a detailed plan of the steps to complete the construction of the design.

List of equipment

To create a jig for doors, we require both hardware and software to create the prototypes.

Hardware:

Materials for manufacturing:
Plastic materials for 3D printing.
Steel is used for the main structural part due to its strength and durability.
Bolts to connect and fix structural components.
Plastic or rubber to act as pads for the door and jig, preventing damage to the connected parts.

Tools:
3D printer for creating a 3D model.
Hot glue gun for assembling and fixing parts.
Calculating tools for length calculations and precise measurements.
Wrench for fastening bolts and assembling parts.
Electric drill for drilling holes.
Small electric grinding tools for adjusting and refining material sizes.
Protective Glasses, coat, and gloves to ensure worker safety.

Software:

Onshape for creating a digital model and analyzing statistics.
Drawing software for designing and illustrating the concept.

Project Risks

To ensure success throughout the execution of the design plan, several project risks have been identified, alongside contingency plans to mitigate these risks.

General system design

The design of this product involves clamps that will be resting against the vinyl coating of the door, as well as several metal tubes to help ensure drilling that is perpendicular to the door. Potential issues may arise through improper use of the product, which could result in damage to the product itself, the clients' door, or the users' equipment that they're using to drill the holes for the door. Improper use of the clamps (tightening them too much, placing them incorrectly) may result in damage to the door's vinyl coating or could result in the clamps breaking, which would impact the user's ability to properly use the jig. The metal tubes on the interchangeable plates may present a risk to users, but only if used improperly. The purpose of these tubes is to ensure the user drills the guiding holes perpendicular to the surface on which the hinge will rest. If the user were to attempt to drill at the wrong angle, it could result in the screw hitting the metal tubing or plate, which could damage the jig, damage the screw, or even the door. These risks can easily be mitigated through careful use of the jig, and proper handling of the tools used to drill the holes.

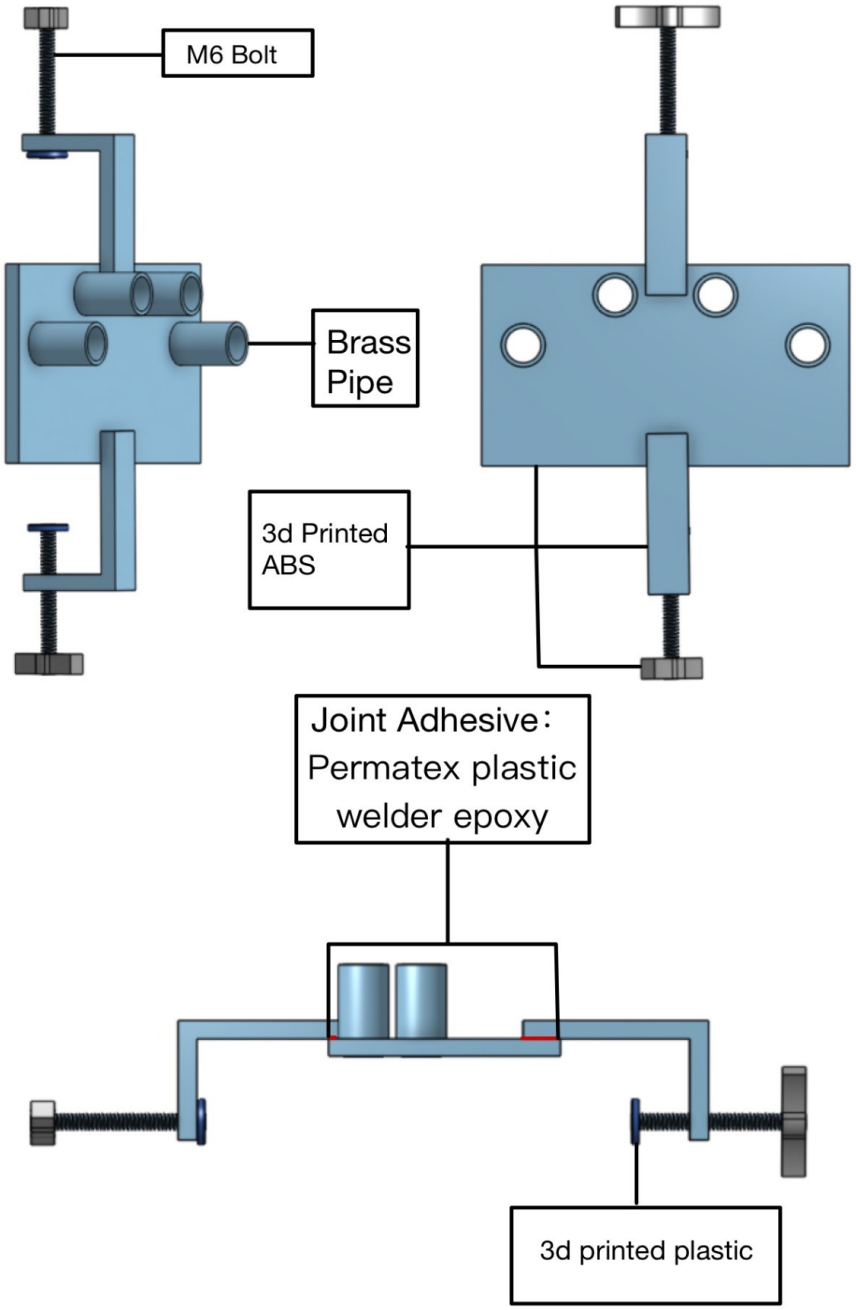
"Wear and tear"

As to be expected with any product, general user wear and tear can also be expected with the jig. Due to the nature of the work environment, this wear and tear may occur sooner than it would with many other products, especially since the jig will be used many times over the span of a day, and it is composed of several adjustable parts. These adjustable parts will likely be the first to experience wear after prolonged use. This includes the screw to adjust the clamp on both the top and bottom of the jig, the part of the clamp that rests against the vinyl coating of the door, and the grooves that allow the interchangeable plates to be inserted/removed.

Contingencies

Due to the structure of the product being incredibly reliant on the clamps and interchangeable plates, any damage to those components may result in the jig becoming unusable. To prevent this from happening, the jig will be designed in such a way that it accounts for possible damage, namely ensuring a strong material to prevent wear and tear. Choosing a durable material such as steel for the plates and frame of the jig will mitigate the risk of wear and tear, reducing the risk of damage. To mitigate any damage to the clamps, it is important that the user knows how to properly secure the clamps to the door, and it is also imperative that the clamps do not move during use. A user manual can be created to ensure proper use of the jig, and to ensure the clamps do not move, the base that rests against the door will be made of a material that promotes static friction, keeping it in place, while keeping the vinyl damage-free. A plastic, or rubber material would work best for those purposes.

Final Design



A Second Prototype will be made identically with the only difference being the width of the Plate and Hole positions

Bill of Materials

Item Name	Item Description	Unit	Quantity	Unit Cost	Extended Cost	Item Link
Zinc Plated Coarse Hex Bolts	M6 x 60 mm	CAD	1 pack	$2.29	$2.29	ıtire.ca/en/pdp/hill ic-bolt-outdoor-str izes-1619309p.161 ead+bolt&colorCo ER_CD_M6
ABS	42.2g of Filament	CAD	2	$0.13/ g	$11	.ca/shop/ols/prod
K&A Round Brass Tube	¼” x 1’ Brass Tube	CAD	1	$13.85	$13.85	w.amazo CISION- 8131-Ro /dp/B002
Permatex Plastic Welder (epoxy)	Epoxy	CAD	1	10.99	10.99	iantire.ca/en/pdp lastic-welder-epo)p.0383850.html QjwtJKqBhCaA Xv8MF8BoQpQ bmF6CErbag6iy JaAvDGEALw_ s#store=174
Total (Without shipping or tax)					$43	
Total (With shipping and tax)					$49	

Prototyping test plan

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 Test duration and planned start date (When)
1	To test if the structure (clamp connecting to plate) can stabilize itself on the door	Stability test (Require prototype 2)	Place the prototype on the side of a desk, and simulate a door placed horizontally/ hang some weight on the prototype and it needs to remain stable on the table	30 min/ 17-Nov
2	To test if the structure (whole structure) is fragile or not	Structure consolidation test (Require prototype 2)	Drop the prototype on the floor/ increase the height after each drop/ check if there is a broken part after each drop/ Stop after reaching 2m	15min/ 17-Nov
3	To test if the structure (tube connecting to the plate) can withstand the shock and vibration from the driller	Shock test (Require prototype 2)	Put the driller inside the tube/ turn on the driller/ hold the driller for 3 min on each tube	20 min/ 17-Nov