

Deliverable B

GNG1103 B00

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The client, Ambico Limited, currently spends approximately 30 minutes manually preparing their doors for hinge installation. This includes routing to create cavities in the wood, marking, and drilling the holes. To implement a support tool (jig) in the hole pattern drilling process for steel-core doors, a summary of the interpreted needs of the client is used to formulate a statement summarizing the problem. Additionally, the primary needs are evaluated against similar products.

Maintaining the integrity of the client’s product represents a crucial part of the solution. All client-imposed design constraints are to be considered of maximum importance, these include, that the system decreases human error, the system supports the client’s requirements for presets and that the jig stays in place during drilling. Technical requirements, including minimizing the additional training for employees, and maximizing durability, and efficiency represent the upper end of importance. General requirements such as the size of the jig are to be considered but are not crucial to the design. Solutions outside the scope of the problem statement are accorded low importance, they are to be considered to avoid straying from the client’s requests but do not represent an integral component of the solution.

Table 1: User Statement and Interpreted Need

Question	#	User statement	Interpreted need	Importance
Typical Uses	1	It will be used very often, daily	The jig is durable	4
	2	One hinge is prepared at a time	The jig is compact	3
	3	The process takes 30 minutes or less	The jig does not hinder efficiency	4
	4	Standard for accuracy	The system decreases human error	5
	5	Minimal labourer training	The jig is easy to use	4
Likes	6	Similar product has handle attached	The jig can be easily held/supported	4
Dislikes	7	Currently self-tap screws are not precise, break easily, and are harder to keep straight	Not flexible on screws and hinge types	1
	8	Wood can be damaged when clamping	The system is careful when applying pressure	5
	9	Current process done unsupported by hand	The jig must act as a guide and support, as well as standing on its own.	5
	10	Angled drilling causes significant problems	Not flexible on manufacturing process	2
Requests	11	Signals user when to stop drilling -> decreases human error		5
	12	The system includes interchangeable presets for measurements		4
	13	The jig stays in place during marking and drilling -> decreases human error		5
	14	The jig remains perpendicular to the floor -> decreases human error		5
	15	Adjustable for tapping		2

Ambico LTD requires a durable, efficient, and portable door hinge jig that will reduce time spent on drilling and marking holes, improve drilling accuracy, and prepare their doors for consumer pairing with variable hinge specifications.

To better define the validity of the proposed solution, previously unaddressed information is required from the client. This includes the impact of the environmental conditions, notably dust, on material

durability and effectiveness of laser technology as well as tolerance for preset interchangeability and adjustment.

Benchmarking

There is nothing currently on the industrial market that could be used as an exact benchmark; however, the Kregg Cabinet Door Hinge jig² is an example of something similar in the industry that already works. This jig was designed for the everyday at-home handyman; meaning ease of use was a priority. However, it is used for cabinet hinges while the Lee Varley Carrey Template would be another example more suitable for a standard door. Taking inspiration from these tools and creating something Ambico can confidently use daily in their shops would be our priority.

Should another similar product come to market, we'd be comparing them based on the following traits: price, ease of use, portability, accuracy, quality, type of materials, and consistency. This device needs to be precise- allowing the user to drill holes in the correct position and correct angle. Alongside being precise, the device must be simple and efficient for the user. The current process requires 30 minutes of tedious work from the technician. Creating an easy-to-use device that will automatically align and stabilize drill bits will reduce the time spent on each door and improve overall shop efficiency. Finally, we must consider the environment in which the device will be used. The workshops at Ambico are dusty, busy places. For this product to be useful, it must be able to withstand any dirt and debris, or potential falls. Excellence is a key value at Ambico, this tool must be no exception.

Table 2: User Benchmarking

Criteria	Kregg Concealed Hinge	Lee Valley Carrey Template ¹
Price point	\$32.99 + tax	\$97.50 + tax
Drill bit- guide	Yes + Stop collar to control hole depth	No
Interchangeable preset	Yes	Yes
Material	Glass filled nylon	Aluminum + Glass filled polycarbonate
Durability	Durable – singular part	Not durable – flimsy aluminum, too many moving parts
Portability	Yes + 1 hinge at a time, pocket size	No + 3 hinges at a time, must clip on to door jamb
Will it damage the veneer?	No	No

The design team concludes that the solution to our customers' request will be unique. It is not a product that is currently available on the market and will require our innovation to meet Ambico's needs. Some of the highest-ranked of which include the product's durability, accuracy, and customization. Products on the market have provided solutions for certain issues; however, not all needs are met, especially considering that one of the jigs is for kitchen cabinets and not standard doors. Further reflection will be necessary to ensure our design criteria fit the requirements described by the customer

Works Cited

- [1] Lee Valley, “The original Carey template hinge mortising system,” www.leevalley.com, <https://www.leevalley.com/en-ca/shop/tools/power-tool-accessories/router-accessories/40219-the-original-carey-template-hinge-mortising-system?item=15J7501> (accessed Oct. 1, 2023).
- [2] Kreg, “Concealed hinge jig,” Cabinet Door Hinge Jig - Kreg Concealed Hinge Jig | KregTool.com Official Store, <https://www.kregtool.com/shop/cabinet-solutions/cabinet-drawer-shelf-jigs/concealed-hinge-jig/KHI-HINGE.html> (accessed Oct. 1, 2023).