

To: David Trevas

From: Alfred Serventi

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Subject: Self-Learning Assignment

The purpose of this memo is to show what was accomplished for the self-learning assignment. This assignment challenged the student to learn a previously unknown skill through 3-10 hours of research and comprehension of this new skill. Next the skill had to be applied in some way to show some proficiency in the material that was researched. All information regarding the assignment can be found below.

The skill chosen for this self-learning assignment was woodworking. I have always had an interest in learning the basics of woodworking and potentially building my own projects. With the Vertical Farming project, our team is set on building the base stand for our design out of wood. By learning this skill, I can bring another strength to the team. The intention is to save our team hours of labor when it comes down to building the physical product we have in mind. After calculating the expected weight of the project, a base support must be constructed to withstand around 1500lbs of weight. Learning the basics can help fulfill this design requirement all while allowing me to learn some new and interesting.

During my research, I was able to identify important information regarding any wood-based project. For example, an after-thought that could be catastrophic is identifying the proper type of wood required for a specified project. For most outdoor projects, cedar is the go-to for wood type, as well as redwood [1]. One style of wood can be more expensive than another and this fact will be noted when deciding which wood to use for the Vertical Farming design. Another skill I chose to focus on was construction of wood pieces. This varied from nailing pieces together to using wood glue. Furthering this aspect of woodworking I decided to learn out of nailing and wood glue, which can withstand more loads. I found an article showing an experiment answering my question. An individual set up an experiment testing the load two nailed boards could handle in comparison to the same type of boards glued to each other. The results of the experiment showed that the glued boards were able to withstand 33% more load bearing than the nailed boards [4]. Keeping this in mind I researched alternative ways of attaching corners of a wood project. This quickly led to me finding the dovetail technique. This creates two puzzle piece type designs at a meeting corner [2]. By joining a corner in this manner, the pieces will remain together even without nails or glue [5]. Dovetailing takes great patience and proper tools to make the cutouts. Despite the difficulty, I sought out to recreate a simple dovetail corner piece using wood.

Using online tutorial videos, I made my own attempt at creating a dovetail corner. Heading into this task I realized I did not own the correct tools necessary for this type of cutout but used what I could without having to buy a new set of tools. Using a simple dovetail pattern, I made a trapezoidal cut from the two pieces that would be connected. One male end and one female end cutout was made. It was difficult to create an equal cutout and required lots of adjustment cuts and sanding. Figures (1) and (2) show the final effort. Although it is far from perfect, I was able to implement my research into a physical attempt.



Figure 1: Half-Blind Dovetail Cuts

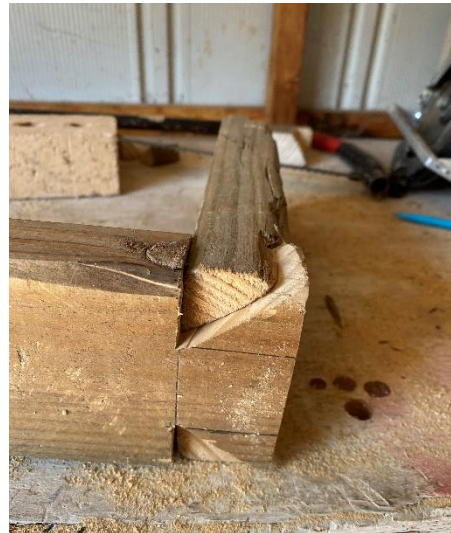


Figure 2: Dovetail Joint Assembled

Moving forward, if our team decides to use this woodworking technique, the project will benefit greatly in terms of quality if the proper toolbox is used to create a dovetail joint. I encountered many issues regarding cutting, measuring angles, and trimming that greatly slowed this skill training. I hope to gather proper materials for future woodworking projects so that I may produce a quality part.

References

- [1] “3 Main Types of Wood,” *builderology.com*, 14-Dec-2019. [Online]. Available: <<https://builderology.com/types-of-wood/>>.
- [2] FineWoodworking, 2019. *Make A Box Part 1*. [video] Available at: <<https://www.finewoodworking.com/2019/07/08/season-1-ep-5-make-a-box-part-one>>.
- [3] Krueger, R., 2019. *Easy Dovetails For Beginners*. [image] Available at: <https://www.youtube.com/watch?v=usDISsUA_fk>.
- [4] Murray, M., 2019. *Glue Vs. Screws: Which One Is Stronger? - The Geek Pub*. [online] The Geek Pub. Available at: <<https://www.thegeekpub.com/4314/glue-vs-screws-which-one-is-stronger/>>.
- [5] Toolstoday.com. 2020. *Dovetail Joints: Different Types And Their Uses By Toolstoday*. [online] Available at: <<https://www.toolstoday.com/g-46-dovetail-joints-different-types-and-their-uses>>.