 

Western University Faculty of Engineering

ES 1050 - Foundations of Engineering Practice

Studio Section 13 – Safwat Ramadan

T13Hide

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Iteration Report Winter Project

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# Pre-Iteration Design

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Figure 1: Pre-Iteration Design, Rectangular in Shape

Our pre-iteration design, as seen in *Figure 1*, was rectangular in shape with a sloped roof. This design was primarily inspired by a desire to keep the construction and design simple in the initial stages so we could put out a prototype in time for the clients to provide feedback during the first client meeting. This prototype features many of the design elements necessary for the final design such as a wheelchair accessible entrance through the ramp (following max 1:12 slope guidelines from Ontario Building Code, 3.8.3.4) and door wide enough to fit most wheelchairs. Windows were placed at wheelchair friendly heights following the average viewing height from a wheelchair. There were two primary concerns with this design. The first was the poor aesthetic qualities of the design. Being such a simple shape there was nothing particularly interesting about the building. The walls being at 90 degrees also limited the usable space in the corners which comes at a premium with the small structure. This did not align with our objective of a visually pleasing design and our design did not achieve anything which a simple shed with some holes cut into it could not. The second concern was the limited FOV (Field of Vision) out of the hide by only having windows on one flat side opposite to the entrance. This could prove to be problematic for people visiting as wildlife could be hiding just out of sight to one side or be barely visible and uncomfortable to view at such a severe angle. These limitations inspired us to devise some tests to improve our prototype.

# Prototype and Goal

The purpose of this change in design was to improve the viewing experience of those who visit the hide. As such, it is related to our objective of having the hide ‘be comfortable’. Our original design was lacking in three important ways. Firstly, it possessed a small field of view, with only one wall having viewing windows. In practice this would not only restrict what those inside could see but would also reduce the number of people who could look out from the hide simultaneously. Our current design on the other hand possesses a field of view nearer to 360 degrees. Furthermore, the iterated design possesses an additional 10 windows (from 5 to 15), allowing a greater number of people to utilize the hide at once, and without as much cramping. Secondly, our previous design lacked a good place to put informational tools as desired by the client. The iterated design has an interior central pillar to hold up the new roof structure, upon which QR codes, posters, signs about wildlife, etc. can be hung up. All these things are desired to be in the hide by the client and are necessary to fulfill one of our concepts. Thirdly, our original prototype was in many ways asymmetric, and lacking in aesthetics. Switching to a ‘rounder’ design allows for greater symmetry, and following from that, architectural artistry. In general, the hide now looks less bland and ‘shed-like.’

We originally evaluated that a change was necessary in the mentioned categories through discussions during client meetings. During said meetings we were exposed to other teams’ designs, many of which followed a hexagonal, half-hexagonal or even round shape. Not only did the clients support this design feature, but we ourselves realized the advantage of them. Then, after some internal discussion, we decided as a group that of the possible shapes, the hexagon best served our goals. The main lesson throughout this prototyping stage was that it is okay to go outside the box and use non-traditional shapes in our construction. Using these more unique shapes we will stand out more from the competition, improve visual appeal, and increase the functionality of the design by taking advantage of the more complex geometry.

# Information Acquired and Derived Insights

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Figure 2: FOV (Field of View) Diagram of the Original Design

Shape

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Figure 3: FOV Diagrams of Alternate Shapes Considered

With regards to the insights made through design evaluation, the overall aesthetics of the design were changed to ensure symmetry in all areas of the hide and an increased surrounding field of view. As a team, we decided to change the shape of the hide from a rectangular box to a hexagonal-based design after receiving feedback from our instructor Safwat Ramadan regarding the importance of symmetry, “The roof should be symmetric!” Essentially, as described through the notes in our instructor review presentation, symmetry is a crucial factor within structural designs and when implemented can create an aesthetically pleasing product while also maximizing other aspects in a design such as field of view. A second insight gleaned from our evaluations is the amount of wasted space in our previous design. Both designs have a similar footprint in terms of the land required but the new shapes considered are much more space efficient. A simple way to sum this up is to say that perpendicular walls are not space efficient and the more circular the structure becomes the less wasted space is created in the corners. By having large angles between the walls more usable space is available on the walls which increases the viewing ability of visitors, a key need of our client. With this information, we decided to also change the parameters of the roof. To combat various weather circumstances in a more effective way, we were advised by our instructor to add gutters to the end of the roof rather than increase the length of the roof located directly above the accessible ramp. In doing this, we were able to create an even and effective way of removing water through harsh weather conditions. Furthermore, the placement of the open windows was changed to a symmetrical placement all around each wall to improve and further reach our goal of achieving an aesthetic design.

# Resulting Design Change or Revision

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Figure 4: Current Iteration of the Hide, Hexagonal in Shape

There were three main changes that resulted from the insights we developed as a team. The first insight that led to a change was due to visitors wanting a greater view of the wildlife they were watching. The purpose of the hide is so that there is maximal viewing of the conservation site. The change that came from this insight was the shape of our hide. Originally our hide was a rectangular shape and had five windows on a single wall opposite and parallel to the door (Figure 1). After this insight was reached, we decided that the best shape that would solve our maximal viewing option was a hexagon. This shape provides five viewing walls with three windows on each wall (Figure 4). Compared to our original design this not only increases the number of windows from five to 15, but also allows for visitors to view different sides of the conservatory, increasing the viewing angles and general functionality of the hide.

The next insight that lead to a design change was that we needed our hide to be aesthetically pleasing to the human eye and therefore symmetry needed to play a larger role in the design. The changes that followed due to this insight was the symmetry of the viewing windows along with symmetric shape of the roof which is now like a gazebo. By comparing the roof in our first design to our iterated design (Figure 1 & 4), you can see how originally our roofs symmetry does not coincide with the shape of the hide, whereas in the iterated design one can see that the roof is integrated and coincides with our design shape. This allows for the iterated design to look fully symmetrical and intentional as a structure.

Overall, we expect these changes to allow for visitors to be able to view as much wildlife as possible. It is important that they can go to different sides of the hide and have completely different views due to the angles in a hexagon allowing for different viewpoints of the conservation site. The change has also allowed for the design to look more visually appealing, which is an important requirement of the clients. Our insights have allowed for the change in geometry in our hide, along with the roof coinciding with the hexagonal structure, as well as the windows on all five sides of the hide. These changes have made a significant impact on our design taking it from something easily replicable to a standout structure. Therefore, our hide can meet our team design goals in addition to being more memorable and impactful for our clients.