Designing a Chicken Coop for the San Luis Obispo High School FFA Farm

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This paper covers the design process by a team of students from Cal Poly to provide a chicken coop for the San Luis Obispo High School FFA Farm. The project, initiated in Summer of 2023, aimed to replace their existing temporary chicken coops with a larger, better functioning structure that could house their 10+ chickens comfortably. The paper focuses primarily on the design phase but touches briefly on material procurement and construction. Through meetings with the client, the team developed a design that met the school’s design criteria and educational needs. The design process involved collaboration and many iterations of feedback to refine the structure's layout, features, and materials. Key features of the design included a raised, fully enclosed coop with nesting boxes and student access. Feedback from the school led to adjustments such as repositioning the entrance, enlarging the nesting boxes, and incorporating a perch. The paper concludes with lessons learned, emphasizing the importance of effective communication, detailed documentation, and a builder-focused mindset in construction projects. The team is satisfied with the design outcome and anticipates a successful construction phase set to be completed in Spring of 2024.

Key Words: Chicken Coop, High School, FFA, Farm, Project Based

Introduction

At the end of Summer Quarter 2023, a few students asked Joe Cleary if he had any possible project ideas that needed student assistance for the following school year. Joe Cleary mentioned he had heard that the San Luis Obispo High School FFA Farm was looking for a few projects to be done before their animals arrived in the Spring. Three students, Zoe King, Tara Keene, and Sofia Amalfitano set up a meeting to tour the farm and meet with the FFA teachers, Anna Bates, and Jodi Evans. Anna and Jodie gave a tour of the property and mentioned one of the structures they wanted to be updated was a temporary chicken coop. They were looking for a larger chicken coop that would allow the farm to have more chickens and provide those chickens with ample space to run around. This project intrigued the students and they decided that they would love to provide this new structure for the farm.

The complexity of the project required more than one academic quarter, so it was split up into three phases: design, preconstruction, and construction. This paper will primarily cover the design phase but may include aspects of the other two phases.

Processes

Once the project was tentatively decided, all stakeholders had to agree on the scope. The students, professor, and high school teachers met to discuss the desired location and needs of the chicken coop. The owners decided that they wanted the new chicken coop to be across from the
old chicken coops and sit next to one of their two greenhouses. This location is about 8-9 feet wide and 22-23 feet long. The amount of space was limited, and this constraint was important to consider when designing the structure. Figure 1 below shows the location of the new chicken coop.

Figure 1: Location of the new Chicken Coop

Figure 2: Chicken Coops Being Replaced
When initially asked, the owners did not give many specific desires. They wanted a functional space for educational purposes to provide the high school students with a place to learn hands-on. Their desires were to have a raised, fully enclosed coop with sufficient space for chickens, nesting boxes, and student access. The coop was to have a window or two and a route for the chickens to safely travel between their nesting boxes and the outdoor space. The initial meeting desires were noted with an image of the future location.

Figure 3: Initial Meeting Coop Conceptualization Notes

Following the initial coop concepts, a compilation of client desires and pictures was assembled. This visualization was slowly clarified into an initial design. The initial design was a 9-foot-tall structure featuring a slanted roof, stairs leading up to a raised chicken coop, and a door on the side for students to easily enter. This coop was raised off the ground and supported by four small wood posts. To maximize flexibility for construction, the design indicated different material options were available.

Along with the 3-dimensional rendering, a few hand drawn sketches were provided for additional clarity. These sketches displayed elevation views and interior layouts. The nesting boxes were set in two rows with six boxes in each row. This allowed the area below to be used as a shelf and storage area. The team added this extra feature to allow the students to store items inside the coop for ease of use. Dutch doors oriented on the North and West walls of the building were selected to provide airflow throughout the coop.
Figure 4: Initial Coop Visualization

Figure 5: Elevation Sketches

Figure 6: Alternate Elevation Sketches
The drawings were well received with some feedback. The suggestions to change were as follows:

1. Move the front door from the current (North) location to the back (East) side of the coop to allow for easier access,
2. Remove the stairs, they are unnecessary as students will be able to step up into the coop,
3. Remove the enclosed storage area as this only allows for small animals to hide and nest,
4. Provide a perch for the chickens to fly onto outside their nesting box.

The feedback was implemented, and adjustments were made to the design. At the following meeting the successful changes were acknowledged to be closely aligned to the owner’s desires. The door was moved to the back (East side), the enclosed area and stairs were removed, and a perch was added for the chickens. Joe Cleary suggested switching the orientation of the roof to allow for possible future upgrades like a solar panel. Once the changes were made, the drawings were resubmitted to the high school for comment.

In the final design meeting, only subtle changes were requested. First, incorporate a perch above the nesting boxes for the chickens. Second, the nesting boxes needed to be larger than 12”x12”. A consensus was reached to size up the boxes to 18”x18” configured in three rows of four instead of two rows of six. Third, a wire screen would be added to the foundation to keep animals from nesting. Lastly, it was decided to remove the vapor barrier and screen door leading into the chicken run.

Once the final adjustments were made, the final drawings were forwarded to all parties and the project lead shifted to Sofia Amalfitano to begin material quantity estimation and procurement.

**Funding**

Funding was largely provided by a grant from the Construction Management Advisory Council (CMAC), along with donations from the Walsh Group and others.

**Deliverables**

Deliverables for the design phase of the project include:

1. Acquisition of funding through donations and grants,
2. Approval of project from SLO High School,
3. 100% Construction Documents including plans, additional drawings/details, step-by-step instructions to complete the build, and possible alternatives to materials.
Lessons Learned

Learning to communicate and express specific desires is important in any field and in construction it is of the utmost importance. This is because projects require direction. The team learned to ask leading questions to identify what specifics the clients would like. For example, the chickens needed a bigger area for their nesting boxes. The team was told that the chickens were too large to fit in a 1-foot cubed area and that they were using their current nesting boxes as a bathroom. This was something that the owners wanted to rectify. They asked the team to provide larger nesting boxes in hopes that the chickens would see the boxes as spacious enough to lay eggs instead of seeing it as a bathroom.

Another lesson was learning how to take an idea and put it to paper. Producing high quality construction documents that can be interpreted by the rest of the team and future stakeholders was a challenge. Designing with a builder focused mindset led the team to include more detailed instructions and additional drawings. Overall, the team enjoyed the process of designing a chicken coop for the FFA farm.

Conclusion

Working on a hands-on project was the perfect example of Cal Poly’s Learn by Doing philosophy. The student team feels that the design was a success, and they look forward to producing a chicken coop that will meet the needs and desires of the owners at SLO High School. The team wants the students at SLO High School to be able to experience hands-on learning and they feel very proud to provide them with this learning opportunity. The owners were clear with their checklist and the team is grateful they could deliver a product to fit their needs. The project is shifting to the next phase and the team is looking forward to beginning to build.
Photos

Figure 7: Cover Page

Figure 8: Level 1 Floor Plan

Figure 9: Level 1 Floor Framing
Figure 10: Roof Plan

Figure 11: North and South Elevations

Figure 12: East and West Elevations
Figure 13: Nesting Box Section

Figure 14: Foundation and Roof Section