

Journeyman International: Mornes Brieux Primary School

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This project-based senior project is a collaboration between students from different schools and a non-profit organization, Journeyman International. The goal of this project is to build a primary school in Les Cayes, Haiti to give the kids there the opportunity to be in a safe and comfortable learning environment. The client on this project is the 610 group, they are an organization that focuses on sustainable community development through education, vocational training and microenterprise in communities in Haiti. This project entails 3 buildings with a total of 8 classrooms, a kitchen and dining area, bathrooms and a courtyard with playground equipment. My deliverables for this project included a construction estimate, construction schedule, site safety plan, SWPPP, Site Layout and a phasing plan. Producing these deliverables was complicated because of the amount of unknowns that come with building in a foreign country.

Keywords: Haiti, Primary school, International construction, Humanitarian

Introduction

Journeyman International is a non-profit organization that connects college students in construction, engineering and architecture and teams them up with professionals and humanitarian organizations to design and manage projects around the world. Working in 42 different countries they've completed 24 projects, designed 101 projects and have 30 projects currently being designed. These projects are schools, community centers, vocational villages, orphanages and any other project that have a positive impact on a community in need. This particular project is a primary school in small town in south east Haiti called Les Cayes. This school will serve 250 young children during the daytime as a primary school and adults in the evening as a job training center. The project consists of 3 similar buildings, 2 have 4 classrooms each and 1 has a kitchen, dining area, administration area and bathrooms. These buildings surround a courtyard with landscaping and playground equipment. The buildings are made up of a concrete post and beam skeleton with reinforced masonry infill, steel trusses and corrugated metal roofing. The design was done by Heather Bing, an architecture student from Montana State. She designed the building for Haiti's hot and tropical climate, the whole building is open with metal window screens instead of windows and the trusses at the top. This project will not only help provide education for the kids in Les Cayes, It will also provide an incredible learning experience for myself and the other students involved.

How the Project Came About?

This project was brought to attention when Daniel Wiens from Journeyman International came to talk to our senior project methodology class and let us know what JI was all about. I decided to be a part of a journeyman international project because I wanted to use my senior project to help others as well as get some great real world experience. I thought it was really cool that I would be able to use everything I'd learned the past 4 years to help people in a different country that I don't even know, it just seemed like an awesome opportunity that I wouldn't ever get again. This project turned out to be a great challenge to work on over the course of my senior year.

Deliverables

My deliverables for this project included a construction estimate, construction schedule, site specific safety plan, Risk analysis, storm water pollution prevention plan Site layout plan and a phasing plan.

Construction Estimate

I was given a Revit model of the buildings from a Montana state architecture student, Heather Bing, which made the estimating process a little easier. I went through the model and took off each building individually then compiled it all in excel. Costing was the hardest part of the project for me because I've never built anything in Haiti before and everyone that I was put in contact with had never built in this region of Haiti. It was difficult to figure out what materials cost over there. I was able to get numbers for concrete, rebar, and a couple other materials from estimates of schools that the 610 Project had built in the past. I learned that material costs in Haiti, although very different than here in the U.S, have the same ratios. For example, a certain material in Haiti will make up the same percentage of a project's material cost as it would here in the U.S. I used this knowledge to fill in the blanks of my estimate and come up with a reasonable number. The division that I had the most difficulty with was the steel in the building as I had nothing to base my numbers off besides my current knowledge and what I had heard about the comparison of US prices to Haiti prices. I calculated labor as 20% of material costs. My total material costs came out to \$877,010 which put my labor costs at 175,400 putting the project's total costs at \$1,052,400.

Construction schedule

For the schedule of this project I used Microsoft project to come up with a realistic timeline. I treated each building as a new phase starting with classrooms 5-8, then classrooms 1-4, then the administration/ kitchen building and finally the courtyard. I started with classrooms 5-8 because it's the farthest from the road so it will be easier to construct that building before the other 2 buildings are in front of it. I started the next building once the previous one had all concrete and masonry completed. The biggest challenge with the schedule was not knowing what type of equipment and labor is available in Haiti. I assumed a crew of 10 workers onsite and tried not to stack too many activities. There's a couple times on the schedule when there's multiple activities going on at once but they are near the end of the project during the smaller finish activities. I am also unsure of the current state of the land so I left some extra time in the schedule for clearing and grading. I think installing the trusses will be one of the more difficult tasks because it's unlikely that they will have the right piece of equipment to get up there. Because of this I left 2 weeks for them to install the prefabricated trusses on each building. The schedule ended up at just over 11 months which I think is a reasonable amount of time to get a project like this completed.

Risk Analysis & Mitigation

There are many risks that come along with this project. There are of course the standard construction safety and financial risks but there are also risks specific to Haiti. Haiti is currently a very dangerous country to travel to. According to the U.S. Department of State "There is an ongoing risk of widespread, violent, and unpredictable demonstrations in Port-au-Prince and elsewhere in Haiti". Protests, tire burning, and road blockages are frequent, violent crime, such as armed robbery, is common, and incidents of kidnapping have occurred. Right now the U.S. government has a limited ability to provide emergency services to U.S. citizens in Haiti local police lack the resources to control what's going on there. The Department of state has put Haiti at a level 4 travel advisory which means do not travel there. Most of this crazy stuff goes on in the bigger cities such as Port-au-Prince and not so much out in the rural areas and smaller towns. This project is about 10 miles outside of a smaller town called Les Cayes and from what I've been reading Les Cayes is not a violent city. I don't think this project needs any crazy security onsite besides a fence around the jobsite that's locked at the end of the day.

Safety plan

In the United States safety is the most important part of any job, in other countries that isn't always the case. That's why for this project I was asked to make a safety plan specific to this site. It was hard to decide what to include and exclude from this plan because I have no idea what their safety standards are in Haiti. Based on what I had heard from Journeyman International there's not high, but safety will still be the first priority on this job regardless of the standard. The goal of the safety plan is to make sure this project is completed with no major injuries or deaths; minor injuries are more or less inevitable but hopefully this plan diminishes them. The plan includes risk on the site and some general rules on this job regarding PPE, fall protection, trenching and equipment. The on-site Foreman on the job will be in charge of enforcing these rules and making sure his employees are comfortable with them given

tasks. However, it's the employees job to speak up if they feel unsafe or aren't comfortable with a certain activity. The nearest hospitals are also listed on this safety plan incase of emergency with directions on how to get there.

SWPPP

A SWPP plan is a plan to limit the amount of pollution in the storm water coming from a construction site. This site looks like it is close to a couple small neighborhoods so we will need to have some sort of SWPP plan in place to protect those neighbors, their water supply and their roads. In my SWPPP I placed straw wattles around the perimeter to make sure water and other debris don't leave the site. I also gave a brief description of what a straw wattle is and its purpose just incase the people using this plan in Haiti haven't seen or used them before. In addition, I put gravel at the main entrance to make sure cars and equipment leaving the site don't track mud all over the surrounding roads. I included both of the pollution prevention methods in my site layout as well as pictures of what it should look like to make it as easy as possible for the workers in Haiti.

Phasing plan

I decided to break this project into 5 different phases, grading, classrooms 5-8, classrooms 1-4, the administration/ kitchen building and the courtyard. I made grading its own phase of the project because the site is located on a steep slope and this might take a few weeks. This phase also includes the retaining walls across the site. Phases 2-4 are each individual building which should each take about 3 months. The fifth and final phase is the courtyard in the middle of the buildings including the wall in the front of the complex.

Lessons Learned during the process

Coming into this project I knew it would present some unique challenges. Now at the end of this process I've gotten some great real world experience with estimating and scheduling among other things. One of the hardest parts about my completing my deliverables were the amount of unknowns. I think because of this I learned how to be creative while staying realistic. I had to leave room in the budget and schedule with out making the project way to expensive or long. I also had to keep the safety and SWPPP realistic knowing that the safety standards are much different in Haiti.

Conclusions and Next Steps

This project proved to be a challenge and a great learning experience. I'm glad that I was able to use what I've learned here at Cal Poly to help people across the globe. Hopefully this project will be able to start construction relatively soon now that they have all the deliverables from the architecture student at Montana state, the 2 structural engineering students here at Cal Poly and myself, the construction management student. Once completed this project will provide and education and a safe area for around 250 kids thanks to The 610 project and Journeyman International. I'm proud to have a small hand in this project and Hope to be able to visit one day.