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2017 ASC Bidding Competition – Heavy Civil

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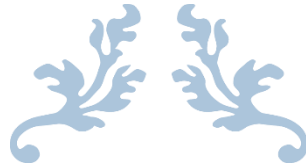
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2017 ASC Bidding Competition – Heavy Civil

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Senior Design Final Report

Montana Tech of the University of Montana

2017

Abstract

We represent the 2017 Montana Tech Heavy Civil Team. Our senior design project consisted of competing in the Region 6 ASC (Associated Schools of Construction) Heavy Civil Bidding Competition in Sparks, Nevada. The competition required a full year of preparation. The fall semester was composed of planning, practicing, and gathering resources. The spring semester involved traveling to Sparks, Nevada, and performing in the competition.

Preparing for the competition involved practice bids, where the team studied various aspects of heavy civil construction. Time was devoted to developing presentation skills, and different team bonding exercises encouraged unit cohesion. Finally, our preparation culminated with a simulated competition where we estimated a project and presented our solution to a mock panel of judges.

The competition involved a 16-hour period where we developed our bid and solution for the given problem statement. We then were given an 8-hour time frame to prepare for a 20-minute presentation, which was followed by a 10-minute Q&A session.

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1. Introduction

The purpose of this report is to explain how our team completed the senior design project, and to explain the results and efforts put into our project. This senior design project was half preparation and half competing. We separated our approach to the competition into two phases: Phase 1) Planning and Phase 2) Competing. Explanations of each phase are on the following pages.

2. Planning

Each week our mentor, Sonya Rosenthal, gave us a little project to do. These projects consisted of researching different construction equipment and/or actual practice projects. We focused our time on practicing bidding these projects, and then presenting in front of each other to gain confidence in our presentation skills.

2.1 Fall Semester

Our first project that we looked at was the Blaine Spring Creek Bridge project near Ennis, Montana. We assigned topics to each team member and focused on becoming comfortable with each topic. The topics were Contract, Safety, QA/QC, Risk, Environmental, and Traffic Control. This first project was just to understand the methodology of bidding for future practice projects.

Our next project was Squaw Creek Bridge in California, where we performed a more detailed analysis. After focusing on the soft topics, a more technical approach to the different aspects of the project were analyzed such as equipment, staging areas, scheduling, material, labor, etc. After bidding the project, we presented in front of our mentors and received constructive criticism.

Kodiak Airport in Alaska was our third project. It focused mainly on asphalt paving and subcontracting pieces of the project. We analyzed items on the bid sheet so we could get familiar with contract documents.

Tillamook Jetty in Oregon was a challenging project that tested our skills as a team. It took us out of our comfort zone and allowed us to learn about safety and regulations that projects along the oceanic coast require. It helped us the most while in Sparks, Nevada. It was a more detailed analysis, and focused more on the technical aspects, but still considered the soft topics.

Cottonwood Pass was our final project. This was our worst project that we practiced, because our team was not together for a majority of the project until the very end. We learned about our strengths and weaknesses while performing this project, and we determined that our work is a lot better when we are doing it as a team compared to doing it individually.

Throughout the first semester, we analyzed little mini research projects. These projects consisted of clearing and grubbing, dam construction, excavation, drilling, asphalt pavement, rolled compacted concrete, demolition, bridgework, different equipment, special material, and others.

During this time, each team member started creating an excel sheet with various rates and operating times to perform different types of work. Templates were also touched up after each practice project, so it would be more helpful while in Sparks. After the excel sheets were made, and the soft topic templates were finalized, a binder was made to simplify the process during the competition. Soft topics were permanently assigned to each member so that when the competition began, each member would feel more confident in their area.

2.2 Spring Semester

During Christmas break, each team member had a project to research and present when we all returned to Butte, Montana. The projects consisted of having an idea of what would go into the methodology of construction when performing the work. Dams, highways, and different types of construction were researched over the break. Materials, cost, labor, and methodology were all needed when presenting.

Different skills were needed during the planning phase. Skills include using Bluebeam, MS Project, Excel, Word, and Heavy Bid were all polished by team members when assigned their particular project during the break.

Each project helped gain knowledge for the competition in different ways. Everything was beneficial in gaining confidence with our expertise with different construction projects. The practice projects, the research projects, and the practice presentations were all great learning tools that instilled a lot of confidence within our team.

3. Competition Phase

The competition took place in Sparks, Nevada. The goal of the competition was to win and gain bidding/construction experience. When we arrived to the hotel in Sparks, we organized our office area to be able to communicate effectively throughout the bid. The next morning, we ate breakfast, then met with Kiewit to go over the project. They presented a PowerPoint, and gave us a USB thumb drive with plans, specifications, pictures, bid documents, etc. After that, we went to our office area and started getting familiar with the project and problem statement. We started creating a mini schedule so we could stay on track during the competition. About two hours after the initial meeting, we had to go back to Kiewit's room for an "owner's meeting." This was when Kiewit went into more depth on the overview of the project, discussing different aspects of the job and giving us options for project. After this meeting, we returned to our office area and began the bidding process.

Our project was a Jetty Rehabilitation in the Mouth of the Columbia River between the coasts of Washington and Oregon. The project consisted of procuring and delivering stone varying from 6-22 tons. Placing each stone individually, while constructing a haul road on the jetty crest was a majority of the work. Also, after each season of work, the access road was to be repaired. Figure 1 below shows and plan view of the job location.



Figure 1: Plan view of Jetty-A

Figure 2 on the next page shows the staging areas on the project job site.

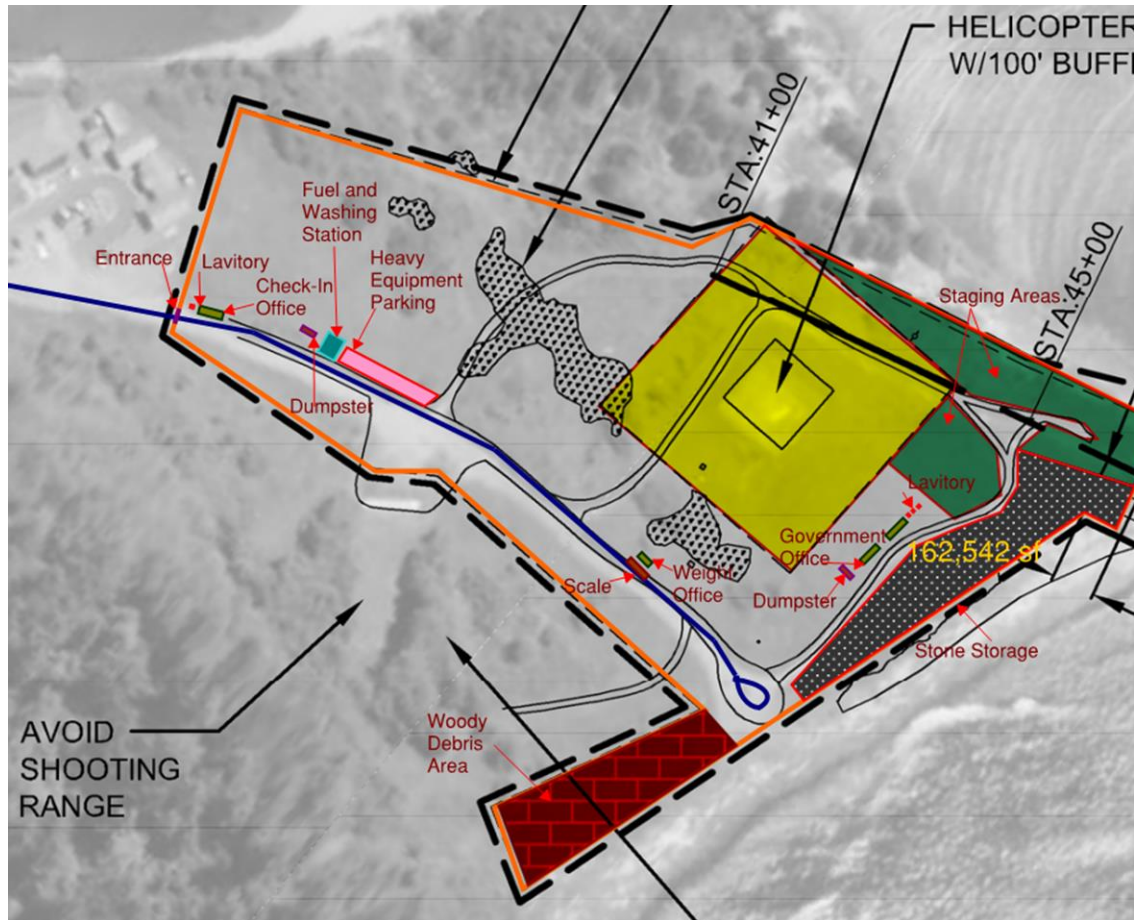


Figure 2: Staging Areas

The figure above illustrates the different areas of the project. The access road that was to be repaired after each season is colored in dark blue.

Each aspect of the job was controlled by each team member, while the templates for the environment, safety, risk, traffic control, contract, and QA/QC were all adjusted to cover the specific needs of the project.

Throughout the competition, the judges would come and stop by each room to ask and answer any questions. They were also checking to see if anyone was on their phone or the internet (which was not allowed for the Heavy Civil category). Requests for Information (RFIs) were submitted when questions arose because the judges weren't allowed to answer certain questions directly. At the end of the bidding portion of the competition, we submitted a binder to the judges by 10:00 p.m., which was the deadline. Figure 3 below summarizes the cost items that were estimated on the project by percentage.

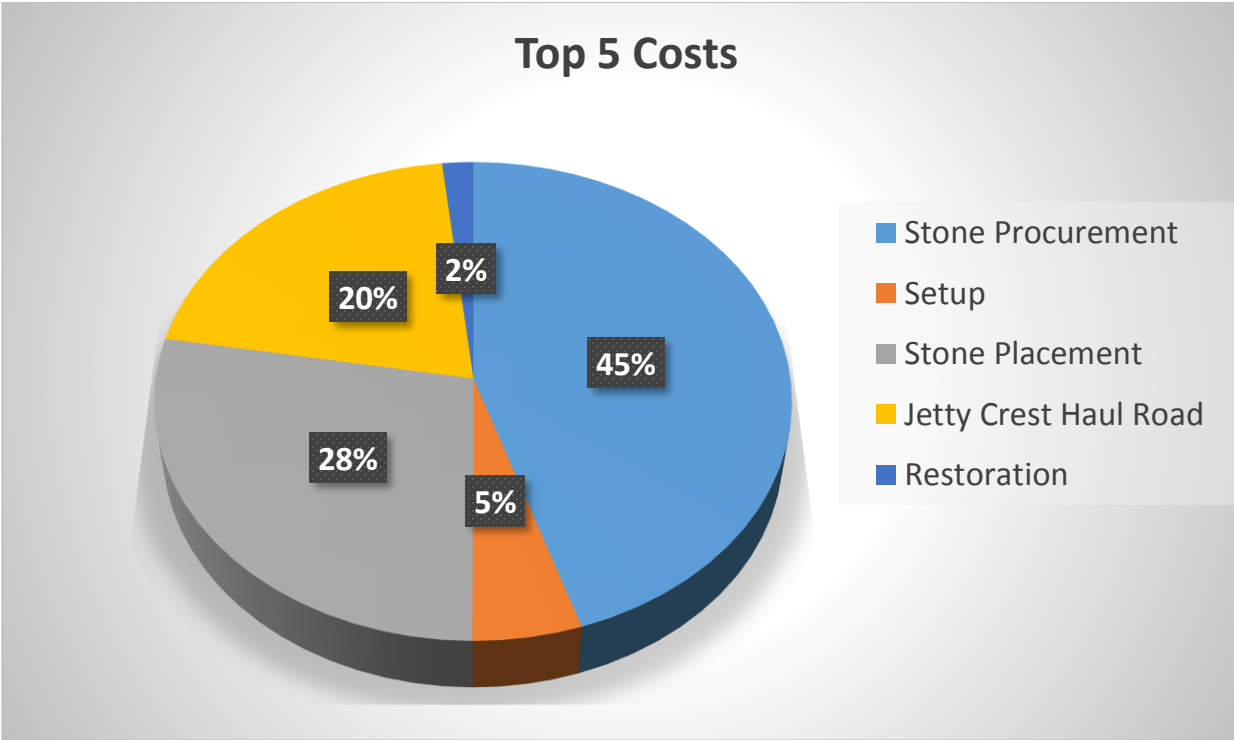


Figure 3: Top 5 Costs for Jetty Rehabilitation

Stone procurement, which included blasting and transporting the stone to the jetty was the most expensive. Placing the stone with a crane was the next expensive, and both of those accounted for the top two most expensive items. Mobilization and demobilization were both included in the stone procurement, but equipment for the jetty was not on the top five most expensive items.

Once the binder was submitted, we had about 8-hours to prepare a presentation for the Kiewit judges. The presentation had to be submitted by 6:00 a.m., and we drew for a presentation time. After a couple of hours of sleep, the presentation was completed and submitted by the deadline. Our time that we drew to present was 11:00 a.m., which was perfect, because it gave us enough time to practice and get ready. The time limit was 20 minutes, so each team member had to present for about 3 minutes. After the presentation was complete, the judges had 10 minutes to ask questions. The questions were answered really well, and we placed 4 overall.

4. Lessons Learned

4.1 Teamwork

Communication was key during the competition, and even before the competition. Nobody was scared to ask questions throughout the time we were together, and we all helped each other in a professional manner. We all wanted to win, and we all respected one another throughout the year. During the competition, we all faced each other and spoke to each other about our thoughts and questions. This was key for our success.

Our time management was not the best. We should have followed our schedule closer and met our deadlines more. We did finish all of our objectives, but we were not too organized when it came to time management.

As a team, overall we felt good about how we did throughout the school year as well as during the competition. We respected and cared for one another, and also all took a leadership role when it came to working. The competition was a great learning experience, and we all made sure we had fun while competing.

4.2 Bid Forms

We understood the contract documents and the scope of work as well the contract specifications but we failed to present this knowledge in the proper format. A big thing that we could have all worked on was filling out the bid forms. Failing to complete several forms correctly definitely hurt our overall score. We should have spent more time learning to fill them out, as well as having a better understanding on what was being asked within the forms.

4.3 Research Topics

It would have been more beneficial if we started collecting the research topics at the beginning of the year rather than putting them together just before the competition. It would have made us more organized when it came to looking for certain equipment and equipment rates. It would have made it easier to find things, and made us more comfortable while bidding the project.

4.4 Presentation

The presentation was the best part of our project. We all spoke with confidence and knew our portion of the presentation really well. We only had a couple of hours of sleep before we began to put the presentation together, and then got dressed in our presentation clothes, then we practiced our presentation for about three hours. We found that standing beside our computer screen and having each person step forward when it was their turn to speak worked really well. Also, having a designated person with the laser pointer and slide clicker made for a much smoother presentation. Together, we focused on looking directly at the judges during the presentation and not paying attention to the audience. We were confident during our presentation and answered each question well.

5. Conclusion

The competition this year was a success. It taught us about real life bidding, and provided us with a very positive experience of teamwork. We are encouraging more students compete next year. The work load was formidable at the outset, but we will help the students understand that after all that work, they will feel ready for anything that comes their way.

Students will need to understand a few things before signing up for the club. A couple of classes would benefit them during the competition (i.e. Bidding & Estimating, and Planning & Scheduling).

In the end, we all learned a lot made memories that we will never forget. We laughed and some of us cried, but we believe it was all worth it. It was important for our personal and professional growth. Lessons were learned that could not have been learned anywhere else while in college. Hopefully we can help guide future teams as they prepare for the heavy civil category.