

AC 2007-2359: LESSONS-LEARNED FROM FIRST TIME PARTICIPATION IN CONSTRUCTION MANAGEMENT STUDENT COMPETITION

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Introduction

In conjunction with the Associated Schools of Construction (ASC), the Associated General Contractors (AGC) sponsors annual construction management oriented student competitions. The competitions involve teams consisting of four to six full-time students enrolled in construction related majors. As part of the competition, teams must complete a construction management related project in one of three available categories: heavy/highway, design-build or commercial. Contractors from industry sponsor each of the categories and prepare problem statements using drawings and bid documents from actual projects. Once given the project statement, teams are given a very limited time (10 to 14 hours) to prepare a proposal for the project including a detailed cost estimate and schedule, bid documents and an oral presentation of the results. Teams are then judged by the industry sponsors on the quality of their presentations and deliverables and winners from each category determined. Winning teams from regional competitions are invited to compete in the national competition held in conjunction with the annual AGC convention.

The University of North Carolina at Charlotte (UNC-Charlotte) launched a brand new construction management program in the fall semester of 2006. In an effort to strengthen the program's development, program faculty made the decision to enter a team into the 2006-07 regional competition which was held in Charlotte, North Carolina. Although the University has a well established civil engineering technology program, this represented the first time that a student team had participated in such a competition. This paper discusses some of the lessons-learned by the faculty and students in preparing for and participating in a competition for the first time.

Pre-Competition Preparation

After consultation with the Department Chair, program faculty made the decision in early September 2006 to enter a team to compete in the regional AGC/ASC student construction management competition. The ASC has divided the United States into a total of eight geographical regions. UNC-Charlotte is located in Region II which includes schools from Virginia, North Carolina, South Carolina, Florida, Georgia, Tennessee, Alabama, and Mississippi.¹ As the Region II competition was scheduled for October 25-27, 2006, this allowed only two months to organize and prepare a team of students for the competition.

The first step in preparing for the competition was to notify local ASC Region II officers of our interest in participating and to download the competition rules from the Region II website.² The rules stipulated that teams were limited to no more than six students each and that participating students must be full-time students enrolled in a construction-related program. With that in mind, faculty began the task of identifying and selecting interested students.

Although schools are allowed to enter a team for each of the three project categories, heavy/highway, design build and commercial, the decision was made to enter only one team into

the competition since this was our first time competing. Therefore, we identify six interested students to participate on the team. The process of selection was primarily based on expressed student interest although some targeted invitations were made based on faculty recommendations. The composition and numbers of students fluctuated during the first several weeks as students learned more about the competition and expected time commitments. However, eventually a team was organized that included five senior level students and one sophomore level student. Academically, the students ranged from strong to average. A few had some actual construction industry experience. None were prepared for the competition to come.

A faculty coach was selected for the team who scheduled and organized the first several meetings. The first item on the agenda was to select the competition category. Based on the students' backgrounds and academic preparation, the heavy/highway category was selected as we felt such projects would likely be more straight forward and easier for student preparation. The team was then organized according to applicable project roles such as project manager, project engineer, estimator, scheduler, etc. The student who assumed the role of project manager was then given the responsibility of organizing all future meetings.

As teams are allowed to use only the materials, supplies, and equipment that they bring with them to the competition, the team then set about to collect the materials and information that they thought would be necessary to complete the competition. This included laptop computers, digitizers, printers, cost databases, software, etc. The faculty coach, with the assistance of other faculty, provided training in the use of the software, digitizers, and cost databases as deemed necessary by the team.

Once the team had been formally registered for the competition, a preliminary problem statement was received from the heavy/highway industry sponsor. In our case, the industry sponsor was Kiewit Construction Company. The problem statement indicated that the project would be a competitively bid unit priced transportation oriented public works project that would require concrete batching, structural concrete (bridgework), concrete paving, etc. As part of the competition, teams would be required to:

1. Complete and submit a bid package as stipulated in the contract documents.
2. Submit an estimate including:
 - § A detailed cost breakdown of labor, equipment, materials, subcontracts, and other necessary supplies for each bid item;
 - § A clear description of the construction methods for each bid item;
 - § A calculation and allocation of overhead costs;
 - § An explanation of risk and margin analysis; and
3. Submit a project schedule.
4. Prepare and present an oral presentation to be structured like a contractor's internal estimate review meeting.

In addition, the preliminary problem statement also provided the rubric to be used by the judges to score the competition. Teams would be judged as follows:

§ Oral Presentation 20%

§ Bid Documents	5%
§ Estimate Quality	20%
§ Construction Methods	25%
§ Project Schedule	15%
§ Project Management	10%
§ Specification Questions	5%

Based on the preliminary problem statement, the team made the assumption that the project would likely be a concrete paved roadway with some bridge elements. Therefore, the team gathered some highway drawings to practice performing quantity takeoffs, preparing mass diagrams, and reviewing construction methods. After several weeks of meetings and practices, the team felt confident that they were ready for the competition.

Competition Day Activities

The competition was held in the Renaissance Charlotte Suites Hotel in Charlotte, North Carolina. The team arrived Wednesday evening and checked into the hotel. The first task was to rearrange the furniture in the hotel rooms to create a construction office style work space. This was a little disconcerting to both the faculty coach and hotel staff as the students moved furniture between rooms and entirely rearranged portions of the rooms. The faculty coach was concerned about something getting broken or misplaced and subsequent additional charges being placed on his credit card.

On Thursday morning, the competition officially began. Once the competition began, faculty coaches were prohibited from interacting with the student team until the competition had officially concluded. In addition, teams were prohibited from contacting outside sources through the Internet, telephone, etc. For the heavy/highway division, the schedule of events was as follows:

Thursday

6:00 a.m.	Teams meet for distribution of project documents, rules and guidelines
10:00 a.m.	Teams receive first set of estimate questions
11:00 a.m.	Deadline for questions and RFIs to judges
1:00 p.m.	Teams receive second set of estimate questions & provide answers to first set of questions.
3:00 p.m.	Deadline for Addenda from judges
8:30 p.m.	Proposals due

Friday

8:00 a.m.	Deadline for presentation materials to be submitted
8:30 a.m.	Team presentations begin
3:00 p.m.	Team debriefing

It was not until Friday afternoon that the faculty coach was able to view the team's oral presentation and to receive any feedback from the team concerning the actual problem statement and competition. However, as the various teams' bid totals were listed on the wall, the faculty

coach's first impression of the team's performance was favorable as their bid was in the middle of the range of bids submitted.

But, after listening to the student presentation and talking to team members, the faculty coach was surprised at the scope of the project that the students had been expected to analyze. The project was a \$100 million airport runway reconstruction project located at Hartsfield-Jackson Atlanta International Airport that Kiewit Construction Company was actually constructing at the time. This was a much larger and complex project than either the faculty coach or students would have imagined.

Post-Competition Critique and Lessons Learned

Obviously, the complexity of the project was the primary issue raised by the student team after the competition was completed. They admitted to being highly stressed and a little overwhelmed during the competition. Even to the point that several students were on the verge of giving up and quitting the competition until other team members convinced them to stick-it-out and complete the project.

The team admitted to pursuing several incorrect paths during the project that led them to wasting time performing quantity takeoffs and calculations on items that turned out not to be required as part of the submittal. In addition, they had run out of time and were unable to fully complete portions of the bid estimate and submittal, particularly the calculation and allocation of overhead among the various bid items. But, despite the stress level, the students indicated that they learned a lot from the competition and were glad that they had participated.

From the faculty coach's perspective, it was clear that the team's oral presentation was not on par with the other teams and would need to be improved in future competitions. This was despite the coach's repeated admonition during preparations for the competition that the oral presentation was an important and critical component of the competition. However, not unexpectedly, the students' sole focus was on the technical aspects of the project and the team needed to learn for themselves how important the communication aspect of the contest was. Hopefully, future teams will be able to learn from the experience of this year's team.

The team also learned about the importance of being meticulous and following the bid preparation requirements exactly. The judges' scores indicated that the team had left out several important required components in their submittal. For whatever reason, calculations that everybody knew they had performed were not submitted as required. Obviously, this resulted in a substantial deduction in their team score.

But, the biggest lesson learned was again the complexity of the project. Clearly, more substantial student preparation will be required for future competitions. In some ways, however, it seems a little unreasonable to expect students to complete such projects in the short time available. When Kiewit Construction personnel were asked during the debriefing session how long they had spent analyzing the construction methods for the project, they admitted to working full time over a four to six week period to arrive at the construction methods that teams were expected to deduce in a period of 10 to 12 hours.

That being said, clearly some teams were prepared to handle such a project and so it is possible to sufficiently prepare teams for the level of competition.

Conclusions

After having the opportunity to reflect on the competition, both students and faculty felt that the competitions were a worthwhile educational opportunity. Many of the senior students expressed disappointment in the fact that they would not have the opportunity to compete in future years. One even asked if he could help coach next year's team. In addition, team members are anxious to promote the competitions to their fellow students.

Based on the experience, UNC-Charlotte intends to continue to participate in the competitions with the hope of fielding teams in all three categories next year. However, the faculty has learned that a substantial increase in student preparation will be required if teams are to be competitive. As a result, we intend to begin identifying students and organizing teams during the 2007 spring semester. This will allow team practice and preparation to begin early during the fall semester.

References

¹Associated Schools of Construction Regional Directory [accessed 1/15/2007]. <http://www.ascweb.org/>

²Associated Schools of Construction Region II, "Heavy/Civil Preliminary Problem Statement," [accessed 1/15/2007]. <http://region2.ascweb.org/2006%20Heavy-Civil%20Preliminary%20Problem%20Statement.doc>