2015

Montana Tech Concrete Solutions Final Report

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Montana Tech Concrete Solutions

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Abstract

As a group we prepared for the 2015 bidding competition in Reno, Nevada. We are competing in the concrete solutions portion of the competition run by Sundt. Throughout the semester we compiled material, delegated assignments to the group members, and prepared for each aspects of the competition.

We expect to obtain familiarity and knowledge pertaining to the construction industry. We have set a group goal to finish in the top half of the competitors.

After the competition we plan to prepare a presentation for the Techxpo and compile all of our information and material we gathered and created throughout the process to make it easier on future teams that pursue the concrete solutions category. We also plan on talking and presenting to these potential future participants to give them an idea on what to expect.

Keywords:

Concrete, Bidding, Competition, Construction

Dedication

We wish to thank the Montana Tech Faculty, particularly our General Engineering advisors, who have provided us with a great education and the skills to be successful engineers in industry.

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We would like to recognize the dedication of professor advisors Brian Kukay and Larry Hunter. They provided valuable insight and direction for how we prepared and executed our project. We would also like to recognize Barnard Construction. A representative from Barnard gave us insight on how to effectively present our project for the competition; this information was valuable in preparing our presentation. We would also like to thank Hensel Phelps for providing us with reference material.

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1. Project

Our senior project group competed in the 2015 ASC Bidding Competition under the Concrete Solutions category. We started our preparations in the beginning of September 2014, and competed in the following February of 2015 in Sparks, Nevada. There were six members on the Montana Tech Concrete Solutions Team: Nathan Gilman, Cole Moller, Ryan Guelff, Wesley Sherman, Colter Bull, and Shane Strozzi. In a joint effort, we prepared during the semesters leading up to the competition date.

1.1. The ASC Bidding Competition

The Bidding Competition is structured in a way that is fairly uniform across all categories of competition. Each team involved is afforded a hotel room with tables and chairs that will serve as an office during the competition. On the morning of the competition day, teams report to their respective category's project sponsor which is a company that does work in industry related to that category. The project sponsor reveals the project to the competing teams and provides the necessary project information and deadlines associated with it. Generally, the projects presented put an emphasis on the following:

- Exploring a project from a contractor's perspective by keeping the project client's best interests in mind.
- Defining and refining the scope of work required for a construction project, as to offer high quality and creative engineering solutions to each aspect of the project.
- Reviewing codes and specifications to meet the requirements of a construction project.
- Analyzing project designs with constructability in mind.
- Cost estimating to provide precise budgets for the client and contractor.

- Providing detailed safety plans to address concerns that are project specific and eliminate for seeable hazards to protect the safety of the public and workers.
- Providing risk assessments to provide secure planning and coordination for construction operations.
- Providing project schedules and construction sequences to understand construction timelines and keep projects moving.
- Meeting requirements associated with construction sustainability and the environment.

After being introduced to projects, the competing teams are then sent back to their rooms to complete the deliverables requested by the project sponsor, and the teams are forbidden contact with any other competition teams, mentors/coaches, or any other outside entity that may give a team insight. A complete list of the competition rules is found in Appendix B: 2015 ASC Student Competition Rules. All project sponsors have their own set of rules on allowing internet access and phone access.

Once the deadline for submitting project deliverables has passed, each team per project category is assigned a presentation time for the following day to present their project deliverables and solutions. The presentations are in front of a panel of judges provided by the respective project sponsor and are to be 20 minutes in length. An additional 10 minutes is left open for a question and answer session between the panel and the presenting team. After hearing all team presentations and reviewing team deliverables, the project sponsors rank the teams and present the results the following day at an awards ceremony.

1.2. Concrete Solutions at Montana Tech

At the beginning of the fall semester of 2014, a number of Montana Tech students from the civil engineering program were enrolled in the Montana Tech Associated General Contractors (AGC) Club. Members of this organization enrolled with the intent of competing in some category of The ASC Bidding Competition, and formed teams with each other to start preparations in their respective categories. Before the 2014 academic year, Montana Tech had only competed in the Heavy Civil Construction and the Commercial Construction categories of the bidding competition. Our team was presented with the opportunity of competing in the Concrete Solutions category, as one our advisor, Dr. Brian Kukay, has a strong design background and industry experience dealing with concrete. With a knowledgeable advisor and a full team willing to take on a new project, we registered for the event early in the fall semester and began preparations for a successful Concrete Solutions competition.

1.3. Team Roles

Before any real preparation could take place, our team assigned roles to its individual members as a way of ensuring that, as a team, we would gain the necessary background to be successful in the competition. The team roles assigned are as follows:

- Nathan Gilman (Captain): Scheduling, Quality Assurance
- Cole Moller: Specifications, LEEDS (construction sustainability)
- Ryan Guelff: Construction Methods, Scheduling
- Wesley Sherman: Quantity Takeoff, Estimation
- Colter Bull: Construction Safety
- Shane Strozzi: Project Risk Assessment

Assigning specific roles to team members was important, as individuals could gain a more in depth understanding of a particular area of construction. The roles assigned are all related to one another in some way, so it was important that every team member had a general understanding of each of the roles and how they worked. Figure 1, below, shows the members of the 2015 Montana Tech Concrete Solutions Team.

Figure 1: 2015 Montana Tech Concrete Solutions Team

The team members' names, as shown from left to right, are: Ryan Guelff, Nathan Gilman, Shane Strozzi, Wesley Sherman, Cole Moller, and Colter Bull.

2. Preliminary Work

There were many preparations made leading up to the 2015 ASC Competition. As a group, we met each week and went over weekly check items that were to be completed within the week. We also met with our advisor, Brain Kukay, on a weekly basis. He helped us decide what the weekly check items needed to be in order to be prepared for the competition. The weekly tasks completed by our group included compiling background information, gathering bidding and estimating information, contacting sources from industry, completing take-offs on old projects, and preparing to travel down to Reno.

2.1. Preparations

Since we were the first Concrete solution Team from Montana Tech, we really had to start from the ground up. We looked at it as a learning experience and as a trail blazing effort. Our group tried to learn as much as we could based on what we thought the Concrete Division was going to entail. We tried to compile a master database from which we could pull information from. Everything from zoning and traffic control regulations to concrete formwork and equipment were looked at. Information on different concrete types and different admixture were looked at and gathered. Concrete trucks, pump trucks, cranes and other equipment were looked at to see what types were beneficial in different situations. A master estimating spreadsheet was created prior to the competition. The spreadsheet was set up so that we could plug in quantities of materials needed and we would get final costs and man-hours required. The spreadsheet also had the ability to take into account different labor costs for different areas of the United States.

Since we were competing in the Concrete Solutions division, we wanted to track down previously completed projects to look at and familiarize ourselves with the work that goes into concrete construction. We contacted a source from Hensel Phelps and obtained project drawings

and material take-offs form a concrete project they had previously worked on, and it was a major help. To go along with those project documents, we also tracked down a concrete practice bid from Montana State. We used both sets of documents to practice material take-offs and project estimations. They gave us a good idea on how to attack a project and create a bid package for that project.

Sundt Construction Company was the problem statement sponsor for the Concrete Solutions division, so we reached out and contacted them. They were able to answer questions we had about the competition and helped us direct our research to areas that would be more beneficial. Contacting the competition representative from Sundt helped us gain a better general idea about the competition since none of our group members had previously competed. We spent time familiarizing with the competition rules, and tried to come up with a process to follow on competition day. Based on our knowledge about previous competitions, what we learned from the Sundt representative, and the type of problem statement we thought we would receive, we designed a specific area for each group member to be in charge of.

Throughout our preparations, we set up a couple of mini presentations that we gave to our advisor. These presentations had a couple of advantages. One advantage was they gave us some practice presenting in front of people. We knew we would have to give a final presentation at the competition, and it was good to get more experience talking in front of a "judge-like" figure. The second advantage that came from the presentations was the extra information that was compiled. For each presentation, each group member gave their own five minute talk on their own respective area of research. At the end of the presentation, we had information on six different topics that we could use for future reference material. After a couple of presentations, we had information on 12 subjects that might not have necessarily been looked at. These presentations

were on various topics such as concrete finishing techniques, pros and cons of different equipment, different concrete types, concrete formwork, and our plan for our completion bid package.

Once the second semester started, we were about a month out from the competition. The final weeks of preparation were spent finishing our master information database and making sure we had everything we would need on competition day. We created two master USB data storage devices so as to make sure everyone in the group had the information they needed for their portions of the project. Various estimating books, construction cost books, and concrete books were obtained for extra reference material to look at if we got a "curveball" on competition day. We wanted to make sure we had as much reference material as we could just to try and cover ourselves in the case we encountered something unexpected during the competition. Each group from Montana Tech was responsible for getting their computers and printer set up prior to leaving for the competition, so we did that and made sure everything was set up and we were ready to go.

Once we arrived in Reno, one of the hotel rooms was transformed into our "office". We got all of our computers and printers set up and connected, obtained tables and chairs from the hotel, and made the best working environment we could. Since the competition started at 7 a.m., we did all of this work the night before so we could wake up and jump right into our project.

Each week, we documented the check items that were completed. They didn't include specifics, but a general note saying what we did and a brief descripting of the tasks. All of the specifics were compiled on the master USB's and our team binder. They were given to our advisor each week when we met with him. All of the memos present a pretty good idea of the

week to week progress made by our group, and they are included in the Appendix A: Weekly Memos.

3. Competition Day

As a group, we were given a project to look at and evaluate as “in-house experts” for Sundt, our project sponsor. Sundt wanted to see if we deemed the project feasible and justify our overall insight and advice on the project.

3.1. Project Scope

The problem consisted of two main objectives: the helices entrance ramps and the decks that make up the structure. Each component had required deliverables that were to be spoken to in a timely manner and eventually presented to the company. Figure 2, shown below, is an artist’s rendering of the rental car center, The “RAC”, that was our project.

Figure 2: The "RAC"

The two component deliverables can be seen as follows.

3.1.1. The Helices Ramps

The helices were a very complex structure used for entering and exiting The “RAC” center. The height and vertical twisting proved to be a very complex scenario that provided many challenges as far as constructability and formwork sequencing. Sundt wanted the concrete experts to provide them with the following objectives:

- Quantity takeoffs (cubic yards) on the walls as well as the elevated decks and beams.
- The pouring and forming sequencing for a single helix to be due before everything else that afternoon.
- A constructability plan that explains what challenges a contractor might face in regards to construction.
- To find any specific costs related to the challenges foreseen by the concrete solutions team.

Figure 3, on the next page, shows The “RAC” under construction; the image shows the airport in the background and just how little room there was on site for construction work.

Figure 3: The "RAC" Under Construction in San Diego, CA

3.1.2. The Decks

The decks were comprised of a massive amount of concrete with relatively little time to complete the pouring. The structure had a total of 2 million square feet of cast in place structural slabs that were divided into four decks, a foundation, and three elevated decks. The overall duration given to complete the project was 11 months. Sundt requested the following deliverables in regards to the decks:

- A logistic diagram showing the location of the cranes, placing booms, designated areas, etc.
- A deck numbering plan showing the construction joint locations and CYs/deck.
- A preliminary schedule to be turned in with the pouring and forming sequencing for a single helix.
- Feasibility of an 11 month schedule.
- A detailed description and sequence of activities for 4 different deck pours.

Once the decking and the helices were observed and analyzed, and our deliverables were completed, we were asked to put them in a sealed envelope and turned them in to the project sponsor by the deadline.

After the delivery of our requested documents were turned in, our team was then on the clock to prepare a PowerPoint and present it to a panel of judges that were current Sundt employees. The presentation consisted of a 20-minute long demonstration of our opinions and expressions on the project as a team. This presentation was dealt with how we approached the challenges presented in this complex project, as well as the solutions we developed to meet these challenges. The presentation was followed by a 10 minute Q&A session from the panel of judges. Once all the teams had presented, we were all invited back to review how Sundt actually went about scheduling and constructing the "RAC". After reviewing how the project was built and reviewing the major issues they ran into on the project, Sundt scored each team based on the project deliverables and the presentation. The scoring criteria used is shown below in Table 1.

Table 1: Concrete Solutions Scoring Criteria

Percentage	Points	Category
5%	5	Team Organizational Chart
40%	40	Evaluation form/schedules
55%	55	Team Presentation
+5%	5	BONUS – Indentifying the "Concrete Solution(s)"

3.2. Competition Timeline

The problem statement was presented at 7:00 AM the morning of the competition and was to be completed by 8:00 PM that night. Sundt, the project sponsor had made some of the deliverables due at an earlier time than the rest of the project deliverables; we were asked to produce a preliminary project schedule by noon and bring it with two team members to the sponsor to ask questions and hold a safety meeting. At the Sundt safety meeting, each team was assigned a time to present their deliverables the following day. We were assigned a 5:00 PM presentation time, so this gave us most of the next day to work on and rehearse our project presentation.

3.3. Project Presentation

The project presentation comprised roughly half of the scoring criteria, so the morning of the presentation day we got up, and we got ready to put forth our best effort of getting a presentation put together. To put our project presentation together, we had one person create the outline for Power Point slides, while everyone took their role in the project and created a component based on what they did. Since we had multiple people working on some of the deliverables, we had to divide the content evenly between team members, so that everyone got the same amount of time to talk on a subject.

Once the presentation was done, we rehearsed as a team multiple times, and individuals made note cards to fall back on during the presentation if need be. About an hour before our presentation, we felt we had done enough mock presentations to get our timing down. When it was time to present we were able to give a well thought out presentation of our project to Sundt. The Power Point slides used in giving our team presentation are shown in Appendix C: Team Presentation.

The presentation judges asked a wide variety of questions of each team member, and the allotted 10 minutes of Q&A session was used in its entirety. Some of the questions asked dealt with technical aspects of the project such as: explaining how we were going to form up the helices for concrete pouring, how we addressed concrete curing challenges, and giving more detail on how the helix pouring sequence would occur. Other questions asked ranged from dealing with the construction site logistics to more nontechnical aspects, such as how we would rank safety, quality assurance/quality control, and deadlines with respect to each other in terms of construction management. It was important during this Q&A session that the team answer the questions based on what we delivered for the project and not contradict what we put for our deliverables the previous day.

4. Post-Competition Reflections

We have come up with some things that we thought we did well and some things that we think we could improve on if we were to compete again next year. Our thoughts on what we did well and what we could have done better proceed in this paper.

4.1. What We Did Well Before the Competition

Leading up to the ASC Bidding Competition, our team made many strides and succeeded in many areas. There were some beneficial things done pre-competition, as well as mid-competition, that helped our team work towards the best problem solution we could. The things we did well before the competition include:

- Each week our group met with our advisor, Dr. Brian Kukay. We discussed the previous week's group actions, and talked about what we needed to do in order to prepare for the competition during the following week. Together, we set up a weekly checklist of work items including but not limited to gathering bid documents and building our background information database. The group would work towards completing those work items by the next weekly meeting.

- We obtained two separate bid documents for studying purposes. One set of bid documents we received from Hensel Phelps was on a previous substation project of theirs. The second set of bid documents were from a team that competed in the bidding competition in a previous year. We tracked down both of these bid examples, and they were helpful in that they gave us experience looking over drawings and diving into the specific details of each drawing. Since our problem given at the competition did not ask for any estimating or bidding, the estimation section of these two bids did not prove to be extremely helpful.

- Since we were the first Concrete Solutions team, we were required to start from scratch as far as our background information goes. We were a first year team in this competition category, and there was no real direction on what to expect on competition day other than we knew we would be presented a problem in the concrete construction arena. Our philosophy, in conjunction with our advisor, entering the completion in the Concrete Solutions division was that it would be a learning experience that would be beneficial not only to us, but future Montana Tech teams that would be competing in the division. Not knowing what to expect, we focused creating and understanding the general items contained in a construction (concrete) bid package. We set up estimate sheets, LEEDS checklists, a risk analysis plan, a QA/QC plan, equipment lists, etc. We compiled our database with a master binder and a couple of master electronic files that held all of our background information.

4.2. What We Did Well During the Competition

During the competition day, our team highlights are as follows:

- On competition day we had all of our supplies organized and ready. The night before the competition we set up our hotel room. Two tables were obtained from the hotel, and our hotel room was transformed into our "office". This allowed us to have a worry-free morning before we received our problem statement. Time was not taken out of the 12 hours given to us to complete any preliminary set up work which gave us a greater chance to succeed.
- We were confident in our presentation. We stuck with the solutions we had come up with as a team and did not go back on our word in front of the judges. This was important because it showed our team's accountability and reinforced the notion that we had given the problem statement the best effort we could with what we had.
- Throughout competition day, we all worked well together. We were all six in our "office" for twelve hours that day, and everyone was able to keep their wits about them and remain in good spirits. There were no major arguments or discrepancies among team members which made our work environment much more enjoyable and made everyone more productive.

4.3. What We Could Have Improved On Before the Competition

Overall, we did a fairly good job of preparing for the competition for what we were expecting. However, being the first team from Montana Tech to participate in our category, there were a significant number of lessons learned that we wish to pay forward. A few of these lessons include:

- Visiting some job sites and seeing the pouring sequences that had been used for the site would have been helpful. Seeing construction sites and the procedures used on site would give us some practical insight into the concrete construction realm and maybe help us see it from a contractor's perspective. Asking questions of the foreman and workers on site would also have been very beneficial in this type of competition. There were opportunities to visit Pioneer Concrete and Pioneer Technical in Butte to ask them questions and gain a better understanding of concrete construction best practices. Future teams definitely need to take advantage of the resources available in town.
- It was difficult to ascertain where to place our emphasis in preparation. Having been to the competition, we suggest looking into means/methods of concrete construction. It was looked into but not nearly as in depth as what was needed to perform to the level that we were asked by Sundt. In particular, formwork systems and complex pouring sequences involved definitely proved to be more than we could handle at the time. Future teams would benefit tremendously from investing time in going over means/methods and logistics of concrete construction.
- Other items include gaining proficiency with pouring sequences on large scale jobs and not so much on smaller scale concrete jobs like the one in the bid documents we were provided with from Hensel Phelps. The documents from Hensel Phelps were a huge

benefic with regards to seeing how pouring sequences should be set up and how they should be attacked. Future teams should build from those documents and add additional larger scale project documents to their own preparation documents.

- While the contracting aspects are important, the preparation should entail a broad-spectrum approach. Future teams would want to take note that, in the competition, it was a job that was already won by our company. We were just the concrete experts asked to evaluate and analyze if the project was feasible/constructible. There was very little in terms of materials that we were asked to quantify.
- Expect the unexpected. That way, if the problem statement is unexpected, tasks can be easily and quickly reassessed and assigned to individuals and the team can move forth. On our competition day, with an estimate and other bid related documents not being included in our project deliverables, some team members did not understand how to contribute. This made our team much less efficient as a whole. If the entire team has a good general understand and knowledge of concrete constructed, tasks can be reassigned to team members easily and the work can be completed efficiently.
- It would be recommended have at least a couple team members familiar and efficient with software scheduling programs such as Microsoft Project or Primavera. With more knowledge and skill using one of these programs, we could have used our time a lot more efficient. The company we dealt with expected detailed scheduling, and a better understanding of the software would have been beneficial.

4.4. What We Could Have Improved on During the Competition

A few of the mistakes that were made during the competition came from not having done the competition before. There are definitely a few points that could have been improved upon during the actual day of competition and they include the following:

- Communication is a key to success, and we definitely could have improved upon our communication skills. We all got along well, but not everybody knew what each other was expecting from one another. If team members would have communicated better that they were unsure of what to do, the project would have gone much more smoothly.
- Along the lines of communication again, we definitely did not take full advantage of the resources that were provided during the competition. The judges basically made themselves available for questions about the deliverables for the entire length of the competition. If we could do it again, we definitely wouldn't have hesitated to ask them questions any time we were confused about something. The judges were not very good about portraying how open they were for questions, so it would be wise to not be discouraged by that and simply ask questions if in future competitions.
- The presentation itself could have gone better. Once the presentation was made, we practiced it as much as we could, but we could have done better with some more repetition. Also, a better game plan could have been established on who would answer particular questions from the judges in the Q&A session. The questions included technical questions about our formwork, questions about our site utilization, and questions about our proposed day-to-day plans involving site logistics and material placement. If it could have worked out to have some industry experts come in sometime

leading up to the competition and ask questions during a practice presentation on a mock problem statement, we would have been much better prepared to answer questions of the caliber that were asked by Sundt.

4.5. Advice for Future Montana Tech Concrete Solutions Teams

To be successful in this competition, adequate team preparation is essential. Following is a list with descriptions of key components to help future Montana Tech Concrete Solutions teams prepare for competition. From the perspective of a group that has gone through this competition and has reflected on it, following these guidelines will provide a rewarding experience to teams that put their best effort forth.

4.5.1. Accountability:

It is important to find a good method to keep all group members accountable throughout the preparation phase of the competition. Every team member should be working towards a common goal, and all contributing to the team's effort. This competition covers a broad spectrum of concrte construction and requires all six group members to make contributions. The successful teams that you will compete against will have six team members that are each equally vested in the project assigned and have been preparing for competition day all year.

An idea for this is to hold weekly meeting(s) (outside of just meeting with an advisor) where the group not only talks about key items that need to be finished, but also works on their individual parts together. By doing this, every group member can see who is working or not working, and issues that arise can be addressed as a team.

It would be helpful to actually assign specific jobs to each person each week such as research topics, contacting outside sources, completing tasks, etc., and then holding each person

accountable at team meeting the following week to present the information they found. Everyone will then have to follow through on what they said they would do.

4.5.2. Concrete Construction Scheduling:

The concrete solutions category is very scheduling intensive. The morning of the competition we were asked to have a preliminary project schedule created and submitted by noon, which was a curve ball. This occupied most of our time in the morning trying to figure out how to sequence and schedule all the work required for our project in the allotted time while also trying to figure out how to enter all of the data in a scheduling software we were not very proficient with. It is important to have at least one team member who is very knowledgeable and efficient in working with Microsoft Project or, preferably, Primavera. Every group member, however, should have at least a good basic understanding of the scheduling and sequencing portion of construction work.

As a team, make scheduling a focus throughout the preparation phase. It is worth much more to your overall competition score than the quantity take-off and estimation portions which were worth very little to none.

4.5.3. Communication:

ASK QUESTIONS! There is no such thing as a dumb question; if something needs clarified, then do everything in your power to get it clarified. Before and during the competition, do not be afraid to ask as many questions of the problem sponsor (Sundt) as needed. Many issues that arise can be solved with a quick question and explanation, and this allows a team to move on to the next important topic that needs to be addressed without spinning your wheels on an issue needlessly.

On competition day, the problem sponsor is expecting questions throughout and is more than willing to answer all of them as best they can. Communication hurt our team, as we spent too much time trying to understand different aspects of the project and making wrong assumptions, while other teams simply asked Sundt any questions that they had and had them clarified immediately. Worst case scenario is the problem sponsor cannot answer the question(s) posed; you will not be penalized for asking for clarification.

4.5.4. Involvement with Other Teams:

Be involved and work with the other Montana Tech bidding competition teams (eg. Commercial, Heavy Civil, etc.). Bounce ideas off of each other, and discuss what each team is doing in preparation for competition day relative to one another. One team might have a great preparation method or team structure that would greatly benefit the other teams to implement, but with no communication, that great idea is not spread to all teams. In the end, all the teams are from Montana Tech, and there is no reason one team cannot help another. This holds true especially since the teams are competing in separate categories.

4.5.5. Industry Background:

Make sure the preparations you make include gaining practical knowledge about real concrete construction practices. Not all divisions are asked to complete a typical bid package for a construction project; this was the case for us. Basically, we were asked to analyze the constructability of our project and develop a detailed pouring and sequencing schedule for its various components. As a team, make sure everyone has a solid understanding of how the various aspects of concrete work is started and completed in the field. Reviewing and compiling information about concrete best practices would be a good starting point for exploring how to actually perform concrete work.

One good idea to do this, if possible, would be to contact an industry professional from the work force that deals with concrete work on a regular basis. Understanding concrete construction is more than just looking at and analyzing plan sheets. A lot could be learned from an industry professional pertaining to how they go about placing concrete trucks/pumps, approaching pouring sequences and schedules, concrete forming systems, and overall construction site-utilization.

4.6. Conclusion

To conclude, there were many advantages in competing in the bidding competition. We were able to gain experience in the concrete construction aspect of a massive project with many unique and challenging twists. We competed well, and ended up receiving a positive learning experience. Hopefully, our preparations and work will help future Montana Tech Concrete Solutions Teams.

Teamwork, accountability, and time management were a few of the soft skills that were required in this competition. We were able to practice these skills and work towards both individual and team improvements. Our goal is to share our experience with future competitors in the Concrete Solutions category and give them the valuable insight on what to expect from the competition. Hopefully our work will be the breaking ground that future teams can start with and use to succeed at the ASC Bidding Competition.

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Appendix A: Weekly Memos

Weekly Memos:

Week of 8/31 – 9/6

- Met with Dr. Kukay on Friday
  - Discussed team Strengths/Weaknesses
  - Went over 2013 pre-problem statement
  - Discussed game plan and strategy for assigning roles
  - Developed a meeting schedule

Week of 9/7 – 9/13

- Presented project and expected deliverables to Larry Hunter
- Group Meeting on Tuesday
  - Assigned roles to team members pertaining to last year's pre-problem
  - Obtained CAT performance handbooks for team members
- Met with Dr. Kukay on Friday
  - Got in groups of two and brainstormed details pertaining to ten most important categories of concrete solutions and contracting
  - Kukay gave us an agenda to complete for the next meeting:
    - Divide up the sheets of brainstormed details and assign to individual members
    - Attain reference material to start building a database binder involving those details
    - Make a master copy on Excel of all of the brainstormed ideas

Week of 9/14 – 9/20

- Group Meeting on Tuesday
  - Created the master copy on Excel
  - Found reference material including:
    - Temporary Structures
    - Traffic Control
    - Zoning
    - Safety
  - Started a time log to track working hours of team members
- Did not meet with Kukay due to homecoming week festivities
  - Spoke with Kukay and decided on meeting the following Thursday
- Contacted Barnard and decided on a date for them to come present concrete info
- Contacted Kiewit and they said they could send us an old concrete bid

Week of 9/21 – 9/27

- Group meeting on Tuesday
  - Worked on obtaining more reference material for the database binder
  - Updated time log

Week of 9/29 – 10/5

- Make sure to have a digital backup flash drive to go with the hard copy database we are collecting information on.
- Outline Chapters out of the CERM that pertain to our individual responsibilities:
    - Cole – Outlined Ch. 82
    - Wes – Outlined Ch. 80
    - Shane – Outlined Ch. 49&81
    - Ryan – Outlined Ch. 50&88
    - Nathan – Outlined Ch. 88
- Updated the Group Time Log Sheet
- Made a progress report for the week

Week of 10/6 – 10/12

- Work as a group on developing a list of potential materials and equipment that are going to be needed in the project.
    - Basic research on the equipment and materials that were drawn up by the group
    - Assign equipment and material types to group members to draw up a PowerPoint on and come back and present to the group
- Reach out to other universities for possibly obtaining old Concrete Solutions bids
- Contact Staples to get a printer for the competition
- Print out and familiarize with the competition rules
- Update Time Log Sheet
- Drew up weekly progress report

Week of 10/13 – 10/19

- Keep developing our individual 5 minute PowerPoint to present to another bidding team.
- Make individual presentations to show engineering economic analysis on the previously assigned criteria for Brian.
- Printed off and reviewed pre-problem statement for 2015 competition that was recently released.
- Updated time log sheet
- Drew up weekly progress report

Week of 10/20 – 10/26

- More competition research
- Attend meeting with Barnard for presentation tips
- Obtain concrete bridge plans and perform quantity and cost estimates on it
- Visit the Sundt website and look for insight on previous projects and construction methods
- Keep working at obtaining an old concrete solutions bid binder project
- Updated time log sheet
- Drew up weekly progress report

Week of 10/27 – 11/2

- Obtain a printer from Staples
- Reach out to the Montana State AGC club for any material to aid in preparation

- Sent out an email with Brian reaching out to a couple companies for any old bid binders or estimates pertaining to concrete projects
- Start to present each other material on tasks relating to our project potentially

Week of 11/3 -11/9

- Obtained a workshop concrete bid binder from Montana State
- Obtained a small concrete bid binder from Hensel Phelps
- Familiarized and researched on all the different concrete types to be possibly used on the project

Week of 11/10 – 11/16

- Start working on the estimates for the Hensel Phelps concrete project
- Begin developing a database spreadsheet to refer to for quantity estimates
- Set up and configure the printer
    - Start thinking about what all we need to bring down to Reno with us to allow for a smooth transition from Butte

Appendix B: 2015 ASC Student Competition Rules

ASC Regions 6 & 7 2015 Student Competition and

Construction Management Conference

February 4-7, 2015

JA Nugget Casino Resort Sparks, Nevada

Competition Rules ** Revised August 14, 2014 **

The following rules and procedures will be in effect for the 2015 competition. It is very important that they are read thoroughly, understood completely, and followed exactly to avoid any appearance of impropriety and the possibility of team disqualification.

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1.0 School Eligibility

2.0 Team Size, Makeup and Eligibility \

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4.0 Conflict of Interest

5.0 Competition Problem Statements and Conditions

6.0 Equipment and Room Setup

7.0 Registration and Time-line

8.0 Disqualification

1.0 School Eligibility:

Entries into the regional competitions will be accepted from undergraduate programs at colleges and universities located within that region. The Integrated Project, Mechanical, Virtual Design & Construction, Marine, Sustainable Building & LEED, Preconstruction Services, Determining Project Risk, Electrical, and Concrete Solutions problems will accept entries from any colleges and universities within any ASC region. The Alternates Competition is open to all students designated as an Alternate on a registered team. All current ASC Region member schools may enter a team, or teams, without charge. Non-member schools must join the ASC in order to register to compete. To Join the ASC contact Larry Grosse:info@ascweb.org

2.0 Team Size, Makeup and Eligibility:

Regional Competition in Heavy Civil, Commercial, Mixed Use, and Design Build: Each ASC Region 6 and Region 7 member school may enter a team comprised of up to six undergraduate student members, maximum, per competition problem.

Open Competition in Mechanical, Virtual Design & Construction, Marine & Technical Structures, Sustainable Building & LEED, Preconstruction Services, Determining Project Risk, Electrical, and Concrete Solutions: Each member school from all regions may enter a team comprised of up to six undergraduate student members, maximum, per competition problem (subject to the limits discussed below.)

Open Competition in Integrated Project: Each member school from all regions may enter a team comprised of up to six graduate or undergraduate student members, maximum (subject to the limits discussed below.)

No additional person(s) may perform as a helper, runner, or assistant for any team for either the regional or open competitions. Teams will be disqualified if any team has more than 6

members materially participating in ASC Regions 6 & 7 2015 Student Competition. This includes food runs! The use of cell phones to contact outside persons is not permitted except in an emergency or as deemed appropriate by the problem sponsor. It is imperative that all team members, coaches, students, and industry behave ethically throughout the entire competition.

Intent to Compete Registration begins on October 6, 2014 and is on a First Come First Served basis. Open Problem categories will be limited to twelve teams, maximum, so please register your intent to compete early. Universities that register a team and dropout after December 19, 2014 will not be allowed to compete in that Problem category the following year. Open Team registration above 12 teams will be at the problem sponsor's discretion. As of October 20, 2014, all schools may register additional teams in all categories up to a maximum number of 12 teams per category. In the event a school registers late in a regional competition, the last school to register an additional team may be asked to remove that team from competing.

Alternate Team Members not participating as a team member must assume the role as an ASC Student Volunteer or participate in the "Alternates Competition". The ASC Student Volunteer organizational meeting will be held Wednesday evening. The time and location will be provided at check-in.

All Teams: In the event that an original team member becomes ill or must drop out of the competition for any reason, the team composition may be changed by simply registering a new eligible team member. If, a substitution or change to the team must be made after registration closes, the problem sponsor judges and the ASC Competition Manager must be notified in writing by the authorized team coach. The notice must include; the school name, team name, competition problem category, name of individual being removed, name of individual being substituted, date and time. All schools may register up to two (2) alternates per team as identified

in the team registration form. Once the competition problem has officially begun, no substitutions or changes may be made.

For a student to be eligible to compete, that student must be enrolled in classes at that school for the term in which the student competition takes place. For a team to be eligible, it must be properly registered for the ASC competition. In addition, the faculty coach and all team members must register as guests at the JA Nugget Hotel, and must utilize these rooms during the competition.

All teams must be housed in the WEST TOWER of the JA Nugget and all coaches must be housed in the EAST TOWER (subject to space availability determined by the JA Nugget). Coaches are not allowed to enter the West Tower or any location where teams are competing once the competition has begun.

3.0 Spirit of Fair Competition and Professional Conduct:

The competition is deemed to be that period of time beginning with the problem sponsor's issuance of its problem packet, and will continue until after that team has presented its problem solution. Coaches should limit discussion with their teams prior to presentation to "good luck" or similar encouragement! Once the competition begins, only properly registered team members may participate in the solution of the problem. Team members must make every effort to avoid any source of "outside" information. No input from outside the team (e.g. Internet, phone calls, satellite hook-ups, team coaches, other teams, etc.). Internet access is allowed if it is officially stated as acceptable in the problem category pre-problem statement. No one may videotape, photograph, or capture in any other manner a team or team activity other than those teams from their school subject to the limitations outlined in this document.

Each ASC competition team shall designate a faculty coach who will accompany the team to the competition. Once the competition begins, the coach's role is limited to ensuring the competition rules have been followed and life-safety issues. The team should have no further contact with the team coach, or any others, until after the team has presented its problem solution.

During the competition, no one shall be allowed to be in any team work room or have any contact with the team except the problem sponsor. An emergency is the only exception where the faculty coach or other appropriate personnel may enter the room.

4.0 Conflict of Interest:

Team members that have any specific prior knowledge of a sponsor's competition problem must bring this to the attention of the Competition Managing Director and the problem sponsor in writing at the earliest opportunity. Refer to the problem categories pre-problem statement for additional information.

5.0 Competition Problem Statements and Conditions:

Each team will be presented with problem statement materials generated by the team sponsor. These materials represent the entire problem statement and scope of work. Questions, if any, may only be directed to the problem sponsor judges. It shall be the discretion of the judges whether a response is given to any question. Each team must strictly adhere to the specific time frames, deadlines, schedules, locations or conditions set forth in the problem. Failure to follow any of these may be cause for rejection, reduction in points or even disqualification from the competition.

Oral Presentations Regional Competition: No school's team member, team coach, other faculty members, registered students, or videographers may enter the problem presentation room

or view a presentation in a problem category in their Region until it is their team's designated time to present within that problem category. Violation of this rule shall be cause for immediate disqualification from the competition.

Oral Presentations Open Competition: No school's team member, team coach, other faculty members, registered students, or videographers may enter the problem presentation room or view a presentation in a problem category that their school is competing in until it is their team's designated time to present within that problem category. Violation of this rule shall be cause for immediate disqualification from the competition.

6.0 Equipment and Room Setup:

EQUIPMENT: A maximum of one computer per team member, (including laptops) and three printers plus, one plotter and one scanner per team is allowed; unless additional requirements are required by the problem sponsor. All-in-one printers are acceptable.

TEAM ORAL PRESENTATIONS: One LCD projector and a laptop computer will be supplied by the problem sponsor in each problem presentation room. Any additional equipment required for a presentation is the responsibility of the team. If your presentation requires specific software you must provide your own computer. Time to interface to the LCD projector will be allowed. Overhead transparency projectors are not provided. The ASC will provide a photo copy center for student use in preparing problem solutions. Each team should allow ample time to make any required copies. Delays or other problems caused by the copy room personnel or other hardware problems will not be considered by the judges as an acceptable excuse. At this time only photocopies made from an original print are available. ROOM SETUP: Teams are responsible for making their own hotel room reservations, and for providing and setting up all

necessary equipment within that room. All furniture provided within a team's hotel room must remain in that room. No fixture within a team's hotel room can be moved or altered.

TABLES: A maximum of two tables per team will be available to check out. Tables may be picked up at the far west end of each hallway in the "AREA OF RESCUE ASSISTANCE" on the following floors of the WEST TOWER:

Floor # 6

Floor #10

Floor #14

Floor #17

Floor #23

Floor #26

Please pick up tables between the hours of 12:00 pm and 5:30 pm on Wednesday, February 4, 2015. Tables must be returned to the Pavilion Foyer on Friday, February 6, 2015 between 10:00 am and 12:00 a.m. The tables will only be checked out to a team representative who must leave a photo ID card (Driver License or current Student ID card) as security. Please do not leave these tables in your guest rooms.

7.0 Registration and Time-line:

Oct. 6, 2014 Team Registration (Intent to Compete): Schools may register their intention to enter a team. Team roster (member names) must be posted prior to Dec. 19, 2014.

Oct. 6, 2014 Pre-Problem Statement Due: Problem Sponsors to have submitted pre-problem statements by this date. See Problem Previews.

Oct. 20, 2014 Additional Team Registration Begins: Schools may register additional teams in the same category on a space available basis.

Dec. 19, 2014 Team Registration Ends: No team may register after this date.

Dec. 19, 2014 Deadline for Team Member's Names: Names of all team members, team faculty coach, and alternates must be registered. Teams that do not provide team members and faculty coach names by this date will be removed.

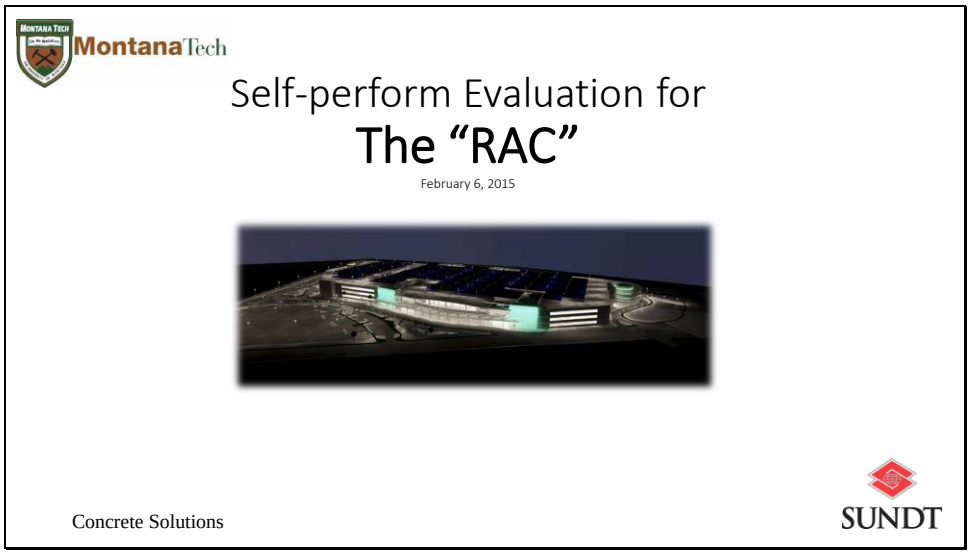
Feb. 4, 2015 Check-in: Students, coaches and other competition attendees may begin checking in and picking up team packets at the competition registration area on the 2nd Floor Convention Center at the Rose Ballroom Foyer from 11:00 AM - 5:30 PM. Late substitutions of team members can be made at that time. A special event name badge will be provided to all who register. This should be worn at all times. It will be required for admission to the welcome dinner, job fair, awards ceremony, and other sponsored events. The JA Nugget has asked that student teams utilize the Freight Dock area for unloading and loading equipment. The freight dock is located on the west side of the West Tower, just to the South of Interstate 80.

8.0 Disqualification:

The violation of any of these rules may result in a team's immediate disqualification as determined by the competition manager and the Region 6 and Region 7 directors

Appendix C: Team Presentation

Slide 1



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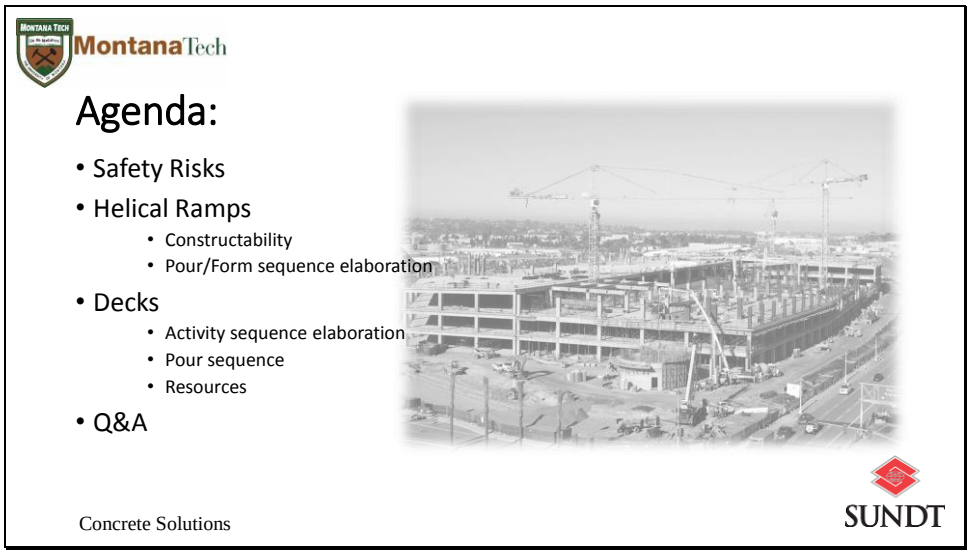

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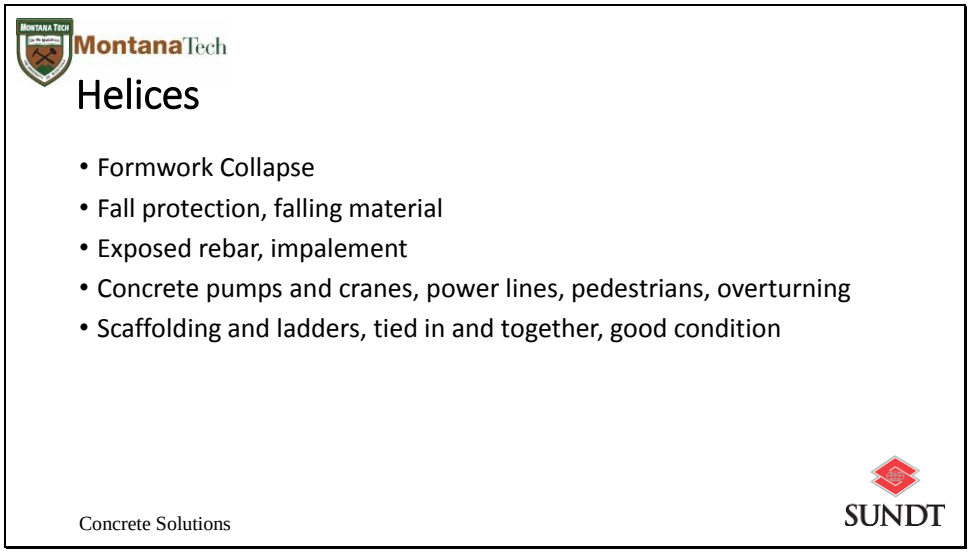

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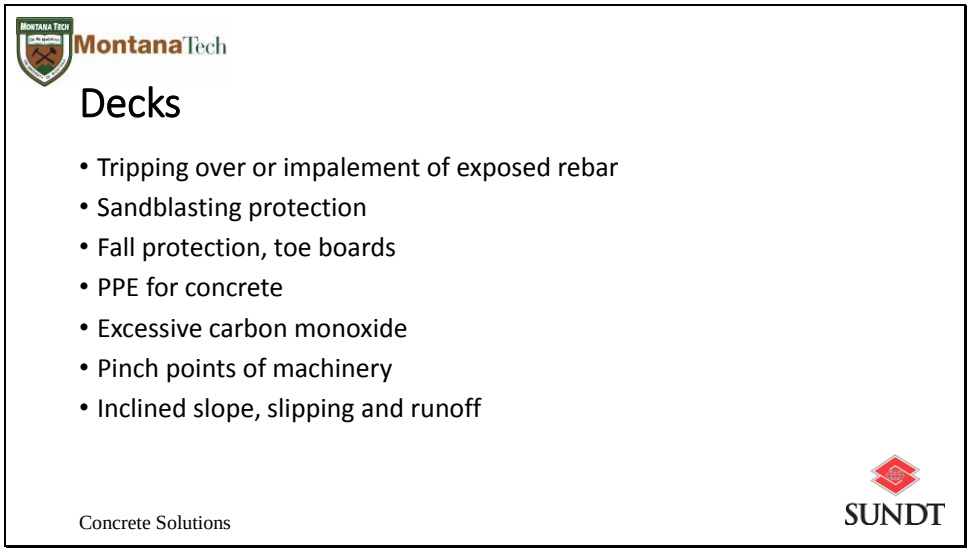
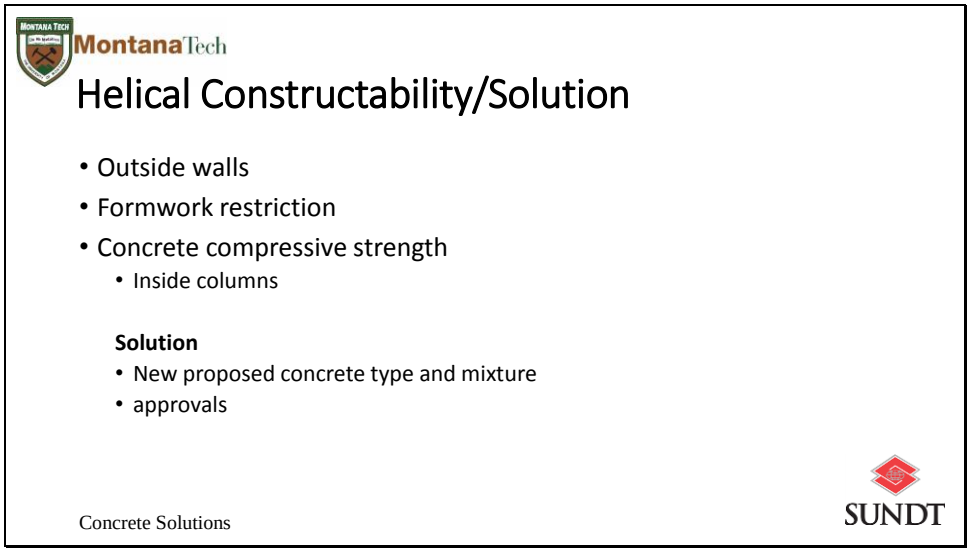


Slide 5

Slide 6



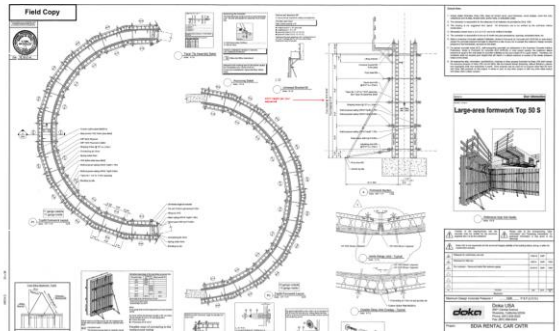
Slide 7

Montana Tech

Helical Formwork

Outside Wall
Formwork: 640 LF

Inside Column
Formwork: 314 LF



Concrete Solutions

SUNDT

Slide 8

Montana Tech

Helical Formwork

- Accelerated formwork set up and tear down with new concrete mix
- Around 5 weeks per Helix
- Pour in two stages
- Formwork take down after both pours
- Outside wall formwork
  - Needs extra bracing
- Shore after formwork in taken down until concrete is at max strength

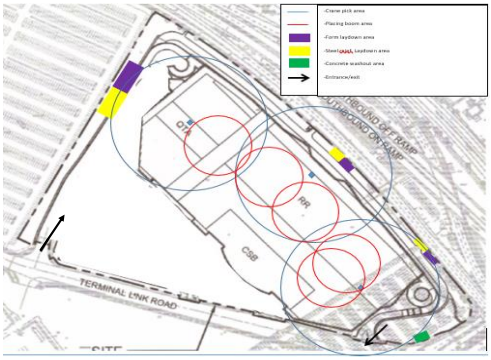
Concrete Solutions

SUNDT

Slide 9

Montana Tech

Site Map



Concrete Solutions

SUNDT

Slide 10

Montana Tech

Deck Pouring Plan

- Means/Methods
- Pouring Sequence
- Pouring Logistics

Concrete Solutions

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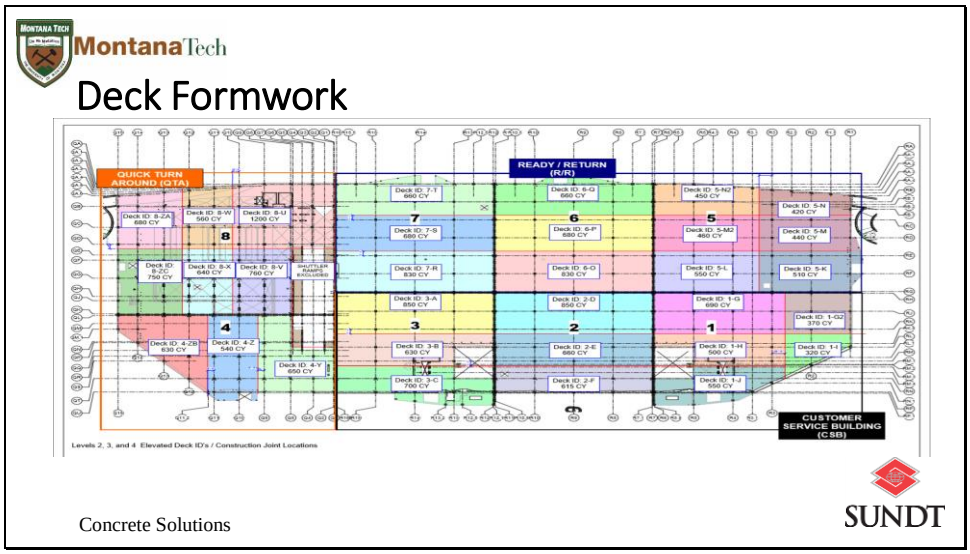
Slide 11



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