



Design-Build/Construction

April 6-8, 2017
hosted at University of California Irvine

1.0 PURPOSE

The Design-Build/Construction Competition allows students to gain experience and insight in two aspects of the Civil Engineering community: Design-Build and Construction Management. Students will learn about how firms go about designing and proposing a project bid, as well as going out to the field to manage and construct their project, all in a friendly competitive environment. Teams are expected to act as a design-build construction firm: preparing a project bid, competing with other companies (universities) for a contract, and then executing their plan of a feature that improves the student experience at the host campus. Teams will be required to complete their initial design and bid, and then plan, construct, and present their plan and the new feature. It is the goal of this competition to provide unique insight and hands-on experience for the next generation of design and construction engineers. The project itself is a real construction project, improving infrastructure within UCI while providing benefits to the campus community.

2.0 SCENARIO

Throughout the United States, we are able to observe how our infrastructure is slowly aging and degrading. Many repairs, retrofits, or redesigns are needed to improve the demands of today's population. UC Irvine, although one of the younger UC's at 50 years old, is no exception. Its facilities are under constant stress due to its everyday business.

One of UC Irvine's most important, and mostly used pieces of infrastructure are it's walkways. They serve as a primary form of access, to, from, and within the campus for students, faculty, and staff. Their quality is of great importance for safety and aesthetic purposes. Many factors are responsible for a sidewalk's initial design and construction to fail. This is why it is critical that when we redesign, we are considerate of what our finished product may endure over it's lifetime.

The 2017 Design-Build/Construction Competition attempts to address UCI's aging infrastructure through the rehabilitation of a walkway segment.

3.0 COMPETITION SCOPE

The Competition will be composed of three phases:

- Design Phase
- Planning and Bidding Phase
- Construction Phase

Teams are to be composed of a minimum of 4 team members and a maximum of 8. Each team is to have at least one female participant, and one undergraduate participant in each team. All participants must be an ASCE national student member, as well as a member of their respective student chapter at their campus.

Tasks may be delegated within a team to distribute the scope of the competition. Not all members will be able to construct at the same time the day of construction. Teams can choose to rotate their members during the construction phase, or they may choose to select 2-4 members to be part of the construction crew exclusively, while other members are in charge of other aspects of the competition. Final decisions are at the discretion of the project managers for each team.

3.1 Design Phase

In the Design Phase competitors will be given a detailed site plan of the construction site. The competitors will then be expected to create a completed set of plans on AutoCAD. Teams are required to design, develop, and execute a plan for the rehabilitation of an existing segment of sidewalk in the Henry Samueli School of Engineering at UC Irvine. The existing field conditions can be found in the appendix. Sidewalk alignment does not have to follow what is currently on site. Feel free to develop a new design for the walkway if you believe it will benefit pedestrian flow. The designed segment of walkway should include critical dimensions, major components, and materials.

To ensure that the designs are in compliance with competition specifications, **the first design submission will be due February 24, 2017; 11:59 PM. (Only a preliminary site design is due at this time.)** This submission will be reviewed for code and design requirement adherence and will be returned no later than **March 10, 2017**. Designs that are red-lined should be revised and resubmitted during the final bidding process. The final design is to be included in the final project bid.

Failure to submit a preliminary initial design will lead to school/team disqualification from the competition.

Designs must be created in AutoCAD, then plotted and submitted in PDF format. Preliminary design submissions must be submitted under the filename <SchoolName-DBC_Design_2017.pdf> to asce.uci.conference@gmail.com with <“School Name” PSWC Initial Design Submission> as the Subject title.

3.2 Planning and Bidding Phase

In the Bidding Phase competitors will prepare a formal project plan report that contains detailed construction planning information pertaining to each team’s project. Project Bid Plans will score points based on specific parameters within the bid, as well as bid format.

Bids are due March 31st, 2017, 6 days prior to the first day of construction and will consist of the elements described below.

3.2.1 Strengths, Weaknesses, Opportunities and Threats (SWOT)

Teams will prepare a SWOT analysis and show it in a table.

Minimizing risks and maximizing safety during construction are both high priorities for the competition. Each team will prepare a comprehensive list of risks and timely construction as part of their SWOT analysis.

3.2.2 Work Breakdown Structure (WBS)

A WBS will be prepared for the construction process and presented in a figure.

3.2.3 Schedule and Staffing

A table will be developed with the expected duration of each sub-task in the WBS and also showing precedence. A schedule will prepare showing expected start, end and duration of each task. This shall be prepared using a Gantt chart that is not more than one page wide (landscape). In addition to this chart, teams must also prepare a staffing plan that outlines which team members will be working on which construction tasks.

Each plan must include an estimate for the project construction. This includes costs of materials, labor, and equipment. These values are to be presented in an organized and professional manner. Material and equipment costs must be based on the monetary values given in the tables included in this package. Labor costs will be based on the number and duration of team members participating in construction.

3.2.4 Materials List

Teams are given the liberty to choose the necessary materials to implement their proposed design. Their construction documents should include directions on how to use the materials they propose. This list should be updated and quantities calculated based on the team's final design. The list must specify the amount of each material (weight, volume, count, etc.) being used.

3.2.5 Quality Management Plan

A description of methods and practices that ensure quality construction shall be included in the project plan and adhered to during construction.

3.2.6 Format

Teams are expected to present a professional bid that meets these requirements:

- a. General: 8.5" x 11" paper, One-inch margins, 12 point Times New Roman font, page numbers on all pages except cover page.
- b. Cover Page: Must contain school name, Firm/Team name, and competition name.
- c. Table of Contents: Must be limited to one page.
- d. Length: Must not exceed 15 pages.
- e. Professional looking format, clear and easy to understand.
- f. File Name: Must take the form: <School_Name-DBC_Bid_2017.pdf>

3.3 Presentations

3.3.1 Purpose of Presentation

The Presentation Phase is an opportunity for teams to communicate to judges and other teams about their design and construction methods. Teams will have the chance to present the process in which their project design had to go through to reach their final end result.

The presentation phase of this competition is essential to professional development as it gives teams a sense of what is to be expected in the professional world when a plan needs to be presented to a potential client.

3.3.2 Presentation Evaluation

Presentations will be judged based on clarity and content. All sections of the process for this competition should be addressed and elaborated on. It is crucial that teams discuss the ad-

vantages and disadvantages encountered throughout the designing of their plan. Presentations will be made the day of construction. This will allow for judges to have an idea of what each team has worked on for a successful bid and build. Presentation order will be random for each team, and may take place before, during, or at the completion of construction.

3.4 Construction

The Construction Phase will take place over half a day. Teams will be responsible for either the construction of concrete pads. The construction assignment to each team will be based on University procedure and site availability. Construction will be judged based on adherence to the construction plan assigned to each team, in addition to safety measures followed by each team. **Construction experience is NOT needed for this competition.** Facilitators will be at hand throughout the competition to assure a successful completion of all teams' assigned task.

4.0 SCORING

Overall scoring will be:

- Design (15 %)
- Completed Design Plan and Bid (40 %)
- Presentation (10 %)
- Construction (35 %)

4.1 Design (15% of total score)

Designs will be scored based on constructability, aesthetics, adherence to specifications, formatting and presentation quality. The document must be submitted by the submission deadline to be considered for the competition.

4.2 Completed Design Plan & Bid Submittals (40% of total score)

Plans will be judged based on adherence to the following categories:

Content and Completeness

- Completeness, having all required elements and sufficient detail to support the construction.
- Technical correctness, is the content reasonable and follow industry standards and definitions.

4.3 Presentation Phase (10% of total score)

During construction, each team will be set aside from their task so they could deliver a short, informal oral presentation on site to the judges about lessons learned from the design and construction phase, including takeaways from the projects and processes that they may have changed. Teams will be scored based on critical thinking and proposed solutions given in the presentation.

Teams will be given 3 minutes with the judges and other spectators/teams to present their proposed design and construction plan. Two (2) minutes will be given for questions. Questions from judges shall be given priority over others.

Teams will be scored based on:

- The completeness and effectiveness of the presentation.

- Adherence to time limits.
- Preparedness for questions.
- Professional conduct.

4.4 Construction Phase (35% of total score)

The Construction Phase consists of the physical work done to create the project.

Parameters:

- Teams will each be given materials and equipment based on what is required to complete the construction.
- No construction may take place prior to the competition.
- No outside materials may be used.
- The number of active team members may be no more than three (3) and no less than two (2) at any time during construction. Members are allowed to rotate with auxiliary members.

4.4.1 Quality & Effective Team Coordination (70 %)

Teams will be judged on how accurately their project follows the design and specifications provided the day of competition, as well as their overall quality of construction. Team members will also be evaluated to see how well they are able to work together.

4.4.2. Safety (30%)

Overall team safety is an absolute priority and teams will be observed for safe practices. All competitors must bring and wear required personal protective equipment (PPE) during the construction phase. Only safety glasses, full-length pants, close-toed shoes (preferably leather or canvas-type material, as running shoes with mesh cover offer little protection from wet concrete), and optional gloves (preferably leather or canvas-type material, which offer better protection than absorbent materials such as cotton) are required at this time. Additional PPE may be used if deemed necessary by individual teams. Teams will lose points for unsafe behaviors.

5.0 PROJECT TENTATIVE TIMELINE

This project is expected to span a course of eight months and consists of two phases: a design/bid phase and construction phase.

5.1 Design Phase

| | | | |
|------|----------|----|--|
| 2016 | November | 1 | Project Rules Released Design Specifications Released Design Period Begins |
| 2017 | February | 24 | Initial Design Submittal Due |
| | March | 10 | Designs Reviewed & Returned |
| | March | 31 | Final Bid Due |

Please note that dates are subject to change. Announcements will be made via email if there is changes to key dates.

5.2 Construction Phase

Due to site availability and University funding and procedure, construction sites may vary the day of construction. Designed team plans included in project bids, may not reflect the actual construction plan. Team site allocations will be released prior to the beginning of PSWC to the Project Managers of each team.

6.0 MATERIALS

Teams will be given building materials on the day of the competition. Teams should include the materials they believe is needed for the successful completion of their project in a list that is formatted similar to the one below.

Table 1: Building materials table example.

| Material | Price/Unit | Team Estimate |
|-----------|--------------------|---------------|
| Concrete | \$6.00/cubic foot | |
| Aggregate | \$50.00/cubic foot | |

Labor Cost: The rate of labor for one team member shall be set as \$20.00 per hour. Intervals of working hours shall be rounded up to the next half-hour. Estimated times for different construction phases should be determined by the competing team.

Tools and Equipment: Teams will be given identical equipment to use during construction. No additional tools may be used, unless approved. Teams should identify the tools they believe will be needed in their project plan, ahead of construction. If a team wants to use their own equipment, prior approval can be sought with the PSWC Design-

Build/Construction Administrator. The request will be considered and will seek that no team is placed at an advantage because of their tools.

7.0 CONTACTS

For any questions regarding the rules or competition, do not hesitate to contact:

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8.0 REFERENCES & APPENDIX

8.1 References

City of Irvine

- Engineering Standard Plans
 - Standard Plan 201 (Sheets 1-2)
 - Standard Plan 405

8.2 Appendix

Site Field Conditions - See next page

