

## Concrete Ladder Golf

**Due Date:** Paper must be received by March 1. Email your submission to [ASCEConference2015@gmail.com](mailto:ASCEConference2015@gmail.com)

### Overview

Students will compete in a single round elimination ladder golf tournament. The match-up will be chosen at random. Judging will be based on concrete mixed design and scoring in the tournament.

### Objective

The objective of the 2015 Ladder Golf Tournament is to have universities make a unique concrete mix design and compete in a fun and friendly competition.

### Eligibility

One team per school will be allowed to participate in the ladder golf competition. The team shall consist of exactly two (2) players allowing two (2) alternates between games. Only one (1) player may be a graduate student. Each team shall have a designated captain.

### Materials and Limitations

There will be a total of six (6) ladder golf stands (three sets) provided for the competition. Three (3) matches can play at a time. Each team is required to bring a minimum of four (4) concrete bolas, a maximum of six (6) bolas are allowed, (one (1) bola consists of two (2) concrete balls attached to a string).

#### Aesthetics

- Each school must place their bolas in a closed container, with a way to identify which school they represent.
- Any other decoration is encouraged
- Each bolas does not have to be decorated the same, creativity is encouraged.
- Paints and stains manufactured specifically for use of concrete are allowed for decoration.
- No more than one (1) coat is allowed, except for one (1) coat of transparent sealer over the decoration.



- More than one (1) color is permitted.
- Coating used for the bola shall not strengthen the structural integrity.
- No adhesives are allowed, or loose items attached to the bolas.
- There are no themes that the decoration must adhere to; decoration is entirely up to the team's preference.

### Dimension and Weight Limitations

- Both connecting spheres on the bola must have a minimum diameter of 1.68 inches and a maximum of 2 inches.
- Each bola must be symmetrical in dimensions and weight.
- The weight of each ball on the bola must weigh a minimum of 45.9 grams and a maximum weight of 65 grams.
- The connecting string must have a minimum length of 12 inches and a maximum length of 18 inches.
- The string used must not have an elastic nature of stretching 2 or more inches past its original length (when stretched by hand).
- Upon arrival to the competition the bolas will be inspected to meet these constraints. If the bolas do not meet the appropriate limitations, the school will be disqualified and will not be able to compete in the tournament.

### Ladder Golf Stand Dimensions

- The ladder golf stands will meet the requirements of a standard ladder golf stand.
- The width of the stand will be  $24 \pm 2$  inches.
- The height will be  $39 \pm 2$  inches.
- The spacing between each scoring rack will be  $13 \pm 2$  inches.
- There will be a total of three scoring racks.

### Concrete Mix Design limitations

- Portland cement must meet ASTM C150, but may be any subtype
- A maximum of 50% of the mass of the total cementitious material can be Portland cement.
- Other cementitious materials must be made up of one or more of the following: Fly Ash/Natural Pozzolans (ASTM C618) Slag Cement (ASTM C989), or Silica Fume (ASTM C1240). Additions of non-ASTM C150 cements as part of the cementitious materials are not permitted.
- The water to cement (w/c) ratio must not fall below 0.35 (This does not include aggregates presoaked in water).



- All aggregates must pass the #8 sieve, and be retained on the #200 sieve.
- At least one (1) of the aggregate types must be either a sustainable or recyclable aggregates.
- Chopped fiber assimilated in the mix design must not exceed 2% by volume.
- The chopped fibers must be greater than 0.25 inches and less than 0.5 inches in length.
- Any other material used to better the structural integrity of the bola is prohibited.
- A mix design spreadsheet (Figure 1) must be submitted.

*Mix Design Spreadsheet*

University Name	Competition Name (Ladder Golf)	Column 1: Amount per Ball	Column 2: Specific Gravity (SSD for Agg.)	Column 3: Proportions
Cementitious Materials	Portland Cement	lb	Unitless	lb/cy
	Cement Replacer	lb	"	lb/cy
	Cement Replacer	lb	"	lb/cy
	Cement Replacer	lb	"	lb/cy
Aggregates	Sustainable Aggregate - Recycled	lb	"	lb/cy
	Aggregate	lb	"	lb/cy
	Aggregate	lb	"	lb/cy
	Aggregate	lb	"	lb/cy
Fluids	Water	lb	"	lb/cy
	Chemical Admixture	oz	1	oz/cy
	Chemical Admixture	oz	"	oz/cy
Reinforcement	0.5"-1.5" Chopped Fibers	lb	"	lb/cy

1. Estimated Total Wet Weight (lb)	Sum of Column 1.
2. Estimated Ball Volume (ft <sup>3</sup> )	Calculated using Specific Gravities



3.Estimated Density (pcf)	Weight/Volume (1./2.)
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Figure 1

## Logistics

Each team will be required to bring a minimum of four (4) bolas and a maximum of six (6) bolas to the conference. The game only requires three (3), however bringing an extra bola is necessary in the event of a bola being lost, broken, etc. Teams are prohibited from borrowing other teams' bolas to be used for gameplay. Every team must construct their bolas to match the specified dimensions, weight, and mix design (part of the judging will be based on aesthetics). The team's captain will choose which three (3), of the six (6), bolas his or her team will use during the tournament.

*Note: Every submitted bola including back-ups will adhere to the judging.*

## Submittals

- Teams must have their concrete bolas constructed and decorated upon arrival to the 2015 conference.
- A mix design spreadsheet of the concrete bolas must be submitted via email to [ASCEconference2015@gmail.com](mailto:ASCEconference2015@gmail.com) with the university name and competition (Concrete Ladder Golf) no later than March 1<sup>st</sup>, 2015 (11:59:59PM EST).
- The bolas must be submitted on Friday, March 20<sup>th</sup>, 2015. (Location of drop-off TBA).
- Bolas will be returned to the teams (location of pick-up TBA), before the day of the tournament (Saturday, March 21, 2015).

## Judging

Every submitted bola will be judged on four (4) criteria:

- 1) Adherence to concrete mix design
- 2) Aesthetics
- 3) Completeness and accuracy of submitted mix design spreadsheet
- 4) Consistency of concrete design from bola to bola, as well as consistency of the bolas to the mix design spreadsheet

*Note: Judging for each category will result in a maximum of 75 points, deduction of points will include errors on spreadsheet, missing items from the spreadsheet, unorganized arrangement and presentation of spreadsheet. Maximum points will be awarded to the team(s) that have the least amount of errors/missing items from the spreadsheet, well organized*



*arrangement/presentation of spreadsheet as well as the best final product/aesthetically pleasing. This judging will not be scored until after the tournament.*

## Scoring

### Tournament Rules

The tournament will consist of a single match elimination in which only one (1) team will progress. Each match will consist of three (3) ladder golf games. The matchups for each round will be chosen at random by a lottery system. In the event of an odd number of teams competing, the last one drawn will enter a bye-round, in which the team will not play anyone but still progress to the next round. Points will be awarded to the top eight teams.

- 1<sup>th</sup> place – 260
- 2<sup>nd</sup> place – 228
- 3<sup>rd</sup> place – 196
- 4<sup>th</sup> place – 164
- 5<sup>th</sup> place – 132
- 6<sup>th</sup> place – 100
- 7<sup>th</sup> place – 68
- 8<sup>th</sup> place – 36

### Game Rules

Prior to playing the game a coin toss will take place to determine which team goes first. A line fifteen (15) feet away from the ladder golf stand will be set; where players must throw behind this tossing line. If the player steps over the line while tossing, the point will be nullified and a re-toss will not be permitted. Only one (1) bola is permitted to be thrown at a time. The game will consist of opponents alternating between throws (i.e. Toss order: team-1 player-1, team-2 player-2, team-1 player-3, team-2 player-4), this rotation will maintain in play when carried on towards future rounds. To win each round a team must get a score of twenty-one (21) or more per round. The game will be won in a best of three series. One (1) point is awarded to a player if their bola wraps around the bottom rung, two (2) for the middle rung, and three (3) for the top rung. Also, an additional bonus point will be awarded to the total score if a team wraps all three (3) bolas around a single rung. However, scores will cancel out if opposing teams wrap their bola on the same rung. For example, if Team-1 wraps one (1) bola on a single rung, and Team-2 wraps one (1) bola on that same rung; both teams will not be awarded any points. Teams



are allowed to knock off other player's bolas that are already wrapped on the rung. If a team's bolas happens to get knocked off from the opposing team they will not receive that point. Each team will use three (3) bolas during the game. Typical etiquette would be to maintain a high level of sportsmanship (i.e. refrain from trash talking). Safety is also very important when playing concrete ladder golf, please refrain from throwing your bolas anywhere but the ladder golf stand. This should be a fun and exciting game, while maintaining safety of both players and the audience.

### Weighted Scoring

Criteria	Maximum Points
Adherence to concrete mix design	75
Aesthetics	75
Spreadsheet accuracy	75
Consistency of concrete design	75
Tournament	260
Total Score	560

*Note: The team with the highest overall score will win the 2015 Ladder Golf Competition.*

### **Disqualifications**

As previously stated, any questionable issues regarding proper dimensions, weight, mix design, and decorative coating of the bolas will be determined by the head judges. The head judges have the capability to disqualify any team(s) that show characteristics of unsportsmanlike conduct, and do not meet the aforementioned requirements.

