University of South Alabama
Civil Engineering Department

Rules and Regulations

For

The Model Concrete Canoe

Presented by the Student Chapter of the American Society of Civil Engineers at the University of South Alabama
for the USA-ASCE High School Competition

Updated October 2026

Concrete Canoe Requirements

Each team will construct one concrete canoe alongside one concrete cylinder, with the same mix design, to be tested for floatation, structural stability, and a compression test of the concrete cylinder. Teams should also provide a mix design sheet and a poster, with additional details below.

Specifications

1. The canoe shall have a length of at least 12 inches and shall not be more that 18 inches.
2. The canoe shall have a beam width of 3 to 8 inches.
3. The canoe shall have an outside height of 3 to 6 inches.
4. The canoe shall have an inside depth of 2 to 4 inches.
5. Other elements of the canoe to include, but not limited to thwarts, ribs, and rockers, shall not be measured and their dimensions and locations are at the discretion of the team.
6. Canoes outside of the specifications will be disqualified and will not be judged.
7. Each entry must be original and not reused from any previous year's submissions. All entries should be created specifically for the current year's event.

Concrete Design

The concrete mix of the model canoe shall consist of any of the following materials:

1. Fly Ash, cement, fibers, aggregates, admixtures.
2. Admixtures such as Water-Reducing (Normal, Mid-Range, and High-Range), Set-Controlling Admixtures, Air-Entraining Admixtures, Coloring Admixtures/Agents and Concrete Pigments, and Polymer Modifiers are permitted.
3. Specialty Admixtures, such as but not limited to, shrinkage reducers, integral capillary water proofers, and viscosity-modifying admixtures are permitted.
4. Epoxy resins (such as acrylic, phenolic, and polystyrene resins), their curing agents, asphalt emulsions, or similar materials shall not be considered as specialty admixtures and are prohibited.

Poster Requirements

1. Posters are to be submitted upon arrival time on the day of competition.
2. Must include images from prototype development through completion (this can be but is not limited to photos of the canoe and of your team working on it).
3. A timeline of the design, prototyping, construction, and testing process is required on the poster.
4. Mix Design Sheet must be included. Failure to include the mix design sheet on your poster will result in a deduction of 5 points.
    a. Materials used: including all admixtures, pigments, and reinforcements.
    b. Specific gravity of each material used.

c. Water to cementitious materials ratio.
d. Aggregate proportionality.
e. Total water used.
f. Air content.
g. Theoretical, design, and actual density.

Reinforcement

Any materials may be used for reinforcement as long as it is encased within the concrete.

Floatation

1. Hollow cavities or air bladders are not permitted.
2. Flotation material that is incorporated into the canoe must be encased in concrete.
3. Flotation can be placed at any location inside the canoe as long as it is below the gunwale line.
4. Flotation pieces must be at least 6 inches from each other.

Concrete Cylinder

1. Each team will submit one 4 inch diameter, 8 inch tall concrete cylinder with the same mix design as the canoe.
    - Molds will be provided upon request

Testing

Structural Stability

1. To determine the structural stability, weights will be applied to the canoe while in water until it sinks or cracks.
2. The team that supports the most weight will receive the maximum number of points.

Floatation

1. The canoe shall pass a flotation test whereby the canoe floats horizontally such that the most exterior point of each canoe end breaks the water surface simultaneously within one minutes of being completely filled with water.
2. Canoes should be able to pass the flotation test either by the inherently buoyant design of

the canoe or through the incorporation of flotation material in the design.

3. Teams that pass the floatation test will receive the maximum number of points while teams that do not pass will receive zero points.

Concrete Cylinder

1. School and Group Name/Number must be on the cylinder at check in.
2. A compression test on the cylinder will be completed using a concrete compression machine.

- Transportation of the Concrete Canoe to the University of South Alabama, on the morning of, or days leading up to the judging, is the responsibility of the team.

Concrete Canoe Scoring Rubric

School Name: _____

Group Name/Number: _____

Category	Requirements	Points
Structural Stability	- First Place (30 points) - Second Place (27 points) - Third Place (24 points) - Nth Place (30-3(N-1) points) - Weight Held:_____	
Flotation	- Passes (20 points) - Fails (0 points)	
Concrete Cylinder (Compression Test)	- First Place (20 points) - Second Place (18 points) - Third Place (16 points) - Nth Place (20-2(N-1) Points) ** Bonus 10 Points for any cylinder reaching 6000 psf*	
Specification Points (5 Points Each)	- Length (12-18") - Beam (3-8") - Outside Height (3-6") - Inside Depth (2-4")	
Poster	- Images and timeline (3 points) - Mix Design (7 points) ** a-g must be included. There will be a 1 pt deduction for each piece of missing information.*	
Display of High School Name or Logo on Canoe and Cylinder	- 5 bonus pts for logo on canoe - 5 bonus pts for logo on cylinder	

Total:_____