The Spaghetti Bridge Competition 2018 Rules

Objectives

A spaghetti bridge building competition during which high school teams compete in a timed head to head competition to build a bridge that will have the best load to weight ratio.

Eligibility

High schools may sponsor more than one team. Each team is to be composed of no less than three (3), nor more than four (4), students, all of whom must be in good standing of the sponsoring school. A student may be listed and participate on only one team. An alternate team member, meeting the qualifications, may be listed on the entry form in case of the need for an emergency substitution prior to the beginning of the competition. Once the competition begins, no substitutions will be allowed.

Registration Fee

$20 per team; pay to "Orange County Community College Association" at the time of registration.

The Poster

Each team should produce a poster prior to competition, and bring it to the competition. The poster (typical poster board size) will be used to identify each team's building area and must include the team's name, school name, individual members' names, and coach's name.

Materials Permitted

The completed bridge may contain no other materials than the "spaghetti" and "glue" which will be applied with a hot glue gun. Each team will be provided with two (2) unopened, sealed box of new, major brand regular spaghetti and twelve (12) mini-glue sticks, as well as two electric mini glue guns. No spaghetti or glue other than that provided will be allowed.

Tools Permitted

Each team will be permitted to bring and use a limited number of tools, which they may use to assist them in the construction of the bridge. Tools permitted include scissors, needle nose pliers, tweezers, and clamps as well as other similar devices. Plans from West Point Bridge Designer 2016 and/or building templates may be pre-drawn and then used as tools to assist with building during the competition. No power tools or devices (other than the supplied glue guns) that generate heat will be allowed.

Design Requirements and Building Phase:

- ✓ An open truss bridge design must be utilized, created, and designed.
- ✓ The maximum amount of spaghetti and glue are limited as stated above.
- ✓ The bridge shall be free standing (not attached to the loading table in any way).
- ✓ Each bridge will be designed to sit on abutments with eighteen inches (18") clear span.
- ✓ A standard, wood #2 pencil will be supplied at check-in
- ✓ This pencil must be incorporated into the bridge so that the pencil is located within the center third of the span. The exact location of the pencil is up to the team. A bucket will be attached to an S hook placed on the pencil to hold the loading weights in the testing phase. Clearance should be provided such that the hook can be placed on the pencil without obstruction from other truss parts. The pencil must rest on both sides of the truss.
- ✓ Individual bundles of glued spaghetti may contain no more than six (6) strands. These six (6) may be arranged in any configuration.
- ✓ Support for the bridge shall be from the top of the level surfaces, and their edges may not be used for support in any way. Supports will be flat boards and cannot be moved to accommodate any particular bridge.
- ✓ No part of the bridge may be more than 2 inches below the support platform's surface.
- ✓ Teams will have 1.5 hours (10:00am to 11:30am) to design and construct their bridge.
- ✓ Anchorage of the ends of the bridge is not permitted.
- ✓ The bridge deck must be an open span. In other words, a car should be able to drive through your bridge from support to support. This will be tested by inserting a 3" high x 3.5" wide piece of foam through the length of your bridge resembling a vehicle. Be sure that your bridge will allow this foam to pass through by ensuring appropriate clearance. Foam pieces will be available during the building phase for teams to check their structures.
- ✓ The bridge must consist of purely two-force members. In other words, there may be no continuous spaghetti through a joint or connection.

Bridge Completion

Subject to the rules stated above, the organization of the building process and the actual management of the construction of the bridge will be left up to the individual teams. During this process, the teams are should stay at their building station.

At 11:30am, the bridge will be inspected by (1) judge and one (1) SUNY Orange committee member.

- ✓ The mass of the bridge will be recorded
- ✓ The dimensions will be checked
- ✓ The test "car" must pass freely across the deck of the bridge

Once weighed, no alterations or repairs will be allowed.

Testing

Weight will be hung from the pencil at the center of your bridge as follows:

- ✓ One team member will add mass (minimum 100g)
- ✓ A judge will determine if the bridge is still stable
- ✓ If the mass is held, it "counts" towards your score—you may go on
- ✓ Mass is added until your bridge is destroyed!

Scoring

$$\frac{\text{Mass held by bridge}}{\text{Mass of bridge}} \quad \begin{matrix}\text{(more is better)} \\ \text{(lighter is better)}\end{matrix}$$

Example:

A 1250 g bridge that holds 3200g has a score of $3200 \div 1250 = 2.56$

A 650 g bridge that holds 1800 g has a score of $1800 \div 750 = 2.77$