

Second Annual - Toothpick Bridge Building Competition

by [Stark County Engineer - Mike Rehfus, PE, PS](#)

ATTENTION

All Stark County High Schools

Enroll your high school to enter a team(s) in the 3rd Annual Stark County Engineer Toothpick Bridge Building Competition, to be held Saturday, February 16, 2008.

Don't miss this great opportunity for your students!

PRIZES:

- 1ST PLACE = \$100
- 2nd PLACE = \$50
- 3rd PLACE = \$25

If you are interested in participating, please contact Scott Basinger at the Stark County Engineer's Office, 5165 Southway St. SW, Canton, OH 44706 or fax (330-477-3926).

2008 TOOTHPICK BRIDGE BUILDING COMPETITION SPECIFICATIONS

DESCRIPTION: The objective of this event is to design and build a structure with the highest load-to-weight capacity ratio (Failure Load/Weight), over a predetermined span using toothpicks and glue. Each team may consist of 2 students and one supervisor, and may enter only one bridge. This is an engineering event; therefore, failure to adhere to the rules and regulations herein may result in disqualification from the competition.

Materials:

1. Flat or round toothpicks, probably 2 to 3 boxes.
2. Bridges shall be bonded using Elmer's white glue.
3. Some suggested tools for construction are as follows:
 - Glue • Hair Dryer for drying glue
 - Ruler / Scale • Exacto Knife Kit / Razor
 - Clamps • Construction plans
4. Design plan or drawing is optional but highly recommended and should be provided by the building team.

Construction:

1. Any type of bridge may be constructed as long as it meets the following specifications.
2. Do not coat the bridge with any material (i.e., paint, stain or glue).
3. All glue should be removed from surfaces that are not bonded together.
4. The bridge must be constructed to meet the following specifications:
 - [See Figure 1 for more detail](#)
 - a. The bridge will span an opening of twelve (12) inches on the loading table. Note that the bridge will need to be longer than twelve inches to allow for bearing on the table.
 - b. Bridge will only be allowed to rest on the loading table, provided by Stark County Engineer's Office. No glue or physical attachments may be made to the top or sides of the loading table.
 - c. Bridge width: Minimum = 1.5 inches
Maximum = 2.5 inches
 - d. Bridge height: Minimum = None
Maximum = 8 inches

5. The bridge must be able to accommodate the loading block (2"x2") at application point (see Note 5 under Testing). The loading block application point is at the midway point in the bridge. The loading block will be placed on top of the bridge or on the road bed depending on the design of the bridge.

Testing:

1. All bridges will first go to the Check Station where they will be weighed and measured for compliance with the construction specifications. Bridges that are completed but do not meet the construction guidelines will be given a chance to make any necessary alterations.
2. No alterations will be allowed unless deemed necessary by the Judges. If such alterations are required, the team will be allowed fifteen (15) minutes to complete them.
3. The Stark County Engineer's office will provide the loading block and testing apparatus.
4. During the test phase, the bridge will be placed in the center of the testing apparatus containing a span of twelve (12) inches.
5. The load will be applied to a 2"L x 2"W x 1/2"H loading block resting at the midpoint of the span. A standard five-gallon plastic bucket will be attached to the loading block. The roadbed must be constructed to accommodate the 2"-wide loading block and the one-fourth (0.25) inch eyebolt at the midpoint of the span.
6. The student(s) will add sand to the five-gallon bucket until the structure fails. For this contest, structural failure is defined as obvious structural collapse.
7. The total load incorporates the total mass of the loading apparatus, bucket and sand.

Scoring:

1. Overall ranking will be based on the structural stability score.
2. The structural stability score will be determined by the equation:
[maximum load supported (grams) / mass of bridge (grams)]

For more information:

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