



36th Annual  
Toothpick Bridge Competition  
Thursday, February 24, 2011

## 2011 Official Rules

Sponsored by the Fargo-Moorhead Engineers Club  
and Minnesota State University Moorhead

*The goal of the competition is to design the strongest possible structure to span at least 560 mm using only round wooden toothpicks and glue. The strength of the structure will be determined by dividing the load it supports by its weight.*

### Entrants:

The contest is open to any student, grades 1 through 12, plus any student enrolled full-time in college. Entrants will be assigned an entry class:

- Elementary (Grades 1-6)
- Middle School (Grades 7-9)
- High School (Grades 10-12)
- College

Bridges built by teams of students will be assigned the class of the student in the highest grade.

### Design Constraints:

**Mass:** The total mass of the structure cannot exceed 85 grams (3.00 oz)

**Span:** Each structure must span at least 560 mm clear of any supports.

**Height:** The overall height of the structure may not exceed 300 mm.

**Toothpicks:** Only round wooden toothpicks may be used (square toothpick with rounded ends will not be allowed). The toothpicks are to be glued together as they come from the box. No cutting, splicing, or fraying of the ends is allowed, except that tips at the top or end of the structure may be evened off to enable the weights to rest flat on the top and to allow the end of the structure to butt up flush with the supports.

**Glue:** Only a white glue, such as Elmer's, or a yellow woodworking glue, such as Titebond, may be used. Structures built with other glue will be disqualified.

**Coatings:** Structures may not be painted, sprayed or dipped in any coating material.

### Compliance:

At check-in, judges from the Fargo-Moorhead Engineer's Club will evaluate each bridge. Bridges will be weighed, measured, and reviewed for compliance with rules regarding materials. If a bridge does not comply with any of the rules, it will be disqualified from competing for the prizes, but may still be loaded to determine its strength. **The decisions of the check-in judges are final.**

### Supports:

The structure will be placed in or on supports made from two 2x4's as shown in the illustration.. Structures with no arch in the bottom chord will be placed on the supports to achieve the required minimum span. No lateral or side support is allowed.



### Loading:

Round metal weights, approximately 220 mm in diameter, will be placed on the top of the structure at the mid-span by the contestants until failure. A 160-mm round wooden disk will be available to place between the structure and the weights, if desired. Contestants may use cards to shim the base of the bridge level. Entrants in the elementary class may ask for assistance in loading their structures.

**In the interest of contestant safety**, the sponsors are exploring alternate means to load the bridges. The means of support will not change, but the load may be applied mechanically or hydraulically.

### Scoring:

Judges from the Fargo-Moorhead Engineers Club will record the total weight supported by the bridge. The judge will make the final decision as to whether a structure successfully supported the final weight before failure. The total weight supported will then be divided by the recorded weight of the structure to determine the strength ratio of the bridge.

### PRIZES:

The three strongest bridges overall will be awarded First, Second and Third Place prizes.

- First Place - \$125 and a certificate.
- Second Place - \$100 and a certificate.
- Third Place - \$75 and a certificate.

The next strongest bridge in each entry class will be awarded a Best in Class prize.

- Best in Class - \$40

A panel of judges appointed by the Fargo-Moorhead Engineers Club will view all the bridges as they are checked in, and will award a prize, based on quality of construction, and overall appearance.

- Best Appearance - \$40

All entrants who pre-register on or before Tuesday, February 22, 2011 will receive a Certificate of Participation when they check in. Entrants may pre-register on-line at <http://www.mnstate.edu/bridge> or by calling (218)-477-2480.

### Competition:

The competition will be held Thursday, February 24, 2011 at:

- Comstock Memorial Union Ballroom
- Minnesota State University Moorhead
- 6th Ave. South and 14th St., Moorhead, MN

Bring your bridges to the check-in tables. Parking is available in the lots to the west of the CMU. (Please call for parking instructions for busses.) Registration from 4:30-5:00 pm. Competition begins at 5:00. (If the number of entrants warrants, competition may begin upon checking in.)