

**STUDENT MODEL BRIDGE BUILDING RULES AND SPECIFICATIONS
2009
SOUTHERN NEVADA REGIONAL CONTEST**

ELEMENTARY AND MIDDLE SCHOOL SPECIFICATIONS

The following rules and specifications will be followed for the **Elementary and Middle School Divisions** of the Southern Nevada Regional Model Bridge Building Contest, to be held on **Saturday, February 28, 2009** at the campus of the University of Nevada Las Vegas, Thomas T. Beam Engineering Complex. Contact Paul Matuska at pmatuska@lc.usbr.gov if you have questions. For more information on the contest, visit our website at: www.usbr.gov/lc/region/programs/bridgebuilding.htm

Please read the specifications carefully! The specifications for the Elementary and Middle School Divisions have changed from past years and they differ from those of the HS Division.

The objective of this contest is to see who can design, construct and test the MOST EFFICIENT bridge within the following specifications.

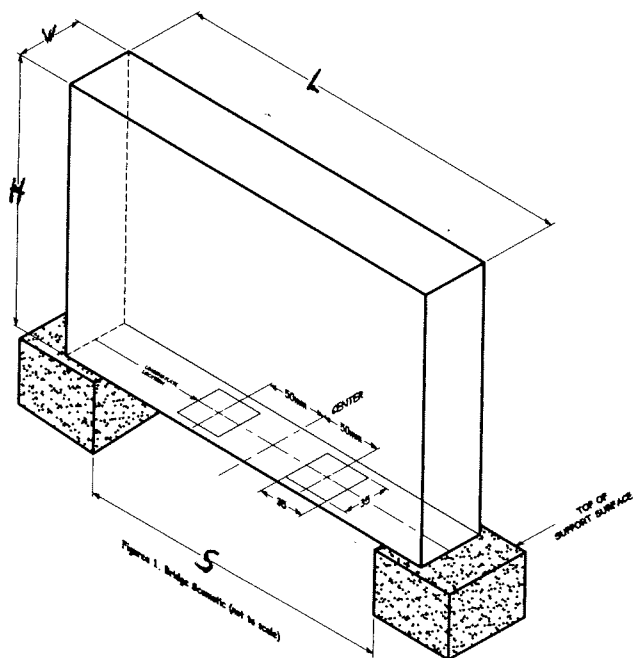
1. Materials:

- a. The bridge must be constructed only from the 3/32 inch square cross-section basswood included in the kit, which may be notched, cut, or laminated in any manner.
- b. Any commonly available adhesive may be used.
- c. No other materials may be used. Do not paint or stain the bridge.

2. Construction:

Conversion factors: 10mm = 1cm (300mm = 30cm); 1in = 25.4mm

- a. The bridge must weigh no more than 35.0 grams (1.23 ounces).
- b. The bridge must span a gap (**S**) of 300mm (hint: bridge must be longer than 300mm), be no longer (**L**) than 400mm, be no taller (**H**) than 75 mm above the support surface, no wider (**W**) than 80mm and no narrower than 40mm. No part of the bridge may extend below the support surface (see **Figure 1**).
- c. The bridge must be constructed to provide support for the loading plate at two locations, 50mm to each side of the center of the bridge, (see **Figure 1**).
- d. The load will be applied with the loading plate centered over one of the loading points described above. Any portion of the structure above the loading point must provide clearance for the loading plate to be lowered into position from above.



3. Loading:

- The load will be applied from above by means of a 35mm square plate that is 10mm thick. A 9.53 mm diameter loading rod is attached to the center of the plate (**see Figure 2**). The plate will be horizontal, have a flat bottom and will not pivot on the loading rod.
- During competition, loading will continue until the bridge experiences failure (see 4d, below).

4. Testing:

- The bridge will be centered on the support surfaces.
- The loading plate will be placed on the bridge at the specified loading location.
- The load will be steadily applied from above, as described in section 3a.
- Bridge failure is defined as the inability of the bridge to carry additional load, or a deflection of 25mm (1 inch) under the loading point, whichever occurs first.
- The bridge with the highest structural efficiency, E , will be the winner.

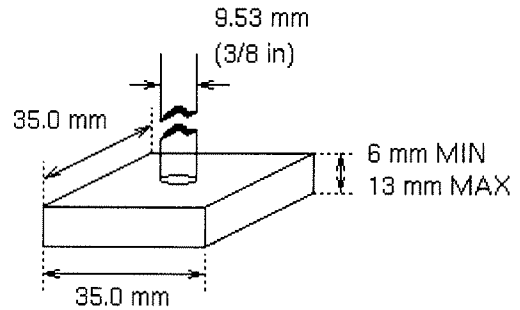


Figure 2. Loading Plate Detail

$$E = \text{Load supported in grams} / \text{weight of bridge in grams}$$

5. Qualification:

- All specifications will be checked prior to testing. Bridges which do not meet the specifications at the conclusion of the allowable time for check-in (5 minutes prior to your school's scheduled testing time) will be disqualified. If physically possible, disqualified bridges will be tested unofficially and scored for the builder.
- If, during testing of a bridge, a condition becomes apparent which prevents testing as described in section 4 above, that bridge will be disqualified. If the disqualified bridge can accommodate loading, it may still be tested unofficially as stated above.
- Decisions of the judges are final.

A **Teacher's Workshop** will be held in the Thomas Beam Engineering Complex, on January 14, 2008 from 4 – 6pm, in the B building of the Thomas Beam Engineering Complex at UNLV. At the workshop, we will discuss the specifications, bridge design, and ideas for presenting this program in the classroom. Directional signs will be posted on the day of the workshop.

The **School Competition** traveling trophy in the Elementary Division will be awarded to the school with the highest average efficiency for its best **three** bridges. The **School Competition** traveling trophy in the Middle School Division will be awarded to the school with the highest average efficiency for its best **five** bridges. Make sure you enter at least five bridges for the best chance to win the Middle School Competition.

Have fun and we'll see you on February 28th.