

North Pocono Bridge Building Contest

The North Pocono Bridge Building Contest will take place on December 22, 2014 immediately after school in room 104. The contest will test the strength of each person's bridge based on the criteria set by the International Bridge Building rules. The top 3 bridges from the school competition will be invited to rebuild their bridges to compete at the Northeastern Pennsylvania Regional bridge building contest.

Student may only use the materials found in the rules manual. Students may work on their bridges, at school or at home. Tools will not be allowed to be taken from the school. Students that want to work on their bridges at school, may do so during any free time in room 104, 308, or a room approved by Dr. Croom. The students may also stay after school to work on their bridges during any of the Science Olympiad meetings. The schedules for these meetings can be found at www.npscioly.org.

Let Dr. Croom know via e-mail that you are interested in competing at the NP competition before Wednesday November 21.

2015 International Bridge Building Specifications

The official rules are found at http://bridgecontest.phys.iit.edu/public/international/2015/international_rules

1. Materials

- The bridge must be constructed only from the **official 3/32 inch square cross-section basswood included in the kit** and any commonly available adhesive.
- The basswood may be notched, cut, sanded or laminated in any manner but must still be identifiable as the original wood.
- No other materials may be used.
The bridge may not be stained, painted or coated in any fashion with any foreign substance.

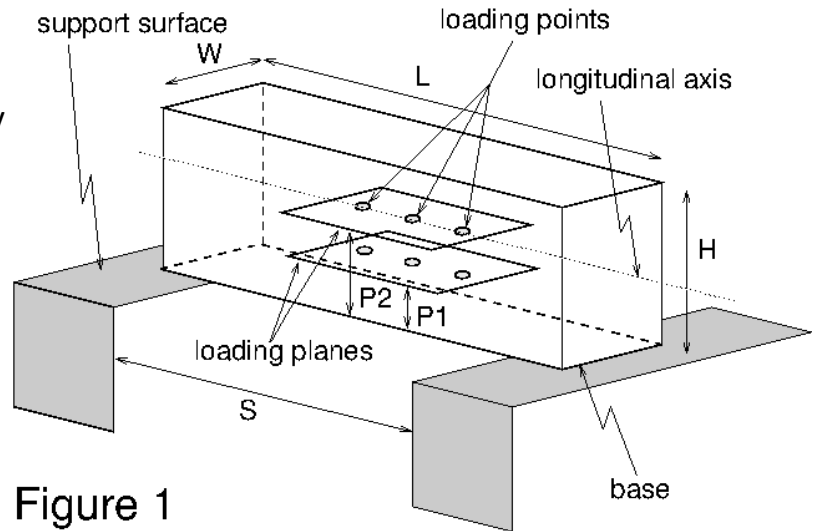


Figure 1

2. Construction

- The bridge mass shall be no greater than 30.00 grams.
- The bridge (see Figure 1) must span a gap (**S**) of 300. mm, be no longer (**L**) than 400. mm, have a maximum width (**W**) of 80. mm, be no taller (**H**) than 150. mm above the support surfaces.
- No portion of the bridge may extend below the top of the support surfaces.
- The two loading planes (**P1** and **P2**) shall be horizontal and shall lie between 0. mm and 10. mm (**P1**) and 50. mm and 60. mm (**P2**) above the support surfaces.
- The bridge must be constructed such that both loading planes are continuous with clearance provided for the loading rod to be attached to the plate and hang down vertically through the bridge below each loading point (see section [3](#) below) . No optimization for a specific plane or loading position will be permitted.

3. Loading

- The load will be applied downward, from below, by means of a 40.0 mm square plate (see Figure 2) resting on the loading plane of the bridge. The plate will be no more than 10. mm thick and will have a 9.53 mm (3/8 inch) diameter eyebolt attached from below at its center. Force will be applied to the loading plate by means of an apparatus shown schematically in Figure 3.
- The two edges of the loading plate will be parallel to the longitudinal axis of the bridge at the time of load application.

- c. The load will be applied on the longitudinal axis of the bridge at one of six loading points: center and 50. mm on either side of the center of the 300. mm span **on each of the two loading planes.**

4. Testing

- a. On the day of the contest, a 6-sided die will be cast to determine which loading location is to be used. It will be the same for all bridges.
- b. The bridge will be **centered** on the support surfaces.
- c. The loading plate will be placed on the bridge at the specified loading location and the load will be applied from below, as described in section 3 above.
- d. Competition loading will stop at 50. kg. However, loading will continue until bridge failure.
- e. Bridge failure is defined as the inability of the bridge to carry additional load, or a load deflection of 25. mm under the loading location, whichever occurs first.
- f. The bridge with the highest structural efficiency, E , will be declared the winner. Bridges failing above 50. kg will be considered to have held 50. kg for efficiency calculation.

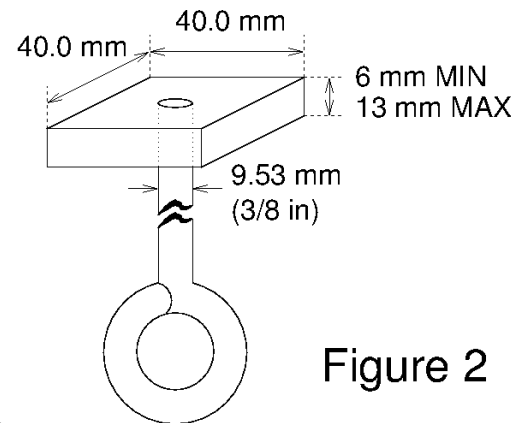


Figure 2

$$E = \text{Load supported in grams (50,000g maximum)} / \text{Mass of bridge in grams}$$

5. Qualification

- a. All construction and material requirements will be checked prior to testing. Bridges failing to meet these requirements will be disqualified. If physically possible, disqualified bridges may be tested as exhibition bridges at the discretion of the builder and the contest directors.
- b. If, during testing, a condition becomes apparent (i.e., use of ineligible materials, inability to support the loading plate, bridge optimized for a single loading point, etc.) which is a violation of the rules or prevents testing as described above in Section 4, that bridge shall be disqualified.
- c. Decisions of the judges are final; these rules may be revised as experience shows the need. Please check our web site, <http://bridgecontest.phys.iit.edu> after January 15, 2015, to learn whether any changes have been made.

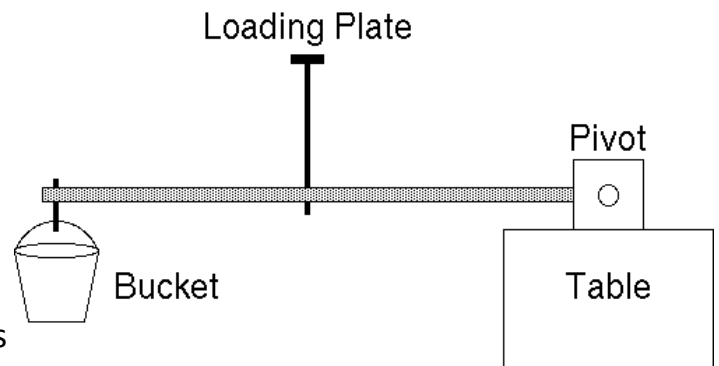


Figure 3