2022 International Bridge Building Contest Rules

These rules have been developed by the International Bridge Building Committee for the **Forty-Fourth International Bridge Building Contest** to be held on **Saturday, May 7** in Covington Township, Pennsylvania, USA. If you have a question about the contest that is not answered by our FAQ, please direct it to Director, NEPA Bridge nepabridge@gmail.com.

In order to receive **official** wood and participate in this contest, a High School student must have placed first or second in a Regional Contest and be reported, by the Regional Coordinator, to Director, NEPA Bridge by e-mail: nepabridge@gmail.com. Students may participate in person, by proxy or by mail entry.

The object of this contest is to see who can design, construct and test the **most efficient** bridge within the specifications. Model bridges are intended to be simplified versions of real-world bridges, which are designed to permit a load to travel across the entire bridge. In order to simplify the model bridge design process, the number of loading positions is reduced, and to allow the contest to proceed in a reasonable amount of time, only one loading position is actually tested. These simplifications do not negate the requirement that the bridge must be designed to accept a load at any of the positions. Bridges determined by the judges to not meet this requirement will be disqualified and tested as unofficial bridges.

1. Materials

   a. 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.
   b. The official basswood may be notched, cut, sanded or laminated in any manner but must still be identifiable as the original official basswood.
   c. No other materials may be used. The bridge may not be stained, painted or coated in any fashion with any foreign substance.

2. Construction

   a. The bridge mass shall be no greater than 25.00 grams.
   b. The bridge (see Figure 1) must span a gap (**S**) of 300. mm, be no longer (**L**) than 400. mm, be no taller (**H**) than 150. mm above the support surface, and no wider (**W**) than 80. mm at the loading surface. The bridge structure may not project below the support surfaces (see Figure 1) and must provide a clearance (**C1**) of 20. mm at the center of the span and for 100. mm on either side of the center (**C2**).
   c. The bridge must be constructed to provide a horizontal support for the load at each of the three possible loading locations (see **3c**). Any portion of the structure above the loading plane must provide clearance for the loading plate and for the eyebolt which extends below the plate (see **3b**).

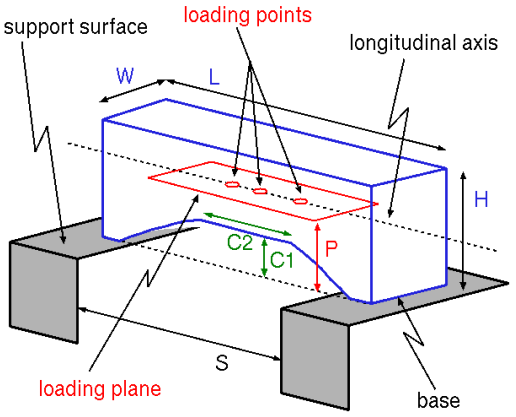

Figure 1. Bridge schematic (not to scale).

   d. The bridge must be constructed to allow a 48 mm diameter, 300. mm long pipe (1.5 inch schedule 40 PVC pipe) to be passed horizontally across the bridge with the pipe's lower surface on the loading plane (**P**) between 80. and 120. mm above the support surface. This pipe must touch all three loading locations simultaneously.

3. Loading

   a. On the day of the competition, the judges will decide which one of the three loading points will be used; it will be the same for all bridges. Competition loading will stop at 50. kg, loading will continue until bridge failure (see **4d**)
   b. The load will be applied by means of a 40. mm square plate (see Figure 2) with a thickness (**t**) of at least 6 mm but less than 13 mm. A 9.53 mm (3/8 inch) diameter eyebolt is attached from below to the center of the plate. The plate will be horizontal and will be mounted with two edges parallel to the longitudinal axis of the bridge.
   c. The load will be applied with the center of the plate at one of three (3) possible loading points on the longitudinal axis of the bridge: The center, 30. mm to the left of center and 40. mm to the right of center. The 3 loading locations must lie in the same horizontal loading plane (**P**) between 80. and 120. mm above the support surface (see Figure 1).

4. Testing

   a. On the day of the competition, the bridge will be centered on the support surfaces.
   b. The loading plate will be lowered from above on the bridge at the selected loading location with two edges of the plate parallel to the longitudinal axis of the bridge.
   c. The load will be applied from below, as described in section 3 above. Competition loading will stop at 50. kg. However, loading will continue until bridge failure (see **4d**).
   d. 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.
   e. 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.

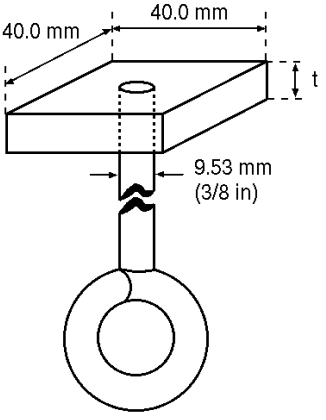

Figure 2. Loading Plate Detail

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

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 February 10, 2022, to learn whether any changes have been made.

Last update: October 28, 2021

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