

## 2018 NEPA Regional Bridge Building Competition Criteria

These rules have been developed by the International Bridge Building Committee for the **2018 International Bridge Building Contest** to be held on **Saturday, April 21, 2018** in Chicago, IL, USA. These rules have also been adopted by the **Northeast Pennsylvania Regional Bridge Building Competition** to be held **Saturday, February 24, 2018** (Snow Date TBD, 2018) at The Marketplace at Steamtown in Scranton, PA.

**In order to receive official wood and participate in the contest, contact Paul Schneider by e-mail at [nepabridge@gmail.com](mailto:nepabridge@gmail.com). Each school is limited to three bridges from 3 different competitors (**NO TEAMS ARE PERMITTED**). Students may participate in person, by proxy, or by mail entry.**

Please visit our website [www.neparbdgblg.com](http://www.neparbdgblg.com) for specific suggestions and information relative to our competition. If you have any questions, please feel free to contact: Paul Schneider at [nepabridge@gmail.com](mailto:nepabridge@gmail.com).

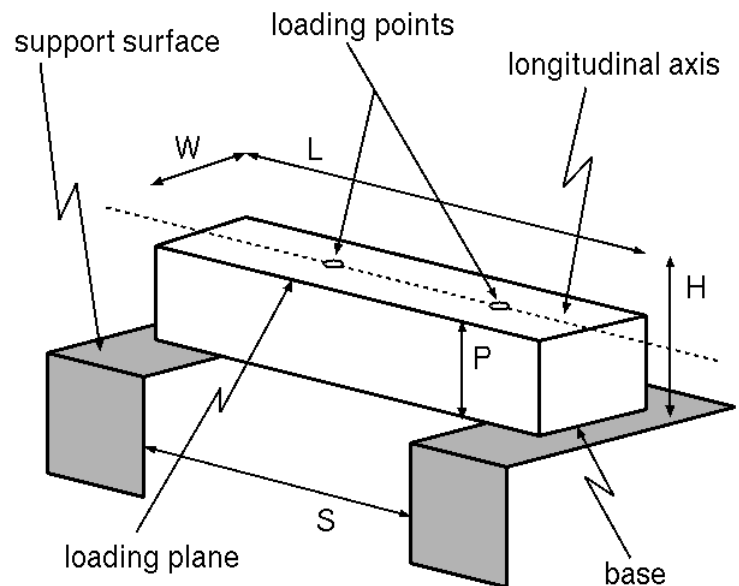
The object of this contest is to see who can design, construct and test the **most efficient** bridge within the criteria established below. Model bridges are intended to be simplified versions of real-world bridges, which are designed to permit a load to travel across the entire bridge. In order to 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

- 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 basswood.
- No other materials may be used. The bridge may not be stained, painted or coated in any fashion with any foreign substance.

### 2. Construction

- The bridge mass shall be no greater than **25.00 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**, and be no taller (**H**) than **150. mm** above the support surfaces.
- The bridge must be constructed to provide a horizontal support for the loading plate and at each of the two possible loading positions (see 3c). The bridge structure must allow the loading rod (see 3c) to be mounted from below.
- The bridge must be constructed to allow a **48. mm** diameter, **400. 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 100. mm** above the base of the bridge. This pipe must touch both loading locations simultaneously (see 3c).
- The bridge structure may not project below the support surfaces (see Figure 1).



**Figure 1. Bridge schematic (not to scale).**

### 3. Loading

- Competition loading will stop at **50. kg**, loading will continue until bridge failure (see **4d**).
- 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 linkage is attached from below to the center of the plate. The plate will be horizontal and will be mounted with its edges parallel to the longitudinal axis of the bridge. Force will be applied to the loading plate by means of an apparatus shown schematically in Figure 3. The minimum initial load will be **2. kg**.
- The load will be applied with the center of the plate at one of two (2) possible locations on the longitudinal axis of the bridge: **30. mm** to the left and **60. mm** to the right of the center of the bridge span (see Figure 1). The two loading locations must lie in the same horizontal plane. This loading plane must lie a distance (**P**) between **80. mm** and **100. mm** above the base of the bridge.
- On the day of the competition, the judges will decide which one of the two loading locations will be used; it will be the same for all bridges.

### 4. Testing

- On the day of the contest, contestants will **center** their bridge on the support surfaces. The judges will apply the loading plate and linkages to the selected loading position with the edges of the plate parallel to the longitudinal axis of the bridge and make attachments to the apparatus.
- 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**).
- Bridge failure is defined as the inability of the bridge to carry additional load, or a load deflection of **25.4 mm** under the loading location, whichever occurs first.
- 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.

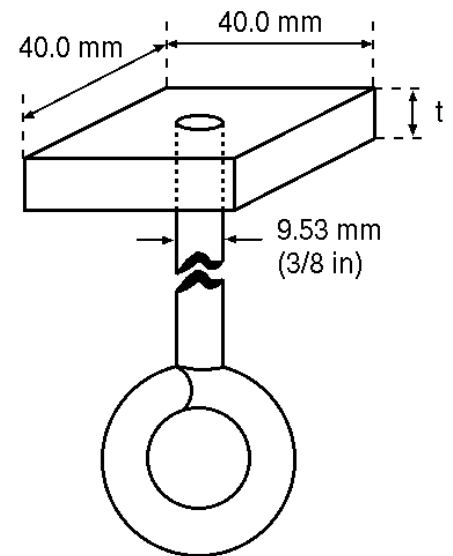


Figure 2. Loading Plate Detail

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

### 5. Qualification

- All construction and material requirements will be checked prior to testing and may be checked after 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.
- 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. If the disqualified bridge can accommodate loading, it may still be tested as an exhibition bridge as stated above.

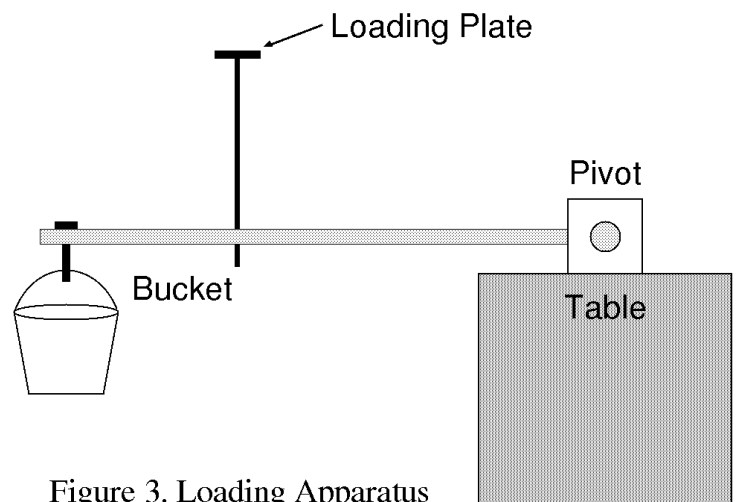


Figure 3. Loading Apparatus

**Decisions of the judges are final;** the above rules will not change for the Northeast Pennsylvania Regional Bridge Building Competition even if the International Rules are changes after our printing of this criteria.