



2008 CH2MHill / OSU High School Model Bridge Contest Rules

These rules have been developed for the **2008 CH2MHill / OSU High School Model Bridge Contest** to be held on Saturday, **February 23, 2008** at Oregon State University, Corvallis, Oregon. Questions about these rules should be directed to [Preston Baxter](#) at 541.768-3164. The object of this contest is to see who can design, construct and test the **most efficient** bridge within the following specifications.

Model bridges are intended to be simplified versions of real-world bridges, which are designed to accept a load in any position and permit the load to travel across the entire bridge. In order to allow the contest to proceed in a reasonable amount of time only one loading position is actually tested.

1. Materials

- The bridge must be constructed only from 3/32 inch square cross-section basswood and any commonly available adhesive.
- The basswood may be notched, cut, sanded or laminated in any manner.
- 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 (**G**) of 300. mm, be no longer (**L**) than 400. mm, have a maximum width (**W**) of 80. mm, be no taller (**H**) than 200. mm above the support surfaces.
- No portion of the bridge shall extend below the top of the support surfaces.
- The loading plane (**P**) shall be horizontal and shall lie no more than 50. mm above the support surfaces. The bridge may extend above the loading plane as long as clearance is provided for the U-bolt, loading plate and U-bolt nuts.
- The bridge must be constructed to provide for the loading plate (see section 3, below). Clearance for the U-bolt to hang vertically through the bridge will be provided by two 12.7 mm (1/2 inch) holes centered 50. mm on the middle of the 300. mm gap.

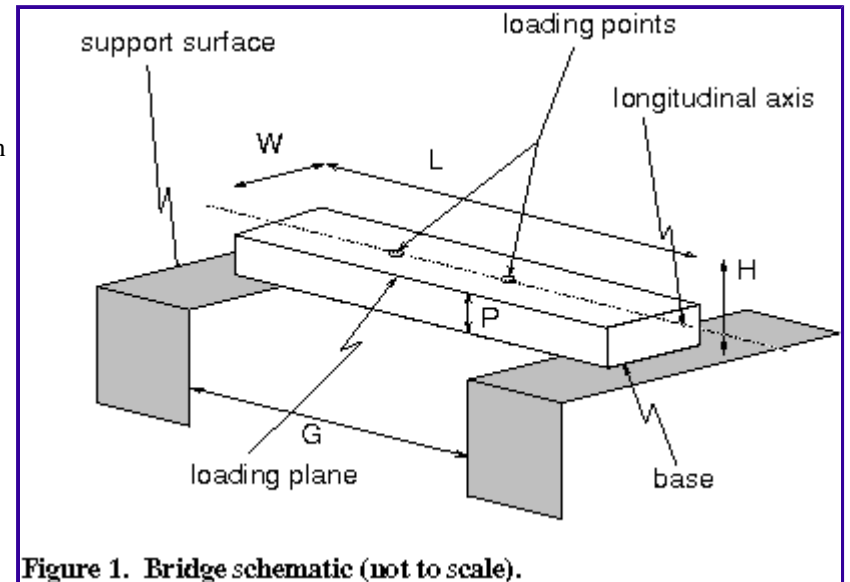


Figure 1. Bridge schematic (not to scale).

3. Loading

- The load will be applied downward, from below, by means of a standard 3/8 inch U-bolt (Home Depot part #030699095568) and its associated rectangular plate of thickness 2. mm with approximate dimensions of 121. mm x 19. mm (see Figure 2) resting on the loading plane of the bridge. Masses will be supported on a vertical loading rod suspended from the U-bolt.
- The two edges of the loading plate will be parallel to the longitudinal axis of the bridge at the time of load application.
- The load will be applied on the longitudinal axis of the bridge with the loading plate centered on the 300. mm gap.

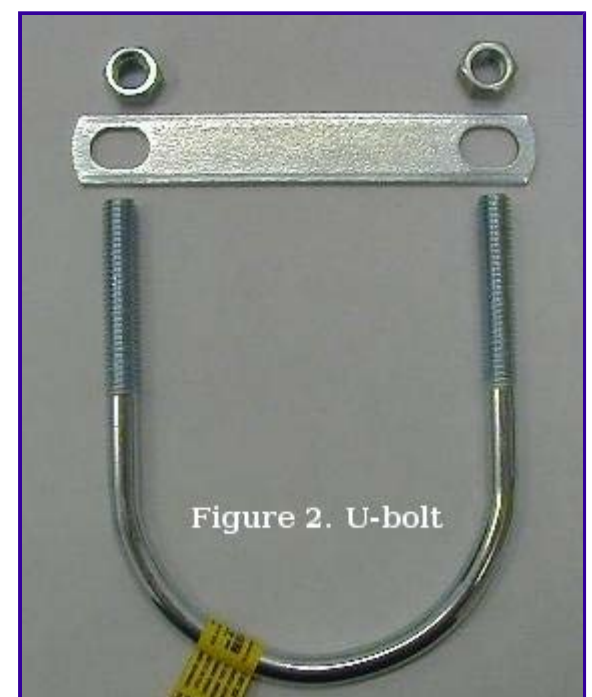
4. Testing

- The bridge will be centered on the support surfaces.
- The loading plate will be located on the bridge at the specified loading location and 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.
- 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.
- The bridge with the highest structural efficiency, *E*, will be declared the winner.

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

5. Qualification

- All construction and material requirements will be checked prior to testing by the judges. Bridges that fail to meet these specifications at the conclusion of the allowable time for checking will be disqualified. Bridges disqualified prior to the start of the contest 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.



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