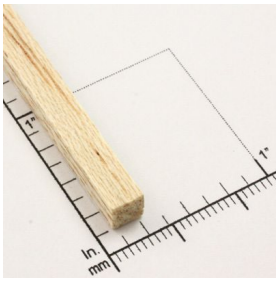
STUDENT MODEL BRIDGE BUILDING RULES AND SPECIFICATIONS
2025 SOUTHERN NEVADA REGIONAL CONTEST
HIGH SCHOOL SPECIFICATIONS

The following rules and specifications will be followed for the **High School Division** of the Southern Nevada Regional Model Bridge Building Contest, to be held on **Saturday, March 1, 2025** at the campus of the University of Nevada Las Vegas, Thomas T. Beam Engineering Complex. Contact Casey Collins at casey.collins@snwa.com or Rich Eastland at reastland@usbr.gov if you have questions. For more information on the contest, visit our website at: http://www.modelbridgecomp.com/

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

The objective of this contest is to see who can design and construct the **most efficient bridge** within the following specifications. The High School Division is open to all students in 9th through 12th grades.



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, stain or coat the bridge 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 100 mm above the support surface, and no wider (W) than 80 mm. The bridge structure must extend below the support surface by no more (B) than 10 mm
   c. The bridge shall contain an "arch-type" structure below the main support plane (see Figure 1) that spans between the supports. An arch uses curved members for its main load carrying members. For this contest, the arch shall be composed of either curved members or two or more straight segments arranged to approximate an A-frame or a multi-segmented frame. The arch element must make contact with the vertical faces of both support surfaces.
   d. The bridge must have a horizontal loading plane shall lie a distance (P) between 10 and 100 mm above the support surfaces.
   e. The bridge must be constructed to provide a horizontal support surface for the loading plate and rod at one of two loading points 20 mm and 40 mm on either side of the center of the 300 mm span along the longitudinal axis of the bridge.

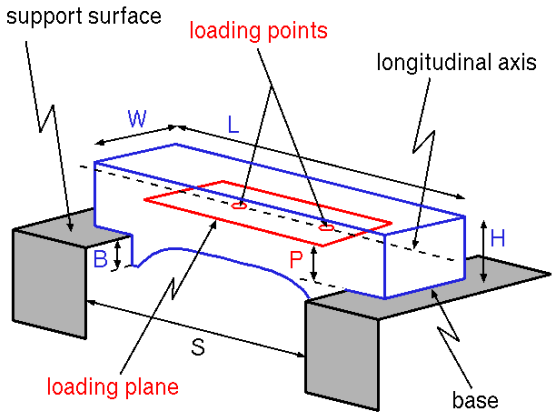


Figure 1: Detail of Bridge Configuration (not to scale). S=300 mm; L=400 mm (max); H=100 mm (max); W=80 mm (max); B=10 mm (max); 10 mm ≤ P ≤ 100mm.

Last Update: November 18, 2024

3. **Loading:**
    a. The load will be applied to the Loading Plane **from above** with the loading plate centered over one of the loading points.
    b. The load will be applied from above by means of a 40-mm square by 6-mm to 13-mm thick plate. A 10-mm to 15-mm diameter loading rod will be 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.
    c. The load will be applied with the center of the plate at one of two possible locations on the longitudinal axis of the bridge: 20 mm and 40 mm on either side of the center of the 300 mm span (Figure 1).

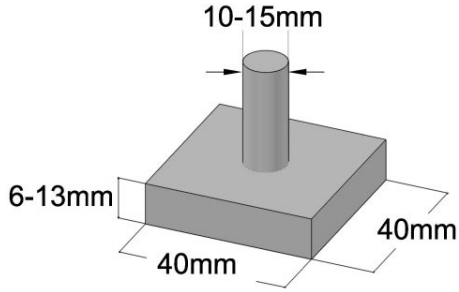


Figure 2

    d. On the day of the competition, the judges will randomly select one of the loading positions to be used; it will be the same for all bridges tested.

4. **Testing:**
    a. The bridge will be centered on the support surfaces.
    b. The loading plate will be placed on the bridge at one of the two specified loading locations (see 3c).
    c. The load will be steadily applied from above, as described in section 3a. (**hint: the loading plate must be able to extend down from above onto the loading plane, be sure to provide a minimum of 40 mm clearance**)
    d. Bridge failure is defined as the inability of the bridge to carry additional load, or a deflection of 25.4 mm (1 inch) under the loading point, whichever occurs first.
    e. The bridge with the **highest structural efficiency**, ***E***, will be the winner.

E = Load supported in grams / weight of bridge in grams

5. **Qualification:**
    a. All specifications will be checked prior to testing. Bridges that 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.
    b. 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.
    c. For the purposes of individual scoring, only one bridge is allowed per student. No exceptions. For the team scoring competition, a maximum of ten bridges are allowed to be tested from each school. If a school has less than five bridges, (constructed from five different students and representing five different designs) at the time of testing, then one additional bridge from one of the students may be tested and accepted for the team's average score provided that this additional bridge is of a different design than the student's first bridge.
    d. ALL BRIDGES SUBMITTED MUST APPEAR TO BE OF UNIQUE DESIGN. Schools submitting bridges designed from a template will face disqualification.
    e. **Decisions of the judges are final.**

A **Teacher's Workshop** is scheduled at UNLV in the B building of the Thomas Beam Engineering Complex, on

January 15, 2025 from 4:30 – 6:00 pm. At the workshop, we will discuss the specifications, bridge design, and ideas for presenting this program in the classroom. Bridge Kits will be available at the workshop.

Still have questions? Please reach out to us at casey.collins@snwa.com or reastland@usbr.gov.

Have fun!

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