**STUDENT MODEL BRIDGE BUILDING RULES AND SPECIFICATIONS**
**2027 SOUTHERN NEVADA REGIONAL CONTEST**
**HIGH SCHOOL SPECIFICATIONS**

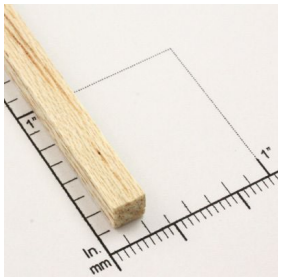
The following rules and specifications will be followed for the **High School Division** of the Southern Nevada Regional Model Bridge Building Contest, to be held on **Saturday, March 6, 2027** at the campus of the University of Nevada Las Vegas, Thomas T. Beam Engineering Complex. Contact Casey Collins 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.




*3/32-in. basswood*

## 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 wider (W) than 80. mm, and be no taller (H) than 150. mm above the support surfaces.
c. There are two horizontal and parallel load planes, the lower (P1) being no less than 20. mm above the support surface and the upper (P2) being no less than 70. mm above the support surface. A bar with square cross section 1.5" x 1.5" (38.1 mm x 38.1 mm) must be able to pass continuously along each load plane for the entire length of the bridge.

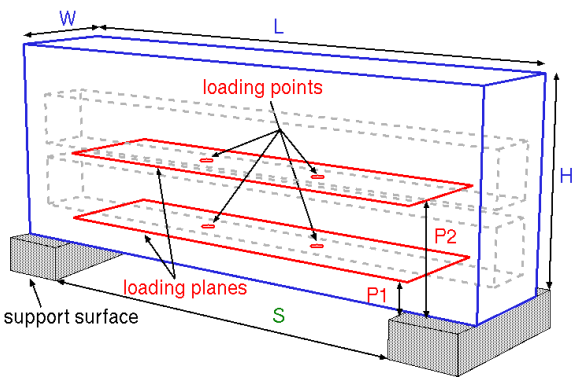



Figure 1: Detail of Bridge Configuration (not to scale). S=300 mm; L=400 mm (max); H=150 mm (max); W=80 mm (max); 20 mm ≤ P1; 70 mm ≤ P2 ≥ P1+38.1. mm.

d. The bridge must be constructed to provide a horizontal support for the loading plate (see section 3b) at each of the four loading locations (two on each load plane) 50. mm on either side of the center of the 300. mm span (see Figure 1) along the longitudinal axis of the bridge and at the center of the width of the bridge.
e. No part of the bridge structure may extend below the support surfaces

## 3. Loading:

a. The load will be applied to the Loading Plane **from above** with the loading plate centered over <u>one</u> 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 on the longitudinal axis of the bridge at one of the four loading points: 50. mm on either side of the center on one of the two load planes (P1 and P2; see **Figure 1).**
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.

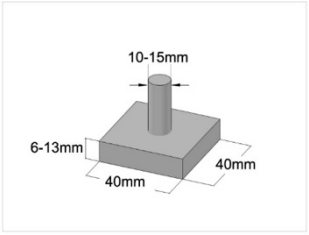


*Figure 2*

## 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 four specified loading locations (see section 3c).
c. The load will be steadily applied <u>from above</u>, as described in section 3a.
d. In the event the lower loading plane (P1) is selected, the loading plate will be temporarily detached from the loading rod to allow the rod to advance to the designated loading position. The loading plate will then be reattached to the loading rod prior to testing the bridge
e. In the event the upper loading plane (P2) is selected, the loading plate must be able to extend down from above onto the loading plane without detaching the loading plate from the loading rod. (Hint: Make P2 the top of your bridge or be sure to provide a minimum of 40 mm clearance.)
f. 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.
g. 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 fewer 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. **<u>Decisions of the judges are final.</u>**

A **Teacher's Workshop** is scheduled at UNLV in the B building of the Thomas Beam Engineering Complex, on **January 13, 2027, 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!