

**STUDENT MODEL BRIDGE BUILDING RULES AND SPECIFICATIONS
2018 SOUTHERN NEVADA REGIONAL CONTEST
MIDDLE SCHOOL SPECIFICATIONS**

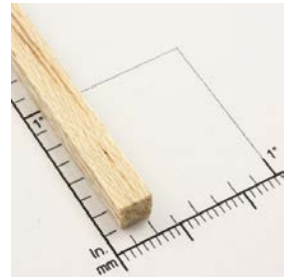
The following rules and specifications will be followed for the **Middle School Division** of the Southern Nevada Regional Model Bridge Building Contest, to be held on **Saturday, March 3, 2018** at the campus of the University of Nevada Las Vegas, Thomas T. Beam Engineering Complex. Contact Casey Collins 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 Middle School Division have changed from past years and they differ from those of the Middle and High School Divisions.

The objective of this contest is to see who can design and construct the **most efficient bridge** within the following specifications. The Middle School Division is open to all students in 6th through 8th 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 or stain the bridge.



2. Construction:

- a. The bridge must weigh no more than **25 grams**.
- b. The bridge must span a gap (**S**) of 300 mm (**hint: bridge must be longer than 300 mm**), be no longer (**L**) than 400 mm, be no shorter (**H**) than 50 mm and no taller than 100 mm above the support surface, and be no wider (**W**) than 80 mm and not less than 30 mm. No part of the bridge may extend below the support surface (**see Figure 1**).

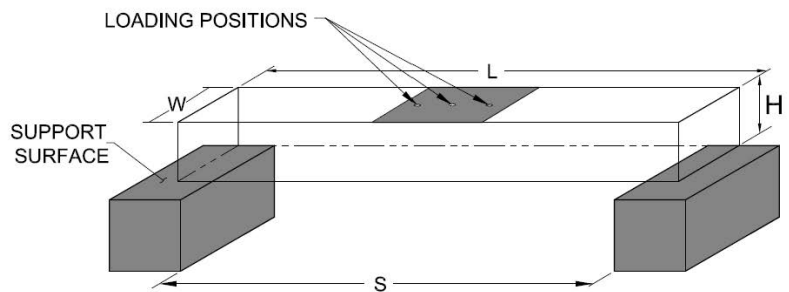


Figure 1

- c. The bridge must be constructed to include a horizontal loading plane that provides support for three possible loading positions along the longitudinal axis of the bridge. The three loading positions are located at the center of the bridge and 50 mm to either side of the center of the bridge. (**see Figure 1**).

NOTE: Load may be applied at the center of each loading position.

- d. The loading plane shall be horizontal and shall lie on the physical top of the bridge between 50 mm and 100 mm above the support surfaces (**hint: top of the bridge must be taller than 50 mm but not exceed 100 mm in total height**) (**see Figure 1**).

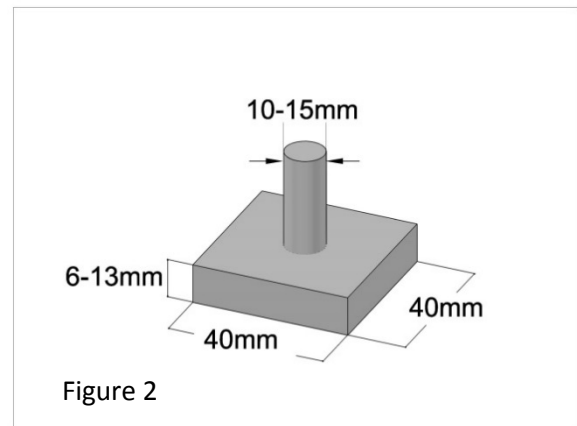
3. Loading:

- a. The load will be applied from above with the loading plate (**Figure 2**) centered over one of the three loading locations. (**hint: Be sure to provide enough clearance for the loading plate to be lowered into position from above.**)

- b. The load will be applied from above by means of a 40 mm square by 6-13 mm thick plate. A 10-15 mm diameter loading rod will be attached to the center of the plate (**Figure 2**). The plate will be horizontal, have a flat bottom and will not pivot on the loading rod.
- c. During competition, loading will continue until the bridge experiences failure (see section 4d).

4. Testing:

- a. The bridge will be centered on the support surfaces.
- b. The loading plate will be lowered from above the bridge and placed at the centerline of one of the specified loading locations.
- c. The load will be steadily applied from above, as described in section 3a.
- d. Bridge failure is defined as the inability of the bridge to carry additional load, or a deflection of 38.1 mm (1.5 inch) under the loading point, whichever occurs first.
- e. The bridge with the **highest structural efficiency, E**, will be the winner.



$$E = \text{Load supported in grams} / \text{weight of bridge in grams}$$

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. Time permitting, disqualified bridges may be tested unofficially and scored for the builder at the testing official's discretion.
- 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. All the participating bridges from a single school must appear to be of different design. Any bridge that appears to be a duplicate design will be disqualified.
- d. Decisions of the judges are final.

A **Teacher's Workshop** will be held at UNLV in the B building of the Thomas Beam Engineering Complex, on **January 10, 2018 from 4:00 – 5:30 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. Directional signs to the room will be posted on the day of the workshop.

The **School Competition** traveling trophy in the Middle School Division will be awarded to the school with the highest average efficiency for its best **five** bridges. A trophy will be awarded to the student with the highest performing bridge from each school on the day of the competition. The competition budget limits our ability to distribute more than one trophy per school; however, additional trophies will be available for purchase (\$15) for teams with more than one student.

Have fun and we'll see you on March 3rd!