STUDENT MODEL BRIDGE BUILDING RULES AND SPECIFICATIONS
2015 SOUTHERN NEVADA REGIONAL CONTEST
HIGH SCHOOL SPECIFICATIONS

The following rules and specifications will be followed for the **High School Divisions** of the Southern Nevada Regional Model Bridge Building Contest, to be held on **Saturday, March 7, 2015** 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: www.usbr.gov/lc/region/programs/bridgebuilding.html

Please read the specifications carefully! The specifications for the High School Division have changed from past years and differ from those of the Middle or 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 focus of participating students should be on developing their creativity, ingenuity, and craftsmanship skills by producing an original product, and not adopt others work as their own.

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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 30 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 taller **(H)** than 150 mm above the support surface, and be no wider **(W)** than 80 mm. No part of the bridge may extend below the support surface (**see Figures 1 and 2**).
c. The bridge must be constructed to include two horizontal loading planes;
    - The first loading plane height **(P1)** is located between 0 mm and 10 mm above the support surface. **(hint: do not build higher than 10 mm)** Refer to Figure 1.
    - The second loading plane height **(P2)** is located between 50 mm and 60 mm above the support surface. **(hint: do not build higher than 60 mm)** Refer to Figure 2.
    - Both loading planes shall be horizontal such to allow the load to be applied on the longitudinal axis of the bridge at one of six potential loading points (The actual loading point will be decided on testing day, refer to Section 3):
        - (P1) center of the bridge
        - (P1) 50 mm on either side of the center
        - (P2) center of the bridge
        - (P2) 50 mm on either side of the center

- The bridge must be constructed such that both loading planes are continuous with clearance provided for the loading rod to be attached to the plate as extended vertically from above. **(hint: be sure to leave a hole for the loading rod to pass through P2 at each of the loading points. The loading rod is 15 mm in diameter)**

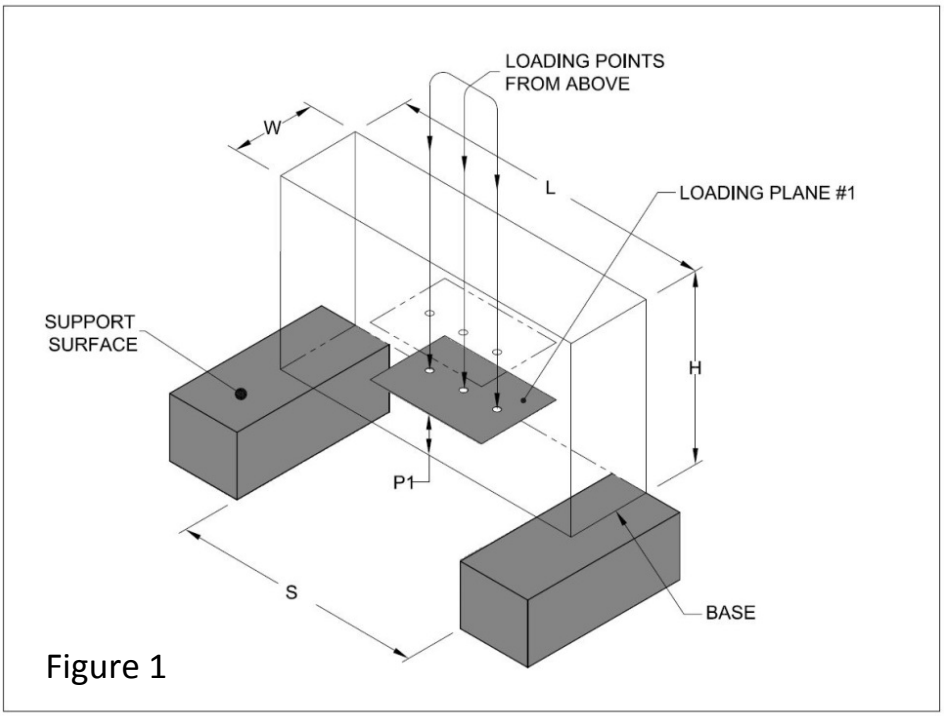

Figure 1

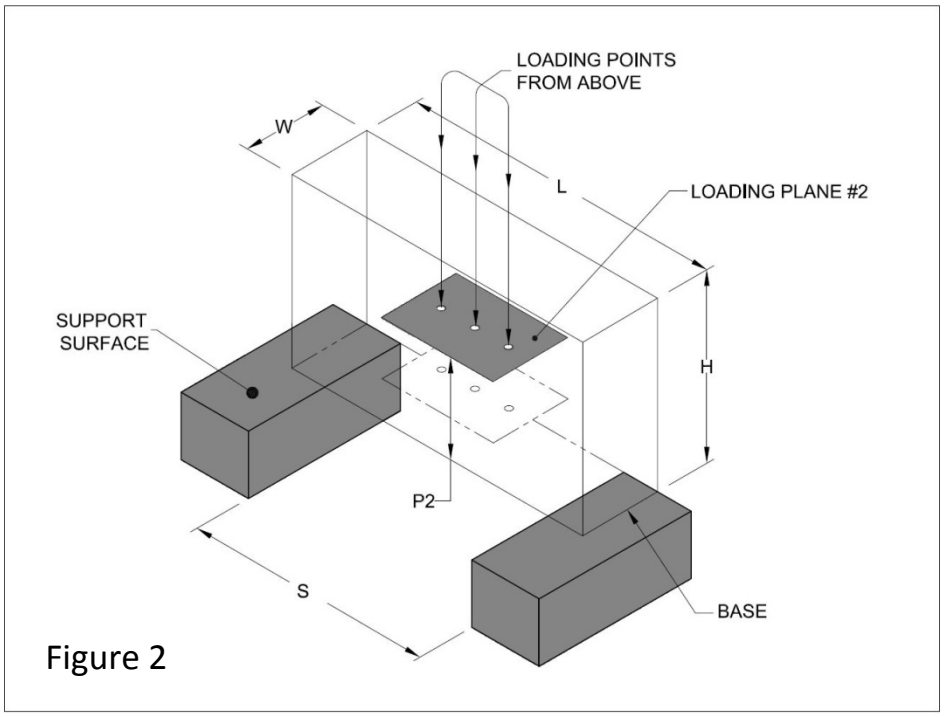

Figure 2

3. Loading:

a. The load will be applied from above with the loading plate (**Figure 3**) centered over one of the loading locations.

b. The load will be applied from above by means of a 50 mm square by 6-13 mm thick plate. A 10-15 mm diameter loading rod will be attached to the center of the plate (**see Figure 3**). The plate will be horizontal, have a flat bottom and will not pivot on the loading rod.

c. The two edges of the loading plate will be parallel to the longitudinal axis of the bridge at the time of load application.

d. Competition loading will stop at 50 kilograms. However, loading will continue until bridge failure.

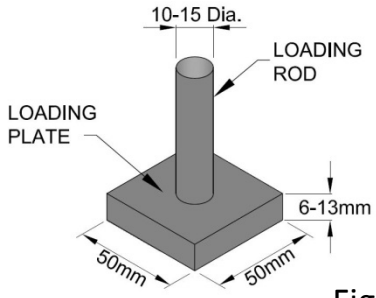

Figure 3

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 six 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 = 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, if a school has less than 10 bridges, (constructed from 10 different students) at the time of testing, then a second bridge from one of the students will be 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 HAVE A UNIQUE DESIGN. Schools submitting bridges designed from a template will face disqualification.

e. 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 14th, 2015 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 will be posted on the day of the workshop.

The **School Competition** traveling trophy in the High School Division will be awarded to the school with the highest average efficiency for its best 10 bridges, respectively.
Have fun and we'll see you on March 7th!

Last Update: Dec 21, 2014