# 2013 High School Rules

1. Materials
    a. The bridge must be constructed only from the official 3/32-inch square cross-section basswood and any commonly available adhesive.
    b. The official basswood may be notched, cut, sanded or laminated in any manner.
    c. No other materials may be used. The bridge may not be stained, painted or coated in any fashion with any foreign substance.

2. Construction
    a. The bridge mass shall be no greater than 25.00 grams.
    b. The bridge shall rest on two support surfaces separated in elevation (E) by 10 mm and horizontally by a gap (S) of 300 mm. (See Figure 1).
    c. 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 150 mm above the upper support surface, no wider (W) than 80 mm at the loading surface. No part of the bridge may extend below the lower support surface.
    d. The bridge must be constructed to provide a horizontal support for the load (see section 3b) at the three loading locations described. Any portion of the structure below the loading plane must provide clearance for the eyebolt which extends below the loading plane (see Figure 2).
    e. The load will be applied with the center of the plate at one of the three (3) possible loading locations on the longitudinal axis of the bridge: the center and 50 mm to either side of the center (see Figure 1). The three loading locations must lie in the same horizontal plane a distance (P) of 10 to 50 mm above the upper support surface.
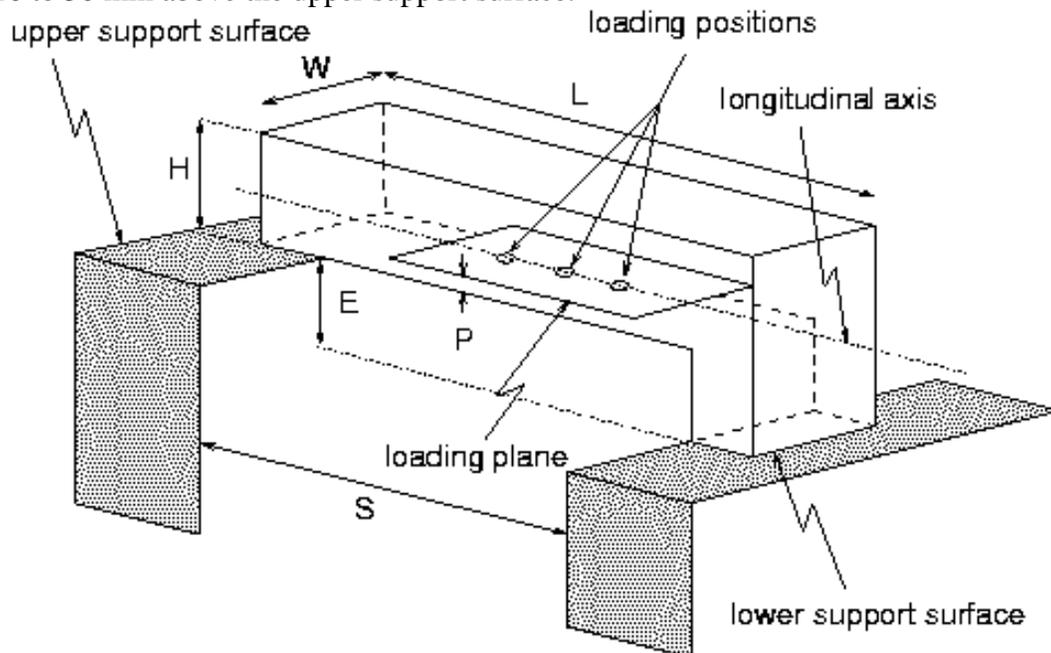
Figure 1. Bridge schematic (not to scale)

3. Loading
   a. On the day of the contest, an independent judge will decide which one of the three loading locations will be used. The same loading location will be used for all bridges. Competition loading will stop at 50 kg, however, loading will continue until bridge failure (see section 4d).
   b. The load will be applied by means of a 40.0 mm square plate that is at least 6 mm but less than 13 mm thick. A 9.53 mm (3/8 inch) diameter eyebolt is attached from below to the center of the plate (see Figure 2). During loading, the edges of the plate will be parallel to the longitudinal axis of the bridge.
   c. Masses will be supported on a vertical loading rod suspended from the eyebolt. The minimum initial load will be 2.00 kg.
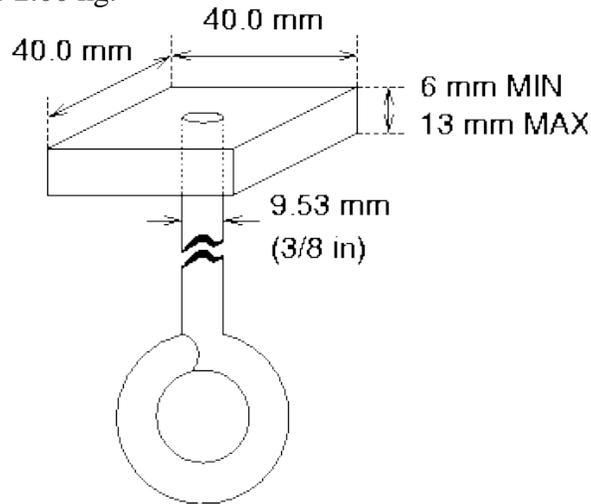

Figure 2. Loading plate detail (not to scale)

4. Testing
   a. The bridge will be centered on the support surfaces.
   b. The loading plate will be placed on the bridge at the specified loading location determined on the day of the contest
   c. The load will be applied from below as described in section 3 above.
   d. 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. If the bridge has leg(s) that fail, the bridge will have failed regardless of deflection.
   e. The bridge with the highest structural efficiency, E, will be declared the winner. Bridges failing above 50 kg will be considered to have held 50 kg for efficiency calculations.

   E = Load supported in grams (50,000g maximum) / Mass of bridge in grams

5. Qualification
   a. All construction and material requirements will be checked prior to testing. Bridges failing to meet these requirements will be disqualified. If physically possible, disqualified bridges may be tested as exhibition bridges at the discretion of the builder and the contest directors.
   b. 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.
   c. Decisions of the judges are final.

Questions about these rules should be directed to Greg Mills at 270-745-5850 or greg.mills@wku.edu