



Department of Civil Engineering
American Society of Civil Engineering
Student Chapter

2019 Ohio Valley Student Conference

Thursday, April 11-Friday, April 12, 2019

2019 Balsa Wood Bridge Competition

Materials

1. The bridge must be constructed only from provided balsa and adhesive.
2. The balsa wood may be notched, cut, or sanded but not laminated to other balsa wood pieces with legal adhesive in any manner but must still be identifiable as the original wood.
3. Only basic cutting tools will be provided. Other desired supplies (rulers, pencils, protractors, etc.) must be brought by competing teams.
4. No battery or electrically powered tools or equipment may be used. This includes laptops and portable printers.
5. No other materials may be used. The bridge may not be stained, painted or coated in any fashion with any foreign substance.

Construction

1. The bridge mass shall be no greater than 50.00 grams.
2. The bridge (see Figure 1) must span a gap (S) of 300mm (1 foot) but be no longer (L) than 400mm, have a maximum width (W) of 100mm but be no narrower than 14mm, and be no taller (H) than 150mm above the support surfaces. The bridge must be constructed to permit a clearance (C) of 20mm above the support surface at the midpoint of the span. No part of the bridge may extend below the support surface.
3. The loading plane (P) shall be horizontal and shall lie between 30mm and 40mm above the support surfaces.
4. The bridge must be constructed to provide for the placement of the loading plate (see “Loading” section below) at each of the two loading points. Any portion of the structure above or below the loading plane must provide clearance for the loading rod at the two loading point locations and the Loading Plate must be able to freely slide along the entire span of the loading plane.

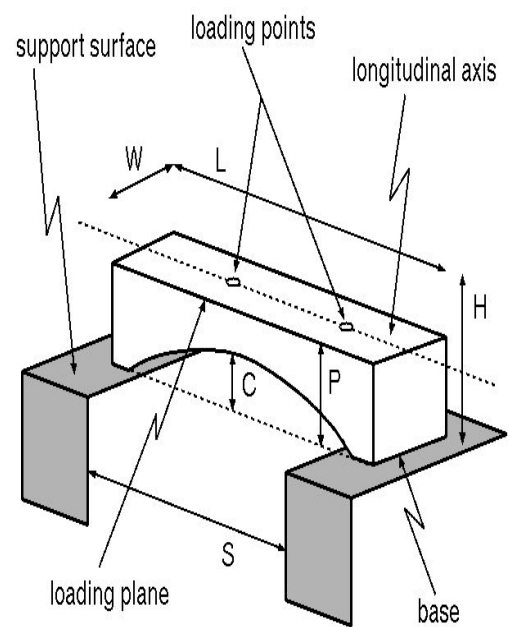


Figure 1. Bridge schematic (not to scale).



Loading

- The load will be applied downward, from below, by means of a 40mm by 40mm square plate (see Figure 2) resting on the loading plane of the bridge. The plate thickness (t) will be between 6mm and 12mm thick and will have a 9.53 mm (3/8 inch) diameter eyebolt attached from below at its center. Force will be applied to the loading plate by means of a bucket hung from the eyebolt with variable amounts of sand added in or with a mechanical tester until structural failure.
- The two edges of the loading plate will be parallel to the longitudinal axis of the bridge at the time of load application.
- The load will be applied on the longitudinal axis of the bridge at one of two loading points: 60mm left of center of the Loading Plane or 20mm right of center of the Loading Plane. Right and left of the loading mechanism will be determined by the judge(s) and will remain consistent for all bridges.

Testing

- On the day of the contest, judges will decide which of the two load cases will be used. The load case will be the same for all bridges.
- The bridge will be centered on the support surfaces.
- The loading plate will be placed on the bridge at the specified loading location and the load will be applied from below, as described above.
- The load will be applied until bridge failure. The maximum scoring load supported by any bridge will be 50 kg. Any amount over this quantity will not count in the calculation of the bridge's efficiency.
- Bridge failure is defined as the inability of the bridge to carry additional load, or a load deflection of 25mm under the loading location; whichever occurs first.
- 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 calculation.

$$E = \text{Load supported in grams (50,000g maximum)} / \text{Mass of bridge in grams}$$

Qualification

- Maximum of 5 participants per team is allowed.
- 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 following the loading of competing bridges.

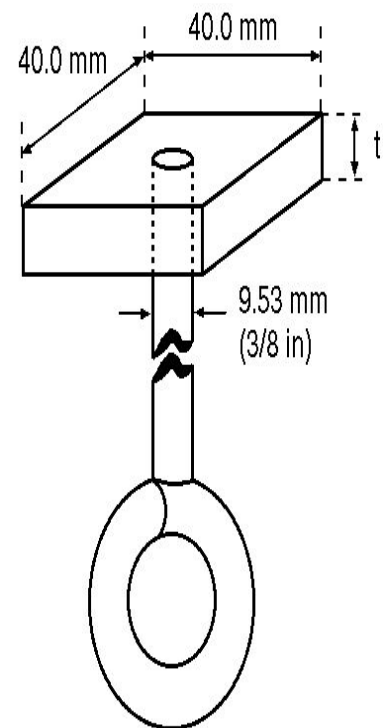


Figure 2. Loading Plate Detail



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3. 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, that bridge shall be disqualified. If the disqualified bridge can accommodate loading, it may still be tested as an exhibition bridge as stated above.
4. Decisions of the judges are final; these rules may be revised as experience shows the need.

**** Please submit any questions regarding these rules to ovsc2019@zips.uakron.edu with “Competition Name_RFI” in subject line****