

Model Bridge Competition

Teams are required to purchase their own materials and build their bridge prior to arrival at the competition

Objective
The objective of this competition is to design and build a model bridge using only balsa wood and glue. The bridge is to span a clear distance of 24 inches and to support a downward load of at least 25 pounds, applied at the center of the bridge. Failure to follow any rule will result in disqualification. The use of a material not on the materials list will result in disqualification.

Materials
- Untreated balsa wood
- Elmer’s Carpenter’s Glue (yellow tinted glue may be used.)
- Glue may only be used to bond two pieces of wood together. Coating the members is NOT allowed and will result in disqualification.

Dimensions
- Height – Bridge must be between four (4) and six (6) inches high, measured from the highest point to the lowest point of the bridge.
- Width – Bridge must be between three (3) and five (5) inches wide.
- Length – Bridge must be within a quarter (¼) inch of twenty-six (26) inches long and must be able to span a clear unsupported length of twenty-four (24) inches.

Weight
- Maximum permissible weight is sixteen (16) ounces (454 grams) including the loading platform as described in the fourth section of Bridge Members.

Bridge Members
- No member of the bridge may have a cross-sectional area (width × thickness) of more than one-quarter inch squared (1/4 in²). In addition, no member may have any cross-sectional dimension greater than one inch (see attached diagrams). Two or more pieces of wood placed together lengthwise will be considered a single member if they are glued together or are placed closer than one-sixteenth of an inch.
- No members of the bridge may be laminated together. Lamination is defined as any connection of two members at an angle of less than 45 degrees being continuously glued. If members meet at an angle less than this than gluing can only be ½” long and must be spaced greater than 2 inches apart.
- The bridge deck (roadway decking) must be at least three (3) inches wide for the entire length of the bridge. (It will be necessary to use more than one member to meet the conditions specified in the first section of Bridge Members.)
- The bridge must be capable of allowing a vehicle 2½ inches wide by 3½ inches high to pass unimpeded along the entire length of the bridge. (The bridge deck must be flat.)
- There will be a loading platform across the width of the bridge at the apex (see attached diagram). The loading platform will be included in the weight calculation.

**Loading Procedure**
Load will be applied gradually and continuously to the loading platform using a mechanical loading device. The minimum acceptable bridge capacity is twenty-five (25) pounds. The bridge will be loaded until failure occurs. Failure is defined as the point which the bridge will no longer support additional load. This point may occur prior to total collapse. The load at failure will be recorded.

The bridges will be judged on the basis of an efficiency ratio, calculated by the equation given below. **The bridge with the highest efficiency ratio will be the winner.**

**Efficiency Ratio =** \( \frac{\text{Failure Load}}{\text{Bridge Weight}} \)

Cross-Section Diagram

<table>
<thead>
<tr>
<th>1/4''</th>
<th>1/8''</th>
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<tbody>
<tr>
<td>1''</td>
<td>1 1/4''</td>
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Permitted | Not Permitted

Member cross-section less than \( A = 1/4 \text{in}^2 \)
Model Bridge Diagram

- **L** = 26” ± 1/4”
- Affix Loading Platform Here
- Sample Bridge
- Deck
- Deck
- Span = 24”

- Max 5”
- Min 3”
- Max 6”
- Min 4”
- Deck