

University of South Alabama
Department of Civil Engineering

Rules and Regulations

For

The Balsa Wood Bridge Competition



Presented by the Student Chapter of the American Society of Civil
Engineers at the University of South Alabama

Rules Updated September 2024

Balsa Bridge

Objective: Construct and test a model balsa wood bridge based on the specifications detailed below.

Bridge Design:

1. Bridge Type:

- Students may choose to construct any type of bridge (beam bridge, truss bridge, etc.) as long as loading specifications can be met.

2. Technical Drawings:

- Technical drawings of bridge must be provided the day of testing.
- Students will be judged on how well the final project matches the technical drawings.

Construction of Bridge:

1. Material Specifications:

- Wood: The bridge members will be composed of balsa wood, with no member having dimensions greater than 1/4 inch by 1/4 inch, and 24 inches in length. Exceptions are made at the joints (See Appendix A for details).
 - Note: A member is defined as a single piece of balsa wood.
- Glue: Wood glue used for carpentry and residential use.
- No other material (e.g. varnish, epoxy, hairspray, string, etc.) may be used as a member or applied to the bridge to strengthen a member or the bridge.
- Bridges may be painted to the students liking.

2. Bridge Dimensions:

- The span between the bridge supports will be 36 inches (measured from the center of each support). Therefore, the model bridges will need to be at least 37 inches to rest on the supports and can NOT be longer than 39 inches. The bridge will be simply supported, meaning the supports exist only at the 0 inch and 36 inch points and are not continuous on either end of those points. The length of the supports will be less than or equal to 1/2 inches total length at those points. See Appendix below for diagram.
- The bridge can be anywhere between 5 inches and 7 inches wide (width is considered to be the length between the outermost edges of the bridge).
- The maximum height of the bridge can range between 5 inches and 10 inches (height is the vertical distance from the lowest point to the highest point on the bridge).

3. Laminating:

- Layering members on top of one another (laminating) is not allowed.

4. Joints:

The following are acceptable for joints:

- Overlapping of members no greater than 1/2 inch will be allowed.
- Gusset Plates with maximum dimensions of 1/2" x 1/2" x 1/16" are allowed.
- Diagrams of allowable joints can be found in Appendix A.

5. Aesthetics:

- Students may paint and decorate their bridge in any manner they chose but are encouraged to decorate it based on a theme important to the team.
- Any paints and materials may be used for decoration as long as they do not affect the strength of the bridge. Consult with a USA-ASCE representative if unsure about use of a material.

Testing of Bridge

Bridges will be tested by applying weights to the bridge until the bridge fails. Loading specifications are outlined below:

- Failure will be defined as the point at which the structure can no longer support a load.
- Diagram provided in Appendix B.

Hints:

- Joints are critical parts of any bridge design. Poor joint construction can greatly reduce the load carrying capacity of your bridge.
- For a truss design, some members will be in tension (pulled), and some will be in compression (squeezed). Decide which members are going to be in tension, and which are going to be in compression. Design these members accordingly.
- Ensure that the bridge will rest appropriately on the supports given.

Scoring:

School Name: _____

Group Name/Number: _____

1. Deductions:

Dimensions (a weight of 10 grams will be added per height, width, and/or length violation)

a. Height (5-10 in) _____

b. Width (5-7 in) _____

c. Length _____

d. Joint/Gusset Plate Size (a weight of 5 grams will be added per joint/gusset plate deduction)

_____ x 5 grams = _____
violations

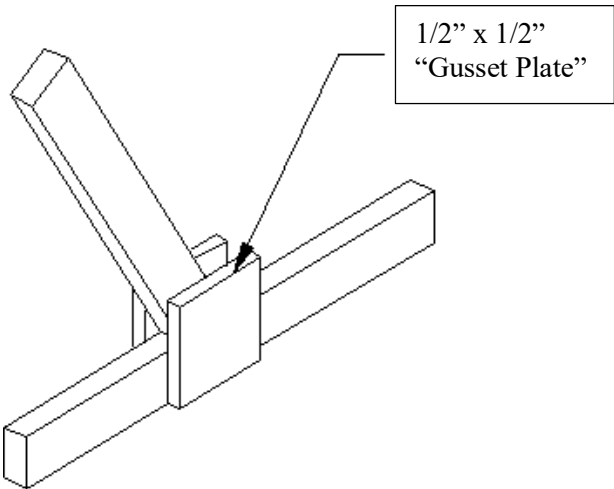
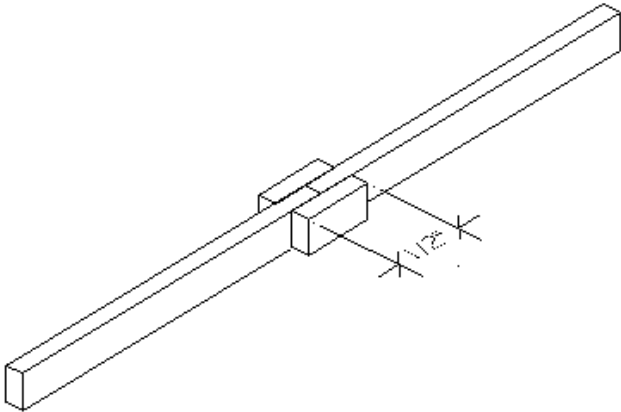
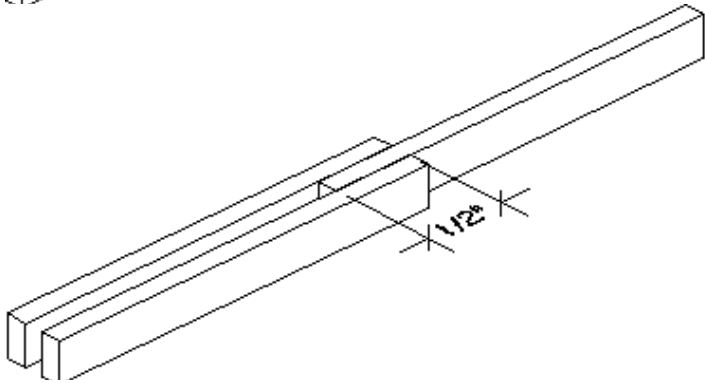
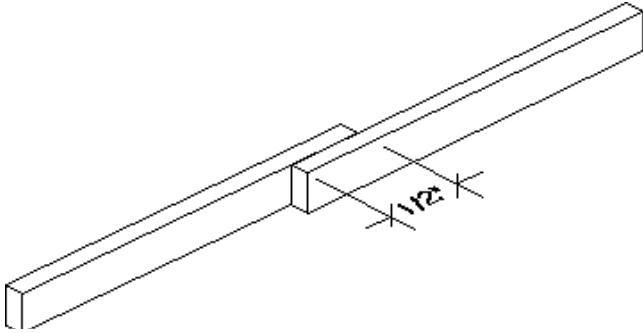
2. Load Applied: _____

3. Bridge Weight: $\frac{\text{measured}}{\text{measured}} + \frac{\text{violations}}{\text{violations}} = \frac{\text{total}}{\text{total}}$

4. Structural Efficiency:

(Load Applied / Total Bridge Weight) _____

Appendix A: Diagrams of Acceptable Joints



Appendix B: Diagram of Loading Specifications

