University of South Alabama
Department of Civil Engineering

Rules and Regulations

For

The Model Balsa Wood Bridge Competition

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

Rules Updated November 2020

Rules revised based on National ASCE Balsa Wood Competition Rules
Rules subject to change

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

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 below 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.

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 Figure 1 below for the 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).
   - 20 point deduction for the inability to follow bridge dimension parameters
   - Design an opening in the center of the bridge for ease of use of the compression machine during testing.

3. Bridge Mass:
   - The overall mass of the bridge shall **NOT** exceed 800 grams. 10 points will be deducted if the bridge exceeds this weight.

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

5. 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.

Report

Teams are required to submit a one page report due at the time of drop off of the competition. The report

must include the following items:

- A brief explanation as to why the team chose their design.
- A brief explanation of the steps the team took to build their bridge.
- Any pictures, blueprints, or drawings from the design and construction phase of the bridge. These should be included in an appendix. No more than 4 pictures of the construction

Testing of Bridge

Bridges will be tested by applying a load 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.
- The load will be applied in the middle of the span. This point is 18 inches from either support.
- The space 3 inches above and 3 inches below the middle section of the bridge must remain clear and free of members to accommodate the loading device.
- 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 (pushed). 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.

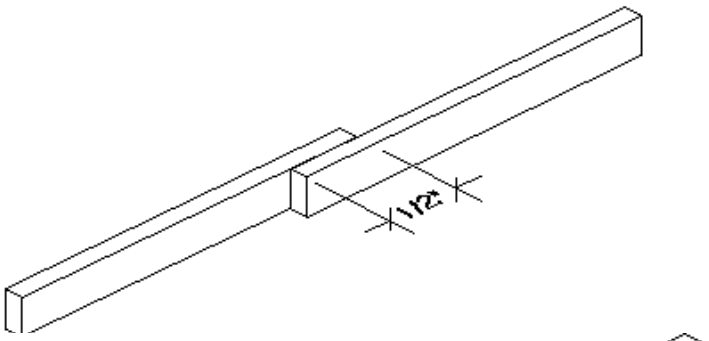
***Transportation of the Balsa Wood Bridge to the University of South Alabama, on the morning of, or days leading up to, the judging, is up to the team.**

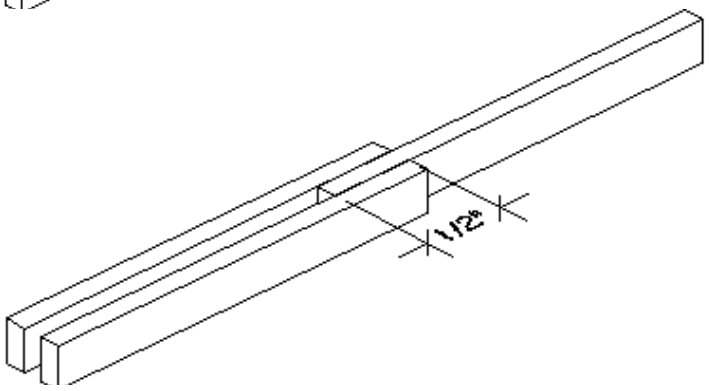
Scoring:

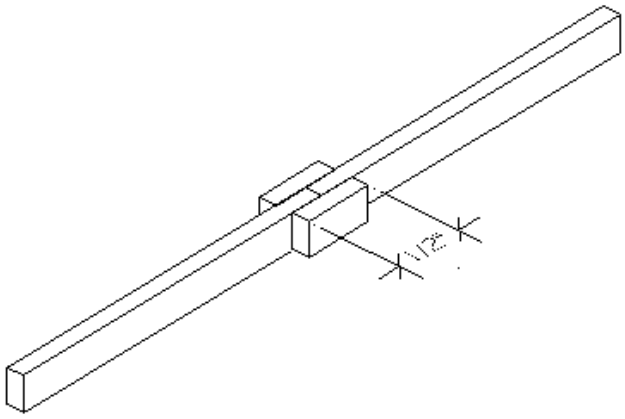
Bridges will be judged in four categories worth a total of 100 points. The categories are outlined below:

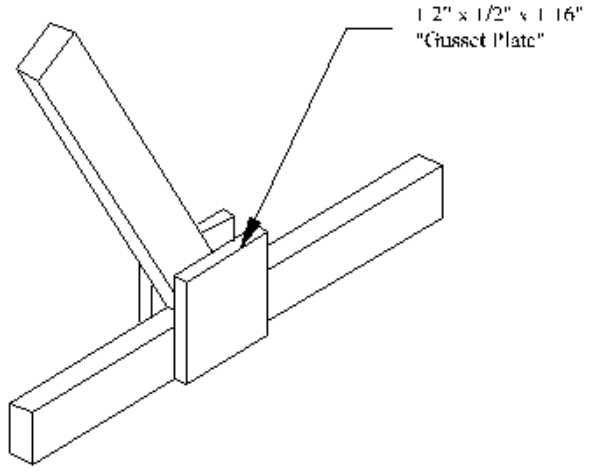
- Structural Strength (based on the sustained applied load to bridge weight ratio) 25 pts
- Efficiency (based on lightness of bridge) 25 pts
- Bridge Design (based on technical drawings) 25 pts
- Report 25 pts

Appendix A: Diagrams of Acceptable Joints









Appendix B: Diagram of Loading Specifications