

SELMON BALSA BRIDGE COMPETITION



THE USF/SELMON EXPRESSWAY BALSA WOOD BRIDGE BUILDING COMPETITION RULES

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GENERAL INFORMATION

General information on the competition as well as registration information for the Balsa Bridge Competition is located on the Balsa Bridge Competition website: (<https://usfselmonbridgebuilding.com>).

Questions regarding qualifying procedures, etc., should be directed to the Balsa Bridge Competition Website's Contact Us page.

RULE CHANGES AND PRECEDENCE

The Rules and Regulations of the Balsa Bridge Competition are updated each year. **Teams are encouraged to read this entire document carefully and disregard rules and website postings from previous years.** Teams should not consider items such as, but not limited to, rulings and interpretations made by judges in previous competitions for this year's competition.

TEAMS, REGISTRATION AND ELIGIBILITY

Teams. Each school may register up to a maximum of four (4) teams. Each team may consist of a minimum of three (3) members and a maximum of four (4) members. Registered participants are the only individuals eligible to present and load the team's bridge. Any changes of registered participants must be requested at least 14 days before the competition.

Registration. Registration is online at: <https://www.usfselmonbridgebuilding.com/>

Eligibility. Registered participants at the Balsa Bridge Competition must: 1) Be a current middle or high school student, and 2) must have contributed to the design and construction of the presented Bridge during the current academic year.

BRIDGE TESTING

The load capacity test will be conducted with a Pitsco Structure Testing Instrument as follows:

The bridge will be placed on the testing stand consisting of two (2) flat, level surfaces which will be level with respect to each other and separated by approximately 350 mm.

A testing block approximately 170 mm long and 40 mm wide will be placed on the roadway surface at the center of the span. The load shall be applied by one rod at the center of the test block. However, if bridge members interfere with placing one

rod at the center of the test block, the judges may opt to apply the load using two rods placed in slots that are symmetrical about the center of the test block.

A testing device will slowly apply pressure downward until either 1) catastrophic destruction takes place and the vertical force applied drops below the maximum load previously recorded during the test, or 2) the downward deflection of the bridge approaches the maximum stroke of the tester, which is about 20 mm. The failure load will be deemed to be the maximum load that the bridge sustained before catastrophic destruction occurs or when the downward deflection reaches the limit stated above.

DRAWING GUIDELINES

Each team may submit a scaled drawing of their bridge. Drawings are not required but are strongly encouraged and will add points to the team's score.

Missing information will not disqualify a drawing or team from the competition. However, it WILL reduce the score.

A scale should be present on the drawing. Scales are written a:b, where "a" is the size on the Drawing in comparison to the size "b" of the actual object. For example, a 1:2 scale means one inch on the drawing is two inches on the bridge.

The drawing should be dimensioned. At minimum the height, length and width should appear on the drawing.

Top, front, and side views should be present.

Text and numbers may be handwritten or typed but MUST be readable and legible.

Non-graphing paper is preferred but is not required.

The drawings should include a title block in the lower right-hand corner with the following information:

Team Name
School
Teacher(s)
Team Members
Scale
Date
Grade Level(s)

JUDGING

Bridges will be visually inspected, measured and weighed to ascertain compliance with these rules. Bridges that do not comply with these rules will not be scored in the competition. However, bridges that have been disqualified may be load tested at the discretion of the judges, if the team requests the test.

Bridge design drawings will be examined and compared with the completed bridge.

Points will be awarded for load capacity, design drawings, craftsmanship, and originality.

SCORING

The Bridge contest will be scored on the following four areas of achievement:

- 1) **Load capacity** - Each bridge will be load tested to determine how much weight it can support.
- 2) **Design Drawings** – The design drawing score will depend on:
 - a) Resemblance - The accuracy of the drawings in relationship to the Bridge. The drawings may be full-size drawings or scale drawings.
 - b) Dimensioning - Proper indication of the height, width and length of various parts of the bridge.
 - c) Completeness of the Title Block – A complete title block will include all of the following: 1) Team’s name, 2) School name, 3) Teacher(s) name, 4) team member(s) names, 5) scaling, 6) grade level(s), and 7) date.
 - d) Appearance and Neatness - Quality and cleanliness of the representation.
- 3) **Craftsmanship** - The workmanship score will reflect the care taken in constructing the bridge.
- 4) **Originality** - Imaginative or innovative concepts used in design and construction of the bridge will determine the score for originality.

POINT DISTRIBUTION

Points that determine the score of each team will be awarded as follows:

1st Highest load capacity	70 Points
2nd Highest load capacity	60 Points
3rd Highest load capacity	50 Points
Below 3rd Highest load capacity	30 Points
Design Drawings	0 to 10 Points
Craftsmanship	0 to 10 Points
Originality	0 to 10 Points

PLACEMENTS AND AWARDS

Five winners will be recognized.

1. First place among the high schools will be awarded to the high school team with the most points.
2. Second place among the high schools will be awarded to the high school team with the second highest number of points.
3. First place among the middle schools will be awarded to the middle school team with the most points.
4. Second place among the middle schools will be awarded to the middle school team with the second highest number of points.
5. Both high school and middle school teams are eligible for the one award for highest overall efficiency. Efficiency shall be calculated by this formula:

$$Efficiency = 100\% \times \frac{Failure\ load}{Weight\ of\ Bridge}$$

TIE BREAKERS

If two or more bridges attain the same number of points in the competition, the front-runner will be awarded to the bridge that has higher efficiency.

ALLOWABLE MATERIALS, PHYSICAL DIMENSIONS, AND BRIDGE WEIGHT

Permissible materials

- Wood type: Only balsa wood is permitted
- Maximum cross-section dimension of balsa wood is 1/4 x 1/4-inch
- Multiple members may be glued together to achieve cross-sections that are greater than 1/4 x 1/4-inch

Permissible glues and adhesives

- Any liquid glue is permissible
- Most teams use cyanoacrylate adhesives or carpenters wood glue

No paint or coating

- The bridge may NOT be painted or coated in any way, including coating of members with glue.

Content of kits that are provided by USF

- 1/4 x 1/4-inch balsa wood, 36-inches long, twenty pieces
- 1/4 x 1/8-inch balsa wood, 36-inches long, six pieces

- 1/4 X 1/16-inch balsa wood, 36-inches long, ten pieces
- Zap® Zap-A-Gap, Medium CA+, cyanoacrylate adhesive, 0.25-ounce

Bridge outline dimensions

- Maximum Length, 550 mm
- Maximum Height, 300 mm
- Maximum Width, 100 mm

Obstruction that bridge must cross and clear

- Height of obstruction, 20 mm
- Length of obstruction, 400 mm

Roadway dimensions

- The roadway must run the full length of the bridge
- The full length of the roadway must support the weight of a Hot Wheels car
- Maximum roadway width, 100 mm
- Minimum roadway width, 46 mm
- Minimum roadway height above the bottom of the bridge feet, 100 mm

Weight

- Maximum weight of fully assembled, ready-to-test bridge, 110 grams



DRAWING - MAXIMUM AND MINIMUM OUTLINE DIMENSIONS

