

University of South Alabama  
Civil Engineering Department

# **Rules and Regulations**

## **For**

# **Balsa Wood Tower**



Presented by the Student Chapter of the American Society of Civil  
Engineers at the University of South Alabama  
for the USA-ASCE High School Competition

Rules Updated November 2023

Rules adapted from the University of Tennessee Balsa Wood Tower competition  
Rules subject to change

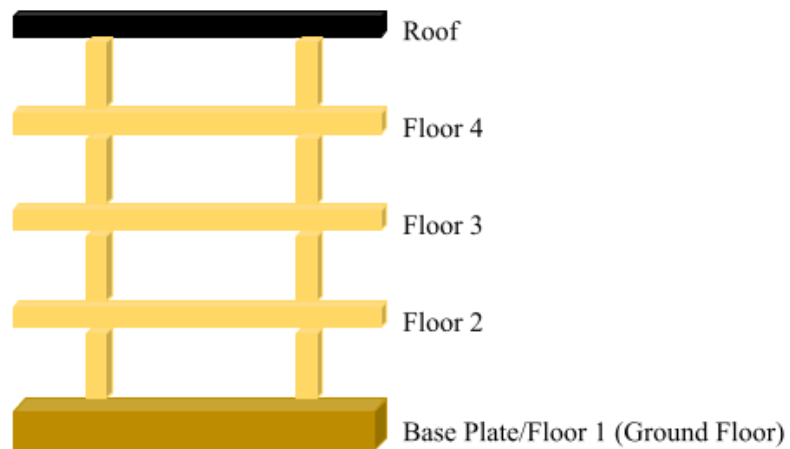
## Balsa Wood Tower

### Requirements

Teams will create balsa wood towers to be used in a compressive strength versus weight competition.

### Specifications

1. The structure shall have 4 floors (including the ground floor and excluding the roof)
2. A minimum width of 2.5 in.
3. A maximum width of 4 in.
4. A minimum height of each floor of 2 in.
5. A minimum height of 12 in. for the whole tower (including floor and excluding the roof).
6. A maximum height of 16 in. for the whole tower (including floor and excluding the roof).



**Figure 1:** Example of what is considered a floor and not.

## Components

### Base plate

- The base plate dimensions shall be 5 in. x 5 in. x 1 in.
- The base plate shall be made of plywood.
- The bottom face of the base plate shall be flat.
- Holes may be drilled in the base plate to anchor columns, but connection specifications will still apply.

### Roof plate

- The roof plate shall be square.
- The roof plate face dimensions shall exceed 3 in. x 3 in. and shall not exceed 4 in. x 4 in.
- The roof plate shall be made of plywood or particle board.
- The top face of the roof plate shall be flat.
- Holes may be drilled in the roof plate to anchor columns, but connection specifications will still apply.
- Names and/or logos of the represented team or high school may be displayed on the roof plate.
- The roof plate edge thickness shall be 1 in.

### Structural members

- Structural members shall be made of balsa wood.
- Structural members include frame members and wall or sheet members.
- Frame member dimensions shall not exceed 0.35 in. x 0.35 in. x 15 in.
- Balsa wood sheets are prohibited.
- Columns - vertical, load-bearing members - shall not be placed within 0.5 in. of the base plate edge.

### Connections

- Connections, *including those to the base and roof plates*, shall be made using glue or adhesives.
- Connections may include *any type* of glue or adhesives.
- Connections shall not include mechanical fasteners (nails, tacks, or screws).

## Testing

- Towers will be ranked on a strength to weight ratio.
- The strength of the tower will be measured by loading to the top of the tower until failure, while the height will be measured from the top of the base plate to the top of the roof plate.
- Failure during strength testing will be defined as the breaking and collapse of the tower.
- The team with the highest strength to weight ratio will receive the most points in this section.
- Any violations of the tower or component specifications will result in a 25% decrease to the team's score within the violated section.

## Rubric

Team Name: \_\_\_\_\_

Judge Name: \_\_\_\_\_

| Category                                      | Requirements   | Points |
|---|--|--------|
| Strength to Weight Ratio                      | <input type="checkbox"/> - First Place (40 points)<br><input type="checkbox"/> - Second Place (36 points)<br><input type="checkbox"/> - Third Place (32 points)<br><input type="checkbox"/> - Nth Place (40-4(N-1) points) |        |
| Specifications                                | <input type="checkbox"/> - Meets Specs (20 Points)<br><input type="checkbox"/> - Each violation (-5 points)  |        |
| Base Plate                                    | <input type="checkbox"/> - Meets Requirements (10 points)<br><input type="checkbox"/> - Each violation ( -2.5 points)  |        |
| Roof Plate                                    | <input type="checkbox"/> - Meets Requirements (10 points)<br><input type="checkbox"/> - Each violation ( -2.5 points)  |        |
| Structural Members                            | <input type="checkbox"/> - Meets Requirements (10 points)<br><input type="checkbox"/> - Each violation ( -2.5 points)  |        |
| Connections                                   | <input type="checkbox"/> - Meets Requirements (10 points)<br><input type="checkbox"/> - Each violation ( -2.5 points)  |        |
| Display of Highschool Name<br>or Logo on Roof | <input type="checkbox"/> - Bonus 15 points!  |        |

Bridge Weight: \_\_\_\_\_

Strength: \_\_\_\_\_

Total: \_\_\_\_\_