

Oct 2004 Rev

RULES AND REQUIREMENTS FOR Balsa Wood Truss Competition

to be held during

ENGINEERS WEEK ACTIVITIES

Promoted By

The Nebraska Section ASCE

1. Competitors must be high school students at the time the Truss was built.
2. Trusses must be constructed from 1/4-inch square balsa wood and wood cement no other size members or materials are allowed.
3. The trusses shall be from 26 to 27 inches in length. The clear span between supports will be 24 ($\pm 1/4$) inches. The height from the base of the testing supports to the top of the trusses load-bearing areas must not exceed 12 inches nor less than 5 inches. The maximum truss depth shall not exceed 18 inches.
4. All trusses will be loaded to the point of failure with one or two or three concentrated loads each spaced evenly between the supports at 6 inches. The method of loading all the trusses in the contest will be made at the start of testing by randomly selecting one of the several concentrated loading combinations. See Figure 3. Each of the three concentrated loads can be adjusted independently to height ranges indicated on Figure 1. No concentrated load point should be below support points A and B. Concentrated load points must be located on the top of the truss. Failure often occurs at connections and buckling of compression members, rather than members coming apart. Be sure truss load-bearing areas are flat to assure even load distribution. See Figure 1.

5. All trusses will be braced laterally at load-bearing areas by the load testing device during loading. Trusses must not be wider than 1 inch.
6. Minimum length of any balsa wood strip will be 1/2 inch.
7. Trusses must be made of single member construction throughout. No strip may be cemented together side by side to form a single member that is more than 1/4 inch wide except to form the concentrated load-bearing or support areas. The cemented together areas at load-bearing or support joints must not extend more than one (1) inch beyond the members entering the joint. All joints must be butt joints. See Figure 2.
8. Gusset plates are not allowed. However, notches at butt joints are acceptable. See Figure 2.
9. No structural members of the truss may be coated or treated in any way. No nails, pins, dowels, or other devices are allowed.
10. Excessive accumulation of wood cement at joints is not allowed. Wood cement should be used only in area of contact between the members, or to fill spaces between a member and notched portion. See Figure 2.
11. Trusses will be judged on two criteria - strength and practicality. The judges will award from zero to ten points for practicality. The remaining 90 points will be awarded for the strength criteria. The strength points will be calculated for each entry by using the ratio of the entry's strength factor to the largest recorded strength factor multiplied by the 90 points $[(F_e/F_1) \times 90]$. The entries strength factor, F_e , will be calculated using the following equation:

$$Fe = \frac{L}{W^{1.25}}$$

where L = Load at failure in pounds

W = Weight of truss in grams

F1 = Largest recorded strength factor

Strength Points SP = $Fe/F1 \times 90 =$

Practicality Points Pp =

Total Points =