National Engineers' Week Student Competitions

UAA Campus, Anchorage, AK

2017 Bridge Strength Competition

Objective

Design and build a bridge which will support the greatest weight while meeting the required specifications. The winning bridge will support the greatest weight (maximum applied load), while meeting all the specifications below.

Specifications

Length: The Bridge must span a 24.0 inch canyon opening. The bridge must bear on 1.0 in at each end, which means the overall length must be at least of 26.0 inches. The overall length of the bridge cannot exceed 27.0 in. Bridges longer than 27.0 inches will not be tested. Bridges that are too short will not be tested.

Width: The bridge must be at least 3.0 in wide but no wider than 5.0 in. The minimum width is measured at the narrowest point of the bridge and the maximum is measured at the widest point of the bridge. Bridges which do not meet these criteria will be penalized.

Height: The bridge may extend no more than 4 inches above the support, and not more than 6.0 inches below the support. There is no minimum height for the structure.

Mass: Bridges should be at or below 150 grams. Bridges more than 150 grams will be penalized by multiplying the max applied load by a reduction factor equal to: (100 grams / actual mass).

Materials: You may use any commercially available Balsa wood or Basswood that does not exceed $\frac{1}{2}$ "x¹/₂" in any cross sectional dimension. There is no limit on the length of the pieces.

Glue is to be any commercially available wood glue or super glue. Hardened glue by itself may not be used as a structural member. Commercially available screws may be used to connect wood member. Non-wood fasteners may not be used as structural members.

Support: The bridge shall be supported by the bearing (sitting) on the horizontal support surfaces at each end. The vertical face of the canyon may not be used to provide support for the bridge, nor may supports sit on the surface below the span (bottom of the canyon). Bridges that touch the sidewalls or bottom of the canyon will be disqualified.

Loading: Each bridge will be loaded from the top at mid-span with a steel loading block that is 6 inches wide x 2 inches long and attached to a mechanical ram.

Termination of Loading: The largest supported load throughout the testing will be taken as the maximum applied load. Loading is terminated for any of the following reasons:

- The bridge breaks (i.e. an obvious peak is reached in the applied load measurement)
- The bridge touches the sides of the load support
- The bridge touches the bottom of the load frame (bottom of canyon)

