

# For High Schools

## Design Specifications and Rules of the Competition

The object of this competition is to design and construct the most structurally efficient model bridge meeting the following specifications.

<b>Design Specifications for the Model Bridge</b>	
Span	22 in. (55.9 cm)
Maximum Allowable Weight	1 oz (28.3 g)
Maximum Allowable Height (Overall)	10 in (25.4 cm)
Max Superstructure Height	6 in (15.2 cm)
Max Substructure Height	4 in (10.2 cm)
Minimum vertical clearance through the bridge	2 in (5.1 cm)
Minimum horizontal clearance through the bridge	2 in (5.1 cm)

### **Definitions:**

- Span -Distance between the edges of the test stand. Bridge will have to be longer than the required span so that it can rest on the test stand.
- Superstructure – The structural portion of the bridge above the surface of the test stand.
- Substructure – The structural portion of the bridge extending below the surface of the test stand.
- Overall Height – The sum of the heights of the superstructure and substructure

### **Rules:**

1. Each bridge will be designed and built by a team of 1-3 students.
2. The construction will be of balsa wood and glue. No other materials are allowed. A bridge cannot be coated with any material (e.g., paint, stain or glue).
3. The weight of the bridge shall be less than or equal to the maximum weight specified above.
4. There should be a 2"x2" clear opening throughout the length of the bridge (i.e. a toy car 2" tall and 2" wide should be able to pass through the bridge on the roadbed without hitting any components of the structure).
5. The bridge supports will only be able to rest on the tops of the tables. No glue or attachments can be made to the top or sides of the table. No braces can be placed against the sides of the tables or extended to the floor.
6. The bridge will be loaded on the roadbed of the bridge at the middle of the span (Fig. 1).
7. The load includes a wood block, a threaded hook and nut, a bucket, and glass beads. Glass beads will be slowly added to the bucket until structural failure occurs.

8. Failure of the bridge occurs when the structure collapses or any part of the structure deflects 2" or more in the vertical direction from the original unloaded position.
9. The structural efficiency will be calculated by dividing the load that caused failure by the weight of the bridge.
10. The bridges will be ranked according to their structural efficiencies. The top three teams will be awarded prizes. Winner's trophy will go the team with highest structural efficiency.
11. The decision of the judges will be final.

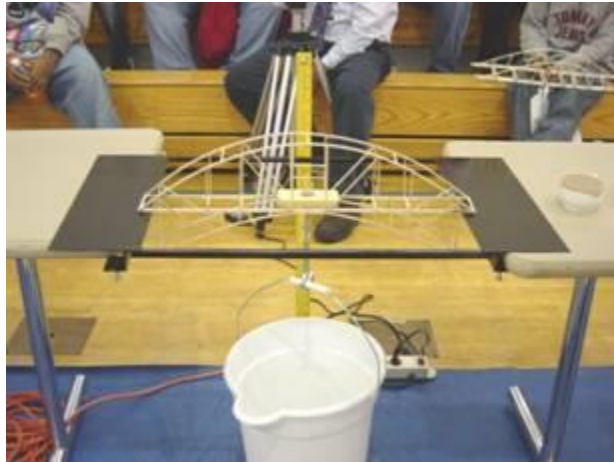


Figure 1. Model bridge being tested using a block of wood, threaded hook, and bucket of glass beads.