Efficiency Bridge

Objective:
To construct the lightest wooden bridge which will carry a 5.0-kg load across a 60.0-cm wide canyon.

Materials:
Popsicle sticks, wooden coffee stirrers, toothpicks and glue consistent with the specifications below.
• Popsicle sticks may be of any variety of hardwood not more than 12 cm in length with rounded ends.
• Wooden coffee stirrers may be any variety of wooden sticks or splints not more than 15 cm in length.
• Toothpicks may be any variety of wooden sticks sold as toothpicks not more than 7 cm in length.

Device:
1. The bridge must be a freestanding structure that spans a 60-cm canyon. It cannot exceed 80 cm in length or 10 cm in width.
2. The bridge may not touch the vertical face of either testing pylon.
3. The bridge must have a flat surface above the structure for the wheels of the testing car across the entire 60-cm span. If the upper surface has rails, they should be about 6.5 cm apart to match the wheel location of the test vehicle.
4. The structure of the bridge must lie entirely below the upper surface that the test vehicle rides on. If the bridge were to be set upside down on a table, the entire upper surface would be within 1 cm of the table at every point across its length.
5. Each bridge shall carry the name of at least one team member and the team number.

Competition:
1. Each team will sign-up for a competition time and deliver its bridge to the competition area between 9:00 and 9:30 am on the morning of the competition. The team should return to the competition area at their scheduled time at which time the team will be given instructions by the official. The official will hold all bridges at the competition area until its scheduled testing time.
2. The pylons will be smooth, level surfaces at least 10 cm square. The testing vehicle and weight hanger are shown in the diagrams below.
3. At the testing time, a member of the team will place the bridge on the pylons and position the testing vehicle and weight hanger at one end. A member of the team may hold one end of the bridge in place.
4. A member of the team will "drive" the testing vehicle slowly across the span by pulling horizontally on a string attached to the testing vehicle. The testing vehicle will be stopped briefly at mid-span. The testing vehicle may be stopped and turned if it starts to veer off the bridge.
5. Any bridge that fails to support the testing vehicle, fails to remain on the pylons,
or that sags more than 5 cm will be designated as unsuccessful.
6. The mass of all successful bridges will be determined after competing.

**Ranking:**
1. Bridges will be ranked according to their mass.
2. The winner will be the team with the bridge having lowest mass.
Weight hanger is placed here.

TOP VIEW

SIDE VIEW

FRONT VIEW

6.5 cm

7.0 cm

3.3 cm dia.

2 cm