Professional Engineers and Geoscientists of BC
www.apeg.bc.ca

Popsicle Stick Bridge Building Contest

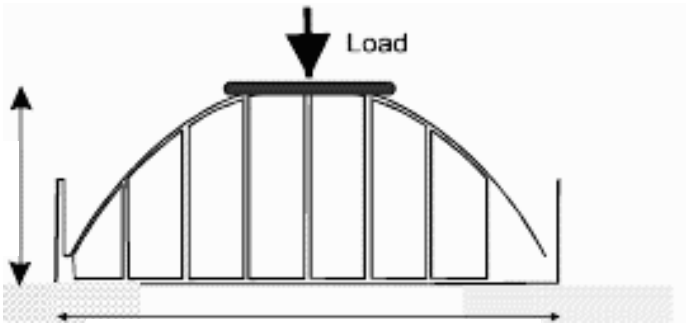
OFFICIAL CONTEST RULES

Registration:

1. Each bridge built by a team is considered as 1 entry. All entries must be registered in advance. A completed registration form should be emailed back to fv@apeg.bc.ca by January 31st, 2010. Include your name(s) using the spelling that you want to appear on certificate for entries.
2. If required, a limited number of construction kits will be available in January 2010 for pick-up at locations listed on the website http://www.apeg.bc.ca/services/branches/fv.html
3. The kit materials consist of about 125 Popsicle sticks, regular white, all-purpose glue and a sheet of construction paper. Participants can also buy their own material from craft stores or dollar stores. Standard wooden popsicle sticks 11.3 cm long and 1 cm wide should be used.

Construction:

1. Start early, as you will have to build the bridge in steps, layer by layer.
2. The bridge must be built with a maximum of 100 Popsicle sticks and all-purpose white glue. No other glues are acceptable. Popsicle sticks with non standard dimensions are not allowed. Popsicle sticks must be used whole and without alteration. For example grinding or sanding is not permitted.
3. A matchbox car must be capable of being rolled across the bridge. A deck made from construction paper must be included, wide enough to permit a matchbox car, 35 mm wide by 15mm high to roll across the bridge.
4. It is critical that the bridge must span a minimum 500mm gap. We recommend that the bridge be at least 600mm long (50mm excess on either end) to ensure that bridge does not fall through the 500mm opening when the load is applied (please see the diagram below).
5. The test load will be applied at the center of the top side of the bridge as shown. The highest centre portion of the bridge should be designed to support a level loading plate.
6. The bridge must not exceed 200mm in height and 700mm in length.



Testing the Bridges:
1. Bridges will be inspected at registration. Any violations of the rules outlined above will result in disqualification from the official results.
2. Bridges will be weighed before being loaded. In event of a tie, lightest bridge wins.
3. The winner is the bridge that holds the largest load at failure.
4. All bridges will be destroyed during testing unless the contestants decide not to continue with incremental loads before the failure occurs (to save their bridge)!

BRIDGE BUILDING GUIDELINES

- Give yourself plenty of time; don't wait until the last minute to build your bridge. The glue will need at least 24 hours to dry and will get stronger if allowed to dry for 2 days or more. Also, wood joints are always stronger if you clamp them tight while the glue dries - try using big paper clips to clamp the sticks together (clamps must be removed before testing).

- For bridge ideas look around at real bridges. A Popsicle stick bridge is of course much smaller, but the same principles apply (the important part is not the deck, but the steel or concrete structure that supports it). Look particularly at railway truss bridges, but also at bridges like the Port Mann Bridge, the Second Narrows Bridge, and the Queensborough Bridge. The Lions Gate Bridge and Alex Fraser Bridge are not good examples to follow because they rely on cables.

- Research the Internet and your local library for excellent bridge reference information to help your design.

- Your bridge needs to have a solid, stiff shape. Notice how a popsicle stick is much stiffer and stronger when on its edge. A bunch of sticks glued together flat, like a raft, has very little strength and will sag during testing. The strongest structural shape is the triangle.

- A bridge that is symmetrical is less likely to twist when loaded and hence will probably carry more load.

- If you aren't sure if your bridge will be stable, test it yourself - span it across two tables set about 500 mm apart, and press down on the top of the bridge in the middle of the span.

- In past years winning bridges at this competition held over 300 kg (660 pounds). The record for a bridge with only 100 sticks is 321.9 kg (710 pounds)!