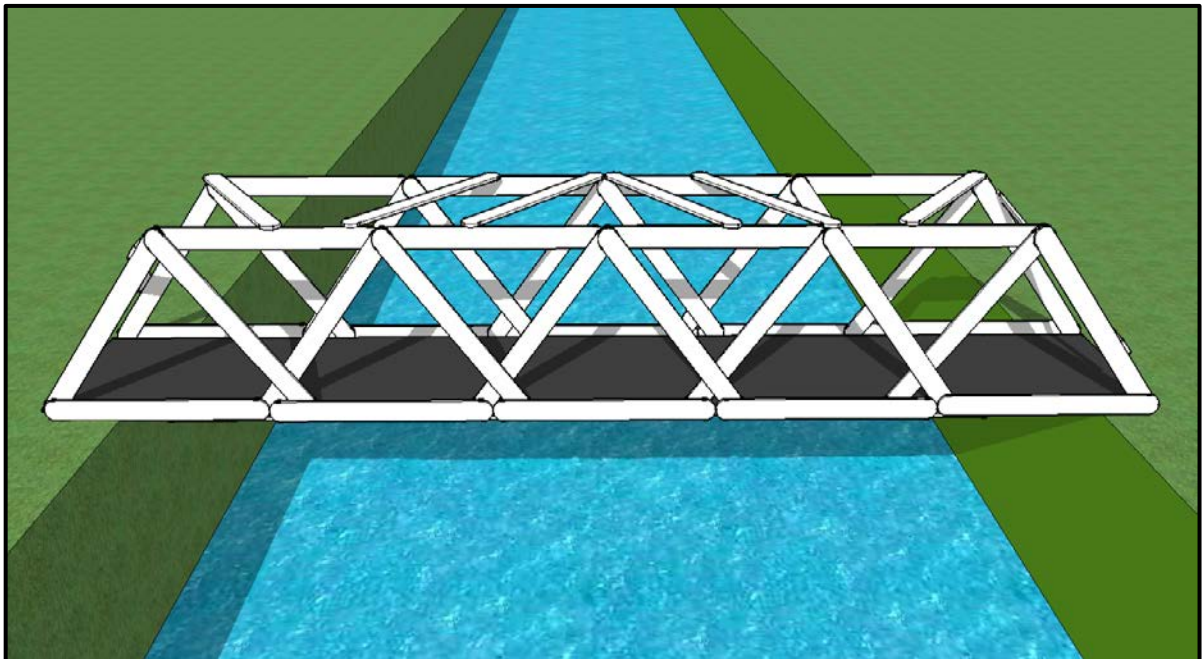


Professional Engineers
and Geoscientists of BC



2015 POPSICLE STICK BRIDGE BUILDING COMPETITION

RULE BOOK



Revision: 2
1/27/2015

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I. SCORING

Scoring will be the same for the following four (4) categories.

- Category 1: Elementary Schools Grades 4 & 5
- Category 2: Elementary Schools Grades 6 & 7
- Category 3: High Schools Grades 8, 9, & 10
- Category 4: High Schools Grades 11 & 12

A. Strength

The bridge capable of the highest load will win a strength prize. Each category will have a prize; out of the four (4) categories the strongest bridge will receive another prize. The strength test will be done as described in section IV. BRIDGE TESTING (Page 7).

B. Aesthetics

The full name of the school, grade and team name must appear on the bridge, on a banner attached to the bridge. The letters are to be a minimum of 10mm high. It should be in place on the bridge before registration.

The bridge that is most aesthetically pleasing will win the innovation prize. In addition to the name, other factors that will be considered in judging include general appearance, balance and proportion of the design, innovation, and finish. For example, a carefully built and decorated bridge with an unusual or eye-catching shape would receive a higher score.



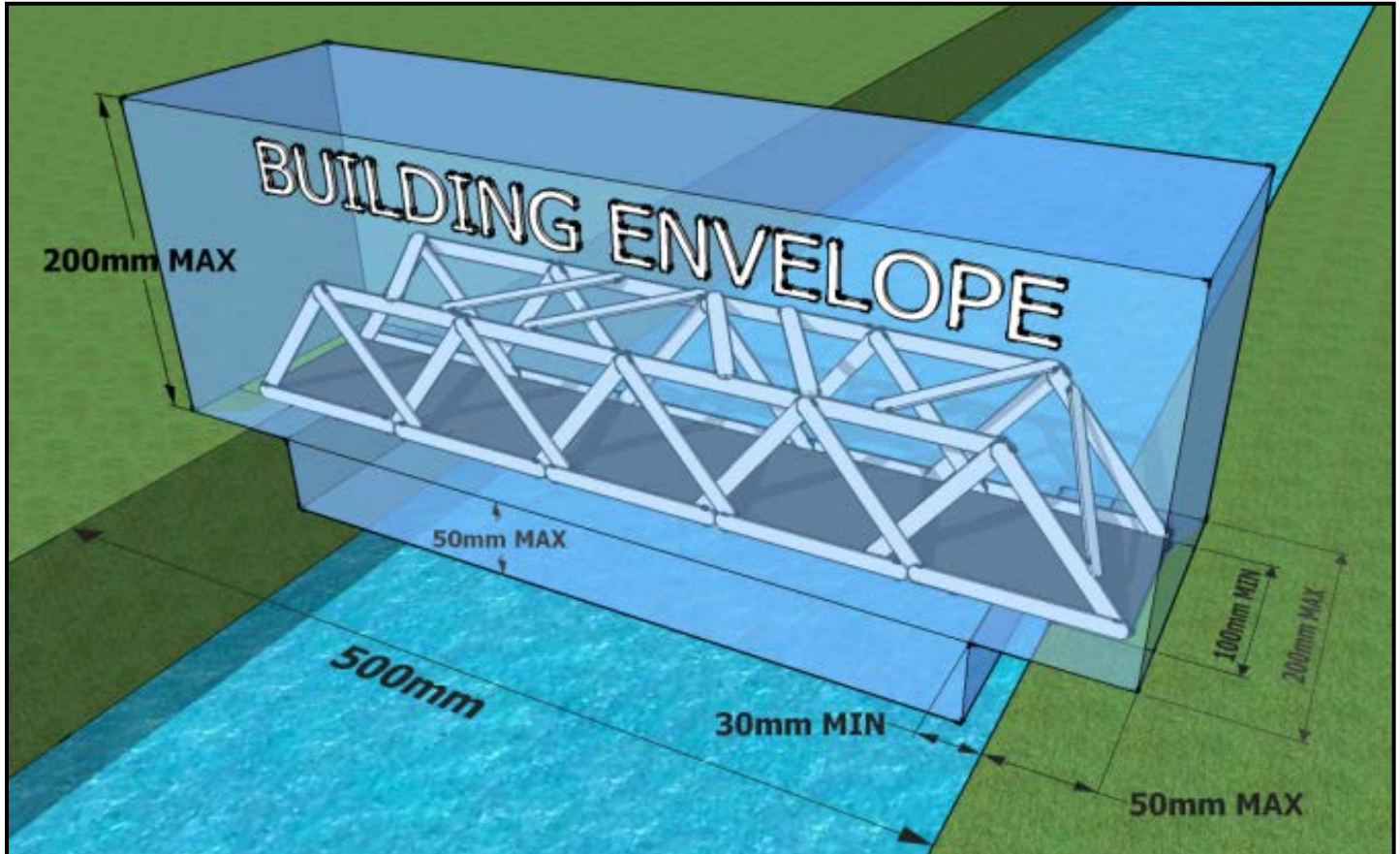
II. DIMENSIONS AND RULES

A. Construction

The bridge must be constructed by the participants (students). Failure to follow this construction rule will result in disqualification.

B. Dimensions

The bridge must be able to span **500 mm**, be more than **100 mm wide** (but less than **200 mm wide**), less than **200 mm high**, and protrude no more than **50 mm** below the bottom of the bridge deck. The bridge must also be free from support by **30 mm on each side**. The bridge deck must be covered in construction paper to allow a "Matchbox" sized car roll across (see section C. Rules for more details).



C. Rules

1. The bridge must conform to **A. Construction** and **B. Dimensions**.
2. The complete bridge is to contain a maximum of **100 Popsicle sticks** joined together with all purpose, nontoxic glue (**note: crazy and industrial glue are not permitted**). White glue is the only glue permitted.
3. Popsicle sticks may be cut.
4. A "Matchbox" / "Hot Wheels" sized toy car must be able to be rolled across the bridge on the bridge deck. The car is approximately 3.5 cm wide and 2 cm in height.
5. Pinning, clamping or non-white glue are not allowed to be used for connections. Failure to abide by this rule will result in disqualification.
6. The banner must be clearly visible. For more information on the label, see Section **I. Scoring**.
7. The bridge must have clearance to insert the loading bar. Sizes can be found in Section **IV. Bridge Testing**

D. Helpful Hints

- 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 competition).
- 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 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.
- The winning bridge at this competition in 2014 held 158.8 kg (350 pounds). The record for a bridge with only 100 sticks is 321.9 kg (710 pounds)!

III. MATERIALS AND COMPONENTS

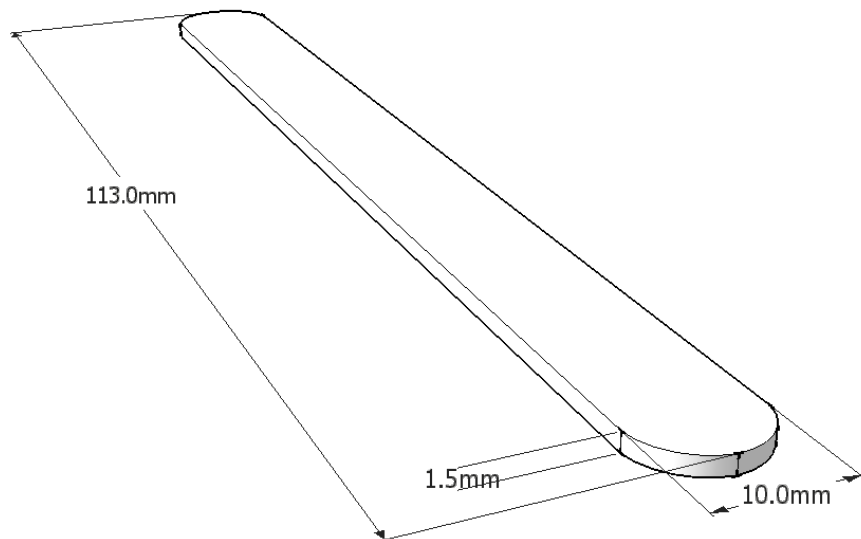
A. Bridge Materials

The material for the bridge construction will be provided:

- One pack of 100 Popsicle Sticks and
- One 4 oz bottle of white glue.

If registration is received before April 17, 2015 APEGBC will provide your team with the Popsicle Stick Bridge Building kit. If you register after the deadline you will need to supply your own Popsicle sticks and glue. The glue must be white glue. The Popsicle sticks used must be within the following specifications:

- 1) 113mm Long.
- 2) 10mm Wide.
- 3) 1.5mm Thick.



B. Bridge Deck Material

Construction paper (not provided) will be used to make the bridge deck, ensure it is a flat, single sheet and will allow a "Matchbox" / "Hot Wheels" sized car to roll across. Use only the thickness of one sheet for the deck of the bridge.

C. Banner Materials

Materials needed for the school name and grade banner will not be provided. Any material can be used as long as the banner does not become a structural part of the bridge. Teams using the banner as a structural part of bridge will be disqualified.

IV. BRIDGE TESTING

A. Prior to competition

Judges will:

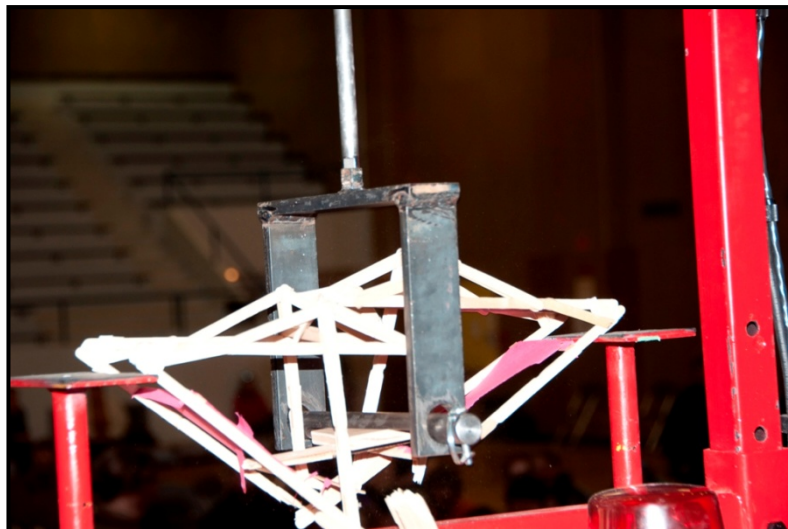
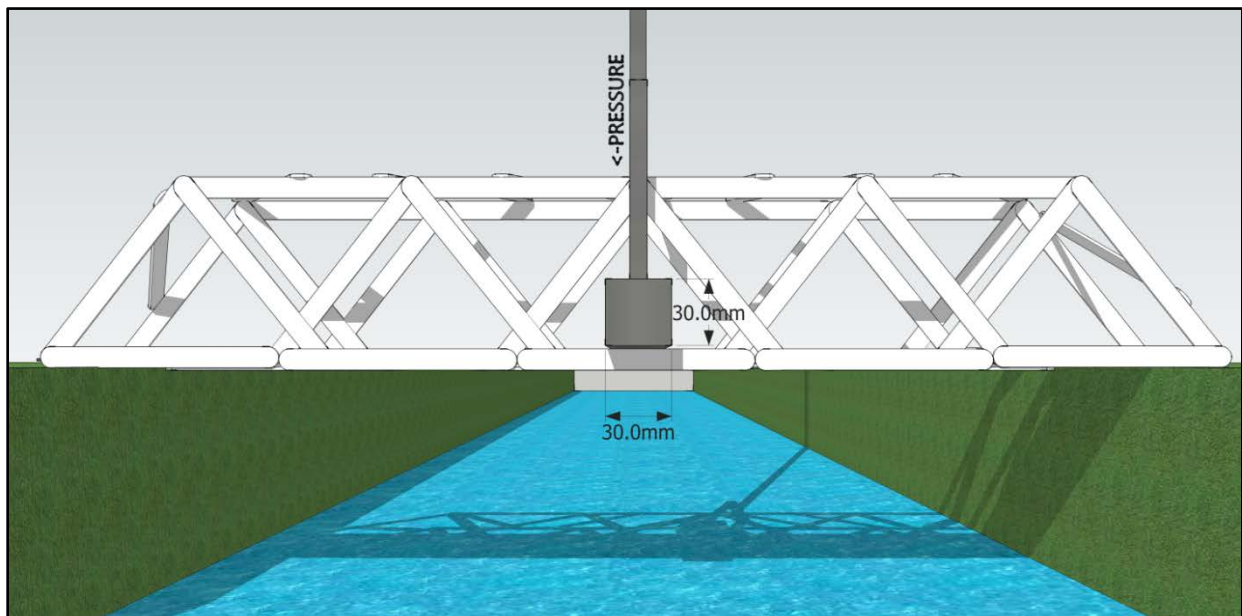
- Weigh each bridge to ensure that a maximum of 100 sticks are used.
- Examine each bridge to ensure that only Popsicle sticks, white glue and construction paper are used and that the construction paper is only used for the bridge deck.
- Ensure each bridge has a team banner and that it has no structural effect.
- Check each bridge to ensure it has a loading gap as per specifications (Listed below).
- Check bridge that there is a deck and that a "Matchbox" car can pass across the bridge.

Bridges not meeting these requirements may be disqualified from the competition.

B. Bridge Load Testing

The bridge will be loaded via **one** loading bar. To accommodate the loading bar, a **30 mm x 30 mm gap** must be provided between the vertical members of the bridge at the center (see figure below). The gap is to be continuous throughout the entire width of the bridge and must allow the bar to sit directly on the bridge deck.

Note: Testing will result in most or all bridges being destroyed, so take your pictures before!



V. PRIZES

Prize Categories

- The strongest overall bridge 1st Place:
\$500.00 to the class of the overall winning team.
The Trophy of Excellence in bridge design and innovation goes to the winner's school until the next competition; it will be engraved with the name of the winning team and their school name.
- The strongest bridge in each of the four categories 1st Place:
\$450.00 to the winning team's class in Category 1, 2, 3 & 4.
- The most innovative design 1st Place:
\$200.00 to the class of the overall winning team.
- Door prizes



VI. CONTACTS

A. General

Teams can register and download the rulebook at Lapointe Engineering Ltd.'s website: www.lapointe-eng.com, or by phoning Sharon Kyte at 250-639-9252 Ext. 121. Once teams are registered, Lapointe Engineering or a local APEGBC member will deliver each team's bridge building kit to their school.

B. Questions

For questions regarding the competition, please contact your local APEGBC Northern Branch member, or Sharon Kyte at sharon.kyte@lapointe-eng.com or 250-632-9252. Ext. 121.

Members of The Northern Branch APEGBC Contacts for Popsicle Stick Bridge Competition			
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