

15th Annual Bridge Building Contest

REGISTRATION FORM

Choose Your Division:

- () Elementary Division - Grade 5 - 6
- () Junior Division - Grade 7 - 9
- () Senior Division - Grade 10 - 12

Please Print Clearly

Student(s) Name:

School:

Grade:

Class:

Teacher:

Please ensure that this form is securely attached to your bridge and also that your name, school and school grade division (elementary, junior or senior) are written clearly on your bridge in permanent marker.

**BRIDGE TESTING ON FRIDAY, MARCH 5 2010
CHARLOTTETOWN MALL**



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15th Annual Bridge Building Contest

Open to Students from
Grade 5 - 12



UPEI Engineering Students weighs and pre-test bridges prior to contest.

Bridge Testing on Friday, March 5, 2010 Charlottetown Mall



Attention Teachers & Students

Bridge Building Contest open to Grade 5 - 6 students

Engineers PEI is pleased to present the 15th Annual Bridge Building Contest.

This contest is open to all students from Grade 5 - 12.

There is no registration fee. Entries can be prepared by one student or a group of students.

This activity offers students the opportunity to apply physics concepts to construction of a variety of different bridge designs.

Students learn about the forces and stresses their creation must endure and develop a greater understanding of structural integrity and the physics of bridge construction.

Students are encouraged to engage in research and to design the most structurally sound bridges.

The entries will be publicly displayed at the **Charlottetown Mall** in Charlottetown on **Friday, March 5, 2010** with judging and load testing performed by Professional Engineers and UPEI Engineering Students.

Winners of the Bridge Building Contest will be announced at the Award Ceremony. Prizes for students not in attendance will be forwarded to their school.



A limited number of "How to Build a Model Bridge" DVD or VCR tapes are available.

The 20-minute video provides insights, tips, and techniques for the planning and production stages of the student project.

Don't forget to state which media format you prefer to receive.

Contact Engineers PEI office to include a copy in your bridge building supplies order.

phone: (902) 566-1268
fax: (902) 566-5551
email: info@engineerspei.com



The Rules:

1. Materials

The only materials to be used in construction of the bridges are wooden popsicle sticks and all-purpose white glue. **NO OTHER MATERIALS ARE PERMITTED; entries using other types of glues or materials would be disqualified.** The popsicle sticks may be cut and the amount of popsicle sticks or glue used is restricted only by the maximum weight limit.

Engineers PEI has a limited amount of materials available for students. Call or email to make arrangements.

2. Design

Many bridge designs are possible; however there are certain limitations to allow the structures to be tested. In particular, the structures must comply with the weight and dimensions as listed on section 3 and on the highlighted box.

If the design has part of the bridge structure extending above the main deck of the bridge, near the area where the load will be applied, consideration should be given to effects of buckling under load. If part of this structure touches the ram as the result of buckling, it will be deemed to have reached its maximum load. The bridge is to be designed to stand on its own, spanning the 55 cm gap on the testing apparatus.

The more successful entries will be those which have correctly applied good engineering design principles.

All bridges will be pre-tested with a 10 kg weight. Bridges that do not pass this screening test will not be tested further. Students are encouraged to pre-test on their own to determine if their bridges are eligible for the competition.

Some guidelines can be found on the Engineers PEI website under "National Engineering Month." Other helpful information can be found at the library and on the Internet. Students might also wish to study some local bridges to get a few ideas.

3. Dimensions and Weight

- The width of the bridge must be between 8 cm and 15 cm.
- The length of the bridge must be no less than 55 cm but can not exceed 65 cm. (Hint: Shorter bridges should weigh less and carry a larger load than a larger bridge with the same design).
- The deck must allow a test vehicle 6 cm in width (e.g., a dinky car) to pass freely along the length of the bridge.

A small piece of steel is placed between the testing apparatus and the bridge during testing (dimension: 51mm x 51mm x 6.4mm thick.)

- The height of the bridge must not exceed 30 cm.
- The weight of the bridge must not exceed 0.5 kg.
- The design must allow for application of the testing apparatus without alteration to the bridge.



IMPORTANT

The bridge must be designed to allow the hydraulic ram to apply a vertical load on the centre of the deck section of each structure.

THE TESTING WILL BE DONE ON THE CENTRE OF THE DECK. Therefore, the top centre area of the structure must be free of obstruction, allowing a minimum space of approximately 4 cm x 10 cm for the ram to be vertically applied.

NOTE: Structures that do not meet the bridge criteria will automatically be disqualified.

4. Identification

A registration form must be securely attached to each entry. In addition, the student's name, grade level (elementary, junior or senior) and the school must be noted on the bridge itself using permanent marker.

Registration Forms may be downloaded from the Engineers PEI Website

Judging:

1. Evaluation

Each bridge will be evaluated according to the following grading system:

A. Strength Factor	80%
B. Quality of Construction and Application of Engineering Principles	20%

The strength factor is given by the following formula:

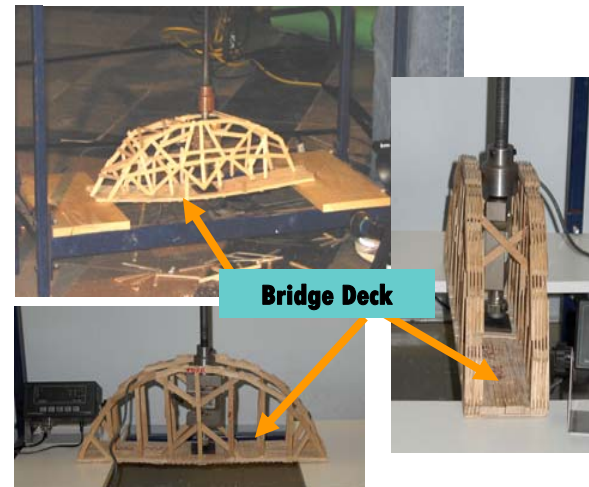
$$\text{S.F.} = \frac{\text{Maximum Load (kg)}}{\text{Weight of Bridge (kg)}}$$

The bridge is considered to have failed when it collapses or the load cell readings decrease.

2. Testing

All bridges must be available for testing at the Charlottetown Mall in Charlottetown by 5:00 p.m. on **Friday, March 5, 2010**. Entries may be sent in advance to the Engineers PEI office by 4:00 pm on Wednesday, March 3, 2010.

Remember, all bridges will be pre-tested with a weight of 10 kg. Bridges that do not pass this pre-test will not be tested further.



Prizes:

School Prize: \$250 will be awarded to the school with the highest average bridge strength (Based on the top 10 finishers from each school; minimum of 10 entries from the school is required).

School Participation Prize: \$250 will be awarded to the school with the highest number of entries that pass the pre-test. (Minimum of 10 entries from the school).

Student/Team Prize: The bridge contest is divided into Elementary, Junior and Senior Divisions. Cash prizes will be forwarded to the winning students care of the school.

Elementary Division (Grade 5 - 6)

- 1st Place - \$50
- 2nd Place - \$30
- 3rd Place - \$20

Junior Division (Grade 7 - 9)

- 1st Place - \$50
- 2nd Place - \$30
- 3rd Place - \$20

Senior Division (Grade 10 - 12)

- 1st Place - \$50
- 2nd Place - \$30
- 3rd Place - \$20

Engineers PEI Strongest Popsicle Bridge Builder Prize!

Can you beat the Engineers PEI strongest popsicle bridge all-time record of 485 lbs of maximum load set in 2001?

The Grand Prize of \$100 will go to the student/team whose bridge withstands the highest load that exceeds the previous all-time record. Bridges must comply with all specifications as outlined in this brochure.



Please note:

Any structure that does not comply with the rules will not be eligible for a prize. Judges' decisions will be final, however all efforts will be made to give entries the benefit of the doubt.

Bridges that pass the pre-test will be tested to failure and returned to students who are present. Any bridges not claimed on the day of the competition will become the property of EngineersPEI.