

NEW this year 2014

BRIDGE BUILDING Competition

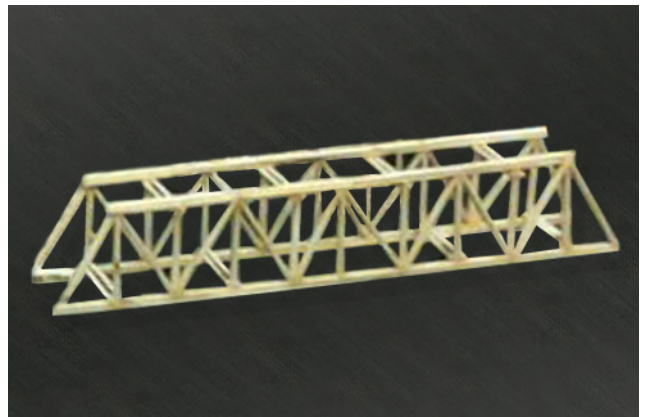
MISSION:

To build a lightweight structure that can carry a lot of weight as compared to the weight of the structure.

- Each bridge shall be built using craft sticks (supplied in your kit) and glue (supplied by participant). The bridges will have a Span Length of 20 Inches and a maximum bridge weight of 400 grams.
- Each Bridge will be loaded to failure as determined by the Judges.
- The overall winner will be based upon an efficiency index determined by dividing the weight the bridge holds in pounds by the weight of the bridge in grams. The highest efficiency rating wins.

How do I Enter the Contest?

Registration details and contest rules are on the MdQI Website. Please contact Glenn Vaughan by e-mail gvaughan@sha.state.md.us if you would like to enter the Bridge Competition and to pick up the Bridge Kit and view the load frame that will be used to support the bridges for the competition. You must be registered for the MdQI conference to participate. The cost of the Bridge Kit and Load Transfer Device is \$25.00 and will be paid for as part of the MdQI Registration Form.



Bridge Judging

The Bridge Competition will be held on February 12, 2014 outside of the Vendor Area beginning at approximately 4:30 PM. All contestants should report to the Bridge Competition Area between 10:00 AM and 12:00 Noon on February 12th to have their bridge weighed and qualified. The bridges will be securely displayed in the Bridge Competition area until the contest.

The winner of the Bridge Competition will be announced at the Luncheon on February 13, 2014.

Mission: To build a lightweight structure that can carry a lot of weight as compared to the mass of the structure.

2014 - MDQI	Span length 20 inches	Max bridge mass 400 g
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Each bridge shall be built using craft sticks (supplied in your kit) and glue (supplied by participant).

Each bridge shall be built to have a clearly defined roadway path capable of passing a vehicle 1 ½" (W) x 1 ½" (H) unimpeded for its full length. If the structure does not meet this criterion, then it will be disqualified.

Each bridge will be supported on a load frame supplied by the judges (available for viewing when you pick up your kit at SHA). The load frame shall be the sole means of support for the bridge. Any bridge found to gain support from an area other than the load frame shall be classified as loaded to failure.

At the contest, each participant will place a load transfer device (LTD - supplied at the contest – but similar to the one supplied in your kit) in the middle of the span and along the clearly defined roadway path (no glue allowed). The load transfer hook at the bottom of the device must be accessible to allow attachment of the load. Replacement of the LTD will be allowed if the LTD fails before the bridge fails. Each participant should have someone with them who will assist with applying load to the bridge. Weights will be supplied by the judges. Only the contestant and their assistant(s) may load the bridge. Note the LTD provided in your kit is only to provide you with a means of testing your bridge prior to the competition and to ensure that your bridge is built to accept an LTD.

Each qualifying bridge will be loaded to failure (as determined by the judges).

The competition winner shall be determined using the following criteria:

The judges will determine each bridge's mass before any load is applied; no LTD may be attached to the bridge at this time. All bridges shall be loaded to failure by the participant while under review by the judges. Once the bridge fails the judges shall take the highest load held by the bridge (the load prior to the one that caused the bridge to fail) and divide that load by the previously determined mass of the bridge to establish the bridge's efficiency index. The bridge with the highest efficiency index will be the winner. In case of a tie, the bridge that held the heaviest load of the tied contestants shall be the winner.

Example of efficiency index calculations to determine winner - (Highest ratio wins)

Bridge A mass equals 198 g and holds 50 pounds - index equals $50 / 198 = .2525$

Bridge B mass equals 170 g and holds 45 pounds - index equals $45 / 170 = .2647$

Bridge B would be the winner.

Questions and Answers

Q - How will failure be determined?

A - Generally failure is defined as that point where the structure is no longer capable of supporting the load. Deflection, distortion or even the separation of jointed members does not constitute failure as long as the bridge still provides the sole means of support of the load. The judges are the only ones to make a determination relative to bridge failure. Suppose a contestant's bridge has successfully held 40 pounds and they now decide to try 50 pounds. Upon hanging 50 pounds on the bridge, the bridge bends but does not break to the degree that the weights are now supported on the floor. In this instance the floor is providing support so the bridge would now be considered as failed. The efficiency index would then be calculated based on the successful test at 40 pounds. A suggestion to all contestants might be to hang your weights high.

Q - What constitutes a clearly defined roadway path?

A - The intent is to have participants build a bridge and not some other type of load carrying structure (load frame). It is not necessary to build a riding surface out of craft sticks across the bridge (you are welcome to do so if you believe it will help to create a more efficient bridge). The judges will have a piece of "Matchbox" style track 1 ½" wide and long enough to go from one end of your bridge to the other. Contestants will place this track across their bridge to help define the roadway path for the judges. This track will not be present during loading. Remember your LTD must be situated on this roadway path for loading.

Q - How is the 20" span length measured?

A - The 20" span length is measured from inside face of end support to inside face of end support on the load frame. Basically if your bridge is only 20" long, then it will be too short to be supported on the end supports. These end supports will be made from 2" x 6" lumber which measure about 1 ½" wide by 5 ½" high.

Q - Can the bridge contact the inside face of the end support during loading?

A - The requirement for support is that the load frame be the sole means of support for the bridge. Since the inside face of the 2" x 6" is part of the load frame, it too can be used to support your bridge.

Q - What is the length of the 2" x 6" end support on the load frame?

A - We will be limiting the portions of the load frame that your bridge can come in contact with to the center portion (6 inches long) of the 2 x 6 members that constitute the end supports.. The intent is to have you construct a bridge such that the two 2" x 6" end supports spaced 20" apart support the bridge.

Q - How tall is the load frame?

A - The load frame is about 4' tall from floor to top of end support. This should give you ample room to hang weights on the LTD. The load frame will be level (as determined by the judges) from one support to the other.