



INTRA COLLEGE TECHFEST

BRIDGE DESIGNING

Day 1: Bridge construction (maximum 5 hours)

Day 2: Testing

MATERIAL KITS

- Wooden Popsicle sticks, fevicol will be provided on spot.
- All other necessary materials (scissors, blades/other cutting materials, thread, clips (30 would be enough) etc.) may be brought by the participants themselves.

CONSTRUCTION OF MODEL BRIDGES

Only wooden Popsicle sticks and fevicol can be used to construct the bridges. No other materials are permitted. The wooden sticks can be cut to fit as desired. The amount of sticks and glue used in the bridge is limited only by the Dimensions and Weight restrictions.

Please note the following when you design and build your bridge:

During the strength test of the bridge, one horizontal bar will be placed on the road deck of the bridge. A downward force will be applied onto the horizontal bar. By placing the bar on the deck in this manner, we ensure that the truss members of the bridge are stressed during the strength test. The builder of the model bridge shall ensure that there is one 3cm x 3cm opening, through the side of the bridge structure, immediately above the bridge deck, to accommodate the load testing.

DIMENSIONS AND WEIGHT

- The length of the bridge must be between 50 cm and 60 cm at its base. This is critical and the bridge will be disqualified if it is shorter than 50 cm and will be penalized if it is longer than 60 cm at the base.
- The road surface of the bridge must be at least 3 cm wide along its entire length (sufficient to allow a match box to pass through).
- The overall width of the bridge shall not exceed 14 cm. This is critical and the bridge will be penalized if it is wider than 14 cm.
- The overall height of the bridge – height of 1 popsicle stick (minimum) to 18 cm(maximum).. Overall height means from lowest point to highest point. This is critical and the bridge will be penalized if it is higher than 18 cm.
- The weight of the bridge shall not exceed 200 grams. “Weight” means finished weight, including sticks and glue, and includes all attachments submitted with the bridge. Penalties will be assessed against overweight bridges.

HOW TO ACCUMULATE POINTS IN THE COMPETITION

- Keep the glued joints clean and trimmed. At the joints, be sure to overlap the sticks and wipe off excess glue.
- If the edges of the bridge are intended to be straight, use a straight edge while building the bridge.
- Try to use some artistic imagination.
- Try to use engineering principles, to transfer the force from the middle of the bridge to its supports.
- Comply with the "Weights and Dimensions" restrictions, to avoid penalties.

PENALTIES

- The self-weight of the bridge must be less than 200 grams. If the above mentioned limit is crossed then points will be deducted as per the following-
 1. Up to 5 grams over limit – for each 2gms, 1 point will be deducted.
 2. 5-10 grams over limit – for each gm, 1 point will be deducted.
 3. 10 & above over limit – for each 2gms, 3 points will be deducted.
- 2 points will be deducted from the score if the bridge deck is narrower than 3 cm.
- 5 points will be deducted for each 1 cm (or portion thereof) that the bridge's height exceeds 18 cm.
- 2 point will be deducted for each 1 cm that the bridge's width exceeds 14 cm.
- 2 point will be deducted for each 1 cm that the bridge's length exceeds 60 cm.

GROUND FOR DISQUALIFICATION

1. Entries will be disqualified if they use any material other than fevicol and wooden Popsicle sticks.
2. Entries will be disqualified if the bridge length is shorter than 50 cm.
3. Entries will be disqualified if there is evidence of heat treating (baking, etc.).
4. Entries will be disqualified if the height of the bridge is less than one Popsicle stick.
5. Suspension Bridge Model is not permitted in this event.

DIMENSIONS AND WEIGHT & PENALTY SUMMARY

PARAMETER	LIMIT	PENALTIES
BRIDGE WEIGHT	Maximum 200gm	Upto 5gms over limit -Deduct 1 point for each 2 grams over limit.
		5 to 10 gms over limit- Deduct 1point for each 1gm.
		10 & above over the limit- Deduct 3points for each 2gms.

ROADWAY WIDTH	Minimum 3cm	Deduct 2 points if roadway is narrower than 3 cm
BRIDGE HEIGHT	Maximum 18cm	Deduct 5 points for each 1 cm in excess of 18 cm
BRIDGE HEIGHT	Minimum height of one popsicle stick	Disqualified if shorter than the height of one popsicle stick
BRIDGE WIDTH	Maximum 14cm	Deduct 2 point for each 1 cm in excess of 14 cm
BRIDGE LENGTH	Minimum 50cm	Disqualified if shorter than 50 cm
BRIDGE LENGTH	Maximum 60cm	Deduct 2 point for each 1 cm in excess of 60 cm
ALLOWANCE FOR TEST LOAD		Deduct up to 10 points if the bridge fails to make allowance for the perpendicular test piece or the down rod.

JUDGING AND TESTING OF BRIDGES

The bridges will be subjected to a Efficiency test in which a downward force will be applied to the bridge and the force will be gradually increased until the bridge fails. This force will be recorded on the Evaluation Sheet. A bridge is considered to fail when it breaks.

During the test, the bridge will rest on two blocks placed apart. These blocks are loose and will resist the downward force applied to the bridge. The blocks will not resist any sideways force exerted on them. Therefore, 'arch' style bridges, which normally require an inward force on the ends of the arch for proper support, will not perform well in this competition.

The Strength Factor will be computed using the formula:

Efficiency= (applied force)/ (self-weight of the bridge)

(Efficiency equals the Applied Force to break the bridge divided by the mass of the bridge)

The bridge with the highest efficiency will be given a score of 100. All other bridge entries within the category will be given a score less than 100, based on the ratio of their Efficiency score to the highest Efficiency score.

CONTACTS

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