

# BRIDGE IT

*'We build too many walls and not enough bridges' -Isaac Newton*

## Problem Statement

### Introduction

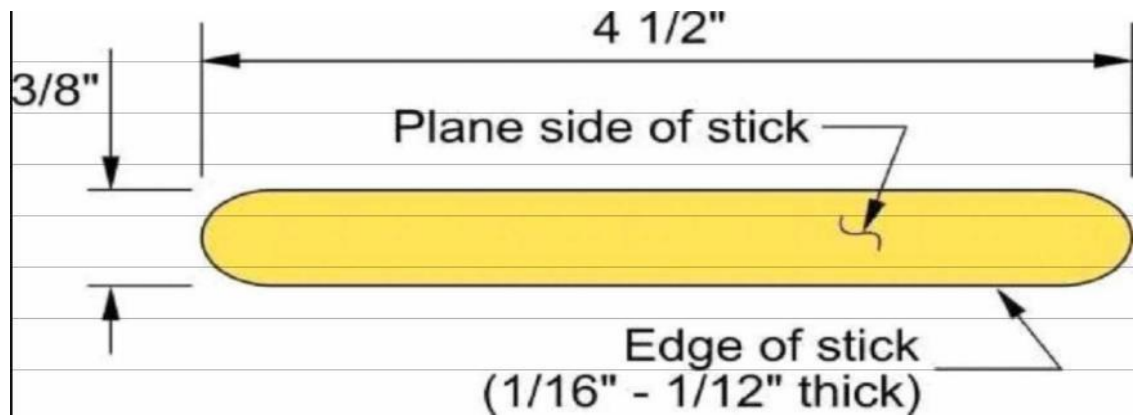
Bridge it Event provides you a great opportunity to prove to the world your caliber of making bridges as an innovative engineer. Before proceeding with the construction of complex and strong bridges, it is essential to model it and test its performance. Now it's your time to build your bridge model with creativity, technique and your engineering brains using ice cream sticks! So do come and be a part of this extraordinary event which will surely leave you with a marvelous experience.

**TASK :** To build a model bridge using common, easily available materials like Popsicle sticks, glue which can sustain maximum load, satisfying the stated constraints.

### SPECIFICATIONS

#### 1. Material to be used for making bridge model :-

- All bridge elements must be made of standard-sized ice cream sticks.
- Only all purpose fevicol glue may be used to hold together all bridge elements.

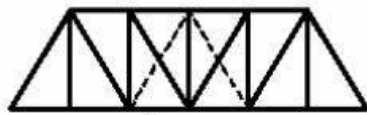


#### 2. Bridge Design :-

- The bridge must be 45-55cm long, 9-15cm high and 8-15cm wide.
- A roadway is defined as a flat surface upon which traffic can travel unimpeded. The roadway must be continuous, flat, and level. There should be no gaps between roadway sticks nor any obstructions along the roadway.

- Bridge must weigh 350-400 grams.
- Adhesives cannot be applied on the free surface of a member made of ice cream sticks to increase its strength.

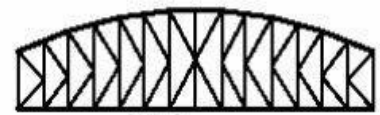
## STANDARD TRUSSES



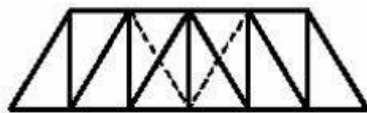
Pratt



Parker



K-Truss



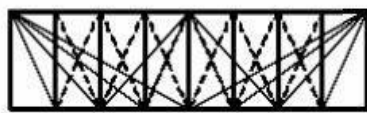
Howe



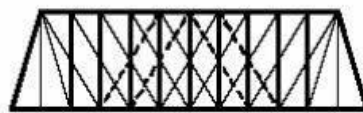
Camelback



Warren



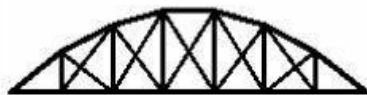
Fink



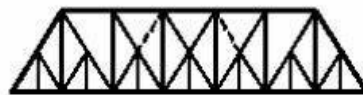
Double Intersection Pratt



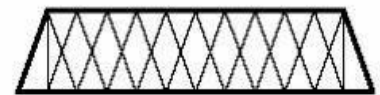
Warren (with Verticals)



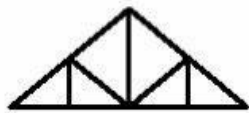
Bowstring



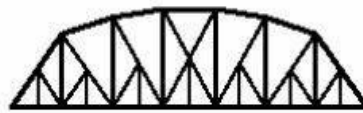
Baltimore



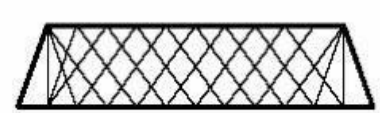
Double Intersection Warren



Waddell "A" Truss



Pennsylvania



Lattice

- You can take help of above standard truss designs to choose your innovative truss design.
- Keep in mind that the truss design should not be same as above designs. There must be some innovation in the design that reflects your innovative mind.

## JUDGING AND SCORING

The final score of each structure will be calculated according to the following rules:

- **Efficiency (40% Weightage):** Maximum efficiency by any structure will be taken as the constant 'E' and points will be calculated according to the formula:

$$E = \text{Maximum Load/Weight of Structures}$$

- **Aesthetics and Economic Efficiency (25%weightage):** Evaluation on the basis of aesthetics and economic efficiency will be done by judges and will include criteria like:
  - Overall look of the bridge structure
  - Innovation in design
  - Cleanliness of work
  - Economic Design
- **Deflection (20%weightage):** The deflection of the bridge at yielding will be noted. If the deflection increases more than 10 mm, then the load at that deflection will be taken as the ultimate load. Each structure will be graded by the judges on a scale of 0-30.
- **Viva (15%weightage):** The viva will be taken by the judges after testing of bridge. The viva will be about the innovation you made and the technical knowledge related to bridge design or other related information.

You have present a written technical report describing the design and construction phases of the bridges.

### Penalties

Penalties as mentioned below

- Use of any material other than that provided (Penalty of 50% of the total score or can lead to disqualification as decided by the judges). In case of any discrepancies, the decision taken by the judges and the coordinators will be final.
- Dimensional specifications are not met (Penalty of 10% of the total score)
- Weight exceeds the limit (Penalty of 15% of the total score)

Will be imposed if the structure violates the dimensional or weight specifications.

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