

## ***Suspendo Brücke***

***“The whole purpose of the construction of a bridge is to provide a path leading to The River, or to serve as a resting place until the rivers deeper and truer nature revealed itself”***

-Aberjhani

### **Introduction:-**

***Suspendo* Brücke** is the etymology of suspension bridge. **A great bridge is a great monument which should serve to make known the splendour and genius of a nation, one should not occupy oneself with efforts to perfect it architecturally, for taste is always susceptible to change, but to conserve always in its form and decoration the character of solidity which is proper.**

### **Task:-**

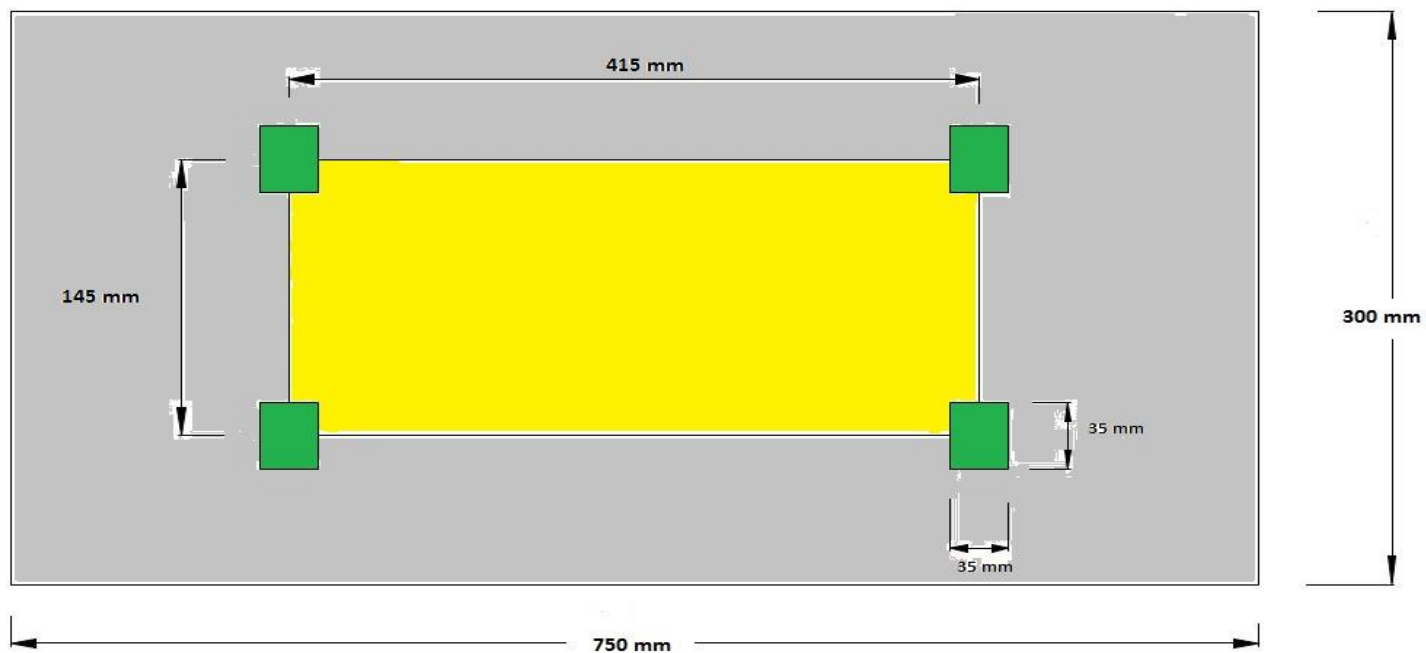
Effulgence brings you the challenge to design a suspension bridge of your own kind using popsicle sticks, strings and adhesive that can sustain the load according to the guided criterion.

### **Arena :-**

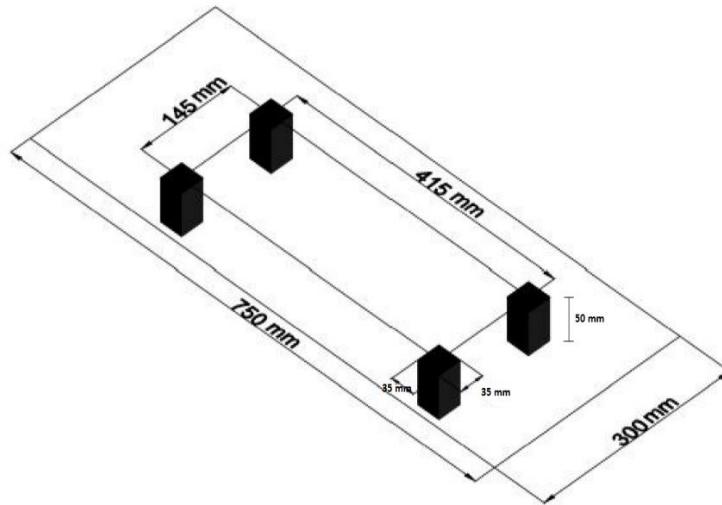
- There is a 750 mm X 300 mm base on which the bridge has to stand.
- There are four grooves with a depth 50 mm and 35 mm X 35 mm cross-section.
- The position of the grooves on the board is such that the center of the grooves form a 415 mm X 145 mm rectangle.

- Four fix support will be provided at the end of base in the form of CI hooks, they can be used according to the willingness of the participants.

Top View



Isometric View



### **Design specifications:-**

- Deviation from the abstract submitted may lead to DISQUALIFICATION.
- Size of the footings of the columns should be exactly 3.5cm x 3.5cm.  
Penalty: 20 points for breaking this rule.

- The minimum height of the bridge measured along its length should be  $H=25$  cm above the deck.

Penalty: 10 points for breaking this rule.

- The maximum height of the bridge measured along its length should be  $H=30$  cm above the deck.

Penalty: 10 points for breaking this rule.

- The deck of the bridge must be smooth (should have no gap) so that a prototype vehicle can pass through it.

Penalty: 5 points for breaking this rule.

- The deck should allow a 10cm x 10cm vehicle to pass the entire length of the bridge.

Penalty: 10 points for breaking this rule.

- Size of the footing below the deck should be 8cm to 10cm.
- The area of cross-section of the bridge at any horizontal section of the bridge should not exceed 18cm and should not be less than 10cm.

Penalty: 30 points for not fulfilling this criterion.

- Length of the bridge should be in range of 435 mm to 500 mm.

Penalty: 10 points for not following this criteria.

### **Material specifications:-**

- Popsicle sticks (maximum length 115 mm, width 13 mm and thickness 3 mm) and adhesives (not resin) should only be used to build the structure. The Popsicle sticks can be cut or trimmed to any shape or size.
- Adhesive can only be used to join Popsicle sticks together; however adhesives cannot be applied on the free surface of a member made of Popsicle sticks to increase its strength (Only fevicol can be used as an adhesive).
- Only provided string should be used for suspension.
- The team will be DISQUALIFIED if found using any other material other than those mentioned in any part of the structure.

### **Testing:-**

- Teams will be given 5 minutes to make final changes in their structure before the testing, and once the changes are done, the structure will be weighed. After weighing is done no changes can be made in the structure.
- Teams will be allowed to put their structure on the base; once the structure is placed loading procedure will be started by the co-ordinators.
- Loads will be applied on the middle surface of the deck.

### **Failure criterion:-**

The structure is considered failed when any of the following happens:

- The structure fails to satisfy any of the specifications above.
- Any member or joint of the structure fails.
- The structure fails if deflection at the midpoint of deck is more than 5cm.

### **Rules:-**

- Structure of bridge could be of absolutely any shape satisfying the above specifications.

- Once the loading is on you are not allowed to modify or touch your structure in any way.
- If any of these specifications are not met, point deductions (as mentioned above) or may even lead to disqualification.
- Any team that is not ready at the time specified will be DISQUALIFIED immediately.
- Judges (co-ordinators) decision shall be final and binding on all and rules may be modified according to the current situation of different teams.

Change in rules, if any will be highlighted on the website.

### **Judging Criteria**

- 150 points will be awarded to the team with the maximum efficiency, zero points to the team with the lowest value of it, and all others will be awarded points based on linear interpolation between these two extremes.

$$\text{Efficiency} = w/W' \times 100$$

w = Bearing weight of bridge

W' = Weight of bridge

- 70 points will be awarded to the team with the lowest self weight of structure, zero points to the team with the highest value of it, and all others will be awarded points based on linear interpolation between these two extremes.
- 30 points will be awarded to the team for aesthetic and clean work.

**NOTE:** Score of a team is the sum of the points based on these criteria minus penalty if any.

### **Team Specifications**

A team may consist of a maximum of 3-4 members.

### **Eligibility**

All students with a valid identity card of their respective educational institutes are eligible to participate in this competition at Effulgence 2015.

### **Compliance**

During the event, the co-ordinators will evaluate each structure. Structures will be weighed, measured, and reviewed for compliance with rules regarding materials. If a structure does not comply with any of the rules, the team may get DISQUALIFIED.

- Structures that are completed but do not meet the construction guidelines will be given a chance to make any necessary alterations.
- No alterations will be allowed unless deemed necessary by the Judges (co-ordinators). If such alterations are required, the team will be allowed thirty (30) minutes to complete them. The decisions of the co-ordinators are final.

### **Certificate Policy**

- Winner Certificate will be given to 1st, 2nd and 3rd rank holders only.
- Certificate of participation will be awarded to the next 5 teams according to the rank list.
- DISQUALIFIED teams will not be considered for any certificates.

