CREDECA

TEAM CHALLENGE1 2024

Structures Efficiency

Team Challenge 1. Structures : Efficiency

A. Understanding the Problem

Today, problems such as resource depletion, environmental destruction, and climate change are becoming very serious. This is not a problem for a country or a continent, and in terms of industry, it has become a top priority to be solved immediately in all fields such as automobiles, construction, ships, and energy. As one way to solve this problem, the experts are conducting a number of studies to maximize efficiency.

The team must create a story that places great importance on efficiency and show it in a performance. In addition, a structure that can withstand heavy weight with a small amount of material should be produced and demonstrated with the performance.

B. Problem Overview

The team should produce and present interesting and original plays and structures that meet the following conditions. (Time and cost: 8 minutes, 150 USD)

a. a funny story that puts a great emphasis on efficiency

b. Stage background or props that show high efficiency

c. a character who doesn't care about efficiency at all

d. Structures that withstand loads

e. Weight to be carried out the load test

f. Two Talent Show

C.Performance

a. Contents of Performance

1) The team must produce everything necessary for the performance in advance and bring it to the competition.

2) The performance should be a content that greatly emphasizes the importance of efficiency.

3) The performance should feature a person who doesn't care about efficiency at all. This person does not necessarily have to be a person.

4) Stage backgrounds or props that express efficiency should appear.

b. the form of a performance

1) The story created by the team should be presented in the form of a theater performance.

2) The team should be able to clearly tell the story the way they want it.

3) It should be presented during the performance, including the load test of the structure. Within the area marked by a contest, some team members will present a structure test and others will present a performance.

4) No separate time is given for the load test.

c. Time of Performance

1) The team's presentation must be completed within the 8-minute time limit.

It includes the time the team needs to set up its props in the competition area.

2) The time provided will begin when the judge signals the team to start.

3) The team cannot ask for the time to be stopped.

4) When the time is up, the judge will stop the team's presentation.

(Zero points will be given to any solutions that are not presented.)

d. Cost

1) The combined value of all the materials used during the team's presentation cannot exceed $150 USD.

2) All materials used in the presentation must be listed in the expense report and included in the total cost.

3) Cost-designated items: The value of items that are worth more than $5 USD, such as musical instruments, laptops, audio equipment, beam projectors, and cell phones, shall be designated as $5 USD.

4) Banned items: Fire (or flame), gunpowder, live animals, chemicals, sprays, weapons, dry ice, items that may pollute or damage the competition

site, items that the judge considers dangerous

5) Value of a used item: One-fifth the market price of a new product

6) Value of a recycled item: $0 (Must be specified in the Expense Report)

7) Cost-related penalties may be imposed if:

- Items are missing from the list.
- The judge decides that the team has exceeded the cost limit.
- Banned items are used. The judge may prohibit the team from using props that include any of the banned items at any time; in the event the banned items have already been used in the team's presentation, zero points may be given for all scoring categories that are related to such items.

D. Structure

The team shall produce structures that meet the following conditions.

a. Scale

1) Build structures made of balsa wood.

2) The structure shall be not less than 20 cm in height but not more than 21 cm in weight and not more than 15 g in weight.

3) The structure shall be able to fit into a cylinder 10 cm in diameter.

4) The structural structure shall be capable of placing a weight on the safety plate after installing the safety plate on it. [See Figure 1.]

5) Structures must be manufactured in advance and brought to the concert hall.

b. Materials: It shall be manufactured using only balsa wood and glue.

1) Only 3 mm cross section of the projectile tree is allowed (allowed error +0.3 mm).

2) The adhesive should be used as it was when it was purchased. Do not add or mix any ingredients to the adhesive.

3) The words "adhesive", "epoxy", "cement", "pool" and "adhesive" shall be the brands marked by the manufacturer.

4) You can't use anything but balsa wood and glue. However, tools necessary for manufacturing may be used, but may not be part of the structure.

c. A weight

1) The team shall bring the appropriate weights directly for the load tester provided by the organizer.

2) You can make it yourself or use existing products that can be used as weights. (e.g., fill a plastic bottle with sand and use it as a weight)

3) The weight shall be within a cylinder of 10 cm in diameter.

4) When standing on a safety plate, you must stand on your own without outside help.

5) The height of one weight is 30cm or less, and there is no limit to the weight and number. However, the height of the load tester (120 cm) shall not be exceeded.

6) Teams should mark their respective weights.

d. Load Test

<Preparation for Testing>

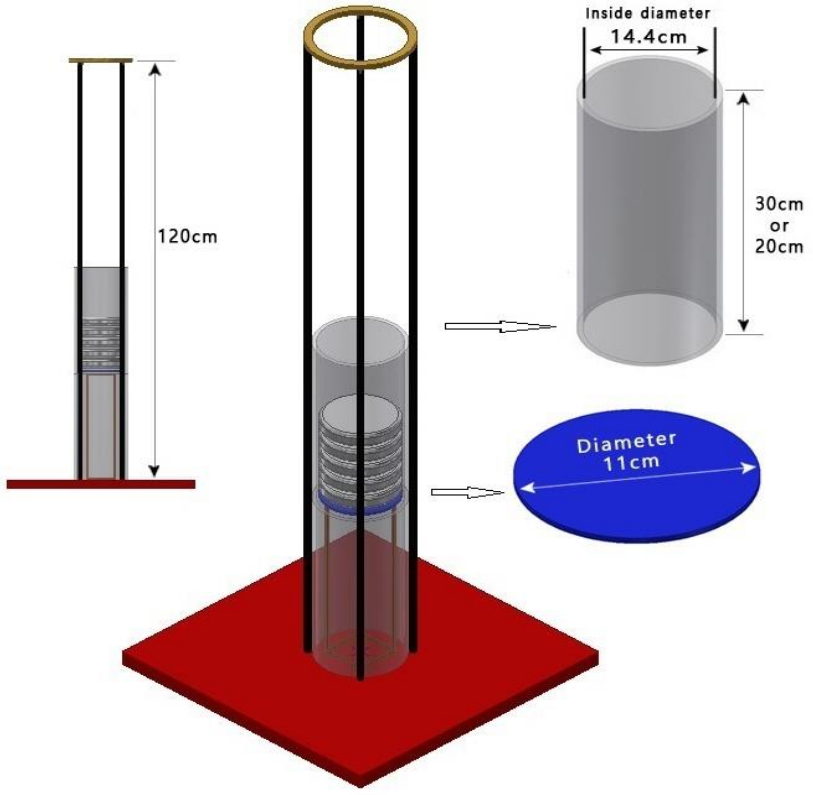
1) The team has to check in 30 minutes before the performance starts. During the

check-in process, we will ensure that the structures and weights created by the team meet the regulations. If you don't pass the check-in, you can't do the (load) test.

2) Where a correction is requested by the examiner during the check-in process, the correction shall be completed by 10 minutes before the start of the performance, and the load test shall not be conducted if the correction is not made within time.

3) Once the check-in is completed, the structure is stored at the designated venue of the competition. At this time, the team cannot touch or modify the structure until the performance begins.

4) The specifications of the structure tester are as follows.



< Figure 1 : A picture of a load tester, safety plate, and structure. >

<Order of test run>

1) Run the test with the start of the performance.
2) The structure is located inside the tester.
3) Place the safety plate on the structure.
4) Place the weight on the safety plate.
5) When the judge shouts 'STOP', it ends

<End of structural load test>

1) When the 8-minute time limit for the performance is over
2) When the structure, weight, or safety plate touches the area except the bottom of the tester.
3) When all the prepared weights have been used
4) The height of the accumulated weight rises to the top of the tester.
5) where the assessor finds it dangerous to conduct a weight test

<Precautions>

1) The tester shall be used as it is placed and shall not be held or attached using any part of the body.
2) The team with the highest efficiency of the structure is given 110 points, and the other team is given a score based on this.
3) In order to be recognized as a weight score, one weight must be raised and then the structure must withstand the load for three seconds before the other weight can be raised. This process will be repeated and the time and success will be determined by the judges.
4) Auxiliary devices or tools may be brought in for the purpose of safely or accurately positioning structures or weights within the tester. However, it must be included in the cost report.

E. Talent Show

a. The team may showcase their 2 talents in any way they wish to during their original performance to further enrich it.(Example: Composing and writing a song that goes hand in hand with the overall atmosphere of the performance and is used as background music)

b. However, in the event the team chooses talents that overlap with a scoring category, its Talent Show will receive zero points.

c. The judges will evaluate the team's Talent Show based on how unique it is compared to those of the other teams, how outstanding the team's talents are, how much effort has been put in, and its harmony with the performance.

F. Evaluation Categories & Scoring

Area	Category	Description	Score
a. performance (100 pts)	Degree of Completion	Story organization & Creativity	0~25
		Acting(audible, motion, natural)	0~10
		Productions (stage backdrop, costumes, props, etc.)	0~15
	Story & Character	the appropriateness of a story that places a great emphasis on efficiency	0~10
		a prop that expresses efficiency	0~20
		Creativity in character settings that don't care about efficiency at all	0~20
b. Structure (110 pts))	Load Test	Team efficiency = $\frac{total\ weight}{weight\ of\ structure}$ Team score = $\frac{team\ efficiency}{the\ efficacy\ of\ the\ most\ efficient\ team} \times 110$ * The most efficient team is 110 pts	0~110
c. Talent Show (40 pts)		excellence of the team's unique talents and the effort that has been put in	0~20
		Harmony with the performance	0~20
Total Score			250

G. Penalties

Judges may impose penalties for "spirit of competition" violation, unsportsmanlike conduct, outside assistance, violation of safety regulations, exceeding the cost limit, and violation of other limitations (-1 to -100 points per offense). (Refer to the penalty regulations in the Program Guide.)

*Omission of scored problem requirements carries no penalty except loss of score (zero points).

H. Competition Site

a. A 2m x 3m competition area will be provided (larger, if possible).
b. A three-prong electrical outlet will be available;
However, the team must bring any extension cords it needs.
c. The team cannot adjust the lighting at the site.
d. A penalty (-1 to -100 points) may be imposed for polluting or damaging the competition site. After its presentation is finished, the team must clean up the site and return it to its original state in a timely manner.
Any cleaning utensils used for cleanup will not count towards the total cost of the team's solution.
e. The team cannot raise objections in relation to the floor surface of the competition site.

I. Documents to Submit

Competition / Document	Preliminary Competition (No signing required)	Main Competition
a. Application Form for Participation	Submit Online	Submit 2 copies
b. Solution Description Form	Submit Online	Submit 4 copies
c. Expense Report (including receipts)	×	Submit 1 copy
d. Script	×	Submit 1 copy

J. Matters to Note

a. The team must read 1) the limitations that apply to this Problem, 2) additional announcements on the Problem limitations (made on the website), and 3) the Program Guide. The team is responsible for any disadvantage it may suffer due to its failure to check the above. Check for any new announcements on the Problem limitations by regularly accessing our website.

b. Submit all problem clarifications using the provided form via e-mail.

c. Set up the team's membership sign on the left or right side of the competition area so that it is visible to the judges throughout the performance.
   1) The sign should be at least 40cm x 40cm in size and free-standing, and must show the team's name, problem, and division.
   2) The judges may impose a penalty if the team's sign is not visible during the performance (or has been omitted completely) or information is missing from the sign.
   3) Materials used to make the team's sign must also count towards the team's total cost.

d. All teams are required to compete in both a Team Challenge (worth 250 points) and a Self-activity (worth 100 points). The scores the team earns in these two problems will be added to calculate its final score.
   Spontaneous Problems offer teams an interesting opportunity to showcase their on-the-spot creativity, problem-solving skills, and teamwork.
   More information on these problems can be found in the Program Guide.