

Team Design

Welcome to XI LisBEC - Lisbon BEST Engineering Competition!

We thank you for your participation in this local engineering competition and we wish that it will provide you with moments of learning, healthy competition and essentially entertainment.

This document describes this engineering competition, the task, the general rules and its evaluation.

Remember: Questions that aren't answered in this document should be asked to the organization.

I. Task Description

The objective of this task is to project and build a device capable of starting **from rest** in a given horizontal surface and traveling along that surface and down a given **inclined plane**, using the energy provided by the materials given by the organization, in the **maximum** possible time. The device has to transport a screw given by the organization, **without stopping, falling or letting the screw touch any surface** outside the device.

The task will last for three hours. This estimated task time includes the project and building of the device and the cleaning of the working table.

At the end, the devices will be tested and prizes will be given to the winning team. In order to win, teams have to build a device that has the best results according to evaluation parameters defined in this document.

II. General Rules

Attention: Before the task starts, read the general rules and the evaluation criteria of this engineering competition. Some of the aspects of these rules may affect the project strategy and the device construction.

1. Materials

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Rule 1.1) Only materials given by the organization are permitted to be used in the device construction.

2. Structure

Rule 2.1) The device doesn't have a maximum limit in height, width or length.

Rule 2.2) The device has to remain complete before and after the runs.

3. Time

Rule 3.1) After the end of the time set for this engineering competition, the devices will be picked up by the organization, even if incomplete.

4. Evaluation

Rule 4.1) Each team has two runs and only the best one counts.

Rule 4.2) Each team has 5 minutes to complete the two runs. The time starts from the moment the last team leaves the evaluation stage.

Rule 4.3) The device has to be put in place by the team at a maximum distance of 5 cm from the start line. The device has to start from rest.

Rule 4.4) During each run, only one team member may start the device.

Rule 4.5) The device cannot stop or touch the ground (that is, fall from the inclined plane) before reaching the finish line.

Rule 4.6) The screw that is transported by the device cannot touch any surface outside the device.

Rule 4.7) The energy used by the device is provided only by the device itself. No external energy sources can be used intentionally or accidentally, for example, kicking or pushing the device.

5. Penalties

Rule 5.1) Prototypes that don't respect rules 1.1, 2.2 and 3.1 will be automatically disqualified.

Rule 5.2) Any run that doesn't respect one of the rules from 4.3 to 4.7 will be repeated.

Rule 5.3) Any run made after the end of the time stipulated in 4.2 won't be considered valid.

6. Doubts

Rule 6.1) If you have any doubts, please contact one member of the organization properly identified.

III. Evaluation Criteria

There are 3 evaluation criteria:

Evaluation Criterion		Criterion Weight
1	Time taken	50%
2	Creativity and Complexity	25%
3	Quality of the construction and functionality	25%

Each of these criteria will be graded from 0 (worse) to 20 (best).

1. Time taken

The grades attributed in regards to the time taken to reach the finish line will be dependent of the overall performance of all competing teams. That is, the team with the device that takes the longest time (LT) will get a 20 and the remaining teams will have a grade (G) computed from the following equation $G=(TT/LT)* 20$, where TT is the time taken by the prototype. Grades will be rounded to integers.

2. Creativity and Complexity

The classification will be left to the discretion of the panel.

The capacity of the team in projecting a device capable of solving the given problem will be rated from the creativity and complexity point of view. The creative use of the materials given to the teams will be taken into account.

3. Quality of the Construction and Functionality

The classification will be left to the discretion of the panel.

The general quality of the structure regarding to symmetry, robustness, surface suavity, etc will be evaluated.

The capacity of the structure to behave according to planned will be evaluated.

III. Panel Members

- Professor Horácio Fernandes
- Professor Luís Caldas de Oliveira

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- Professor Nuno Matos Silva
- Diogo Caldas
- Local BEST Group member – Manuel Rêgo

IV. List of Materials

In order to complete the task each team will be given the following material:

Material	Quantity
Straws	25
Vegetable paper	1
Glue *	1
Clips' box	1
String	1
Rubber Band	20
Cork	4
Notebook	1
Metric Tape	1
Pen	2
Razor blade	1
Scissors	1
Fan *	1
Sticks	10
Wires	4
Duct tape	1
Screw hook	4
Balloons	2
Sandpaper	2
Dish scrubber	1
Styrofoam piece	1
Plastic cups	4

* these items will be shared with other teams.

Good Luck!

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