MEGALITH 2016
DEPARTMENT OF CIVIL ENGINEERING
INDIAN INSTITUTE OF TECHNOLOGY KHARAGPUR

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DEPARTMENT OF CIVIL ENGINEERING

IIT Kharagpur

ROTOLARE

INTRODUCTION

Roller coasters are thrill rides that operates like a railroad track. The history of this ride reflects a constant search for greater and more death-defying thrills. They are made from steel or wood and comprise a series of hills and drops, sudden turns, track loops and corkscrew-like elements. Roller coasters don't have engines, they must be pulled by a motorized chain to the top of the first big hill. As the roller coaster rises higher, its potential energy increases and reaches maximum at crest of hill. The potential energy accumulated by the rise in height is transferred to kinetic energy as the cars race down the first downward slope.

Teams shall design and build a "roller coaster" meeting the requirements specified in these rules. The "roller coaster" shall mean the entire structure, including the roller coaster track and the base, but not the actual vehicle. The "COASTER" shall mean the vehicle that travels on the Roller Coaster track.

PROBLEM STATEMENT

Students are required to build a marble roller coaster using **PAPER**. The event will be on the spot and you are required to finish it within the given time frame.

Materials provided by megalith team: Ply board (2m*1.5m), Tape, Fevicol and Scissor.

Note: Students have to bring their own track and any other material required for making the roller coaster (Megalith Team will not provide any other material apart from specified above).

Roller Coaster Model Rules

a) Size restrictions - the height should not be more than **2m**.
b) The model should be designed for a regular size, steel or glass marble.
c) The starting position at the top of the first hill should be clearly marked.
d) You will have to measure the total track length and mention it somewhere on the track.
e) Your team may use more than one marble.
f) The use of electricity during the competition is prohibited.
g) Magnets are permitted without restrictions. However, electromagnets are prohibited.
h) Only gravity and magnetism may be used to propel the "COASTER".

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JUDGING CRITERIA

1) Time (30 Points)

Each model will be entitled to three runs. The longest time to go from the start position to the finish will be the official time for that model.

Calculation of Points for Time:-
Points will be relative.
Points = (Your time/max time) * 30
For example: if your time is 22 seconds and max time = 31 sec, then you will get
marks = (22/31)*30

2) Technical points (45 points)

Your roller coaster must have a "thrill factor." There must be at least one loop, at least one turn, and if possible, a "jump."

a) **Horizontal curves (10 points)**
   Points = (sum of the diameter of your horizontal curves/ maximum sum of diameters) *10

b) **Vertical curve** (10 points)
   Points = (sum of the diameter of your loops / maximum sum of diameters) *10

c) **Thrill** (10 points)
   Is the track open for all/part of the ride? How abrupt are any changes in motion? Are there any jumps?

d) **Vertical Jump Height** (10 points)
   Height the Coaster travels during jump.
   H = Max height Coaster jumps in any Roller Coaster in competition.
   h = Height jumped by your Roller Coaster.
   Points = (h/H) * 10

e) **Start Height Bonus** (5 Points)
   For 5 cm less height of Roller Coaster you will be awarded 1 point , max allowed
   SHB point is 5 .
   Max allowed height of Roller Coaster = 200 cm
   190 cm = Height of your Roller Coaster (in cm)
   SHB = (200-190)/4 (2 Points will be awarded)

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3). <u>Aesthetics</u> (25 points)

Points will be awarded for creativity and addition of interesting events like the free fall of the marble, uncontrolled movement through a funnel, Frisbee, disc or similar to the ride.

a) **Creativity and complexity** (10 marks)

Is there anything unique about this roller coaster? You may use items not made from paper for this. Points will be awarded for addition of interesting events like free fall of marble, use of elevator, two or more marble tracks etc.

b) **Details** (10 marks)

Teams must submit the following:-

i) Start height
ii) Vertical jump heights
iii) Diameter of loops
iv) Diameter of the corkscrews/helix
v) Total length of the track.

Note:- Providing wrong information may lead to disqualification.

c) **Theme** (5 marks)

What's the name of your roller coaster? Does your scenery support this theme? Does the design support your theme? Is there a coolness or cleverness factor in your name?

RULES AND REGULATONS

a) Event is open to all.
b) Maximum team size is 5.
c) Participants can form teams from different branches/ college/ university/ institute.
d) No two teams must have any common member.
e) Teams are not allowed to touch their model once the ride begins.
f) The time limit for the completion is **180 minutes.**
g) **The decision of the judges shall be final. Any coaster that violates the rule above or the spirit of the competition will be disqualified**

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