

# TRAM

## THE RAIL

### **INTRODUCTION:**

You have to design a “Manually Controlled Machine” based on the concept of world famous “Calcutta TRAM”. The challenge is to receive supply from the overhead live wire and return to the neutral through the tracks of the TRAM. The TRAM will be equipped with modern hi-tech components so as to detect obstacles on its path and give proper “Warning Signals”. You will be the operator of the TRAM, control its speed, save it from the hazardous obstacles and maneuver over specially designed track.

### **TASK:**

Design and construct a remote controlled machine based on the working principle of “TRAM”.

### **GUIDELINES:**

1. This is a time-based racing event.
2. The participants have to bring their own TRAM which shall be according to the dimensions of the track.
3. The TRAM should be able to perform following functions:
  - Tram has to move on a ‘T’ angle track which is similar to that of a railway track.
  - Make and remove contact with the supply line i.e. Movable Pantograph.
  - Detect obstacles in its path and give warning.
4. In the course of event you would be provided 2 attempts out of which the best would be counted.
5. The details of tasks to be performed in event would be told at the starting of the event.
6. Marking would be done for based on the time taken by a team to complete all the tasks without breaking any rules and cumulatively two winner teams would be decided.

## **SPECIFICATIONS:**

### **Dimensions and Fabrications:**

1. The TRAM should fit in a box of dimensions **250mm x 250 mm x 250 mm** (lxbxh) at any instant during the event. The external device used to control the machine or any external tank is not included in the size constraint.
2. The TRAM should not exceed **5 kg** of weight.
3. The distance between the rails on which the TRAM has to run will be **17.8 cm ( $\pm 0.2\text{cm}$ )**.
4. The supply wire will be **24cm ( $\pm 1\text{cm}$ )** high from the ground level.
5. The motors used in TRAM must not be rated above **100 rpm**.
6. There should be a mechanism for detection of obstacles at a distance. The warning signal of the presence of obstacle must come through remote.  
For example- If you are using an IR detector module, the sensing LED must also glow in the remote control.
7. There should be mechanism for connecting the TRAM to neutral provided through the metal rails.

### **TRAM Control Requirements:**

1. The machine can be controlled through wired or wireless remote.
2. The TRAM should not start/stop automatically. It should be **manually controlled only**.
3. Non-standard or self-made remote control systems must first be approved by the organizers.

### **Power & Battery:**

1. The machine can be powered only by electricity. Use of an IC engine in any form is not allowed.
2. Two DC supplies, each of 12 V shall be provided to each team during the match. One will be provided for the obstacle detector kit and pantograph control mechanism. The other supply will be through the over-head live wire running above the rails. The neutral of the over-head supply will be through the metal rails.
3. The electric voltage (from battery or supply) between 2 points anywhere in the machine **should not be more than 12 V DC** at any point of time during the match.

### **Arena:**

1. The distance between the rails on which the TRAM has to run will be **17.8cm ( $\pm 0.2\text{cm}$ )**.
2. The supply wire will be **24cm ( $\pm 1\text{cm}$ )** high from the ground level.
3. More details regarding the arena will be disclosed during the event.



Fig.1: Type of rail used for track

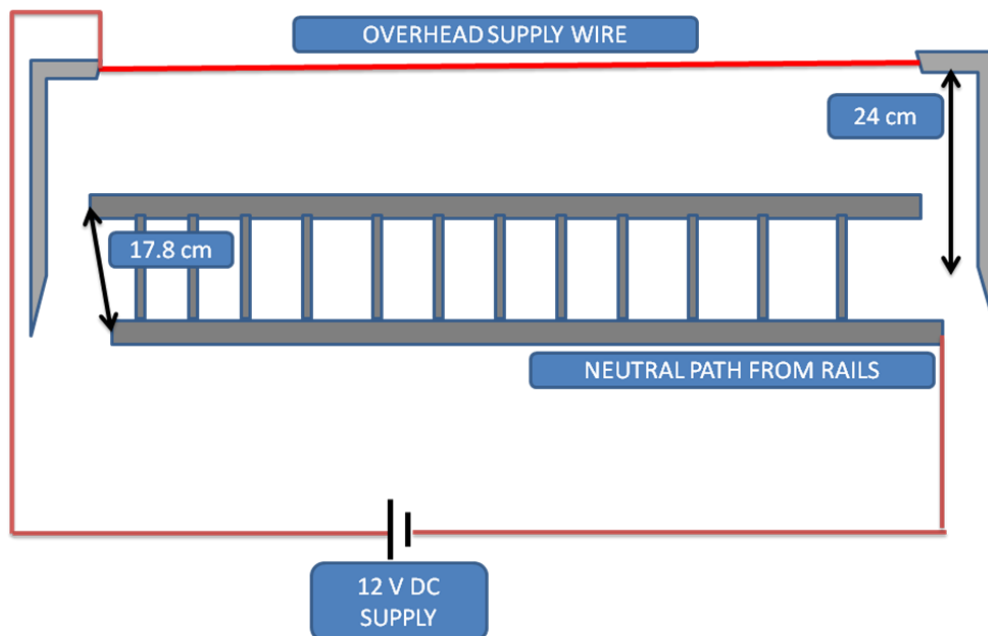


Fig. 2: Schematics of track

**JUDGING CRITERIA:**

1. A TRAM is declared victorious if it takes minimum time to cover the complete track and performing all the tasks.
2. There will be penalty for breaking rules, man handling etc.
3. A TRAM deemed unsafe by the judges will be disqualified immediately.

### **RULES:**

Compliance with all event rules is mandatory.

1. The teams must adhere to the spirit of healthy competition. The teams must not damage their fellow participants' TRAM in any way. Judges reserve the right to disqualify any team indulged in misbehavior.
2. Any team found not keeping proper safety measures will stand disqualified.
3. If a TRAM does not fit within the specifications, it can be disqualified.
4. Special care should be taken to protect the arena and equipments provided.
5. Any team that is not ready at the time specified will be scratched from the competition automatically.
6. The machine will be checked for its safety before the race and would be discarded if found unsafe for other participants and spectators.
7. Judges decision shall be final and binding on all.
8. The organizers reserve the rights to change any or all of the above rules as they deem fit. Change in rules, if any will be highlighted on the website and notified to the registered participants.

### **TEAM SPECIFICATIONS:**

A team may consist of a maximum of 6 participants. Participants can be from the same or different educational institutes.

### **EVENT COORDINATORS:**

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