

1. ROBO KICK (ROBOSOCCKER)

2. TASK

Design and construct a remote-controlled robot capable of fighting a tournament against another robot(s).

3. DESIGN SPECIFICATIONS

A. Specifications:

1. There will be no restrictions on the dimensions of the bot(s).

The weight of the machine should not

TASK

- Teams have to build a manually controlled Robo-soccer bot, which should be able to push or drag the ball in opponents goal, without gripping.

BOT SPECIFICATIONS

- The dimensions of the bot should be less than or equal to **300 mm X 300mm X 300mm** (lxbxh) and the bot should be under **5Kg**. failing which the team will be disqualified from the competition (the dimensions includes tires). An error of ($\pm 5\%$) is permitted.
- The bot must be controlled manually.
- Teams can use both wired as well as wireless control mechanisms. In the case of wired bots, the length of the wire should be a minimum of **2 metres** so that the wire remains slack at any instant of time. If the participants use a wireless mechanism they have to use either a dual-frequency remote, Bluetooth, or Wifi.
- The dimensions of the remote are not included in the size constraint of the bot.
- The Bot may have an onboard power supply or remote power supply any case.
- Participants are not supposed to use any readymade Lego components or readymade gripping mechanism. However, the participants are allowed to use ready-made gear assemblies.
- The mechanism used should be such that only one person will control the bot.
- Failing to meet any of the above specifications will lead to immediate disqualification.

POWER SUPPLY

- The participants should use an electric power supply i.e. the power source should be on the bot or kept outside the arena. The power source must be non-polluting and must satisfy the safety constraints determined by the organizers.
- In the case of an electric power supply, the voltage between any two points should be less than or equal to 12V DC at all times during the run.
- AC power supply will not be provided and cannot be used in the competition.

GAMEPLAY

- At the beginning of each half, the ball will be kept within the center circle , and both bots must be outside the circle, within their own half of the arena. The team which wins the toss will decide, whether it first wants to attack or defend.
- The team which attacks will start from $\frac{3}{4}$ th ground. The bot which will defend will start from the corner of the ground in his allotted half.
- After every goal, the ball will be placed within the circle and both bots must be outside the circle, within their own halves. The defending bot will be at $\frac{3}{4}$ from ground and the scoring bot will be at the corner of its own half.
- Each match will consist of two halves. The duration of a half will depend on the type of the match as follows:
 - Initial knockout matches – 2 minutes
 - Quarter and Semi-final – 3 minutes
 - Final – 4 minutes
- In case of foul, the non-fouling team must start the match from the center circle. The other team must stay in its half till the play starts.
- In case of a draw, the tiebreaker will be as follows. Additional 2 minute time will be provided to play in which bonus will not be considered. The game will start at the beginning of the half, and both bots may now enter the circle once play starts. Whichever bot scores more goals, wins. If a foul is committed during the tiebreaker, the fouling team is disqualified and the other team wins.
- If no winner is declared even after the tiebreaker (maximum time of play is 2 minutes), then the golden goal rule will be used to break the tie. Whichever team scores first shall be declared winner. In this case also if a foul is committed the opposite team will be declared winner.
- If a team earns a lead of five goals, it will be declared as the winner of the match.

GAME RULES

- The bot would be checked for safety before starting and will be disqualified if found unsafe for other participants.
- Only one team member is allowed to handle the bot. No other team member is allowed to enter the arena.
- The bot will be liable for disqualification if it causes any kind of damage to the arena.
- The soccer bot can only transform to its size at the beginning. It cannot be divided into multiple separate parts.
- Each team will be given a time span of 2 minutes at the beginning of each half to check the bot and fine tune. Referees will check the robot after every modification.
- If the bot becomes immobile during the match, the team will first be given 60 seconds to fix it, without any loss of points. If the team fails to fix it in 60 seconds, another 60 seconds will be given at the expense of 1 points. If the team does not repair the bot within this time, then that bot will be disqualified.
- No stalling of any kind is allowed.
- All bots must have their own power supply.
- Bots will be analyzed by the referee before a match. He will select or reject bots, taking into consideration the rules and dimension limits.
- The match will be paused in case of any entanglement of wires of both the bots.
- Any clamp in the structure of the bot should not grip the robot.
- The bot should not lift the ball in the air.
- In case one team is disqualified, the other team may be asked to play again.
- The decisions taken by the referees will be final.
- In case of any disputes, the decisions of the referees or event managers will be final.
- **The organizers reserve the right to change any or all of the above rules as they deem fit.**
Change in rules, if any will be notified to the registered teams.

SCORING

- 3 Points for every goal scored.
- After 3 penalties, 1 point will be deducted for every penalty further.
- If the bot is immobilized during the match, 60 seconds will be provided, post 60 seconds, 2 points will be deducted for every minute.
- Winner will be decided on the basis of final points.

TEAM SPECIFICATIONS

- A team may consist of a **maximum of 4 members**.
- Students from different educational institutes can form a team.

ELIGIBILITY CRITERIA

- All students with a **valid identity card** from their respective educational institutes are eligible to participate.

B. Mobility:

All robots must have easily visible and controlled mobility in order to compete.

Methods of mobility include:

1. Rolling (wheels, tracks or the whole robot).
2. The robots should not secure itself on the ring surface by using suction cups, diaphragms, sticky treads, glue or other such devices.

C. Battery and Power:

1. The machine must be powered electrically. Use of an IC engine in any form is not allowed. Onboard batteries must be sealed, immobilized-electrolyte types (such as gel cells, lithium, NiCad, NiMH, or dry cells).
2. The electric voltage between any 2 points on the machine should not exceed 12V DC at any point in time. Participants will have to bring their own converters for standard power supply according to Indian standards.
3. Participants must protect the battery terminals from a direct short and causing a battery fire, failure to do so will cause direct disqualification.
4. The use of damaged, non-leak-proof batteries may lead to disqualification.
5. Special care should be taken to protect the onboard batteries. If the judges find that the battery is insufficiently protected, the team will be disqualified immediately.
6. Change of battery will not be allowed during the match.
7. Only bots with onboard batteries will be allowed.
8. A team cannot use the same bot with different names in the same categories more than once by just modifying certain components of the bots.
9. The supply from the battery to all the weapons and power systems should

qualify the following fail-safes:

- a. A manual disconnect (switch) that can be turned off without harming the person doing it, i.e. No body parts or weapons should come in the way of the switch.
- b. Manual emergency stop that can be triggered through the radio controller

If teams do not show up during their allotted slot, they will be disqualified.

10. The following weapons cannot be used:

- a. Liquid projectiles (Foam, liquefied gases)
- b. Any kind of inflammable liquids
- c. Weapons causing invisible damage (Electrical weapons, RF jamming weapons and others).
- d. Weapons causing opponents' weapons (spinners) to entangle in them (Chains, Ropes or loose Fabrics).

A. Event Specific Terminology:

1. Disabled: A robot is not functioning correctly due to either an internal malfunction or contact with the opposing robot or Arena Hazard.
2. Immobilized: In the judges' opinion, a robot is not responsive for a specified period of time.
3. Pinning: Occurs when one robot, through sheer force, holds an opponent stationary in order to immobilize it.
4. Radio Interference: Refers to a situation where at least one robot becomes unresponsive or non-controllable due to the effect of the other robot's remote-control signal.
5. Restart: This occurs after a fault or a timeout has been declared and the competing robots are ready to continue.
6. Stuck: A robot is hung up in a part of the arena, an arena hazard or an opponent, such that it is effectively non-responsive.
7. Tap-Out: Occurs when a robot's operators decide that they no longer want to continue the match and concede the win to the opposing team.
8. Technical Knockout: This occurs when a robot wins due to the immobilization of its opponent even though, in the judges' opinion, no action of the winning robot caused the opponent's immobilization.
9. Timeout: A temporary halting of a match. Timeouts are usually called to separate robots but can be called for other reasons as well.