TECHNOVANZA

Taking technology to society

ROBOWARS

‘War does not determine who is right. Only who is left’

Passionate about Bots? Or you just like to watch things get crushed from fierce competition? The path to glory passes through the alley of destruction, lethal combats, violent bots, and flying blades! Merge your technical know-how with the ferocious gladiator in you! Make your bot fight for the ultimate glory or land up in the junk yard! So folks, fight smart, be patient and pray. Seriously, pray because Robowars just got crazier in its new avatar!

TEAM SPECIFICATION:

- Any team can participate in Robowars, Technovanza. A team may consist of a maximum of 6 participants. These participants can be from same or different institutes.
- Team Name: Every team must have a name which must be unique. Technovanza reserves the right to reject entries from any Team whose name it deems inappropriate, offensive or conflicting. Organizers must be notified during if a Team's name has been changed.
- Team Representative: Each team must specify their Team Representative (Leader) at the time of registration on the website. All-important communications between Technovanza and the registered teams will be done through their Team Representative. The Team Representatives must submit valid contact details (phone no., email ID etc.) at the time of registration.

CERTIFICATE POLICY:

- Certificate of appreciation/participation will be awarded to the all teams. And certificate of excellence will be given to top three teams.
- Disqualified teams will not be considered for any certificates.

RULES AND SPECIFICATIONS

DIMENSION AND FABRICATIONS:

- The machine should fit in a box of dimension 1000mm x 1000mm x 1000mm (l x b x h) at any given point during the match. The external device used to control the machine or any external tank is not included in the size constraint.
- The machine should not exceed 60 kg of weight including the weight of pneumatic source or tank.
- All pneumatic tanks/source and batteries being considered. Weight of remote controller will not be counted. The machine should not intentionally be split into components or any parts should not be intentionally detached from machine at any point of match.

GENERAL CONSTRUCTION:

- Any on-board equipment that could require attention between duels for maintenance - e.g. recharging of compressed gas cylinders, charging batteries, resetting of weapons, etc. - should be easily and quickly accessible i.e. systems must be installed in such a manner that they can be removed for filling and testing within five minutes.

STYLE AND MOBILITY:

All robots must have easily visible and controlled mobility in order to compete. Methods of mobility include:

- Rolling (wheels, tracks or the whole robot).
- Non-wheeled robots having no rolling elements in contact with the floor and no continuous rolling or cam operated motion in contact with the floor, either directly or via a linkage. Motion is "continuous" if continuous operation of the drive motor(s) produces continuous motion of the robot. Linear-actuated legs and novel non wheeled drive systems come under this category.
- Jumping and hopping is not allowed.
- Flying (using aerofoil, helium balloons, ornithopters, etc.) is not allowed.

ROBOT CONTROL REQUIREMENTS:

- The machine should be controlled through **WIRELESS** remote. Power supply has to be on-board. Refer below for further details on battery and power.
- There should be binding capability between transmitters and receivers. The remotes with such facility will only be allowed.
- The team must have at least four frequencies wireless remote-control circuit or two dual control circuits which may be interchanged before the start of the race to avoid frequency interference with other teams. The case of any interference in the wireless systems will not be considered for rematch or results.
- Remote control systems from toys might be used. Remote control systems available in the market may also be used.
- Nonstandard or self-made remote-control systems must first be approved by the organizers or the judges.
- Team should pair up the wireless remote with the machine before putting it into the arena.

BATTERY AND POWER:

- The machine can be powered electrically only. Use of an IC engine in any form is not allowed.
- Power supply has to be ON-BOARD.
- On board batteries must be sealed, immobilized-electrolyte types (such as gel cells, lithium, NiCad, NiMH, or dry cells).
- The electric voltage between 2 points anywhere in the machine should not be more than 36V DC at any point of time. For using transformers as source, they should be verified by the organizers and output cannot be greater than 36V DC. (A variance of 2V would be considered due to batteries not being exactly equal to said voltages)
- All efforts must be made to protect battery terminals from a direct short and causing a battery fire, failure to do so will cause direct disqualification.
- Use of damaged, non-leak proof batteries may lead to disqualification.
- Special care should be taken to protect the on-board batteries. If judges found that the battery is not properly protected, then team will be disqualified immediately.
- Change of battery will not be allowed during the match. (exemption can be made in case of battery damage).
- There should be a provision for a 'Kill Switch' which should be easily available to stop the robot in case of any uncontrolled robot response.
- It is suggested to have extra battery ready and charged up during competition so that on advancing to next level, you don't have to wait or suffer due to uncharged battery. If teams don't show up on allotted slot, they will be disqualified.

PNEUMATICS:

- Robot can use pressurized non-inflammable gases to actuate pneumatic devices. Maximum allowed outlet nozzle pressure is 10 bar. The storage tank and pressure regulators used by teams need to be certified and teams using pneumatics are required to produce the Safety and Security letters at the Registration Desk at the venue. Failing to do so will lead to direct disqualification.
- Participants must be able to indicate the used pressure with integrated or temporarily fitted pressure gauge. Also there should be provision to check the cylinder pressure on the bot.
- The maximum pressure in cylinder should not exceed the rated pressure at any point of time.
- You must have a safe way of refilling the system and determining the on-board pressure.
- All pneumatic components on board a robot must be securely mounted. Care must be taken while mounting the pressure vessel and armour to ensure that if ruptured it will not escape the robot. The terms 'pressure vessel, bottle, and source tank' are used interchangeably.
- Entire pneumatic setup should be onboard, no external input (from outside the arena) can be given to the robot for functioning of its pneumatic system.

HYDRAULICS:

- Robot can use non-inflammable liquid to actuate hydraulic devices e.g. cylinders.
- All hydraulic components on-board must be securely mounted. Special care must be taken while mounting pump, accumulator and armor to ensure that if ruptured direct fluid streams will not escape the robot.
- All hydraulic liquids are required to be non-corrosive and your device should be leak proof. Maximum allowed pressure is 10 bars.
- Participant must be able to indicate the used pressure with integrated or temporarily fitted pressure gauge.
- Entire hydraulic setup should be onboard, no external input (from outside the arena) can be given to the robot for functioning of its hydraulic system.

WEAPONS SYSTEMS:

Robots can have any kind of magnetic weapons, cutters, flippers, saws, lifting devices, spinning hammers etc. as weapons with following exceptions and limitations:

- Liquid projectiles.
- Any kind of inflammable liquid.
- Flame-based weapons.
- Any kind of explosive or intentionally ignited solid or potentially ignitable solid.
- Nets, tape, glue, or any other entanglement device.
- High power magnets or electromagnets.
- Radio jamming, Tasers, tesla coils, or any other high-voltage device.
- Tethered or un-tethered projectiles.
- Any kind of spinning weapon or the robot itself should not cause any damage to the arena.

SAFETY RULES:

- Compliance with all event rules is mandatory. It is expected that competitors stay within the rules and procedures of their own accord and do not require constant policing.
- Special care should be taken to protect the on-board batteries and pneumatics, robot without proper protection will not be allowed to compete.
- If you have a robot or weapon design that does not fit within the categories set forth in these rules or is in some way ambiguous or borderline, please contact the event organizers. Safe innovation is always encouraged, but surprising the organizers with your brilliant exploitation of a loophole may cause your robot to be disqualified before it even competes.
- Each event has safety inspections. It is at their sole discretion that your robot is allowed to compete. As a builder you are obligated to disclose all operating principles and potential dangers to the inspection staff.
- Proper activation and deactivation of robots is critical. Robots must only be activated in the arena, testing areas, or with expressed consent of the event coordinators.
- All weapons must have a safety cover on any sharp edges.
- All participants build and operate robots at their own risk. Combat robotics is inherently dangerous. There is no amount of regulation that can encompass all the dangers involved. Please take care to not hurt yourself or others when building, testing and competing. Any kind of activity (repairing, battery handling, pneumatics systems etc.) which may cause damage to the surroundings during the stay of the teams in the competition area should not be carried out without the consent of organizers. Not following this rule may result in disqualification.
- All the resources provided at the time of competition from the organizers should be strictly used only after the consent of the organizers.
- Once the robots have entered into the arena, no team member can enter into the arena at any point of time. In case if a fight has to be halted in between and some changes have to be done in the arena or condition on the robot(s), it will be done by organizers only.

- There should be a provision for a 'Kill Switch' which should be easily available to stop the robot in case of any uncontrolled robot response.
- A driver must have a helmet which covers his entire face along with other safety materials if any. Each team must bring its own helmet. No helmet will be provided by Technovanza Committee.

ARENA:

The arena for Robowars, Technovanza 2017 will be a fully enclosed one. The dimensions of the arena are 20ft x 20ft x 6ft (lxbxh). 5 mm Mild Steel metal sheets will be used for arena floor. The arena will be enclosed by 8 mm thick Polycarbonate sheets. All the necessary safety measures will be taken care of.

PRIZE MONEY:

Total Cash Prize – **1, 80,000 INR**

JUDGING CRITERIA:

- A robot is declared victorious if its opponent is immobilized.
- A robot will be declared immobile if it cannot display linear motion of at least one inch in a timed period of 30 seconds. A robot with one side of its drive train disabled will not be counted out if it can demonstrate some degree of controlled movement. In case both the robots remain mobile after the end of the round then the winner will be decided subjectively.
- A robot that is deemed unsafe by the judges after the match has begun will be disqualified and therefore declared the loser. The match will be immediately halted and the opponent will be awarded a win.
- If a robot is thrown out of the arena the match will stop immediately, and the robot still inside the arena will automatically be declared as the winner.
- Robots cannot win by pinning or lifting their opponents. Organizers will allow pinning or lifting for a maximum of 10 seconds per pin/lift then the attacker robot will be instructed to release the opponent. If, after being instructed to do so, the attacker is able to release but does not, their robot may be disqualified. If robots become entangled or a crushing or gripping weapon is employed and becomes trapped within another robot, then the competitors should make the timekeeper aware, the fight should be stopped and the robots separated by the safest means. Points will be given on the basis of aggression, damage, control and strategy.

    1) Aggression – Aggression is judged by the frequency, severity, boldness and effectiveness of attacks deliberately initiated by the robot against its opponent. If a robot appears to have accidentally attacked an opponent, that act will not be considered Aggression.

    2) Control – Control means a robot is able to attack an opponent at its weakest point, use its weapons in the most effective way, and minimize the damage caused by the opponent or its weapons.

3) Damage – Through deliberate action, a robot either directly or indirectly reduces the functionality, effectiveness or defensibility of an opponent. Damage is not considered relevant if a robot inadvertently harms itself. Also, if a pressure vessel or a rapidly spinning device on a robot fragments, any damage to the opponent will not be considered "deliberate".

4) Strategy – The robot exhibits a combat plan that exploits the robot's strengths against the weaknesses of its opponent. Strategy is also defined as a robot exhibiting a deliberate defence plan that guards its weaknesses against the strengths of the opponent.

NOTE: Qualification of a robot to next level is subjective and totally on the decision of the judges. All the decisions taken by the judge will be final and binding to all.

REGISTRATION:

Any team participating in Robowars will have to register on the website of Technovanza www.technovanza.org Teams using pneumatics or hydraulics will have to send a safety letter signed by any Faculty In-charge/Lab in-charge or a testing lab/company dealing in this field, on their official letter head.

PARTICIPATIPATION RULES:

Video and Abstract Submission:

Participants have to submit a portfolio of their machine, consisting of a written abstract and a video of the working model before the competition. This portfolio will be used to seed teams for the competition. Only the shortlisted teams will be eligible to participate in Robowars at Technovanza 2017. The teams can do an online submission, mailing us the soft copy of abstract (PDF format) and a video of your robot at robowars@technovanza.org Offline submissions won't be entertained.

Written Abstract:

The written abstract should be prepared on the following lines:

- The weapon systems and power supply method should be explained in detail, along with proper diagrams. Picture(s) showing these should be attached.
- Functioning of remote and the frequency or any other wireless module used for wireless remote must be explained in detail.
- Description of any unusual advantageous mechanism used. The specifications of all the components used, including motors, suspension springs, remote controller, wires, battery etc. have to be mentioned.
- You can email the portfolio minus the video and send the video later. This will make sure that at least the abstract part of your portfolio reaches us before the deadline.
- An email will be sent to the team leader confirming the receipt of the entry. Each team is allowed to make online submission only by email. In case of multiple submissions, only the first submission will be used for judging purposes.
- All submission must be made online before the deadline set by the organizers.
- Soft copy of the permission regarding pneumatics and hydraulics capacity must be mailed to before deadline. Hard Copy of the permission must be produced during the competition. Teams failing to do so, will not be allowed to participate.

Video Abstract:

The video should be of at least 1 minute with the unedited clip showing the machine performance to the fullest. All destructive mechanism(s) being used must be shown working and testing should be at safe locations.

- It is not necessary to explain the mechanisms in the video. All portfolios will be used strictly for seeding purposes. The elimination procedure will be objective and the evaluation of every participant will be published on the website. Technovanza assures total privacy of the matter submitted to us. The portfolio of your machine will be helpful in future as an evidence of your hard-work along with determining your position for the competition. Hence, please pay adequate attention to it

- All submission must be made online before the deadline.

Please note that this video abstract will not be the sole criteria for selection of your robot to perform at Robowars, Technovanza. Judges will go very thoroughly over the video and written abstracts both and then shortlist the robots which would be allowed to perform in the competition here at Technovanza. The portfolio is meant to assess the efforts put in by participants. Thus, even if you are not able to meet the requirements asked in the portfolio, please send us the portfolios based on the current state of your machine before the deadline. That means even if your machine is incomplete, please send the portfolios anyway, instead of not sending them or sending them late.

EVENT SPECIFIC TERMINOLOGIES:

Disabled: A robot is not functioning correctly due to either an internal malfunction or contact with the opponent robot or Arena hazard.

Disqualification: A robot is no longer permitted to compete in the current Robowars, Technovanza 2017.

Immobilized: In Judge's opinion, a robot is not responsive for a specified period of time.

Knockout: Occurs when the attack or deliberate actions of one robot makes the opponent robot immobilize.

Lifting: Occurs when one robot controls an opponent's translational motion by lifting the drive mechanism of the opponent off of the Arena floor.

No Contact: Occurs when neither robot makes contact with each other for specified period of time.

Pinning: Occurs when one robot, through sheer force, holds an opponent robot stationary in order to immobilize it.

Radio Interference: Refers to the situation where at least one robot becomes nonresponsive or non-controllable due to the other robot's remote-control signal.

Non-responsive: In a Judge's opinion, the robot cannot display some kind of controlled translational movement along the Arena floor.

Restart: Occurs after a Fault or Hand-touch time has been declared and the competing robots are ready to continue.

Stuck: A robot is hung-up on a part of the Arena or an opponent such that it is nonresponsive.

Tap-Out: Occurs when a robot's operators decide that they no longer want to continue the Match and concede the win to the opponent Team.

Technical Knock-out: Occurs when a robot wins due to immobilization of its opponent even though, in the Judge's opinion, no action of the winning robot caused the opponent's robot immobilization.

Hand-touch Timeout: A temporary halting of the match; Timeout is usually called to separate out the robots or the timeout can be called for other reasons as well.

FOR ANY QUERIES

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