ROBO SUMO

1 KG

RULES & REGULATIONS

(V2)

PETROSAINS RBTX CHALLENGE 2022

Version Updates

V2 : Updated 1.0 General Rules – 1.5.2. Restriction on Robot Design

: Updated 2.0 Video Submission Requirement – 2.3 The Ring

1kg Category

1.0 GENERAL RULES

1.1 The Robo Sumo challenge involves deploying a self-built autonomous robot to push the opposing robot out of the ring.

1.2 A team must consist of a maximum of two (2) participants aged between **7 to 17 years old** and one (1) guardian/teacher.

1.3 Each team must have their own robot

1.4 **Competition Phases:**

I. **Registration and Video Submission:** Upon registration, each team is required to submit a video the challenge which involves **deploying a self-built autonomous robot to push specified objects out of the ring in the fastest time possible.** The time taken to push the objects must be recorded. The link to the video (which can be uploaded on any platform such as YouTube, Google Drive, Sharepoint etc.) must be shared in the registration form and must be accessible for the organiser to view. Please refer to **2.0 Video Submission Requirement** for further information on the challenge. All costs incurred shall be borne solely by the participating team.

II. **Qualifying:** The judges will review the video submissions and select the top teams who will move on to the onsite Qualifying Stage. The qualified teams will be informed of the competition schedule via e-mail. All costs incurred shall be borne solely by the participating teams.

III. **Grand Finals:** Top teams from the Qualifying Stage will be selected to move on to the onsite Grand Finals. All finalists will be informed of the competition schedule right after the completion of the qualifying stage. All costs incurred shall be borne solely by the participating teams.

1.5 **The robot**

1.5.1 **Specifications of the robot**

- The robot (when all parts are **fully extended**) must be within a width (w), length (l) and height (h) of **15cm x 15cm x 15cm**. Participants must show the judges that the robot can fit in the printed measurement box before every game.
- The robot must be self-operated (autonomous) with a start button on the robot body. Disqualification will be imposed if the robot is found to be non-autonomous.

1.5.2 **Restrictions on robot design**

- The robot cannot expand in size during the game.
- The robot must not be equipped with any parts that might damage or deface the ring.
- The robot must not be equipped with a device that can release liquid, powder or gas.
- The robot must not be equipped with detachable parts or a firing/ throwing device.
- The robot must not be equipped with any part that fixes the robot to the Ring surface and increases the apparent weight of the robot (such as suckers, glue, vacuums, fans, and so on).
- The robot must not cause danger to the operators and audience.

2.0 VIDEO SUBMISSION REQUIREMENT

2.1 Participating teams are required to record **a video** of their robot completing the challenge in the fastest time.

2.2 The following are the requirements for the video file:

- Duration must not exceed 3 minutes.
- All final audio/video presentations must be in MP4 Format (H.264 video and AAC audio codec).
- Video size set at HD (1280 x 720 or other '720p' setting)

- The file to be shared in the form of a video sharing link, i.e. Google Drive, YouTube
- The audio/video dimensions must have a minimum height of 480 pixels with an aspect ratio of 16:9.

2.3 **The Ring**

2.3.1 Every participating team must construct their own 'ring' using suitable materials. The specification of the ring must comply with the below guidelines:

- 'The Ring' is a black surface square with a white border. The black surface square measurement is 530 mm x 760 mm (approximately A1 size) and the white border measurement is 30 mm width.
- The Shikiri spot is a **dark brown dot** located 150 mm from the white border outer edge (refer Figure 1). The centre of the robot from top view should be placed on the Shikiri spot, and the robot should face either to the left or to the right
- Object placement spots are indicated by a **dark brown dot** located 200 mm from the white border outer edge (refer Figure 1). The centre of the object from top view should be place on the dark brown spot.

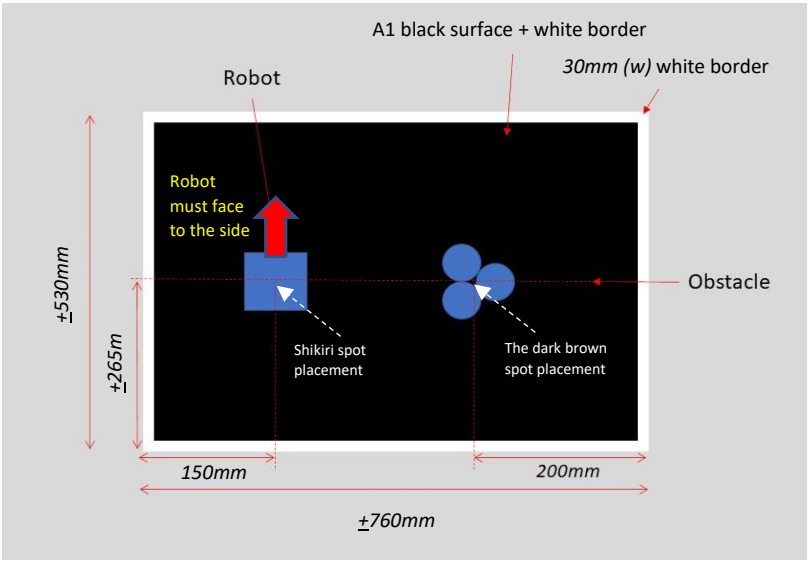

Figure 1: Robo Sumo Ring for video submission only

2.3.2 Each team is **responsible** to ensure the quality of the competition ring which includes the material, colour tone and accurate measurement. The track must also be smooth and free of smudges. **The ring template will not be provided for download and printing.**

2.4 The Object

2.4.1 The object is built from **three (3) 250 ml filled mineral bottles** taped together. The weight is around 750 ml in total.

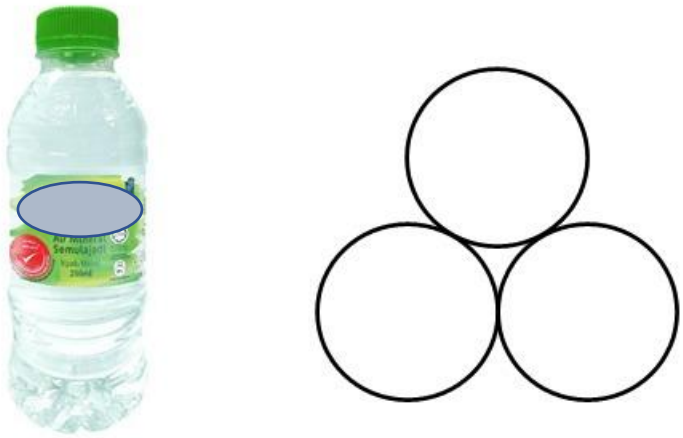

Figure 2: The object is built from 3 mineral bottles taped together

2.4.2 The object must be placed at the specified placement spot. **Object placement is subject to change by the organiser without prior notice**

2.5 Game Principles

2.5.1 Robot should face to the side and not directly to the object when placed on the 'ring'.

2.5.2 Robot has to push the object out from the ring within the one- minute time frame.

2.5.3 Robot must remain in the ring before it pushes the object out from the ring.

2.5.4 Robot begins action 5 seconds after it is turned on.

3.0 QUALIFYING STAGE AND GRAND FINALS

3.1 Ring Interior

3.1.1 The Ring interior is a circle Plywood plate with a minimum height of 250 mm and a diameter of 1000 mm including the border line (refer to appendix A). It has a black matte surface.

3.1.2 The border line is indicated as a white circle with a width of 30 mm. "On the border" is defined as being within the interior of the Ring.

3.1.3 Shikiri lines (starting lines) consist of two painted parallel brown (or equivalent for absorption of IR light) lines centred in the ring with appropriate width and spacing. The separation distance between the lines is measured to their outside edges.

3.1.4 During the games, it is up to the referee to decide whether the Ring can continue to be used or whether it should be changed when a scratch or tear appears on the Ring surface.

3.2 Ring Exterior

There will be a space appropriate outside the outer edge of the ring for the referee and contestants. This space will be of different colours, and of any material or shape as long as the basic concept of these rules are not violated.

3.3 Game principles

3.3.1 A game consists of three one-minute matches. There will be no breaks in between the matches.

3.3.2 The contestant with the most wins out of the three matches will be the winner of the game.

3.3.3 In the event of a tie after the third match, the lighter robot will be declared as the winner

3.4 Beginning of a match

3.4.1 Following the referee’s instructions, the contestants will enter the Ring area and place their robots (facing any direction) centred behind their starting point.

3.4.2 At the referee's start signal, the operator must press the start button/flick a switch on their robot. The robot should be designed to begin action about T seconds after it is turned on. During these T seconds, players must clear out of the ring area.

3.4.3 No changes of robot components and batteries are allowed during the match

3.5 End of a match

The match will end when the referee calls the winner or the match time limit is reached.

3.6 Match cancellation and rematch

A match will be cancelled for rematch under the following conditions:

3.6.1 Both robots touch the exterior of the Ring at the same time.

3.6.2 Any occurrence of violations.

3.6.3 Any other conditions under which the referee decides that there are no winners.

3.6.4 In the case of a rematch, maintenance of competing robots are prohibited and the robots must immediately be placed back to the starting point. The one-minute timer will not be reset.

3.7 Winning a match

3.7.1 The robot which manages to push its opponent out of the Ring with a fair action will be declared the match winner.

3.7.2 A robot will be declared as match winner if the opponent's robot steps out of the Ring on its own (due to any reason).

3.7.3 A robot will be declared as match winner if the opponent is disqualified or has more than one violation.

3.7.4 The match will be considered a tie if both robots manage to stay in the Ring until the match timer ends

3.8 **Violations**

3.8.1 The operator enters the Ring before the referee's call to end the match.

3.8.2 The robot begins action before the referee's start signal or before the ‘T seconds’ mark.

3.8.3 The robot does not move at all or is not powered on during the match.

3.8.4 Any other actions that may be deemed unfair by the referee.

3.8.5 Warning will be given for the first violation. A second violation will result in disqualification.

3.9 **Disqualification**

3.9.1 A contestant is not present for robot inspection five minutes before the beginning of the game.

3.9.2 The contestants’ robot does not meet the "Specifications of the robot" and “Restrictions on robot design”. For example, robot size is bigger than 15cm x 15cm x 15cm or robot is equipped with parts that will damage the Ring.

3.9.3 A contestant ruins the game. For example, by intentionally breaking, damaging or defacing the Ring.

3.9.4 A contestant displays unsportsmanlike behaviour. For example, using rude and offensive language, or injuring an opponent or a referee.

3.10 **Objections**

3.10.1 Contestants with any objection must express the disagreement to the secretariat before the end of the game.

3.10.2 Objections to the judgment of the referee will not be entertained.

3.11 Specifications of robot tagging

Contestants must clearly display the registered robot numbering code during the competition

3.12 Injuries and Accidents during the Match

3.12.1 A contestant can request to stop the game when he/she is injured or his/her robot has an accident which can prevent the game to continue.

3.12.2 In the event that the game cannot continue due to a contestant's injury or robot is accident, the contestant who is the cause of such injury or accident will be forfeited. When it is not clear which team is the cause of such incident, the contestant who is unable to continue the game, or who requests to stop the game, shall be declared as the loser.

3.12.3 The game can continue in the event of any injury or accident if decided by the referee and the Committee members. The decision process shall take no longer than five minutes.

3.13 Miscellaneous

As long as the concept and fundamentals of the rules are observed, these rules shall be flexible enough to encompass the changes in the number of players and the contents of the matches.

Appendix A

Sumo Robot (1kg Category): Game Field Setup

- 3cm white border
- Separation of Shikiri lines 10 cm
- Length of Shikiri lines 10 cm
- Width of Shikiri lines 1 cm
- Diameter of the Ring (including white border) 100cm