

The 23rd TSUYAMA Robot Contest Rule Book

Decide with a team!



FOOTBALL

ROBOCON



High school general section

■Outline of the game■

The 23rd game is a ROBOCON with the theme of football.

Each team creates two robots, competes in a game rule imitating football, and competes for points in time.

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Revision history

date	Version	Revised content
July 4, 2018	First edition	

1. Tournament format

1-1 Competition method

1-1-1 The competition consists of the preliminary rounds (3 minutes) and the finals tournament (3 minutes in the first half, 3 minutes in the second half), and two teams compete in one competition per field. The team composition and competition order in the preliminary rounds will be decided in consideration of which category the team belongs to by the organizer (high school, college, university etc.)

1-1-2 In the competition, two teams compete for the score from the start to the end of the game. The team that scores more points will be the winner.

1-1-3 At the preliminary round, the ranking is determined by the points of the team in each group. If the ranking is not decided by the points (in case teams have same points at the end of the preliminaries), the rank is determined by the goal difference. If the ranking is not determined by the difference between the goals and goals, the ranking is determined according to the total score. If the rank is still unknown, it is decided by the rock-paper-scissors taken place by the team's representatives.

1-1-4 Win points are as follows.

- (1) Win 3 point
- (2) Draw 1 point
- (3) Defeat 0 point

1-1-5 The first place in each group of the preliminaries will go through the final.

1-1-6 At the finals, if winning or losing is not decided within the competition time, win and loss must be decided by the Sudden death style, which the game will be stopped as soon as one team scores.

1-2 Referee

The referees which consist of two people in one field will judge each game.

1-3 Commendation

1-3-1 The commendation shall be the first, second, third place, special prize.

1-3-2 The winners will receive the certificate of commendation and supplementary prizes.

2. Competition environment

2-1 Field of the game (See the Field Diagram)

2-1-1 The competition field should be 7100 mm in length and 3500 mm in width. The height of the field is about 300 mm high from the floor level, and surrounded by the wall of approximately 50 mm in height. The material of the field is aluminum composite resin version (SOREITA FSV - 321 S). Each line is 50 mm wide.

2-1-2 Please note that the competition field does not necessarily become flat due to the floor's shape of the hall.

2-1-3 Each team should prepare to be able to adjust the robot according to the environment of the venue, such as the lighting conditions and magnetic conditions.

2-1-4 The size of the goal inside is 1250 mm in width and 400 mm in depth.

2-2 Competition area (see competition field diagram)

The competition area is set on the outskirts of the competition field.

2-3 Ball

2-3-1 As the official ball of the game, we use a pack for air hockey (diameter about 190 mm, height about 65 mm, made by YA SHUN (model number 789-19 B)).

2-3-2 Exchange of pack and batteries etc, before and during the competition should be decided by the judgment of the referee.

3 .Robot

3-1 Robot condition

3-1-1 A robot which can participate in competition

Each team can operate two robots, one shooter robot, the other keeper robot in the competition.

3-1-2 Control of robot

The shooter robot should be operated by the operator remotely or autonomously without connecting to the outside with a cable or the like.

The keeper robot is controlled by wired or wireless. In case of wired control, the assistant lifts up and operates the cord so that it will not be on the floor.

3-1-3 Interference in the venue

When competitors operate the robot, do not interfere with the opponent team, and as using the electronic equipment, mobile phones, any wireless device in the hall it should be considered not to interfere with the robot radio communication.

3-1-4 Radio Communication Commission

In order to prevent interference of radio waves, the radio wave management committee is organized. Each team must elect one radio manager and adjust radio waves etc. at the same committee that will be held before the preliminary round.

3-1-5 Robot size

The size of the shooter robot should be within 300 mm in length × 300 mm in width × 300 mm in height, and the size of the keeper robot should be within 250 mm in length × 250 mm in width × 250 mm in height. Even when the robot is designed to be transformed, its size should be limited to the range of the aforementioned dimensions.

3-1-6 Structure of robot

As a robot structure, separated design structure is not permitted. In addition, it must be structured so as not to be easily damaged by impact due to contact etc., and in case of overturning it must be constructed to be able to rise by itself.

3-1-7 Robot weight

Weight includes the robot itself as well as the power supply should be 15 kgf or less.

3-1-8 Prohibition of dangerous materials / mechanisms

Dangerous items such as explosives for the structure and material of the robot is prohibited to use.

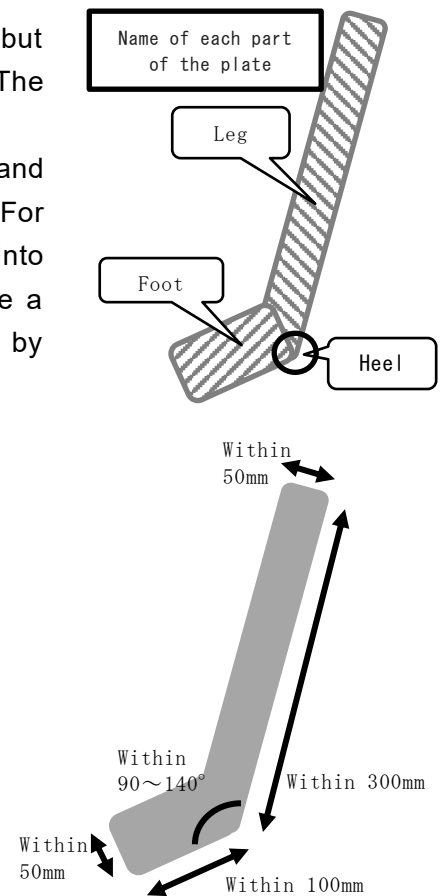
3-1-9 Use of compressed air / carbon dioxide gas cylinder

When using compressed air and carbon dioxide gas cylinders for the structure and material of the robot, make sure to install safety devices and prevent scattering of parts etc. However, for safety devices less than 0.7 MPa is not applied this rule.

3-1-10 Shooter robot

The shooter robot must equip a plate that faces the foot, but the plate is not included in the provisions 3-1-5 to 3-1-7. The plate to be equipped is as follows.

- (1) The thickness of the plate should be less than 15 mm, and prohibited to give bending to the thickness direction. For the plate, the safety processing should be taken into account such as chamfering. In addition, it must have a strength that does not easily break by impact caused by contact or the like.
- (2) To prevent damage to the ball, a sponge rubber ((Wake Industries Co., Ltd.)model number NRS-01, NRS-02, NRS-03, NRS-04) is pasted on the contact surface. Any processing or painting on the surface of the attached sponge rubber is prohibited.
- (3) The curvature of the plate should be one, and its bending must be within 90 ° to 140 °.
- (4) The plate must be in a shape that can be replaced promptly.
- (5) Legs on the plate should have a length from the tip to the heel within 300 mm and a width within 50 mm.
- (6) The plate should be within 100 mm from the heel to the tip and within 50 mm in height.
- (7) Any part of the plate can be colored unless it is contrary to this section (1) to (6).
- (8) The shooter robot can move the equipped plate, but the shooter robot and the heel of the plate must always be separated by 50 mm or more.



3-1-11 Keeper robot

The keeper robot can control the ball with only the robot itself.

- (1) Sponge rubber (WAKE INDUSTRY CO., LTD. (NRS - 01, NRS - 02, NRS - 03, NRS - 04)) must be affixed to the ball contact surface of the keeper robot.
- (2) The keeper robot can't have the function of kicking, throwing, etc.

3-2 Robot design

3-2-1 When decorating some illumination to the robot, it should not interfere with other team's robot's optical sensor reading function (sensor used by autonomous robot) and infrared control function.

3-2-2 A robot must not infringe the copyright of another person.

3-3 Metrological measurement

Robots and plates (including preliminary plates) participating in the competition must be weighed and measured. A robot that has not received the measurement test can't participate in the tournament and also a plate that has not undergone the weighing measurement should not be used at the tournament.

After weight and size measurement, it is prohibited to modify the robot and plate.

3-4 Production cost

- 3-4-1 The organizer will pay each team the production cost of 25,000 yen.
- 3-4-2 As the production cost, each team can include expenses such as literature, tools and equipment, expendable items etc required for research and development for production of finished products, but personnel expenses, food and beverage expenses and transportation expenses can't be acceptable.
- 3-4-3 Need to submit an expense report (including a copy of the manufacturing expense statement and a copy of the receipt) . Expenses without a copy of the receipt can't be accepted as production costs.
- 3-4-4 If the production cost falls below the payment amount due to the liquidation, need to pay back the difference.
- 3-4-5 When not participating in the competition, refund the production cost to the organizer.
- 3-4-6 When making a refund, follow the instructions of the organizer immediately.

4 . Contents of the competition

4-1 Competition time

- 4-1-1 The game will proceed according to the clock installed in the field.
- 4-1-2 In the game, the score from the start signal by the referee to the signal of the end is recorded.
- 4-1-3 If the team was late for the start time of the game, the record of the team's robot would be given no score and three points be given to the opponent team.
- 4-1-4 In principle, when the game is interrupted, the watch is going to be stopped and the referee move the clock when the game restarted.

4-2 Start of the game

- 4-2-1 When the game begin, the referee makes a coin toss. The team representatives do rock-paper-scissors beforehand and the winning team declares heads or tails while the coin is in the air.
- 4-2-2 Teams who win the coin toss can choose their territory side or first kicking off.
- 4-2-3 The team lost by the coin toss takes the remaining options.
- 4-2-4 If there is the first half and second half, the team that does not kick off in the first half will kick off the second half.

4-3 Kick off

- 4-3-1 Team members place the robot on the own territory within the field. The keeper robot should be placed within the goal area.
- 4-3-2 The team who kicks off at the first half places the robot in the field first. In addition, do not perform any adjustment of the robot at the time of placement.
- 4-3-3 The shooter robot of the team who does not kick off must be put outside the center circle.
- 4-3-4 In the state where the robot is placed, the operation of all the devices other than the receiver must be stopped.
- 4-3-5 The referee puts the ball in the center of the field.
- 4-3-6 The game starts with the signal of the referee kickoff (whistle).
- 4-3-7 If the team started before the signal of the referee, it would be foul and should be restarted by the kick-off as the opponent ball.

4-4 Team members

- 4-4-1 In principle, it is not allowed for team members to touch and move the robot directly.
- 4-4-2 Team members can touch and move the robot only when the referee instruct them.
- 4-4-3 Before each game, team members start, place, remove, and reposition the robot according to the instructions of the referee.
- 4-4-4 Team members except the pilot and assistant are out of the game area during the game unless the referee specifically instructs them.
- 4-4-5 The pilots should be two people, and prohibit to change in the middle of the competition.

4-5 Progress of the game

4-5-1 Robot movement

When the game start, the shooter robot controls the ball with the foot and aims at the goal. The keeper robot protects the goal within the goal area. The keeper robot must not go outside of the goal area.

4-5-2 Dribble

The shooter robot should not be operated and moved in a position in which other parts except the foot is in contact with the ball.

4-5-3 Hold

Hold means completely control of the ball, the robot should not hold.

4-5-3 Goal

When the ball goes beyond the goal line completely and goes into the goal net and the referee recognize there is no violation of the rule, the goal is admitted. If a goal is acknowledged, the referee add 1 point to the team that did the goal.

4-5-4 Goals using non-plate

If the shooter robot intentionally kicks a ball other than a foot, or put the ball inside the goal net using any other method, the goal will not be admitted.

4-5-5 Penalty goal

If a shot heading for the goal strikes a robot which lies on the goal line or is in the in-goal area, it becomes the goal of the opponent team.

4-5-6 When the goal is decided, the referee notifies each team by blowing a whistle.

4-5-7 Resuming the game after goal

When a goal is acknowledged, each robot moves promptly and the team that gave the goal kicks off. In this case, the game will not be interrupted and the watch will not be stopped

4-6 Fall, failure/out of order, repair of robot

4-6-1 Robot falls etc.

If the robot can not get up on its own due to falls or the like, team members can enter the game field and raise the robot according to the direction of the referee when the game is interrupted.

4-6-2 Robot failure/out of order / repair, plate breakage etc.

Each team can take one timeout per minute and per robot for each game. In this case, after the pilot declares to the referee and the referee stops the game, the team member carries out the robot out of the game field. At that time, it is possible to repair or replace a plate. When returning a robot which is taken out of the field, the members should report to the referee and obey the instructions. The position of the robot and the ball after the

timeout is instructed by the referee based on the positions before the timeout.

4-7 Interruption and resumption of game

4-7-1 In the case when the goal is not acknowledged and there is a rule violation etc.

In the case that the goal is not approved or there is a violation, the game would be interrupted by a whistle at the judgment of the referee. In this case, the robot that made a violation should be moved to the own territory, the ball is given to the opponent robot, and the game is resumed by the whistle of the referee.

4-7-2 When there is trouble in the progress of the game, etc.

The referee can suspend the game by whistle if there is a problem with the progress of the game or there is a safety problem. In this case, the robot should be stopped immediately and follow the referee's instruction. The referee also can resume the game by their decision.

4-7-3 In other cases

If the referee stops the game, the referee may instruct if necessary and can resume the game.

4-8 Foul play

4-8-1 The following acts shall be foul play

- (1) Acts that intentionally collide with the other robot
- (2) Act of intentionally remove the plate of the robot
- (3) An act of deliberately delaying the progress of the game
- (4) Acts that will deliberately contaminate or destroy the playing field or ball

4-8-2 In the case of the foul act above, the game is interrupted by the referee, and one point is given to the opposite team as a penalty.

4-8-3 If the game is interrupted due to foul play, kickoff according to 4-3 rule.

4-9 Disqualification

4-9-1 The following acts shall be disqualified.

- (1) Destruction :deliberately destroy robots of other teams
- (2) Acts of deliberately destroying the competition field
- (3) Action to ignore attention and instructions of the referee
- (4) Acts that deliberately interfere with operations of other teams
- (5) When you are late for all the game in qualifying

4-9-2 The team who performed the disqualification acts is regarded as disqualified and shall be deemed not to participate in the competition.

4-9-3 The judgment of disqualification is made by the referee. Also before the competition and after the competition, the judge team may decide disqualification after consultation.

5. Safety measures, etc.

■If the accident happens, we can't continue the competition. Please pay attention to safety not only during the convention period but also through preparation and production stages.

5-1 To make the event safe

5-1-1 When trouble or out of control of the robot occurs, promptly declare to the referee and stop the robot.

5-1-2 Prohibits flight of uncontrollable flight and uncontrolled floating objects such as balloons.

5-1-3 When you do practice, make sure to take sufficient safety measures.

5-1-4 To compete under ideaman-ship. Please do not participate using the same or similar robot.

5-2 Evacuation when the disaster occurs

If a disaster happened, the organizer would decide to cancel the competition and the participants should evacuate promptly following the instruction by the organizer.

5-3 Others

Competition issues and regulations may be changed for the sake of ensuring safety and for facilitating the progress of the competition.

5-4 Information sharing

It is a common understanding at this conference to share information on technology and developed curriculum in relation to the competition with other participants after the competition.