2013 International Robotic Olympiad (V4)

Ocean Exploration Competition Rules

(Secondary School Division)

General Rules

Game Rules

1. Single motor category robots may use only one set of motor-gear box.
2. Multi-motor category robots may use only two sets of motor-gear box for the walking actions.
3. All contestants should wear uniform during the competition.
4. Name list of the student contestants should not be altered without the Organizer's permission.
5. Contestants not accompanied by their instructors or teachers are not allowed to take part in the competition.
6. Instructors or teachers cannot enter the restriction area to command students to play the game.
7. Judges have the right to give warning or disqualify the contestants, instructors or teachers who do not obey the rules or the decision of the judges.

Robot Rules

8. Except for the servo motor robot group, all participating robots must use Tamiya70093 gear box (203.7:1, 58.2:1, 16.6:1) and its matching motor for competition. The gear ratio may only be adjusted in accordance to the manufacturer's instructions. Contestants are not allowed to modify the motor or the gear box in any way. Gearbox should be exposed and cannot be sealed. Transparent materials must be used if gear box is needed to be sealed. Before and after the game, sealed gear box must be disassembled for checking.
9. All motors must pass the power consumption check. The motor cannot consume more than 280mA when 3V supplied by the power regulator.
10. The weight of the robot means the total weight including all accessories and parts. (Including batteries)
11. Participating robots must comply with the dimensions, weights and specific requirements set by the Organizer.
12. All robots cannot add on control devices not approved by the Organizer. All wireless installations must be able to alter frequency channels. Transmitters found interfering must be immediately changed channel; otherwise it would be disqualified for the competition. 2.4 G wireless remote control device are recommended. All approved models of electronic controller accessories, wireless installations and their suppliers would be announced on the website.
13. The mechanical parts must be constructed by the student contestants from raw materials except for screws, nuts, rings and gear boxes. Ready-made models or toys cannot be used for mechanical parts. No more than 30% decorative accessories should be ready-made subassemblies.
14. In the "Hand Generator Category Competitions", more than one student contestants are allowed to operate the hand generator. They can change at any time.
15. Pneumatic device cannot be used.

Other Points to Note

16. Hand generators (attachment 1) and batteries provided by the Organizer should only be used in the national competition (batteries will be prepared by contestants in regional competitions).
17. Registration number of the robot must be engraved or printed with permanent ink on its chassis.
18. The Organizer may check robots on their design any time after registration. Units found not meeting specifications would be disqualified for the competition.
19. The Organizer reserves the right to use all participating items for marketing and publicity purposes.
20. Violation of the above rules would lead to immediate disqualification of the competition and its result.
21. The Organizer reserves the right to modify the game rules and announce them on its website.

Hand Generator (12V 350rpm)

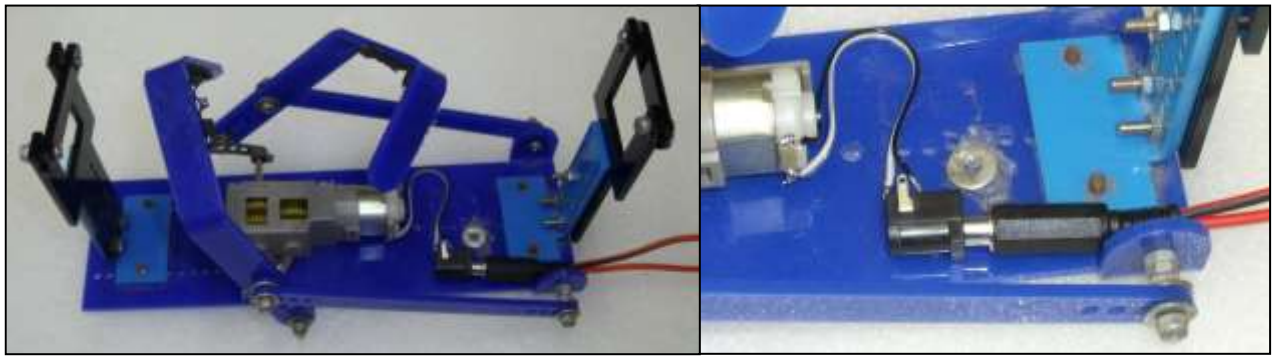
Attachment 1

12V 350rpm Hand Generator

12V 350rpm Hand Generator [with ⊕ ⊖ electrode selector]

2.1mm plug and socket

Different types of *2.1mm* socket



Each Single Motor Robot should be equipped with a 2.1mm socket for the plug of hand generator.

How to equip the 12V 350rpm Hand Generator with a [⊕ ⊖ electrode selector]

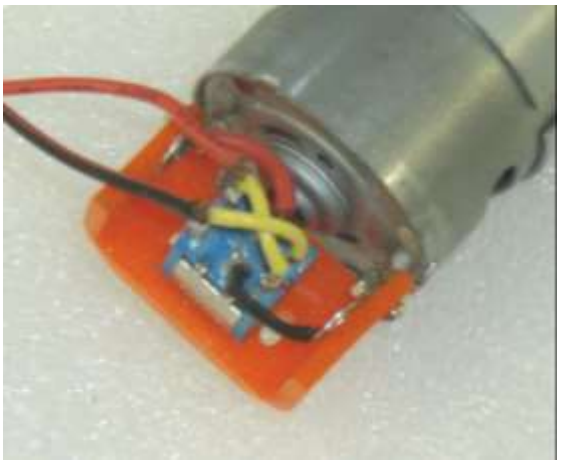
Step 1: Install the 2 wiring blades and acrylic accessory on the electrodes of the Hand Generator.

Step 2: Install a double-pole triple-throw (DPTT) switch.

Step 3: Connect the middle poles of DPTT switch to the electrodes with wires.

Step 4: Cross the opposite poles of DPTT switch with two yellow wires as shown.

Step 5: Connect each end of the yellow wires with the red and black wires of the 2.1mm plug.



The 12V 350rpm Hand Generator
with a ⊕ ⊖ electrode selector

Individual competition rules

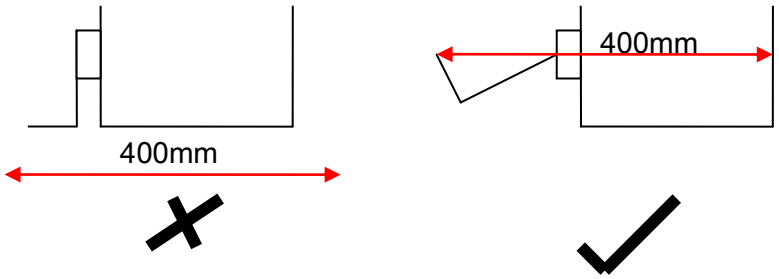
1. Environmental Protection – Sea Surface Sweeper Robot Game
2. Water Polo Robot Game
3. Shipwreck Rescue and Salvage Robot Game
4. Ocean Treasure Hunting Robot Game
5. Land and Water Robot Obstacle Avoidance Competition
6. Hand Generator Robot Backstroke Swimming Competition
7. Hand Generator Robot Breaststroke Swimming Competition
8. Hand Generator Robot Butterfly Stroke Swimming Competition
9. Hand Generator Robot Freestyle (front crawl) Swimming Competition
10. Hand Generator Robot Medley Relay Swimming Competition
11. Hand Generator Robot Fish Short Distance Swimming (Vertical style) Competition
12. Hand Generator Robot Fish Short Distance Swimming (Horizontal style) Competition
13. Wired Control Robot Fish Obstacle Avoidance Competition
14. Wireless Control Servo Motor Robot Fish Obstacle Avoidance Competition
15. Hand Generator Robot Four-Oar Rowing Boat Competition
16. Hand Generator Robot Canoe Competition
17. Wireless Control Servo Motor Robot Four-Oar Rowing Boat Obstacle Avoidance Competition

1. Environmental Protection – Sea Surface Sweeper Robot Game

Rubbish floating in the sea not only bad for hygiene but also creates risk to marine traffic. This competition aims to arouse attention of students to environmental protection and to develop their design creativity. Each school may have a maximum of two teams and each team may submit one robot for the competition.

Robot Specification

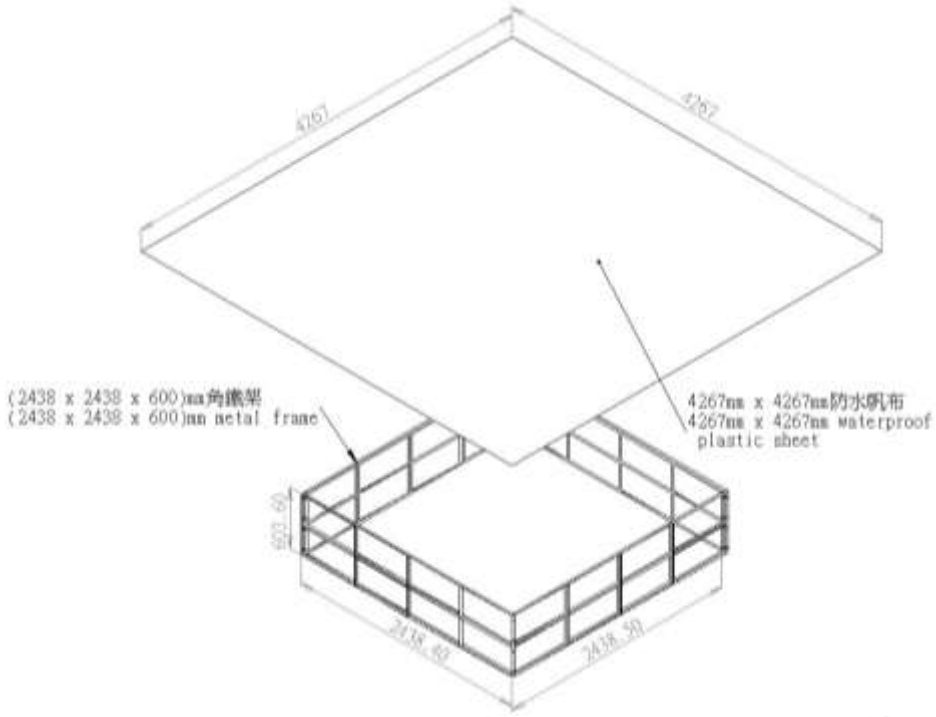
1. The robot, with its arms fully stretched cannot exceed 400mm (Length) x 300mm (Width) x 300mm (Height).

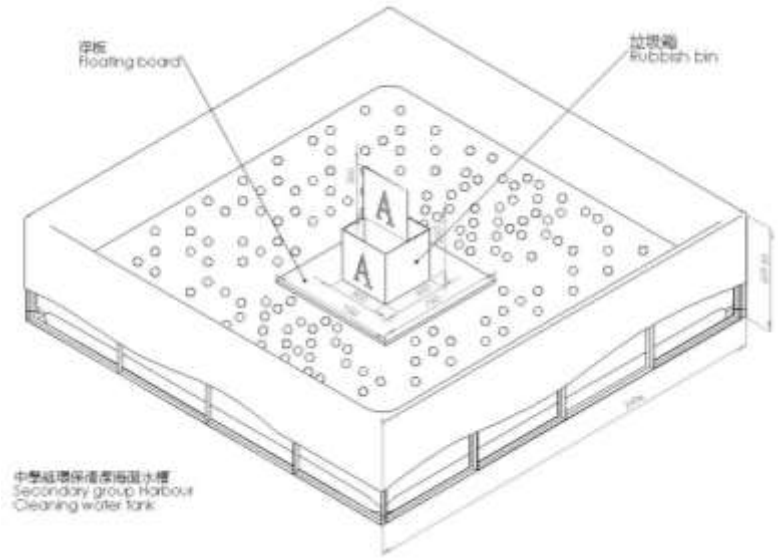


2. The robot must only be controlled by wired manual controller.
3. No restriction on the quantity of actuators (motor, gear box, servo mechanism and propeller) on the robot. All participating robots must use Tamiya70093 gear box (203.7:1, 58.2:1, 16.6:1) and its matching motor for competition. The gear ratio may only be adjusted in accordance to the manufacturer's instructions. Contestants should not modify the motor or the gear box in any way.
4. No more than 8 pcs. 1.5V 2A size batteries can be used to drive the actuators and catcher and NO additional energy installment can be made. Batteries must meet the specifications set by the Organizer.
5. Only FA-130 and RE-260 motors can be used to drive the propeller.

Playing Field Specification

1. Water tank dimension: 2438mm (Length) x 2438mm (Width) x 610mm (Height)
2. Water is filled to about 150mm deep
3. A Square floating board with 750mm long is placed in the centre of the water tank
4. Each side has a trashcan of 300 mm (Length) x 150 mm (Width) x 300 mm (Height) separated by a 300 mm long square panel.





Game Rules

1. Ping-pong are used as rubbish; There are about 200 each of orange ball (10 points) and white balls (-50 points) in the water tank.
2. Each game shall last for two minutes. The participative robot must use its catcher to collect and throw the ping-pong to its own bin on their side. Robot can also throw the white balls (with negative scores) to its opponent's bin. However, robots cannot cross the floating board to shoot the balls.
3. At the end of the game, balls inside the bin will be scored. The robot sweeper that has the higher points wins the competition.
4. Each game has two teams. A verbal warning with a detainment penalty of 30 seconds will be served to any robot found deliberately obstructing the action of the other team. The team would be disqualified on receiving three warnings.
5. The robot that deliberately sinks other robots would be disqualified.

2. Water Polo Robot Game

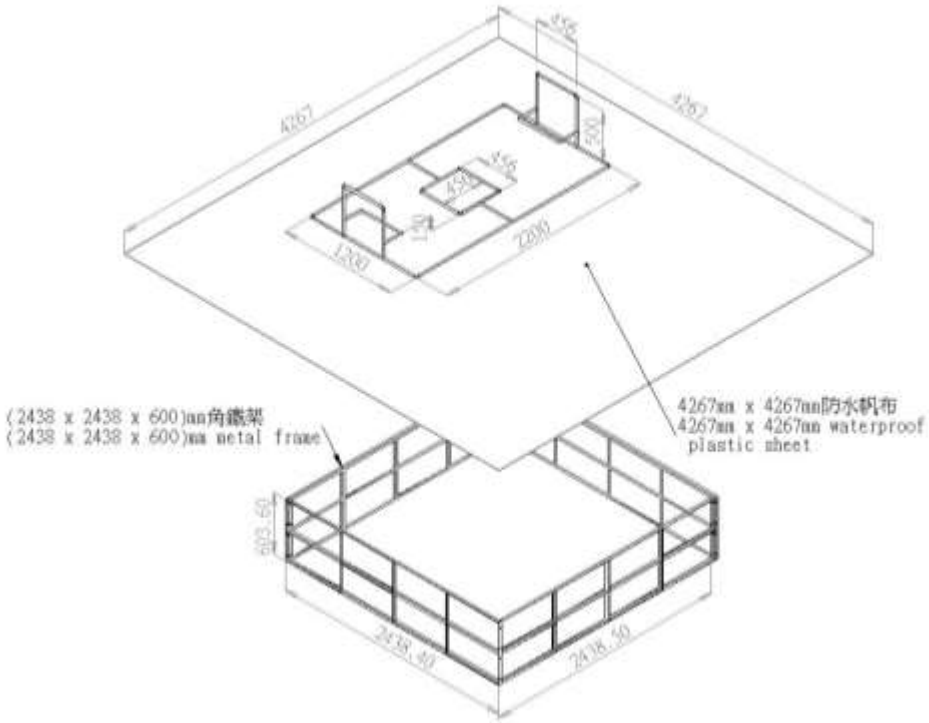
The water Polo robot game is a team competition. Each team has two robots. The participating robots should have good ability to pick up and throw balls with skillful control.

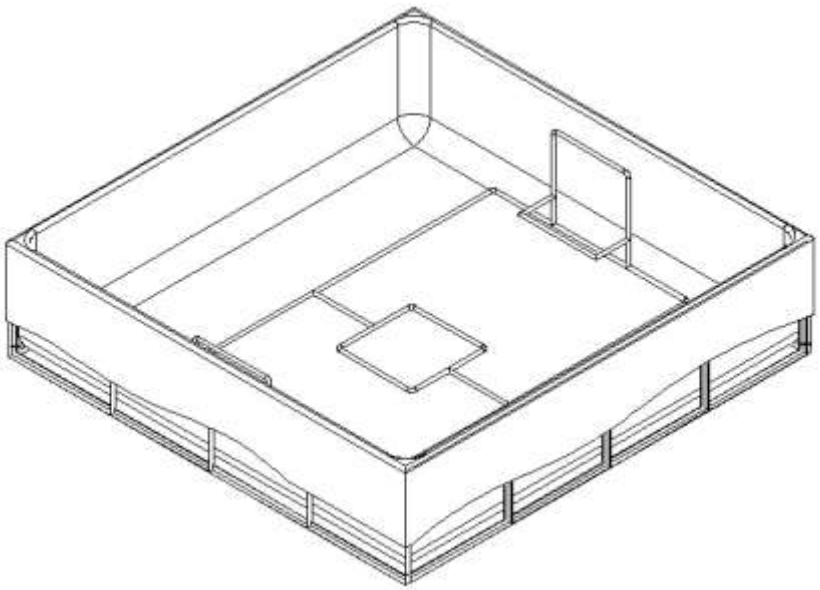
Robot Specification

1. The robot, with its arms fully stretched cannot exceed 400mm (Length) x 300mm (Width) x 300mm (Height).
2. The robot must only be controlled by wired manual controller.
3. No restriction on the quantity of actuators (motor, gear box, servo mechanism and propeller) on the robot. All participating robots must use Tamiya70093 gear box (203.7:1, 58.2:1, 16.6:1) and its matching motor for competition. The gear ratio may only be adjusted in accordance to the manufacturer's instructions. Contestants should not modify the motor or the gear box in any way.
4. No more than 8 pcs. 1.5V 2A size batteries can be used to drive the actuators and catcher and NO additional energy installment can be made. Batteries must meet the specifications set by the Organizer.
5. Only FA-130 and RE-260 motors can be used to drive the propeller.

Playing Field Specification

1. Water pool dimension: 2438mm (Length) x 2438mm (Width) x 610mm (Height)
2. Penalty area: 370mm (Length) x 160mm (Width)
3. Water is filled to about 150mm deep





Game Rules

1. 'Toss a coin' is used to decide on the goals and the serve right. The Kick-off side is to kick-off the ball in the centre of the pool. The defensive robots are to get prepared in their own penalty area.
2. Ping Pong is used as the water polo ball. Each successful goal scores one point. After each successful score, the losing team will kick-off the ball at the centre of the pool.
3. There are two halves in the match and each is of three minutes duration. The first stage of the competition will be conducted on a round-robin basis. The winning side will get 3 points, losing side 0 point and each side 1 point in case of a draw. The second stage will be conducted on a knockout basis.
4. The game is divided into two halves, each of 3 minutes duration. The team that scores higher points will win. Should there be a draw at the end of the game during the knockout stage, the first team scores the goal within an extra 3 minutes game time wins. Should there be no score or same score in the extra time, each team takes turn to send their robots to do the fix point shooting one at each time. The time of each successful shooting is recorded. After the two robots of each team have done the fix point shooting, the team that scores higher points will win. In case of draw, the team with the shorter total shooting time of the two shootings will win. Second round will be conducted until a winner is identified.
5. **Fix Point Shooting**: A ball is placed at the mid-court of the pool. Each team would be given one minute to shoot the ball without defensive robot. If unsuccessful, repeat shooting attempts are allowed. Robot cannot shoot or get the ball inside the penalty area.
6. The robot should not hold the ball longer than 5 seconds; otherwise a penalty would be given. The opposite side will be given a penalty kick at where the game stops.
7. The robot cannot shoot inside the opponent's penalty area. If the ball falls in the penalty area or outside the field area, the defensive robot would serve from the side of the penalty area.
8. The robot has to shoot the ball with the throwing device directly into the goal to score. Score would not be counted if the ball is bumped in by the body nor if the ball is drifted into the goal by itself.
9. There are no foul balls. A central struggle ball will be served if both sides struggling for the ball for over ten seconds at the edge of the field. A robot from each team is to move from the penalty area to the centre of the field to scramble for the ball while other team members have to stop nearby the penalty area and could only move until either robot touches the ball.

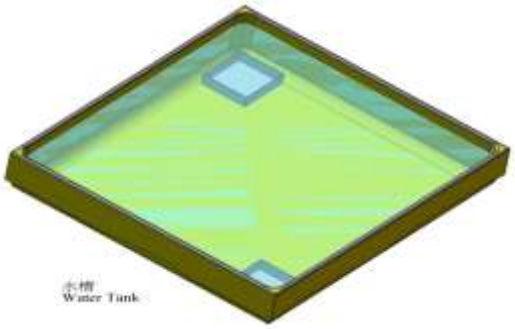
3. Shipwreck Rescue and Salvage Robot Game

The shipwreck rescue and the salvage robot competition is in team form, each team composes of two robots. The participative robot must be able to move forward and backward, turn left and right, float and sink, and has a mechanism capable to salvage a sunken ship. The team uses the shortest time to salvage the sunken ship at the bottom to the collector wins.

Robot Specification

1. The robot, when fully stretched cannot be larger than 400mm (Length) x 300mm (Width) x 300mm (Height).
2. The robot must only be controlled by wired manual controller. The entire robot may only operate and move under water with no part above water surface.
3. No restriction on the quantity of actuators (motor, gear box, servo mechanism and propeller) on the robot. All participating robots must use Tamiya70093 gear box (203.7:1, 58.2:1, 16.6:1) and its matching motor for competition. The gear ratio may only be adjusted in accordance to the manufacturer's instructions. Contestants should not modify the motor or the gear box in any way.
4. No more than 8 pcs. 1.5V 2A size batteries can be used to drive the actuators and catcher and NO additional energy installment can be made. Batteries must meet the specifications set by the Organizer.
5. Only FA-130 and RE-260 motors can be used to drive the propeller.

Playing Field Specification



1. The playing field is a water tank of 2400mm (Length) x 2400mm (Width) x 600mm (Height), filled with water to 450mm deep.
2. A collector of 400mm (Length) x 400mm (Width) x 150mm (Height) is placed at the opposite corner on each side of the bottom of the tank (as shown in figure) for placing the salvaged vessel.
3. A 1:550 Titanic model is used as the sunken ship in the competition. Half of the sunken ship weighs approximately 85 grams and is approximately 255mm long. The height is approximately 60 mm from the bottom to the deck and approximately 105mm from the bottom to the chimney respectively. The width of the sunken ship is approximately 52 mm.

Game Rule

1. Each team has two salvage robots. The titanic ship, broken into two halves, rests on the bottom of water tank. The two robots would start initially from the collector position to salvage the broken ship bodies and place them on one of the collectors within a time limit of five minutes (the entire boat must be placed within the outer edges of the collector).
2. The time to transport each broken ship body to the collector is recorded. The team that uses the shortest time to salvage the entire ship wins the competition. Should none of the teams complete the mission in five minutes; the team that salvaged half of the ship in the shortest time becomes the winner.

4. Ocean Treasure Hunting Robot Game

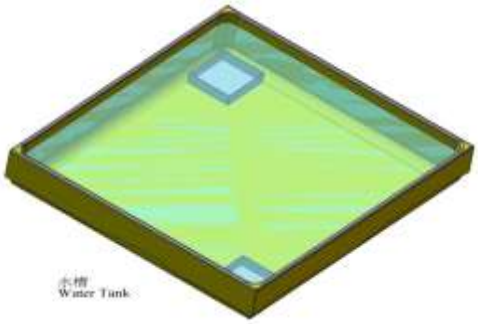
The sea although is immeasurably deep, it would not stop men's curiosity from exploring it. Besides, the very rich resources, there are treasures from numerous sunken vessels lying in the seabed. The participant must design two robots capable to dive under water, and transport the treasure from the seabed to the collector. The one who salvages the most will be the winner.

Robot Specification

1. The robot, when fully stretched cannot be larger than 400mm (Length) x 300mm (Width) x 300mm (Height).
2. The robot must only be controlled by wired manual controller. The entire robot may only operate and move under water with no part above water surface.
3. No restriction on the quantity of actuators (motor, gear box, servo mechanism and propeller) on the robot. All participating robots must use Tamiya70093 gear box (203.7:1, 58.2:1, 16.6:1) and its matching motor for competition. The gear ratio may only be adjusted in accordance to the manufacturer's instructions. Contestants should not modify the motor or the gear box in any way.
4. No more than 8 pcs. 1.5V AA size batteries can be used to drive the actuators and catcher and NO additional energy installment can be made. Batteries must meet the specifications set by the Organizer.
5. Only FA-130 and RE-260 motors can be used to drive the propeller.

Playing Field Specification

1. The playing field is a water tank of 2400mm (Length) x 2400mm (Width) x 600mm (Height), filled with water to 450mm deep.
2. A collector of 400mm (Length) x 400mm (Width) x 150mm (Height) is placed at the opposite corner on each side of the bottom of the tank -(as shown in figure) for placing the salvaged treasure.
3. Colored plastic stones are used as treasure. The points score for each of the color stones are:



Red	Orange	Yellow	Green	Blue	Violet	White
4	5	6	7	8	9	10

Game Rule

1. Two robots are placed inside the collectors and start the treasure hunting to pick as many stones as possible in five minutes. The robot that scores the highest points wins the competition.
2. Only stones inside the two collectors and those stones entirely placed inside the collector of the robot would be counted provided that the robot must return to the platform before the time is up to count the stones it has carried.

5. Land and Water Robot Obstacle Avoidance Competition

Oblique platform, drawbridge, water tank and cylindrical obstacle are placed in the obstacle avoidance game field. The participating robot is required to navigate through the oblique platform, drawbridge, water tank and cylindrical obstacle to reach the destination in the shortest time to win. This game tests the ultimate performance of the robots as well as the navigation ability of the players.

Robot Specification

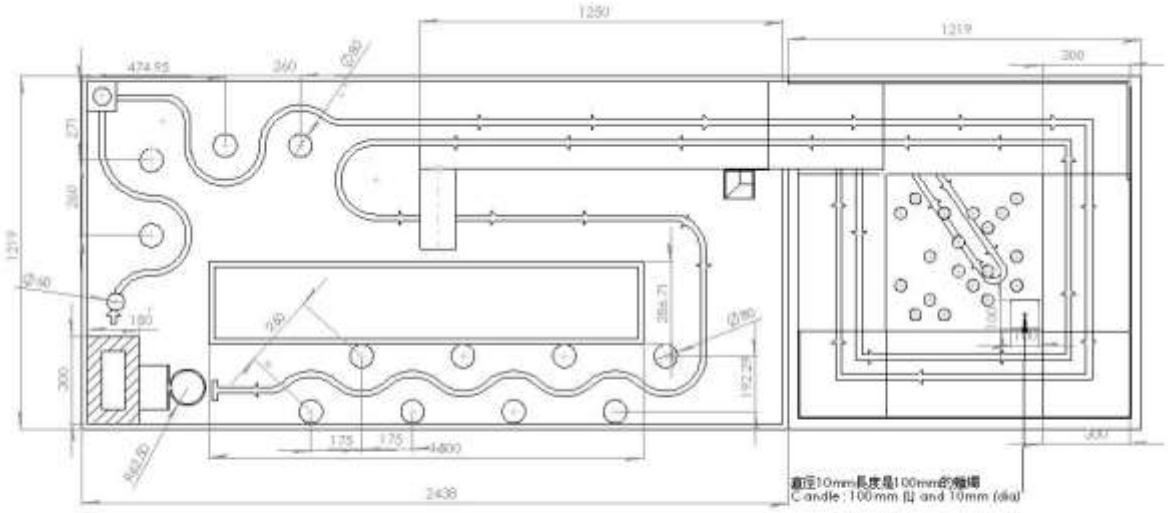
1. The robot cannot be longer than 300mm, wider than 280mm, taller than 240mm, nor heavier than 1kg （excluding wired controller）.
2. The robot is controlled by wired manual controller. Player may also use shorter wire and move around with the robot. Only batteries provided by the Organizer could be used.
3. The robot can use only two gear boxes for walking motion, two gear boxes for mechanic movement and two motorized propellers to move in water.
4. No more than 8 pcs. 1.5V AA size batteries can be used to drive the actuators and catcher and NO additional energy installment can be made. Batteries must meet the specifications set by the Organizer.
5. Only FA-130 and RE-260 motors can be used to drive the propeller.

FA-130 

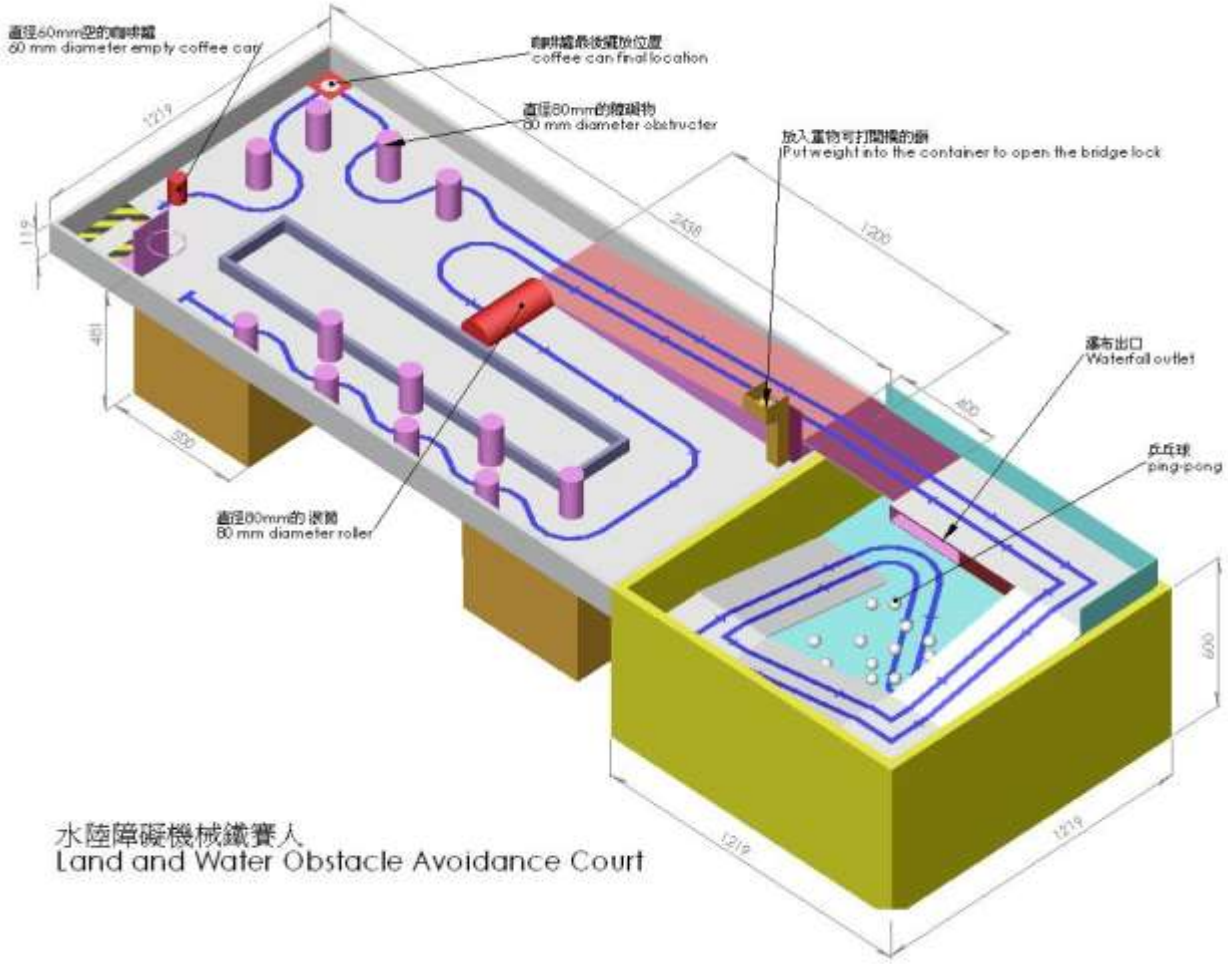
RE-260 

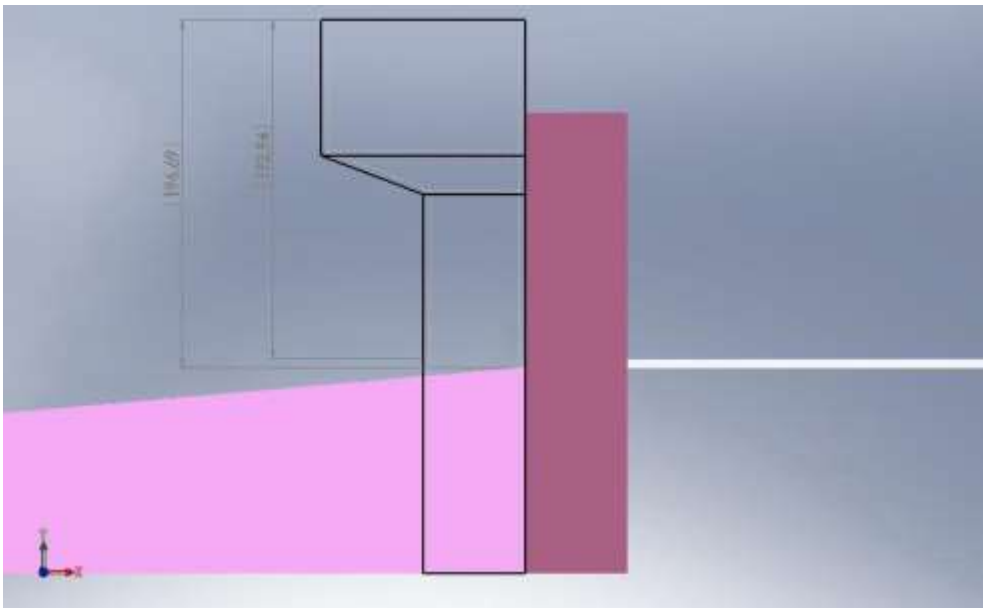
Game Filed Specification

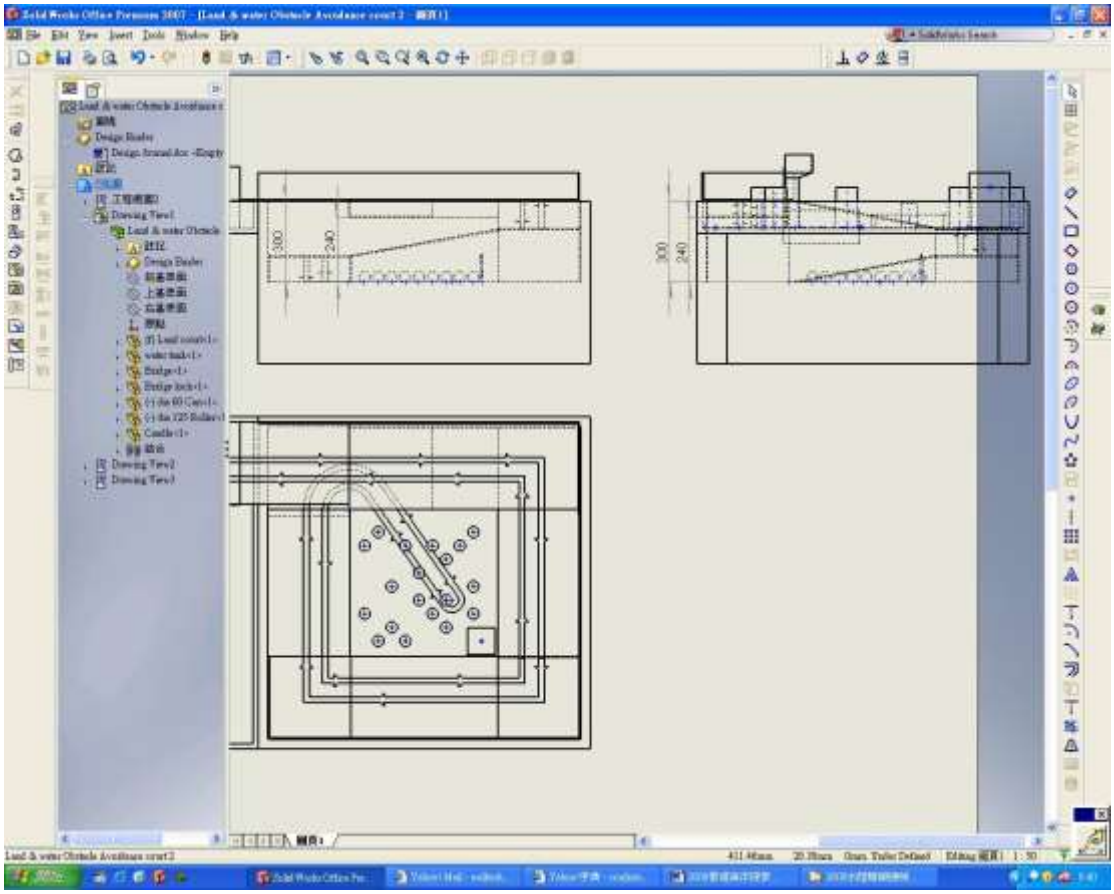
1. This game uses the land and water robot obstacle avoidance playing field (diagram referred).
2. The area of land playing field is 2438mm × 1219mm with 100mm tall fencing on four sides. The water playing field is located at the end of the land playing field; the area is 1219mm long x 1219mm wide, the depth of water tank is 300mm. The oblique platform is slippery proof.
3. The diameter of can (an empty coffee can) is 60mm, the height is 90mm and the weight is 50g. The diameter of cylindrical obstacle is 80mm, the height is 150 mm. The diameter of roller (1.25 Liter soft drink) is 125mm, the height is 280 mm.
4. The length of oblique platform is 1200mm, the width is 300mm and the highest point is 100mm. The length of drawbridge is 300mm and the width is 300mm (diagram referred).
5. The fire is a candle with 50mm in length and 8mm in diameter. It is placed on a holder which is floating in the water tank.



水陸障礙機械鐵賽人
Land and Water Obstacle Avoidance Court


直徑60mm空的咖啡罐
60 mm diameter empty coffee can
coffee can final location
直徑80mm的障礙物
80 mm diameter obstructer
放入重物可打開橋的鎖
Put weight into the container to open the bridge lock
瀑布出口
Waterfall outlet
乒乓球
ping-pong
直徑80mm的滾筒
80 mm diameter roller
1219
2438
1200
481
550
400
600
水陸障礙機械鐵賽人
Land and Water Obstacle Avoidance Court





Game rule

1. The robot is placed at the "START" position and given a golf ball (the weight) for carrying. The judge orders start of the game and the timer begins to count the time.
2. The robot has to follow the designated route. Firstly, the robot will push an empty coffee can to a specified position (corner) bypassing a cylindrical obstacle. Then it moves up to the end of the oblique platform, where the drawbridge is in an upright position. The robot has to put the golf ball (the weight) into the container beside the bridge in order to open the lock of the drawbridge. The drawbridge will then be lowered down once the robot touches its surface. Should the golf ball is dropped on its way, the robot must restart the game from the very beginning but the timer will not stop. The robot moves to the water tank. If the golf ball is dropped on the way, it has to restart again, but the timer will not stop.
3. After passing through the drawbridge, the robot gets down into the water and puts out the fire (candle). Before leaving the water tank, the robot has to pick up a ping-pong with it and passes through the drawbridge and oblique platform again. After leaving the drawbridge the robot has to push away a roller in order to advance to the cylindrical obstacles zone get into the entrance of next part. After passing through all the obstacles, the robot will then throw the ping-pong into the basket. If the ping-pong is dropped off or lost, the robot may pick it up or return to the water tank and get another ping-pong.
4. Once the robot touches the timer, the game is considered finished and the finishing time is recorded.
5. Maximum game time is 5 minutes. Robots that cannot complete the game would be recorded as 5 minutes game time.
6. Players cannot touch their robot or steer it by pulling the control wire during the competition. 10 seconds would be added for each offence.
7. Each team can play twice and the best time will be recorded.

6. Hand Generator Robot Backstroke Swimming Competition

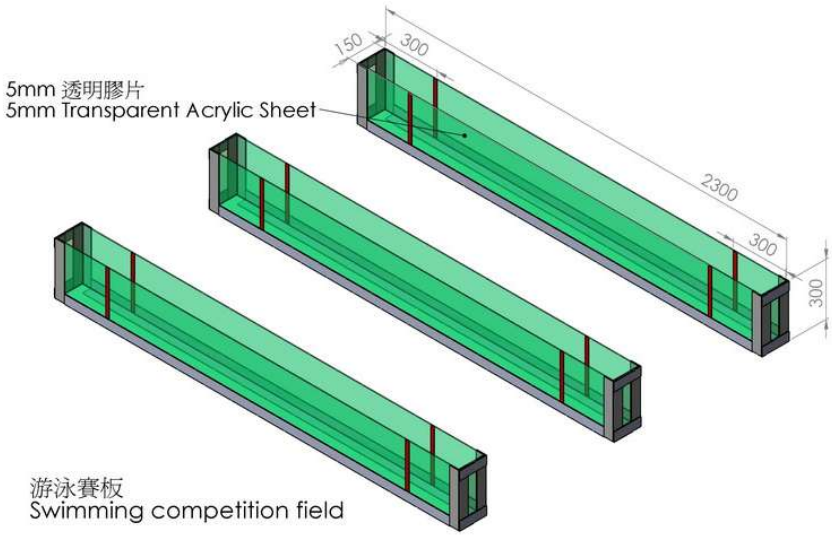
Students are required to make a single motor robot which can simulate the backstroke swimming action by applying mechanical principles.

Robot Specification

1. The robot operates only with one motor and the power should only be supplied by the Hand Generator provided by the Organizer. The robot must be equipped with a 2.1mm socket for connection to the Hand Generator.
2. The robot cannot be longer than 300mm, wider than 150mm, taller than 180mm. The length of hand cannot be less than 70mm and the length of leg cannot be less than 100mm. A ping-pong should be used as head.
3. The robot must complete the game in backstroke swimming action by both hands and legs. No propeller, additional supporters nor floating device can be used.
4. The Backstroke Swimming Robot is different from a Freestyle Swimming Robot particularly in the directions of their faces.

Game Field Specification

1. A swimming competition board is used (see diagram)
2. Dimension of the transparent swimming track: 2300mm (Length) x 150mm (Width) x 300mm (Height) filled with water to 150mm deep
3. The starting area is 300mm long. A timer is placed at end of the runway.



Game Rules

1. Each team can play twice and the best time will be recorded. The shortest time to complete is the winner.
2. The power of robot should only be supplied by the Hand Generator provided by the Organizer. Pulling the wire of hand generator is prohibited.
3. The wire of Hand generator is long enough so that the contestants must stay behind at the starting area. Moving along the field with the robot is prohibited.
4. Once the game begins, the contestants cannot touch the robot until it reaches the end plastic sheet of the runway. The maximum game time is 30 seconds.

7. Hand Generator Robot Breaststroke Swimming Competition

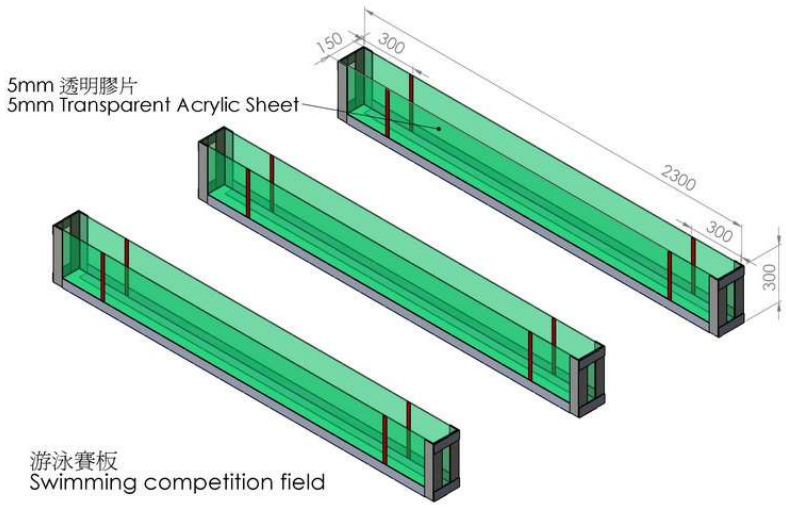
Students are required to make a single motor robot which can simulate the breaststroke swimming action by applying mechanical principles.

Robot Specification

1. The robot operates only with one motor and the power should only be supplied by the Hand Generator provided by the Organizer. The robot must be equipped with a 2.1mm socket for connection to the Hand Generator.
2. The robot cannot be longer than 300mm, wider than 150mm, taller than 180mm. The length of hand cannot be less than 70mm and the length of leg cannot be less than 100mm. A ping-pong should be used as head.
3. The robot must complete the game in breaststroke swimming action by both hands and legs. No propeller, additional supports nor floating device can be used.
4. Breaststroke is performed face down in the water without rotating the torso. The arms stay in the water and move synchronously, while the legs perform a frog-kick.

Game Field Specification

1. A swimming competition board is used (see diagram).
2. Dimension of the transparent swimming track: 2300mm (Length) x 150mm (Width) x 300mm (Height) filled with water to 150mm deep.
3. The starting area is 300mm long. A timer is placed at end of the runway.



Game Rules

1. Each team can play twice and the best time will be recorded. The shortest time to complete is the winner.
2. The power of robot should only be supplied by the Hand Generator provided by the Organizer. Pulling the wire of hand generator is prohibited.
3. The wire of Hand generator is long enough so that the contestants must stay behind at the starting area. Moving along the field with the robot is prohibited.
4. Once the game begins, the contestants cannot touch the robot until it reaches the end plastic sheet of the runway. The maximum game time is 30 seconds.

8. Hand Generator Robot Butterfly Stroke Swimming Competition

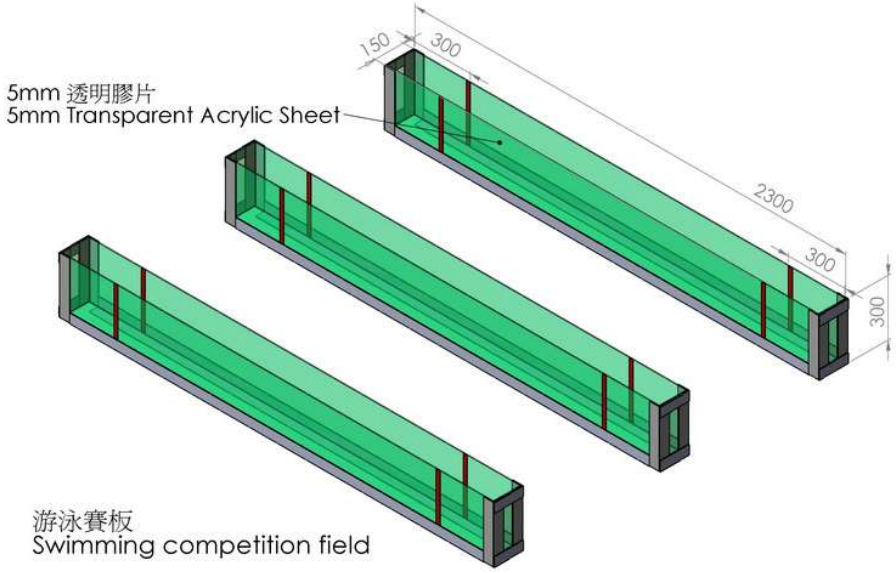
Students are required to make a single motor robot which can simulate the butterfly stroke swimming action by applying mechanical principles.

Robot Specification

1. The robot operates only with one motor and the power should only be supplied by the Hand Generator provided by the Organizer. The robot must be equipped with a 2.1mm socket for connection to the Hand Generator.
2. The robot cannot be longer than 300mm, wider than 150mm, taller than 180mm. The length of hand cannot be less than 70mm and the length of leg cannot be less than 100mm. A ping-pong should be used as head.
3. The robot must complete the game in butterfly stroke swimming action by both hands and legs. No propeller, additional supporters nor floating device can be used.
4. Butterfly stroke is performed face down in the water. The robot does a dolphin kick and moves its arms in a forward circle at the same time.

Game Field Specification

1. A swimming competition board is used (see diagram)
2. Dimension of the transparent swimming track: 2300mm (Length) x 150mm (Width) x 300mm (Height) filled with water to 150mm deep
3. The starting area is 300mm long. A timer is placed at end of the runway.



Game Rules

1. Each team can play twice and the best time will be recorded. The shortest time to complete is the winner.
2. The power of robot should only be supplied by the Hand Generator provided by the Organizer. Pulling the wire of hand generator is prohibited.
3. The wire of Hand generator is long enough so that the contestants must stay behind at the starting area. Moving along the field with the robot is prohibited.
4. Once the game begins, the contestants cannot touch the robot until it reaches the end plastic sheet of the runway. The maximum game time is 30 seconds.

9. Hand Generator Robot Freestyle (*front crawl*) –Swimming Competition

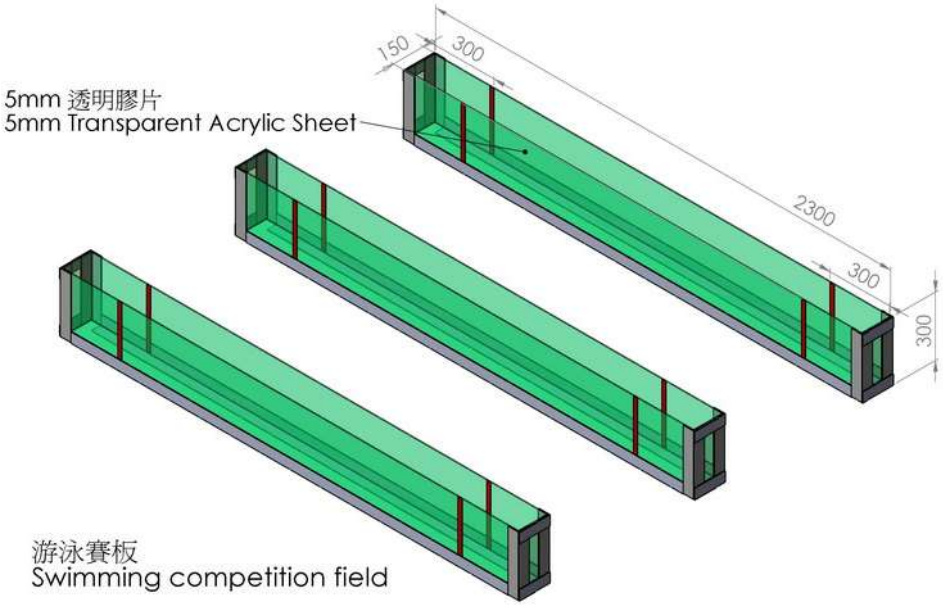
Students are required to make a single motor robot which can simulate the front craw swimming action by applying mechanical principles.

Robot Specification

1. The robot operates only with one motor and the power should only be supplied by the Hand Generator provided by the Organizer. The robot must be equipped with a 2.1mm socket for connection to the Hand Generator.
2. The robot cannot be longer than 300mm, wider than 150mm, taller than 180mm. The length of hand cannot be less than 70mm and the length of leg cannot be less than 100mm. A ping-pong should be used as head.
3. The robot must complete the game in freestyle swimming action by both hands and legs. No propeller, additional supporters nor floating device can be used.
4. Freestyle is performed face down and both arms move synchronously with a small synchronized kick.

Game Field Specification

1. A swimming competition board is used (see diagram)
2. Dimension of the transparent swimming track: 2300mm (Length) x 150mm (Width) x 300mm (Height) filled with water to 150mm deep
3. The starting area is 300mm long. A timer is placed at end of the runway.



Game Rules

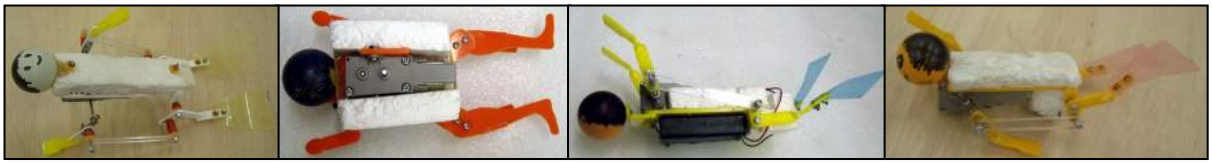
1. Each team can play twice and the best time will be recorded. The shortest time to complete is the winner.
2. The power of robot should only be supplied by the Hand Generator provided by the Organizer. Pulling the wire of hand generator is prohibited.
3. The wire of Hand generator is long enough so that the contestants must stay behind at the starting area. Moving along the field with the robot is prohibited.
4. Once the game begins, the contestants cannot touch the robot until it reaches the end plastic sheet of the runway. The maximum game time is 30 seconds.

10. Hand Generator Robot Medley Relay Swimming Competition

Medley Relay is a combination of four different swimming styles by four robot swimmers in one race. It not only tests the mechanical design of robots but also the ability to cooperate among the players.

Robot Specification

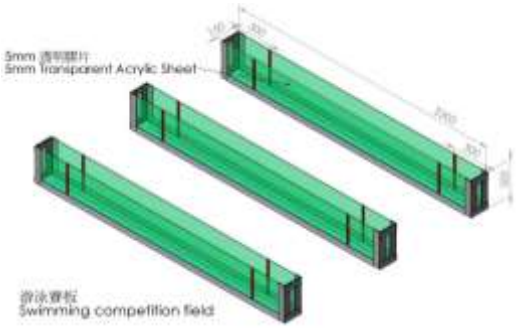
1. The robot operates only with one motor and the power should only be supplied by the Hand Generator provided by the Organizer. The robot must be equipped with a 2.1mm socket for connection to the Hand Generator.
2. The robot cannot be longer than 300mm, wider than 150mm, taller than 180mm. The length of hand cannot be less than 70mm and the length of leg cannot be less than 100mm. A ping-pong should be used as head.
3. The robot must complete the game consists of four strokes. Each stroke has an equal length of the overall distance. The four strokes are performed in the order of: Backstroke, Breaststroke, Butterfly stroke and Freestyle. No propeller, additional supporters nor floating device can be used.
4. The Backstroke Swimming Robot is different from a Freestyle Swimming Robot particularly in the directions of their faces.



Backstroke | Breaststroke | Butterfly stroke | Freestyle

Game Field Specification

1. A swimming competition board is used (see diagram)
2. Dimension of the transparent swimming track: 2300mm (Length) x 150mm (Width) x 300mm (Height) filled with water to 150mm deep
3. The starting area is 300mm long. A timer is placed at end of the runway.



Game Rules

1. Each team composed of four different swimming styles robot swimmers. Two Hand Generators will be given to each team.
2. The game is performed in the order of: Backstroke, Breaststroke, Butterfly stroke and Freestyle.
3. Each team has two robot swimmers at the starting and finishing points. A Hand Generator will be provided to each team at both the starting and finishing points respectively. The wire of Hand generator is long enough so that the contestants must stay at the end of field in the designated area. Moving along the field with robot is prohibited.
4. The game is started by the Referee. The hand generator of Backstroke Swimming Robot can be started and the robot should touch the end plastic sheet to finish the 1st stroke. The wire of hand generator plugged on the Backstroke Swimming Robot will be unplugged and pulled back for preparing the Butterfly Stroke Swimming Robot. The Breaststroke Swimming Robot at the finishing area swims back and touches the end plastic sheet to end the 2nd stroke. When the Breaststroke finishes its part, the game is continued by Butterfly Stroke Swimming Robot. The wire of hand generator plugged on Breaststroke Swimming Robot will be unplugged and pulled back for preparing the Freestyle Swimming Robot. When all four robots have completed the game, the total time will be counted. The team with the least swimming time is the winner.
5. If the wire is pulled for taking advantage of moving the robot forward, the team will be warned and 10 seconds is added to the total time counted. The team will be disqualified upon second offence.

11. Hand Generator Robot Fish Short Distance Swimming (Vertical style) Competition

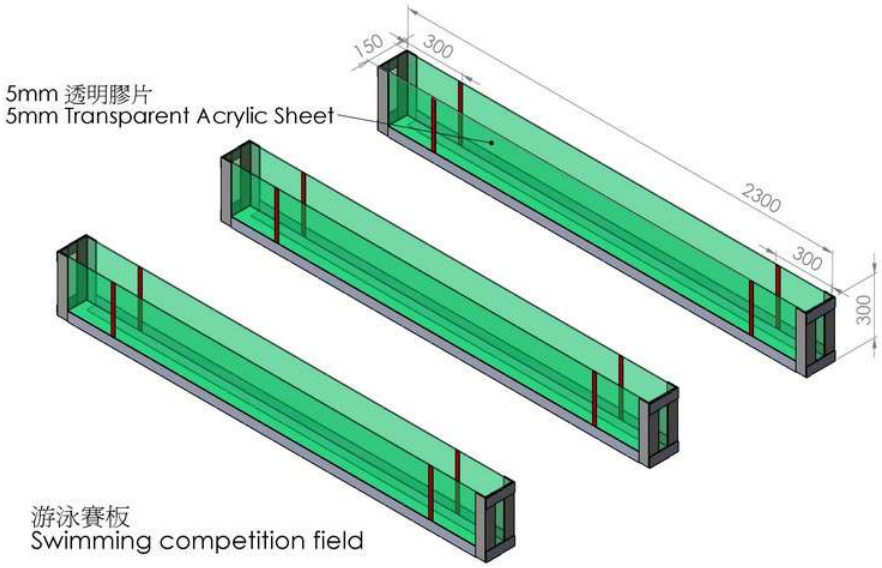
There are a wide variety of marine organisms with numerous kinds of fishes in the ocean. Their swimming style may be different from one another. Students are required to make a single motor robot fish which can simulate the fish swimming action (vertical style) by applying mechanical principles.

Robot Fish Specification

1. The robot fish operates only with one motor and the power should only be supplied by the Hand Generator provided by the Organizer. The robot must be equipped with a 2.1mm socket for connection to the Hand Generator.
2. The robot fish cannot be longer than 300mm, wider than 150mm, taller than 180mm.
3. The robot fish must complete the game in fish swimming action (vertical style). No propeller can be used.

Game Field Specification

1. A swimming competition board is used (see diagram)
2. Dimension of the transparent swimming track: 2300mm (Length) x 150mm (Width) x 300mm (Height) filled with water to 150mm deep
3. The starting area is 300mm long. A timer is placed at end of the runway.



Game Rules

1. Each team can play twice and the best time will be recorded. The shortest time to complete is the winner.
2. The power of robot fish should only be supplied by the Hand Generator provided by the Organizer. Pulling the wire of hand generator is prohibited.
3. The wire of Hand generator is long enough so that the contestants must stay behind at the starting area. Moving along the field with the robot is prohibited.
4. Once the game begins, the contestants cannot touch the robot fish until it reaches the end plastic sheet of the runway. The maximum game time is 30 seconds.

12. Hand Generator Robot Fish Short Distance Swimming (Horizontal style) Competition

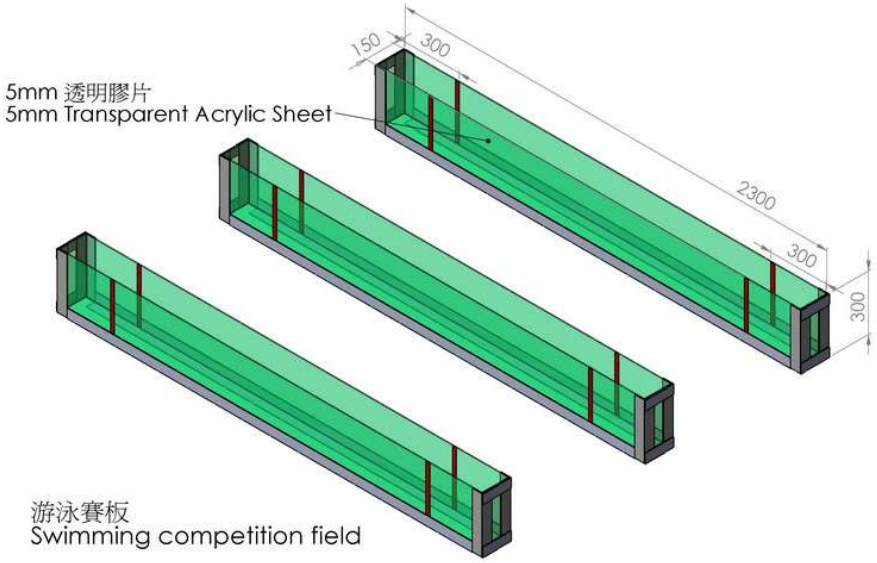
There are a wide variety of marine organisms with numerous kinds of fishes in the ocean. Their swimming style may be different from one another. Students are required to make a single motor robot fish which can simulate the fish swimming action (Horizontal style) by applying mechanical principles.

Robot Fish Specification

1. The robot fish operates only with one motor and the power should only be supplied by the Hand Generator provided by the Organizer. The robot must be equipped with a 2.1mm socket for connection to the Hand Generator.
2. The robot fish cannot be longer than 300mm, wider than 150mm, taller than 180mm.
3. The robot fish must complete the game in fish swimming action (horizontal style). No propeller can be used.

Game Field Specification

1. A swimming competition board is used (see diagram)
2. Dimension of the transparent swimming track: 2300mm (Length) x 150mm (Width) x 300mm (Height) filled with water to 150mm deep
3. The starting area is 300mm long. A timer is placed at end of the runway.



Game Rules

1. Each team can play twice and the best time will be recorded. The shortest time to complete is the winner.
2. The power of robot fish should only be supplied by the Hand Generator provided by the Organizer. Pulling the wire of hand generator is prohibited.
3. The wire of Hand generator is long enough so that the contestants must stay behind at the starting area. Moving along the field with the robot is prohibited.
4. Once the game begins, the contestants cannot touch the robot fish until it reaches the end plastic sheet of the runway. The maximum game time is 30 seconds.

13. Wired Control Robot Fish Obstacle Avoidance Competition

There are a wide variety of marine organisms with numerous kinds of fishes in the ocean. Their swimming style may be different from one another. Students are required to make a robot fish which can simulate the fish swimming action by applying mechanical principles. The robot fish is required to navigate through obstacles. This game tests the ultimate performance of the robots as well as the navigation ability of the players.

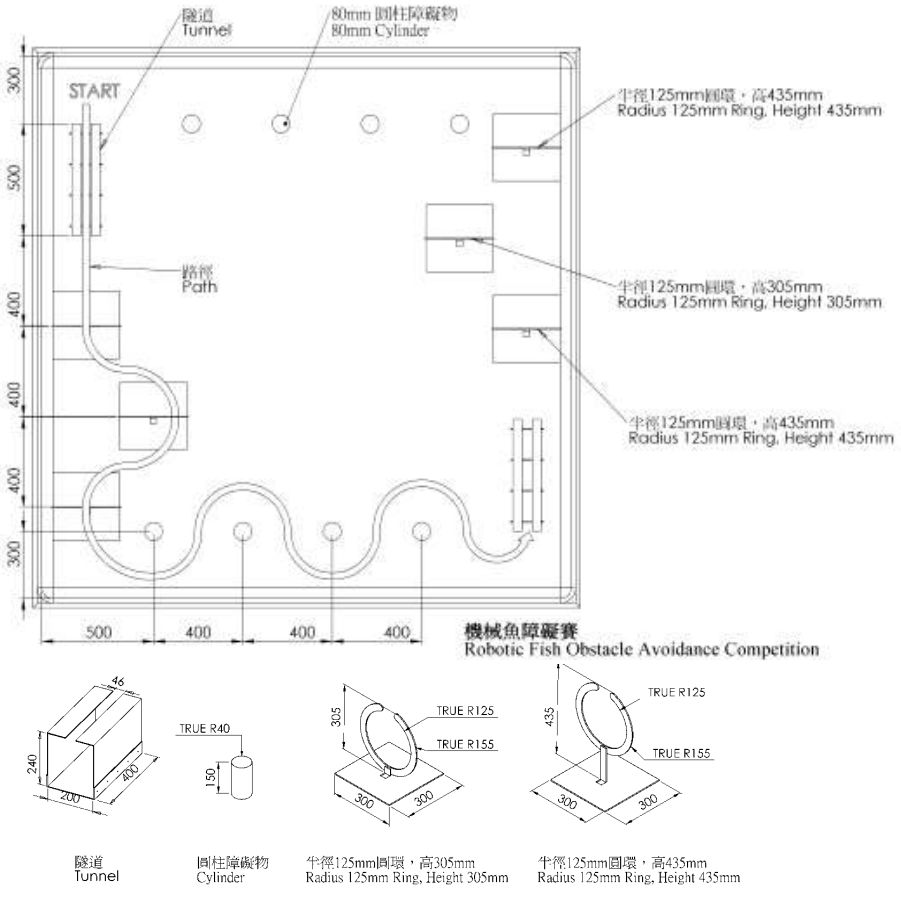
Robot Fish Specification

1. The robot fish when fully stretched cannot be larger than 300mm (Length) x 200mm (Width) x 240mm (Height).
2. No restriction on the quantity of actuators (motor, gear box, servo mechanism, propeller) on the robot. All participating robots must use Tamiya70093 gear box (203.7:1, 58.2:1, 16.6:1) and its matching motor for competition. The gear ratio may only be adjusted in accordance to the manufacturer's instructions. Contestants should not modify the motor or the gear box in any way.
3. The robot fish must complete the game in fish swimming action. The propeller can only be used for floating and sinking function. Only FA-130 motors can be used to drive the propeller.

4. The robot fish must only be controlled by wired manual controller. Batteries are provided by the Organizer (batteries are prepared by contestants for the Hong Kong region competition).

Game Field Specification

1. The playing field is a water tank of 2400mm (Length) x 2400mm (Width) x 600mm (Height), filled with water to 450mm deep (as shown in the figures below).



機械魚障礙賽
Robotic Fish Obstacle Avoidance Competition

Game Rules

1. The power of robot fish controlled by wired manual controller must be supplied by the batteries provided by the Organizer (batteries are prepared by contestants for the Hong Kong region competition). Pulling the wire of controller is prohibited.
2. The robot fish is placed at the starting area inside the tunnel. The robot fish can be started after the Referee gave the signal and timer begins.
3. The robot fish must finish the game by following the designated path. It should first swim through the tunnel, bypass the 3 rings of different height. It then turns and, bypassing 3 cylinders. Once the whole body of robot fish swims completely into the second tunnel, the timer is stopped and the time will be recorded.
4. The maximum game time is 3 minutes. If the robot fish cannot complete the game, a 3 minutes game time is recorded as well its completed distance.
5. Each team can play twice and the best time will be recorded. The shortest time to complete is the winner.

14. Wireless Control Servo Motor Robot Fish Obstacle Avoidance Competition

There are a wide variety of marine organisms with numerous kinds of fishes in the ocean. Their swimming style may be different from one another. Students are required to make a robot fish which can simulate the fish swimming action by applying mechanical principles. The robot fish is required to navigate through obstacles. This game tests the ultimate performance of the robots as well as the navigation ability of the players.

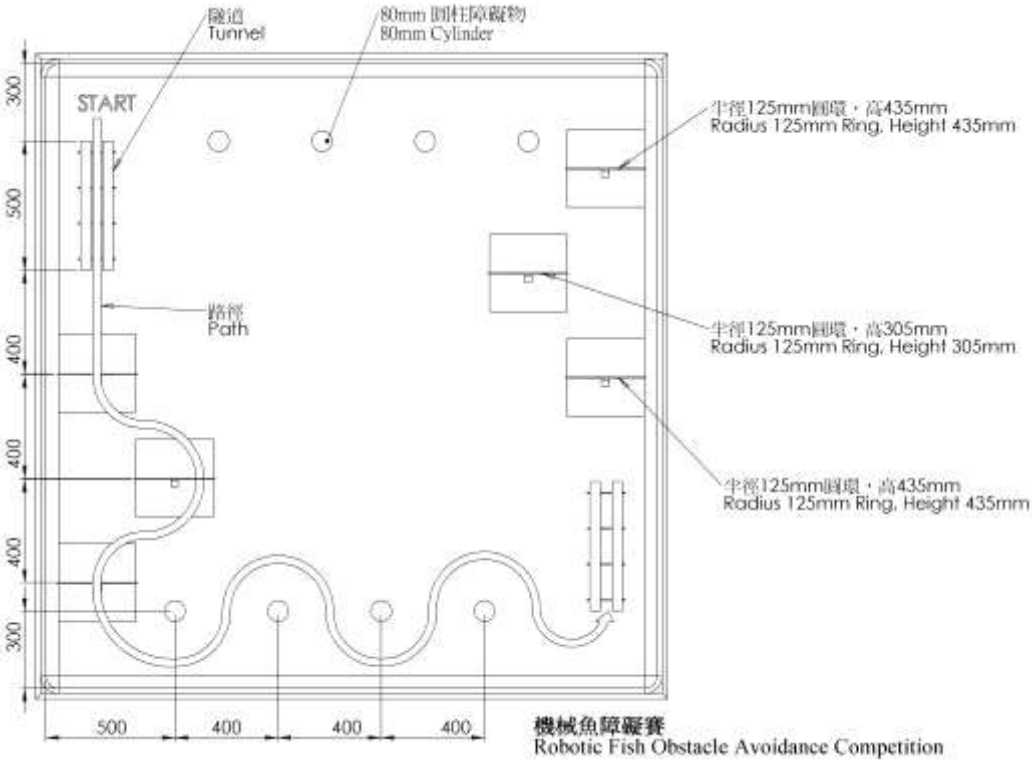
Robot Fish Specification

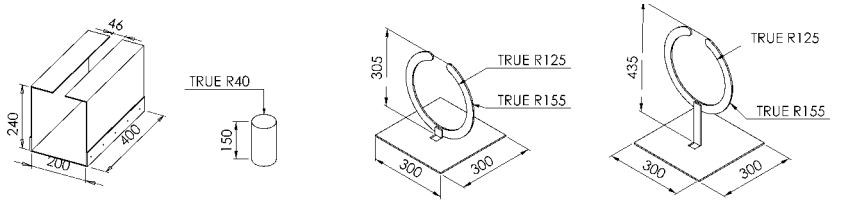
1. The robot fish when fully stretched cannot be larger than 400mm (Length) x 200mm (Width) x 240mm (Height).
2. The robot fish operates only with servo motors. No restriction on the quantity of servo motor.
3. The robot fish must complete the game in fish swimming action. The propeller can only be used for floating and sinking function. Only FA-130 motors can be used to drive the propeller.

4. The robot fish must only be controlled by wireless controller. Contestants are to prepare their own batteries.

Game Field Specification

1. The playing field is a water tank of 2400mm (Length) x 2400mm (Width) x 600mm (Height), filled with water to 450mm deep (as shown in the figures below).





隧道 Tunnel　　圓柱障礙物 Cylinder　　半徑125mm圓環，高305mm Radius 125mm Ring, Height 305mm　　半徑125mm圓環，高435mm Radius 125mm Ring, Height 435mm

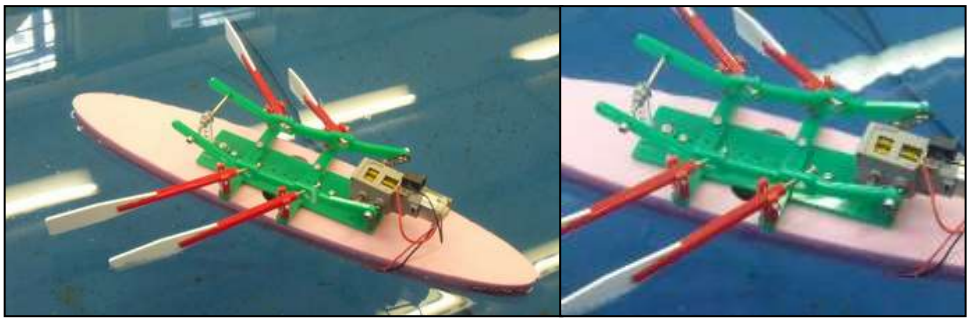
機械魚障礙賽
Robotic Fish Obstacle Avoidance Competition

Game Rules

1. The robot fish is placed at the starting area inside the tunnel. The robot fish can be started after the Referee gave the signal and timer begins.
2. The robot fish must finish the game by following the designated path. It should first swim through the tunnel, bypass the 3 rings of different height. It then turns and, bypassing 3 cylinders. Once the whole body of robot fish swims completely into the second tunnel, the timer is stopped and the time will be recorded.
3. The maximum game time is 3 minutes. If the robot fish cannot complete the game, a 3 minutes game time is recorded as well its completed distance.
4. Each team can play twice and the best time will be recorded. The shortest time to complete is the winner.

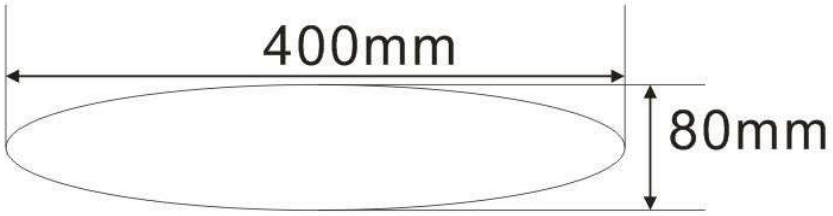
15. Hand Generator Four-Oar Robot Boat Competition

Rowing competition is one of the Olympic sports as well as an annual event held by Cambridge University and Oxford University. Participants are required to design and make a four-oar rowing robot boat.

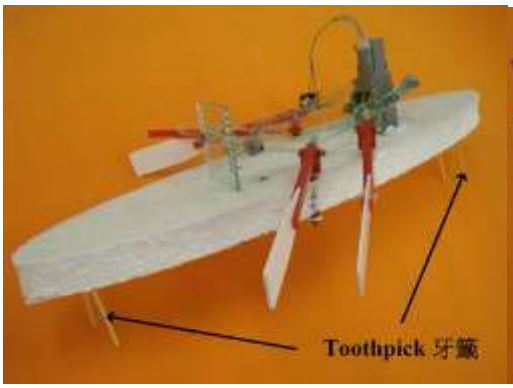


Robot Boat Specification

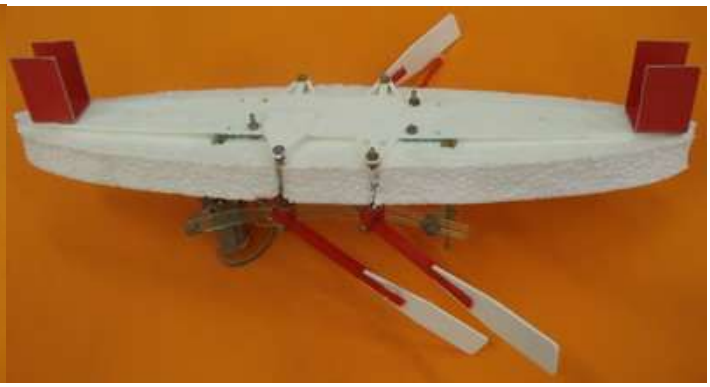
1. The robot boat operates only with one motor and the power should only be supplied by the Hand Generator provided by the Organizer. The robot boat must be equipped with a 2.1 mm socket for connection to the Hand Generator.
2. The robot boat (including the robot, 4 oars and the boat) cannot be larger than 400 mm, wider than 400 mm, taller than 240mm. The standard size of the boat is 400 mm long, 80 mm wide.



3. The robot boat advances with all 4 four oars moving simultaneously. No propeller can be used.
4. A device should be installed at the bottom of the boat for the guiding pipe to pass through.



guiding pipe device 1



guiding pipe device 2

Game Field Specification

1. The playing field is a water tank of 6000mm (Length) x 3000mm (Width) x 200mm (Height), filled with water to 150mm deep.
2. A 20mm guiding pipe is installed across the water tank to form a fixed rowing track.

Game Rules

1. Each team can play twice and the best time will be recorded. The shortest time to complete is the winner.
2. The power of robot boat should only be supplied by the Hand Generator provided by the Organizer. Pulling the wire of hand generator is prohibited.
3. The wire of Hand generator is long enough so that the contestants must stay behind at the starting area.. Moving along the field with the robot boat is prohibited.
4. The poop of the robot boat is to be placed against the side of the starting area before the game starts. The game is considered completed once the bow of the robot boat touches the rim of the finishing area and the time is recorded.
5. Once the game begins, the contestants cannot touch the robot boat. The maximum game time is 60 seconds.

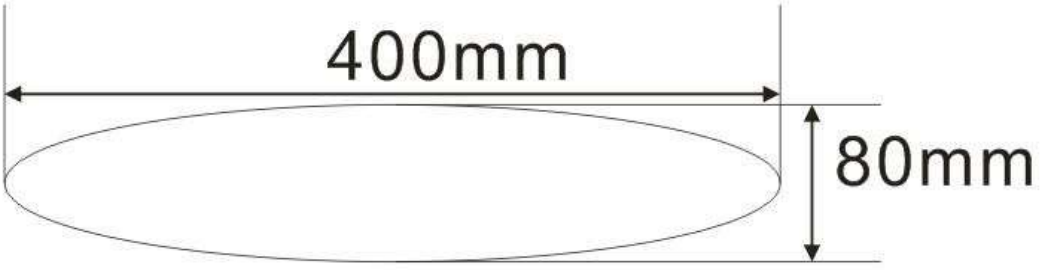
16. Hand Generator Robot Canoe Competition

In the ancient time, men already knew to hollow a tree trunk to make a canoe to commune on the water. Participants are required to design and make a Single-Oar robot canoe.

Robot Canoe Specification

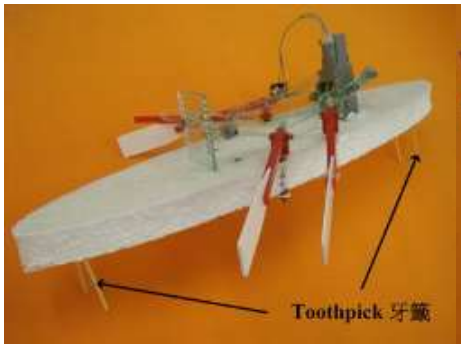
1. The robot canoe operates only with one motor and the power should only be supplied by the Hand Generator provided by the Organizer. The robot canoe must be equipped with a 2.1 mm socket for connection to the Hand Generator.

2. The robot canoe (including the robot, the oar and the canoe) cannot be larger than 400 mm, wider than 400 mm, taller than 240mm. The standard size of the canoe is 400 mm long, 80 mm wide

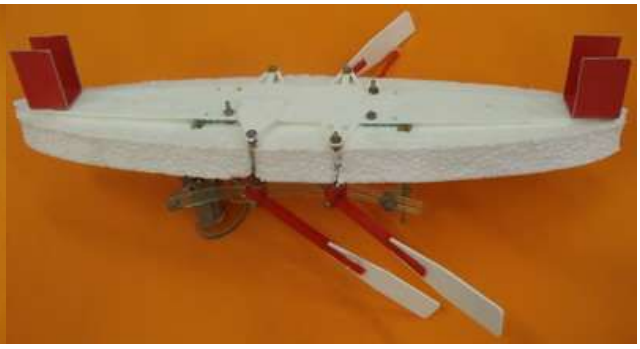


3. Robot canoe advances in a canoe moving pattern. No propeller can be used. No device can be used to hold the oar except hands.

4 Device should be installed at the bottom of the boat for the guiding pipe to pass through.



guiding pipe device 1



guiding pipe device 2

Game Field Specification

1. The playing field is a water tank of 6000mm (Length) x 3000mm (Width) x 200mm (Height), filled with water to 150mm deep.
2. A 20mm guiding pipe is installed across the water tank to form a fixed rowing track.

Game Rules

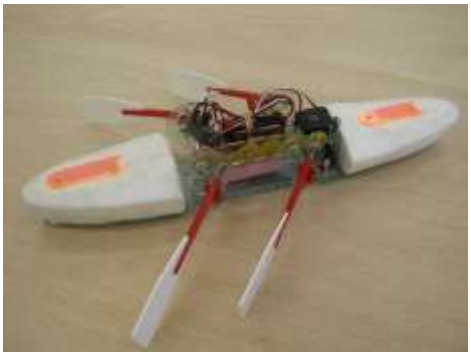
1. Each team can play twice and the best time will be recorded. The shortest time to complete is the winner.
2. The power of robot canoe should only be supplied by the Hand Generator provided by the Organizer. Pulling the wire of hand generator is prohibited.
3. The wire of Hand generator is long enough so that the contestants must stay behind at the starting area.. Moving along the field with the robot canoe is prohibited.
4. The poop of the robot canoe is to be placed against the side of the starting area before the game starts. The game is considered completed once the bow of the robot canoe touches the rim of the finishing area and the time is recorded.
5. Once the game begins, the contestants cannot touch the robot canoe. The maximum game time is 60 seconds.

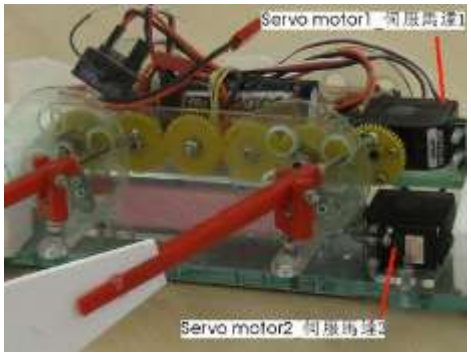
17. Wireless Control Servo Motor Four-Oar Robot Boat Obstacle Avoidance Competition

This match is to test the control ability of the players. Several obstacles are placed in the playing field and the contestants are required to make a four-oar robot boat bypassing all the obstacles using wireless control.

Robot Boat Specification

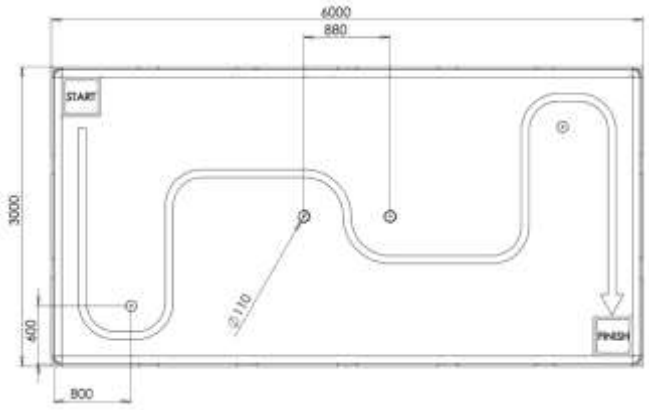
1. The robot boat operates only with two motors. One motor is to drive the four oars moving simultaneously and the other one is to drive the upper part of the robot boat to move sideways to make turns. No propeller or rudder can be used.
2. The robot boat is controlled by wireless controller. Contestants are to prepare their own batteries.
3. The robot boat (including the robot, four oars and the boat) cannot be larger than 400 mm, wider than 400 mm, taller than 240mm. The standard size of the robot canoe is 400 mm long, 80 mm wide. There is no weight limit.

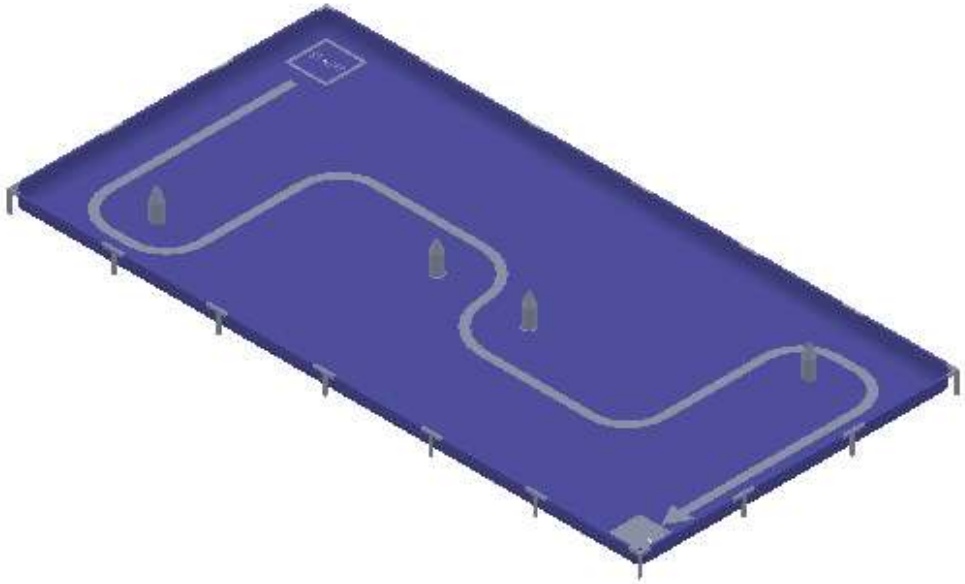




Game Field Specification

1. The playing field is a water tank of 6000mm (Length) x 3000mm (Width) x 200mm (Height), filled with water to 150mm deep.
2. The obstacle is a 1.25L soft drink plastic bottle of 110 mm in diameter.





Game Rules

1. The robot boat is placed at the "START" position. The judge orders start of the game and the timer begins to count the time.
2. The robot boat has to follow the designated route. Players can pick up and place back the overturned or sunken robot boat at the original position and continue to play but the timer will not pause.
3. Each player will be awarded with 100 scores before the game starts. Players cannot touch the robot boat once the game begins. 20 scores will be deducted for each touching. The robot boat has to stop the game once all 100 scores are deducted.
4. The game is considered completed once a robot boat touches the rim of the finishing area and the finishing time is recorded.
5. The maximum game time is 5 minutes. If the robot boat cannot complete the game, a 5 minutes game time is recorded as well its completed distance.
6. Each team can play twice and the best time will be recorded. The shortest time to complete is the winner.