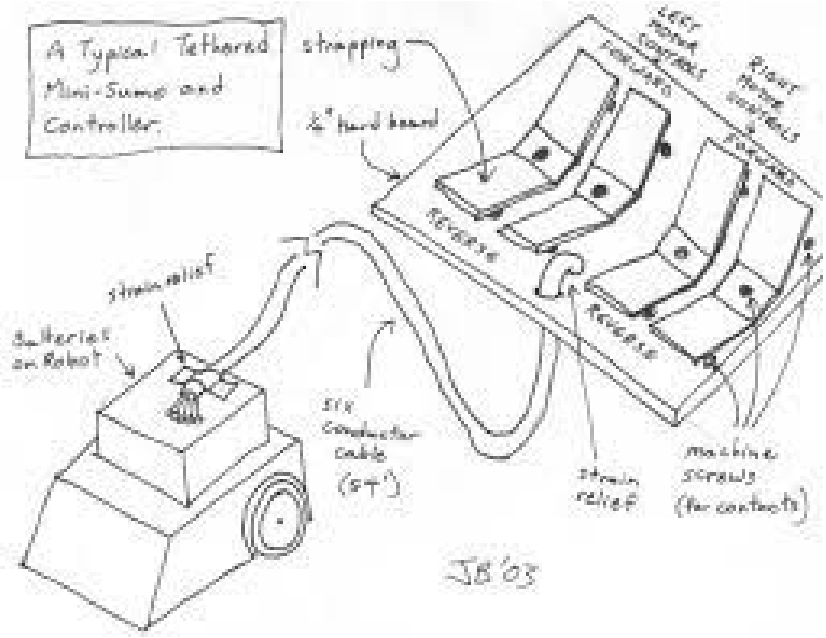
2024 Sumo Robot (Junior Skills) Competition



Provincial Competition

April 17, 2024

At the Tradex in Abbotsford, B.C.

Technical Chair:

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UPDATED IN SCOPE FOR 2024: *Students are allowed to design their robot in 3D software and then use 3D printers, CNC and Laser cutters to build the project.*

B.C. Skills Canada 2024 Tethered Mini-Sumo Robot Challenge Scope

Level: Junior Grades 6 to 9 (some grade 10s may enter as teachers make this as a project in their grade 9/10 classes across BC)

Duration: (4 Hours)

Purpose of the Challenge: To create a wheeled device that can remove an opponent out of a given area (sumo ring).

Tested Skills and Knowledge: Drafting and Design, mechanics, electronics, metalwork, woodwork & Communications.

Supplied by the Competitors: Robots, robot accessories, extension cord, power bar, various tools required to modify and repair robots on site and safety equipment including mandatory eye protection.

Supplied by the Committee: A weigh scale, playing field (sumo ring), and a Power Supply for the Sumo robot to connect to during competition. Also, a power outlet and worktable will be available for repairs during the competitions.

Judging Criteria: The winner of the double knockout tournament.

Team Size: This is an individual event.

Number of Individuals entered: The top 3 from a regional event. If the event is not offered in a region, then we will go to a first come, first serve basis to a limit of the first 32 registered. The maximum number of competitors at the Provincials from a school is 2 with an additional 3 on a waiting list. Individuals will be placed in pools and the winners will advance. Skills Canada has the right to limit spots to individual schools.

Mission Statement

The intent of the Tethered Mini-Sumo Robot Challenge is to introduce junior students to the varied field of Technology through the design, building and competing in an event that is fun and exciting. While at the Provincial Skills Canada event students will get a chance to view other more specific trades that they may wish to participate in when they get into the senior grades.

In the spirit of the competition and the intent of the challenge, the individual must compete with a completely student designed/built robot. A student ***cannot purchase, re-use or adapt*** *any commercially made robot/system* ***except for the gearbox****.*

The judges will check for adherence to the above-mentioned statement, before a robot is allowed to compete in the challenge.

Origin of the Mini-sumo Challenge

The Mini-Sumo Robot is an internationally standardized class of robotic competition, which has traditionally seen most competitions use a computer-programmed chip to control the robot. The original rules (http://www.robotroom.com/SumoRules.html) of the International challenge have been used as a guide in helping to develop this package, but have not been adhered to explicitly. The biggest change from the original rules is the size restriction of 13cm cubed at the start of the challenge.

The Challenge

The objective of the challenge is simple; get your opponent out of the ring using traditional Sumo rules. To compete in the challenge you will require a self-built Mini-Sumo Robot that is no more than 13cm cubed WHEN PLACED ON THE PLAYING SURFACE at the beginning of the match. The robot will be manually controlled by the student through an attached tethered wire.

Robot Limitations and Rules

1. Before starting a match, the robot must fit within a box measuring 13 cubic centimeters. An additional tether antenna with a maximum height off the playing surface of 20cm is recommended and allowed to reduce tangles during competition.
2. The robot cannot exceed a maximum of 500g.
3. A robot can be 3D printed, CNC machined or laser cut, as long as the student designed it.
4. The operating voltage is restricted to 4.5 volts or 3 – AA batteries
5. The robot must stay as one unit.
6. **A Tamiya Twin-Motor Gearbox Kit (part # 799-70097 or 799-70168) MUST** be used to drive the robot. **The Tamiya Twin-Motor Gearbox Kit** (part # 799-70097 or 799-70168) can be purchased from Borgfeldt Canada (tel: 905-946-9677, www.borgfeldt.ca) at under $10 each including tax and shipping – they take VISA or Purchase Orders.
7. Additional gearboxes/motors may be used to move other parts.
8. No store bought wheels or treads.
9. You cannot use parts or devices that are intended to damage another robot (No drills, saws, flames, hammers, object throwers, etc.).
10. You cannot use liquid, powder or compressed air to be used against another robot.
11. You cannot use parts that could damage the playing surface.
12. You cannot use sticky tapes, glue or suction devices to hold your robot to the playing surface. A paper pick-up test may be used at the judge's discretion or at other competitor's request. A robot will be disqualified if the paper is picked up off the playing surface by a wheel.
13. Your robot should have a clearly labeled name on it so the judges and spectators can identify it.

Controller Limitations and Rules

1. The case of the controller MUST be student made, NO commercially fabricated cases are allowed (plastic boxes, game boy controller, etc)
2. 3d Printed, CNC/laser cut controllers are allowed as long as they are **student designed**.
3. You cannot use any form of bought or salvaged switches or potentiometers. (See "Controller Construction Ideas" for suggestions and diagrams on making switches).
4. A power supply will be used for consistent power therefore batteries are not required. Both robots in a match will be connected to the same power source for fairness.

The Playing Surface

The playing surface will be an elevated 77cm diameter circle constructed out of ¾" MDF. It will be painted flat black with a 1" white ring around the outside. There will be a ¾" white tubing structure above the playing field for the tethers to be attached to, to help prevent tangles during competition.

Game Play

1. Robots will be placed randomly into round robin game play of 8-12 teams. Depending on the number of contestants there will be anywhere from 2 – 4 pools (Pool A, B, C, D) of round robin play. The top 4 – 8 robots from each pool will advance to the playoff round.
2. The top 16 robots will compete in a true double knockout tournament style competition where you are OUT only after you have lost 2 matches.
3. Each match will consist of 3 games. The winner of the match is the one who wins two games.
4. The first robot that has been removed from the playing surface (robot touches the table) is considered the loser of the game. In the event that both robots fall off the playing surface, the first to touch the table is the loser.
5. If the robots wiring become tangled, the judge has the decision to continue play or untangle and restart the match from the beginning.
6. If two robots are facing each other and NO movement is made for 5 seconds, then both robots must stop power and the judge will restart the game and continue for the time remaining (this helps prevent the burning out of motors).
7. If a robot loses power and cannot move during the match, it forfeits the game. A 2 minute timeout will be granted between games to correct any repairs! After the 2 minutes, the robot will forfeit the match if the repair is unsuccessful.
8. IT IS THE COMPETETORS RESPONSIBILITY TO ENSURE PROPER POWER CONNECTIONS FOR THE ENTIRE MATCH. A match may not be stopped or

paused for a competitor to reconnect power. Standard Alligator Clips will be used to attach the power supply to the students controller.

Robot Construction Ideas

- The use of recycled materials is encouraged (VCR casing, plastic cutoffs, photocopier parts, scrap aluminum, etc).
- With the advancement of technology (3D printers and Laser Cutters) a student can design the robot in 3D software and then 3d print, CNC Machine or laser cut pieces to assemble a robot.
- As the intent of the competition is to remove the other robot out of the ring, your robot should be constructed to withstand repeated contact of other robots. A case to cover the internal workings is recommended.
- As this competition is very much a spectator's sport, you should design your robot with some entertaining qualities (paint, body design, attitude, flare).

Controller Construction Ideas

- The tether cable needs to be between 4ft - 6ft long. A mouse cable works well.
- The following 2 diagrams are helpful for making a typical controller and switches, however, there are other ways to do this.

Underside of a typical Controller