

# **BotBrawl Robot Fighting League Sumo Competition**

## **Event Rule Set**

Revision #8

### **Sumo Rules;**

Prior to competition robots must pass a safety inspection.

1: The competition will simulate, using robotic machines, a sumo wrestling tournament, with machines competing in separate matches on a 'one on one' basis.

2: A match will consist of three rounds. The winner of two out of three rounds will be awarded the match. The tournament will follow round robin, double elimination or triple elimination format for all classes. The EO will select an appropriate tournament style prior to the tournament. Each robot will fight every other robot in its class with points awarded for each win. 1st, 2nd and 3rd will be awarded to robots based on points accumulated. 1st place is based on the robot with the most points. Ties (based on points) will be decided by a tie breaking round. Each round is 2 minutes long making one match roughly 6 minutes long.

3: Each round will take place on a playing field consisting of a circular platform, 10 feet in diameter, raised approximately 1-3" above the 'crash area' for robots to fall safely. There will be a steel pole mounted vertically in the center, less than 2" in diameter.

4: The object for a competing machine during the course of a

round will be to remain within the boundary of the playing field longer than one's opponent. A robot will lose a round if any substantial part of it touches the ground outside of the playing field (decorations not included) or the containment ring. Once a starting command is given, no one other than the referee may touch a competing machine until a win or time-out is declared.

5: If both machines leave the playing field, it will be up to the judge(s) to decide which robot left first, or if a reset and restart is necessary. If neither robot has crossed the boundary line or been 'knocked out' of the ring at the end of round, the judge(s) will choose a winner by assigning points to each robot (aggressiveness 1p, strategy 1p, driving 1p). The robot with  $\frac{2}{3}$  points wins.

6: If at any time during a match there is a period of inactivity for one or both robots that exceeds 20 seconds; the referee will initiate a 10 second countdown, ending as soon as the robot(s) regains mobility. If only one robot is still mobile at the end of the countdown, the mobile robot will be deemed the winner of the round. If both robots are disabled at the end of the countdown, the judges will decide whether to call the round a draw and redo, or declare a winner for that round.

7: Robots may grip the steel pole but must be able to release it under its own power. Robots cannot start a match attached to the pole. A robot may only clamp/attach to the pole for 15 seconds at a time but may do so repeatedly. Physical contact with the pole is not required for this rule. Entrapment of the pole can invoke the 15 second rule. IE placing a ring

around the pole which technically is not touching it but serves to attach a robot to it.

8: Robots may not intentionally cause damage to the steel pole, mechanisms cannot pose a danger to the audience

9: Robots may, in some fashion, secure themselves to the floor. They must be free at the beginning of the match. Under their own power they may secure themselves to the floor but must also be able to disengage under their own power. This may only occur for 15 seconds max but may be repeated.

10: Each round will start at an audible or verbal command from the referee, with both machines facing each other, in the center of the platform approximately 6 inches from the pole (as shown in Fig.2).

**Arena:**

Fig.1: Sued Platform

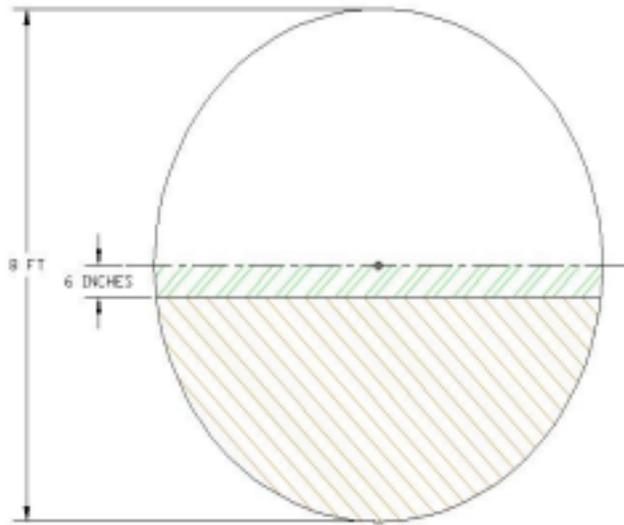
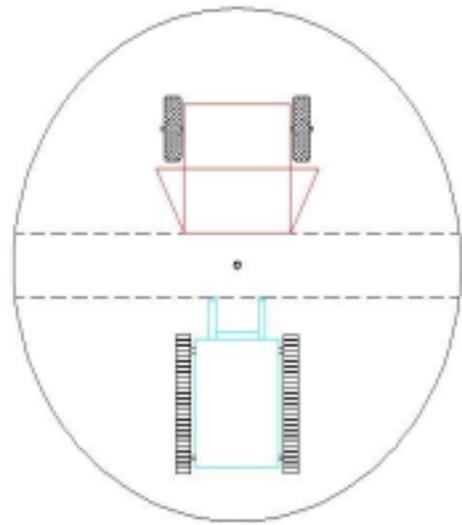


Fig.2: Referee Lines Up Competitors For Start of Round



**\*\*Arena is now 10ft in diameter\*\***  
**(05/09/16 RB)**

[\[enlarge\]](#)

Fig.3 Referee Starts Round and Competitors Engage Each Other

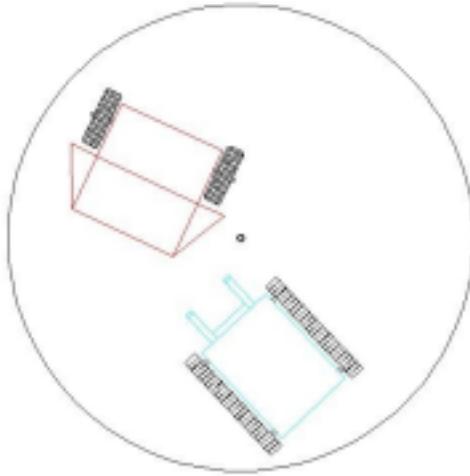
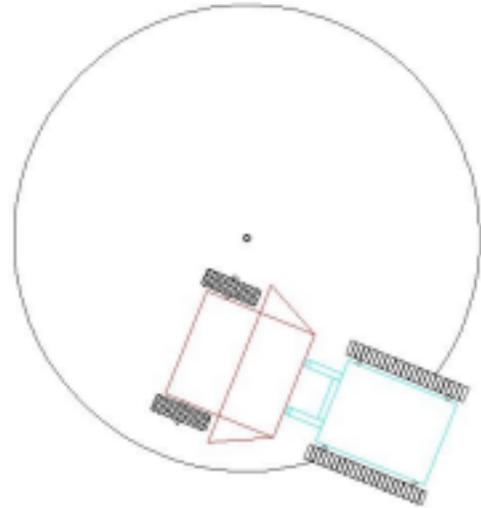


Fig.4 One Competitor is Pushed Out and the Round Ends



[\[enlarge\]](#)

The arena floor is constructed from painted plywood and features a steel pole in the middle. The steel pole has a diameter of less than 2 inches.

### **Safety/Inspection:**

All entries will be required to pass a safety inspection before competing. All operating principles must be clearly explained and demonstrated during this inspection.

1: All robots must be on some type of 'stand' to keep the drive wheels or drive mechanisms off the ground while in the pit area.

The judges reserve the right to disqualify, at any time, a robot which poses a threat to anything other than the arena surface or its opponent(s). If you have a questionable

design, please consult with the organizer before constructing your robot.

2: All robots must be capable of a linear speed of 5 feet per minute. This requirement must only be met during initial inspection. This rule is not a means to disqualify any competing bot or to determine the winner of a bout.

3: Robots must display controlled motion in order to compete.

You will be asked to drive forward then turn left or right on command.

4: Weapons must have a safety cover on any sharp edges.

5: Weapons that could harm a person outside the arena must have some kind of mechanical locking device in case of accidental activation. This system for instance prevents a flipper from actuating while the robot is being handled.

6: Robots running pneumatics or hydraulics must stay within the specified ratings of the system parts. Documentation and proof of operation will be required. A gauge to display operating pressure is required. The maximum operating pressure is constrained to the minimum rated component in the tree. IE the high pressure side has a 200 PSI regulator but 150 PSI fitting, the system must run at 150 PSI. Systems must have automatic pressure relief valves to protect against overpressure (IE burst disc, pop valve).

7: Any liquids contained within the robot (oil, fuel etc) must be contained in such a fashion that containment vessels cannot be easily punctured or leak when inverted.

8: All robots will be weighed during the safety inspection and cannot exceed the specified weight limit for that class. If the referee or judge requests it, a robot can be weighed again before being allowed to fight at any point during the event.

**Banned weapons include:**

- Liquid projectiles
- Any kind of flammable liquid.
- Flame-based weapons.
- Any kind of explosive or intentionally ignited solid.
- Nets, tape, glue, or any other entanglement device.
- Radio jamming, tasers, tesla coils, or any other high-voltage device.
- Un-tethered projectiles.
- High speed or kinetic energy weapons (high powered flippers, large spinning masses)
- Oil Slick weapons
- Excessive audio equipment (Air horns, mega phones etc)  
Anything which might drown out the announcer

**Multi-bots:** Multi-bots are legal. They do not need to 'snap' together in any way, but they do need to conform to all rules and regulations. If all members of the multi-bot team are walkers, they follow the walker weight limit. Multi's that are a mixture of walking/rolling robots follow rolling weight guidelines.

**Example:** *A 150 lb multibot consisting of a Roller/Walker is allowed 150lbs total. A 150 lb multibot consisting of a walker/shuffler is allowed 225 lb. A 150 lb multi-bot consisting of two walkers receives a 300lb allowance.*

**Multibot knockout:** The entire multibot will be considered KO'd if 50% or more of the bot by weight is KO'd. Each section of a multi-bot will be weighed separately and the judges and opponent will be informed of the weights.

**Power sources:**

All robots must run on DC systems.

Batteries must be sealed, immobilized-electrolyte types (such as gel cells, lithium, NiCads, NiMH, or dry cells).

Lithium battery powered robots must inform safety inspectors of battery type during inspection. Internal combustion engines are allowed depending on the venue. Please contact the event organizer if you wish to compete with an ICE robot.

**(Update 07/18/2022 - Sumo robots competing in a weight class less than or equal to 30lb have open battery choices. Any robots competing in a larger weight class may not use a LiPo battery. TB)**

Power sources shall not exceed nominal 48 Volts DC.

**All bots** must have a manually operated master kill switch or removable link. This switch or link will shut off the main weapon and drive power. Simply turning off the receiver is not sufficient. A remotely operated relay or contactor to break main power does NOT fulfill the killswitch requirement. The switch or link must be quickly and easily accessible. Having to remove armor panels etc. to access the switch is not acceptable.

A single switch or removable link is preferred, but two switches/links will be allowed if they are easily accessible.

### **Control system:**

1: Competing machines may be either self-controlled or remotely controlled.

2: Control cables between machine and human operator(s) are permitted, providing they are not used to deliberately entangle the opponent. Cables must be long enough to keep a safe distance back from the playing surface (12ft recommended).

3: Remote control systems must be FM, PCM or Spread Spectrum. Any frequency crystals must be verified during safety inspection to avoid duplicate robots on the same channel.

4: Devices which cut the opponent's control cable WILL be permitted. Therefore; control cables carrying greater than 0.5amps should be fuse protected.

5: Remote control systems must have a failsafe option. If signal is lost (or transmitter turned off) the robot must stop DEAD and remain inactive. All weapons must failsafe to a de-energized state (spinners stop, springs untensioned etc)

### **Weapon systems:**

Active weapons or devices used for flipping, lifting, or overturning opponents will be permitted, but will be approved at the event coordinator's discretion. There are no protective walls between the robots and competitors or audience, and safety must always be top of mind.

Robots must not be larger than half of the playing field, and must start each round on their own side.

Each machine must be self powered, with its batteries or power source on board.

### **Classes:**

The maximum weight of a 'Clever' class sumo bot will be determined by its method of propulsion or drive.

-Wheeled robots will be a maximum of 150lbs (hobby class 30lb).

-Shufflers will be allowed 225lbs (hobby class 45lb).

-Walkers will be allowed 300lbs (hobby class 60lb). The definitions are as follows:

**Wheeled:** A robot is considered to be wheeled if those parts of the robot which touch the ground and either cause it to move or support some or all of its weight undergo unrestrained rotation around a horizontal axis during the normal operation of the robot's drivetrain. This includes all forms of wheels (including non circular, spoked, or offset-axis wheels) as well as continuous track or belt drive systems.

**Examples:** *Every wheeled or tracked robot out there. Also Mongus and Little Slice*

Robots that rely on a thrust method other than mechanical friction with the floor (such as thrust-generating fans, electromagnetic interaction with the surroundings, or reaction forces from gas jets or hurled projectiles), will not be considered walkers or shufflers. This is true even if the robot rests on an air cushion or skids rather than wheels.

Robots that float or fly are not allowed. Hovercraft robots are allowed, but are subject to wheeled weight limits. A jumping bot that has no wheel driven locomotion and otherwise conforms to the walker definitions may receive the walker weight bonus. Keep in mind, the controlled movement and minimum speed requirements must be met.

**Shuffler:** If a robot is supported and/or propelled by parts that do not normally undergo continuous unrestrained rotation around a horizontal axis, but using a system of mechanical devices such as cams or crankshafts to generate reciprocating motion of those parts from one or more continuously rotating drive shafts, it will be considered a shuffler. The defining feature of a shuffler (versus a walker) will be the ability to generate continual forward motion of the robot from continual rotation of its drive motors. Shufflers typically have electrical control systems indistinguishable from those on wheeled robots.

Shufflers may weigh up to 50% more than their standard class weight limit.

**Examples:** *Phelan, Nemesis, Pressure Drop, Son of Whyachi, Reflex, Belladonna, Kung Fu Cow, Pitter Patter*

Example of a shuffler mechanism:

<https://youtu.be/GuMb-HgBbx0>

**Walkers:** Walkers are those robots in which multiple linear or limited-travel rotary actuators are intermittently driven to

produce linear travel of the robot. Actuation may be through electric, pneumatic, or hydraulic means. Walkers must have no parts normally in contact with the ground undergoing continuous rotation, and must require some change in timing or sequencing of the driving mechanisms in order to reverse direction. Walkers will typically have control systems significantly more complex than those found on shufflers or rollers, involving multiple actuators, servos, or valves running through a specific sequence to produce motion. Walkers may weigh up to 100% more than their standard class weight limit.

**Examples:** *Mechadon, Snake, Lock Nut Monster, Ixion, Lurch*

If you are unsure which category your design falls or need clarification of the rules please email [gcbotbrawl@gmail.com](mailto:gcbotbrawl@gmail.com)

### **General Rules;**

1. The competition is open to everyone. Minors must be accompanied by an adult.
2. BotBrawl organizers or volunteer staff cannot be held liable for damage incurred by competing machines, or by any systems involved with such machines, during the course of the tournament.
3. The judges may bar from the contest any machines which they feel pose a real threat of injury to spectators, or damage to the contest site. Moreover, the referee or any judge may stop a trial at any time if it appears to them that a danger to spectators, site or competitors is impending.

4. Each participant will be required to present their robot at the start of the tournament. At that time, the judges will inspect the competing machine for infringements of any of the rules. Location of main shut off, and any active parts aside from the drive mechanism will be overseen at this point, as well as a brief inspection of battery type and control method for the robot.
5. Judges will be selected by the tournament organizers.
6. The referee will be announced at the drivers meeting day of the competition.
7. Prizes will be awarded based upon performance and audience popularity. All decisions of the judges will be final and absolute.
8. Competitors are required to wear closed toe footwear; steel toe boots are recommended for all competitors and helpers.
9. The Competing class for this event will be the 'Clever' (150lb) class and 'Hobby' class (30lb). The full address, as well as all important times and schedules will be posted closer to the event.
10. Registration fees will go towards prizes and arena upkeep!
11. Competitors under the age of majority (18 years) must be accompanied by an adult to compete.
12. Registering for this event signifies you have read and understand the rules outlined here.

13. Registering for this event signifies you release your image, likeness and robot likeness for media exposure and use by Bot Brawl and its partners.
14. Teams who have not checked in and completed safety before the scheduled drivers meeting will be disqualified. Example: If the drivers meeting is