

BotBrawl Robot Fighting League Sumo Competition

Event Rule Set

Revision# 7

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

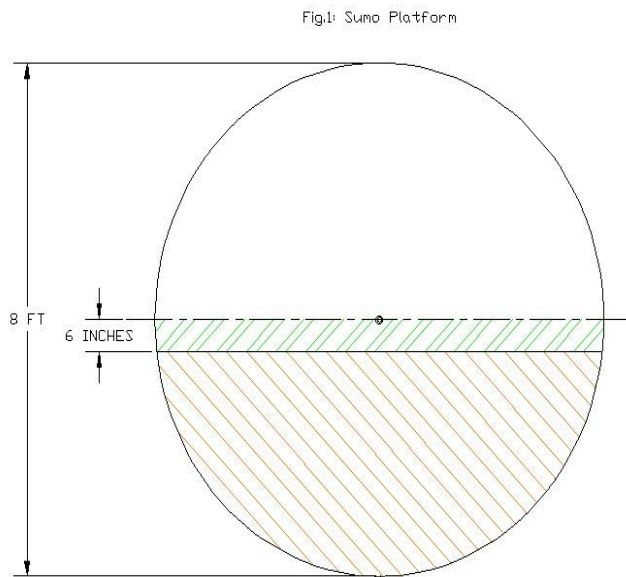
around the pole which technically is not touching it but serves to attached a robot to it.

8: Robots may not cut 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.

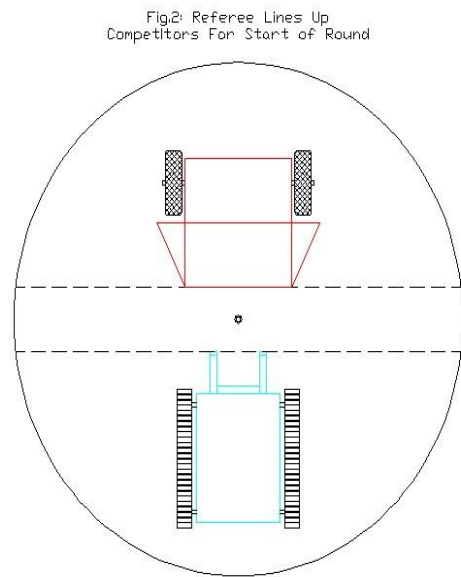
10: Each round will start at an audible or verbal command from the referee, with both machines facing each other, in the center of the platform approximately 6 inches from the pole (as shown in Fig.2).

Arena:



AREA TO BE CLEAR OF
ALL ROBOTS AT THE START
OF EACH ROUND

MAXIMUM AREA TO BE
OCCUPIED BY A COMPETITOR
AT THE START OF THE MATCH



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

[\[enlarge\]](#)

Fig.3: Referee Starts Round
and Competitors Engage Each Other

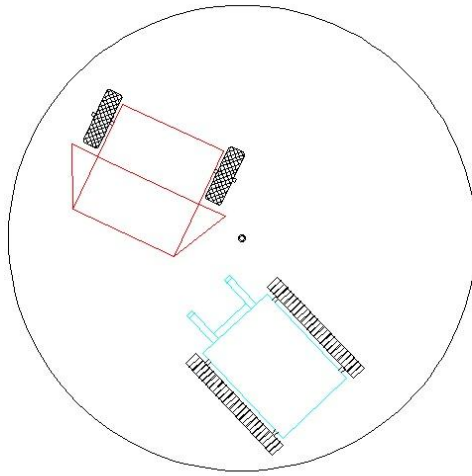
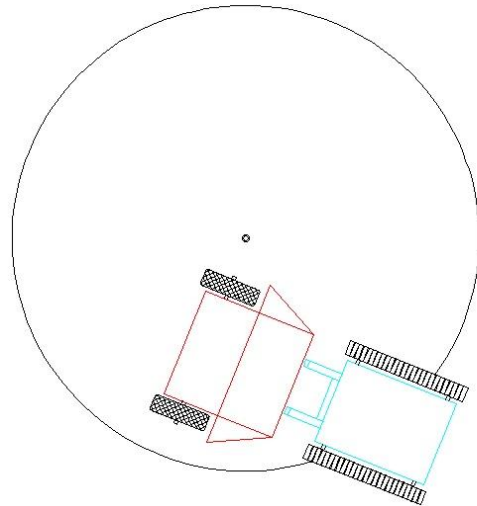


Fig.4: One Competitor Is Pushed
Out and the Round Ends



[\[enlarge\]](#)

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 200PSI regulator but 150PSI fitting, the system must run at 150PSI. Systems must have automatic pressure relief valves to protect against over-pressure (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 venue. Please contact the event organizer if you wish to compete with a ICE robot.

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 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 untension 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 noncircular, 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 uses 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

General Rules;

1. The competition is open to everyone. Minors must be accompanied by an adult.
2. Bot Brawl 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 robots 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

Emergency Match Stoppage Procedure:

In the event of an arena breach, damage to the arena that renders it unsafe, or any other event that is otherwise judged a safety risk by event staff the match shall immediately be halted. For sufficiently large or loud arenas there should be a system in place to allow any event official to quickly act to stop the fight either by triggering a notification system or having direct communication with an official that does that won't be impacted by distance or arena noise. It is strongly encouraged that there is both an audible (alarm, buzzer, air horn, or similar) and visual (arena lights off, flashing red lights, a deployed curtain, or similar) indication that the fight has been stopped to ensure that competitors are aware of the issue immediately. It is the responsibility of the team to ensure that the driver or another team member is watching and/or listening for these indicators. If a competitor continues to fight after the referee has called for the fight to be stopped they will be disqualified. Repeated infractions will result in removal from the tournament. It is the responsibility of the driver to ensure that they respond promptly to the call to stop fighting. Once fighting has ceased the robots will be deactivated. The deactivated robots may be left in place or moved to a safe location in or around the arena until a determination about the status of the fight is made. No work may be done on the bots during this time. The source of the safety issue will then be inspected to determine the appropriate action. Once the issue has been resolved a determination will be made as to whether or not the fight will resume. If possible, the fight will resume from the point where it was paused. If resuming the fight is determined to not be possible due to a safety concern or other issue the fight will be judged up until the point where it was stopped. The safety of the crowd, competitors, and crew must always be considered when determining if any additional measures

need to be taken beyond resolving the immediate safety issue. If there is a battery ejection or if a battery is at risk of catastrophic damage emergency 1 match stopping procedures will take effect.

Emergency Deactivation

Procedure: In the event of an emergency (for example: one or more robots on fire) the standard procedure does not apply. The following attempts to address the vast majority of possible situations that are likely to occur:

- One robot is burning and the other is mobile o The mobile robot is to move to the wall furthest from the arena entry door and align its drive wheels parallel with the wall. If the robot has an active weapon it is to immediately begin dissipating stored energy (spinning down, release for spring actuated weapons, etc) and if possible, bring it next to or into contact with the wall it is aimed at. o Once the working robot is in position the arena marshall will enter the arena and extinguish the fire, then if possible, remove the robot from the arena. o The operator of the non-burning robot may then proceed with normal load out procedures.

- One robot is burning and the other is immobile o If the immobile robot has an active weapon it is to immediately begin dissipating stored energy. (spinning down, release for spring actuated weapons, etc) If the robot retains some degree of mobility but cannot move in a reliable manner it will attempt to angle itself such that any weapons that are aimable are aimed at the wall furthest from the arena entry door. o Once the arena is able to be entered safely the arena

marshall will enter the arena and extinguish the fire, then if possible, remove the robot from the arena. o The operator of the non-burning robot may then proceed with normal load out procedures.

- Both robots are burning

- o Both robots will, if applicable, immediately attempt to dissipate any stored energy systems and will attempt no other actions.

- o Once the arena is able to be entered safely the arena marshall will enter the arena and extinguish the fire, then if possible, remove both robots from the arena.

- One or more robots are burning during a rumble

- o All mobile, non-burning robots will move to the closest arena wall that is not used to access the arena and begin dissipating stored energy.

- o All immobile robots will immediately begin dissipating stored energy and will perform no other actions unless they are able to rotate such that they are able to angle any aimable weapon systems at the wall furthest from the arena entry door.

- o Once the arena is able to be entered safely the arena marshall will enter the arena and extinguish the fire, then if possible, remove the robot from the arena.

- o If there is time left, the match will be allowed to resume.

- One or more robots are acting erratically/stuck on
 - o The operator(s) of the robot(s) will turn off their transmitters to attempt to activate the robots failsafe. ▪ If this works then normal load out procedures will resume.
 - o In the event that the robot(s) are still acting erratically the robots will be allowed to drain their batteries until they are safe to approach.
 - o Should a robot in the arena still be fully functional, no weapon system be active on the malfunctioning robot and all involved operators agree to it the operator of the still working robot may attempt to pin and prop up the malfunctioning robot such that its wheels are no longer in contact with the ground. The operator of the malfunctioning robot will then be allowed to power off their robot. Once powered off they will exit the arena and the robot that was pinning the malfunctioning robot will be allowed to go through normal load out procedures. The malfunctioning robot will then complete its load out procedures

Unsportsmanlike Conduct:

Unsportsmanlike Conduct includes but is not limited to: Post fight contact, sabotage, distraction of opposing robot operators, blatant early movement, etc. For the first incident of unintentional unsportsmanlike conduct the person responsible will receive a warning. These warnings will carry over between events and will expire 25 months after the date of the incident. For the second incident of unintentional unsportsmanlike conduct the person responsible will automatically forfeit the match. For any instance of clearly

intentional (as ruled by the judges or event officials) unsportsmanlike conduct, the driver of the robot will be disqualified for the remainder of the event. This means that if they are driving robots in the tournament they will need to find driver substitutes or those robots will be unable to continue to compete. In the event that the unsportsmanlike conduct occurs during the finals of a double elimination tournament that is structured such that if the robot in the losers bracket wins the two robots will fight again, the driver initiating the contact will forfeit not only the current match, but the match that potentially would follow.