

## BOTBASH BASHBALL RULES, 2008

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### 1 INTRODUCTION

BashBall is an exciting, entertaining robotic sport in which two teams of remotely-operated robots vie for points by scoring goals, ejecting opponents from the arena, disabling opponents, or all three in any combination. BashBall is played in an enclosed arena with transparent walls featuring pneumatically operated pits, flame jets, and “death blossom” pistons that pop up from the floor. Scoring goals in this environment is not easy, and every match is sure to feature plenty of exciting action!

### 2 THE ARENA

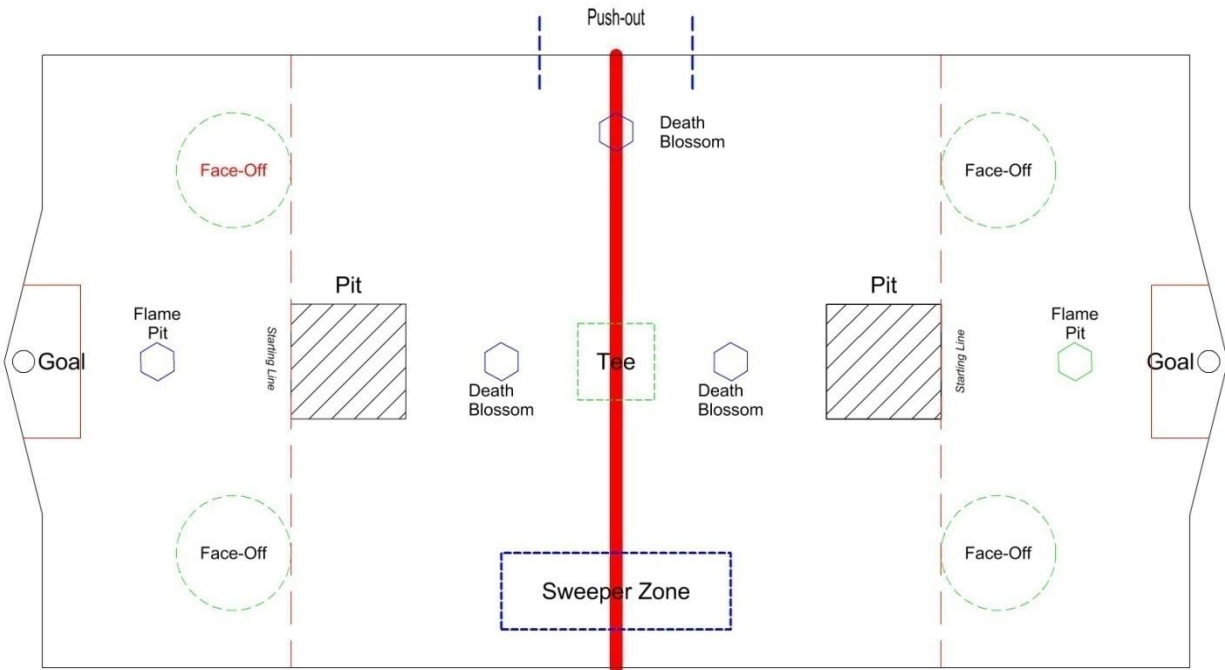
The arena consists of a 16'x30' flat playing surface with a goal opening at each end. The arena is surrounded by rails, above which are angled sections of metal mesh which allow the ball to roll back onto the playing surface.

The arena is equipped with several obstacles:

- Push-out: there are 14 rail sections that surround the arena. One section is removed leaving a gap through which robots may push other competitors. The open section is shown located approximately on the center line on one side of the arena but the actual location may vary.
- Pits: there are two pneumatically operated pits, each approximately 36" square and 8" deep when lowered. The pits floors are lowered and raised automatically at intervals. The interval, up, and down times can all be varied.
- “Whunkle Sweeper” – this is a pendulum that sweeps across the half-court line of the arena parallel to the side rail (see diagram). The pendulum weight features a 2' long vertical spinning bar and flame ports – it spews burning propane as it swings.
- “Death Blossoms” – 3 pneumatic rams that pop up from the floor.
- “Flame Pits” – 2 propane powered flame jets that fire up through the floor.

#### 2.1 SCOREBOARD

The arena is equipped with a “basketball” style lighted scoreboard displaying the score, period of play, time remaining, and possession timer (“shot clock”).



### 3 OVERVIEW OF THE GAME

#### 3.1 OBJECT OF THE GAME

The object of the game is to accumulate the highest possible score during regulation play. In the case of a tie a “sudden death” overtime period will be played with the first team to score winning the match.

#### 3.2 GAME PLAY

The game is played in 4 quarters of 5 minutes each; with a 10 minute break between quarters. Sudden Death overtime, if required, is 5 minutes.

The game begins with each teams’ robots positioned behind the “starting line” at their respective ends of the arena. Play is started with the ball in the ceiling-mounted center-court “Tee”. The ball is released onto the arena floor when a robot hits a release bar projecting from the bottom of the Tee.

The ball remains in play until:

- It is placed in a goal

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- It is ejected from the arena
- It becomes stuck in a non-playable position

When the ball goes into a goal it is automatically shot back into the arena after a 5 second delay. The ball cannons are aimed such that the ball will usually land back in the Tee. If the ball lands in the Tee it must be released by a robot hitting the release lever. [Competitor robots must clear the goal area within 5 seconds of scoring. If the ball is blocked by a competitor when the ball return fires a timeout will be called, the ball will be placed in the tee, and teams will return to their starting positions. The game will then restart.](#)

When the ball goes out of play by leaving the arena or becoming stuck a time-out will occur and the ball will be returned to the Tee.

Possession of the ball is limited by a 20-second “shot clock”. A team may not control the ball for more than 20 seconds without scoring a goal. If the shot clock expires the ball must be surrendered within 5 seconds. If the ball is not surrendered play is stopped and a **face-off** occurs (see below).

In the event that a robot is ejected from the arena while carrying the ball, a timeout will occur and the ball will be placed in the Tee. Should a robot become stranded or disabled while carrying the ball and be unable to release it, a timeout will occur and the ball will be placed in the Tee.

Any robot ejected from the arena during game play will be “out” for the remainder of the quarter. Should all of a team’s robots be ejected or disabled before time expires, the quarter will be declared over. A 10-point bonus score will be awarded for ejecting all opponents.

### 3.3 SCORING

There are 4 ways to score points:

- (5 points) – ACE. ball score with ball on the “serve”, originating from ball Tee
- (3 points) – ball score from play
- (3 points) – throw opponent out of arena
- (1 point) – disable opponent

In addition a team can win the match during Sudden Death Overtime by scoring with the ball.

#### 3.3.1 BONUS SCORE

A team can end a period early and score 10 “bonus points” by ejecting all of the opponent robots from the arena.

#### [3.3.2 AUTONOMOUS BONUS SCORE](#)

[Robots with qualifying autonomous features receive a 100% bonus on any goal scored: 10 points for an Ace and 6 points for a ball scored from play.](#)

### 3.4 TEAMS

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A team will consist of from 3 to 5 people and from 3 to 5 robots ([6 robots in the Small Class](#)). Teams may include additional personnel, but no more than 5 may enter the pit or the driving area at any one time.

### 3.5 ROBOTS

#### [3.5.1 LARGE CLASS](#)

[“Large Class”](#) Robots must weigh at least 30 lbs but no more than 60 lbs. A team may bring up to 5 robots total and must select at least 3 but no more than 4 to play in each quarter. The total weight of the robots selected must not exceed 150 lbs.

#### [3.5.2 SMALL CLASS](#)

[“Small Class”](#) Robots must weigh at least 10 lbs but no more than 20 lbs. A team may bring up to 6 robots total and must select at least 3 but no more than 4 to play in each quarter. The total weight of the robots selected must not exceed 80 lbs.

## 4 ROBOT TECHNICAL CONSTRUCTION RULES

Robots shall be constructed in accordance with the **Robot Fighting League Standard Extensible Technical Regulations for Botbash BashBall 2007** (provided under separate cover) as defined for the **30 Lb Sportsman Class**, with the added proviso that a [Large Class](#) robot must weigh *not less than 30 lbs* and *not more than 60*, [and a Small Class robot must weigh not less than 10 lbs and not more than 20 lbs](#). [The “active weapon” rule is waived for Small Class robots](#). All other RFL rules apply.

### 4.1 BALL GRIPPER

An active ball gripper shall be considered a “weapon” for purposes of the RFL Sportsman Class rules. Grippers designed to pierce or otherwise damage the ball are not allowed.

### 4.2 TEAM IDENTITY

For purposes of refereeing and scoring a match teams shall be designated as a “RED TEAM” or a “BLUE TEAM” in advance of their match. All robots must display one or more very bright LEDs in the assigned color (red or blue), clearly visible in daylight from a distance of **50 feet**. LED(s) must be positioned such that they are clearly visible by the referee(s) and other players in all normal operating positions.

Since team color assignment will be made at the competition venue the light system must allow for easy switching between colors.

## 5 GENERAL RULES AND PROCEDURES

### 5.1 OFFICIALS

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The power of all officials is absolute, and all decisions are final. This includes the Event Organizer, arena staff, referees, safety inspectors, and any other event staff. The job of the officials is to provide a safe environment for competitors and spectators and to ensure a "level playing field" for all competitors.

## 5.2 TECHNICAL INSPECTION

All robots will be inspected by the safety inspection staff to ensure compliance with the robot construction rules prior to being allowed to compete.

### 5.2.1 STATIC INSPECTION

1. A Competitor's robot will not be inspected if it does not have adequate protective covers and weapon locks. Competitors shall be required to personally demonstrate that the safety covers and locks are adequate.
2. Weight check - No tolerance for overweight robots.
3. Appearance suitable for competition. No profane, racially insulting, sexually explicit graphics, etc. will be allowed. The event reserves the right to have removed from Competitor's robot any graphics deemed not suitable for general public viewing.
4. Internal inspection -- covers/armor must be removed to allow for an internal inspection.
5. Approved batteries.
6. Battery terminals not exposed.
7. Clearly visible power status LED.
8. Pneumatic and hydraulic components (pressure vessels, valves, line, etc.) are compliant with RFL rules.
9. Leakage -- There shall be no visible or audible fluid/gas leaks.
10. No other hazards.

### 5.2.2 ACTIVE INSPECTION

- Transmitter/receiver check --Ensure that the robot is receiving adequate signal without interference.
- Verify master switch and fail safe.
- Verify mobility and control.
- Verify weapon(s) operation and safety.

### 5.2.3 TECHNICAL / SAFETY DISPUTES

Tournament Safety / Technical Officials are held to the highest standards of fairness and interpretation of the rules as set forth in the tournament documents. If a Competitor's robot should fail based on the strict interpretation of the rules every means possible will be explored to remedy the situation and allow the Competitor to compete. However, should a dispute arise between the Competitor and the Senior Safety Official, the Event Organizer shall rule on the acceptance or disqualification of the Competitor's robot and this ruling will be final.

### 5.2.4 FAILURE TO PASS

Any Competitor failing safety / technical inspection will forfeit Competitor status and may be required to remove their robot from the premises for the duration of the tournament.

## 5.3 RADIO FREQUENCY MANAGEMENT

### 5.3.1 USE OF FREQUENCY CLIPS

To prevent interference between robots, one antenna clip is provided for each of the frequencies used by Competitors. Before their transmitter is turned on, the Competitor must obtain the appropriate clip for his or her frequency and attach it to the transmitter antenna. Clips are obtained from the Tournament Frequency Coordinator. This clip must remain attached at all times while the transmitter is on. After the transmitter has been turned off, the clip is returned to the Frequency Coordinator. Unless otherwise authorized by a Tournament Official, use of a transmitter without a frequency clip may result in disqualification and expulsion from the tournament forfeiting all passes and entry fees.

#### 5.3.1.1 FREQUENCY COORDINATION

Prior to the start of a match radio frequencies will be coordinated between the competing teams. Each team will retain their given frequencies for the duration of a match.

### 5.3.2 SPREAD-SPECTRUM RADIOS

There are several commercially available hobby radios using 900 MHz or 2.4 GHz spread-spectrum technology. These include the “Nomadio” and “Spektrum” products among others. These radios use techniques such as dynamic channel allocation and/or frequency hopping to avoid interference and numerically keyed transmitters and receivers to “bind” a specific transmitter and receiver together. These and similar radios do not require frequency clips. Their use is allowed, and in fact highly recommended.

### 5.3.3 CUSTOM RADIO SYSTEMS

Custom radio control systems based on spread-spectrum technologies may also be exempted from radio frequency management. Contact the event if you are using a custom radio control system that may qualify.

## 5.4 PITS

### 5.4.1 PIT ACCESS

A maximum of 5 team members will have access to the pit area. Additional personnel (above the 5 team members permitted) are not allowed in the pits.

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## 5.4.2 PIT BEHAVIOR

While it is impossible to list all the safety / behavior requirements of the Pit area, competitors should practice common sense and good sportsmanship at all times. Any competitor violating any of the safety rules is subject to immediate disqualification and removal from the event forfeiting all passes and entry fees as well as being banned from future events.

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### 5.4.2.1 SPECIFIC REQUIREMENTS WHILE IN THE PITS:

1. All robots' wheels shall be lifted off of the ground so that they are suspended in air. This is to prevent runaway bots.
2. Under no circumstances shall a robot that employs pneumatic and/or hydraulic systems be pressurized in the pit area. A robot may only be pressurized in the Arena or in a designated area just prior to their match.
3. Gas supply cylinders in robots must be emptied before the robot is moved to the pit. . An exception is made for the intra-quarter break or when the next match for a given robot will occur within an hour of the match just ended. Competitors may fill their supply tanks one hour prior to the scheduled time of their next match.
4. Keep all sharp objects and edges covered at all times in the pit.
5. Welding and grinding are not allowed in the pit area. A designated welding / grinding area will be made available.
6. Make sure the tournament Frequency Coordinator is aware of your radio frequency(ies) and channel(s). Do not use your radio at any time without first obtaining and attaching a frequency clip (See 1.7).  
**UNAUTHORIZED USE OF TRANSMITTERS IS GROUNDS FOR IMMEDIATE DISQUALIFICATION AND REMOVAL FROM THE PREMISES FORFEITING ANY AND ALL PASSES AND ENTRY FEES.** Any violators are subject to disqualification from future events.
7. As safety issues arise during a tournament, the tournament staff can and will modify the rules regarding safety as set forth in this document and make them effective immediately. A flyer will be placed at each pit table indicating the rule change and the effective time of the change. Anyone found in violation shall be subject to disqualification.
8. Be safe. Keep your fellow Competitors safe. Have a good time.

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## 5.4.3 COMPRESSED GAS STORAGE AND TANK FILLING

Compressed or liquefied gases for use in pneumatic systems will be stored in approved cylinders at a designated location in the tournament venue. All compressed gas cylinders will be stored upright and secured to a rigid support with a safety chain.

A tournament safety official will supervise the filling of all compressed or liquefied gas supply tanks.

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## 5.4.4 TESTING

An area for testing purposes may be provided for all Competitors; if a testing area is provided a Tournament Staff Member will supervise the testing area. This Official will control entry and exit from the testing area, the testing area schedule, and what type of testing may be safely executed.

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### 5.4.4.1 DRIVING ROBOTS ("TEST DRIVES")

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The testing area is not intended for use in testing robot mobility or providing driving practice. Competitors that can show a legitimate need to operate their robot with the wheels on the ground may be allowed limited test driving at the discretion of the event Safety Director. This will normally take place in the arena, but may be allowed elsewhere if a sufficiently protected space is available at the venue.

Absolutely **no** driving of robots outside of the main arena will be allowed at any event without the prior consent of the Safety Director and direct supervision by the event staff. Any violators are subject to immediate disqualification and removal from the event.

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#### 5.4.4.2 DRIVE TRAIN TESTING

Competitors may perform drive train tests with the robot's driving mechanism (wheels, legs, treads etc.) clear of the ground such that no movement of the robot is possible. Wheels-up drive train testing will normally be performed in the testing area. Trivial tests (e.g. briefly running the drive train to verify control) will usually be allowed at the competitor's pit table, at the discretion of the Safety Director.

### 5.5 MATCH TEAM COMPOSITION

Prior to the start of a match each team will select the robots that will participate. Each team must select 3 or 4 robots from among those available (up to 5 [in the Large Class](#), 6 [in the Small Class](#)). The maximum combined weight of the robots selected must not exceed [80 lbs for the Small Class and 150 lbs for the Large Class](#).

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#### 5.5.1 SUBSTITUTIONS

Teams may change their "line-up" at each inter-quarter break. At no time can the combined weight of the robots selected exceed 150 lbs [in the Large Class or 80 lbs in the Small Class](#).

### 5.6 PRE-MATCH PROCEDURE

Teams are called to the pre-match starting area at least 10 minutes before the start of their match. At 1 minute before the start of a match, the Arena staff will call the teams to load their robots. Any robot not present in the pre-match staging area when called will be "out" for the quarter.

When the robots are loaded the arena staff will signal the teams to turn their robots on. The team farthest from the door will be called first, and will exit the arena after powering on. The team nearest to the door will be called last and will exit the arena after powering on. No robot shall be turned on before the arena staff signals the team to do so by calling "<x> TEAM, POWER ON, where "<x>" is FAR or NEAR. If a robot is powered on before the arena staff calls for it is OUT and will be removed from the arena for that quarter.

When all robots are powered on and all personnel have exited the arena, the door will be closed and locked and the arena systems enabled. The match is then turned over to the referee who will verify that the teams are ready, and start the match.

### 5.7 POST-MATCH / QUARTER PROCEDURE

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At the end of a quarter the arena staff will disable the arena systems and unlock the door. Two minutes are allowed for arena unloading. Each team will enter when called, power off and remove their robots. Robots will be powered off and removed based on their position relative to the arena doors, with the closest robot first, then the next closest, and so on.

No team member shall enter the arena until called by the arena staff.

During the two minute unload period Robots unloaded will be moved to the post-match staging area. When all robots have been moved to the post-match staging area the 10 minute break timer will start and the teams may service their robots.

## 5.8 INTRA-QUARTER BREAK PROCEDURE

Teams have 10 minutes between quarters to remove their robots from the post-match staging area, service them, and return them to the pre-match staging area. Any robots NOT in the pre-match staging area when the 10 minute time expires will cost that team **2 points** for each minute or part thereof until all of the team's robots are present.

When all robots are present in the pre-match staging area arena loading will proceed as for the beginning of a match.

## 6 DETAILED GAME RULES

### 6.1 THE BALL

The ball is a 6" diameter black polyethylene sphere with an offset weight inside. The ball is made from a tank float, McMaster-Carr Part #8154K11. The threaded nipple is removed, ~~¼ lb of sand is added~~ and the float is filled with expanding rigid foam ("Great Stuff" or the equivalent).

#### 6.1.1 DAMAGING THE BALL

Intentionally damaging the ball is not allowed and will result in ~~the assessment of a 1 point penalty.~~ [the award of a free kick to the opposing team.](#)

##### 6.1.1.1 FREE KICK

[The team awarded a free kick shall select one player and position it on the far side of the starting line at the opponent's end of the arena, e.g. between the starting line and mid-court line. The player is given the ball, and allowed a single attempt to score a goal from \*\*outside\*\* the exclusion zone. All other players must move to the far side of the starting line and may not interfere in any way with the free kick.](#)

[A goal scored with a free kick shall score \*\*3 points\*\*.](#)

### 6.2 THE GOAL

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Each goal is a 6.25" diameter hole in a flat steel floor plate. The goals are on the center line of the arena, set in a shallow "vee" in the rail, 8' wide and 1' deep. The screen behind the goal forms a "funnel" that directs the ball toward the goal but not necessarily into it.



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### 6.2.1 GOAL ASSIGNMENT

Prior to the start of the match each team will be assigned a goal to defend. Teams will trade goals each quarter, e.g. if a team is assigned that FAR goal (away from the door) in the first quarter, they will be defending the NEAR goal (closest to the door) in the second quarter, and so on.

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### 6.2.2 EXCLUSION ZONE

The goal is surrounded by an "exclusion zone" which may not be entered by players from either side unless the ball has entered the zone first (the exclusion zones are outlined in red on the arena diagram above). When a robot enters the exclusion zone physically carrying the ball the ball is presumed to have entered first. [Following a goal all players must clear the exclusion zone within 5 seconds.](#) ~~Two~~ [Three](#) fouls are possible for violating the exclusion zone.

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#### 6.2.2.1 OFFENSIVE FOUL

An offensive foul occurs when the aggressor team enters the defending team's exclusion zone before the ball. A time-out is called and the offensive team surrenders the ball in a **FACE-OFF** in the nearest face-off circle at the defenders end of the court.

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#### 6.2.2.2 DEFENSIVE FOUL

A defensive foul occurs when a member of a team enters their own exclusion zone before the ball. A time-out is called and all members of the defending team must move to the far side of their starting line, e.g. the area between their starting line and the ½ court line. When the players are repositioned play resumes.

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#### 6.2.2.3 BLOCKED BALL RETURN FOUL

A blocked ball return foul occurs when a player fails to exit the exclusion zone within 5 seconds of a goal being scored and blocks the automatic ball return cannon. A time-out is called, the ball is placed in the tee, and all players must return to their starting positions. When the players are repositioned play resumes.

### 6.3 ROBOT STARTING POSITIONS

At the beginning of a new quarter all robots must be positioned behind the Starting Line passing through the rear edge of the pit at their end of the arena. The robots can be placed ANYWHERE behind this line.

### 6.4 PLACING A BALL IN PLAY

Prior to the beginning of a quarter a new ball is placed into the “Ball Tee” located in the center of the ½ court line in the arena. Play commences on the referee’s whistle and the ball is released from the Tee onto the playing surface when one of the robots hits a lever extending downward from the Tee.

When a goal is scored the ball is returned to play automatically 5 seconds later by pneumatic cannons located in each goal. The ball may land in the Tee in which case it must be released by hitting the lever.

If the ball fails to land in the Tee following a goal it returns directly to play.

When the ball goes out of play for any reason a timeout is called, the ball is placed in the Tee.

### 6.5 SCORING

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#### 6.5.1 SCORING ON THE SERVE: THE ACE

A goal shall count for **5 points** if it scored directly from the Ball Tee without intervening possession by the defending team. This is referred to as an “ACE”, as in tennis and volley ball.

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#### 6.5.2 SCORING FROM PLAY

All other goals shall count for **3 points**.

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#### 6.5.3 AFTER SCORING: HALF-COURT RULE

When a goal is scored the ball is fired back into the arena after a 5 second delay by an air cannon. The cannons are aimed such that the ball will normally land in the Tee. If the ball does not land in the Tee, it must pass the half-

court line in the direction of the opposing goal before it can be scored again in the goal in question. If the ball lands in the Tee is must be released by a player and in that case is considered to have met the half-court requirement.

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#### 6.5.4 EJECTING AN OPPONENT

When a robot from one team forces a robot from another team out of the arena through the rail opening, the aggressor team shall score **3 points**. In the event that both robots leave the arena the aggressor team shall receive 3 points. The referee shall make the call. Both robots shall be OUT for the remainder of the quarter.

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##### 6.5.4.1 EJECTING ALL OPPONENTS

If a team succeeds in ejecting all of the opponent's robots from the arena, the quarter shall be declared over and a **10 point bonus** shall be awarded to the surviving team.

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#### 6.5.5 DISABLING AN OPPONENT

When a robot from one team directly disables an opponent (e.g. renders the opponent inoperable) the aggressor team shall score **1 point**. A robot is deemed inoperable if it is not stranded and the driver cannot drive the robot in a direction indicated by the referee when asked to do so. The referee shall determine whether the robot is stranded or disabled if necessary by calling a time-out and observing the robot to see if the drive train moves on command.

If a robot's drive train is damaged such that it can only move in a fixed circle, it shall be considered disabled.

Once a point has been awarded for disabling a robot the point shall stand even if the robot subsequently recovers.

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##### 6.5.5.1 STRANDING

*Stranding* an opponent shall not be considered disabling. A robot is *stranded* when it is placed or lands in such a way that it cannot move even though the drive train moves on command.

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### 6.6 POSSESSION TIMER

A team may control the ball for a maximum of 20 seconds without scoring. "Possession" is defined as clear control of the ball. The possession timer starts when a team takes control of the ball and is reset each time control of the ball changes hands as determined by the referee.

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#### 6.6.1 FACE-OFF

If the possession timer expires the offensive team shall have 5 seconds to release the ball. If they fail to do so a time-out shall be called by referee whistle. The ball will be given to the defending team in the center of the closest "face-off" circle. The defending team shall select the robot to receive the ball from those currently in the arena. . The robot which had possession at the time of the whistle shall have its front wheels placed on the edge

stripe of the 3 foot diameter face-off circle; all other robots will back away at least 5 feet from the ball, after which play will resume on the referee's whistle.

## 6.7 TIME OUTS

All time-outs will be signaled by referee whistle. Other than time-outs called by the referee, play will be continuous.

The referee will call a time-out when:

- The ball leaves the arena
- The ball becomes stuck in an inaccessible or unplayable position
- Play needs to be stopped for any other reason

The referee shall signal the resumption of play by whistle.

## 6.8 SUDDEN DEATH OVERTIME

If the score is tied at the end of regulation play, the teams shall play a sudden-death overtime period. The procedure for servicing the robots between regulation and overtime play shall be that described for an intra-quarter break (see [5.85-7](#)).

The first team to score a point by any means (see 6.5) shall be declared the match winner.

## 6.9 OFFICIALS

Play shall be monitored by one or more referees. In the event that there is more than one referee, one referee shall be designated as the primary referee and will make the final call in the event of any disputes. Referees' decisions are final.