ROBOCORE®

Robot Combat

MATCHES JUDGMENT CRITERIA

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Robot Combat | Matches Judgment Criteria

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This guide aims to standardize the criteria and judgment methods for official competitions endorsed by the Brazilian Robotics League and RoboCore. The creation of this guide was motivated by the lack of standardization and the great subjectivity of the judgment criteria used in competitions held around the world, causing doubts for competitors and judges.

1. Judges and Referees

Judging a robot combat competition is a difficult challenge that requires a deep knowledge of the rules, concentration, and above all, impartiality. As combat robots involve a wide variety of chassis and weapon designs, a judge must maintain an open and flexible perspective to consider the attacks of different types of robots.

The event organization must be very careful and attentive in choosing, training, and instructing judges. They must have a general understanding of combat and associated damages so that they are not influenced by pyrotechnic or visual effects that do not cause real damage to the robots. Judges should focus on damages that affect the functionality of the combatant.

1.1. Combat Judge

Based on their observations during the Match, each judge assigns points to the competitors. The competitor with the most points is the judge's choice for the winner. The winner is then determined by the majority decision of the judges with the sum of all points.

1.2. Match Referee (Door Referee)

The Match Referee (also known as the Door Referee) will ensure that all pilots comply with the tournament rules. Warnings and instructions from the Match Referee will be verbally issued to pilots during matches, where if a pilot fails to comply with the order issued, the match will be interrupted and the offending robot will be declared the loser.

The Match Referee will determine the point at which a knockout countdown should begin based on a strict interpretation of the rules. The unresponsive combatant will be notified and the countdown will start at 10 and end at 0. If, by the end of the countdown, the unresponsive robot fails to display sufficient controlled movement as described in the rules, it will be declared the loser.

2. Judgment Criteria

The result of a robot combat is based on the evaluation of two criteria, each with a points value to be distributed as follows:

Damage: 6 points x 3 judges = 18 points
Aggressiveness: 5 points x 3 judges = 15 points

Judges must assign the distribution of points in the two criteria as mutually exclusive.

Each combat must be judged by 3 (three) judges, where each judge is responsible for distributing 5 (five) points in the AGGRESSIVENESS criterion between the two combat robots. However, for the DAMAGE criterion, the result of the points distribution must be unique, totaling 18 points to be distributed between the two combat robots. This is because the DAMAGE criterion is

based on levels of damage that occurred during the fight, with physical damages occurring, leaving no subjectivity to be evaluated.

The total sum of points distributed to the robots at the end of the combat is 33 (thirty-three), making it impossible for a tie to occur in a combat result.

2.1. Damage

"Damage" represents the loss of functionality that a robot may suffer during a fight. The damage can be caused by a controlled action of the opponent, by a passive action of the opponent, or it can also be caused by the robot itself.

2.1.1. Classification of Damage Levels

The DAMAGE criterion is classified into the following levels.

- **Trivial**

The "Trivial" level can be considered as the baseline (ZERO level), that is, during the match, the combatant robot did not suffer any type of damage that will be counted by the judges.

Visible scratches on the armor, tears and loss of stickers or paint, small cuts or non-penetrating notches in the robot will fall into this level of the DAMAGE criterion. In other words, they will not be counted as damage for changing the criterion level.

- **Cosmetic**

The "Cosmetic" level is the first real level of damage that will be counted by the judges after the end of the match.

The following DAMAGES will be considered at this level: removal of non-structural and non-crucial cosmetic parts for the full functioning of the combatant robot.

Examples: loss of decorative items (except stickers and paint), lighting, damage to wheels or other exposed movable parts that do not result in loss of functionality or mobility of the robot.

- **Menor**

The "Minor" level is the second real level of damage that will be counted by the judges after the end of the match. At this level, the DAMAGES suffered during the match do not affect the main functionalities of the robot.

The following DAMAGES will be considered at this level:
- Intermittent smoke not associated with noticeable power drop.
- Significant dents or penetrating cuts in the robot structure without affecting in any way the full functioning of the robot.
- Complete removal of one or more wheels, but without affecting the robot's mobility
- Removal of ablation structure components or other weapon components without resulting in loss of functionality.
- Structures presenting warping, but without resulting in loss of mobility or function of the robot's weapon.

- **Significant**

The "Significant" level is the third real level of damage that will be counted by the judges after the end of the match. At this level, the DAMAGES partially reduce the functionalities of the robot.

The following DAMAGES will be considered at this level:

- Continuous smoke or smoke associated with partial loss of power of the locomotion system or weapons.
- Armor torn in a way that reduces the robot's functionality.
- Complete removal or locking of one or more wheels that causes a clear loss of mobility.
- Damage to the rotating weapon, resulting in loss of speed of the weapon or severe vibration.
- Damage to the arm, hammer, or other movable part of a weapon system resulting in partial loss of its functionality.
- Warps in axles, ramps, forks, or other attack components of robots that do not have active weapons in a way that causes a partial loss of their functionalities.
- Robot structure visibly warped or deformed in a way that reduces its functionalities.

- **Major**

The "Major" level is the fourth real level of damage that will be counted by the judges after the end of the match. At this level, the DAMAGES are completely critical to the functionalities of the robot.

The following DAMAGES will be considered at this level:

- Visible fire.
- Section of armor completely removed, exposing internal components.
- Total loss of functionality of active weapon systems.
- Complete removal of ramps, forks, or other attack components of robots that do not have active weapons. Internal components torn off or dragging on the arena floor.
- Significant leakage of hydraulic fluid. Leakage of pneumatic gasses.

- **Massive**

The "Massive" level is the fifth and last real level of damage that will be counted by the judges after the end of the match.

This level will only be considered when there is a total loss of energy of the combatant robot at the end of the round, causing total immobilization of the robot in the last 10 seconds without having time to start the countdown for the knockout.

2.1.2. Post-Match Jury Inspection

The judges may request that the pilots demonstrate the operability of their robots after the end of the match, before the arena doors are opened.

The judges must inspect the combat robots after a match to determine the best way to award DAMAGE points. If a judge needs to examine one or both robots before

awarding points, they must signal the designated Match Referee immediately after the end of the match.

Neither the judges nor the Match Referee will manipulate the combat robot. The pilot or a designated member of the team will perform the manipulation. A member of the opposing team has the right to be present during any inspection.

2.1.3. Distribution of Damage Points

The distribution of DAMAGE points is based on the relative ranking of the levels of damage received by each robot.

X	Trivial	Cosmético	Menor	Significativo	Maior	Massivo
Trivial	9-9	10-8	12-6	14-4	16-2	18-0
Cosmético	8-10	9-9	10-8	12-6	14-4	17-1
Menor	6-12	8-10	9-9	11-7	13-5	15-3
Significativo	4-14	6-12	7-11	9-9	11-7	13-5
Maior	2-16	4-14	5-13	7-11	9-9	11-7
Massivo	0-18	1-17	3-15	5-13	7-11	9-9

2.2. Aggressiveness

The AGGRESSIVENESS criterion is defined by the sum of HITS assigned to each combat robot during the match. The sum of points assigned by each judge is equal to 5 points. In this criterion, there is no possibility of a tie. The scores will only be **5x0**, **4x1**, and **3x2**.

2.2.1. Hit Definition

In order to clarify how the counting of attacks, or HITS, by judges in robot combat competitions in Brazil is done, this guide was created. Its study and use during competitions, as well as during the process of creating robots and the strategies that will be used by teams during Matches, is encouraged. It is important to note that this guide is not definitive, and discussion of its topics is also encouraged so that the sport can constantly evolve.

A HIT is defined as a controlled and effective action by a robot that manages to hit the opponent robot and cause an impact. The concept of effectiveness should take into account, most of the time, the type of weapon that the attacking robot has. It is said most of the time because an active weapon robot is effective when launching its opponent with its weapon, but if the weapon stops working during a match, it becomes effective when pushing its opponent at least one length of its robot, lifting the opponent entirely off the ground, or throwing it. The aggressiveness of robots in a robot combat competition is highly encouraged.

- **Criteria for Counting HITS**

A HIT is counted in favor of a robot when it effectively performs one of the attacks on the list below, regardless of the position that the attacker hits the opponent.

- Lift the opponent entirely off the ground using its active or passive weapon*.
- Turn, grab, pierce, or throw the opponent.

- Attack horizontally, causing the opponent to be thrown sideways, even if its wheels continue to touch the ground.
- Carry its opponent with control for at least the length of its body, or until it hits the arena wall or another obstacle.

*An active weapon is understood to be drumbots, lifters, spinners, and other weapons presented in the RioBotz Combat Tutorial. A passive weapon is understood to be ramps, forks, and rammers.

In the case of two robots colliding with an active weapon with an active weapon or an active weapon with a passive weapon, and both are investing against each other with movement, they may be thrown off the ground. In this case, the HIT is awarded to the robot that was more effective during this attack. The match judge must promptly analyze the fact and decide the criterion that will be used, always considering the effectiveness of the attack. The criteria may be greater displacement of the opponent or greater impact on the opponent.

- **Criteria for Not Counting HITS**

The effectiveness of the attack should always be considered in the counting or not counting of a HIT. Thus, no HIT is counted in the following situations.

- Both robots attack but do not hit the opponent.
- The robots touch or collide without consequences.
- A robot attacks but passes over the opponent.
- Carrying the opponent for a very short distance (less than its length).
- When neither robot can win a strength contest.
- While one robot keeps its opponent dominated for up to 10 seconds. The attack that generated this dominance may or may not be counted as a HIT, considering the criteria in the section above, but while one robot keeps the opponent locked, no HIT is counted.
- Repeatedly hitting the opponent against the same wall without retreating at least the size of its robot.
- Turning, flipping, and being thrown alone and not by the opponent's act.

If one of the robots does not attack and only stays in defense mode, and still performs better during the opponent's attack, no HIT will be counted, since the opponent's attack was not effective.

- **Tie in HIT Counting**

If the match ends with a tie in HIT counting, the winner will be determined by the judge's decision, applying 1 point of HIT in favor of the one who has shown greater control or dominance in the match.

2.2.2. Distribution of Aggression Points

At the end of the match, the number of HITS obtained by each combat robot will be counted, and the AGGRESSION points will be distributed as follows:

- If the robot with the highest number of HITS counted by the judges is greater than 90% of the total HITS, the score will be **5-0**.

- If the robot with the highest number of HITS counted by the judges is greater than 70% or less than or equal to 90% of the total HITS, the score will be **4-1**.
- If the robot with the highest number of HITS counted by the judges is greater than 50% or less than or equal to 70% of the total HITS, the score will be **3-2**.

The decision of each judge is independent, and only after the individual assignment of points will all the judges' points be added up to declare a match winner.

Once the decision of the match winner is counted, it cannot be contested, and there will be no recourse available to the losing robot of the match.

The evolution of the robot combat sport in Brazil over time is notable. Television exposure and social media bring in more and more fans every day. The discussion of rules and judging methods is extremely healthy and important so that more teams and robots can be created and participate in competitions. If the reader of this document has suggestions or criticisms and wants to engage in discussions, please access the WhatsApp group dedicated to this purpose: https://chat.whatsapp.com/IhjC0O1SVZU6S3unZYMHpv or send an email with your comments to the channels below:

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