

# NINJA RPG

## FULL FULL RULEBOOK RULEBOOK



230118

# CONTENTS

<b>General Overview</b>	<b>3</b>
<b>Our Core Values</b>	<b>3</b>
Put Builders First	3
Be Fun and Accessible	3
Be Creative and Innovative... Safely	3
Challenge and be Challenged	3
Bias for Action and Always Learning	3
<b>History of NHRL</b>	<b>4</b>
<b>Spirit of the Rules</b>	<b>4</b>
<b>Builder Conduct Policy</b>	<b>5</b>
Expectations and Standards of Conduct	5
Reporting Misconduct	6
Discipline	6
<b>Robot Design Rules</b>	<b>7</b>
Weight Classes	7
Batteries and Power	8
Robot Control Systems	8
Size Requirements	8
Weapons	9
The NHRL Design Approval Process	10
Spare Robots & Batteries	10
Design Restrictions	11
The Spirit of the Competition	11
<b>Event Rules</b>	<b>12</b>
Tournament Format	12
Match Readiness	13
Match Queuing, Cage Load-in, and Unloading	14
Event Safety	14
Safety Inspection	14
The Pits & Robot Repair	15
<b>Fight Rules</b>	<b>17</b>
Objective	17
Fight start	17
Fight end	17
Fight resets	18
Unstick Attempts	18
Pins	19
Disentanglement	19
Hazardous robots and behavior	20



# GENERAL OVERVIEW

NHRL is the premier combat robotics league for 3lb, 12lb, and 30lb bots in the world. We welcome builders all over the world for the most intense and competitive robot fighting anywhere.

This document is a single consolidated resource containing all of our rules and regulations for 2023.

New rules for 2023 are highlighted in blue.

## OUR CORE VALUES

### PUT BUILDERS FIRST

- Treat all builders fairly and respectfully.
- Celebrate and respect builders and what they create.
- Listen to the concerns and needs of builders and work to incorporate feedback into our policies and operations.

### BE FUN AND ACCESSIBLE

- Combat robotics should be fun.
- Combat robotics should be as affordable as possible.
- Competitors and fans should come from all walks of life and backgrounds.
- Building your first robot should be as easy as possible.
- A supportive and inclusive community is key.

### BE CREATIVE AND INNOVATIVE... SAFELY

- Simple and concise rules that favor encouraging builders to think creatively.
- Strong safety culture and safety design makes pushing the limits possible.

### CHALLENGE AND BE CHALLENGED

- We support each other, but we play to win.

### BIAS FOR ACTION AND ALWAYS LEARNING

- We are unafraid to push the limits, even if it means we sometimes make mistakes.
- We may make mistakes, but we are always learning and trying to improve.



# HISTORY OF NHRL

NHRL was founded in 2018 by Austin McChord and Ryan Sasloe with the goal of creating a large, welcoming community and following.

We began operations at 50 Day Street, with a single cage for 3lb bots and the occasional 12lb Sportsman fight. Our first competition was on December 8, 2018, with 13 3lb bots fighting for the Golden Dumpster, filled with broken robot parts from that competition. Brett the Brick was a painted, motorized cinder block with a mounted GoPro camera.

The size of our events kept growing, and began attracting participants from all over the country. On December 6, 2020, we held our first Championship event, contested by only bots who had finished in the top 4 of the season's events.

On February 6, 2021, we held our first event at our new, larger facility at 165 Water Street, one block over from our old facility. The new facility had two 3lb cages and one cage that could hold larger full-combat robots. We fought 3lb, 12lb, and 30lb weight classes.

On December 18, 2021, we brought in a full TV sports production crew to bring our production to the next level.

On March 26, 2022, we expanded our facility again, moving the pits to the second floor, installing a second 30lb cage, and a third 3lb cage. This was also our first event as a company, with Kelly Biderman joining us as CEO.

We are proud of our community of builders and fans, and we continue to grow!

# SPIRIT OF THE RULES

Above all, we are a builder-centric league. We do not make rules to stifle creativity or to look for ways to disqualify builders. Instead, we want to make a place where builders feel welcomed and safe.

Safety is vital. While we try to not be too restrictive with our rules in general, we must make sure all our fights are safe for builders, audience, and crew.

- We want fights that are entertaining and fun for builders and audience.
- We provide both an entry level for new builders to learn about combat robotics, and the most competitive robot combat in the world for experienced builders.
- We love seeing new and weird ideas in play.
- We don't mind builders pushing boundaries, so long as it's done safely and the result is entertaining.



# BUILDER CONDUCT POLICY

It is a privilege to be part of the Havoc Robotics and Norwalk Havoc Robot League (collectively, "Havoc") community. Everyone who is associated with Havoc must refrain from illegal, violent, dangerous, or irresponsible conduct that is detrimental to the integrity of and public confidence in the league. We must show respect for others inside and outside our community and we must strive to conduct ourselves in ways that favorably reflect on ourselves, our sport, our teams, the communities we represent, and Havoc. As such, Havoc Robotics has established this Builder Conduct Policy (BCP), which applies to existing and former builders, builders who have registered to compete, prospective builders, and members of our social media community (collectively, "Builders").

The BCP is intended to address and sanction conduct detrimental to the league and sport. In order to uphold our high standards, when violations of this BCP do occur, appropriate disciplinary action must follow.

## EXPECTATIONS AND STANDARDS OF CONDUCT

Builders must conduct themselves in a way that is responsible, promotes the values of Havoc, and is lawful. Even if the conduct does not result in a criminal charge or conviction, Builders found to have engaged in any of the following conduct will be subject to discipline.

Prohibited Conduct includes but is not limited to the following:

- Actual or threatened physical violence against another person, including dating violence, domestic violence, child abuse, and other forms of family violence;
- Assault and/or battery, including sexual assault or other sex offenses;
- Violent or threatening behavior toward any person in any Havoc setting;
- Stalking, harassment, or similar forms of intimidation;
- Illegal possession of a gun or other weapon (such as explosives, toxic substances, and the like), or possession of a gun or other weapon in any Havoc setting;
- Illegal possession, use, or distribution of alcohol or drugs;
- Possession, use, or distribution of steroids or other performance enhancing substances;
- Crimes involving cruelty to animals as defined by state or federal law;
- Crimes of dishonesty such as blackmail, extortion, fraud, money laundering, or racketeering;
- Theft-related crimes such as burglary, robbery, or larceny;
- Disorderly conduct;
- Crimes against law enforcement, such as obstruction, resisting arrest, or harming a police officer or other law enforcement officer;
- Conduct that poses a genuine danger to the safety and well-being of another person; and Conduct that undermines or puts at risk the integrity of Havoc, its facilities, or its personnel.



“Havoc setting” means any physical or virtual location or conveyance used in connection with Havoc activities, including but not limited to event facilities, offices, private or off-site events, workshops, and social media platforms.

## **REPORTING MISCONDUCT**

If you have witnessed Prohibited Conduct by a Builder, or are aware of any incident which, if the allegations were true, would constitute a violation of the BCP, you are obligated to promptly submit a report to Havoc’s leadership.

Reports must be sent via email to [complaints@nhrl.io](mailto:complaints@nhrl.io), and must contain:

- Your full name
- Your phone number
- Date(s) and time(s) of the incident, as applicable
- Any relevant information or context about the nature of the incident, identity of any all parties involved (including the legal first and last name of any individual(s) and contact information, as known or available)
- Any supporting evidence, like photographs, social media activity, emails, complete and unedited screenshots or transcripts, a news article, a police report, or other materials as applicable

Upon receipt of an incident report, Havoc will review it in a timely manner, and open an investigation. The investigation may include conducting interviews with the complainant, the accused, witnesses, and/or may include contacting the authorities if Havoc deems it necessary. The timing and scope of any investigation will be based upon the particular circumstances of the matter. In conducting investigations, Havoc will make reasonable efforts to safeguard requests for confidentiality from complainants or others with information. In addition, Havoc will not tolerate, and will discipline, any retaliation, threats of retaliation, intimidation, harassment, or any other adverse action against anyone who in good faith reports a possible violation, or provides truthful information during an investigation.

In certain cases when further investigation is warranted, Havoc may choose to temporarily ban or restrict any individuals who are subject to said investigation until it has concluded, at which time the temporary ban may be lifted or extended, or augmented with additional discipline.

## **DISCIPLINE**

In the event where a Builder has been found in violation of the BCP, either by being formally charged with a crime or through the course of Havoc’s investigation, Havoc will determine what, if any, disciplinary action will be taken, and communicate its decision with the necessary parties involved.

Depending on the nature of the violation and other circumstances, discipline may be a suspension for a fixed or an indefinite period of time, or banishment from the league and/or its digital platforms with an opportunity to return, with Havoc’s approval, after a specified period of time. Discipline may also include a probationary period and conditions that must be met for reinstatement and to remain eligible to participate in the league. Repeat offenders will be subject to enhanced and/or expedited discipline.



# ROBOT DESIGN RULES

## WEIGHT CLASSES

NHRL offers 3 different weight classes to compete in; 3lb, 12lb and 30lb. All robots must be at or below the maximum weight listed for their respective weight class at the start of the fight. In any given class, additional weight allowances may be allotted to entrants that meet certain criteria.

## NON-TRADITIONAL MOTION BONUS

Any robot that falls outside the definition of a “Traditional Motion System” qualifies for the Non-Traditional Motion Bonus. NHRL classifies Traditional Motion Systems as a robot that relies on rotational motion of a component in contact with the ground as its method of locomotion around the arena. This includes all forms of wheels (round, non-circular, spoked, or offset axis) as well as continuous tread, track or belt driven systems. This also includes any robot that uses unpowered rotating objects (wheels, drums, rollers, ball bearings, etc.) as a means of friction reduction with the ground.

## MULTIBOT BONUS

Any competitor with multiple independent robots fighting under a single name qualifies for the Multibot Bonus. Each bot in a Multibot must have independent active control and be capable of influencing the fight. Only the heaviest bot in a multibot must have an active weapon. Additionally, for a multibot to benefit from the Non-Traditional Locomotion Bonus, only the heaviest segment of the bot needs to meet the criterion to qualify for the weight bonus.

The weight of any segment of a multibot may not exceed 110% of the ‘base weight’ for its respective weight class, except in the beetleweight class. If the bot also qualifies for the Non-Traditional Locomotion Bonus, the additional weight may also be factored into the base weight.

For example, the heaviest segment of a 12 pound multibot may not exceed 13.2 lbs. However, if the robot also qualifies for the shuffler weight bonus, the maximum weight of the heaviest segment increases to 19.8 lbs (18lbs x 110%).

Competitors may choose to forgo their multibot bonus so long as their robot still meets the base weight for their weight class.

Any active cameras or recording equipment on the bot do not count towards the robot’s weight, but must be approved during safety inspection by an event organizer or head referee.

Weight Class	Non-Traditional Locomotion	Multibot	Absolute Maximum
3lb	+2 pounds	+1 pounds	6 pounds total
12lb	+6 pounds	+3 pounds	21 pounds total
30lb	15 lbs	+8 pounds	53 pounds total



# BATTERIES AND POWER

Bots must have an easily accessible master power cutoff in the form of a switch or removable link. The power cutoff must be accessible without disassembling the robot in any way. The power cutoff must be able to be deactivated in no more than 15 seconds.

Nominal battery voltage may not exceed 60 volts for 3lb bots, or 75 volts for 12lb and 30lb bots. It is understood that a fully charged battery pack will have an initial voltage above its nominal Voltage.

Any robot system that produces voltages above the robot's battery voltage limit must be approved by NHRL and may require additional inspection. Email [hello@nhrl.io](mailto:hello@nhrl.io) to discuss your design!

Battery charging must be done safely! Batteries may be charged within your robot, except for robots with flame or heat-based weapons. Unsafe charging procedures may result in a penalty via the demerit system.

## SAFE CHARGING PRACTICES:

- Inspect batteries for damage or puffiness before charging.
- A team member must be present while a battery is charging.
- Balance charge leads must be used for any OTS battery that has them.
- Keep a sand bucket or liposafe bag nearby.
- Set an appropriate charge rate based on your battery.

*While not a requirement, it is a good practice to make sure your robot has enough power to be idle for up to 3 minutes prior to the start of your fight.*

# ROBOT CONTROL SYSTEMS

Robot controls and communication systems must pass a failsafe test. In the event of signal loss or transmitter power-down, the bot's drive system must stop within 30 seconds and weapons must come to a complete stop within 60 seconds.

All robots and multibots must have a dedicated receiver(s).

Autonomously controlled robots are allowed, but they must still retain a radio control module that can remotely activate and deactivate the robot.

# SIZE REQUIREMENTS

- 3 pound robots must be able to fit into a 30x 30 x 24 inch box.
- 12 and 30 pound robots must be able to fit into a 36 x 36 x 36 inch box.
- In the case of a multibot, all segments of the robot **must** fit within the box size **together**.
- Once the match begins, robots are allowed to expand or contract to any size.





# WEAPONS

All entrants must have an **active weapon**. An active weapon is defined as a weapon or mechanism that operates independently from the robot's drivetrain or means of locomotion.

"Mellybrains" (bots that can show controlled movement while spinning at rapid speeds), and "Gyro Walkers" (bots that use spinning masses or weapons to generate inertia to induce translational motion) are exempt from this rule. "Thwackbots," (robots which use momentum created by the robot's drivetrain to 'actuate' an otherwise unpowered weapon) do not qualify as having an active weapon.

In a multibot, only the heaviest bot is required to have an active weapon.

## WEAPON LOCKS

**All weapon systems must have a lock** that stops their actuation, extension, expansion, rotation, ignition, etc. Weapons that move or rotate must have a lock or be constrained such that movement is restricted in all directions. Weapons that shoot a projectile or gas must have physical means to prevent firing AND block the expulsion of a projectile. Additionally, all means of fuel storage must be designed to default to the closed position if damaged or removed from the robot.

## ADDENDUM ON SPECIFIC WEAPON CLASSIFICATIONS

**Flame and heat-based weapons are allowed.** This includes but is not necessarily limited to flamethrowers and low or medium-power rocket motors. Robots with flame and heat based weapons must be able to self light and self extinguish. In the case of signal/communication loss with the transmitter, flame and heat based weapons must self-extinguish in 30 seconds.

3lb robots are allowed up to 8 ounces of fuel. 12lb and 30lb robots are allowed 16 ounces of fuel. Consumable fuel and gasses **do** count towards your overall robot weight.

NHRL allows the use of propane, butane and other fuel sources that are gaseous at STP (standard temperature and pressure). Fuels cannot be self-oxidizing and flame systems must not include additional oxidizing systems (e.g. oxy acetylene torches and similar).

Matches may be stopped and your robot disqualified if cage equipment, cameras or safety gear, is being damaged by fire.\*

**Rocket motors (also referred to as rocket engines) are allowed.** NHRL permits the use of any commercially available NAR-Certified rocket motor below size F class (EX: Estes, Aerotech, etc.). *Any design that involves a rocket motor of F class or higher, or that is homemade may be allowed with special permission via the Design Approval Process.*

Rocket motors must be constrained via a tube or clamp mechanism that retains a majority of the motor's outside surface and back. Additionally, the peak thrust of your rocket should not be enough to lift your robot off the ground.

Rocket motor igniters must not be installed until the robot is in the cage. Robots must be powered on prior to ignitor installation to prevent any unexpected signal that might trigger on startup. During igniter installation, the robot must be positioned such that the engine is facing into the cage.



**Drive systems and weapons powered by internal-combustion engines are allowed.** Combustion engines may be manually or electrically started during load in, provided they do not cause the weapon to move. Consumable fuel and gasses **do** count towards your overall robot weight.

**Projectile weapons, both tethered and untethered are allowed.** A fired projectile's maximum speed may not exceed 150 miles per hour. Additionally, a tethered projectile must not be designed in a way that is likely to become entangled with the opposing robot.

**Modular weapon systems are allowed.** Modular weapon systems are defined as mechanisms, subsystems, or subassemblies that are interchangeable between fights. For example, a modular weapon system may allow a competitor to choose between a horizontal spinner and a vertical spinner configuration between fights.

No more than 50% of a robot's weight may change between configurations. Additionally, all configurations of the robot must qualify for the same weight bonuses.

Designs that utilize pneumatics, hydraulics and subsystems using airbags are allowed, but must be approved by NHRL staff through the Design Approval Process.

## THE NHRL DESIGN APPROVAL PROCESS

Any design that falls outside the parameters outlined in the NHRL Competition Handbook, OR that includes airbags, pneumatic or hydraulic systems **MUST** be approved by NHRL Staff.

To receive approval or discuss your robot design, please email [hello@nhrl.io](mailto:hello@nhrl.io) at least 3 weeks prior to the competition. We cannot guarantee that any proposal sent later will be approved in time for the competition.

Your email should include sufficient information to communicate/demonstrate your design intent. This can be in the form of hand sketch, pictures, video, CAD models, or written word, etc. During the approval process, builders may be asked to provide additional details as necessary.

## SPARE ROBOTS & BATTERIES

Due to the fast pace of the competition, bringing multiple copies of your robot is allowed and encouraged at NHRL. Spare robots must be as close to exact copies of the original as possible. All copies of spare robots must pass safety inspection before competing.

For any robot with modular weapon systems OR multiple armor configurations, all spare robots must be compatible with each modular system or armor configuration interchangeably.

NHRL highly encourages competitors to bring spare batteries! Builders are only guaranteed 20, 25 or 30 minutes in between matches dependent upon their weight class for repair and recharge, which may not be enough to fully recharge a battery. In order to assist with this, NHRL will gladly lend you a spare battery for your robot. Simply email [hello@NHRL.io](mailto:hello@NHRL.io) at least 3 weeks before the competition, and provide us with a link or information about your battery. NHRL has a strong preference for XT style connectors XT90/60/30s.



## DESIGN RESTRICTIONS

Fabric, foam, and other ablative armor is allowed. However, ablative armor must not be designed in such a way that it presents a likely entanglement risk. The decision of what is a likely entanglement risk is up to the discretion of NHRL.

Entanglement devices are not permitted. An entanglement device is defined as a component, subsystem or armor configuration that is designed to be entangled in the rotational or moving parts of an opponent.

- Liquids expelled from the robot are not permitted; However, liquids expelled from a robot that become gaseous shortly after leaving the robot and/or before hitting the opponent are permitted. Expelled liquids must be gaseous at STP conditions.
- Electrical and shock weapons such as tasers and cattle prods are not permitted.
- Weapons that primarily act by obstructing visibility are not permitted; However, weapons that produce smoke or fog as a by-product of their attack (i.e. rocket motors) are allowed.

Any weapon that directly targets or that may result in harm to those outside the cage is not permitted. This includes, but is not limited to lasers, high luminosity or strobing lights, or excessively loud noises.

## THE SPIRIT OF THE COMPETITION

*Have a unique, groundbreaking, wacky or super-secret design that isn't covered by the rules? At NHRL, we love creative and fun designs that push the boundaries of what can be done in combat robotics. If you are unsure if your robot design qualifies, please contact us at [Robot@nhrl.io](mailto:Robot@nhrl.io). NHRL Staff would be more than happy to chat with you! We would rather see new and interesting bots fight than disqualify them!*

Event Organizers, Safety Inspectors, or Head Referees may disqualify any robot that has been designed in such a way that skirts or violates the spirit of the competition, whether intentionally or unintentionally. See Spirit of the Rules above.



# EVENT RULES

## TOURNAMENT FORMAT

In 2023, NHRL will run most events under a new format, which we're calling NHRL Live.

All competitors' first fights (with some exceptions) will be in a preliminary round. Then, all competitors will be slotted into a single-elimination bracket based on the result of their preliminary round fight. Winning a preliminary round fight will generally give a competitor an easier path in the single-elimination bracket.

A few hours into the day, we will open NHRL Freestyle Fights, which is a series of grudge fights that eliminated competitors can take part in. You may choose to register for Freestyle Fights only, but your bot must still pass safety.

### THE PRELIMINARY ROUND

The preliminary round's seeding will be livestreamed about 10 days before the event. You will be seeded by NHRL rank. Bots with no NHRL rank will be seeded next, starting with bots that have fought outside NHRL, followed by new bots from experienced builders, and finally followed by new bots from new builders.

Most single-elimination brackets have some number of byes. The highest-seeded bots will get automatic byes. The next-highest-ranked bots will have to win their preliminary round fight to get a bye. Some bots may not get byes, whether they win or lose their preliminary round fight. That said, the result of your preliminary round fight will determine your path in the bracket. If you win your preliminary round fight, you will generally face lower seeds in the single-elimination fight.

Unlike previous years, we will not necessarily split bots from the same team or builder into different spots in the bracket. If you are bringing multiple bots, you should prepare for the possibility of fighting your own bot.

If you are present at the event but forfeit your preliminary round fight, it will count as a loss in your statistics and rankings. Exception: If you are an individual builder and both of your bots are set to fight each other in the preliminary round, you may forfeit one of them without incurring a loss.

### THE SINGLE-ELIMINATION BRACKET

All bots will be placed into the single-elimination bracket according to how they did in the preliminary round.

At this point, the event will run with standard single-elimination brackets. All brackets will have an additional fight between the losers of each semifinal fight to determine third place.

### QUALIFICATION FOR THE NHRL WORLD CHAMPIONSHIPS

The top 4 bots of each bracket will qualify for the NHRL World Championships at the end of the year.

If a bot that has already qualified earlier in the year makes it into the top 4 again, the highest-ranked bot (using rankings from before the event started) will qualify.



If there is a tie in the rankings, then the bot that lost to the already-qualified bot will qualify.

Important: You may choose to forfeit a qualification slot. However, you may not gift your slot to another builder.

## NHRL FREESTYLE FIGHTS

Freestyle fights are a series of grudge fights run throughout the day that ensure that every builder gets to fight as much as they can.

**All bots that participate in the Freestyle fights must pass safety.**

Many Freestyle Fights will happen in the Titanium area at NHRL. This area allows for 3lb and 12lb Sportsman fights. Note that we reserve the right to decline a fight to certain 12lb Sportsman bots if we feel they're a hazard to the cage.

## MATCH READINESS

All entrants are guaranteed a certain amount of repair time between the end of any given fight and the start of the next fight. The exact amount of time depends on whether you have just finished your preliminary round fight, or if you have won a single-elimination bracket fight.

Weight class	Preliminary Round	Single-elimination bracket
3lb	At least 60 minutes	At least 20 minutes
12lb	At least 60 minutes	At least 25 minutes
30lb	At least 60 minutes	At least 30 minutes

At the end of your allotted repair time, you MUST check in with Pit watch for a status update. In certain circumstances, additional time may be available to builders before their next match, however, this is ultimately determined by match schedule and queuing time.

Builders who are not prepared for their upcoming match at the end of their 20 minute repair window may be forfeited at the discretion of Pit Watch, Referees or an Event organizer.

**Disclaimer:** Any builder bringing multiple robots will be expected to manage their repair time effectively. NHRL does not guarantee extra time for builders who bring multiple robots, nor do we guarantee that repair windows will not overlap.

*Due to scheduling and bracket structure, we cannot guarantee that any competitor will have the same amount of repair time as their opponent, only that each robot will have at least 20/25/30 minutes of repair time dependent upon their weight class.*







# MATCH QUEUING, CAGE LOAD-IN, AND UNLOADING

When queuing for, loading and unloading from your match, follow the instruction of event staff. Failure to comply may result in unnecessary scheduling delays, confusion or hazards and may be penalized via the demerit system in extreme cases. If you are unsure what to do or where to go, seek out the proper personnel for assistance or inquire at the “Pit Watch” desk. For more information on our queueing, load-in and unloading procedures, see our ‘Event Operations’ Manual (coming soon).

## EVENT SAFETY

At NHRL, Safety is our #1 priority at all times when it comes to robot combat. While combat may look dangerous and exciting in the cage, we work hard to ensure that that excitement stays in the cage. Our safety rules extend to a variety of processes and locations including but not limited to safety inspection, pit behavior, and match load-in and unloading. Failure to comply with safety rules and procedures may result in a penalty via demerit system at least, all the way up through forfeiture from an event, or a ban period.

At NHRL, we use an escalating system of consequences, known as the Demerit system. Typically one infraction results in one demerit. However, Referees, Pit-watch staff, Safety officials or Event organizers may assign multiple demerits at their discretion depending on the severity of the infraction. Demerits are recorded by team, not by builder or robot. Demerits accrued reset after each event.

-  1st infraction: Yellow Card - Warning
-  2nd infraction: Orange Card - Match forfeit
-  3rd infraction: Red Card - Event forfeit
-  4th infraction: Black Card - Year forfeit

Each infraction recorded is accompanied by a debrief, during which a referee or safety official will discuss the incident and how to improve safety. We understand that accidents happen, especially in high stress environments. If you receive a demerit, don't panic- it is not a personal slight. We will do everything in our power to ensure a safe environment for all competition attendees, and will work together to correct the safety issues in question.

Demerits may also be given out for unsportsmanlike behavior. At NHRL we strive to create a competitive, comfortable, and fun environment.

## SAFETY INSPECTION

At the beginning of every event, robots must pass a safety inspection, during which a safety official will ensure your robot is in compliance with all design and safety rules. Robots that do not pass safety inspection will be unable to compete. **Safety inspection may only be open for a limited period of time**, so be sure to get your robot checked as early as possible. Contact pit watch, safety officials or an event organizer for specifics on inspection availability.



This process includes:

- Robot weigh-in
- Including alternate configurations and spare robots.
- Weapon Lock/Weapon cover checks
- Radio Fail-safe Testing for weapon and drive systems
- Demonstration of general design requirements:
- Active weapon and controlled motion
- Switch/removable link operation
- Any other functional, weight or design requirements specific to the robots design or weapon type (see Robot Design Rules for specifics)

After successful completion of safety inspection, your team captain or robot driver will be given a robot badge to attach to their builder ID. This must be kept with you at all times, as demerit marks are recorded on it.

## THE PITS & ROBOT REPAIR

In order to ensure a safe environment for both builders and staff, it is imperative that builders are not only aware of, but fully compliant with our pit safety rules. Just because your bot isn't actively fighting doesn't mean it, or the environment around it, is not hazardous!

Though alcohol is served at NHRL, it is **never** allowed in the pits or workshop, nor is any active competitor or team member allowed to drink. Alcohol and power tools do not mix.

### BATTERY CHARGING

- Any time a battery is charging, it must be attended by a builder or team member.
- Any Lithium chemistry battery must be charged using balance leads.
- If a battery catches fire or presents a safety hazard, make the situation as safe as possible and alert NHRL staff immediately.
- Though not required, it is good practice to have a lipo-safe bag and fireproof resistant gloves nearby when charging.

### HAND AND POWER TOOLS

Safety glasses and other appropriate PPE must be worn while working with power tools in the pits or machine shop. See a member of pit watch, safety inspection, or workshop staff if you are unsure what qualifies as appropriate PPE.

- **Power tools that produce sparks, dust, or shrapnel** may only be used in the workshop or in the designated "cutting and grinding" area in the pit.
- **Power tools that produce flames or lasers** may only be used in the workshop shop.
- 3D printers are allowed, but may not be left running overnight.



## WEAPON LOCKS

A weapon lock is defined as a mechanism or component that will keep your weapon from being dangerous when your robot is not in the ring. Weapon locks are required during loading and unloading into the ring or test boxes. All robots with an active weapon must have a weapon lock. Failure to follow rules will result in a penalty via the demerit system.

When a weapon lock must be used:

- During robot load-in and unloading from a cage or test box.
- Any time your robot is in transit from one location to another.

Anytime your robot is powered on at NHRL, unless otherwise instructed by a referee, cage manager, pit-watch staff, or safety official.

### What works well as a weapon lock:

- A metal pin, plug or stop that prevents any rotating or translating weapon from spinning, ideally painted or marked with a bright color.
- A plastic or foam cover (such as a pool noodle) over sharp edges, forks or lifters.

### What isn't great as a weapon lock:

- Your hand or any other part of your body
- Anything that can easily fall out or be dislodged.
- Tools such as vice-grips, screw drivers, or clamps

Weapon locks should be a dedicated safety measure and not something that can be misplaced, misconstrued or used for another purpose.

## TESTING YOUR ROBOT

**All robot testing must be done in a test box!** The only exception to this rule is 'Wheels-up' testing for robots with a second dedicated switch for their weapon system.

Robots and/or minibots may not be driven on the floor of the pits, around the competition venue, or outside the test box, regardless of their weapon status.





# ROBOT HAZARD STATION

The Robot Hazard Station is an extension of our pit safety efforts. It ensures that potentially hazardous processes are done in a controlled and safe environment outside of the pits. The station is conveniently located by the load-in dock, en-route between the pits and cages. It's marked with appropriate signage and is blocked off by black and yellow stanchions. Failure to use the hazard station appropriately may result in a penalty via the safety demerit system.

The Robot Hazard Station is designed and equipped for two purposes:

- Firstly, it provides a designated location for builders of robots with flamethrowers, pneumatics, hydraulics, internal combustion engines, jets, rocket engines, ramset charges or airbags to safely load, fill, pressurize and depressurize their systems. Robots fitting into one of the listed archetypes **MUST** perform tasks here. Certain exceptions may be made depending on the weapon type and materials used.
- Additionally, it serves as designated post-fire robot inspection and clean-up station in the event that a robot is rushed out of the building after a match.

## HAZARD STATION RULES

- No more than 3 teams with 2 representatives each may work in the station at a time.
- Use appropriate PPE when working in the station.
- Return all tools to the cart/cabinet.
- Clean any spills or messes created while working.
- Do not charge batteries in the Hazard Station.
- If recovering from a fire, talk to the hazard station attendant for a check-in.

If you have any questions about the Robot Hazard Station, hazardous robot types or best practices, please reach out to **[safety@nhrl.io](mailto:safety@nhrl.io)**.



# FIGHT RULES

## OBJECTIVE

Utilize your robot to disable your opponent's robot by any means allowable by the tournament and design rulesets. The duration of each match is 3 minutes. If both entrants are still mobile at the end of the 3 minute timer, the winner will be declared by judges decision.

These rules only cover head-to-head fights. NHRL does occasionally run fights with more than two competitors ("rumbles"), but they are run as exhibitions. Exceptions for exhibition fights are listed below.

## FIGHT START

The beginning of a match is signaled by an 8 second countdown followed by the words "*Fight, Robots, Fight!*" The match officially begins at the enunciation of the first "F" in "Fight." During the countdown, robots must be at a full stand-still.

Robots must start the match in their assigned corner of the arena and must be oriented such that they fit within the constraints of their classes' respective bounding box size as outlined in **Robot Design Rules**.

## FALSE STARTS

A false start occurs when any bot begins moving or activating their weapon before the match start countdown is complete.

False starts are considered to be unsportsmanlike and may be subject to penalty. False starts may additionally trigger a match reset, additional repair time for the bot that did not false start, or in extreme cases, a forfeit loss for the offending robot.

## FIGHT END

A fight can end in these ways:

### KNOCKOUT

Any robot that is unable to demonstrate **controlled motion** will receive a 10 second count-down. If the countdown is completed, the robot will be considered knocked out and the fight ends.

If the robot successfully demonstrates controlled motion during the 10 seconds or the robot is directly engaged by their opponent, the count-down ends and the match continues.

A robot is considered to be displaying controlled motion if they are capable of moving to a desired quadrant of the cage in a reasonable amount of time and can turn to face the opponent favorably.

For a multibot, a knockout countdown will start if more than 51% of the robot is immobile.

A knockout ends the fight immediately. Any further engagement or attacks will be considered unsportsmanlike behavior and may be subjected to penalty via demerit system.



## TAP OUT

All competitors have the option to “tap out” of their match. This immediately ends the match, giving their opponent the victory. Note that tap out is not considered a “forfeit.” A forfeit implies that the fight was never contested. Tap outs are considered knockouts in NHRL statistics.

Competitors tap out by hitting the TAP OUT button on their side of the cage. If the button doesn’t work, they should inform the referee immediately that they are tapping out.

## JUDGE’S DECISION

If a fight runs the full 3 minutes without a knockout, tap out, or other way of ending, it ends. Competitors must immediately stop engaging their opponent; however, as long as the cage door is not open or in the process of being opened, a competitor may drive around or spin their weapon without engaging their opponent to show which systems on their bot are still functional.

The winner of the fight will be determined by a panel of judges. There are usually 3 judges on a panel, but sometimes there may only be a single judge, if circumstances dictate that.

## DOUBLE KNOCKOUT

If both robots are disabled simultaneously, the referee may choose to count them both out at the same time.

If the countdown finishes uninterrupted, and neither bot shows signs of movement, then the fight will be treated as a **Judge’s Decision**, as above.

## FIGHT STOPPED BY REFEREE

The referee has the option of stopping a fight before the full 3 minutes is over. This generally happens if both bots are stuck together and cannot be easily separated, or there is a safety issue like an arena breach. In this case, the fight will be treated as a **Judge’s Decision**, as above.

## FIGHT RESETS

A fight reset may occur at the referee, event organizer, or production team’s discretion. This could be for a variety of reasons including but not limited to technical faults within the box or facility, safety concerns, or false starts.

When a fight reset is called, robots must stop fighting immediately. Both robots are then repositioned to their starting corners, and the fight timer is reset.

## UNSTICK ATTEMPTS

During the course of a fight, robots may get flipped or stuck in an orientation such that they cannot demonstrate controlled movement. In each match, competitors are entitled to one **unstick attempt** from the house bot. However, in the event that the house bot is unable to perform an unstick whether by faults or malfunctions internal or external to the house bot, the referee will notify the competitors and their allotted unstick attempt will be waived.



**IMPORTANT:** There is **no guarantee** that an unstick attempt will be successful. Additionally, it is possible that either robot may get damaged or end up in a less favorable position than they started when the unstick attempt was called.

When an unstick attempt is called, the housebot will drive to the impaired robot and try to right/free/reorient it. The effort will start slowly and deliberately, then gradually become more forceful.

Calling for an unstick attempt does not pause the match, or mandate that your opponent stop attacking.

Unstick attempts may be initiated automatically in the event that a robot cannot demonstrate controlled motion. Alternatively, competitors may verbally call for their unstick attempt at any point in the match when their mobility is impaired, unless they are being actively engaged by their opponent.

An unstick attempt officially starts once the house bot has made contact with the immobile robot and will generally last no longer than 20 seconds.

In the event that a competitor's opponent has impeded a house bot's unstick attempt, the house bot driver may spend additional time performing the unstick at their discretion. Additionally, the house bot may retaliate against any robot that takes aggressive action against it, regardless of whether or not it is with the intent of delaying an unstick.

## **DOUBLE-UNSTICK**

A Double-Unstick occurs when both robots are interfering, stuck on or impeded by each other in such a way that neither can demonstrate controlled motion. Double unsticks function similarly to standard unsticks, however a double-unstick counts for both robots' unstick attempt. A double unstick may be performed as long as one of the two robots still has an unstick attempt available to them.

## **PINS**

A pin occurs when a robot is actively preventing their opponent from moving. This includes, but is not limited to lifting, grappling, blocking, or forcing against a wall.

A pin may not last more than 10 seconds. At the end of the pin, the offending robot must release their opponent by giving them sufficient space to escape.

Holding a pin for longer than 10 seconds, or giving an opponent insufficient space, is considered unsportsmanlike behavior and may be penalized via demerit system. It is at the referee's discretion to determine how much space is sufficient.

## **DISENTANGLEMENT**

Though NHRL prohibits the design and use of entanglement devices, it is still possible that robots may become entangled with each other by accident. If entanglement lasts more than 10 seconds and cannot be rectified by the house bot, the match will be paused and the referee will attempt to separate the robots manually.



During disentanglement, the referee will attempt to free both robots such that both their drivetrains and weapon systems are in operable condition.

If the referee is unable to safely separate the robots, or if either robot is unable to drive at the end of the disentanglement, the match will end and the winner will be determined by judges' decision.

Additionally, if robots get entangled multiple times in the same match, the match will be ended and the winner will be determined by the judge's decision.

## **HAZARDOUS ROBOTS AND BEHAVIOR**

If the referee or event staff deem a robot to be a hazard to the crowd, crew or competitors, or if a robot is inflicting considerable damage to the arena, the referee may elect to end the fight early. In this case, the winner is determined by judges' decision.

Purposeful damage to the arena is considered to be both unsportsmanlike and unsafe, and will be subject to penalty. This includes but is not limited to a forfeit loss for the offending robot.

