

VEX Robotics Competition In the Zone – Referee Guide

Overview

Thank you for your willingness to help make the VEX Robotics Competition a success by volunteering as a referee. Refereeing is one of the most challenging and rewarding volunteer positions in a robotics competition; this document is intended to serve as a guide to help you prepare for your time on the playing field. Please take some time to become familiar with *VRC In the Zone* and the referee's role prior to the event.

Refereeing a VRC competition is different from a traditional sporting event in that the referees actually HELP the competitors avoid breaking rules. For example, you will note in this guide we like to remind team members when they are getting close to an infraction with a warning, rather than watching passively until a violation has occurred.

Referee Position Summary

Referees observe matches, identify rule violations, and enforce the *VRC In the Zone* manual as written. They keep track of all game objects scored and record these results on a score sheet or scoring tablet. The Tournament Manager Operator will then enter this data into the scoring program to calculate and display the match score. Thus, in addition to just enforcing rules, referees play a critical role in ensuring smooth flow of match play and maintaining the pace of the event.

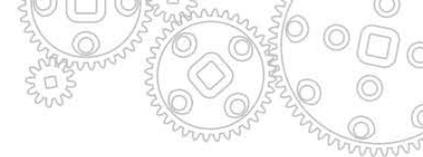
Key Responsibilities of a Referee:

- Ensure that field elements are properly reset before each match.
- Check that teams are placed correctly and prepared for their matches.
- Consistently apply official Game rules to the matches.
- Record the match score via scoring sheets or tablets.
- Discuss possible rule infractions with the Head Referee and/or teams.

Key Skills of an Effective Referee:

- Thorough knowledge of the current game and rules of play.
- Effective decision making
- Attention to detail.
- Ability to work effectively as a member of a team.
- Ability to be confident and assertive when necessary; strong communication/diplomacy skills





Referee Staffing

It is recommended that each tournament have two referees per field, plus one head referee. The head referee is responsible for organizing and overseeing the other referees, and is the final authority on all match related rulings. If your tournament is running a two-field configuration, it is feasible to have one head referee who works both fields. This is contingent on having experienced and well-trained referees working each individual field.

Referees should stand on the sides of the field, with the head referee in the back between the two Alliance Stations. Referees should **never** be in front of the field blocking the audience view.

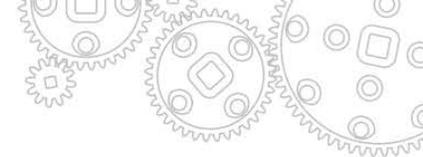
Additional Head Referee Key Roles:

- Training all referees and ensuring that they are fully versed in *VRC In the Zone* game rules.
- Acting as the liaison between the teams and the full referee crew.
- Works with the field manager and/or Event Partner to ensure that matches are proceeding in a timely fashion.
- Works with the lead inspector to ensure that all robots are safe and rule compliant.
- Makes all final scoring decisions and rulings.
- Discusses any rules or ruling questions with teams.

Referee Training and Preparation

In addition to this Guide, the following resources are available to help prepare for your Referee role:

- Official Game Video: https://www.youtube.com/watch?v=1Yo_mIR1VJU
- Official Game Manual: <http://link.vex.com/docs/vex-in-the-zone/InTheZone-GameManual>
- Official Q&A Forum: <https://www.vexforum.com/index.php/conversations/official-in-the-zone-q-a>
- Referee Training Videos: <https://www.youtube.com/playlist?list=PLvvcc7S26YEikwu9x1QQFeF9sexBbPBip>
- Robot Inspection Checklist: http://link.roboticseducation.org/vrceventdocuments_vrcinspectorresources_vrcinspectionchecklist
- Official VRC Hub App:
 - iOS: <https://itunes.apple.com/us/app/vrc-hub/id1102054601?ls=1&mt=8>
 - Android: <https://play.google.com/store/apps/details?id=com.dwabtech.vexhub.vrc>



Referee Task List

The following is a list of the major tasks the referees are responsible for during a match cycle.

Pre-Match:

- Check to make sure game objects are in the correct places after the last field reset.
 - Keep a copy of the proper setup, found in the game manual, near the field.
- Ensure all team members are within the Alliance Station and the correct teams are present.
- Check that each team has securely connected the Field Control Cables to each of their VEXnet Joysticks.
- Make sure that all robots are turned on by checking the LED indicators on the Cortex Microcontroller.
- Make sure that all robots are of a legal starting size and in a legal starting position.

Autonomous Period:

- Watch the team members in the Alliance Station to be sure they do not operate their controls or touch any part of the playing field
 - One way to do this is for all drivers hold their joysticks such that the buttons are facing away from them, signaling to the audience that robots are truly acting on their own.
- Make sure no interaction occurs with the robots, as per <G8> and <G5>.
- Quickly determine who wins the Autonomous Bonus.
 - In the interest of time, do not count the exact score unless necessary. You just need to determine which alliance scored the most - in many cases, it will be obvious.

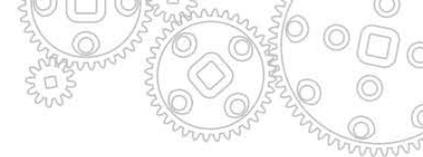
Driver Controlled Period:

- Watch for any instances of Drive Team Members touching robots or breaking the plane of the field, when not explicitly allowed by the <G5> or <SG3>.
- Observe the match and watch for any rules violations, verbally warning teams if necessary.

Post-Match:

- Discuss any rules violations with fellow referees and the Head Referee.
- Score the match, confirming with the Head Referee.
- Once the score is recorded, give an "all clear" signal, so that teams can remove their robots and event volunteers can reset the field for the next match.
 - If needed, it is appropriate for Referees to assist with field reset between matches.
- The Head Referee should complete the score card (or double check the scoring tablet) and submit it to the Tournament Manager Operator.





Referee Tips

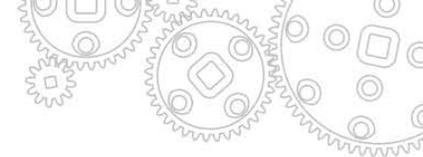
Other than scoring, a referee's primary role is to watch for violations and "call" them. Since the most common penalty in the VEX Robotics Competition is a Disqualification for that Match, *please help to warn and guide teams before they violate the rules.*

The teams have put a lot of time and effort into the competition; it is the philosophy of the VEX Robotics Competition to be helpful rather than punitive when it comes to refereeing.

Other tips include:

- Warn teams if they are close to being penalized.
- Make the necessary calls, even if violations happen unintentionally.
- Be fair and consistent to all teams.
- Be friendly and positive.
- Remember that a referee's job is to enforce the rules as written, not as a referee thinks they should be written. Global consistency is key in ensuring the integrity of competition.
 - Do not invent, modify, or ignore rules.
 - Do not penalize teams who are not playing in a way that a referee "feels" is right.
- If a team violates a rule that calls for them to be disabled, the easiest way to disable them is to have the drivers turn off their transmitters and place them on the ground.
- Be very vocal and visual when making calls. This way the audience and the teams will be aware of what is happening.
 - For example, when counting a team who is pinning, make large arm gestures as you count. This way the team will know that they should back off, and the audience will be aware of the infraction
- Direct all team questions to the Head Referee. The Head Referee should be the **only** person discussing rulings with the teams. When multiple referees are explaining rulings to the teams, inconsistencies in verbiage can easily arise.
- The Head Referee (and only the Head Referee) should explain all controversial rulings and close calls to the teams. This level of communication is a positive experience for the teams.
- When it comes to issues such as Disqualifications, often referees will want to rule leniently to avoid being too harsh. Unfortunately, by not punishing a team for a rules violation, you directly punish their opponent. As unpleasant as it is, if a team violates a rule that is punishable by Disqualification, the team must be Disqualified. It is the only fair thing to do.
- If possible, attend some practice rounds to get the feeling for a typical gameplay and start establishing a match flow a system between all referees and other event staff.





Discussion Points

The following section looks at some of *VRC In the Zone*'s more complex and/or critical rules. It is crucial to become 100% familiar and comfortable with Section 2 of the *VRC In the Zone* Game Manual. This section is intended to be a supplement, not a replacement, for the official manual.

Safety Rules

<S1> If at any time the *Robot* operation or *Team* actions are deemed unsafe or have damaged the *Field Elements* or *Scoring Objects*, the offending *Team* may be *Disabled* and/or *Disqualified* by the determination of the referees. The *Robot* will require re-inspection before it may again take the field.

- a. *Teams* should be extra cautious when interacting with *Scoring Objects*. Damage to *Scoring Objects* can be ruled as a violation of <S1>.

Minor chips or scuffs on Scoring Objects are to be expected as part of normal gameplay. Do not stop a Match or Disqualify a Team if a Cone has suffered minor damage but is still usable. If a specific Robot mechanism is causing repeated damage, ask the Team to fix the problem and get re-inspected.

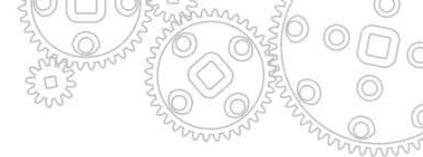
General Game Rules and Definitions

<G1> All *Teams* are expected to conduct themselves in a respectful and professional manner while competing in VEX Robotics Competition events. If a *Team* or any of its members (*Students* or any adults associated with the *Team*) are disrespectful or uncivil to event staff, volunteers, or fellow competitors, they may be *Disqualified* from a current or upcoming *Match*, or even the entirety of the event depending on the severity of the situation.

Be sure to inform your Event Partner if any Teams are exhibiting egregiously uncivil or unethical behavior, as these are factors considered in judging awards. Referees may use the ["Field Note to Judges" form](#) to report egregiously uncivil or unethical behavior, as well as noteworthy positive behavior, to judges.

<G2> When reading and applying the various rules in this document, please remember that common sense always applies in the VEX Robotics Competition.

If a situation arises that is not covered by official sources like the Game Manual or the Official Q&A, Referees are advised to make a common-sense judgment and remember that the student experience should always come first in the VEX Robotics Competition.



<G3> At the beginning of a *Match*, each *Robot* must be smaller than a volume of 18" (457.2 mm) long by 18" (457.2 mm) wide by 18" (457.2 mm) tall. An offending *Robot* will be removed from the match at the Head Referee's discretion.

If a Team places their Robot on the field outside of this size restriction, gently remind them to re-orient their Robot such that it would fit in an 18" cube. If they cannot do so in a timely manner, you will have to ask them to take their robot off the field and start the match without them. This should not be considered a Disqualification or a No Show, since they did arrive to the field on time, but they cannot participate in the Match.

<G5> *Drive Team Members* may only touch the *Team's* controls, *Robot*, and *Scoring Objects* at specified times during a *Match* as per <G5a> and <SG3>. *Drive Team Members* are prohibited from making intentional contact with any *Scoring Object*, *Field Element* or *Robot* during a *Match*, with the exception of the contact specified in <G5a> and <SG3>.

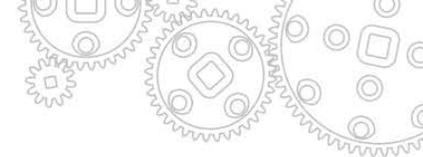
- a. During the *Driver Controlled Period*, *Drive Team Members* may handle their own *Robot* if no part of the robot has moved at all during the *Match*. The type of fixes that are allowed are limited to the following:
 - a. Turning the *Robot* on or off
 - b. Plugging in a battery and/or power expander
 - c. Plugging in a VEXnet Key
 - d. Turning the power expander on or off
- b. *Drive Team Members* are not permitted to break the plane of field perimeter at any time during the match, with the exception of the actions described in <G5a> and <SG3>.

<G5a> is generally known as the "forgot to turn on your robot" rule, and only exists as an aid for completely dead Robots. Once a Robot has moved in any way, it may no longer be interacted with. Note that this interaction is only permissible in the Driver Controlled Period, not the Autonomous Period.

<G7> During the qualification rounds, the red *Alliance* has the right to place its *Robots* on the field last. During the elimination rounds, the higher seeded *Alliance* has the right to place its *Robots* on the field last. Once a *Team* has placed its *Robot* on the field, its position cannot be readjusted prior to the *Match*. A *Team* that violates this rule will have its robots randomly repositioned by the referees.

Generally, Teams will not be too concerned about placement order. However, if an Alliance wishes to invoke this rule, you must enforce it, so it is important to be aware that it exists.





<G10> Any infractions committed during the *Autonomous Period* that are not *Match Affecting*, but do affect the outcome of the *Autonomous Bonus*, will result in the *Autonomous Bonus* being automatically awarded to the opposing *Alliance*.

You can think of violations in terms of "Autonomous Affecting", instead of "Match Affecting".

<G12> Strategies aimed solely at the destruction, damage, tipping over, or *Entanglement* of Robots are not part of the ethos of the VEX Robotics Competition and are not allowed. However, *VEX Robotics Competition In the Zone* is an interactive game. Some incidental tipping, *Entanglement*, and damage may occur as a part of normal game play. If the tipping, *Entanglement*, or damage is ruled to be intentional or egregious, the offending *Team* may be disqualified from that *Match*. Repeated offenses could result in a *Team* being *Disqualified* from the remainder of the competition.

VEX Robotics Competition In the Zone is intended to be an offensive game. *Teams* that partake in solely defensive strategies will undergo extra scrutiny in regard to <G12>. In the case where referees are forced to make a judgment call on interaction between a defensive and offensive *Robot*, the referees will err on the side of the offensive *Robot*.

A *Team* is responsible for the actions of its *Robot* at all times, including the *Autonomous Period*. This goes for *Teams* that are driving recklessly and potentially causing damage, but also goes for *Teams* that drive around with a small wheel base. A *Team* should design its *Robot* such that it is not easily tipped over or damaged by minor contact.

This is a case where the Head Referee will often have to exercise his or her discretion based on the context of the full match. Some examples of behavior that violates <G12> are:

- *Prolonged pushing, high on a Robot, causing them to tip over.*
- *Repeated aggressive contact with a crucial Robot mechanism resulting in damage.*

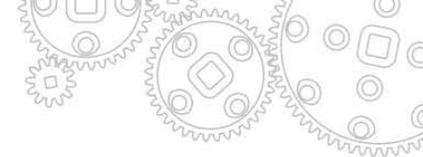
For entanglement to be considered intentional, it should be clear that the offending team attempted to entangle their opponent. Examples include:

- *Reaching into an opponent Robot and deploying a mechanism that is likely to get stuck.*
- *Intentionally grasping an opponent Robot and making no moves to break free.*

Teams who accidentally entangle an opponent should be warned after the match, and re-inspected for compliance with <R3c>.

If there is ever a judgement call between a team who is trying to score, and a team who is trying to play defense, referees should always rule in favor of the offensive team. That said, offensive teams trying to intentionally lure their opponent into penalties cannot be rewarded.





Disablement – A penalty applied to a Team for a rule violation. During Disablement a Team is no longer allowed to operate their robot and the Drive Team Members will be asked to place their controller(s) on the ground.

The tournament software cannot disable Robots mid-match. So, to disable a team, you must ask them to gently place their VEXnet Joystick on the ground. Disablements should be rare – safety rules <S1> and <S2> are the only rules which can call for a disablement.

Match Affecting – A situation that results in a change of the winner and loser of a Match.

Most VRC rules only result in Disqualifications if the violation is egregious or Match Affecting. Therefore, Disqualifications should not be awarded until a Match is over, because that's the only way to determine if the violation changed the outcome of the Match. Any lesser violation should only result in a warning.

Pinning – A Robot is considered to be *Pinning* an opposing Robot if it is inhibiting the movement of an opponent Robot while the opposing Robot is in contact with the foam playing surface and another Field Element.

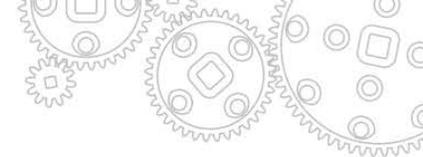
Trapping – A Robot is considered to be trapped if an opposing Robot has restricted it into a small, confined area of the field, approximately the size of one foam field tile or less, and has not provided an avenue for escape.

Trapping is often overlooked, since it can be less obvious than Pinning. However, it can affect a Match just as severely as Pinning, so it is still important to watch for.

<SG4> A Robot may not *Pin* or *Trap* an opposing Robot for more than five seconds during the *Driver Controlled Period*. A *Pin* or *Trap* is officially over once the *Pinning Robot* has moved away and the Robots are separated by at least 2 feet (approximately one (1) foam tile). After ending a *Pin* or *Trap*, a Robot may not *Pin* or *Trap* the same Robot again for a duration of 5 seconds; if a Team does pin the same Robot again, the pinning count will resume from where it left off when the pinning Robot initially backed off.

Pinning and Trapping are some of the more common warnings that you may have to deal with as a VRC referee. If a Pin or Trap begins to occur, be sure to begin a "5-count" immediately by clearly counting out loud and gesturing to the offending Robot. See the associated Referee Training video for more examples and considerations related to Pinning and Trapping: <https://www.youtube.com/watch?v=n-b4mJEC3E>





VRC In the Zone Specific Game Rules and Definitions

Autonomous Bonus – A bonus awarded to the *Alliance* that Scores the most *Cone* & *Goal* points during the *Autonomous Period*.

Parking does not apply to the Autonomous Bonus. Highest Stacks do apply. When awarding the Autonomous Bonus, do not count the exact score unless necessary. You just need to determine which alliance scored the most - in many cases, it will be obvious.

<SG6> *Robots* may not intentionally grasp, grapple or attach to any *Field Elements* or the opposing *Mobile Goals*. Strategies with mechanisms that react against multiple sides of a *Field Element* in an effort to latch onto said *Field Element* are prohibited.

Passive interaction with opposing Mobile Goals, like pushing or covering, is allowed. Attaching to them, such as with a claw, a hook, or a clamp, would be considered a violation.

Possessing – A *Robot* is considered to be *Possessing* a *Cone* if it is carrying, holding, or controlling the movement of a *Cone* in the *Robot*. Pushing/plowing *Cones* is not considered *Possession*; using concave portions of your *Robot* to control the movement of *Cones* is considered *Possession*.

<SG9> *Robots* may not *Possess* more than one (1) *Cone* at a time.

Note: The intent of this rule is not to punish *Robots* for pushing *Cones* that are in their way; that is, *Robots* are free to incidentally drive through *Cones* on the field while *Possessing* a *Cone*. However, **Teams are not allowed to employ Cone hoarding strategies.** *Cone* "hoarding" refers to the act of intentionally plowing multiple *Cones* to a specific location of the field, even with a flat/convex portion of a *Robot*, such that they are kept away from the opposing *Alliance*.

The "hoarding" clause is not meant to be overly restrictive of normal gameplay. The first sentence of the Note is more important than the second. True hoarding (e.g. plowing multiple cones to a corner and blocking that corner) is an extreme and deliberate strategy, and should be rare. If you are seeing actions on the field that could lead to hoarding, warn teams early and often so that there is no confusion if a violation is called.

The following Q&A posts provide some guidance regarding what is and is not legal play:

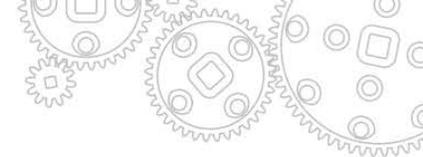
<https://www.vexforum.com/index.php/27573>

<https://www.vexforum.com/index.php/28098>

<https://www.vexforum.com/index.php/28974>

The related Referee Training video also has further advice on interpreting *Possession* and judging SG9 violations: <https://www.youtube.com/watch?v=bmCDly4m01g>





<SG10> Robots may not contact the opposing Alliance's 10 Point Zone or 20 Point Zone.

- a. Robots may not contact an opposing Robot that is contacting opposing Robot's 10 Point Zone, 20 Point Zone, or Starting Bar.

Note that standard defense of the Scoring Zones, such as by driving along the white tape line, is legal. If an offensive robot comes into the Zone attempting to score (e.g. with the intent to place a Mobile Goal or Cones) and a defender violates this rule during their defensive action, <G12> should be referenced and the defender should be penalized. However, if the offensive robot has no intent of scoring (e.g. is not holding a Mobile Goal or Cone) and is simply pushing the defender into the 10 Point Zone to "draw" a violation of <SG10>, the offensive robot should not be rewarded and <G13> should apply.

Scoring Mobile Goals in Zones

5 Point Zone – One of two (2) areas of foam field tiles, one (1) for each alliance, in which *Robots can Score Mobile Goals*. The *5 Point Zone* is defined by the inner edges of the playing field walls, the *Starting Bar*, and the diagonal white tape line.

Note: The tape and *Starting Bar* are considered to be a part of the *5 Point Zone*

10 Point Zone – One of two (2) areas of foam field tiles, one (1) for each alliance, in which *Robots can Score Mobile Goals*. The *10 Point Zone* is defined by the inner edges of the playing field walls, the *Starting Bar*, and the large ~2.375" (60.325 mm) pipe that separates the *10 Point Zone* and the *20 Point Zone*.

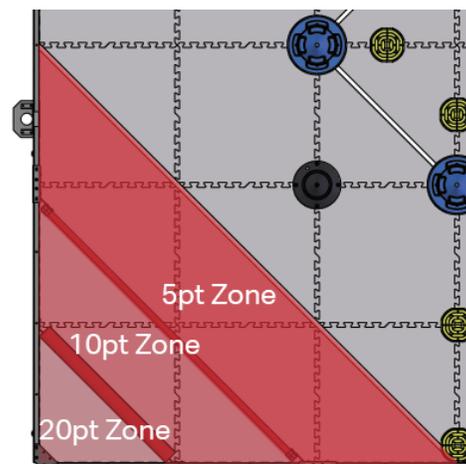
Note 1: The *Starting Bar* is not considered to be a part of the *10 Point Zone*

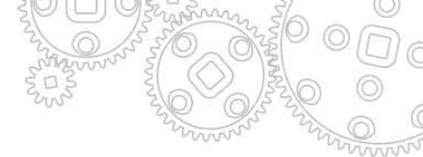
Note 2: The large pipe is considered to be part of the *10 Point Zone*

20 Point Zone – One of two (2) areas of foam field tiles, one (1) for each alliance, in which *Robots can Score a Mobile Goal*. The *20 Point Zone* is defined by the inner edges of the playing field walls and the large ~2.375" (60.325 mm) pipe that separates the *10 Point Zone* and *20 Point Zone*.

Note 1: The large pipe is not considered to be in the *20 Point Zone*.

Note 2: Only one *Mobile Goal* can be Scored in each *20 Point Zone*.





Scored – A *Mobile Goal* is *Scored* in a *Goal Zone* if it meets all of the following criteria:

1. The *Mobile Goal* is touching the *Goal Zone*
 - a. If a *Mobile Goal* is touching multiple *Goal Zones*, it is *Scored* in the higher point value *Goal Zone*
2. The *Mobile Goal* is not touching a *Robot* of the same color *Alliance*.
3. The *Mobile Goal* and the *Goal Zone* belong to the same *Alliance*.

Note 1: Only one *Mobile Goal* can be *Scored* in each *20 Point Zone*.

Note 2: If multiple *Mobile Goals* are in a scored position in a *20 Point Zone*, the *Mobile Goal* with the most *Cones Stacked* will be the one that is *Scored*.

Note 3: If a *Mobile Goal* is not touching a *Zone*, but is entirely *Supported* by other *Scoring Objects* it counts as being *Scored* in the highest value *Scoring Zone* of the *Supporting Scoring Objects*.

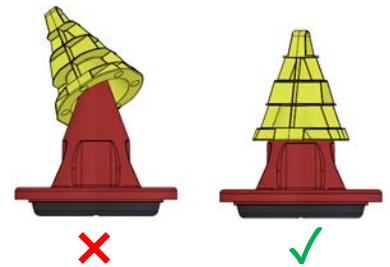
The Zones are not 3-dimensional volumes - they only consist of foam tiles, pipes, and tape. To determine where a Mobile Goal should be Scored, ignore all other Scoring Objects, Robots, or Mobile Goals, and just look at what part of the field it is contacting. Note 3 only applies if it is not physically contacting a field tile, pipe, or tape line.

One way to remember which areas are part of which Zone is to think of the large pipe and Starting Bar as obstacles – if the Mobile Goal made it “past” an obstacle and “touched down” on the other side, even by a small amount, then it is Scored in the higher value Zone.

Stacking Cones on Mobile Goals

Stacked – A *Cone* is *Stacked* on a *Goal* if it is not touching a *Robot* of the same color *Alliance* as the *Goal* and either:

- a) Fully nested on a *Goal* (see Figures 5 & 6 in the Game Manual).
- b) Fully nested on a *Stacked Cone* (see Figures 7 & 8 in the Game Manual).



Note 1: *Cones* still count as being *Stacked* even if the *Mobile Goal* that they are *Stacked* on is not *Scored*.

Note 2: By these definitions, if a *Robot* is touching a *Cone* on a *Mobile Goal*, that *Cone* and any above it will not count as being *Stacked*.

Note 3: *Cones* are not considered *Stacked* unless the *Goal* upon which they are fully nested is upright. *Stacked Cones* on tilted *Goals* are fine (e.g. a *Mobile Goal* resting partially on top of a *Zone* pipe or *Cone*), however *Cones* that are fully nested upon a *Goal* that has been knocked over will not count as *Stacked*. (see Figures 9, 10, & 11)

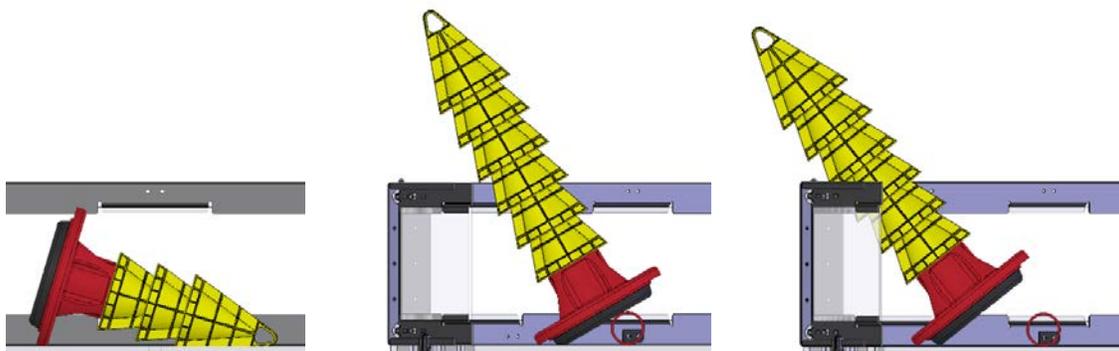
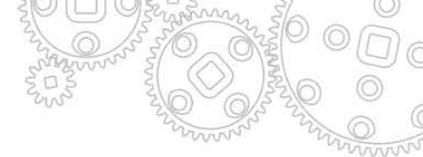


Figure 9 (left): – A knocked over Mobile Goal; these Cones are not considered Stacked

Figure 10: – A Mobile Goal resting on a Field Element (the 20 Point Zone pipe); these Cones are considered Stacked

Figure 11 (right): – A Mobile Goal that is tilted due to its Cones resting on the field perimeter; these Cones are considered Stacked

<SG5> Robots may not intentionally or accidentally, indirectly or directly, remove Cones from an opponent's Stack (i.e. Cones that are fully nested on an opponent's upright Goal).

- a. A Robot that accidentally knocks over an opponent's Goal, causing Cones to be removed, would be in violation of this rule. Teams should exercise extreme caution when interacting with or around opponent Goals.

ANY Match Affecting action that causes Cones to be removed from an opponent's Goal should result in a violation of SG5. Teams should feel comfortable that once a Cone is Stacked, it is not going to be removed.

<SG9> Note 2: Stacked Cones do not count towards the Possession limit. (i.e. A Robot is allowed to control the movement of a Mobile Goal with Stacked Cones). Robots can interact with Cones that are fully nested on upright Goals without those Cones counting towards the possession limit, provided that those Cones would otherwise be considered Stacked if they were not being contacted by a Robot.

This means that Robots can "brace" or "guide" tall stacks without violating the Possession rule. However, when a fully nested Cone is contacted by a Robot, it is no longer considered Stacked, and is thus no longer worth points at the end of a Match; teams need to back away before the clock hits zero.

