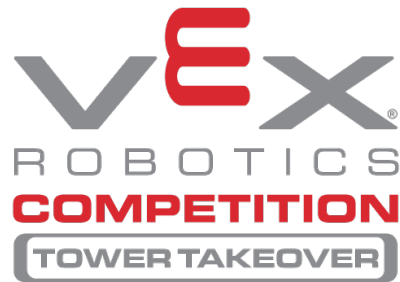


Q&A

VEXU 2019-2020: Tower Takeover

Tagged: R3



Welcome to the official VEX Robotics Competition Question & Answer system, where all registered teams have the opportunity to ask for official rules interpretations and clarifications. This Q&A system is the only source for official VRC Tower Takeover rules clarifications, and the clarifications made here from the Game Design Committee (GDC) are considered as official and binding as the written [Game Manual](#) itself.

Please review the [Q&A Usage Guidelines](#) before posting. This system is only intended for specific VRC Tower Takeover rules questions.

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Minor Field Damage Clarification

G18 R3

A question from one of my team members:

<G18> Replays are allowed, but rare. Replays are at the discretion of the Event Partner and Head Referee, and will only be issued in the most extreme circumstances.

<R3> The following types of mechanisms and components are NOT allowed:

- a. Those that could potentially damage playing field components.
- b. Those that could potentially damage other competing robots.
- c. Those that pose an unnecessary risk of entanglement.

<S1> Be safe out there. If at any time the Robot operation or Team actions are deemed unsafe or have damaged any Field Elements or Game Objects, the offending Team may be Disabled and/or Disqualified at the discretion of the Head Referee. The Robot will require re-inspection before it may again take the field.

In the quarterfinals of a local tournament yesterday, the red alliance ran into a low flag in autonomous in such a way that it pivoted past 90 degrees (which isn't supposed to happen). Red also passed the center line in autonomous and blue scored more points. Here is a recording of the incident.

drive.google.com/file/d/12NUL5WUIM0Lj3L41kPdXv0H2qCM06qZx/view?usp=sharing

After some discussion, the head referee ruled that the damage to the field was too severe to continue playing the match. So, they reset the flag, told the four teams to reset their robots, and restarted the match. This time, red won the autonomous period, and then they ended up winning the match by 3 points (the winner of autonomous was match affecting).

I understand that the head referee's decision is final and that the calls for replays are made at their discretion. But in the same situation in the future, what is the correct call? Is the match replayed? Is the match continued with blue winning autonomous? Is the red robot disqualified or disabled?

Thank you!

Answered by Game Design Committee

First - as you noted, replays are always an option at the discretion of the Head Referee and Event Partner. Once a decision to replay has been made, the previous match is no longer relevant in any Match Affecting determinations, should they arise. Decisions made at an event by a Head Referee are final, and cannot be overturned by Q&A post after the event.

In this specific instance, for crossing the Autonomous Line, the Red Alliance would have been assessed an <SG3> violation and the Autonomous Bonus would have gone to the Blue Alliance.

In the future, over-rotating a Flag does not need to be cause for a replay. However, if done intentionally or repeatedly, it could be considered a violation of <S1>. Thus, <G10> may apply:

<G10> Rules still apply in the Autonomous Period. 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.

- a. Teams are responsible for the actions of their Robots at all times, including during the Autonomous Period. Any infractions committed during the Autonomous Period that are Match Affecting can result in a Disqualification, if warranted by the rule.

If the match had not been replayed, then the over-rotated Flag would have been considered in any Match Affecting determinations (i.e. if the Match ended up being within the point value of one over-rotated Flag).

<G12> How to determine if incidental entanglement is egregious

G12 R3 G13

<G12> Don't destroy other Robots. But, be prepared to encounter defense. Strategies aimed solely at the destruction, damage, tipping over, or Entanglement of opposing Robots are not part of the ethos of the VEX Robotics Competition and are not allowed. 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 Disqualification from the entirety of the competition. b. VEX Robotics Competition Tower Takeover is an interactive game. Some incidental tipping, Entanglement, and damage may occur as a part of normal gameplay without violation. It will be up to the Head Referee's discretion whether the interaction was incidental or intentional.

<R3> Robots must be safe. The following types of mechanisms and components are NOT allowed: c. Those that pose an unnecessary risk of Entanglement.

<G13> Offensive Robots get the "benefit of the doubt". In the case where referees are forced to make a judgment call regarding a destructive interaction between a defensive and offensive Robot, or an interaction which results in a questionable rules violation, the referees will err on the side of the offensive Robot.

Egregious is not defined in the game manual, by Oxford Dictionary
www.oxfordlearnersdictionaries.com/us/definition/english/egregious

extremely bad

the definition of extremely

to a very high degree

extremely is a very subjective adjective, how should one determine if the incidental tipping is egregious? Does the duration of the entanglement(usually starts from the time of entanglement to the end of the game) matter? Does the scoring capability of the robots that are entangled matter(how much points would they score if they are not entangled)? Does the context when the entanglement happened(whether the robot was playing defense or offense) matter? Does R3 come into play as well, and we need to determine whether there was unnecessary risk of entanglement?

Two reference videos:

youtu.be/AGJUjDCF0nQ?t=25953

at 7:12:33 the blue robot was playing defense and has entangled with the red robot. Red won the match so the entanglement is not match affecting.

youtu.be/EXhWerDR03w?t=187

at 3:07 the red robot was playing defense and has entangled with the blue robot. Red was DQed for that match, I couldn't find any other violations in this game other than the entanglement, so I believe red is DQed for "egregious entanglement" since it was not intentional.

Answered by Game Design Committee

extremely is a very subjective adjective, how should one determine if the incidental tipping is egregious?

As you noted, this is a very subjective question. If it was possible to provide a black-and-white definition, then human Head Referees would not be necessary. It is the judgment and discretion of these Head Referees which determines if a given interaction is egregious or not.

We are not going to be able to provide a point-by-point checklist to determine where to draw this line. The answer to

all of your specific questions is, "it could". In general, we would provide the following overarching guidelines:

- Context matters. As noted in [this similar Q&A](#), if a game is played more defensively at a different event, then it would stand to reason that the judgment calls would be handled differently in the context of that event.
- Offense vs defense matters. Per G13, offensive Robots usually get the "benefit of the doubt".
- On-field performance of the tipped/Entangled/damaged Robot generally does not matter. This is why G12 is one of the only rules in the Game Manual that does not hinge upon Match Affecting verbiage, and instead uses "egregious".

Ramming the towers

R3

<R3> Robots must be safe. The following types of mechanisms and components are NOT allowed: a. Those that could potentially damage playing field components such as the field perimeter or Field Elements.

My teams noticed that it is possible to remove a cube placed in a tower by ramming the tower at full speed. This causes the tower to bend and then whiplash back, often dislodging the cube. As an EP my initial thought is that at the drivers meeting I will announce that this strategy is a violation of R3 because of the potential damage it would cause to the towers over the course of a tournament (or even more so over the course of a season). That drivers will be given a warning if it is done intentionally and be disqualified if they continue.

I just completed the referee certification, however, and it mentioned ramming several times in the final test that made it seem like an allowable strategy. My concern is that a pole may take a lot of damage before it breaks/becomes unusable. If ramming is allowed it would hardly be fair to the 20th team who bends the pole to give them a penalty simply because the pole was weakened by the preceding teams.

Are teams allowed to ram the towers intentionally? (obviously if a cube is barely in there and it

Answered by Game Design Committee

Please see this similar Q&A, which appears to be asking the same question: www.robotevents.com/VRC/2019-2020/QA/293

If this does not answer your question, please feel free to rephrase and re-submit.

My concern is that a pole may take a lot of damage before it breaks/becomes unusable. If ramming is allowed it would hardly be fair to the 20th team who bends the pole to give them a penalty simply because the pole was weakened by the preceding teams.

During development of VRC Tower Takeover, this specific scenario was tested by driving a VRC robot into a Tower several thousand times until the Tower failed. We are confident, based on this testing, that the number and severity of impacts needed to cause failure exceeds the realistic number of impacts that any given Tower will see throughout the competition season. Therefore, if a Tower does break as the result of a specific single Robot impact, it is highly likely that Robot has violated some other rule in order to cause that failure (e.g. S1 or G16).

Detaching robots and entanglement

G5 R3

One of my students wants to build a robot similar to this design to the ones featured in the following video but wants to make sure the design is legal before building it. Specifically in the video we are looking at designs that build a wall that detaches from the robot and the only connection is rope/string. www.youtube.com/watch?v=Rznrndditly0

They are concerned firstly that rule G5 is being violated.

<G5> Keep your Robots together. Robots may not intentionally detach parts during the Match or leave mechanisms on the field.

The designers of these robots have defended at length on forums that their designs don't detach mechanisms on the field."

Secondly if this sort of design is allowable within G5 they are also concerned that it would violate

<R3> Robots must be safe. The following types of mechanisms and components are NOT allowed: c. Those that pose an unnecessary risk of Entanglement.

Would leaving behind a trail of 20 feet of rope/string be considered an unnecessary risk of entanglement?
Thanks in advance!

Answered by Game Design Committee

The designers of these robots have defended at length on forums that their designs don't detach because they are connected by rope/string. Is that enough to consider your robot parts still attached?

When there is no VRC-specific definition for a term, a dictionary definition should be used. The Oxford dictionary definition for "attached" is "joined, fastened, or connected to something".

Parts connected by rope/string are, by definition, considered "attached" to the Robot. Therefore, G5 is not being violated if a mechanism is attached solely via rope/string.

Would leaving behind a trail of 20 feet of rope/string be considered an unnecessary risk of entanglement?

In addition to R3, Entanglement is also referenced in G12 (i.e. it is possible for a Robot to pass R3 in inspection, but still violate G12 during a Match).

< G12 > Don't destroy other Robots. But, be prepared to encounter defense. Strategies aimed solely at the destruction, damage, tipping over, or Entanglement of opposing Robots are not part of the ethos of the VEX Robotics Competition and are not allowed. 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 Disqualification from the entirety of the competition.

< G12b > VEX Robotics Competition Tower Takeover is an interactive game. Some incidental tipping, Entanglement, and damage may occur as a part of normal gameplay without violation. It will be up to the Head Referee's discretion whether the interaction was incidental or intentional.

Note: A Robot which has expanded horizontally in an effort to obstruct the field, or is legally covering the top of a Tower in a solely defensive manner, should expect vigorous interactions from opponent Robots. Damage that is caused by opponent Robots pushing, tipping, or Entangling with them would not be considered a violation of < G12 >. Gratuitous damage or dangerous mechanisms may still be considered a violation of <R3>, <S1>, or <G1> at the Head Referee's discretion.

Bearing both R3 and G12 in mind, it is impossible to provide a blanket ruling that would cover all possible hypothetical Robot designs and/or on-field interactions. This is the type of question that requires a human observing the context of a specific Robot and/or Match to provide a judgment call.

So, we will provide the following overarching guidelines as starting points for Head Referees, inspectors, and Teams to use when determining whether a given design/interaction is legal.

1. When inspecting for R3, has the Team done their due diligence in the engineering design process to mitigate the risks of unnecessary Entanglement? While it is outside the scope of this Q&A to provide specific design advice, we would recommend that Teams wishing to utilize this strategy test different thicknesses, attachment methods, lengths, etc in different types of robot-to-robot interactions to minimize unnecessary, egregious, or intentional Entanglement.

2. Does the string on the field pose a likely or strategic possibility of Entangling another Robot? That is to say - is Entangling a primary function of the string (is it a "dragnet" mechanism), or is it simply a means-to-an-end?
3. Any Robot with a mechanism such as the one in the linked video would be taking on some risk of incidental Entanglement. Therefore, if incidental Entanglement occurs, was the Entanglement egregious or intentional? If it was not egregious or intentional, was it the result of vigorous interactions from opponent Robots (per the Note in G12)?

Roller Intakes and Entanglement

R3 Other

Many of this year's robots have a ball intake like a paddle wheel wrapped in rubber bands or elastic (like the attached picture). The rubber bands often get entangled in other robots. How should a referee handle a match when the outcome is dependent on an entanglement? As reference the game manual defines entanglement as:

"Entanglement – A Robot status. A Robot is Entangled if it has grabbed, hooked, or attached to an opposing Robot or a Field Element."

That definition fits this scenario. In addition, rule R3c says:

"The following types of mechanisms and components are NOT allowed: ... c. Those that pose an unnecessary risk of entanglement."

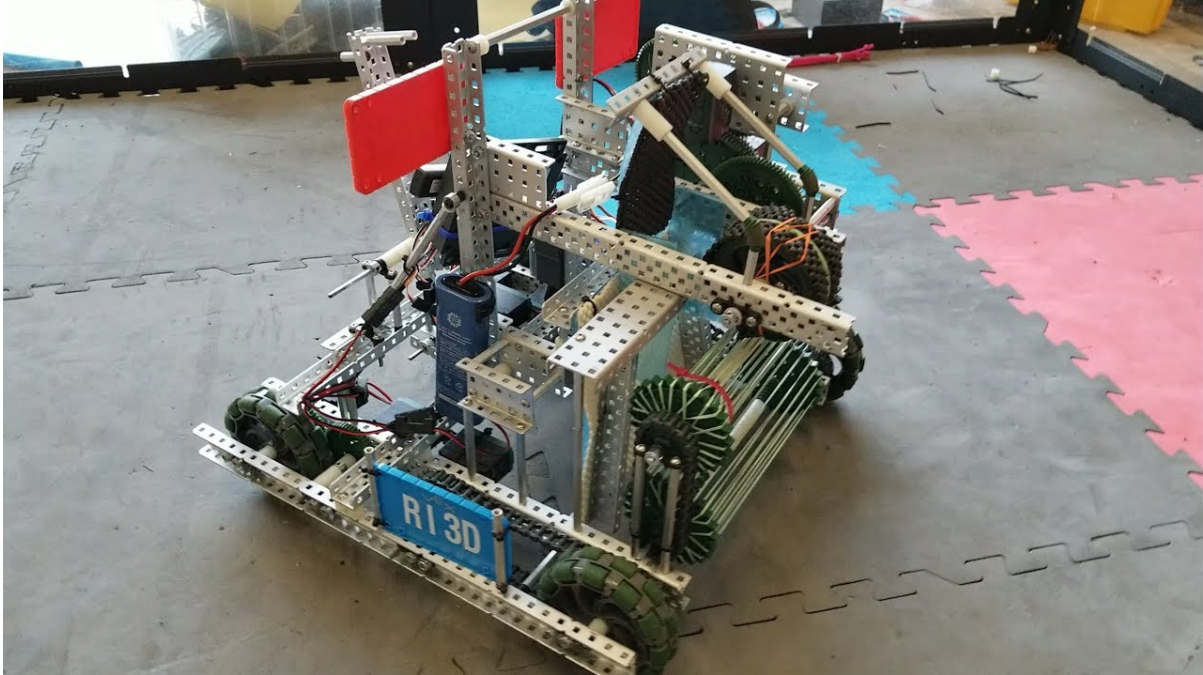
"Unnecessary" is the key word here. There has been no precedent for robots with this type of intake failing inspection (that I know of), and I wouldn't expect that to change now, but I'll still ask. Is this type of intake legal?

Beyond that the rules don't provide much guidance for referees to handle situations where two robots become entangled for a long period of time affecting the outcome of a match. This seems like a question that would have been asked early in the season, and maybe I'm missed it, but I don't see anything in the official Q&A.

The answer might depend on how the entanglement occurred. So here are three scenarios. In each scenario the Red robot has the roller intake that becomes entangled in the blue robot. The entanglement occurs with 30 seconds left in the match and the robots are unable to separate. Neither robot can move or score after being entangled. The final score is 16-15.

1. Red robot is playing defense and engages with blue when entanglement occurs.
2. Blue robot is playing defense. Red robot is playing offense, but does not attempt to protect intake from blue.
3. Red is offense, blue is playing defense aggressively. Red attempts to protect intake from blue, but still becomes entangled. Referee believes that blue purposefully become entangled.
- 4.

(OK one more). Referee didn't see it happen. Red and blue both claim the other is at fault.



Answered by Game Design Committee

Is this type of intake legal?

Yes, the intake in the attached photo appears to be legal, in the context of this question regarding Entanglement hazards (i.e. we can't see if there are any 3D printed parts, or check if the rubber bands are of legal width, etc). The intent of <R3c> is to prohibit mechanisms which serve no primary purpose other than Entangling opponents (e.g. [a net](#)).

Beyond that the rules don't provide much guidance for referees to handle situations where two robots become entangled for a long period of time affecting the outcome of a match.

There are a several key rules that apply in this interaction. First, <G12b>:

b. VEX Robotics Competition Turning Point is an interactive game. Some incidental tipping, Entanglement, and damage may occur as a part of normal gameplay without violation. It will be up to the head referee's discretion whether the interaction was incidental or intentional.

And its related rule, <G13>:

<G13> Offensive Robots get the "benefit of the doubt". In the case where referees are forced to make a judgment call regarding a destructive interaction between a defensive and offensive Robot, or an interaction which results in a questionable rules violation, the referees will err on the side of the offensive Robot.

And finally, <G12c>:

c. A Team is responsible for the actions of its Robot at all times, including the Autonomous Period. This applies both to Teams that are driving recklessly or potentially causing damage, and to 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.

These rules all combine to form the following overarching guideline regarding "rubber band intakes":

- A Robot with this type of mechanism is assuming the potential risk of Entanglement.
- Teams who build mechanisms with Entanglement hazards are responsible for minimizing this risk, or accepting the potential inevitability of becoming Entangled with an opponent.

- A Robot with a "rubber band intake" who becomes Entangled with an opponent generally would not result in a <G12> violation on their opponent, because it is inherently the rubber band Robot's "fault" for assuming that risk, per <G12c>.
- However, that "fault" does not immediately flip to a <G12> violation on the rubber band Robot, because this intake is generally being used for an inherently offensive maneuver, per <G13>.
- In short, under normal gameplay (as judged by the Head Referee), there would be no violations on either Team.
- Of course, all of the above is superceded by <G12> if the Head Referee determines that the Entanglement was intentionally or egregiously initiated by either Robot (e.g. the rubber band Robot is defending and "intakes" their opponent with no Balls nearby or other reason to have the intake; or, the non-rubber-band Robot is defending and puts out a "claw" which is immediately ensnared by the intake).

Clarification on damage and entanglement

G12 R3

Is it legal for a team to make a mechanism that is solely built to purposefully grasp, grapple, or entangle their teammate robot? If this mechanism, as a second hand as a backup strategy, gets used to purposefully grasp, grapple, or entangle opponents robots while center parked, would this also be a legal strategy?

Answered by Game Design Committee

As always, it is impossible to issue a blanket ruling on a hypothetical design. In addition to the first line of G12, the other main rule to consider would be R3, quoted here for reference:

<R3> The following types of mechanisms and components are NOT allowed:

- a. Those that could potentially damage playing field components.
- b. Those that could potentially damage other competing robots.
- c. Those that pose an unnecessary risk of entanglement.

Any mechanism which is designed primarily to Entangle partner Robots, and secondarily to Entangle opponent Robots, could be at risk of violating R3b and/or R3c, depending on the specific nature of the mechanism.

As mentioned in [this Q&A post](#), there are no rules against Entanglement between Robots on the same Alliance. If attempting such a strategy, the best way for Teams to avoid potential issues with R3 and/or G12 would be to protect these hypothetical mechanisms from opponent interaction, or otherwise proactively ensure that they are primarily used for offense, not defense.

Possible rules contradiction between <G12> and <R3>

Center Platform G12 R3

After reading through the manual some more, I have found that there is a possible contradiction in the rules, specifically regarding damage to robots when contesting the center platform. Rule <G12> note 1 states:

Teams who attempt to utilize the Center Platform should expect to encounter vigorous interactions from opponent Robots who are attempting to do the same. Engaging in this gameplay element of VRC Turning Point constitutes an acknowledgement of the risk of incidental tipping or damage, as covered by <G12b> and <G12c>, and waives the protection that is offered by <G12> against destructive interactions.

Which means that the intentional damage of robots is expected and allowed when contesting the center platform. However, rule <R3> states that:

The following types of mechanisms and components are NOT allowed: b. Those that could potentially damage other competing robots.

So it seems the possible contradiction is rule <G12> stating that damaging a robot while contesting the center platform is allowed, while rule <R3> states that mechanisms that could damage robots are not allowed.

My question would be is this a mistake in the rules, or is this stating that we may not make mechanisms *specifically* for damaging robots, and have to use existing mechanisms and/or drive power to contest and coincidentally damage opposing robots on the center platform?

Answered by Game Design Committee

My question would be is this a mistake in the rules, or is this stating that we may not make mechanisms specifically for damaging robots, and have to use existing mechanisms and/or drive power to contest and coincidentally damage opposing robots on the center platform?

Your latter interpretation is correct. R3 still exists independently of G12. For example, picture a "robot puncher" mechanism that served no purpose other than to hit opponents, or a piece of metal that has been sharpened to a point and could cut an opponent's wires. These would be considered mechanisms that could damage robots, and would not be legal.

On the other hand, picture a Robot with a strong enough drive base to push an opponent off of the Center Platform, and the resulting fall causes damage to the opponent. This is the type of tipping or damage that is covered by the G12 note, and would likely not result in a violation.

Most Robot rules could be thought of as "inspection rules" - a robot puncher or a sharp blade should be recognized during inspection as violations of R3, and would never even take the field to risk damaging an opponent (on the Center Platform or elsewhere).

INTENTIONAL tipping off center platform <R3> <G12>

Center Platform G12 R3

Applicable rules...

<R3> The following types of mechanisms and components are NOT allowed: b. Those that could potentially damage other competing robots.

<G12> Don't destroy other Robots. But, be prepared to encounter defense. Strategies aimed solely at the destruction, damage, tipping over, or Entanglement of opposing Robots are not part of the ethos of the VEX Robotics Competition and are not allowed. 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 Disqualification from the entirety of the competition.

Note 1: Alliances who attempt to utilize the Center Platform should expect vigorous interactions from opponent Robots. When a Robot is contacting or engaging with the Center Platform, incidental damage that is caused by opponent Robots pushing, tipping, or Entangling with them would not be considered a violation of <G12>. Intentional damage or dangerous mechanisms may still be considered a violation of <R3>, <S1>, or <G1> at the Head Referee's discretion.

QUESTION...

It's understood that a mechanism on a robot designed only for tipping robots would be disallowed. However, robots may have a mechanism that can flip caps and happens to also be able to flip opposing robots (so the mechanism is legal).

Is it legal for a robot to have their forks, or other mechanism, under an opposing robot (that is attempting to utilize the Center Platform) and lift, or activate their mechanism to lift one side of the opposing robot to intentionally flip them?

The crux of the matter is, should we differentiate between actions that cause incidental tipping, and strategies (not necessarily mechanisms) aimed solely at INTENTIONALLY tipping opponents off the center platform?

Related Q&A posts...

[Possible rules contradiction between <G12> and <R3>](#)

[Questions about <G12>](#)

Answered by Game Design Committee

<G12>, in general, only comes into consideration once a Robot has been tipped, damaged, or Entangled. Most damage that occurs in VRC is incidental; few teams come to the field intending to play combat robotics, as there are many rules against it (<G12>, <G1>, <S1>, <R3>).

With this in mind, Note 1 is intended to act as a clarification that when Robots are engaged in the Center Platform, the line for what is considered "incidental" is different from standard gameplay. Simple pushing and shoving, which would have looked fine on the normal playing field, could now turn into a tipped Robot because of the elevated Center Platform. Note 1 provides a guideline that damage caused by this maneuver should be waived as "incidental". To re-quote Note 1 with portions bolded for emphasis...

When a Robot is contacting or engaging with the Center Platform, **incidental damage** that is **caused by opponent Robots** pushing, **tipping**, or Entangling with them would not be considered a violation of <G12>. **Intentional damage or dangerous mechanisms may still be considered a violation of <R3>, <S1>, or <G1>** at the Head Referee's discretion.

Note 1 does not say whether "intentional tipping" is legal or illegal on the Center Platform, because that question is irrelevant. It focuses on what happens when a Robot has become damaged as the result of a Center Platform interaction, such as tipping. The intent for this is to help draw the thin line between "vigorous interactions" vs "combat robotics" - in other words, "incidental damage" vs "intentionally dangerous mechanisms".

Is it legal for a robot to have their forks, or other mechanism, under an opposing robot (that is attempting to utilize the Center Platform) and lift, or activate their mechanism to lift one side of the opposing robot to intentionally flip them?

As always, it is difficult to provide a blanket ruling on a snapshot description of a hypothetical mechanism. That said, this is getting close to a mechanism that would have the potential to violate some combination of <G1>, <S1>, or <R3>, depending on the context of the interaction, per the last bolded sentence in Note 1 above. Possible referee questions could include:

- Did the team's action compromise the safety of the competition area?
- Has this team been warned before about their mechanism being unsafe / destructive?
- Is this mechanism designed primarily for tipping other Robots?
- Is there something in the mechanism's design that resulted in damage? To be more specific in this hypothetical example - Did it lift the wheels just enough to break traction on the Platform and tip them when they fell off, or was it so powerful that it launched the opponent into the air?