FIRST® RISE™ powered by Star Wars: Force for Change

2019-2020 FIRST® Tech Challenge

Forum Answered Questions
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**General Robot Rules**

09-03-2019, 10:34 AM

Answers to questions about General Robot Rules.

**Tags:** None

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**Stuck**

General Robot Rules - FTC Forum

10-01-2019, 05:35 PM

Vacuum

Originally posted by FTC14188

Q1: Is vacuum allowed if generated by FTC legal motors??

Q2: If vacuum is allowed are air tanks allowed to store that energy?

A1: Yes, vacuum is allowed providing the system that generates the vacuum does not create a higher-than-ambient pressure anywhere in the system.

A2: No, vacuum storage tanks are not allowed.

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**Luke Skywalker**

Game Design Committee Member

Join Date: Sep 2010
Posts: 945

10-01-2019, 05:54 PM

Drivetrain Marks
A: Yes. Rule <I8> allows for marks caused by the COTS wheels. Transfer of paints, dyes, lubricants, etc. from the Robot to the playing field floor is considered Field Damage and will result in a penalty.

Q: According to rule <I8> in Game Manual Part 1, "Discoloration or black marks alone are not considered field damage." Our team is using GoBilda's new mecum wheels, and GoBilda has recently come out with rollers which can be dyed. If small amount of colored dye come off on field tiles during the Field Damage Test, would that be a violation of rule <I8>?

A: The Robot, in it's starting configuration as it sits on the Tile Floor at the start of the Match, must fit into the 18" sizing cube. There is nothing in the rules that says the Robot cannot start tipped on it's side, providing it can remain in that position without outside support (i.e. the Perimeter wall) until the Match has started.

Q: <RG02> states the maximum starting size of a robot must fit into an 18" cube. A cube cut on it's hypotenuse would have it's longest side be 25", allowing for a 25" x 18" drive base. The robot could be measured for compliance by first tipping it on it's side before using the sizing tool. Would a robot having a drive base larger than 18" x 18" be legal if it still fits inside the 18" cube dimensions?

A: Rule <RG06> refers to the image of the Red Square and Blue Circle, they must be solid colors approximately 2.5" in size. They can be mounted on anything you like of whatever size you prefer, as long as no other rules are violated.
Syringe

Originally posted by FTC13804

Q: Follow up question to FTC 14188's question on vacuum storage vessels dated 10-01-2019. Can we use a syringe to create the vacuum? Does the syringe count as a vacuum storage vessel?

A: Pulling a vacuum using a syringe is legal, however reversing the direction of the syringe and forcing air out through tubing can create a positive pressure and is illegal. This is especially true in circumstances where the Stone may be trapped between the gripper and the wall (or other Field Element) which would result in higher than atmospheric pressure in the syringe.

Allowable Vacuum Devices

Originally posted by FTC10138

Q: We know that vacuum systems are allowed as long as they use an approved motor (or servo) for power. Our question relates to COTS air “pumps” that could be modified and used with respect to the one degree of freedom restriction. We know in all cases that air outlets must be unrestricted to prevent any possibility of positive pressure. Would the following be permitted?

1. Q1: Diaphragm style pump. These typically consist of a top flexible diaphragm and two flap “check” valves. Everything moves in the same direction (up down with movement of the diaphragm).
2. Q2: If #1 is not permitted, could the pump be fabricated using just the diaphragm and adding a chamber and valves separately?
3. Q3: A “turbine” style pump with a fan and shroud (similar to most hand vacuums or air pumps)? These consist of an impeller plate and a contoured housing.
4. Q4: A small vacuum pump with rotating spring-loaded vanes? This would be run without flooded oil (but would be lubricated, no more than a chain might be lubricated).

A: A commercial off the shelf (COTS) vacuum pump is not legal if any of the following apply:
   a) if it compresses air in any form. Rule <RG01> applies
   b) If there is more than one degree of freedom (i.e. pistons, diaphram, valves, etc.) Rule <RM02> applies
   c) if the vacuum pump motor is not listed in Rule < RE09>

A1: This would not be allowed as it violates Rule <RM02>
A2: This is legal providing it is designed in such a way that there is absolutely no possibility of positive pressure building up in the system. This is especially important in situations where the Stone may get jammed or if the output ports get blocked. If a jam or blockage occurs and the system can possibly create a
positive pressure, then the device is illegal.
A3: Yes this device is legal. The restrictions in A2 apply.
A4: Yes, this device is legal. The restrictions in A2 apply. Teams must be able to demonstrate to the Inspector that the Stones or playing field will not be contaminated by any residual oil in the system.

**Soft Gripper**

_Originally posted by FTC4096_

_Q: Our team was thinking of creating something like this (sorry, best link I could find): [https://softroboticstoolkit.com/reso...s/soft-gripper](https://softroboticstoolkit.com/reso...s/soft-gripper)_

It would be a gripper made of silicone with an air pocket inside. A linear actuator would move a syringe that would inflate/deflate the gripper to make it grip and relax. I realized that this could potentially be considered a closed gas device. However, we believe it follows the spirit of the rules, as it would not have significant pressure, poses no danger, and would only be constructed using available legal materials. Would this be legal?

_A: Devices that result in above atmospheric pressure of a fluid are illegal. Therefore the soft gripper as described in your question is not allowed._

**Safety Grip Tape**

_Originally posted by FTC3763_

_Q: We are building a claw like device to pick up blocks. Would using safety grip tape on the claws to help hold the blocks be against the rules? The tape would not be on a rotating device or moving in any way to cause damage to the block. Two years ago it was legal and we would like to know if it would be legal again this year._

_A: Yes, the use of safety grip tape as described is legal._

**Masking Tape**

_Originally posted by FTC9979_

_Q: Is using masking tape a legal way to grab stones in this year's game? The ruling on this sort of thing seems to be: you can't use
**A:** Using a sticky substance, like masking tape, in contact with a *Scoring Element* is legal providing there is absolutely no residue. Teams using such a substance may have to demonstrate to the *Robot Inspector* or *Referee* that no residue remains on the contacted surface. If this cannot be demonstrated satisfactorily, the team will have to remove the substance/mechanism. Note that Duct Tape is known to leave a sticky residue [https://www.wikihow.com/Remove-Duct-Tape-Residue](https://www.wikihow.com/Remove-Duct-Tape-Residue) so this would not be a legal material to use in this situation.

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**Luke Skywalker**  
*Game Design Committee Member*  
Join Date: Sep 2010  
Posts: 945

### Number Size

*Originally posted by FTC12644*

**Q:** With respect to Rule <RG05>, When you print out and measure *Arial Font, Bold, 250 point*, you will find that there are very few elements that meet at least in 0.5 inches (1.27 cm) stroke width, and I would say if they did, you would have a blob of text that is hard to read. Our robot inspectors insist that each element of the text have the .5” stroke width. Is the Arial Bold Font 250 Point ok and how can we prove it to the robot inspectors when the stroke width rule appears to contradict this?

**A:** Yes, *Arial Bold Font 250 point* is acceptable. When printed out using *Microsoft Word* the numerals are .5” wide and 2.5” tall and are clear and easy to read. The intent of this rule is to insure that *Field Personnel* can clearly read the team number from outside the playing field during a Match. This should be the primary consideration for the *Robot Inspector*, slight variations from the specification can be allowed providing the rule intent is achieved.

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**Luke Skywalker**  
*Game Design Committee Member*  
Join Date: Sep 2010  
Posts: 945

### Alliance Marker

*Originally posted by FTC5501*

**Q:** In previous seasons the alliance specific flag did not count towards the 18” sizing limit. Is this the case this year? Do the alliance specific markers need to fit within the 18” sizing limit?

**A:** Yes, just like the *Team Number*, the *Alliance Marker* must fit within the 18” sizing limit.
**Mechanism Exchange**

*Originally posted by FTC10107*

Q: Can we interchange our lift mechanism with an intake mechanism in between matches as long as our robot remains within size and weight restrictions?

A: Mechanism exchanges that significantly change the robot's capability must be re-inspected after every exchange and prior to being allowed back on the field. Even if the mechanism has been used in an earlier match, the revised robot must be re-inspected.

**Team Number**

*Originally posted by FTC3848*

Q: Hello wonderful people of FIRST. For this challenge our team is using a modified diamond design robot. Due to the nature of the design we cannot have team numbers 180 degrees from each other. To remedy this we have three team numbers on each side of the robot. It this acceptable? Thank you very much for your time.

A: Yes, this is perfectly acceptable. The intent of the rule is to allow Field Personnel to be able to quickly identify a robot, and having your team number on three sides accomplishes this.

**Team Numbers**

*Originally posted by FTC12592*

Q: We have one of our team numbers mounted on our robot vertically but the numbers are rotated 90 degrees. Is this legal? At our last competition the inspector said he doesn't know if this is ok or not but he let it slide.

A: As long as the numbers can be clearly read by Field Personnel it is ok to rotate the numbers.
**Commercial Off The Shelf Components**

09-03-2019, 10:34 AM

Answers to questions about Commercial Off The Shelf Components.

Tags: None

**Stuck**

09-03-2019, 10:34 AM

Linear Actuators

*Originally posted by FTC13804*

Q: Can students build their own linear actuator from kits or individual parts again this year?

A: Yes, providing it does not violate any other rule.

**Linear Actuators**

10-07-2019, 05:15 PM

Linear Actuators

*Originally posted by FTC13804*

Q: Can students build their own linear actuator from kits or individual parts again this year?

A: Yes, providing it does not violate any other rule.

**Commercial Off-The-Shelf Parts - Linear Slide**

10-16-2019, 07:55 PM

*Originally posted by FTC14165*

**Subject: <RM02> Commercial Off-The-Shelf Parts - Linear Slide**

Question: According to Rule <RM02>, commercial off-the-shelf parts are allowed if they do not violate the single degree of freedom rule. This rule allows linear sliders, but we're unclear on a specific type of...
linear slide: the Cascading X-Rail Slide Kit from ServoCity. Is this part allowed?

https://www.servocity.com/cascading-x-rail-slide-kit

Answer: Yes, the Servocity Cascading X-Rail Slide Kit is an allowed linear slide.

GoBilda Chassis Kit

Originally posted by FTC3805

IQ: is the Gobilda Strafer Chassis Kit legal? It appears to consist of legal parts, so am I required to buy the parts separately from the BOM, or can I just buy the kit?

https://www.gobilda.com/strafer-chassis-kit-no-wheels/

A: Yes, you may just buy the kit.

Karlsson Vacuum Pump

Originally posted by FTC14365

Q1: Is the Karlsson Vacuum Pump, part # ROB-10398 a legal part as long as we change out the motor to an approved motor.

Q2: Also, can a valve be used to release the pressure on the suction cup?

A1: Without knowing the internal construction of the vacuum pump it is impossible to give a definitive yes or no on this device. Any team using this pump will have to demonstrate to the Robot Inspector that it contains only one degree of freedom (and remember, that if it contains valves, each valve counts as one degree of freedom) and that there is no possible way for there to be pressure buildup on the exhaust side of the pump.

A2: Yes, teams may use a valve to restore ambient pressure to the suction cup.
Ratchets

Originally posted by FTC11477

Q1: Section <RM02> of Game Manual 1 says that ratchet wrenches aren't allowed because they have more than one degree of freedom, however if you detach the handle of a ratchet and use the rotating head of the ratchet is that illegal and if so why?

Q2: Secondly, are single direction bearings illegal?

A1: Ratchets are illegal because they contain two degrees of freedom, the Gear and the Pawl each have their own separate degree of rotation. Removing the handle does not change this.

A2: Single Direction Bearings are designed to take axial load in only one direction, they are legal. Based on your question you may be referring to One Way Bearings in which the bearing transmits torque between the housing and the shaft in one direction while allowing free motion in the opposite direction. These are legal.

Universal Joint

Originally posted by FTC16471

Q: We are designing an intake system for our robot and would like to put a 45 degree joint in the axles that rotate our intake wheels. We were thinking about using the universal joints sold by GoBILDA to accomplish this task, but we are not sure if it is considered a legal part since it technically has two rotational degrees of freedom, which potentially violates rule <RM02>. The axles themselves, however, will be in a fixed position and will only have a single degree of freedom. The piece is not all that complex, and we do not believe it violates the intent of rule <RM02>, which is to encourage teams to design their own mechanisms. Given the situation, can we use the GoBILDA Universal Joint on our robot?

A: Yes, universal joints are legal. Since one of the axis of rotation is coupled to the other, like gears in a gear train, this is considered a single degree of freedom mechanism.

Vex Claw

Originally posted by FTC13670

Q: In the illegal parts list there are two Tetrix grippers; however, the VEX claw (https://www.vexrobotics.com/276-2212.html) is not listed
A: Yes, this is an illegal COTS part.

Modified Gripper Parts

Q: Would a modified VEX Gripper Claw on which the Gears, and linkage arms were redesigned, and 3D printed be allowed? Would the redesign and exchange of parts meet RM02, RM04 and the answer #2 of Rover Ruckus Build and Inspection Commercial off the Shelf Components #2

Answer 2: In general, it is legal to remove a single degree of freedom part from a commercial off the shelf multiple degree of freedom mechanism and use the single degree of freedom part in a Robot.

It is legal to use the servo bracket (flat plate with through-holes) from the ServoCity gripper kit in a Robot. It is also legal to add Team designed and fabricated parts to the servo bracket to build a gripper or other mechanism. However, it is against the spirit of rule <RM02> to use the servo bracket and make copies or slightly modified versions of the remaining unused gripper kit parts and build a gripper for the Robot.

A: It is against the rules to use an illegal mechanism. Making minor modifications to improve performance or to get around the restriction is against the spirit of the rules.

Tape Measure

Q: Is it legal for robots to use an off the shelf tape measure to extend during navigating/parking. I found two old forum posts that seem to contradict each other.

“No, the steel rule in the tape measure is a COTS and is not a legal part.”

https://ftcforum.firstinspires.org/f...2095#post12095

“Yes, a tape measure is essentially a torsional spring and is allowed.”
If a tape measure has both a spring and a lock it seems that would be two degrees of freedom, and therefore illegal. If a tape measure does not have a locking mechanism, but only a spring, then I am guessing that is legal. I am also guessing that it is illegal to modify a tape measure that has two degrees of freedom by removing the lock, since modifying an illegal part does not make it legal. Please straighten me out 😊

A: Tape measures are a legal COTS for Skystone.
Raw and Post Processed Materials

09-03-2019, 10:35 AM

Answers to questions about Raw and Post Processed Materials.

Tags: None

Stuck

Glues and Adhesives

10-01-2019, 05:47 PM

Originally posted by FTC4149
Q1: Are "Glue, cement and adhesives" allowed?
Q2: Noting that the examples of allowed materials in <RM01> include both wood and rubber, are wood glue and vulcanizing rubber cements such as are used in tire tube repair kits[/URL] allowed?

A1: Yes, adhesives are allowed. However, some events may restrict the use of certain chemicals, including adhesives, in the venue so please check with your Event Coordinator before using these adhesives.

A2: Yes

Silica Gels

12-02-2019, 03:26 PM
A: Silica gels are bead like particles that are restricted per Rule < RG01.h>.

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Originally posted by FTC8565
Q: Do solid/hard gels count as illegal materials via <RG01>? For example, silica gel (at least the kind for preserving food) acts more like plastic than a liquid.

A: Silica gels are bead like particles that are restricted per Rule < RG01.h>.

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Luke Skywalker
Game Design
Committee Member

Join Date: Sep 2010
Posts: 945

12-17-2019, 10:13 AM

Gels, Part 2

Originally posted by FTC8565

This is a clarification about our previous question:
Our question asked about the legality of solid/hard gels in general and used silica gel as an example. Assuming <RG01.h> doesn't apply (like if we had a sizable cube of the gel rather than the typical small beads), silica gel acts more like a plastic than a liquid. The specific item we were questioning is from https://www.amazon.com/gp/product/B0...?ie=UTF8&psc=1. This item acts like a very soft rubber, but is advertised as a gel.
Q1: Obviously liquid-like gels are not allowed, and assuming <RG01.h> isn't broken, is silica gel allowed?
Q2: If so, where is the line between legal and illegal gels? what about gel adhesives?(we were thinking teams could cut an extra piece open to prove that there's no liquid or anything that could leave residue)
Q3: Is the specific item we linked to above legal?

Unfortunately the term gel is used for a wide range of products with varying characteristics so it is impossible to give a one-size-fits-all answer. But here are the answers to your specific questions:
A1: Yes, a silica gel that is not a liquid and does not violate <RG01.h> is legal.
A2: Adhesives are legal providing they do not violate any other rule. Gel adhesives are just another type of adhesive.
A3: The item mentioned is a solid object and is legal.

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Darth Vader
Senior Member

Join Date: Nov 2013
Posts: 152

Miscellaneous Robot Electrical Parts and Materials

09-03-2019, 10:37 AM

Answers to questions about Miscellaneous Robot Electrical Parts and Materials.

Tags: None

Han Solo
Game Design Committee Member

Join Date: Sep 2010
Posts: 1043

Originally posted by FTC8397

Subject: Use of Camera Flash/Flashlight Allowed

Question: Will use of the Camera Flashlight be allowed during the 2019-20 season? It can be helpful with computer vision tasks. It was allowed during the 2017-18 season. For 2018-19, it was initially disallowed, but that decision was changed, and it was ultimately allowed during 2018-19. Thanks!

Answer: Yes

Last edited by Han Solo; 09-18-2019, 01:59 PM. Reason: update formatting

Luke Skywalker

09-21-2019, 03:13 PM

A: No, the only legal batteries are those listed in Rule <RE03>

Originally posted by FTC12090
GoBilda Battery

Q: Is the goBILDA 12v battery pack using the same cells as the Tetrix and Rev Robotics battery pack in an offset cell layout for spacing going to be allowed this year?

A: No, the only legal batteries are those listed in Rule <RE03>

Originally posted by FTC16072
Subject: COTS LED Module Legality

Question: Sparkfun has an I2C controller for LED strips that also has some LEDs built-in: https://www.sparkfun.com/products/14783 (code here for other FTC teams: https://github.com/ftc16072/2019pres...cLEDStrip.java)

According to GM1, <RE12C>

Technically this has a programmable micro controller on it (ATTiny85), BUT it is not designed to be programmed in the circuit and we are not programming the chip. (ie, we are using what it comes with which is a simple program that accepts I2C commands and uses those to select which lights to light up with which color.

It feels to me that this is within the spirit of the rules since it isn't designed to be user programmed (and we aren't programming it)

Thanks!!

Answer: Yes. Most of the LED interface boards and intelligent sensors have some sort of processor in them. As long as the processor is not user programmable, the part is allowed (if it does not violate other rules)

Last edited by Han Solo; 09-26-2019, 02:13 PM.

Originally posted by FTC4634
Subject: LED Clarification

Question: <RE12-A> States "Focused or directed light sources (for example: lasers and mirrors) are not allowed except for the REV Robotics 2m Distance sensor (REV-31-1505)". Would using LEDs or an LED strip inside a Robot for illumination of Game Elements
Answer: focused or directed in this context is referring to the use of lenses and/or mirrors to concentrate or direct the light in directions that it would not travel naturally.

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**Han Solo**  
Game Design Committee Member  
Join Date: Sep 2010  
Posts: 1043

**Question:** Are electromagnetic solenoids allowed?

**Answer:** No - they fall under <RE17> and are not allowed

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**Han Solo**  
Game Design Committee Member  
Join Date: Sep 2010  
Posts: 1043

**Question:** In <RE17> it specifically says that custom circuits are not allowed. However, can we make a printed circuit board (PCB) that has no components besides connectors? (For example - to convert from one type of connector to another in a way that is less error prone than making our own cables.)

**Answer:** Yes. Care should be taken to make sure all connections are appropriately insulated. Be prepared also to describe/discuss/provide details about the connector conversion board with the robot inspectors at your events. It might be helpful to have an extra or two without covering insulation to be able to show.

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**Han Solo**  
Game Design Committee Member  
Join Date: Sep 2010  
Posts: 1043

**Question:** The team desires a master power disconnect between the
There is nothing in the rules that would prohibit this. This is equivalent to making/extend leads for the battery connection. Make sure to use appropriately color-coded wires of the correct minimum gauges. Be prepared to explain/demonstrate the intended usage to the robot inspectors at your events.

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The combination you describe would be allowed under the current rules. If you are unsure about the wiring of the devices, we would recommend contacting the manufacturers/sellers for advice.

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Yes. The combination you describe would be allowed under the current rules. If you are unsure about the wiring of the devices, we would recommend contacting the manufacturers/sellers for advice.

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Would my team be allowed to use multiple parallel wires of a smaller gauge that when combined, equal or exceed the same cross

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Previously posted by FTC1999

**Subject:** Multi-Conduction Wiring

**Question:** Would my team be allowed to use multiple parallel wires of a smaller gauge that when combined, equal or exceed the same cross

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I'm looking to add a controllable RGB light strip to the outside of our robot for aesthetics and for signaling purposes in TeleOp and Autonomous to the drive team. I've found Adafruit's DotStar LED strips which accept a 5V input and SPI control (https://www.adafruit.com/product/2238) and a non-programmable I2C to SPI bridge module (https://sandboxelectronics.com/?prod...-bridge-module). I would connect the light strip to the SPI bridge module (SCK, SS0, 5V and GND), then from the module the I2C communication channels to an I2C port on the REV Expansion Hub and 5V and GND to an auxiliary 5V port on the REV Hub since the I2C ports only supply 3.3V. I have two questions: Are these acceptable electronic products? They seem to abide by the COTS non-programmable electronics rule and LED light strips have been generally accepted in the past, but I wanted to double-check. Also, do I need to connect the ground of the SPI bridge module to both the REV auxiliary 5V port and the I2C port, or would wiring the ground of the bridge to just the auxiliary port be enough? (SDA, SCL to I2C and 5V, GND to 5V auxiliary)
Answer: No. All wires used in an electrical connection must meet the minimum wire gauge requirements for the connection.

Originally posted by **FTC16461**

**Subject: Alternative Battery Packs**

**Question:** The Modern Robotics battery listed in <RE03> is currently out of stock:

- **b.** Modern Robotics/MATRIX (14-0014) 12V DC battery pack
  (https://www.gobilda.com/matrix-12v-3..-nimh-battery/)

The TETRIX battery is a similar form factor, so it could work as a replacement, but it is considerably more expensive:

- **a.** TETRIX (W39057, formally 739023) 12V DC battery pack
  https://www.pitsco.com/TETRIX-12-Vol...H-Battery-Pack

Is it possible that the Gobilda NiMH Battery (12V, 3000mAh, XT30 Connector [MH-FC], 20A Fuse, 12-20) https://www.gobilda.com/nimh-battery...0a-fuse-12-20/ could be added to the allowable list this year? It matches cell count, mAh and fuse with the other batteries in the list.

**Answer:** The only batteries currently allowed for FIRST Tech Challenge are those listed in Part 1 of the Game Manual.

Originally posted by **FTC8397**

**Subject: Connectors for DIY Power Splitters**

**Question:** We are using two Rev Expansion hubs, a Rev Servo Power Module, and a Rev Resistive Grounding Strap. We plan to use a splitter to connect from a Rev Expansion Hub to both the Servo Power Module and the Resistive Grounding Strap.

From Game Manual Part I, <RE14>e states: "Power distribution splitters are recommended where appropriate to reduce wiring congestion. All connectors and distribution splitters should be appropriately insulated."

We would like to make our own "Y"-shaped splitter with XT30 connectors on all limbs, and limbs connected with either:

- **a.** Appropriately-sized wire nuts (wrapped with electrical tape or shrink
Answer: Both mentioned connectors are allowed when used appropriately (i.e. appropriately sized for the wire gauge and well insulated)

Would these approaches be allowed?

**Answer:** No. Voltage converters fall under RE17 and are not allowed.

**Question:** Can we use a voltage converted something like this one?

We noticed that the Gobilda servo has different RPM on different voltage, for example, on 7.0 voltage, the servo can run 60 rpm instead of 50 rpm.


https://www.amazon.ca/Converter-Volt...TYZ84KFYT6HAV

**Answer:** No. Voltage converters fall under RE17 and are not allowed.

**Question:** RE14(g) says: Power and motor control wires must use consistent color-coding with different colors used for the positive (red, white, brown, or black with a stripe) and negative/common (black or blue) wires.

At our tournament today, our inspector suggested that we ask about this rule for clarification. We use 6 wire coils for our lift. Our motor extension wires as part of the bundle are black and red to match our motors. Our other cables, however, do not match the servo wire colors. We just want to make sure that this is not a problem. We have presumed not, because the leading servo extension cables are a different color than the wires that come on most servos.

**Thanks!**
Answer: Use of a color convention does not require matching colors between connected wires, just a consistent use of the colors that exist.
Darth Vader
Senior Member
Join Date: Nov 2013
Posts: 152

Motors and Servos
09-03-2019, 10:37 AM
Answers to questions about Motors and Servos.

Tags: None

Han Solo
Game Design
Committee Member
Join Date: Sep 2010
Posts: 1043

Originally posted by FTC6155
Subject: Servo Legality

Question: Can you confirm that the Gobilda 2000-0025-0002 servos are legal for this season 2019-2020 game?

Answer: There is no way for us to confirm/deny the legality of individual servos in any reasonable way. <RE10> allows any servo that is compatible with the attached servo controller to be used. In general, this implies that the servo operates at 6v, uses a three-wire PWM type signalling for control, and requires power that fits within the power limits of the servo controller.

Han Solo
Game Design
Committee Member
10-23-2019, 06:59 PM

Originally posted by FTC11477
Subject: GoBilda Motor/Gearbox Combos

Question: Are the GoBilda 5202 Series Yellow Jacket Planetary Motors legal for Skystone 2019-2020. GoBilda is listing them as legal but it doesn't specifically say that they are legal in the manual.
https://www.servocity.com/motors-act...cket-planetary

Answer: Technically, this is an assembly of a motor from MATRIX/Modern Robotics and a gearbox from GoBilda. The motor is allowed, as are single-degree-of-freedom gearboxes.

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Han Solo
Game Design Committee Member

Subject: Removing PreInstalled Encoder

Question: AndyMark NeveRest motors have an encoder attached. It is possible to completely remove this encoder leaving just the 2 motor terminals exposed which is exactly how the approved Tetrix MAX DC motor W39530 is supplied.

Q: Provided we insulate wires connected to the motor terminals to ensure safety, is removal of the NeveRest encoder permitted by <RE15>?

Answer: Yes.

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Han Solo
Game Design Committee Member

Subject: Payload Release Servo

Question: We're wanting to know if the EFLA405 "payload release" servo is legal. (https://www.horizonhobby.com/product...elease-efla405)

Even though it's advertised as "servoless", it clearly has a servo-like motor inside and interfaces with a standard servo port, so we believe it meets the requirements of <RE10> as a linear servo.

However, the EFLA405 also appears to use an integrated spring-loaded pin for the payload release (see video at https://youtu.be/zWGrN9c-2Nk?t=70), and so we wonder if collectively the servo and its integrated release mechanism could violate <RM02> (e.g., more than one degree of freedom for the assembly).

Any guidance on the legality of this device is greatly appreciated!
**Answer:** There is nothing in the rules that currently would prohibit this servo from legal use. It would appear from the very limited documentation that the “daisy chain” port/connection is simply a signal pass-through.

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**Han Solo**  
Game Design Committee Member  
Join Date: Sep 2010  
Posts: 1043

*01-20-2020, 07:35 PM*  

**Originally posted by FTC16147**  
**Subject: Rule RE15 - modifying a servo for continuous rotation**

**Question:**

If the purpose of this rule is safety, then changing a servo to a continuous rotation servo is clearly not violated. The change is entirely mechanical, not electrical, and has no impact to the safety of the motor. The change only makes the servo behave like any other legal off-the-shelf CRServo motor.

In reviewing posts from earlier years, however, there seems to be a consensus that this is illegal. Unless this was explicitly prohibited in earlier years, it must have been considered illegal due to the words “may not be modified internally”. But focusing on those few words ignores the emphasis of the rule which is on safety, and as that relates to electrical modifications. It also ignores that mechanical changes are allowed.

Even considering the change to be illegal because the change is "internal" is not valid because it is simple to remove the external casing of a servo. Doing so would make all changes "external" modifications.

For reference, the changes required to make a servo continuous rotation are:

1. removing a plastic stopper on one of the gears ("changing gear" is allowed).
2. shortening a portion of the protruding shaft so the encoder does not detect changes in the current position ("shortening motor shafts" is allowed).
3. gluing the shortened shaft so it will not move, so the encoder never detects a change in position (tiny drop of glue easily applied)

**Answer:** Modifying a servo to alter it from limited rotation to continuous rotation would fall into the "internal" category of modifications and is not allowed per RE15.
Originally posted by FTC3708

Subject: Servo Power Limits

Question: We don’t really understand the rules on servos. Rule <RE10> states "Any servo that is compatible with the attached servo controller is allowed. Servos may only be controlled and powered by an allowed Servo Controller, REV Expansion Hub or REV Servo Power Module (when used with an allowed Servo Controller or REV Expansion Hub). Servos may be rotary or linear but are limited to 6V or less and must have the three-wire servo connector.

This is further expanded upon in Appendix B - Robot Inspection Checklist: "Servos ...must be compatible with the attached REV Expansion Hub, REV Servo Power Module, or servo controller and not exceed the manufacturer specifications for the controller."

So our question concerns servos like the Savox SA1230SG (https://www.servocity.com/sa1230sg-c...-digital-servo). This servo has a voltage range of 4.8-6.0 V, and a rated stall current of 4.2A (at 4.8V) and 5.3A (at 6V). It seems like the purpose of these rules is to avoid driving a servo at an unsafe voltage or current. So IF the servo controller is capable of generating more than 5.3A of current to a servo motor being held in stall position, then this could clearly be a problem (i.e., if you continued to stall the servo, and the controller would continue to dump current into the servo up to, say, 9A, then you could damage the servo and potentially create a fire hazard).

But the REV Expansion Hub has overcurrent protection (http://www.revrobotics.com/content/d...31-1153-GS.pdf, section 1.3), which limits current output to each pair of servo channels to just 2A (section 1.3). So you could put the biggest servo available on the REV Expansion Hub, and it wouldn't be an issue for either the Expansion Hub OR the servo, because the 2A being provided at 5V (10 W) would still be FAR lower than the servo's power capability.

It appears that this rule <RE10> is being interpreted as, "it is not legal to plug any servo that can handle more than 10 W of power into the REV Expansion Hub," but this doesn't make any sense! If a servo (such as the Savox SA1230SG referenced above) is plugged into the REV Expansion Hub, it will be inherently underpowered, and thus not a safety issue in any way. Why would FIRST care if we bought an expensive servo and used it at a fraction of its potential power?

Now if we WANTED to use the Savox servo at closer to its full potential, we would need to plug it into the REV Servo Power Module, which ups the available voltage from 5V to 6V, and from 2A max to 15A max (assuming that only a single servo is plugged into the REV SPM). But this would never happen because the Savox servo won't try to DRAW more than its max stall current of 5.3A. This would increase the power available to the Savox servo from 10 W (2A @ 5V) to 31.8 W (5.3A @ 6V).

Therefore, we would argue that the Savox servo IS in fact compatible with the REV Expansion Hub (as it is capable of operating at 5V and 2A, and has a standard 3-wire connector), and it does NOT exceed the manufacturer specifications for the controller.

Are we correct, and if not, why not?

Answer: No. Usages of servos that are designed to rely on the over-current protection within the controllers is unwise and unsafe. Robot mechanisms that suddenly become unpowered can collapse/move in unexpected ways.
Stuck
Control System
09-03-2019, 10:39 AM

Answers to your questions about the Control System.

Tags: None

Han Solo
Game Design Committee Member
09-18-2019, 01:57 PM

Originally posted by FTC2818

Subject: Phone Naming Convention

Question:

Is the intent to absolutely exclude -A- from the naming sequence?
Is there no leeway to use the following name sequence for several phones?

2818-A-DS
2818-B-DS
2818-C-DS

The alternate restrictive sequence just looks odd.

2818-DS
2818-B-DS
2818-C-DS

The reason for the question: We call our phone pairs A, B and C when we track charging and programming.
What would you call the first one in this sequence? Blank?
Answer: Your question was posted before the forums were supposed to be open and before the recent update to GM Part 1. The naming guidance was clarified in the 9/9 update.

Answer: an update to Game Manual Part 1 is being released with the current list of allowed phones. The Moto G6 does not appear in the list. The SKU XT1925 has been removed from the E5 list. Teams looking to understand if a phone is allowed should start with the marketing name (i.e. Moto G4 Play), if the marketing name is not found, the phone is not allowed. If the marketing name is followed by a specific list of SKU numbers, only those specific variants of the marketing name are allowed (i.e. some international variants of phone models are not allowed - Moto E4 as an example)

Answer: Update - please see Control Systems Post #7 for an update

Last edited by Han Solo; 11-20-2019, 05:14 PM.
**Han Solo**  
Game Design  
Committee Member  
Join Date: Sep 2010  
Posts: 1043

10-23-2019, 07:31 PM

**Originally posted by FTC6545**

**Subject: Phones not listed in Legal/Illegal Lists**

**Question:** In the game manual some phones like the Samsung Galaxy S5 is on the legal parts list. On the side of that page I saw that those phones are not able to be used in the next year. Our team has got some Samsung Galaxy S7’s that we could use. My question is, can the Samsung S7’s be used in the Skystone tournament, and be allowed though the robot inspections. They are not in the game manual on the legal parts but it isn't on the illegal parts list either. Any help would be appreciated

-Team 6545

**Answer:** Only the phones listed in <RE06> are allowed and will pass inspection. The mis-bullet-ed <RE06>.j.i explicitly states no other devices may be used. It would be impossible to manage a listing of all non-allowed phones. The mention of Nexus 5, Galaxy S5 and ZTE Speed being disallowed next season is to help teams steer away from those models if they are planning to get new phones this season.

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**Han Solo**  
Game Design  
Committee Member  
Join Date: Sep 2010  
Posts: 1043

10-28-2019, 04:38 PM

**Originally posted by FTC16823**

**Subject: Secondary, Custom Driver Station Application for Supplementary Control**

**Question:** What if gamepad input is not enough for us, and we want to use accelerometer and compass signals from Driver Station smartphone? Technically, it should be dedicated process and communication channel on the phone because driver station app doesn't send this data to the Robot Controller.

Thanks.

**Answer:** This would not be allowed. It would violate <RS10>. Only communication allowed is to/from Driver Station Application and the Robot Controller Application.

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**Darth Vader**  
Senior Member  
Join Date: Sep 2010  
Posts: 1043

11-20-2019, 02:09 PM

**Question:** What if gamepad input is not enough for us, and we want to use accelerometer and compass signals from Driver Station smartphone? Technically, it should be dedicated process and communication channel on the phone because driver station app doesn't send this data to the Robot Controller.

Thanks.

**Answer:** This would not be allowed. It would violate <RS10>. Only communication allowed is to/from Driver Station Application and the Robot Controller Application.

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Subject: Motorola Moto G4 Play vs. Motorola Moto G

Q: Previous question #4 in Control has the answer Moto G Play on the phone's about phone Model Number menu item is not legal. In my research the game manual states Motorola G4 Play is the legal model. One set of phones we have has Moto G Play in the about phone model number. When I plug it into Android Studio it is identified as model XT1609. In this wiki page https://en.wikipedia.org/wiki/Moto_G4 The model XT1609 is listed as a Moto G4 Play.

The next time Play is used is at the G6 level. My guess is that since the G4 Play was the first and only Play model at the time, its designation model on the phone is Moto G Play. My belief is that this phone is legal, unless there is evidence to the contrary that I haven't found.

A: The Motorola Moto G4 Play may be sold as either the "Motorola Moto G4 Play" OR "Motorola Moto G Play (4th Generation). These are considered the same phone model and therefore both are considered legal. However FIRST Tech Challenge highly recommends that teams purchase either model number XT1607 or XT1609, as these are the US versions that have been tested and are fully compatible with the FIRST Tech Challenge software. Teams that have purchased phones with model numbers XT1601, XT1602, XT1603, or XT1604 may continue to use these phones as legal, however there is a potential for issues with these phones not being fully compatible with the software. We will continue to test these phones and make sure to publish findings as we have test results.

Updates to the Game Manual Part 1, as well as Answer #4 in this thread will be posted shortly to reflect the above information.

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Subject: Upgrading Phone Battery Pack

Question: Would replacing a Samsung Galaxy S5's battery (which is a 3300mah battery) with a 6600mah battery be permissible? We thought since it doesn't improve the performance (with the exception of battery life) of the phone that it might be legal.

Answer: Yes, as long as the replacement does not require modifying the phone and is done with a COTS battery pack.
**Game Design Committee Member**

**Join Date:** Sep 2010  
**Posts:** 1043

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**Originally posted by FTC11081**

**Subject:** Samsung Galaxy S5 Naming

**Question:** When utilizing the Samsung Galaxy S5, it is impossible to name the phone according to `<RS01>`. The phone automatically adds a [phone] to the beginning of the name, and to the best of our knowledge this feature cannot be turned off. In previous years, there was either a blue box in GM1, or the forum would clarify that the names and are legal **IF** a Samsung Galaxy S5 is used. We would like to make sure that this is still legal.

**Answer:** Yes. This is a known limitation of the phone.

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**Han Solo**  
**Game Design Committee Member**

**Join Date:** Sep 2010  
**Posts:** 1043

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**Originally posted by FTC3848**

**Subject:** Updating OS on Moto G Play (4th Gen XT1609)

**Question:** Hello wonderful people of FIRST! We have the Motorola Moto G Play (4th Gen) XT1609 phones. The latest os version we can update to is 6.0.1. In RSO3 section c they mention the Motorola Moto G 2nd Generation and the Motorola Moto G 3rd Generation. It does not cover our phones the Motorola Moto G 4th Generation, they are not the Moto G4 Play, and we are concerned about possible repercussions in the future. What should we do?

**Answer:** Every reference source I can find for the XT1609 Moto phone suggests that it is capable of being updated to 7.0.1. Updating is to your advantage (improved stability, etc).
Darth Vader
Senior Member

Join Date: Nov 2013
Posts: 152

Answers to questions about sensors.

Tags: None

Han Solo
Game Design Committee Member

Join Date: Sep 2010
Posts: 1043

Originally posted by FTC0365

Subject: Intel RealSense Tracking Camera T265

Question: Hi,

Our team is looking at the Intel RealSense Tracking Camera T265 model, a camera that can perform Simultaneous Localization and Mapping (SLAM) functions. It makes no use of lasers, only two fisheye lenses and embedded electronics that take care of the SLAM computation. The device has a USB cable (UVC compatible) in which position data is received and has no features that would interfere with other robots’ Autonomous or TeleOp routines.

Since the device is only a camera with inbuilt processing (similar to the already allowed Pixy Camera https://pixycam.com/pixy-cmucam5/in a previous season post), is this allowed for competition use? In addition, it is not a directly programmable camera and passive only. There is an Android SDK available to support development.

T265 Camera:
https://www.intelrealsense.com/tracking-camera-t265

Specs sheet:
https://www.intel.com/content/dam/su...5Datasheet.pdf
Answer: Yes.

Thanks,

MOE 365

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**Han Solo**  
Game Design Committee Member

Join Date: Sep 2010  
Posts: 1043

10-23-2019, 07:12 PM  
#3

*Originally posted by FTC7171*

**Subject: USB Web Cameras**

**Question:** What type of webcams are allowed for sky stone detection?

**Answer:** There is no list of allowed cameras. Any USB camera that is UVC compatible is allowed - see Game Manual Part 1 <RE13>

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**Han Solo**  
Game Design Committee Member

Join Date: Sep 2010  
Posts: 1043

12-18-2019, 08:02 PM  
#4

*Originally posted by FTC11081*

**Subject: I2C Interfaces for Non-I2C sensors**

**Question:** Especially with the dropping of Modern Robotics Motor Controllers in the 2020 season, the choices for quadrature encoders are limited. We were wondering if a sensor to convert quadrature output to an I2C input such as [https://www.tindie.com/products/saim...project_buynow](https://www.tindie.com/products/saim...project_buynow) would be legal. It seems to satisfy all applicable rules, as it is not programmable, and can be connected to the Rev Expansion Hub.

**Answer:** Under current rules, this type of interface board would fall into the "<RE17> Additional Electronics" portion of the rules and not be legal/allowed

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**Han Solo**  
Game Design Committee Member

Join Date: Sep 2010  
Posts: 1043

02-04-2020, 02:42 PM  
#5

*Originally posted by FTC13296*

**Subject: Seeking Approval for Custom Sensor Module**

**Question:** Our team has been developing an optical XY odometry...
module. We would like to submit the module for approval and share the module design for use by other teams. We have not come across anything in the FTC resources that provides a procedure for this. Is there an official procedure?

To begin the dialog, let us provide a brief overview of our module.

Our module implements an XY optical odometer with a resolution of 100 counts per inch in either axis. The module connects to two Rev encoder ports on the Control or Expansion hub. The module draws minimal power from the 3.3v lines of the encoder ports. The module produces two wire quadrature signals just like any ordinary optical encoder.

The module uses a commercially available optical sensor (used for open source gaming mice). The sensor has a SPI interface. To translate from the SPI interface to the quadrature encoder signals, an arduino "teensy" is used. We understand that RE17 disallows the use of programmable boards. However, our module does not allow access to the programming capability. We view the function of the teensy more like an interconnect or bridge.

While reviewing the FTC resources and forums, we came across the forum thread (https://ftcforum.firstinspires.org/forum/first-tech-challenge-skystone-presented-by-qualcomm-game-q-a-forum/robot-inspection-and-build-rules-aa/answer). The thread included a comment in a ruling: "If it is used in a module that does not include the user programming, it would be allowed."

We view the module similar to a Rev 2m sensor, the PixyCam or even the recently approved Intel RealSense T265 tracking camera. These are purpose specific modules that include a processor but does not expose it for use. In our specific case, there is no access to the processing capability other than the quadrature outputs.

We realize you will need more than this brief overview for a ruling, but we first wanted to see if there was a precedent. We can provide pictures, links to part datasheets, schematics, power draw, cad files, assembly details and the code running on the teensy as needed.

Regards,
Team 13296 TiGears

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**Answer:** The module as described violates RE17. It is a custom circuit and contains an arduino that is programmed by the user. There is no process for getting it approved. The other sensor modules you mentioned are all commercial products, not team built modules. The post you referenced is a couple of years old. The allowance for SPI-I2C bridges to control LEDs was rolled into a generic interface module description in RE12.c - explicitly only for control of light sources.
Answer: No. The sensor uses an embedded IR laser and violates RE12.a as a result.

Originally posted by FTC7854

Subject: Modified Vex Sensors

Question: We would like to take either the Vex bumper switch [https://www.vexrobotics.com/276-2159.html](https://www.vexrobotics.com/276-2159.html) or the bumper switch v2 [https://www.vexrobotics.com/276-4858.html](https://www.vexrobotics.com/276-4858.html), take the casing off, and 3d print the electrical parts into our claw. In essence, make a 3d printed touch sensor. If we print it so the sensor can be assembled so the electrical components are configured in the same manner as the original bumper switch, would it be legal? It would use COTS electrical components, but with a custom 3d printed case instead of the red and gray plastic it comes with.

Answer: No. This is not a modification, but rather a disassembly and reconstruction using parts of the original sensor. The modifications described appear fall under the "modified internally" portion of RE15 ... i.e. the entire internals are removed and built into a completely separate device.

Originally posted by FTC11104

Subject: Breakout Board for Analog Sensor Chip

Question: Hello,

We would like to know if the following contraption is legal.

An analog voltage sensor is mounted to a team-designed PCB that contains only the sensor and passive components as recommended by the sensor manufacturer.

The way we read the rules, this is legal. Rule <RE11> d. states that "Voltage sensors are allowed; except on an output port of a motor or servo controller." Our voltage sensor should be legal, since it isn't being used in either of the exempted scenarios.

Additionally, a forum by the title “Custom Sensor PCB” asked by FTC 6081 on 11/22/2016 asks the question "Is it legal for a team to use a sensor if it is a manufactured sensor mounted on a custom printed circuit board containing only passive components as recommended by the sensor manufacturer?"
The GDC answered, “Yes. Be prepared to show a schematic of the circuit to the inspectors and discuss/describe the design as part of the robot inspection process.”

See the attached diagram for more context.

Is our described part legal?

Thanks!


Answer: <- deleted original "yes" answer ->

Update: It has come to our attention that the actual usage of the breakout board was NOT to use it as a simple sensor, but as a multiplexer to allow access to several sensors. The ruling is amended to a NO, as a sensor multiplexer clearly violates the “additional electronics” portion of the robot rules.

Last edited by Han Solo; Today, 12:20 PM.
Robot Software Rules

09-03-2019, 10:00 AM

Answers to questions about Robot Software Rules.

Tags: None

Stuck

10-01-2019, 12:48 PM

Originally posted by FTC4634

Subject: Distribution of Team Generated Robot Controller APK to other Teams

Question: We created a library, EasyOpenCV, which drastically simplifies the process of getting custom OpenCV computer vision code up and running in the FTC SDK. We'd like to be able to support not only teams that write their code using Android Studio (the current situation) but also teams that use OnBotJava. However, due to the way that OnBotJava is implemented, the library runs into some runtime issues if the JAR file is simply loaded into the “libs” folder of OnBotJava. But, if the app is built with the library from Android Studio, then the library can be used from OnBotJava without any issues. Therefore, we are considering providing a pre-built RobotController APK that would be built simply from the stock SDK with our library added. The resulting APK would be certainly legal if built directly by a team, as it would not violate <RS09> in any way. However, we want to make sure it would be legal for another team to use that pre-built APK in a competition before we do so.

Answer: While your offer to help other teams is generous, and not technically
violating any rules, the GDC cannot recommend or endorse this offer. There are a couple of reasons:

- a team using your pre-built APK may lose functionality at an event if their app needs to be reinstalled and your version is not available.
- event support personnel (FTA, CSA, etc) will not be able to provide support for teams using this APK.
- if FIRST releases a mandatory update to the SDK, your team's build/release process may make it difficult/impossible for the other team(s) to comply with the required update.
- the risk of malicious code, if others offered similar APK options to teams.

If you wished to provide support for the OnBotJava teams, we would recommend creating a whitepaper that allows teams to build their own APK modeled after yours and using your library. This would minimize all of the above risks.

---

**Han Solo**  
Game Design Committee Member

Join Date: Sep 2010  
Posts: 1043

**11-27-2019, 07:05 PM**  
#3

**Originally posted by FTC7171**  

**Subject: Minimum App Versions and Version Mismatches**

**Question:** In our inspection report we found that the driver station and robot controller were different versions. Our driver station is 5.3-64bit whereas the robot controller is 5.0. Is this permitted?

**Answer:** The Robot Controller and Driver Station app versions are required to match per <RS06>. Additionally, your Robot Controller app version does not meet the minimum version requirement in <RS02> (currently the minimum allowed version number is 5.2)
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New Topics FIRST Tech Challenge Blog Calendar Who's Online

Darth Vader
Senior Member

Join Date: Nov 2013
Posts: 152

Team Scoring Element
09-03-2019, 10:40 AM
Answers to questions about the Team Scoring Element.

Tags: None

Luke Skywalker
Game Design Committee Member

Join Date: Sep 2010
Posts: 945

10-01-2019, 03:56 PM

[QUOTE=FTC11026;n74955]
Subject: Capstone Requirements

Q: Last years game had very specific requirements for the team marker. This years game has a team capstone but I can't find any requirements in the game manual. I have read through it twice. Are there no requirements or am I overlooking them?

A: The Capstone is a Team Scoring Element. Rules for the Team Scoring Element are found in Game Manual 1 Section 7.4.

Last edited by Darth Vader; 10-10-2019, 01:04 PM.

Luke Skywalker
Game Design Committee Member

Join Date: Sep 2010

10-01-2019, 04:11 PM

Capstone Dimension
Originally posted by FTC14200

Q: Only going into our second year, we are still struggling to understand the instructions. Could someone please clarify are the dimensions in the manual, for the capstone, for the widest point of the object or the entirety of the object, I.E. a triangle with a 3 inch base, or must the Capstone be a solid minimum size requirement, I.E. rectangle. Thank you for your help.

A: The Capstone does not have to be a solid, 3" x 3" base. The requirement is that if placed in a 3" x 3" x 4" cube, some portion of the Capstone will meet or exceed 3" in both the X and Y dimension. In your example, a triangle with a 3" base and with an apex 3" (or greater) would be legal.

Originally posted by FTC6103

Subject: <TE05> Capstone construction using a Stone or Stone variant

Question: In regards to rule <TE05> "Current season’s Scoring Elements may not be used as the Team Scoring Element." I think this is just a tad vague. Read one way no part of a scoring element can be used, read another a (entire) scoring element can not be used as a Capstone. I'm wondering if we modify a stone from our field, cut it half, shave it down, use pieces of it- tape it back up into a new thing- can that be used as our Capstone?

Answer: No, the Capstone construction described in the question is not allowed. Capstones made from Stones are not allowed per Rule <TE05> (regardless of painting/modifications). Capstones made via 3D printing need to ensure that they are visually distinct from Stones/Skystones. Using the same color and materially the same dimensions would NOT produce a Capstone that is visually distinct.

Expanding or Contracting Capstone

Originally posted by FTC8565

Q: During the game, is the capstone allowed to expand outside of its maximum size or contract to be smaller than its minimum size? This is assuming the capstone fit the size requirements during robot inspection.

A: The Capstone should be inspected with the Capstone in the configuration as it will be used on the field. The Capstone may be compressed (expanded) when held by the Robot but must expand (collapse) to a legal size when put
Capstone Quantity

Originally posted by FTC8297

Q: Can a team bring more than one (type, shape, size, color, material, etc.) of Capstone to a tournament as long as they each meet the game sizing criteria and pass inspection? We understand that only one capstone can be played during each match but did not see any rule or update which limited the number of team supplied capstones we could bring and/or use.

A: Yes, Teams may bring multiple Capstones to an event. Only Capstones that pass inspection may be used in a Match.

Team Scoring Element Dimensions

Originally posted by FTC12231

[FONT=Calibri]Q: At our first QT this season there was quite a bit of confusion regarding our capstone vs acceptable dimensions as specified in TE02. Our capstone is of a rectangular design with dimensions of 4.5”x1.1”x7.8” that will fit inside a volume of 4”x4”x8” space, but will not fit in a space of 4”x3”x3”. It accomplishes this by residing on a 45

A: As long as there is at least one orientation where the Capstone meets both the minimum and maximum dimensions, the Capstone is legal. Angling the Capstone is a perfectly acceptable method for achieving the requirement.

Flexible Team Scoring Element

Originally posted by eraitt2018

Q: One of the teams at our weekend Qualifier brought a Team Scoring Element that was effectively a set of connected Zip-Ties with a loop of masking tape. The Element itself was very flexible, and fits in the minimum required dimensions. However because it’s just zip-ties, it requires being forced into that very specific position to meet the dimensions, and if dropped to the field (as it had before) it flexes when
A: Flexible Team Scoring Elements (TSE) are legal as long as when they are placed on the Field, Foundation, or Skyscraper they are of a legal size. The fact that a TSE is damaged during Game Play should not disallow the TSE providing it is not a game strategy to change the shape of the goal by running it over.

Does this still sound like a legal design for the Team Scoring Element?
Game Play - All Match Periods

09-03-2019, 10:23 AM

Answers to questions about Game Play - All Match Periods

Tags: None

Yoda
Game Design Committee Member

09-18-2019, 09:48 PM

Originally posted by FTC10131

Subject: <GS3> Control/Possession Limits of Stones/Capstones - Two Scenarios

Rule GS3 says in part: "a Robot may Control or Possess a maximum of one (1) Stone and/or one (1) Capstone. a) Plowing through any quantity of Stones or Capstones is allowed but herding or directing multiple Stones or Capstones to gain a strategic advantage (i.e., Scoring, accessibility, defense) is not allowed."

Question 1: During the Driver Controlled Period, a robot with a stone in its possession drives towards its foundation. In front of the foundation on the playing field is another stone making accessing a desirable part of the foundation difficult. May the robot push the stone on the playing field away, or is this a violation of GS3 (possessing a stone while directing another stone away to improve accessibility)?

Question 2: A robot with a "U" shaped drivetrain base drives to pick up a skystone in the quarry. In doing so, it pushes the two stones on either side of the skystone away from the skystone. Is this legal "plowing" or is this directing multiple stones to gain an accessibility advantage and thus prohibited by GS3?
Answer 1: Yes, a Robot may push Scoring Elements away from a position blocking access to the Alliance’s Foundation. This action is considered to be removing a disadvantage caused by a Scoring Element.

Answer 2: The action described in the scenario is legal plowing and it does not violate rule <GS3>.

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Originally posted by FTC7083
Subject: <GS3> Control/Possession Limits of Stones/Capstones - Moving several Stones in the Quarry

A previously answered question was:

A robot with a "U" shaped drivetrain base drives to pick up a skystone in the quarry. In doing so, it pushes the two stones on either side of the skystone away from the skystone. Is this legal "plowing" or is this directing multiple stones to gain an accessibility advantage and thus prohibited by GS3?

The answer was that the action described in the scenario is legal plowing and does not violate rule <GS3>. To further clarify this question, if a robot with a "U" shaped drivetrain base drives to pick up a skystone in the quarry and in doing so it pushes two stones only on one side of the skystone away from the skystone, is this legal "plowing"?

Thanks!

Answer: The action described is legal Plowing and it does not violate rule <GS3>.

---

Originally posted by FTC16072
Subject: <GS10> Foundation Movement and <GS8> Controlling the Opposing Alliance’s Foundation

According to GS10, "Foundations must remain Completely In the Building Zone. A Minor Penalty will be assessed for every 5 seconds that the Foundation is not Completely In the Building Zone." It doesn’t specify who receives this penalty.

Question 1: Does the alliance who moved it receive this penalty or the alliance whose foundation it is?

Question 2: According to GS8, "Robots may not Control the opposing Alliance’s Foundation when the Foundation is In the opposing Alliance’s Building Site or at any time during End Game." So, if we
Answer 1: The Alliance that moves the Foundation out of the Building Zone violates the rule and is penalized.

Answer 2: This gameplay strategy is not allowed. The action described violates rules <G17> for entanglement of Game Elements, <G29> for amplifying the difficulty of a Scoring or game activity, and <G28> for Egregious Behavior. Rule <GS5> may come into play depending on how the Robot interacts with the Foundations.

Answer: Yes, this is a correct interpretation of rule <GS3>. A Robot may Possess one Stone outside the Foundation plus one or more Stones that are In the Foundation.

Question: Just to be clear, aside from meaning that robots may control > 1 stone that is in the foundation, is it also allowable for that a robot may control stones in the foundation while also simultaneously controlling a single stone that is outside of the foundation? Imagine, for instance, a robot must move or shuffle stones in the foundation prior to, or simultaneous with, placing the stone it had moved over to it - are we to assume this is allowable?

Answer: Yes, provided that the LEDs are powered and controlled using an allowed method specified in the Game Manual Part 1.
Yoda
Game Design Committee Member

Join Date: Sep 2010
Posts: 575

Originally posted by FTC13754

Subject: Launching Game Elements

From the manual: Launching; Propelling Game Elements with enough force such that they can move independent of contact with the Robot or Human Player.

Question 1: If a STONE is released and falls [primarily vertically] from a mechanism, then the STONE is moving independent of contact with the Robot or Human Player. Is dropping a STONE considered LAUNCHING?

Question 2: Imagine an escalator in which the STONE arrives at the top only to fall off the edge with "minimal" horizontal velocity, is this LAUNCHING?

Please advise. Thanks!

Answer 1: No

Answer 2: No

Han Solo
Game Design Committee Member

Join Date: Sep 2010
Posts: 1043

A Note from the GDC about <G28> and Consequences for Intentional Rule Violations

As the season is getting under way, we wanted to remind teams that intentionally violating rules can have significant consequences for the team and potentially the outcome of a match.

We are hearing of teams doing the calculus to determine if intentionally violating rules and accepting the penalties for those rules is a good trade-off ...

Teams should be aware that in addition to the penalties associated with the violated rules, <G28> Egregious Behavior would also apply to instances of flagrant and/or intentional rule violations.

<G28> would add an additional Major Penalty and a Yellow Card. Particularly flagrant violations can result in a direct Red Card in place of the Yellow Card.

As an example, if during the driver controlled period (and before End Game), a Red Alliance Robot drives up to the the Blue Alliance Foundation and pushes it out of the Blue Alliance Building Site and once clear of the Building Site, then uses an arm to knock down the Blue Alliance Skyscrapers that had been constructed.

The Red Alliance Robot is guilty of violating <GS8> and <GS5>. Additionally, the Red Robot is guilty of a <G28> violation for the intentional rule violations. In total, the Red Robot will receive a minimum of 3 Major Penalties (one each for <GS8>, <GS5> and <G28>) and a Yellow Card. This type of violation occurring during elimination match play would result in a Red Card in place of the Yellow Card and a loss of the match for the Red Alliance.
In general, teams should focus on playing the game, not playing the rules.

Good luck and play smart!

- The FIRST Tech Challenge Game Design Committee

Yoda
Game Design Committee Member

10-13-2019, 01:45 PM

Originally posted by FTC12773
Subject: Capstone gameplay strategies.

Question 1: If a Capstone is pre-loaded on a robot, can the robot leave it on the field floor before the end game, and then finally place it on a skyscraper during the end game?

Question 2: In the same vein, can the robot leave it on the foundation before the end game, and then finally place it on a skyscraper during the end game?

Answer 1: Yes, keep in mind rule <G29> for Illegal Usage of Game Elements when selecting a location to place the Capstone.

Answer 2: The action described in the question is Capping; a Scoring activity that is only allowed during the End Game. Zero Capping points are earned in this scenario. The Game Manual Part 2, Section 4.5.4 states that except for Parking, End Game tasks completed prior to the start of the End Game will earn zero points.

Yoda
Game Design Committee Member

10-13-2019, 02:03 PM

Originally posted by FTC7182
Subject: <GS3> Control/Possession Limits of Stones/Capstones - Once a Match begins, a Robot may Control or Possess a maximum of one (1) Stone and/or one (1) Capstone.

Question: GS3 says you can control one stone and/or one Capstone. So, can you control one stone OR one capstone, or are you able to control one stone AND one capstone? Based on the other rule clarifications, it sounds like you can control both a Stone and Capstone at one time, but there is no direct clarification.

Thank you!

Answer: Rule <GS3> allows a Robot to Control/Possess a maximum of one Capstone and one Stone in any combination. For example, the following Control/Possession combinations are allowed:

a) One Stone
b) One Capstone  
c) One Capstone and one Stone

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**Yoda**  
Game Design Committee Member  
Join Date: Sep 2010  
Posts: 575  

11-06-2019, 09:45 PM  

Originally posted by FTC4175  

**Subject: <GS4> Launching Game Elements - Stone**

<GS4> Launching of Game Elements - Game Elements may not be Launched by a Robot or Human Player. A Minor Penalty will be assessed for every Launched Game Element.

Our team has designed an intake system that collects and distributes skystones using a two wheeled intake

**Question 1:** The first three examples in this video show a Stone supported by the floor while it is ejected from the Robot. Is this illegal launching of a game element?

**Question 2:** Examples four through six show a Stone elevated off the ground while it is ejected from the Robot. Is this illegal launching of a game element?

**Answer 1:** Section 4.4 of the Game Manual Part 2 defines "Launching" as "propelling Game Elements with enough force such that they can move independent of contact with the Robot or Human Player." Applying this definition to the first three examples in the video, the Robot's actions are Launching and subject to rule <GS4> penalties.

**Answer 2:** The Stone in examples four, five, and six appears to contact the ground and stop forward motion at nearly the same time as the Stone releases from the Robot. In these examples, a referee is likely to rule that the Stone is not Launched and rule <GS4> penalties will not be applied. However, for the Robot in the video, a Stone ejected from a higher elevation than demonstrated in the video may have forward motion after it is ejected from the Robot; making the Robot's actions subject to rule <GS4> penalties.

**Additional Guidance from the Game Design Committee:** It is the Team's responsibility to design and operate their Robot so that it is obvious that Stones are not Launched. Motion of a Stone outside of the Robot that is caused by...
anything other than direct contact with the Robot (i.e., pushing/pulling) or
gravity (i.e., it falls) is likely to be considered Launching by the referee crew.

Last edited by Yoda; 11-07-2019, 04:01 PM.

Originally posted by FTC3216

Subject: <GS3> Control/Possession Limits of Stones/Capstones -
Clarification questions

I am trying to understand the implications of GS3 and when GS3(a)
comes into play, especially with an eye to unsophisticated bots with
hard-to-use intake/grabber mechanisms.

Represent a field configuration by X=stone and Y=skystone.

Question 1: Given the initial setup XXY, is it allowable for a grabber
to push both X's out of the way at the same time, then grab the Y in
the middle? This seems like a violation of GS3 - controlling 2 stones
and gaining an advantage from doing so.

Question 2: Given a field setup XXYY and a plain old pushbot, is it
permissible to plough through the line moving a bunch of stones (say
XXYY), leaving "X___Y" and then push the remaining single Y to the
other side?

Question 3: A team has trouble controlling a stone and ends up
pushing a bunch to try to get it. Is there any direction they can push
these stones that would make it permissible under GS3(a)? Does it
even matter which way they push?

Question 4: If a robot is controlling a stone, then is ploughing through
a stack of stones on the way to deliver ok?

Rereading the "Control/Controlling" definition in section 4.4 of the Game
Manual Part 2 is helpful for interpreting rule <GS3>.

Answer 1: The action described is Plowing and does not violate rule <GS3> as
previously stated in the "Game Play - All Match Periods" answer thread posts
#2 and #3.

Answer 2: A Referee will probably view the Robot's actions as Herding, a
violation of rule <GS3>.

Answer 3: A Referee is likely to view the Robot's actions as legal Plowing if the
result does not cause two or more Stones to be Delivered during the act.

Answer 4: A Referee is likely to view the Robot's actions as legal Plowing if the
result does not cause two or more Stones to be Delivered during the act.
Game Design Committee Member

Join Date: Sep 2010
Posts: 575

Originally posted by FTC13670
Subject: <GS3> Control/Possession Limits of Stones/Capstones - Opposing Alliance Capstone

Question: At the beginning of the driver-controlled period, a blue robot places its capstone between the two foundations. From that point on, if a red robot touches the blue capstone, will red receive penalty? What if it’s a minor bump and the capstone didn’t move much?
Thank you.

Answer: If the Red Alliance Robot's contact with the Blue Alliance Capstone occurs while the Robot is simply playing the game, it is likely that the Referee will apply rule <G19> and no Penalty will be assessed against the Red Alliance Robot.

Rule <G29> for Illegal Usage of Game Elements may come into play for the Blue Alliance at the discretion of the Referee.

Yoda
Game Design Committee Member

Join Date: Sep 2010
Posts: 575

Originally posted by FTC4634
Subject: <GS3> Control/Possession Limits of Stones/Capstones

A previously answered question was:

At the [redacted] Qualifier, we had a long discussion over the interpretation of this ruling with the Head Referee for our division, [redacted]. He believed that this ruling carried an implicit requirement that a Robot's actions must carry a visual intent of targeting the SkyStone when pushing other stones out of the way in order for the action to be considered "legal plowing". To clarify "visual intent": he believed that if the action of pushing the stones appeared to be a distinct, separate action from the action to grab the SkyStone, then it would illegal, but if the pushing of the stones did not appear to be a separate and distinct action from collecting the SkyStone, then it would be legal. To clarify "distinct action": he believed that pushing the stones, then aligning to the SkyStone would be a distinct action, but if the pushing occurred during the alignment to the SkyStone it would not be a distinct action.

Upon demonstrating to him by hand how the Robot would interact with the Quarry, his conclusion was that he could not provide a definite ruling until seeing it in real time during gameplay, and that if during gameplay he viewed it to not be legal plowing, a minor penalty (which
Answer: The Robot's actions in the video are legal Plowing.

Question: Therefore, we arrive at the point of this post: do the Robot's actions while collecting the SkyStone in the video below constitute legal plowing?
Scoring

09-03-2019, 10:25 AM

Answers to questions about Scoring.

Tags: None

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Yoda
Game Design Committee Member

11-05-2019, 01:01 PM

Originally posted by FTC3708

Subject: Capstone Supported by two independent Skyscrapers

Question: A Capstone placed on top of a level four Skyscraper earns 5 points for the Capstone and 4 points for the 4 levels below it. If a robot creates 2 Skyscrapers of 4 blocks each that are not interlocked, 2 distinct Skyscrapers, and a Capstone is placed across both Skyscrapers, would the score value for levels be 8 points - 4 points for each tower covered by a capstone?

Answer: This Capstone Scoring scenario earns nine points for the Alliance as shown below:

Capstone Value = 5 points
Level Value = 4 points for the four levels supporting the Capstone
Total = 9 points
Forums
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New Topics  FIRST Tech Challenge Blog  Calendar  Who’s Online

Darth Vader
Senior Member
Join Date: Nov 2013
Posts: 152

Pre-Match
09-03-2019, 10:26 AM
Answers to questions about Pre-Match.

Tags: None

Yoda
Game Design Committee Member
Join Date: Sep 2010
Posts: 575

09-21-2019, 08:31 PM

Originally posted by FTC4634
Subject: Section 4.5.1 Pre-Match - Setting up a Robot under the Skybridge and over the tape separating the Loading Zone from the Building Zone.

Question: May a team elect to place their Robot under the Skybridge and over the the tape separating the Loading Zone from the Building Zone during pre-match setup? If so, would the Robot be eligible to earn parking points even if it did not move during the Autonomous Period?

Answer: No, the next release of the Game Manual Part 2 will contain a new setup constraint that prevents pre-Match setup of Robots In a Scoring Location.

Yoda
Game Design Committee Member

10-04-2019, 03:18 PM

Originally posted by FTC9808
Subject: Section 4.5.1 Pre-Match - Pre-Match Robot placement on the Playing Field

"Drive Teams with the concurrence of their Alliance Partner, select their Robots’ starting locations with the following constraints:
1) Drive Teams must place their Robots, in any orientation, touching the Playing Field Wall adjacent to their Alliance’s Driver Station.
2) A Robot may not contact another Robot.
3) A Robot may not start In the Depot.”

Question: Figure 1.3-1 shows distinct left and right positions for each team in an alliance. (ie Red 1 and Red 2) This implies one robot starts on the left and the other on the right. Please clarify that either team may position their robot anywhere in front of their alliance driver station subject to the above constraints. ie.. both robots could start in the Loading Zone if they wish.

thank you

Answer: Your interpretation of the Pre-Match Robot setup constraints is correct. Both Robots on the same Alliance are allowed to start in any legal location on the Playing Field. Robot starting locations are independent from the Drive Team Alliance Station position labels (Red 1, Red 2, Blue 1, and Blue 2) shown in the Game Manual part 2 Figure 1.3-1.

Yes, both Robots on an Alliance may start a Match in the Loading Zone.

Note from the Game Design Committee: An upcoming release of the Game Manual Part 2 will add the constraint that a Robot may not start a Match In a Scoring location.

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Originally posted by FTC10650

Subject: Game Manual Part 2 Section 4.5.1 Pre-Match - Powering Motors During Initialization

Section 4.5.1 mentions that "Robots that require Autonomous program initialization to satisfy the Robot starting volume constraint must be initialized before Referees give the set up complete signal." GM1 mentions that to stay in the 18”x18”x18” sizing cube, robots may be initialized to hold position of servos.

Question: Neither Game Manual makes mention of motors during initialization. Are teams allowed to have motors powered during initialization in order to fit within the sizing cube? (Example: Applying power to keep an arm at a 45 Degree angle to keep it within the sizing restrictions)

Answer: Yes
**Subject: Human Player interaction with the Stone Supply during Pre-Match Setup or during the Autonomous Period**

**Question:** May a Human Player manipulate (e.g. touch, re-arrange) the Stone Supply during Pre-Match Setup or during the course of the Autonomous Period?

**Answer:** Human players should not handle/rearrange the off-field stacks of Stones prior to the start of the Autonomous Period (i.e., this is considered a <G2> violation for adjusting the Game Elements during Match Setup). The Human Player may touch, re-arrange, possess, etc. Stones in the Stone Supply after the Autonomous Period starts.

**Subject: <G3> Pre-Match Robot Placement and <G5> Robot Setup/Alignment - Executing an OpMode during pre-Match setup**

**Question:** Provided that the terms of rule <G5> are not violated, is it acceptable to run an op mode during robot setup/alignment? The op mode we have in mind would not cause the robot (or any part of the robot) to move.

**Answer:** Yes, there is no rule preventing a Drive Team from running an OpMode during pre-match setup. Rule <G3> e) consequences will be applied if the Drive Team unnecessarily delays the beginning of a Match.

**Subject: Providing a Capstone for an Alliance Partner**

**Question:** My team already has our own capstone and will pre-load it on our robot. Can we bring another generic capstone for our partner, when partner is determined, use tape to write their team name, and they use this capstone in competition? We know that each team can only score 1 capstone, so we will only pre-load our own capstone and put that to foundation. The partner needs to bring that to foundation and push it to foundation to score themselves.

**Answer:** No. Adding or replacing a Team number on a Capstone requires re-
inspection before it can be used in a Match. Inspecting a Capstone that is modified each time it is used in a Match is beyond the scope of inspection services provided at a Tournament.

Additional Guidance: The Game Design Committee's intent is for Teams to provide their own Capstone.

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**Yoda**  
Game Design Committee Member  
Join Date: Sep 2010  
Posts: 575

02-05-2020, 09:21 PM  
#8

Originally posted by FTC10138  
Subject: <G5> Robot Setup/Alignment - Detaching an Alignment Device from the Robot

Rule <G5> states:  
Robot Setup/Alignment – Teams may align their Robots during Pre-Match setup if they do so with legal components that are part of the Robot and can be reset to be within the 18-inch (457.2 mm) cube starting volume constraint.

Question: Does that part need to remain physically attached to the robot during alignment use? For a simple example, could a ruler be placed on the robot, removed for measurement during setup, and then re-stowed on the robot (legally within the 18-inch cube) and remain there during the rest of the game. Or, does it require that the part be firmly attached to the robot at all times? Again for a simple example, the same ruler but fastened at one end with a hinge made of gaff tape. It would fold down for use, then back up to be within the volume.

Answer: The intent of the rule is that the measuring device remain physically attached to the Robot at all times. The example of a ruler fastened to a Robot with a hinge made of gaff tape is an allowed construction technique.
Autonomous Period

09-03-2019, 10:26 AM

Answers to questions about Autonomous Period.

Tags: None

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09-17-2019, 10:06 PM

First of all, thank you for citing the appropriate section number in your question.

**Answer 1:** 10 points (10 Skystone points).

**Answer 2:** 12 points (10 Skystone points + 2 Stone points).
Answer 3: 12 points (2 Stone points + 10 Skystone points).

09-18-2019, 09:05 PM

Yoda

Game Design Committee Member

Join Date: Sep 2010
Posts: 575

Originally posted by FTC8565

Subject: <GS6> Blocking Access to the Depot - May Robots purposefully enter the Depot during the Autonomous Period?

Question: May Robots purposefully enter the Depot during the Autonomous Period?

Rule <GS6> states that entering the depot during autonomous will be handled by <G30>. An autonomous route programmed to pass through the opponent's depot would be repeatable and thus wouldn't be inadvertent. Since the depots are useless during autonomous, passing through the opponent's depot would be inconsequential and in line with the rule's intention stated in the orange box (the depots are already blocked by the bricks because of <GS2>, and there are no bricks in the depot during autonomous). (This is assuming that <G30> applies to actions that are both inadvertent and inconsequential instead of individually referring to both as methods of waiving rule violations)

Answer: Robots may enter the opposing Alliance's Depot during the Autonomous Period without incurring rule <GS6> penalties. Robots in the Depot at the end of the Autonomous Period are expected to immediately move out of the Depot at the start of the Driver-Controlled Period.

09-18-2019, 09:34 PM

Yoda

Game Design Committee Member

Join Date: Sep 2010
Posts: 575

Originally posted by FTC10131

Subject: <GS6> Blocking Access to a Depot - Questions about three Autonomous Period scenarios.

Rule GS6 states in part: "Robots may not be In or Block access to the opposing Alliance's Depot. Inconsequential violations of this rule during the Autonomous Period will be handled per rule G30."

Just to clarify:

Question 1: May a robot travel purposely and repeatedly through their opponent's depot to get skystones and stones during the autonomous period without penalty if they end the autonomous period not in the depot and do not violate other rules (e.g., interfering with opponent scoring, etc.)?

Question 2: If a robot has unexpected behavior during the autonomous period and ends the autonomous period in the opponent's depot, but immediately leaves the depot when the driver controlled period starts, will they incur a penalty?
**Question 3:** If a robot during the autonomous period accidentally or purposely pushes one or more stones into their opponent’s depot, will any penalty be incurred? Note that it is possible that this type of activity could have strategic value (e.g., putting a knocked-over stone in the depot corner if a team knows their opponent’s robot cannot pick up stones in a corner or stones that are knocked over, etc.)?

**Answer 1:** Yes

**Answer 2:** No

**Answer 3:** Rule `<G29> Illegal Usage of Game Elements` may come into play at the discretion of the Referee. A single Stone or Skystone in the Depot that is near the taped portion of the Depot area is unlikely to be penalized because it is reasonable to assume that any Robot is capable of moving the Scoring Element out of the way. At the other extreme, several Stones or Skystones pushed against the Playing Field Wall corner of the Depot is more likely to be viewed by the Referee as violating rule `<G29>`.

**Question 3:** If a robot during the autonomous period accidentally or purposely pushes one or more stones into their opponent’s depot, will any penalty be incurred? Note that it is possible that this type of activity could have strategic value (e.g., putting a knocked-over stone in the depot corner if a team knows their opponent’s robot cannot pick up stones in a corner or stones that are knocked over, etc.)?

**Answer:** The Robot’s actions violate rules `<GS2>` and `<G29>`.

---

**Originally posted by FTC10138**

**Subject:** `<GS2> Autonomous Period Interference and <G29> Illegal Usage of Game Elements - Repositioning the opposing Alliance’s Foundation during the Autonomous Period`

We believe (and hope) the intent of the rules would prohibit the following, but the letter of the rules seems to leave a loophole.

- `<GS2>` explicitly prohibits the opposing Alliance from contact or disrupting Stones or Skystones. But no mention of the Foundation is made.
- `<GS5>` explicitly prohibits robots being IN the opposing Alliance’s Foundation. This leaves contact/movement possible from the side face of the Foundation.
- `<GS8>` explicitly prohibits the opposing Alliance from CONTROLLING your foundation when it’s IN your Building Site, or during END GAME. Nothing explicit is mentioned of Autonomous or Driver-Controlled period.

**Question:** Would pushing into the opposing Alliance's foundation side face (and moving it), either directly or by pushing your own Foundation into it, during AUTONOMOUS be allowed (repositioning it to somewhere other than the starting position, but still in the Building Zone)?

**Answer:** The Robot's actions violate rules `<GS2>` and `<G29>`.
Subject: <GS2> Autonomous Period Interference and <G29> Illegal Usage of Game Elements

<GS2> says that robots "may not interfere with the opposing Alliance’s Scoring attempts."

**Question 1:** Is it legal to place a Skystone pattern and/or navigation target on the robot walls with the intent of showing it to opposing Alliance robots and triggering their visual recognition systems? For example, if a team used this strategy and an opposing team failed to score Skystones as a result, would GS2 have been violated?

**Question 2:** If the above strategy is illegal, would it also be illegal to place a plain black rectangle on the robot wall?

**Question 3:** If both of the above are illegal, would it also be illegal to have black robot walls? At what point do aesthetic design choices become violations of GS2?

**Answer 1:** This strategy violates rule <GS2> for interfering with the opposing Alliance’s Scoring attempts during the Autonomous Period. The team provided facsimile of a Skystone image or Navigation Target also violates rule <G29> for for using Game Elements to amplify the difficulty of a Scoring or game activity.

**Answers 2 & 3:** Panels, images, shapes, etc. mounted on the robot that a "reasonable observer" would consider to be a possible source of visual interference for the opposing Alliance Robots are not allowed.

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Subject: <GS2> Autonomous Period Interference - Blocking the opposing Alliance’s Skybridge

<GS2> says that robots "may not interfere with the opposing Alliance’s Scoring attempts."

**Question:** If an autonomous routine drives across the field through the stones it would effectively block the alliance bridge requiring a robot to drive around or under the center bridge. It seems this would violate GS2 for a 20 point penalty, but that would be a very good point trade against an auto that does more than 20 points. Is there any other penalties that can be incurred by just driving straight across the field and potentially hitting the opponent robot?

**Answer:** The following rule violations apply to this scenario if the action interferes with the opposing Alliance’s Scoring attempts:

a) <GS2> for interfering with the opposing Alliance’s Scoring attempt via Blocking Access to their Skybridge.

b) <GS2> violation if the Stones/Skystones in the opposing Alliance’s Quarry are contacted/disrupted.

c) <G18> for intentionally Blocking the opposing Alliance’s Robot.
d) **<G28>** for a flagrant and/or intentional rule violation. See post #8 in the "Game Play - All Match Periods" answer thread for additional details.

Multiple violations of the above rules will occur as appropriate, if the Scoring attempts of both of the opposing Alliance Robots are affected.

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**Yoda**  
Game Design Committee Member  
Join Date: Sep 2010  
Posts: 575  

**11-04-2019, 04:46 PM**

Originally posted by FTC4634  
Subject: **Human Player interaction with the Stone Supply during Pre-Match Setup or during the Autonomous Period**

**Question:** May a Human Player manipulate (e.g. touch, re-arrange) the Stone Supply during Pre-Match Setup or during the course of the Autonomous Period?

**Answer:** Human players should not handle/rearrange the off-field stacks of Stones prior to the start of the Autonomous Period (i.e., this is considered a **<G2>** violation for adjusting the Game Elements during Match Setup). The Human Player may touch, re-arrange, possess, etc. Stones in the Stone Supply after the Autonomous Period starts.

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**Yoda**  
Game Design Committee Member  
Join Date: Sep 2010  
Posts: 575  

**11-12-2019, 08:58 PM**

Originally posted by FTC11115  
Subject: **<GS2> Autonomous Period Interference - Moving the opposing Alliance’s Foundation.**

**Rule GS2** prevents interference with opposite Alliance’s autonomous scoring attempt and specifically stones+skystones as being protected. It is a bit unclear about the foundation and recent streamed events showed very inconsistent referee rulings on this.

**Question:** What if any penalties should be called on the following scenarios that result in the opposite alliance in missing moving their foundation and delivering their stone(s) onto it:

A) Robot accidentally bumps opposite alliance’s foundation out of position. The bump is small, but still results in opposite team missing their foundation.  
B) This time the robot pushes the opposite foundation a significant distance while grabbing their own foundation. It is still unclear whether this is intentional.  
C) Robot clearly intentionally pushes opposite foundation while grabbing their foundation.

The most common scenario witnessed in the scrimmages was teams pushing forward to grab their foundation, resulting in pushing their foundation forward into the opposite team’s foundation.
**Answer:** All three scenarios violate rule <GS2>.

---

**Yoda**  
Game Design Committee Member  
Join Date: Sep 2010  
Posts: 575

11-25-2019, 07:27 PM  
#10

*Originally posted by FTC13380*

**Subject:** <G21> Scoring Elements in Contact with Robots - Stone Delivery

**Question:** During the autonomous period, if the robot takes the skystone from the loading zone to the building zone fully and comes back to park under the bridge without detaching/dropping the skystone, will the team get points for skystone? The robot is still in contact with the skystone but the skystone remains fully in the building zone.

**Answer:** Yes, the Skystone earned the Stone Delivery Score as soon at the Skystone and Robot were both Completely In the Building Zone. A Stone or Skystone in contact with a Robot is still eligible to earn the Stone Delivery points.

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**Yoda**  
Game Design Committee Member  
Join Date: Sep 2010  
Posts: 575

12-04-2019, 07:23 PM  
#11

*Originally posted by FTC16008*

**Subject:** Section 4.5.2 Autonomous Period Navigating Task

**In the rule 4.5.2 Autonomous Period - item 3:**

Navigating - Each Robot that is Parked over the tape separating the Loading Zone from the Building Zone and under their Alliance's Skybridge at the end of the Autonomous Period will earn five (5) points for their Alliance.

**Question:** What does "parked" over the tape and under their Alliance’s Skybridge mean in this instance? Does it mean that just part of the robot (e.g. an arm) be over the tape and under the Skybridge? Or does the robot's wheels have to be over the tape?

**Answer:** Any portion of a Parked Robot that is over the tape and under their Alliance’s Skybridge satisfies the requirement for Navigating. For example, a Parked Robot's arm extending over the tape and under their Alliance’s Skybridge satisfies the requirements for Navigating. A Robot's drivetrain does not have to be over the tape.

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**Yoda**  
Game Design Committee Member  
Join Date: Sep 2010  
Posts: 575

01-06-2020, 03:27 PM  
#12
Originally posted by FTC14433

**Subject: <GS2> Autonomous Period Interference and <G29> Illegal Usage of Game Elements - Foundation movement during the Autonomous Period**

In [https://<b>:</b>.firstinspires.org/forum/first-tech-challenge-skystone-presented-by-qualcomm-game-q-a-forum/game-rules-ab/driver-controlled-period/7](https://firstinspires.org/forum/first-tech-challenge-skystone-presented-by-qualcomm-game-q-a-forum/game-rules-ab/driver-controlled-period/7), it asked "**Question:** Would pushing into the opposing Alliance’s foundation side face (and moving it), either directly or by pushing your own Foundation into it, during AUTONOMOUS be allowed (repositioning it to somewhere other than the starting position, but still in the Building Zone)?”, answer is "The Robot's actions violate rules <GS2> and <G29>.”

**Question 1:** What if both Alliances move their foundations (sometimes you push the foundation for better grab) during AUTONOMOUS, push foundations to the center, and hit each other? Who should get penalty?

**Question 2:** What if red team moves their foundations towards center first (or even cross center line), and when blue team moves their foundation to the center, it hits the red foundation, will blue team get penalty?

**Question 3:** My understanding is that the rule is to prevent the team to intentionally increase difficulty of other Alliance. If the one alliance moves its foundation for its own benefit, never cross the center line, should it get penalty if it hits the other foundation already moved by the other alliance to the center? Will it get penalty only if it de-scores other other team?

**Answer:** The answer to all three questions is: it is likely that Referees watching the Match will consider these actions to be simply Robots "playing the game" and no Penalty will be assessed.
Driver Controlled Period

09-03-2019, 10:27 AM

Answers to questions about the Driver Controlled Period.

Tags: None

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10-01-2019, 12:33 PM

This topic by FTC14534 has been deleted by Darth Vader

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09-18-2019, 02:44 PM

Yoda
Game Design Committee Member

Subject: Rule <GS1> d) Human Player Introduction of a Scoring Element Into a Depot

We have what may be a hyper-technical "human player" question based on current "robot in 30 hours" videos we've seen and game intent, but I want to make sure we are clear on the rules before robot design.

4.4: In (Inside) / Completely In (Completely Inside)--An object that has crossed into the upwards vertical (i.e., at a right angle to the Playing Field/Floor) extension of a defined Area's boundary is Inside the Area.

4.6.3 <GS1> (d) )A Human Player cannot break the vertical plane of the Perimeter Wall when there is a Robot or Scoring Element already IN the Depot. (emphasis added)
**Question:** When the human player starts placing the stone into the Depot, it is (under 4.4) IN the Depot. Which means that the human player must drop the stone before the hand gets across the perimeter wall. Is this how the rule is intended to be enforced? Does "already in" have a different meaning than "in"? (For example, there's another stone halfway in the depot and halfway on the rest of the playing field, so the robot must either clear it or pick it up and use that).

The robot in 30 hours videos I've seen show the hand placing the stone nicely (and vertically) in the Depot. This seems to follow the intent of avoiding robot to human contact, while also maximizing the chance that the stone is "in" the Depot as 4.6.3 <GS1> (g) says (our preliminary testing has the stone bouncing out of the Depot quite often when we drop it from the wall) and also not requiring every robot to figure out how to reorient every stone for stacking (though I recognize the competitive advantage in being able to do that reorientation).

*Any clarification on this is appreciated. Thanks!*

**Answer:** Thank you for the thorough description of a good "hyper-technical" question. A hyper-technical interpretation of rule <GS1> d) could lead to an unintended limitation on Human Player actions.

A single Scoring Element possessed by the Human Player does not count as a "Scoring Element already in the Depot." The Human Player may "place a Stone nicely in the Depot" as stated in the question, if a Scoring Element or Robot is not In the Depot at the time the Human Player introduces the new Scoring Element Into the Depot.

---

**Yoda**  
Game Design Committee Member

Join Date: Sep 2010  
Posts: 575

09-24-2019, 03:42 PM

*Originally posted by FTC10138*

**Subject: <GS8> Controlling the Opposing Alliance’s Foundation and <GS9> Descoring - Robot repositioning the opposing Alliance’s Foundation when the Foundation is not protected by rules <GS8> and <GS9>**

We believe (and hope) the intent of the rules would prohibit the following, but the letter of the rules seems to leave a loophole. Q’s are all related.

<GS2> explicitly prohibits the opposing Alliance from contact or disrupting Stones or Skystones. But no mention of the Foundation is made.  
<GS5> explicitly prohibits robots being IN the opposing Alliance’s Foundation. This leaves contact/movement possible from the side face of the Foundation.  
<GS8> explicitly prohibits the opposing Alliance from CONTROLLING your foundation when it's IN your Building Site, or during END GAME. Nothing explicit is mentioned of Autonomous or Driver-Controlled period.

**Scenario:** During the Driver-Controlled Period, but before End Game, the opposing Alliance Foundation is not in their Building Site and an opposing Alliance robot is not attempting to Score using the Foundation.
**Question 1:** Is contact and/or movement against the side of the opposing Alliance’s Foundation allowed? This could be intentional or inadvertent.

**Question 2:** If #1 is allowed, is there a penalty if Skyscrapers are disrupted (toppled, with Stones/Skystones possibly falling off of the Foundation)?

**Answer 1:** Yes, provided that the Robot stays outside the Foundation.

**Answer 2:** No.

---

**Yoda**
Game Design Committee Member

Join Date: Sep 2010
Posts: 575

10-30-2019, 05:02 PM

*Originally posted by FTC12524*

**Subject: **<GS3>c Control/Possession Limits of Stones/Capstones - Opposing Alliance Capstone in the Alliance’s Depot

During our first Scrimmage we had this kind of situation. A team from the opposing Alliance lost their Capstone and it accidentally turned out to be in our Depot.

<GS1> states that A Human Player cannot hand-deliver a Stone or Capstone into the Playing Field when there is a Robot or Scoring Element already In the Depot and

<GS3> states that Controlling or Possessing an opposing Alliance’s Capstone is a Major Penalty.

**Question:** What should teams do in such a situation?

**Answer:** In this scenario, a Robot may Control/Possess the opposing Alliance's Capstone to move it Outside of the Depot. The Control/Possession time should be no longer than necessary to move the Capstone clear of the Depot so that it doesn’t Interfere with reasonable access to the Depot.

---

**Yoda**
Game Design Committee Member

Join Date: Sep 2010
Posts: 575

10-30-2019, 05:59 PM

*Originally posted by FTC12524*

**Subject: **<G18> Pinning, Trapping, or Blocking Robots - Preventing an Opposing Alliance Robot from moving between Zones via their Alliance specific Skybridge

**Rule <GS7>** states that

b) Robots may not move from one Zone to another via the opposing Alliance’s Skybridge section. Each occurrence will result in an immediate Major Penalty.
c) Robots may not prevent an Opposing Alliance Robot from moving between one Zone to another via the Neutral Skybridge. This is considered Blocking and will be penalized per <G18>.

**Question:** But it states nothing about prevents Opposing Alliance Robot from moving between Zones via their Alliance specific Skybridge. Imagine a situation when Alliance Robots are in a queue to their Depot (which is on front of opposing Alliance Skybridge) for Stones, and waiting for the Stone they may accidentally or intentionally prevent Opposing Alliance Robot from moving to the Building Zone under their specific Skybridge (which may bring the Alliance additional 1 point for Delivering). Is there any penalty for such a behaviour and Robots should avoid blocking waiting for the Stones in their Depot or is this a legal thing?

**Answer:** The action described in the scenario violates rule <G18>.

---

**Yoda**

Game Design Committee Member

Join Date: Sep 2010
Posts: 575

Originally posted by FTC12524

**Subject: <GS6> Blocking Access to the Depot**

Rule <GS6> states that Robots may not be In or Block access to the opposing Alliance’s Depot.

**Question:** Does that mean that during Driver-Controlled period after the warning Robots will immediately receive Major Penalty EVERY time they turn out to be In the Opposing Alliance Depot even if there is no Opposing Alliance Robots near the Depot? Does that mean that Robots should collect Stones from the Quarry with real care trying not to cross the Opposing Alliance Depot boundary?

**Answer:** The goal of rule <GS6> is to ensure that the owning Alliance is not prevented from accessing/playing their Depot. If at any point, the intrusion to a Depot by an opposing Alliance Robot causes gameplay changes, the action is not Inadvertent and Inconsequential; appropriate warnings and penalties will be applied to the offending Robot.

Robots should be careful while near the opposing Alliance’s Depot. Stones in Control/Possession of a Robot are considered part of the Robot. Possessed/Controlled Stone intrusion into the Depot should get the same Inadvertent and Inconsequential analysis as the Robot.

After the first Warning during the Driver-Controlled Period, an incursion into the opposing Alliance’s Depot that is not considered by the Referee to be Inadvertent and Inconsequential will receive a Major Penalty plus additional Minor Penalties assessed for every five seconds that the rule violation persists.

---

**Yoda**

10-31-2019, 09:06 AM

#7
**Game Design Committee Member**

**Join Date:** Sep 2010  
**Posts:** 575

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**Originally posted by** FTC15210  
**Subject:** Game Manual Part 2, Section 4.5.4 End Game - Capping

We understand that under 4.5.4 completing end game tasks prior to the end game will not score. However, our robot is able to build a tower within the foundation but without placing it on the foundation. (It uses a mechanism that lifts a stone, slides a new one under it on a shelf, then lifts the combined stones - they do not touch the foundation until the tower is complete). Using such a mechanism, it is technically possible for the robot to place a capstone on the first stone, then build a tower within the foundation under that stone, before finally placing the completed tower (including the capstone) as a single unit.

**Question:** As the tower would not be placed on the foundation until the end game, would the capstone count towards the score?

**Answer:** Yes. Keep in mind that rule <GS3> constraints will come into play if the Stones and/or Capstone Possessed by the Robot are Completely Out of the Foundation.


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**Originally posted by** FTC8367  
**Subject:** <GS6> Blocking Access to the Depot - Disabled Robot

<GS6> says disabled robots in the opposing alliance's depot earns a yellow card for the possibility of a severe disruption to the ability of the other alliance to play the game. However, <GS6> also says inconsequential violations of the rule will be handled at the referee's discretion, per <G30>.

**Question:** If a disabled robot is parked on the line of the opposing alliance's depot so the opposing alliance still has a clear and direct path to their depot, does the disabled robot still get an automatic yellow card?

**Answer:** A Disabled Robot In the opposing Alliance's Depot that has an affect on the Driver-Controlled Period gameplay of the opposing Alliance's Robot(s) is not Inconsequential. If the referee believes that the Disabled Robot affects gameplay, the Robot should receive a Major Penalty, a Minor Penalty for each additional 5 seconds, and a Yellow Card.

A future release of the Game Manual Part 2 will have an update to rule <GS6> to clarify the Penalty points and Yellow Card consequences.

---

**Originally posted by** Yoda  
**Subject:** Game Manual Part 2, Section 4.5.4 End Game - Capping

**Answer:** A Disabled Robot In the opposing Alliance's Depot that has an affect on the Driver-Controlled Period gameplay of the opposing Alliance's Robot(s) is not Inconsequential. If the referee believes that the Disabled Robot affects gameplay, the Robot should receive a Major Penalty, a Minor Penalty for each additional 5 seconds, and a Yellow Card.

A future release of the Game Manual Part 2 will have an update to rule <GS6> to clarify the Penalty points and Yellow Card consequences.
Originally posted by FTC10650

**Subject: <GS3> Control Limits on Stones and Capstones - Robot Plowing Stones into their own Alliance’s Depot**

**Question:** We understand that there have been several prior questions in the forums about controlling stones when trying to access other stones or the foundation. However, we had an edge case occur at our league meet which our team and the referees at the event found wasn’t properly covered by any prior questions. During our match in question, several stones which started in the quarry were pushed up against the wall near our depot, but were in such an orientation that we could not intake them. In order to access a stone placed by our human player in the depot, we needed to push through the debris. However, because the debris was up against the wall, the stones were not shoved to the side of the robot, but were pushed along the robot’s direction of motion by the robot for a few feet into our own depot.

*Are the actions described legal? If not, what ruling/part of the game manual were we in violation of?*

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**Answer:** The Robot's actions in this scenario are likely to be viewed by the referee as Plowing and no Penalty will be assessed.

Additional Information: Rule <GS1> prevents the Human Player from hand-delivering a Stone or Capstone if a Scoring Element (i.e., Stone or Capstone) is already In the Depot. A Robot must remove the "debris" Stones from the Depot before the Human Player is allowed to hand-deliver a new Scoring Element Into the Depot. Also, rule <GS1> prevents the Human Player from interacting with a Scoring Element that is already In the Depot.

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**Yoda**  
Game Design Committee Member

12-11-2019, 10:20 AM

Originally posted by FTC8565

**Subject: Controlling/Possessing an Alliance Partner’s Capstone**

**Question:** Is a robot allowed to control their alliance partner’s capstone to deliver it to their alliance partner? Our capstone is shaped like a normal brick (following all the team scoring element rules) and we place it in the depot and we would like for our alliance partner to deliver it to us because our robot is designed for stacking.

**Answer:** Yes, provided that the Robot complies with the rule <GS3> constraints on the number of Scoring Elements a Robot may Control or Possess.
End Game - FTC Forum

[Image]

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**Darth Vader**
Senior Member

Join Date: Nov 2013
Posts: 152

End Game
09-03-2019, 10:27 AM

Answers to questions about End Game.

Tags: None

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**Yoda**
Game Design Committee Member

Join Date: Sep 2010
Posts: 575

09-23-2019, 05:19 PM

*Originally posted by FTC6155*

*Subject: Section 4.5.4 End Game - Putting a Capstone on a Stone before Placing the Stone on a Skyscraper or Foundation*

*Question:* Is it legal to take a preloaded capstone (already on the robot) and the robot loads it onto a stone at end game, before placing that stone on a skyscraper or the foundation?

*Answer:* Yes.

---

**Yoda**
Game Design Committee Member

Join Date: Sep 2010
Posts: 575

10-04-2019, 02:59 PM

*Originally posted by FTC16072*

*Subject: Section 4.5.4 End Game - Scoring more than one Capstone during the End Game*
Question 1: If your alliance partner caps a stone with their capstone, can you then lift the stone (with their capstone on it) to a new height if you have also capped a tower with your capstone?

Answer 1: No, the action described is Scoring a second Capstone. As you stated in your post, this action is not allowed by the Capping constraint described in the Game Manual Part 2, Section 4.5.4 1) d).

Answer 2: No, the action described is Scoring a second Capstone.

Question 2: On a related note, if they place their capstone on a stone can you put yours on the same stone and then lift that stone onto a tower?

Answer 2: No, the action described is Scoring a second Capstone.

Originally posted by FTC11115
Subject: Capping - Capstone touching the side-wall of Stones below the top-most Stone in a Skyscraper

The capping bonus states in section 4.5.4.1b that there is: One (1) point for each Level that Supports a Capstone.

We interpret this to mean a Capstone could overhang and potentially touch the side-wall of Stones in the same Skyscraper that are below the top-most one without lowering the effective height.

Answer: This is a correct interpretation of the Capping requirements.

Last edited by Yoda; 10-21-2019, 09:27 AM.

Originally posted by FTC11589
Subject: Section 4.5.4 End Game Foundation Moved Task - Foundation moved into the Building Site during the Driver-Controlled Period

The rules state that if the foundation is moved out of the building site during end game it is worth points provided it was in the building site when end game begins.

Question: Does the foundation have to be moved into the building site during autonomous or can it be moved in during the regular driver-controlled period [before the start of the End Game] to count for end game points. Thank you
Answer: A Foundation is eligible for the Foundation Moved Task if it is moved into the Building Site during the Autonomous Period or during the Driver-Controlled Period before the start of the End Game. The Foundation must be in the Building Site when the End Game Begins.

Yoda
Game Design Committee Member
Join Date: Sep 2010 Posts: 575
11-13-2019, 10:07 AM

Originally posted by FTC6299
Subject: <G29> Illegal Use of Game Elements - Foundation affecting movement of the opposing Alliance’s Foundation during the End Game

In one of the qualification match this weekend, the following scenario occurred:
At the start of End Game, both Alliances had their Foundation in their respective Building Sites. Red Alliance got to their Build Site first and pulled out their Foundation from their Build Site but moved it well past the center line of the field so that it was almost 3/4 of the distance towards the Blue Build Site. When Blue Robot came to move its Foundation out of their build site, there was very little room available for it to move their Foundation and, or Park its’ robots in their Build Site. In the process of pulling their Foundation out of the Build Site, the Blue Alliance stuck the Red Alliance Foundation. While no blocks were displaced, with the Foundation being protected in End Game, they had violated <GS8>.

Question: Since the End Game doesn’t put any restrictions on where the Foundation can be moved by an Alliance, Teams can easily abuse <GS8> by moving the Foundation close to the opposing Alliance Build Site thereby limiting the opposing Alliance’s ability to perform End Game tasks or incur GS8 penalties. We would appreciate clarification on how to deal with the scenario described above? If Foundation movement cannot be limited (e.g. in end game the Alliance cannot move their Foundation past the middle of the field - i.e. on to the opposing Alliance side), should Referees be advised to leverage <GS19> Forcing an Opponent to Break a Rule, to override the GS8 penalty for the above described scenario?

Answer: If the Referee views the Red Alliance Robot’s actions to be a deliberate strategy to affect the Scoring or gameplay of the Blue Alliance’s Foundation, rule <G29> consequences should be applied.

Additional Guidance: Alliances can easily avoid this scenario by positioning a Robot to move their Foundation at the start of the End Game.

Yoda
Game Design Committee Member
Join Date: Sep 2010 Posts: 575
11-26-2019, 10:26 PM

Originally posted by FTC8565
Subject: <GS5> Foundation Scoring Interference - Defensive gameplay strategies
Question 1: If an opposing alliance robot intentionally blocks the foundation from being moved out towards the center of the field, but the foundation can still be moved out towards the skybridge or vice versa, is that considered blocking? Pulling out the foundation in different directions can change the likelihood of a skyscraper falling, what if this defense indirectly causes a skyscraper to fall?

Question 2: If the foundation hits the robot playing defense (which may or may not be moving) while a robot is pulling it out of the build site, would this be a penalty?

Question 3a: After moving the foundation differently than normal because of defense from the opposing alliance, if there is no path left to reach the building site for parking, is that considered blocking/trapping from the opposing alliance?

Question 3b: If the only path left to reach the building site for parking is through the neutral skybridge, but the robot can't travel over the neutral skybridge (because of the bump), is that considered blocking/trapping?

Answer 1: A referee will likely view this scenario as a violation of rule <GS5>. A Robot that appears to have a gameplay strategy of disrupting Scoring with a Foundation should be subject to <GS5> penalty consequences. A Robot that is playing the game, attempting to Score points for their Alliance will probably be viewed as not violating rule <GS5>.

A Robot that is attempting to Score does not have an automatic exemption from rule <GS5>. Drive Teams have an obligation to avoid interfering with the opposing Alliance Foundation Scoring attempts, even while interacting with their own Alliance's Scoring Elements.

Answer 2: The actions of an Alliance or their Robots shall not cause an opposing Alliance or Robot to break a rule and thus incur Penalties per rule <G19>. The action described in this scenario should not result in Penalties unless the referee views the opposing Alliance Robot's actions as defensive gameplay that violates rule <GS5> for interfering with Foundation Scoring.

Answer 3a: It is unlikely that a referee will view this scenario as Blocking/Trapping access to the Building Site. Rule <GS5> consequences will be applied if the referee believes that Robot defensive gameplay interferes with Foundation Scoring.

Answer 3b: No, Robots are expected to be able to traverse the Neutral Skybridge.
Question 3: If more than one capstone is allowed to be approved but only one capstone is allowed on the robot at a time, can a team switch which capstone they use from match to match?

Answer 1: Yes.
Answer 2: No, as specified in rule <GS3>.
Answer 3: Yes, provided that the Capstone has passed inspection.

Originally posted by FTC15347
Subject: Capstone Scoring - Capstones at different Levels on the same Skyscraper

We are trying to determine whether a Capstone can be sandwiched within a Skyscraper so that two Capstones can be placed at different levels and both receive Capping Bonus points. It does not appear to be clear from the Game Definitions in 4.4, the End Game scoring in 4.5.4.1, and examples in Appendix E whether it is prohibited to have a Capstone mid-Skyscraper. The definition for Skyscraper and Skyscraper Level specify that the Stones must be Interlocked with another Stone beneath them. Consider a slender Capstone design that drapes around the stud(s) of a Stone, hanging off the side. It would be physically possible to continue building the Skyscraper, sandwiching the Capstone but still Interlocking with the Stone beneath.

Question: Given a Capstone design that leaves the studs of the Stone it is Capping exposed for interlocking, if one robot places such a Capstone, and then the Alliance partner adds one or more additional Interlocked Stones before placing their own Capstone at a higher Skyscraper Level, is the Skyscraper still valid and does each Capstone score a Capping Bonus for the number of levels beneath it?

Answer: Yes, keep in mind that the Capstone does not count as a Level. Capstone height = Stones below the Capstone. Skyscraper height = total height (Capstone does not count as a Skyscraper Level).

Originally posted by FTC12869
Subject: End Game Parking - Extended Tape Measure

Our team has a tournament this weekend and we want to check if it is legal to extend a tape measurer into the build corner in the endgame. We extend a tape measurer over the build plate to save time. We are wondering if it violates any rules and if it would count as parked in the endgame.

We want to confirm that:
**Question 1:** Is this considered to be "launching", or does it violates any rules?

**Question 2:** Is this considered valid parking and can score points?

Thank you!

**Answer 1:** The tape measure action is not Launching. The action is legal, provided that it doesn't violate rule <G17> for entanglement.

**Answer 2:** Yes, provided that the Robot is Parked at the time the Score value is determined.

---

**Yoda**  
Game Design Committee Member  
Join Date: Sep 2010  
Posts: 575

01-21-2020, 03:03 PM  
#11

*Originally posted by FTC6299*

**Subject:** <GS8> Controlling the opposing Alliance’s Foundation - Foundation in the opposing Alliance’s Building Site in the End Game

**Question:** If the Blue alliance's foundation is blocking access to the Red alliance's building site in end game. Is a Red Robot allowed to push the Blue foundation in a plowing manner to access and park in their Building Site or would this contact be a GS8 violation?

**Answer:** The action described is allowed; it does not violate rule <GS8>. Rule <GS9> consequences will be applied if the Red Alliance Robot's actions cause descoring of Stones or Skyscrapers.

If Referees believe that the Blue Alliance intentionally placed their Foundation to limit access to the Red Alliance's Building Site, rule <G29> consequences are likely to be applied to the Blue Alliance.

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Darth Vader       Tournament Rules       #1
Senior Member
Join Date: Nov 2013       Posts: 152

09-03-2019, 10:41 AM

Answers to questions about Tournament Rules.

Tags: None

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Darth Vader       #2
Senior Member
Join Date: Nov 2013       Posts: 152

10-01-2019, 12:18 PM

Originally posted by FTC14534
Subject: Human Player

Q: If we only have 3 team members I would think that our alliance team would have to provide the human player. What happens if both teams only have 3 team members, who would the human player be?

A: In the described scenario, the student drive team coach should transition to the human player, while the team may use an adult coach of the team as the drive team coach.

Darth Vader       #3
Senior Member
Join Date: Nov 2013       Posts: 152

10-31-2019, 10:11 AM

Originally posted by FTC8565
Subject: Crawling/Sliding Under Skybridge
Q: I understand there is a penalty for players to walk/jump over the Skybridge. Are players allowed to crawl/slide under the Skybridge?

A: No. The intent of rule <GS11> is to avoid a tripping hazard to both teams and volunteers. Crawling or sliding under the Skybridge creates further tripping hazard for teams attempting to place or retrieve their robot, and a hazard to volunteers who need to reset the field.

Darth Vader
Senior Member

Join Date: Nov 2013
Posts: 152

01-02-2020, 10:36 AM

Originally posted by FTC8565
Subject: Skybridge Tolerance

Q: <G26> states the game pieces have a tolerance of +/- 1.0". Is this also true for the Skybridge height?

A: The rule states that both the Playing Field and Game Elements may vary by as much as +/- 1.0 inch. The Skybridge is included in the definition of Game Elements and therefore is also subject to rule <G26>.

Darth Vader
Senior Member

Join Date: Nov 2013
Posts: 152

01-02-2020, 12:00 PM

Originally posted by FTC8565
Subject: Drive Team in Driver Station

Q: I can't seem to find it in the Game manual, but from what I and some of my teammates remember, it has been stated that the drive team must stand together during a tournament match, however, we're unsure about how strict this rule is. We would like to know if any of these scenarios are allowed.

- A driver team is playing from the side far from the foundation and a driver coach goes over to the other side (staying in the driver station) to check if the robot is aligned with a skyscraper.
- A driver coach stands with the alliance partner's drive team or regularly travels between them to coordinate strategy.
- A driver coach oversees the alliance partner's match preparation to make sure they haven't made any mistakes (for instance: if their wifi-direct connection is faulty or off)
- Both driver teams of an alliance stand on the building zone side, leaving the other side empty

A: Per rule <G3> in the Game Manual Part 2, Drive Teams must stand completely Inside their respective Alliance or Human Player Station. Moving within the Alliance Station is allowed as long as it does not negatively impact your Alliance Partner.
A: If there is a tie in Semifinal Match 1, then the next Match played is Semifinal Match 2. Then it will move on to Semi-Final Match 3, and Matches will continue to be played until one Alliance has two wins. The scoring system will not wipe out Matches, rather it will continue to generate Matches until one Alliance receives two wins.

The rules for a 3 team Alliance will still apply in that the team that sits out in the first Match must play in the second Match. After the second Match, a combination of two Alliance Robots may be used. This rule applies regardless if either of the first two Matches were ties.

Q: 4.10 in Game Manual Part 1 states "Within each bracket (Semi-Finals or Finals) of the elimination, Matches are played to decide which Alliance advances. The advancing Alliance is the first Team to win two Matches. Any tied Matches are replayed until one Alliance has two wins and advances."

To clarify, if the first match in a series ties during semifinals (Semifinal 1 Match 1), does that mean that match score is void and we replay that match? In other words, Semifinal 1 Match 1 is replayed with the same teams until a winner emerges or do we play a semifinal 3 match with any combination of teams from both alliances?

For example, alliance 1 has teams #1, #2, and #3 and alliance 4 has teams #4, #5, #6. The score for Semifinal 1 Match 1 is a tie. Do we play Semifinal 1 Match 2 and then replay match 1? Does that same teams have to play in the replay? Or do we play a match titled "Semifinal 1 Match 3" (assuming someone won the second)? Do the same teams play in this 3rd match or can teams swap the teams? What if there is another tie? Do the same teams play again a third match in a row or can they swap with another member on their alliance?

A: Teams and/or Tournament Directors cannot use their own application to calculate rankings for League Meets or League Tournaments. Every Tournament must use the Scoring Software provided by FIRST Tech Challenge which follows the ranking rules outlined in section 4.8 of the Game Manual Part 1.
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**Darth Vader**
Senior Member

Join Date: Nov 2013  
Posts: 152

**Field Setup**
09-03-2019, 10:42 AM

Answers to questions about Field Setup and Assembly

**Tags:** None

**Darth Vader**
Senior Member

Join Date: Nov 2013  
Posts: 152

**FCT8565**

Subject: Gap Between Field Tiles and Field Border

**Question:** After cutting off the zigzag on border mats, will there gap between the mat and border?

**Answer:** There might be a small gap between the field tiles as there could be slight variations depending upon the type of field border being used (Logo Loc, IFI, or AndyMark).

**Darth Vader**
Senior Member

Join Date: Nov 2013  
Posts: 152

**FTC9915**

Subject: Navigation Target Placement

**Q:** The [Field Setup Guide](https://ftcforum.firstinspires.org/forum/first-tech-challenge-skystone-presented-by-qualcomm-game-q-a-forum/field-setup-aa/answers-field-setup-ac/74) says "Step 6-5: The navigation target should be centered horizontally on the left and right perimeter panels."
We have a standard Andymark field perimeter, which is made of twelve panels approximately 4 feet wide. Each wall consists of a left, center, and right panel. The field setup instructions therefore place the navigation targets approximately 48 inches from the center of the wall.

SDK 5.2 has an example called ConceptVufloriaSkyStoneNavigation, which indicates the navigation targets are 36 inches from the center of the wall.

(The SDK's image locations agree with the depiction of the images shown in Game Manual 2, "Figure 1.3-1 – Isometric view of the Playing Field", while the Field Setup Guide disagrees with Figure 1.3-1.)

Which is the correct location of the targets?

A: Please reference the Field Setup Guide, Rev. 1.2, Step 6-6 which details the location of the navigation targets.

Original posted by FTC11115

Subject: Quarry Placement

Q: The field setup guide has the stone location next to the seam between the tiles. Game manual part 2 shows a picture with the stones nudged over and completely covering the seam. What is the official location of the stones?

A: The Quarry should be set up as outlined in Part 7 of the Field Assembly Guide. Stones should be placed along the inside of the two tile seams.

Darth Vader
Senior Member
Join Date: Nov 2013
Posts: 152

01-21-2020, 03:52 PM

The Quarry should be set up as outlined in Part 7 of the Field Assembly Guide. Stones should be placed along the inside of the two tile seams.
Judges Interview

09-03-2019, 10:45 AM

Answers to questions about Judges Interviews.

Tags: None

Originally posted by FTC12533

Subject: Judging Interview Presentation Time

Q: Game manual part 1 states that teams will receive a minimum of 5 minutes to present after which judges may ask questions, which is the same as last season. However at Houston World's JAs stated that teams will receive a *maximum* of 5 minutes to present after which judges *must* interrupt to ask questions, though this was not solidly followed by judges used to 5 minutes being the minimum not the maximum.

At our kick-off this season we were told the 5 minute *maximum* will be enforced this season and judges *must* interrupt after 5 minutes. This is the same practice as Houston World's last season and apparently what was practiced in some regions around the country last season, but not ours. However Game Manual 1 still states the 5 minutes presentation is a minimum not a maximum.

Can you please clarify how it will be run this season? Personally I would prefer to give the students a chance to present their prepared presentation provided it's not excessively long, especially as they generally keep the coolest wow item for the end of their presentation.
A: Judges are instructed to stop the team presentation at the 5 minute mark to provide the judges an opportunity to ask questions of the team, and to keep judging practices consistent across all regions. Our strong recommendation is that teams practice their presentation and reduce it to a very concise summary of the teams greatest strengths and accomplishments. Think about this as if it were an elevator pitch about your team.

Darth Vader
Senior Member

01-28-2020, 09:41 AM

Originally posted by FTC14433
Subject: Electronic Team Presentations

Q: For presentation, can team bring iPad or Laptop, show extra pictures to judge in presentation? Will not use projector.

of course, we will bring engineer notebook, but iPad or laptop will show a lot of pictures much easier while we are talking.

A: Teams are allowed to bring a laptop or iPad to a judging interview for the sole purpose of using it for their team presentation. Teams cannot use a laptop or iPad as their engineering notebook, these must be printed and handed in to be considered. Teams should understand that the time a team spends setting up for their presentation is considered as part of the interview time, and interview rooms rarely have power outlets available to teams.

Darth Vader
Senior Member

02-19-2020, 01:08 PM

Originally posted by FTC12863
Subject: Outreach Counting for Next Season

Q: Can you share the official start and end dates for the FTC season? And are we allowed to present to judges outreach that is performed outside of that time period? We want to make sure that the outreach activities that we share during interviews for our upcoming tournament are within bounds.

Specifically, we perform some outreach in the months of February to April after our season ends in January (we haven't advanced out of our local qualifier before). We look at these events as the start for our next season.

TIA!

A: Work that a team does after the Tam's season ends, including outreach, should be counted toward the next season. In this case the work that is done in February through March, after the team's season ended, should be counted toward the next season outreach activities.
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Darth Vader  Senior Member
Join Date: Nov 2013  Posts: 152

Advancement
12-12-2019, 12:10 PM
Answers to questions about Advancement.

Tags: None

A: An update to the Game Manual Part 1, as well as a blog, have been posted further explaining the rankings for teams that play in a league format. League Tournaments do not advance to the World Championship. League Tournaments advance to a State Championship, and the State Championship then advances to the World Championship.

Originally posted by FTC10015
Subject: League Tournament Ranking and Advancement

Q: Where can I find the info on which matches are used to calculate final rankings for Alliance selection at regional tournaments that advance to World’s? I’ve been told it is your top 15 matches with the 2 lowest TBP’s thrown out, but unclear what happens to the 5 matches at the regional tournament. Is it your 10 best from the season plus the 5 at the tournament? Thx.

Darth Vader  Senior Member
Join Date: Nov 2013  Posts: 152

12-12-2019, 12:03 PM  #2

#2

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Senior Member

Join Date: Nov 2013
Posts: 152

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Originally posted by FTC1999

Subject: Advancement Limits

Q: I've read in the game manual part 1 -section 6.3 on advancement. However, I'm kind of interpreting it in two ways. Basically, the rules say that only the first 3 events that you attend can be counted toward advancement.

So West Virginia doesn't have any qualifiers. They just have a state championship. We were fortunate to be selected. They are sending only one team on to the world championship from this. This event is on December 8.

We are considering attending one qualifier in Pennsylvania on December 7 and then two qualifiers in Maryland (January and February).

So will one of the qualifiers in Maryland not count towards advancement since we are going to a total of 4 events (1 state championship that is early and them 3 qualifiers later)? Or will all three qualifiers count since they send us to either Maryland or Pennsylvania State Championship, while the West Virginia event sends us to something different (the world championship)? This is first explained on page 22 of the manual. On page 23 there is a table that seems to contradict what is stated on page 22. Or at least to me it does. Thanks for the help with this.

A: The cap on advancement listed in the game manual refers to the level of competition. In the above scenario your team is competing in 3 qualifiers. Your team would be eligible for advancement at the first 3 qualifiers you compete in. You would not be able to receive an advancement spot at the 4th and subsequent qualifier your team competes in, even if your team did not earn an advancement spot at the first 3 qualifiers. These event types generally advance to the State/Region Championship.

Teams may then compete in up to 3 State/Region Championships and be eligible for advancement. The same rules would apply, in that your team would not be eligible for an advancement spot at the 4th and subsequent State/Region Championships you compete in, even if you have not earned an advancement spot at the first 3 Championships.