

THE 1999 FIRST ROBOTICS COMPETITION

TEAM UPDATE #4

Date: February 12, 1999

RULES QUESTIONS & ANSWERS

- Q46. With regard to puck construction, does the carpet wrap around from the top to the sides, or is it carpet on the top, and a separate piece on the side, meeting flat at the corner?
- A46. It is one big piece of carpet that wraps around to the bottom. There are slices (wedges) taken out at the vertices of the octagon in order to prevent the carpet from sticking out there.
- Q47. In the manual, it states that the drill motors, fisher price motors, and the van door motors may only be driven by the Innovation First speed controllers. Can we use the relays on the receiver to control larger relays to control any of the above motors?
- A47. Good idea, but no. Relays are not included in the Kit, Additional Hardware List, or Small Parts, Inc. catalog.
- Q48. May we use the wheels that Fisher Price cars use? If not is there any other type of wheel legal to use other than the ones given to us in the kit?
- A48. You may not use the Fisher-Price car wheels. Wheels that you may use are those you find in the kit, those bought from the Additional Hardware List, those bought from Small Parts, Inc., and those you fabricate from raw materials.
- Q49. Is it necessary that we machine parts from the Additional Hardware List or buy them from Small Parts, or can we obtain them commercially (hardware store, etc.)?
- A49. Parts on the Additional Hardware List must be purchased "off-the-shelf". That is, you must purchase them in their finished form, and may then make modifications. If, for example, you make a pulley from aluminum plate, it would count as aluminum plate, not a pulley. However, if you bought a pulley and then modified it, it would still count as a pulley. See Rule K4.
- Q50. We have a question about the Autodesk Animation Competition...
- A50. Questions about the Autodesk Animation Competition should be addressed to Laura London at Autodesk at laura.london@autodesk.com.
- Q51. It was stated in the rules that FIRST is going to give teams at least 2 minutes to learn the identity of their ally and make plans before the start of a match. Does this mean that FIRST is hopeful in giving us more time? If they are, what is the expected amount of time that teams will have to learn the identity of their ally?
- A51. FIRST will inform teams of their alliance partners as they stand in the on-deck queues near the playing fields. The exact timing for this will be determined by

event specific details such as the queue length, how promptly teams arrive in the queue, etc.

Q52. Question 20 from Team Update 2 states that FIRST may reinforce the bottom of the pipes on the puck. May we know what type of bracket, or how you intend to reinforce it?

A52. The exact details of the bracket design will not be made public. The reason FIRST is adding a bracket to the puck is to try to avoid potential failure of the puck posts during competition. The bracket design will not affect the mobility or outer dimensions of the puck. Teams considering applying large loads to the puck posts are encouraged to build their puck to the specifications included in the documentation and test their designs on the original-style puck. If damage occurs, then the robot design should be reconsidered. This should, hopefully, limit forces applied to the puck to those which can be safely tolerated by the reinforced design.

Q53. Is there a limit on the number of sprockets we can use from a donated source? A supplier has given us 4 regular sprockets and two double sprockets. This brings us to a total of eight sprockets, though we have purchased none.

A53. It is ok to use donated sprockets in place of purchased sprockets as long as they are "off-the-shelf". That is, the sprockets must be normally available for sale from some manufacturer/distributor. As for the quantity, you may use up to 6 of these sprockets. Note that double-sprockets are counted as two sprockets each. See Rule K4.

Q54. If we can't pass the floppy from one human player station through the operator stations (handled by the coaches and/or robot operators) to the next human player station in the alliance, is it considered "unsafe" to throw the floppy the sixteen feet from one human player station to the other - behind the operators and coaches? Or is there no way that is considered "safe" to get the floppy from one human player station to the other except out on the playing field (such as by a robot)?

A54. It is acceptable to throw the floppy directly from one player station to the other player station on the same alliance.

Q55. At competition events, is all day Friday and half the day Saturday spent in qualifying rounds, with the last part of Saturday devoted to the elimination rounds? Do we understand that correctly?

A55. Yes.

Q56. Is welding allowed?

A56. Yes. Welding is considered a form of fastener and is allowed per Rule K1.

- Q57. Are we required to use the pressure switch to control the Air Pressure in the Pneumatics system ? If we must, are the switches factory set to some useful value (or will we have to calibrate, and to what pressure.)?
- A57. The pressure switches are not required. The sensitivity of the switch can be adjusted using the recessed yellow trimmer. Please read the documentation enclosed with the switch for more information.
- Q58. Are we permitted to use a nylon tee from Small Parts, Inc. for our pneumatics?
- A58. Yes, fittings from SPI may be used. See Rule M13.
- Q59. Are spring clamps or alligator clamps used to fasten two parts together considered fasteners and hence fall into the category of unlimited use?
- A59. If used to fasten the parts together such that they are not meant to be separated during a match, then yes.
- Q60. Rule K12 states: "...The melting and recasting of materials, such as a block of aluminum, is allowed as long as the basic alloy or chemical composition is not changed..." The rule does not say who can melt and reform the material. Is it only our machine shop, or can we have one of Home Depot's raw material suppliers do it (e.g. buy square aluminum tubing at our local Home Depot)?
- A60. As long as a part starts with raw material that is within the rules, it does not matter who does the actual work. Please note that sub-contracting work will not be considered a violation of Rule M15.
- Q61. How many batteries may we use on our robot?
- A61. Only one battery at a time may be used on the robot. See page 39 of The Robot.
- Q62. Will FIRST distribute freshly charged batteries to teams for each match?
- A62. Teams should charge their own batteries in the pit area at each competition event. Each battery should have sufficient capacity to power the robot for multiple matches. FIRST will only supply fresh batteries to teams reaching the Elimination matches. See page 39 of The Robot for more information.
- Q63. We have a need for a small block of steel 2 3/8" x 2 1/2" x 1 1/4" thick. We can laminate 5 pieces of 1/4" plate from the additional parts list, welded together at the seams to make the equivalent size. Question: Can we use a solid block instead of the extra work to laminate and weld?
- A63. Using a solid block would not satisfy the criteria for the Additional Hardware List. Such a block may be available from Small Parts, Inc., however.
- Q64. We were given a small bag containing a pair of diodes marked "Bi-Directional Transorb for Victor 883 Speed Controllers". What are they for?
- A64. The transorbs must be used on the Victor 883 Speed Controllers as described in Victor 883 Owners Manual.

Q65. We know the control station has two joysticks. The rules say one student human player and two student controllers are allowed. Can ONE student control both joysticks or do we have to have two students controlling the robot?

A65. Two joysticks are supplied in the kit. An additional 2 joysticks may be used, for a total of 4. See the Additional Hardware List and Team Update #2 for details. There is no requirement that both student operators actually control the robot. However, given the quantity of inputs (joysticks, switches and potentiometers), teams thus far have always opted to distribute the inputs among two students.

Q66. May we shorten the steel shafts on the pneumatic cylinders if we are not using the full travel?

A66. No. See Rule M14.

Q67. May we weave a net(basket) by unraveling the 5/16" nylon rope? The concern is that the basket is obviously not an entanglement device but could become entangled with an opponent if they attack us.

A67. Weaving a basket from the rope is allowed. If tightly woven, it should minimize the risk of entanglement. If problems with entanglement crop up during a competition match, and it looks likely that further problems will occur, then the net may need to be removed.

Q68. We were wondering if it the term 'fastener' would also apply to a clasp that engages itself in the middle of the round. It's a spring-loaded piece that would snap into place to attach two pieces once they are properly aligned, and would remain in place for the rest of the round. The fastener wouldn't function as a bearing or a structural support, and would only serve to keep the two pieces in place. Would this be acceptable under the criteria for a fastener?

A68. Good question. The fastener allowance is intended to allow the reasonable use of nuts, bolts, glue, welds, etc. in order to hold the robot together in a permanent (during the match) fashion. Mechanisms which engage and/or disengage during the match are not within the intended scope of the fastener allowance. The only exception to this is Velcro, which is considered a fastener this year with the hope that it may assist teams in picking up the floppies without consuming a large portion of the Small Parts, Inc. budget. You are, of course, allowed to purchase a clasp from Small Parts, Inc. against your \$425 limit and use that.

Q69. We would like to use glue during the construction of our robot to fasten chord to a pipe. It will be clear and will not be detrimental to the aesthetics of our robot. Is this legal?

A69. Glue is considered a fastener.

Q70. Is the surface of the puck considered part of the playing surface as far as the rule of Velcro touching the playing surface is concerned?

A70. Yes, Rule M10 includes the carpet on the surface of the puck.

Q71. Although not supplied in the kit or available from SPI, may we install an inline pressure gauge for testing and adjusting the pneumatics on our robot ?

A71. For testing, yes. The gauge may not be used on the robot during competition matches.

Q72. May the batteries be mounted on their side in the robots, or must (should) they be mounted upright?

A72. According to the CSB battery spec sheets included in Appendix H of The Robot, the batteries may be used in any orientation, but should not be charged while in an inverted position.

Q73. With the new Victor Speed Controllers, do we still have to solder a capacitor to the drill motor terminals?

A73. No. In fact, this year FIRST recommends that teams don't use capacitors even with the Tekins. There have been too many problems with short circuits in the past.

Q74. How will movement after the expiration of time be judged? If we have a non-electrical mechanism (so it's not effected by the control box cut-off) that continues to perform after the "end" of the round such that it affects the final score, would this be considered the same as "sagging" or floppies in free-fall where motion would be allowed to continue until a state of rest?

A74. The referees would make that decision based on the motion happening. If the motion does not affect the scoring, then they would begin scoring as described in Rule SC1. Otherwise, they would likely wait for motion to stop (or greatly slow) before scoring the match. Note that the referees have the option to simply make their best estimate 10 seconds after the match stops. This would be a likely outcome if the motion continued for a long time after the match is over.

Q75. Is there any restriction on where the additional (2 allowed) joysticks may be purchased?

A75. No. Just make sure you get the CH Products brand Flightstick model joysticks.

Q76. Is reaching into a container (on the robot) by the human player in the interaction zone permitted, as long as there is no direct contact?

A76. Yes.

Q77. If a floppy is inadvertently deflected by a coach or operator while being tossed between human player stations, will the human player be allowed to retrieve it at the other end?

A77. No, it will be returned to the playing field by a field attendant.

Q78. May round or square tubing be used as an accumulator for the compressed air?

A78. No. See Rule M13.

Q79. May we put wedge under puck to prevent it from moving?

A79. No. See Rule P30.

- Q80. May we modify the motor shafts?(shorten, machine flats, etc.)
A80. Please see Rule M17 in Team Update #2.
- Q81. May we place paper wheels/or painted segments on the robot to be used for control purposes?
A81. This is not specifically forbidden. However, these parts would not qualify under the non-functional decoration category. Per Rule M8, "Decorations must not affect the outcome of the match." Thus, you would need to purchase any paper, paint, etc. used for such a purpose from Small Parts, Inc.
- Q82. May we use cardboard, the manual binder from FIRST, and/or the pages in the binder in our robot?
A82. No. See the bullet items at the top of Rule K1 in Appendix A of The Robot.
- Q83. May we wire the fans on the Innovation FIRST speed controllers directly to the battery? We would like to cool the devices all the time during the matches.
A83. You may run the fan wires back to the power distribution blocks. The fan wires must not bypass the battery fuse.
- Q84. May we use ring lugs on the ends of wires, run a small bolt through the lugs to join multiple wires, then insulate with tape or heat shrink?
A84. Yes, this is a logical extension of the allowed use of ring terminals.
- Q85. May we throw floppies into the crowd? If so, if the crowd does not want to return it until the match has ended, will another floppy be placed into the arena to replace it during that match?
A85. Yes and yes. See Rule P22. Floppies that cannot be easily retrieved will be replaced with spare units.
- Q86. If a robot is resting solely in bounds, but its arm is extended out of bounds and holding a floppy, does the floppy count as a point even though it is above an out of bounds area?
A86. No. Floppies must be completely over the playing field in order to count.
- Q87. If a floppy has landed on a rail along the edge of the arena, and is not touching the ground, is it worth a point or is it considered out-of-bounds?
A87. If the edge of the floppy is past the outer edge of the 4x4 field border, it is considered not in a scoring position, otherwise it is worth 1 point.
- Q88. If an opposing team's robot has driven behind the puck and our robot pushes the puck against them, thus immobilizing them, is this considered "pinning" them? We are not directly in contact with them, but because of our force on the puck, they cannot move. Must we release the puck after 10 seconds?
A88. Rule V22 applies whether you are pushing directly on another robot or causing the puck to push on the robot. However, if you stop pushing the puck and the puck holds the robot by itself, it is not considered pinning.

- Q89. If a robot is pushed out-of-bounds where it applies force beyond the playing field and its power is terminated, will its points still be counted? These include floppies on the disabled robot.
- A89. If the floppies are still in a scoring position, they will still count.
- Q90. Prior to the beginning of a match, is the human player allowed to have the 3 floppies already in his/her hand?
- A90. No. The human player may not touch the floppies until the match has started.
- Q91. May a robot move in front of the opposing alliances' drivers and purposely block their vision into the playing field? Is this considered to be within the spirit of the competition?
- A91. No, that is not considered in the spirit of the competition.
- Q92. Will the competitions result in a dual championship? If an alliance wins, do they both earn a share of the championship?
- A92. Yes, there will be a "dual-championship".
- Q93. May we modify a wheel with additional hardware to be used as a pulley and satisfy the pulley requirement in the Additional Hardware List?
- A93. You may modify a wheel to use it as a pulley. However, it will not count as a pulley per the Additional Hardware List. See Rule K4.
- Q94. If we are in the elimination rounds and our alliance partner's robot blows-up, do we have to compete on its own or do we get to chose another team to finish the elimination rounds with?
- A94. Once an alliance is formed for the elimination matches, it stays together through thick and thin for the rest of the event. Any team which is unable to field their robot should still field their human player.
- Q95. May we use the material from the floppy we received in the kit to make a part for our robot?
- A95. No. The floppy is not listed as a kit item.
- Q96. May we use M.E.K. (Methyl Ethel Keytone) to bond several pieces of polycarbonate together?
- A96. Yes, that would be considered a fastener. Please be careful when using M.E.K.
- Q97. May the materials used on our robot be hardcoated, anodized, and/or nickel plated?
- A97. Hardening by mechanical working or heat treating is allowed. Anodizing is allowed. Nickel plating would only be ok if the nickel is purchased from Small Parts, Inc. See Rule K12.

Q98. If our robot's front end is resting on top of the puck and the back end is resting on top of another robot in such a way that our entire robot is greater than 2" above the floor, is our score tripled?

A98. Yes.

Q99. May we cut "off the shelf" DB15 cables in half and splice them together in order to create custom joystick interface cables? This will save us a lot of extra soldering.

A99. FIRST already allows teams to use their own wire and DB15 connectors, and this is a somewhat logical extension of that. Go ahead.

Q100. If our robot picks up an opposing alliance's floppies and gets them above 8 feet, do the points go to our alliance or are they ignored because they are on our robot?

A100. The opposing alliance would get the points because their floppies are above 8 feet. It doesn't matter who's robot is holding the floppies.

Q101. Do turnbuckles count as fasteners or must we machine our own? (SPI doesn't carry them)

A101. Turnbuckles are adjustable mechanisms, not fasteners. You are welcome to make your own.

Q102. May we use colored heat shrink tubing and in any amount?

A102. Yes, as long as it is used as an electrical insulator.

Q103. May we install multi-conductor 'automotive type' connectors on the ends of motor leads, sensors, switches, etc. to facilitate quick removal and replacement of components?

A103. Allowed electrical connectors are butt connectors, spade connectors, ring terminals, wire nuts, and the models of Anderson Power Products connectors provided in the kit.

Q104. Is thread considered a "fastener" per Rule K1?

A104. If used to fasten two objects together, such as by tying or sewing, then thread is considered a fastener.

Q105. May we solder the wires directly to the terminals on the drill motors and insulate with heat shrink tubing?

A105. Yes.

Q106. In reference to rule M16, would netting within the bounds of a robot's frame be considered a risk of entanglement? Are we responsible for another robot reaching into the area of our frame?

A106. Risk of entanglement is not limited to the space outside a robot's frame. If it is likely that, in the course of normal robot interaction (pushing and shoving, etc.) something could reach inside the robot and become entangled, then you should be concerned.

Q107. With respect to the 5" x 12" red/blue color alliance identifier, does it count towards the total weight? Does it count against the cost of the robot if we don't have any additional materials left over however unlikely and we need to order something from Small Parts?

A107. The alliance identifier is considered a "non-functional" decoration. See Rule M8 for details.

Q108. Rule P20 allows robots into any interaction zone yet Rule P21 says you cannot steal floppies from your opponents player station which includes the interaction zone. May we remove floppies from the interaction zone of our alliance partner's player station?

A108. A robot may retrieve floppies from either player station within it's alliance. It may not retrieve floppies from opposing player stations.

FISHER-PRICE SWITCH INFORMATION

Teams may use the switches (shifter & pedal) included with the Fisher-Price motors as input switches on the Transmitter.

ADDITIONAL HARDWARE LIST CLARIFICATION

A number of teams have expressed confusion over the Additional Hardware List. When designing your robot, please keep the following points in mind.

- 1) Items on the Additional Hardware List are not related to the \$425 limit on parts from Small Parts, Inc. These items are "Additional" to what is in the kit and what can be purchased from Small Parts, Inc.
- 2) Items on the Additional Hardware List have no cost limitations.
- 3) Items on the Additional Hardware List are limited by quantity.
- 4) Unless the quantity specified is greater than 1, the quantity allowed is 1. So, for example, when it lists a 4' x 4' sheet, it means 1 sheet of up to 4' by up to 4'.
- 5) It is acceptable to substitute multiple smaller sheets as long as the combined length and width of the smaller sheets does not exceed the length and width of the original sheet. For example, in place of a single 4' x 4' sheet, it is acceptable to substitute two 2' x 4' sheets. However, it is not acceptable to substitute two 1' x 8' sheets.
- 6) Please see rules K1 to K7 in Appendix A of The Robot for more information.

IMPORTANT PUMP INFORMATION

Repeated cycling of the pneumatic pump can sometimes blow the 20A relay fuses in the Receiver. Therefore, FIRST has decided to allow the use of 30A fuses on the relay controlling the pump. 30 Amp fuses for the relay outputs should be available from most automotive supply stores. Look for the "mini-ATO" style fuses.

FIRST has also decided to allow teams to use speed controllers (either type) to drive the pump if desired.

PRESIDENTS DAY HOLIDAY

FIRST and Small Parts will be closed on February 15, 1999 to honor Presidents Day.

DRAYAGE TRANSPORT INFORMATION

Suddath Transportation Services, an agent for United Van Lines, can provide transportation to and from the respective drayage sites for the FIRST Regionals and National Competition(s). Since they are a transportation broker, their prices may be cheaper than other national vendors.

For more information, you can call Reid Whittemore at 888-614-7271 ext.28. You should have available for him, the weight and dimensions of your crate(s), crate origin and destination, when the crate will be ready for pick-up and the date and time that delivery is required.

CORRECTIONS AND UPDATES TO THE MANUAL

On page 23 in Appendix B of the Events section of the manual, the date for the UTC New England Regional is listed incorrectly. The correct date is March 18-20 as stated previously in the Manual.

The 5:00 p.m. deadlines for shipping robots referred to in section 14 of Events refer to 5:00 p.m. local time, not EDT.

Please ignore references to black wire wrapped with red electrical tape on page 11 and rule C26 in The Robot.

The updated Kit Checklist contains a double listing for the Drill Housings. Please ignore the listing on Page 1.

The fax number listed for Skyway Recreation Products has changed. The new fax number is (530) 243-5104

The third bullet item of Rule K4 in The Robot (which applies to sprockets, gears, pulleys, chain, and belt listed in the Additional Hardware List) is corrected as follows:

- These components must be "commercially available," strictly *off-the-shelf* only. No custom or special orders. ~~Within the SPI catalog there are custom lengths of a specific cross-section item available for standard parts with special orders. These items may be ordered and are considered *off-the-shelf*.~~

Rule K15 applies to "special order" parts from Small Parts, Inc.