

# 2001 FIRST ROBOTICS COMPETITION

## TEAM UPDATE #5

Date: January 25, 2001

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### PLEASE CHECK YOUR TEAM DATA

As stated in email previously sent to all teams' Main Contacts, it is the responsibility of each Main Contact to provide accurate and complete team profile information (team name, home city, team home page, etc.). Team profile data will be used for team lists on the FIRST web site, event programs, and the scoring system at competition events. Regional event programs have already gone to print and changes to team profiles after Monday, January 29<sup>th</sup> 5PM (EST) will not be incorporated into the event programs for the National Championship. Unfortunately, many teams still have team profiles that appear to be incomplete or incorrect.

**Please** avoid embarrassment with your peers and potential trouble with team sponsors that are not recognized by reviewing and updating your team data as necessary. All updates must be done by the Main Contact for the team through the online registration system at <http://www3.usfirst.org/frcweb/>. FIRST will not process requests to update team profiles by mail, email, phone, or fax.

### JOYSTICK UPDATE

CH Products has discontinued manufacturing the Flightstick line of joysticks and is now permanently out of stock. Therefore, FIRST is revising the Additional Hardware List such that teams may now purchase and use any "PC joystick port compatible" joystick, flight yoke, steering wheel, and/or pedals with a 15 pin interface (i.e. not USB). Please note that not all devices are guaranteed to be compatible with the Innovation First control systems, but most should work. Also, note that not all joysticks contain center-adjust calibration features, which may make use more difficult, so please shop carefully.

### SKYWAY WHEELCHAIR WHEELS

The phone number printed on the Skyway spec sheet in Appendix H of The Robot is no longer used by Skyway. The correct phone number, 1-800-332-3357, is listed in Appendix G of The Robot.

### MENTOR GUIDE CORRECTION

The mentor guide was removed for a correction to an incorrect URL. We apologize for any inconvenience. You may download the updated mentor guide at [www.usfirst.org](http://www.usfirst.org).

### AWARDS UPDATE

There will be no "Featherweight in the Finals" award for the 2001 competition season.

## PNEUMATIC PARTS REPLACEMENT POLICY

Any problems with parts provided in the Pneumatics Kit should be directed to the Fluid Power Distribution Association. See Appendix G of The Robot or the back cover of the Pneumatics Manual for contact information. Please do not contact FIRST about these parts.

### MESSAGE FROM THE FPDA

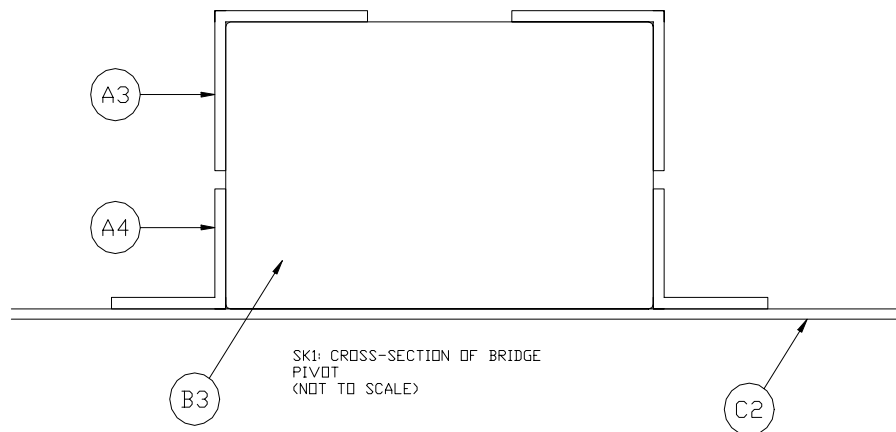
Many teams have inquired about being able to order additional cylinders above the four we have offered at no charge. After reviewing this with our suppliers, we have made the decision to allow teams to order additional cylinders at no charge, assuming there is a real requirement for their use. We will be reviewing orders both in quantity and type to make sure that they appear valid. You still must use the fax form on the back of the manual to order these cylinders. Please include your e-mail address should we have any questions on these requirements. No additional valves can be provided unless it is to replace a damaged one.

### PNEUMATICS CLARIFICATION

Team Update #3 clarified that robots may contain up to six (6) cylinders, which meant that robots could contain the two (2) in the pneumatics kits and four (4) additional from the custom order form. The FPDA has now agreed to allow teams to obtain more than four (4) custom cylinders. We must now clarify that the robot may contain ANY six (6) cylinders from the FPDA (kit or order form). That is, you are no longer restricted to two (2) of the six (6) cylinders being the units included in the pneumatics kits.

### PLAYING FIELD INFORMATION

The following figure illustrates the proper orientation of angles A3 and A4 as they are mounted on B3.



SK1  
REV 0 - 01/16/00

# ENGINEERING CHANGE NOTICE

## ECN #2: 01/16/01

Effective the above date, the changes noted below have been authorized and will be reflected in a future update of the indicated document:

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**Document being changed:** 2001 Field Components (Bill of Materials) revision dated 01/08/01

**Line #30:** Material: was: 5/16-20 nylon lock nut, is now 5/16-.18

**Line # 39** Size: was: 36- 3/16", is now 34- 3/4"

**Document being changed:** 01-FLD-0001-D sheet 2 of 2

**Sheets 1 & 2 lower right corner:** added: "NOT TO SCALE"

**Sheet 2:**

**View labeled "Bridge A-A":** added hidden line to depict placement of plywood.

**View labeled "Bottom View of Bridge":** Lip overhang: was 3", is now 4".

Spacing of 2x8 bridge supports: was 3x 1' - 4" on center, is now 2X 1'-4" from outside edge of outer 2x8 board to center of inner 2x8 board.

**View labeled "Goal C-C",** right side view at goal base: was: casters shown in-line with vertical pipes of goal. Is now: repositioned casters outward to reflect true location on radius of caster mounting circle to agree with specified radius dimension.

**Stretcher top view:** Added dimensions (to clarify size of area where robot may be placed on stretcher) to show distances from inner edges of parallel railing pipes as follows: left-to-right = 3'-4", and top-to-bottom = 2' -10"

## RULE UPDATES

The following is appended to Rule GM6:

"Only student team members may operate the Stop buttons."

The following is appended to Rule GM9:

For this rule, "surface of the playing field" is defined as the carpet on the floor and bridge as well as the 1" and 5" wide metal plates (A2, F1 on the BOM) around the edges of the carpet on the bridge.

The following is appended to Rule SC3:

For this rule, "surface of the playing field" is defined as all field components (walls, carpet, rails, bridge, etc.).

The following is appended to Rule SC6:

For this rule, "surface of the playing field" is defined as the carpet on the floor of the playing field.

## QUESTIONS & ANSWERS

- Q70. With regards to Rules T6 & T7, when it comes time to pick alliance members at Nationals, do the non-pre-arranged alliance picks have to come from within a team's respective division?
- A70. Yes, alliance partners must be picked from the remaining teams within the division.
- Q71. With regards to Rules T10 & GM13, does the term "field crew" refer to the 3 students and 2 coaches? In other words, must the "Alliance Captain" be a student?
- A71. The field crew is the group described in GM13. Yes, the Alliance Captain must be a student.
- Q72. May we use the ball that came in the kit on the robot?
- A72. You may use the balls in the kit on the robot, but they may not be inflated because that would cause too much confusion during a match. If you wish to cut them up and use the vinyl, that is ok.
- Q73. Is it legal to use electronic components from Small Parts as part of our control system?
- A73. Only if they fall under the control system components listed on the Additional Hardware List (i.e. wire, switches, electrical connectors, etc.). Otherwise, it would not satisfy Rule C5 because those devices are not described in Section 2 of The Robot. The logic is that electronic parts are restricted for safety and reliability reasons, similar to the pneumatics.
- Q74. Are we allowed to buy parts which are in the Small Parts catalog from another store and write them in at the Small Parts price toward the \$1200 spending limit? Is it required that they be genuine Small Parts parts?
- A74. We expect teams to purchase parts listed in the Small Parts catalog from Small Parts. The reason for using the catalog is to provide all teams with equal access to certain parts in terms of both selection and lead time.
- Q75. May we put lights on our robot to indicate the time remaining in the match?
- A75. Lights to indicate time remaining would not fall under the "non-functional decoration" rule (M9) because they definitely serve a function related to gameplay. Therefore, you would need to use lights in the kit. The rotating light must be used as described in Rule M8, which leaves the LEDs in the kit. You are welcome to use the LEDs for this purpose. FYI, there will be large LED displays mounted on the playing field facing the alliance station to indicate time remaining, so you really don't need to try to make a match timer on the robot.

- Q76. What happens if we buy two 1" wide timing pulleys, machine the inner hub off each, and weld them together into one 2" wide pulley? Does this now count as two timing pulleys (per the purchase) or one timing pulley (per use on the robot)?
- A76. It would count as two pulleys, because that's what you needed to make it.
- Q77. Regarding Additional Hardware List quantities, do you determine the limit on quantity by how much was purchased or by how it was used on the robot? For example, if I bought 20' of timing belt, 2" wide, and cut it into two 20' sections, each 1" wide, am I considered to be using 20' of timing belt on my robot or 40'?
- A77. In general, it is determined by the quantity that had to be purchased in order to create what was used on the robot. However, in this example, since we do not place a constraint on width of the belt, the total length used may not exceed the 20' limit.
- Q78. During the elimination rounds, do all 5 teams get 2 stretcher coupons? Is the number or coupons given different for the Nationals versus the Regionals since in the Regionals you do not have to play as many matches to get to the finals?
- A78. Yes, all 5 teams get 2 coupons each. There are no extra coupons for the Nationals. See Rule GM9.
- Q79. Please define "surface of the playing field" with respect to Rule SC3. Is the bridge considered part of the field surface? In other words, if a ball is on or in a goal that is on the bridge and the ball is also touching the counter-weights, does it count for points?
- A79. For the purposes of Rule SC3, the bridge and all other field components (carpet, walls, rails, etc.) are considered part of the field. Therefore, points for balls in contact with any field feature will be negated. Balls touching the weights or another field surface will not count.
- Q80. Please define "surface of the playing field" for Rule GM9. May a robot on a stretcher touch the bridge to balance it or reset it? What if it results in the robot being propelled along the floor? What if the robot is on the bridge and pulls against the counter-weights to move itself?
- A80. For the purposes of Rule GM9, only the carpet on the field floor and bridge, and the metal plates on top of the carpet on the bridge are considered the "field surface". A robot on a stretcher may manipulate the bridge. A robot on a stretcher may move itself by contacting the bridge as long as the robot doesn't push or pull on the "surface". Grabbing the counter-weights is specifically ok, though reasonable care should be taken so as not to apply unnecessarily large forces to the weight supports.
- Q81. Will FIRST use any lubricant to smooth the action of the bridge pivoting on the angle irons?
- A81. No. We believe that the friction is insignificant compared to the forces that will be applied.

Q82. Are we correct in thinking that the rules say that we are allowed to decorate our robot with paint that is not sold by Small Parts? Are there any restrictions on the kind of paint? May we paint any part of the robot? What if the paint is somewhat functional because it increases or reduces friction on a part of the robot in such a way that it could affect the outcome of a match?

A82. Rule M9 covers "non-functional" decorations such as paint. In a nutshell, non-functional decorations do not have to come from Small Parts or even be listed on the Additional Hardware List, but they may not affect the outcome of a match. Therefore, you couldn't use it to change the friction of a critical component, but you could use it to decorate the robot. You may use any type of paint on your robot if it is used in a "non-functional" role. Using paint on a surface where friction with other objects is critical would count as functional and therefore you would need to get it from Small Parts.

Q83. Team Update #2 mentions "off-the-shelf" electrical connectors, but doesn't mention where the shelf is. Is a slip-ring system available or may we build our own slip-ring system?

A83. "Off-the-shelf" is a common phrase that indicates a readily available standard component instead of something custom designed and manufactured for the purpose. Rule K3 states that all items on the Additional Hardware List must be "off-the-shelf" in order to clarify that these items must be purchased as pre-built components. Teams may not custom fabricate parts from raw materials and then account for them as covered by the Additional Hardware List. Parts fabricated from raw materials must be built from allowed raw materials and accounted for as the raw materials. In the case of electrical components, you may ONLY use off-the-shelf versions of the parts listed in the Additional Hardware List, and may not custom fabricate electrical connectors, terminal strips, contacts, switches, etc.

Q84. We would like to design a tank-style tread system using timing belts and pulleys. To do this we need 6 main pulleys and several rollers supporting the middle of the robot. Would these free-rotating load bearing rollers with grooves fitting the belt be considered pulleys, rendering them unavailable due to the Additional Hardware List limitation of 6 timing pulleys? If so, may we make our own beyond the 6 out of wood to put on the robot?

A84. Per the Additional Hardware List, you may purchase up to 6 timing pulleys from any source and use them on your robot. In order to use additional timing pulleys or rollers, you must purchase them from Small Parts, Inc. or fabricate them from allowed raw materials. See Rules K1 and K2.

Q85. Are cable ties and cable tie mounting bases considered fasteners?

A85. Yes.

Q86. We are having trouble locating the light within our very compact robot. It seems that everywhere we put it, there is no direct view of all four sides. Our question is, just how much visibility is "visible"? Would a colored spot 1/2" in diameter shining on a transparent side meet the requirement? What about using mirrors (from Small Part of course) to redirect light around mechanisms so that it will be visible from the other side?

A86. Direct view of the light is not necessary. It is necessary for the color from the light to be visible so that the audience and referees can determine which team the robot belongs to. If, in a brightly lit room, you can reasonably see the color from a distance of at least 50 feet, etc. then it is ok. Mirrors are ok.

Q87. Would a turnbuckle used to attach a cable be considered a fastener, or do we have to make our own as there were none in the kit or the catalog?

A87. A turnbuckle is considered a fastener.

Q88. If a goal is knocked over, and balls are resting inside, are balls that are touching the floor through the goal legal? If not, are balls supported by the "illegal" ball legal?

A88. No and yes, respectively.

Q89. The Additional Hardware List includes steel and aluminum plates. Does off-the-shelf perf-stock (pre perforated sheet) count?

A89. Yes.

Q90. May we use an air cylinder from the pneumatics kit as an air storage device if the piston is not being used to perform work? May we store compressed air at 120psi in the cylinder as we do in the storage tanks?

A90. Air cylinders from the pneumatics kit, including units ordered from the custom order form, may be used as additional air storage tanks at the "storage pressure" of up to 120 psi under the following conditions: 1) The air pressure is connected to one end of the cylinder and the other end of the cylinder is open to atmosphere, and 2) The cylinder is mounted such that the piston is fixed in the position that it would try to attain when pressure is stored (i.e. so that it doesn't try to move).

Q91. Rule K4 states that pneumatic actuators may not be modified for use as springs. May pneumatic actuators be used as shock absorbers if unmodified and plumbed into the regulated air supply? May we use a pneumatic cylinder to extend and damp an impact as long as the regulator relieves over pressure situations?

A91. Yes, as long as the system is configured to allow the regulator to relieve over pressure conditions. Keep in mind that you will need to prevent any side loads on the piston shaft or it will likely bend and ruin the cylinder.

Q92. May the volume tanks be pre-charged before each match starts or must they charge as the game progresses starting from empty?

A92. The robot may start the match with the "storage" pressure up to 120 psi and the "working" pressure up to 60 psi.