

January 25, 2008

## TEAM UPDATE #5

### GENERAL NOTICES

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Modifications to rules are highlighted in **yellow**.

#### **Replacement Parts**

Replacement parts began shipping this week and will continue through early next week. The parts are shipping FedEx 2-day and are addressed to the team shipping contact. We appreciate your patience.

#### **About "shooters"**

Teams are hinting about exciting designs for *FIRST* Overdrive robots. As we hear stories about progress, we would like to emphasize the need for particular caution in designing, developing, and using TrackBall launchers.

A heavy ball to be launched over a high bar almost certainly means quick release of substantial energy. Well-designed machines will be able to do that safely, but seeming small mistakes in the process can produce dangerous situations.

Some suggestions --

- Assign a "Release Safety Officer" to insure that all team members understand the prototypes and experiments and their potential misuses. Establish guidelines for its use, such as: "No one is allowed to prepare the shooter to fire unless the Release Safety Officer is present and has made sure everyone is paying attention and following all the safety rules."
- Never assume that the device will operate as intended. For example, imagine that a surgical tubing spring is to be used to launch the Trackball. If all goes well, the ball is launched and most of the energy stored in the surgical tubing is transferred to the Trackball. If, for example, the small metal clip that was intended to anchor one end of the surgical tubing pulls loose, rather than a heavy ball leaving with a reasonable velocity, one could have a small bullet leaving with a very high velocity. That could be dangerous in the extreme. Always ask "What unexpected can happen?" and plan for that contingency. Because of the inherent dangers, redundant safety systems should be considered in the system design.
- Be aware that a launcher that is accidentally fired "empty" must absorb all the energy that was intended for the ball. An empty launcher can be a very powerful hammer.

- Always be extremely careful when shooting mechanism is armed. Any body parts in the path of the firing mechanism will be subject to tremendous amounts of energy. The firing and release system must be regarded with the amount of respect they deserve.
- Always know the answer to "Where will the energy go?" and protect against even unlikely events.
- Use guards.
- Use shields.
- Keep all high velocity parts within the main structure of the Robot.
- Use safety catches or double safety catches. Mechanical stops that prevent the mechanism from releasing, and are removed only when the Robot is placed on the field for a Match, are very highly recommended.
- Use "armed" flags/indicators. For example, install warning lights on the Robot to indicate when the launching mechanism is "armed."
- Use padding.
- Run a safety wire through the length of the coil of any springs, so the parts of the spring will be restrained if it breaks.
- Design the mechanism so that it does not make any sudden movements when the Robot is powered on or off, or when the pneumatic system (if used) is charged or discharged.
- Design the mechanism so that any stored energy is released in a slow, controlled manner (over several seconds) when the Match concludes and the Robot is powered off.
- Use remote triggers during tests.
- Use critical design reviews by experienced engineers/designers/builders.
- Carefully avoid high velocity pinch points. They can quickly become small guillotines. Any pinch points that cannot be avoided should be brightly colored (using yellow-black safety tape to indicate pinch points is strongly recommended, and would be a permitted use of adhesive tapes under the first bullet of Rule <R38>).
- Publish on *FIRST* Forums creative ways to help insure safety. You can submit your recommendation in the *Team Safety Suggestions* part of the *Submit Your 2008 FRC Question Here!* forum (<http://forums.usfirst.org/forumdisplay.php?f=622>). Once moderated and approved, your input will be posted publicly in the *Safety and Damage Prevention* sub-forum of *The Robot* section of the Q&A (<http://forums.usfirst.org/forumdisplay.php?f=595>).
- Ask experienced teams to review your design.

- Test, test, test, and retest. You must know that your system is capable of handling the intense loads.
- Obviously, the inspectors and referees at events will look carefully to make sure the machine is safe, but you must be responsible for safety while you are building, testing, and competing with your Robot.

PLEASE be extremely cautious with any of these types of devices once at a competition event. While you are developing and testing it in your shop, you will have the opportunity to make sure all your team members are aware of the device and trained to work around it safely. That will not be the case when you are in the pits at the competitions. Your Robot will be in close proximity to other people that do not know the details (and any potential dangers) of your design. It is incumbent upon you to ensure that any high-energy mechanisms are safely secured and incapacitated when others are around.

The *FIRST* experience is one of inspiration. Being safe is part of that experience.

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**Section 0 – Introduction**

No changes.

**Section 1 - Communication**

No changes.

**Section 2 – Team Organization**

No changes.

**Section 3 – At the Events**

No changes.

**Section 4 – Robot Transportation**

No changes.

**Section 5 - The Awards**

No changes.

**Section 6 – The Arena**

No changes.

**Section 7 – The Game**

Section 7 – The Game, Rev E, has been modified to include the following change:

## Section 7.3.5.2

<G38> Signal To Pass – During the Teleoperated Period, a ROBOT may indicate a desire to pass an IMPEDING ROBOT by approaching the opponent ROBOT and “bumping” the back of the opponent ROBOT (relative to the Direction of Traffic).

- All “bump to pass” signals must be made with or against a STANDARD BUMPER, and inside the BUMPER ZONE, or
- If in POSSESSION of a TRACKBALL, the ROBOT may “bump” the IMPEDING ROBOT with the TRACKBALL outside the BUMPER ZONE, providing the contact is made exclusively with the TRACKBALL, or
- If the IMPEDING ROBOT is in POSSESSION of a TRACKBALL, and positioning the TRACKBALL so that it covers the back of the ROBOT, then the approaching ROBOT may “bump” the held TRACKBALL. In this situation, “bumping” the TRACKBALL will be considered equivalent to “bumping” the STANDARD BUMPER of the IMPEDING ROBOT.

## Section 8 – The Robot

Section 8 – The Robot, Rev E, has been modified to include the following change:

### Section 8.3.8

<R66> ROBOTS shall use the diagnostic LED flasher provided in the Kit Of Parts. Field personnel will use the LED flasher during the MATCHES for diagnostic purposes. Up to (4) LEDs can be installed on one robot. The diagnostic LED flasher is supplied with a four-wire cable with a length of approximately 6 feet. The cables are hard-wired at the lights and plug into the “Team Color” header pins on the Robot Controller. The Black wire of the ribbon cable must be plugged into the header pin marked BLK on the RC. It must be mounted on the ROBOT such that it is easily visible while standing three feet in front of the ROBOT in the STARTING CONFIGURATION. The excess cabling needs to be secured into a harness and anchored to the chassis. There is no direct method of attachment on the module; the attachment method is at the discretion of the team (usually some industrial-grade adhesive backed Velcro is suitable for this purpose). The Robot Controller directly powers and controls the LED flasher. The team has no direct control over the LED flasher and no programming is required.

### Inspection Checklist

The Inspection Checklist, Rev D, has been modified to include the following change: (please note that a Rev C of the checklist was intentionally skipped over)

- Removal of “robot class” concept,
- Change to +/-1” tolerance for flag height,
- Change “similar” to “appropriate crimp-on” for battery terminal’s connections

## **Section 9 – The Tournament**

No changes.

## **Section 10 – The Kit of Parts**

### **FisherPrice motors**

*FIRST* is currently working with FisherPrice to make additional motors available to teams as spares. They will be available in the *FIRST* Store (<http://www.ifrobotics.com/first-store.shtml>) on the Innovation First, Inc. website once delivered (delivery is expected within one week).

## ***FIRST* Guidelines, Tips and Good Practices**

No changes.