

Section

6



Guidelines, Tips, & Good Practices

6.1 General

6.1.1 Safety

Regardless if you are a from a veteran robotics team, a “rookie” team, a mentor, student, or teacher, safety is of utmost importance when doing this competition. Teams should display proper safety behavior when working with these machines.

6.1.1.1 Shop/Classroom Safety

- *Obey all Shop/Classroom rules*
- *Wear Safety Glasses.*
- Keep hands and fingers away from machinery tools while in operation.
- Untrained personnel are not allowed to operation machinery/power tools.
- *Use the Proper tool* for the job.
- *NO HORSEPLAY*

6.1.1.2 Robot Safety

Mechanical

- Be careful of protruding objects from the robot. Wherever possible, de-burr all holes and sharp edges.
- Make sure all mechanically stored energy is release or is safely secured before working on the robot.
- Lift the robot from a safe location. Do not grab the robot by the VEX controller.

Electrical

- Shut the power off before working on any electrical device.
- Confirm the correct polarity of electrical devices before plugging it in and turning on the robot.
- Keep wires away from moving parts of the robot (gears, chains, wheels, etc.)
- If you are using the VEX Power Pack, be sure the put the battery in the charging station before plugging it in. The charging station has switches that “sense” what type of battery it is charging. The 7.2V

Robot battery presses this switch down while the 9.6V Transmitter battery doesn't.

6.2 Robot Mechanical

K.I.S.S. – Keep It Simple Students! The more complicated the robot, the more that can go wrong.

Change is good – As you build your robot, you'll find that modifications must be made. It is ok to make changes. Your first robot will definitely not be your last.

6.2.1 Chassis Design

When designing the chassis of your robot, you must consider the size limitations. You may want a long robot, a wide robot, or a square robot. In fact, you may not want a chassis that is a quadrilateral at all!

6.2.2 Drive Train/Transmission

The Drive Train consists of components that connect your drive motors to the wheels or treads. The Kit of Parts (KOP) contains many components that can be used in your drive train.

The drive train can also be considered the transmission of the robot. With different size gears/sprockets, you can create gear ratios that will make your robot faster or stronger. Remember that if you increase the speed of your drive train, your pushing power will decrease and vice versa. Consider what Drive Train you will use for this game.

6.3 Robot Electrical

6.3.1 Wires

The wires used in Vex are PWM (Pulse Width Modulation) wires. Each consists of 3 wires, a power (red), ground (black), and signal (white) wire. When using PWM extensions, be sure to check the polarity of the wires (red to red, black to black, and white to white).

If requested by a team, you may make your own PWM Extensions. Make sure the crimps are tight but not crushing the wire to the point of breaking it.

6.3.2 Battery

The VEX Power Pack includes a charger, a robot battery, and transmitter battery. These are Nickel-Cadmium batteries which means they will eventually suffer from the “memory effect” if not well taken care of. When the battery gets low, remove the battery from the robot and use a battery discharger (or anything that is a load) to completely drain anything that is left. Then you can recharge it.

As mentioned above, the chargers that come with the VEX Power Pack have a switch that can “sense” which battery it is charging. Be sure to put the battery in the slot before plugging it in.