



# 2018 Back to Build Notes

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# Steve's Thoughts - 1 - General and Ranking

- Read The *FIRST* Manual
  - This is the best manual and game in a long time.
  - No significant holes in gameplay
  - Lots of variety, strategy heavy game
  - Don't Forget Team Updates!
- Ranking points
  - W-L-T
  - Help everyone move during Auto!
  - Bumpers above the bricks!



## Steve's Thoughts - 2 - Tech Fouls

- G09. Launching POWER CUBES is okay, but keep it short.
- G16. The NULL TERRITORY is safe.
- G17. Don't climb on each other until the end.
- G20. POWER CUBES: use as directed.
- G24. POWER CUBES stay on PLATES.
- G25. PLATES are moved by POWER CUBES, not ROBOTS.
- H11. COACHES, no POWER CUBES.
- H12. COACHES, stay clear of the VAULT.



## Steve's Thoughts - 3 - Gameplay and Roles

- Many defensive moves this year use offensive skills
  - e.g. owning other alliance switch
  - Design to play offense - ***Cube Intake Critical***
  - See 118's and/or WCP's MCC Robot
- Drive Team Roles
  - Reminder Coach can be Adult or Student,
  - New Technician role - expected to stay with cart during match



# Game Analysis - Anne and Steve's Predictions

Modeling this year's game different

Let's look at the mathematical model -

Max Score for Alliance

Max score for Match

Scoring Sensitivity Analysis

Final Score Breakdown



## Resources

- Ri3D - Florida guys (1.0), Snow Problem, Green Horns
- MCC Matches, specifically [118's solution](#) ([CD Post](#))
  - <https://www.youtube.com/watch?v=RQNCeHsOeJE>
  - <https://www.chiefdelphi.com/forums/showthread.php?t=161168>
- Spectrum 3847 Blog <http://blog.spectrum3847.org>
- John V-Neun Blog <https://johnvneun.com/>



# Inspection - Kevin Genson

- My e-mail - keving.frc@gmail.com
- Robot Inspectors are your friends
- Three priorities:
  - Safety
  - Compliance
  - Fun
- Goals
  - Get all teams on the field for all matches
  - Help teams improve their robots



# Changes

- No major surprises or changes to the Robot Rules
  - No height limit outside of starting configuration
  - Bumper zone now 0-7.5" (Team Update 2)
  - No motor limit
  - 20,000 mAH USB batteries for powering of COTS computing devices
- Pre-Inspection
  - There will be two pre-inspection days after stop-build day
    - Saturday, February 24 from 10AM - 4PM at Osbourn Park Senior High School in Manassas, VA
    - Sunday, February 25 from 10AM - 4PM at URSA STEMAction Center in Columbia, MD
  - Does not count towards unbag period. No work may be performed on the robot.
  - Pre-inspection does not require students. It is not official. You will still need to be inspected at events.
  - Registration process still in development. Plan is to allow teams to register for time slots.
  - On-site inspections may be possible depending on the availability of LRI, but that is not guaranteed.





# Things I Always Look For

- Safe Energy Storage
  - Battery must be secure (turn the robot upside down and shake it).
  - Storage tanks must be rigidly secured.
    - Avoid cable ties or tape.
    - Avoid banding or hose clamps that can cut into the storage device.
  - Stored mechanical energy must be safe to be around.
- Accessibility
  - Please make the breaker easy to find and manipulate.
  - Ensure your pneumatic gauges, regulators, dump valve, relief valve and switch are easily accessible.
  - Ask a stranger to turn off your robot or dump your pneumatics and see how long it takes.



# Robot Tips

- Bag-And-Tag
  - Take a picture of the form after every signature. I can verify a form without it being physically present.
- Electronics
  - The KOP now includes a Power-Over-Ethernet connector. Use it; it's far superior to the barrel connector.
  - Mount the radio high and away from metal.
  - Wrapping a cable tie around the radio (or using clamps) can compress the case and cause a short. Use Velcro.
  - 120A breakers trip more often at high temperatures, and will trip MUCH faster after it happens once.
  - Use quality connectors such as Anderson Powerpole
  - Larger gauge wire is good. 10 gauge for motors (McMaster 9697T5), 4 gauge for batteries (6948K92)
  - Use proper crimpers. Preferably hydraulic. Poor crimping is a leading cause of robot death.
  - Perforated plastic (McMaster 92985T51) is an excellent base for electronics.



# Robot Tips

- Pneumatics
  - Brass  $\frac{1}{8}$ " NPT fittings have a larger ID than plastic fittings; hard fittings between solenoids and pistons can provide more air flow.
  - McMaster P/N 48435K714 is a superior pressure relief valve that is pre-set. Go buy this. It's \$5. Please.
- Bumpers
  - Spend the time to make sure your bumpers are secure, easily changed, and an integral part of your design.
  - Do not leave them until the last minute.
  - Pay particular attention to gaps; no gaps in the last 0.5" of each corner of each bumper.
- Layout
  - Pneumatics and electronics both benefit from clean, labeled configurations.
  - The easier it is to inspect, the easier it is to troubleshoot.



# Things I Expect

- Overhead threats
  - Protect your robot from falling crates and tipping robots.
- Catastrophic Failures
  - Robots climbing on robots is a recipe for dropped robots (similar to Steamworks)
  - Unstable robots can easily fall over, potentially exiting the field or blocking major areas.
- Full Contact
  - Expect high speed collisions, similar to Aerial-Assist.
  - Bumpers will likely be high and narrow.
  - Lots of narrow places for defense.