Team 1257 - All Divisions

General Use Approved

FRC Penultimate Manual
2016

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Team Divisions

Everyone On The Team

- Contribute to the team as much as you can, even though it might be something small.

- Keep a cool head at all times.

- It doesn't hurt to help another team, **ever**. They love FRC just as much as you do!

- Sit down once a match begins / after your team is selected for an alliance.

- NEVER talk badly about another team. They know their own mistakes as well as your own team knows theirs.

- Read the RULES! You never know when you'll be doing someone else's job.

- Mentors and captains are there to help **everyone** on your team, not just you. They're also really nice.

- Talk to other subteams, your visions may not align, or may be shared! Communication amongst team members is equally as important as comms between the DS & the ROBOT. *Collaborate!*

- Always be positive. Please don't talk negatively about yourself, a specific group of people, or the team in general. Attitude is everything.

- Don't be afraid to ask questions.

- MAKE FRIENDS. People are so nice.

- There is *always* something to do, you just have to ask.

- While many of us would love to dedicate all of our energy to the team (and some of us do), unfortunately, we still have other, very important priorities. DO NOT let robotics become your #1 priority. That GPA is more important.

- ○ Don't lose sight of your future goals and dreams. That being said, putting your entire heart and soul into the team can be a good thing. Just keep consequences in mind.
- Don't take disagreements on robot or team decisions personally. Everyone wants the best for the team, even though there may be disagreements as to what that is.

Train the way you fight. Because you will fight the way you have been trained.

- Sun Tzu

Officers & Leadership

- **Lead by example**, not by order. You are not an exception to doing work.
- **Set clear goals and make sure you have a plan outlined.**
- **Keep the goals simple, brief and achievable.**
- **Set a timeline and/or deadlines. Adhere to these.**
- **Delegate effectively, so you can get more done - other team members get experience and you can stay sane.**
- Remember:
    - ○ People see you as role models, whether you want them to or not.
    - ○ It's still just a **game.**
- Notes are important. All subteams taking notes makes recalling binned ideas that may help the team later is important.
- Account for mistakes, plan for them, but don't hold it over someone's head. It'll never help the team as a whole, and ruins the mood.
- The best plans are the ones that work and get the job done efficiently.

- Know who's who.

- A team that fights within itself can never defend against others. Solve internal struggles and the external ones slacken.

- No one needs to be able to do everything, though the officer team needs to be able to make sure everything gets done.

- Make good friends out of your teammates, and the dynamic that produces an amazing team is soon to follow.

- Reference: [Roles of Team Captain](#)

Electronics

- Checklists are helpful.
    - **Never** skip a checklist if you use them, though you may add to one at an event.

- When a robot breaks down, it is usually an electronics problem, so make sure your robot works before going onto the field.
    - For example: RSL Brownout

- Make sure you turn your robot is turned on. *This is important.*

- ALWAYS connect to the field at least once before qualification matches start

Build

- Strategy should happen before design and design should happen before fabrication
    - Not that strategy can never be re-evaluated during design or design can be revised during fabrication

- Focus on having a working robot that achieves its strategy goals, not about its design.

- Determine whether you want a robot that specializes in one aspect of the game, or one that can be cheesecaked and can support the alliance.

- Bringing multiple battery chargers is a GOOD idea.

- Developing a new feature/mechanism for the robot during competition is almost impossible when focusing on match preparation.

Programming

- Don't over complicate your code.

- Clean code is good, functional code is better.

- Changing the code during competitions is do-able, but risky, so try to avoid it.
  - Try to test it a practice field if possible

- Use WPILib & Screensteps if starting off, and ask your fellow programmers for help!

    ScreenStepsLive - WPILib

- Pick a programming language that works for your team. You don't have to work on the language everyone else is using, but use what you know, and can support.

Drive

- Make sure you know the game rules.

- The actions of the human player can greatly determine the outcome of a game.
  - Human players are generally responsible for moving game pieces. A skilled human player can help their alliance control game pieces to maximize scoring and sometimes reduce opponent scoring.

- Communication between members of drive is *essential*. Don't be afraid to talk to one another!

- Reference: 254's Guide

Strategy

- Scout at EVERY competition. You never know for sure going into a competition if you'll be an alliance captain. Even if you do not think you have a good enough robot to seed high, you may end up with a nice schedule. Even if you do not pick, the data can be used to formulate smart match strategy.
  - Don't let a lack of manpower be an excuse. If your team is short-staffed, reach out to other teams at the event to collaborate on scouting
- If you don't end up scouting for some reason, ask teams if they'd be willing to share their data with you. You would be surprised how many teams would be happy to help a team unexpectedly thrown into a captain spot.
- If you have ANY chance of finishing in the top fifteen teams, MAKE A PICK LIST (or a few) THE NIGHT BEFORE ALLIANCE SELECTIONS. Have a ranked list of robots you want, or alternatively a separate list for each role you'd want robots for (e.g. shooters, defense, low goal, etc).
  - There should be at least as many teams listed as there will be teams in playoffs (CMP, 32 teams; elsewhere, 24). You should be willing to work with absolutely any of them.
  - As additional matches are played after your list is assembled, move teams up and down as needed. Some teams shine on their second day. Others robots break. Keep scouting, and observe upward and downward trends. If robots are having issues, reach out to the teams and find out how fixable they are. A strong robot may be available later than they should be because other scouts were concerned with issues that you know can be resolved. On the other

hand, a robot on the rise may be passed over due to their weaker previous

showing.

- ○ NEVER leave a robot off your pick list because they "won't be available by the

    time you pick". *You never know*

● If you have a good, well-reasoned picklist, you'll be fine for alliance selection. Do not

worry about making the perfect pick, just pick the best one from your list.

● The scouting team should talk beforehand and make it clear how much the team

representative is allowed to deviate from the prepared list. In the past, I have

regretted going strictly by the list rather than by my gut. On the other hand,

teammates may be annoyed by going against the mutually agreed-upon ordering.

● Scouting has two primary applications: formulating match strategy and planning for

alliance selection.

● Scouting is not just about how many points a team scored, but how that team

performed and what sets them apart from other teams.

● Pick the teams that maximizes your chance of winning

- ○ Don't simply pick the highest scoring team available, though that is often

    what maximizes your chance of winning

● Using electronic scouting is great, but if it seems beyond the team's reach, resort to

just using paper scouting.

- ○ Just make sure you don't cut down a forest.

- ○ Paper is failsafe in a way electronic scouting isn't.

● Recovery from mistakes is qualitative thing, not a quantitative.

● Drive team depends on scouts for competition information, and especially for

alliance selections.

● Good communication with the drive team is very important, scouting will be useless if the data is not put to good use.

● When scouting, finding more about other team's weaknesses can help you win.

● When picking alliances, rather than focusing on your picklist, try picking teams based on what other alliances pick, so you can beat them with the greatest advantage.

● Very important factors that will always be important: Drive team skill, CONSISTENCY

● When picking, keep in mind where you are picking from and who you will face.

  ○ Keep in mind how deep the field is and the difference in strength between the top picks, middle picks, and late picks. Where the field "drops off" can make or break alliances.

  ○ In general, if you are picking from a high captain spot (1,2,3), go for the best consistent robot for your alliance. A robot that fails can cost you quarterfinal or semifinal matches against considerably weaker alliances.

  ○ In general, if you are picking from a low captain spot (6, 7, 8), go for a somewhat consistent robot with a high ceiling. You will almost certainly be facing a stronger alliance in quarterfinals and semifinals. If you want to make it past those, you will need to upset. A consistent #8 alliance is great, though if they can't outscore #1, they simply won't make it past quarterfinals.

  ○ Before starting your picklist, ask how much risk is acceptable and what your goal is. If you want to win above all else, as is typically desired at regionals and the championship, making riskier picks can make it easier to create a higher-scoring alliance, though also one that is more likely to fail. If you want to make it as far as safely possible, as is typically desired at district events and

district championships due to the point system, be more risk-averse, as risky picks can cost precious district points if they fail early on.

● A whiteboard can be a valuable tool for communicating pick suggestions to the team representative.

● Choose carefully between a triple offense and a two-offense/one-defender strategy. Having a defender creates a scoring disadvantage, but a triple-offense alliance can often be defeated by an alliance with a strong defender.

   ○ A good guiding question is "how many points can our wekeast robot score, and how does that compare to how many points they can take from our opponent?"

   ○ Always have a contingency plan for defense played against you

● Look for teams with the "X-factor", that powerful drive to win or excellent strategic instinct. Some teams demonstrate it with their previous event results. Others demonstrate it in excellent match strategy or driver skill. Look for it, and while it shouldn't be valued over robot functionality, it can be used to determine the best pick among similar robots.

   ○ Example: 1257 at Mount Olive 2016, selecting 1676 in order to play defense. Their drivers demonstrated considerable skill during qualifications, and the team has a history of competitive success. There were a number of other robots who *could* have played skilled defense for the alliance, but 1676 went above and beyond and helped them win the event.

Business

● Business is extremely important because without money, you can't do anything.

● Maintaining sponsors in-between years is IMPORTANT.

- Follow through on all contractual obligations.

- Mass emails don't always work to try and get sponsors. Don't be afraid to go door to door!
    - Sponsor packets with personalized letters

- Local businesses are likely to help you if you look good while doing good. Preach FIRST more than your team, and your team as in inroads to supporting the mission.

- SEND OUT UPDATE EMAILS!
    - Companies like to brag as well.

- Your sponsors & partners are more than wallets, treat them as such.
    - Example: If your sponsor is a steel manufacturer, *ask* for shop-work if they can, or even just raw material. Spares at competition are a good thing.

- If you don't have a business plan, make one. It's not only a step closer to Chairman's, but also a philosophy to keep the team running. It makes money easier to get, and sponsors more likely to stick around.
    - [Writing A Business Plan](#)
    - Business plans shouldn't just cover the financial details of the team, they should be a guiding document for all team operations and organization.

Safety

- Safety is one of the most important parts of an FRC team.
    - Make sure people recognize that and not take it as a joke.
    - It is *just* as important as build or electronics or other subteams.

- Improvement is everything
    - Make gradual changes in building a well rounded safety program.

● Start by making a PPT on basic rules for the school environment and specific machinery

   ○ Collaborate with captains from other subteams and pit crew members to show new members the works of tools and precautions needed to know

   ○ Make safety quizzes that require 100% passing to demonstrate understanding

   ○ Make safety contracts and rules and make sure both the parent and the student signs it (if the student/parent does not sign it, the student should not be able to participate--- check with mentor to approve of this notion)

   ○ Keep records (e.g. injury records), but do not show PHI to FRC judges; it is private info.

● Over time, start showing judges your comparison from a few years after creating a concrete program to the hectic whirlwind of what the club was like before.

   ○ Progress is important.

● As a safety captain, familiarize yourself with some of the tools used. That way, you can point out hazards to members and help others.

● *It may not seem like it, but you hold a lot of responsibility for the members and mentors of the team.*

   ○ Their safety may/may not fall back on you in some circumstances.

● DO NOT try intimidating students/or using scare tactics; it won't work

   ○ Teaching and making sure they understand what they're doing and what they put themselves at risks for is key.

● Get to know every person, even if their subteam is not in build or electronics.

- ○ Some people hide their injuries without telling the captain (big mistake!), you need to make sure you are able to catch when they do it and tell them not do it again.
- Make your own team Safety Rulebook, specific with your school's rules and regulations (if you are part of a school)
- Teach members responsibility by having the team purchase new safety glasses for each new member (you will have to discuss this with your mentor/advisor) and telling them that the team will not buy new pairs if they are damaged or lost
  - ○ If the safety glasses do not have a side and upper (distance covering space from eyes to glasses) guard, they are NOT safety glasses.
  - ○ Prescription glasses used in daily life are NOT safety glasses
- Make sure to make clear distinctions between safety at school vs. at the arena
  - ○ 2 different areas, more things to watch out for and rules to follow
- When competition comes around, make something that sums up your safety program and hand it out to other safety captains while getting to know their team program
  - ○ They could have something in their program you don't have that could be a good idea to implement
  - ○ Also helps to give it to safety judges when they come around
- Have 2 Safety Co-Captains, that way both people can rotate being in the pits during competition and one person won't be dead tired.
  - ○ One in the Pits, one in the stands to make sure everything is good in both settings.
- Have 2 first aid kits, one in the pits and one in the stands with a co-capt

- Help out with the robots pre-match checklist.

  - Make one if you don't have one.

- Make a checklist of things to bring to competition.

- Make a binder for all types of documentation.

  - Have the FRC Safety Manual

  - Sort out all types of documentation by year or by type of document

    - E.g. - Injury reports or Safety contracts

- Bring a trash can to competition

  - Metal, hopefully.

  - Multifaceted / Many Uses.

- Before every competition, discuss an emergency plan and place to meet in case of emergency

- Be CPR/First Aid certified

  - Not only is it an incredibly useful thing to be, but it also looks good to Judges and other officials.

- Have machinery checks of the machines used the most (ask build captain about this) to check for damages and possibly brokenness

  - Do this especially during build season (it would be horrible to use a broken machine unexpectedly and get hurt)

Design

- The team brand is extremely important. If you look good, people will subconsciously conclude that you are good… at least at first impression.

- Having a good aesthetic also affects the team's general drive.

- Make sure everyone follows the design guidelines. Changing the fonts of a
  document is not extremely hard.
- If working with a team, make sure everyone knows the leader's vision.

Mentors

- There's no such thing as a bad idea, consider everything.
- Planning and note-taking can save you, write stuff down!
- Not all other mentors are GP, you must be in the face of all adversary.
- Maintaining a flow of information from year to year is useful.
  - Writing down everything the team did well, and how they did it at the
    end of each season might help.
- You are a student as well. Never stop learning.
- Every opportunity is a learning one. Never pass it up.
- Volunteering gives you a chance to not only understanding both sides of the
  Competition Coin, but also to respect those who do it, and appreciate what
  they do in the "muscles I didn't know exist hurt" sort of way.
  - Shoutout to the Field Reset Crew (the recursive FRC!)

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*Winning a match is not something a robot does, winning is a team effort that requires
the cooperation of dozens of individuals.* - [Andrew Schreiber on Chief Delphi](#)

Competition Notes

No matter the type, scale, or location of event, follow the rules of it to the letter.
Reading the Administration Manual may help, but is rather heavy… Generally, don't
do anything that could be in any way be construed as cheating / not being GP. No

Wi-Fi access points / hotspots, no being rude to other teams, team mates, drivers, etc. Respect others pit areas, and above all else, remember that everyone else there loves the competition just as much as you. Don't treat them with any less respect than they deserve for it.

- ● **Regular Events**
  - ○ Bring snacks, prices vary per venue.
    - ■ Some venues prohibit outside food and drinks. Some do search bags to enforce this rule.
  - ○ A schedule helps a LOT.
  - ○ Follow said schedule.
  - ○ The drive team knows when you're not cheering, the arena mood changes. Help them help everyone! **CHEER!**
  - ○ Spirit is important, not for the trophy, but for your morale. Fake it 'till you make it!
    - ■ Spirit makes competition more fun.
  - ○ If there are audience selections are important, especially if your team is playing
  - ○ If you don't know, **ASK!** People like sharing what they know, especially in FIRST.
  - ○ Every team is a potential ally, even if they're against you in the next match.
  - ○ Get used to songs on loop, it happens more than anyone is comfortable with…
  - ○ Get to know the event flow before hand, if at all possible. Ask another teammate who's been there before.

- ■ Know who's who.

○ If a "bad" call is made, don't try and force a ref to see footage you took with your phone or anything. They do **NOT** look at footage, and cannot. Don't force them into an awkward situation.

○ It is highly encouraged to talk to people from other teams.

○ Remember, everyone is stressed at these events.

○ If, at any point, you feel lightheaded, take a walk somewhere where there aren't many people.

● District Championship (DCMP)

○ See Regular Events

○ High-Stress ⇒ Don't forget to eat!

○ Do not expect to perform the same at District Events as well, teams have their own strengths and weaknesses.

○ Be aware: Judges may judge differently here, a bit more strict on rules compared to other events.

○ Get to know the event flow before hand, if at all possible. Ask another teammate who's been there before.

● World Championship (FRC CMP)

○ As high stress as it gets, be prepared. High-strung people **everywhere.**

○ Pack EVERYTHING you *need*, not everything you *want*.

○ Bring your own amenities (shampoo, toothpaste).

○ Eating on time will be difficult, but you NEED to.

○ Expect not to sleep as well as you would in your own bed.

○ The entire event is totally different from any event you've ever been to.

- ■ Different refereeing: The rules may be interpreted differently field to field.

- ■ Layout is a LONG walk (St. Louis) (~1 mile stands ⇒ pit, Archimedes 2016)

- ■ Food is EXPENSIVE. (St. Louis ⇒ Go to Culinaria up the street. ~4 blocks)

- ■ Merch can be had AT the event, bring spare change.

    - ● A event shirt can be anywhere between 20 and 100 dollars.

- ■ Event Handbooks are INCREDIBLY useful for not just people attending to see robots, but for teams.

    - ● They have pit assignments in the guidebook.

    - ● They're free, and usually near entrances. Get two copies, for when you lose one / give it to a mentor to have / look at.

○ The pit pathway is long. Multiple carts are useful (eg robot & spares)

○ Mentors:

- ■ Get the hotel rooms as **FAR IN ADVANCE AS POSSIBLE**.

    - ● They only go up in price.

    - ● Same for plane tickets.

- ■ Do your own bag check (if by plane) the day before, so that you can get through lines quickly at the airport.

- ■ Logistics will eat up most of your time between your DCMP and your CMP. Plan accordingly.

- ■ If you are doing well in district play, start looking at logistics long before DCMP.

⬤ Offseasons

- ○ Very different culture, much calmer & more relaxed.

- ○ Lower overall costs (500 versus 5k)

- ○ Often used to train backup / upcoming drive teams.

- ○ Sometimes have silly rules (human robot matches, robot vs humans, etc.)

- ○ A good way to get someone into FRC for the next season.

- ○ Occasionally has pre-rookie teams (registering for the next season next year)

While Grace will carry you through good times and victory, Professionalism will carry you through hard times and defeat. - [Venkatesh on Chief Delphi](#)

Good Resources

Karthik's Lectures

Karthik is a successful lecturer and FRC mentor with FRC#1114. He's lectured year after year at CMP in St. Louis talking about the various successful components of an FRC team. He covers everything from game analysis to scouting and strategy (including alliance selection). Watching at least one of the videos below is a good idea in general.

- ⬤ The Subtle Secret To Success TEDxUTSC

  - ○ https://www.youtube.com/watch?v=MfC3JdkEVgQ

- ⬤ Effective FIRST Strategies 2016

  - ○ https://www.youtube.com/watch?v=sJOfH-lomEQ

- ⬤ Effective FIRST Strategies 2013

  - ○ https://www.youtube.com/watch?v=Apk_X-maRf8

Watching at least the first two are highly recommended, and are applicable not only in FRC / FIRST, but in anything you do. Overall, the general message is simple. When you are passionate about something, it becomes easy to not only meet expectation, but to exceed it. However, please note that a general summary to Karthik's lectures does in NO way do them justice,and viewing them yourself would be a great benefit to you.

Gracious Professionalism / Coopertition

http://www.firstinspires.org/about/vision-and-mission

"Gracious Professionalism is part of the ethos of FIRST. It's a way of doing things that encourages high-quality work, emphasizes the value of others, and respects individuals and the community.

With Gracious Professionalism, fierce competition and mutual gain are not separate notions. Gracious professionals learn and compete like crazy, but treat one another with respect and kindness in the process. They avoid treating anyone like losers. No chest thumping tough talk, but no sticky-sweet platitudes either. Knowledge, competition, and empathy are comfortably blended.

In the long run, Gracious Professionalism is part of pursuing a meaningful life. One can add to society and enjoy the satisfaction of knowing one has acted with integrity and sensitivity.

Coopertition®

Coopertition® produces innovation. At FIRST, Coopertition is displaying unqualified kindness and respect in the face of fierce competition. Coopertition

is founded on the concept and a philosophy that teams can and should help and cooperate with each other even as they compete.

Coopertition involves learning from teammates. It is teaching teammates. It is learning from Mentors. And it is managing and being managed. Coopertition means competing always, but assisting and enabling others when you can.”

Gracious Professionalism and Coopertition may seem like buzzwords, but they are and become to each participant the spirit of competition. To read the words on a piece of paper, or in the many manuals of competition is one thing, but to experience them is an entirely different thing. People acting so selflessly, to forward not their personal agendas, but the values that they aim to extend to everyone they know, is inspiring. One such example is that of a soccer goalie, unable to tie his shoes. A player from the opposing team walked over and tied them for him, enabling the opponents to get a free kick. The opposing team, however, threw the free kick, allowing the game to continue on as normal. Without Gracious Professionalism and Coopertition, there would be no FIRST in the form we know it today.

Jack Kamen & Imagery Award

Jack Kamen was the father of Dean, founder of FIRST. He was a comic book illustrator who supported Dean in everything he did, perhaps helping him do things he never would have otherwise. He was to Dean, what Dean Kamen is to the FIRST Family of teams and districts, inspirational and right in everything he did. The logo of FIRST and all

FIRST events was designed by him, and in 2011, the FRC GDC honored him with a game, Logo-Motion. In addition, his long-lasting mark is the Imagery Award, presented at each event, in his honor.

> *"In honor of Jack Kamen, Dean's father, for his dedication to art and illustration and his devotion to FIRST. This award celebrates attractiveness in engineering and outstanding visual aesthetic integration of machine and team appearance."*

http://www.firstinspires.org/robotics/frc/awards

Indispensable Tools & Techniques

Certain tools throughout a build season are both essential and easy to lose. A quick list use useful ones:

- Screwdriver Set (two of 'em, for when you have two subteams)
- Wrench Set (metric & US, though you really should only use one when building a robot. STANDARDIZE!)
    - Mark your most commonly use wrench off with tape to speed up pit repairs.
    - For example, the 7/16ths wrenches on 1257 were covered with red tape to be found easily. We have / had about half a dozen of them.
- Wire Cutters
    - A good sharp pair is essential for trimming zip-ties, wires, and a whole load of other things. If you have a dull pair of cutters, it can stop the whole rhythm of the robot checklist in the pit, which is not a nice thing to have when you may or may not have
    - Many posts on Chief Delphi recommend this pair:

- ■ https://www.sparkfun.com/products/11952
- Multitool
  - ○ Especially useful if you packed up a crate and need to open it *with your tools in the crate.*
- Good Wire Strippers
  - ○ http://amzn.com/B00BC39YFQ

Keys To a Successful Drive Team (254 & Travis Covington)

https://frcdesigns.com/2016/01/08/keys-to-a-successful-drive-team-an-interview-with-travis-covington/

Excerpts:

- ○   *"What do tryouts for drivers look like on 254?*

TC: We try to bring up new drivers early and retain them for as long as possible. We feel that the driver can be one of the most important roles on the team, and requires some skills that need to be taught and that can be honed with time/practice. The more experience once trained initially, the better. Many of our best drivers started as Freshman/Sophomores and drove for 3+ years."

- ○   *"What factors into your decisions on drivers?*

TC: Many things, least of which is actual skill driving the robot. We have a large list of criteria which we send to the whole team prior to tryouts or selection. It is a prioritized list, from most important qualities to least important. At the top of the list is Maturity. The "Driver Qualities" list is as follows:

- ● *Mature*
- ● *Communicative*

- *Respectful [and] Cooperative*

- *Humble & Accommodating*

- *Dedicated & Hardworking*

- *Experienced*

- *Skilled & Assertive*

- *Knowledgeable in Mechanical, Electrical & Controls aspects of the robot*

As you can see, knowledge of the robot is not a huge concern. Many of the things above cannot be taught and are harder to find. We also have attendance and GPA requirements of our drivers. These bullet points are explained on our selection criteria document but are summarized here for simplicity."

RobotPy - Anatomy of a Robot

- http://robotpy.readthedocs.io/en/latest/guide/anatomy.html
- Though the guide is designed for Python, a language that not many teams use, the ideas and principles behind it are very useful, and explain the philosophy very well. Includes code & examples.

Apps & Programs

- The Blue Alliance
    - www.thebluealliance.com
    - https://play.google.com/store/apps/details?id=com.thebluealliance.androidclient
    - https://github.com/the-blue-alliance/the-blue-alliance
- FRC Spyder

- ○ https://play.google.com/store/apps/details?id=com.dwabtech.frcspyder&hl=en
- ● FRC Drive
  - ○ https://play.google.com/store/apps/details?id=com.aquamorph.frcdrive
- ● Slack
  - ○ www.slack.com
- ● Trello
  - ○ https://trello.com/
- ● Basecamp
  - ○ https://basecamp.com/

6054: What We Learned

- ● https://www.chiefdelphi.com/forums/showthread.php?p=1591100#post1591100
  1. Lessons Learned:
  2. Ordering parts is hard. Getting a system in place at the school to decide you need a part, and get it sooner than 3 weeks requires some outside the box methods of procurement for a school district.
  3. The Kitbot is really good. It was simple yet flexible enough to allow us to modify it. The time we saved was crucial to writing code, and practicing driving.
  4. Having FRC teams to rely on is awesome. We were lucky enough to be part of the NEOFRA [Northeast Ohio FIRST Robotics Alliance], and going to kick off with those teams, and seeing their robots from previous years was awesome. New teams should definitely find nearby teams to work with.

5. The control system setup walkthrough needs special attention to detail. A slight omission on step 4 of 30 will have you banging your head against the wall for days trying to get it sorted out.

6. Metal shavings are very bad for electrical components.

7. The stress on the drive team is hard to simulate outside competition.

8. As a new team try to pick a few things to well in the game. If you have time to add in new functionality after mastering that…. Nah, you won't have time.

9. Getting sponsors is difficult. The average manager at a car dealership isn't as excited about robotics as a high school student. You need to have a few kids that are able to sell your team, your vision, and FIRST in general.

10. It's really important to keep track of dates like when FIRSTchoice opens, and when registration is due, and all the things that are on deadlines.

11. Retired mentors make great mentors. They have more free time, and a lifetime of experience.

ScreenStepsLive - WPILib

ScreenStepsLive is an invaluable tool for programmers who need to work on the robot code. They have examples in C++, Java and MatLab, though the concepts of PID tuning (among other things) are uniform to FRC regardless of the programming language due to the inherent nature of the RoboRIO.

● http://wpilib.screenstepslive.com/

QDriverStation

QDriverStation is an open-source implementation of the driver station that runs on Linux, Windows and macOS. Supports virtual joysticks, and quite a few

driver-station protocols. Not allowed for official competition, but okay for demos & offseasons if they allow it.

Advice for Rookie You?

This was a thread started by one of 1257's rookies at the end of the 2016 season with the intention of finding out what other people would tell their rookie selves. A way to go back and see what they'd have done differently, and any advice they think that they as individuals would have needed. Applies to both mentors and students.

● https://www.chiefdelphi.com/forums/showthread.php?threadid=148836
● Courtesy of frcguy on Chief Delphi.

"Although I am still technically a rookie, I'll answer anyways. My answers are more geared towards advice for new rookies, but I hope not just rookies can learn from some of the things I experienced. Here goes it!"

● **Hard work and long nights pay off.**

After weeks and weeks of long nights, delays, and problems, you might start asking why you are even still involved. Just keep doing the best work you can. When you see the robot that you poured 6+ weeks of your life in to at your event, on the field, it is one of the best feelings in FIRST!

● **Try your best, no matter what.**

While times may be tough, especially your rookie season, stay strong and try your best. The knowledge and experience you will gain from FRC is worth it.

● **"Powerhouse" teams are some of the kindest and gracious people you will ever meet.**

While they may seem scary with their large looming pits and many students and mentors, don't be frightened! Much of what I know is gathered from conversations with

members of 254, 1678, 971, etc. Don't be afraid to reach out to these people and talk to them at competitions. I guarantee that you will learn something new.

- **Don't be afraid to meet new people and build relationships.**

  Similar to the above, always meet new people and talk with them. You will gain so much knowledge and wisdom from other people. Just from talking with people, I now can contact some of the most esteemed minds in FRC when I need help or have questions.

- **Take advantage of any opportunities you are given.**

  Always take advantage of opportunities that are presented to you. For example, I got to experience so much and learn so many things my rookie year from taking advantage of opportunities like visiting other team's shops, going to Champs, and just talking to people at events.

- **Clean up as you go, don't leave a huge mess at the end of a build session.**

  Many times this build season we would leave tools out after finishing a task and put off cleaning up scraps, putting away tools, etc. This then left a major cleanup at the end of a session, which no one wants to do at 9:30pm after a long school day. Something we learned was to have an ongoing clean-up. This allowed us to leave faster after sessions and everyone was in a better mood!

- **Get a printer and make mechanical drawings.**

  As one of my colleagues said in another thread, without a printer our robot probably wouldn't have gotten finished. Using mechanical drawings allowed us to speed up fabrication of parts ten fold.

- **Help other teams!**

There is nothing better than helping to improve another team's bot! We sent a team of students and a technical mentor to 253 at SVR to work on their robot so they could play

their last qualification match. The feeling when our fix to keep their battery in worked was like nothing else.

Writing a Business Plan

Various teams share their business plans during the offseason, and for previous years. If you don't have a proper plan yet, making one is a good idea. If only to serve as a code of conduct for working with sponsors, adding it is essential. Professional sponsors with professional recipients, especially those with a long term plan, can cultivate larger sponsorships during mergers and absolution.

- https://www.chiefdelphi.com/media/papers/2925

- https://www.chiefdelphi.com/media/papers/2380

- https://www.chiefdelphi.com/forums/showthread.php?threadid=148799

- http://www.teamneutrino.org/resources/fundraising/

Roles of Team Captain

- Courtesy of Conor Ryan (FTC9998)

- https://www.chiefdelphi.com/forums/showthread.php?p=977217#post977217

"In my time in FRC (this is my 8th year of involvement), the best team captains on any team should have one assigned job. ***Make sure everyone else on the team is busy at all times.*** *Other than that they should delegate everything they do. But here are some other thoughts on qualifications great team captains should have:*

- *ability to delegate*

- *ability to come up with ideas and jobs for others to do (anybody ever look about how many people sit around and become disengaged?)*

- *ability to make quick decisions*

- *ability to motivate*

- *a work ethic to model after*

- *an idea of what FIRST is all about (heres a hint, its not all about the robot)*

- *no interest in actually building the robot (there are so many other things for a captain to do, they'll have no time for the actual robot, unless your team is smaller than 8 people (in which case you might want to try Vex).*

- *the idea of what a deadline is*

- *social skills to talk to judges/other teams/VIPs*

- *ability to say screw it, nothing is ever perfect and relax at the end of the day*

- *Being on the drive team, being the person who gets to pick the final design, all of those *perks* are not in the best interest of the team. The best leaders let those who are the best at what they do, do what they do (and then give them credit for it).*

- *Also on a note, being a senior/oldest member on the team/most experienced should have nothing to do with being team captain. Rookie teams have team captains any 9 times out of 10, nobody has any experience. Actually, some of the best team captains I've seen have been from rookie teams.*

Chief Delphi Quotes

Though they may not seem it, Chief Delphi Spotlights can be an interesting way to view FIRST history, as people chatter throughout the more than decade of the site's history. Examples of profoundness include:

"Some of us should be so lucky to have something go wrong on Einstein." - Kevin Sevcik

"Yes ONE blue banner would be nice one of these days, but I've never lost focus of why we as mentors do what we do. It's about preparing the students for "defense" in life, and laugh when your robot gets scored into a goal." - Chris_Elston

"Welcome to FIRST, the place where you can be competitive in a team. Here people can learn more in one year of FIRST than in four years of high school." - dude__hi

Just note that it can also be host to the likes of these:

"Your cat-bell skills are most impressive." - Andy Baker

"What is this... extreme air-keyboarding?...For those about to type, we salute you. "- Andy Baker

"Never underestimate people's ability to underestimate." - Ginger Power

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