

Preparing for an FRC Competition

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Special Thanks:
FRC Competitions: What to expect?
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<http://www.firstnemo.org/PDF/frc-competitions-expectations.pdf>

Introduction

FIRST Competitions can be challenging if you are not organized

Venues are usually crowded and hot

- Shorts, Team shirt, Safety Glasses
- Team make up, optional

Scheduling Lexicon

- Day -1 (minus 1) (night before Day 0) – Optional Load in (those traveling long distances)
- Day 0 - Load In, Inspections, Practice Rounds
- Day 1- Qualifying Rounds
- Day 2- Qualifying Rounds, Alliance Selection, Finals

Venues

Regional Event

- Run by FIRST usually in a larger venue or arena.
 - Usually more comfortable seating
 - Food is usually expensive but you can go out
 - May or may not have Free Parking
 - Trailer parking can be a challenge

District Event

- Run by the local FIRST sanctioned non-profit group in the District. Example: Mid Atlantic Robotics (MAR).
- District Event – Mostly high schools
 - Bleachers - Bring seating pads or cushions
 - Local team runs food venue (usually cheaper)
 - You can bring in your own food (most cases)
- Champs Event – Larger Venue Arena (similar to Regional Event)

Regional Example Schedule

Wednesday (Day -1)

- Event Setup – If you or your team has any cycles please volunteer to help.
- 6-8:00 PM : Early Unloading

Thursday (Day 0)

- 7:30 AM: Early unloading/pit setup
- 8:30 AM: Pit and machine shop open
- 9:00 AM: Driver's meeting
- Inspections (All day)
- 11:00 AM: Practice matches start
- **2:00 PM: May start preliminary Rounds**
- 5:00 PM: All matches end
- 8:00 PM: Pits close

Friday (Day 1)

- 8:00 AM: Pits open
- 9:00 AM: Opening Ceremony
- 9:30 AM: Qualifying Matches
- 12:00 PM: Lunch break
- 4:45 PM: Award ceremony
- 6:00 PM: Pits close

–Saturday (Day 2)

- 8:00 AM: Pits open
- 9:00 AM: Opening ceremony
- 9:30 AM: Qualifying matches
- 11:30 AM: Alliance selection
- 12:00 PM: Lunch break
- 1:00 PM: Elimination matches
- 4:00 PM : Award ceremony
- 5:00 PM: Pits close

District Example Schedule

Thursday (Day -1)

- Event Setup – If you or your team has any cycles please volunteer to help.

Friday (Day 0)

- 9:00 AM: Setup
- 4:00 PM: Team load in/pit setup
- 4:00 PM: Pit and machine shop open
- Inspections (All day/night)
- **7:00 PM: Practice matches start**
Qualifying Matches may start!!!
- 10:00 PM: Matches end,
Pits close

Saturday (Day 1)

- 8:00 AM: Pits open
- 9:00 AM: Opening Ceremony
- 9:30 AM: Qualifying Matches
- 12:00 PM: Lunch break
- 6:30 PM: Qualifying matches end
- 8:00 PM: Pits close

Sunday (Day 2)

- 8:00 AM: Pits open
- 9:00 AM: Opening ceremony
- 9:30 AM: Qualifying matches
- 11:30 AM: Alliance selection
- 12:00 PM: Lunch break
- 1:00 PM: Elimination matches
- 4:00 PM : Award ceremony
- 5:00 PM: Pits close

Team Spirit

Uniforms

- Most have at least a t-shirt
- Include parents and siblings
- Consider matching pants too
- Makeup is fun and makes the student feel more apart of the team (mentors – if you do it, the kids will do it!)

Mascots

- **Make sure costume is flame retardant (if possible)**
- **Make sure student can see.**
 - **If away from team area have a helper along**

Cheers

- Noisemakers are not allowed, work to get around rules!
- Practice Cheers before competition (great team building) especially in lobby before entrance.
- Mentors join in

Most teams sit together but saving seats is not allowed

Don't attach team banners to the stands

- See if there is a correct location for your banner

Day-1 Early Load IN – Regional can Champs Only

Typically 6-8 PM

Allowed 5 team members

- At least one must be an adult

Can bring in pit materials and bagged robot

Inspectors may be available to review bag and tag documentation

- Don't have to wait for them
- Make sure you leave your documentation taped to bag in a clear location

No pit setup or unbagging of robots!!!! (some cheat, this is considered bad form)

Day 0 – Regional Load In

Usually starts at... 7:45 AM

Allowed 3 team members

- At least one must be an adult

Can bring in equipment/robots

Can setup pit and start charging batteries

Adult can complete registration

- Go to pit admin with your team roster and any paper waiver forms

At official pit opening (8:30 AM)

- Can unbag robot if and only if there is a green approval sheet from inspectors (Do NOT Open before this)
- If there is a red sheet, visit the inspection station

Day 0 – District Event Load In

Usually starts at... 4:00 PM

Can bring in equipment/robots

Can setup pit and start charging batteries

Adult can complete registration

- Go to pit admin with your team roster and any paper waiver forms

Can unbag robot if and only if there is a green approval sheet from inspectors (Do NOT Open before this)

- If there is a red sheet, visit the inspection station

The Pits - What to bring

Your “pit” is a 10x10 (hopefully) area where your robot and crew will be when not running on the field.

Decorations cannot be > 10 feet tall, all must fit in Pit area

8x3 foot table is provided

Note: If competition is in a building where union labor is involved you may need them to remove table. Check with pit admin.

- Origami Shelves are a good idea, wire shelving even better

Robot Cart – Carries robot to playing field and back. Nice branding opportunity.

- 2015 – make sure you robot in travel form fits through small venue doors.

White Board and Markers, Highlighters

Team Laptop Computer for software changes

- Tell Students to leave their own expensive electronics at home.
- Pit can be unattended at times

Batteries

- At least 4 including chargers. Purchase Battery Tester (Cross The Roads Electronics)

Extension Cord and Power strip

- You will be given only 1 or 2 outlets Power is limited to 4 to 5 AMPs
- If your pit is drawing too much current you will be asked to turn off non essential items.

The Pits - What to bring

Tools - Bring only what is needed to maintain the robot.

- Do not bring all your wrenches, screwdrivers, Allen keys, etc. Only bring the tools you need to fix the robot.
- Purchase additional specific sized tools.
 - Example: 7/16" wrenches or sockets is a good start. These fit 1/4-20 nuts.
- How do I know what to bring?
 - What tools were you most using during the build? Bring them.
- Pack a set of crescent wrenches or a few multi-tools just in case.
- Files and de-burring tools a must!

Pack bins of spare parts

- What kind of things will break? Bring spares of custom parts.
- All competitions will have a "Spare Parts" area for FIRST supplied parts. You turn in the old part and get a new one. If you lose a roboRio or radio you can borrow one for the competition but your team will have to get a replacement. They may hold a credit card until this is returned.
- You can bring raw materials and have custom parts fabricated by your team or the on site machine shop while at the competition. No welding or heavy machining in the pits.
- Empty bins are great places to store coats, and hoodies.

Prepare a post and pre-run check list that is executed every time you go out.

- Post run – What broke in that last round, tighten screws.
- Pre run – Is everything working, load the air, get a fresh battery.

The Pit Crew

You need to define up front who is going to be in the “pit” crew.

- Only those that know how to work on the robot and/or can speak to judges.
- Include sophomores and freshmen if you can, to allow them to carry the experience to the next year.

Assign a role to each person in the pit.

- Make sure they are allowed to do their job without interference from other students and mentors who “know everything”.
- Include a pit manager
 - Good idea if they are safety captain (otherwise you need another body in pits)
 - Keeps the crew focused on safety and cleanliness
 - Keeps eye out for judges, grabs students who can speak on specific topics.
 - Calls out checklist items as Pit crew checks robot
 - Appoints people to vacuum pits when robot leaves.

Appoint a battery CBU (Carbon Based Unit) (usually a freshman) who knows what batteries are on charge.

- Rounds are lost because no one wants to do this job.
- Suggest you purchase a battery tester (Cross The Road Electronics)
<http://www.crosstheroadelectronics.com/Beak.html>

Drive Team and Coach

- At least one member must be available for conferences with other teams

Encourage students to do the repairs with a mentor looking on.

- To many times pits have only mentors in them. Nothing wrong with mentors standing back handing students tools.

Drive Team and Media Credentials

Driver Team Badges

- You'll receive them in your registration packet
- One will have a colored dot – coach button
- Don't lose these!!! Best to keep them in a safe place in your pit overnight

Driver Meeting

- Why attend?
 - Review of process to get on/off field
 - Meet the field crew
 - Hear from the head ref
 - Learn who to talk to about concerns/questions
 - If you do not understand something ask for clarification.
- Send your entire drive team (drivers, human player, and coach)

Media badges

- Each team may get 1 or 2 media badges. This allows you to have someone rear the field during your round for still pictures and video.
- Usually in a designated area with the other teams in that round. When done please move out quickly.

Inspections

Day 0 primary activity

- START AS SOON AS POSSIBLE
- Inspectors are there to help you compete on the field safely
- Send a representative to the inspection table when you are ready to be inspected.
- Make sure bumpers are off the robot! **Note: 2105 - Bumpers stay on, count as weight.**
- Have a paper copy of your bill of materials available.
- Have knowledgeable students in pits to answer questions.
- Encourage students to take the lead, mentors fill in where necessary.
 - Practice this before getting to competition.

Programming The Radio

There will be an encryption kiosk setup – usually near pit admin or at the field

Two choices

- Bring just your radio or bring your robot with radio installed (not a good choice. Make sure radio is removable)
 - However it must be secured on the robot because if it falls off from a hard hit it is your fault.
(BTW: I am no longer bitter ☺)

You'll plug your radio in and follow the directions on the kiosk

This MUST be done before you go to your first practice match

Practice matches

You do not have to have passed inspections to participate in your scheduled practice matches

- Some may require a basic safety inspection
- Some may require full inspection after 1 practice match.

A copy of the practice schedule will be in your pit Day 0 morning.

You should send just the human player if your robot is unavailable.

Should plan on making at least one match so you can verify that your robot connects to the field properly.

Filler line

- Take more practice rounds if you are ready.
- Only if you've passed inspection

Getting Help

Machine shop

- Bring parts/drawings to request work
- Some sites require travel to shop. May need mentor to go along.
- Machinists often have recommendations to fix issues

Ask at Pit Admin for announcements

- Request help or specific parts/tools
- Pit announcer will make call to other teams over PA

Visit your friendly neighborhood inspectors

- Go to Spare Parts

Ask for the Control System Advisor (CSA)

Talk to your neighbors

Opening Ceremonies

All non-essential personnel should clear out of the pit to attend

- You will be asked to stop using power tools

Usually includes

- VIP speakers (event sponsors)
- Introduction of the judges
- Introduction of the referee crew
- National anthem

Matches start immediately after

- Teams in the first few matches will be asked to queue up before ceremony

Judging Process

Pairs of judges will visit each team starting after opening ceremony on Friday

- Usually after your first qualification round

One pair will be asking about your robot, the other will ask about non-robot items

Judges will go back to deliberate around lunch time on Friday

Will return to those teams they are considering

Always have someone in the pit to talk to judges

- Practice with students to help them feel more comfortable.
- Tell students to introduce themselves to judges. Shake hands look judges in the eyes. Judges are happy to talk to you.

Qualification Matches

Note: At some events you may start qualification rounds on day 0.

Will receive schedule either late Day 0 or first thing Day 1 morning

- TIP: Use a highlighter to mark your match times
- Get a copy to your scouts

Make every attempt to participate in every match

- Send Human play if robot not working
- Greatly affects your ranking
- Affects your partners as well
- Results determines your ranking for eliminations

Can't participate until you pass inspection

Pit Admin will be calling what round is being queued.

- You must know what rounds you are in and get your team to the queue. (Good Job for Pit Manager.)
- Some venues use scoreboard to show match queuing and match being played.

Scouting – 4th Man on Field

You need to know your alliance members and opponents.

- Students scout other teams' runs to quantify their abilities.
- Watch every round to see what others can do.
- Appoint SMEs (Subject Matter Experts) to look over competition robots in pits. Most important on Day 2 morning.

Create a scouting form.

- Simple number based results are best.
- Rate on scale of 1 to 5 where bad to very good.
- Just basics, speed, agility, pickup ability, shooting and human player
- While subjective it can give you insight.
- Enter data into spreadsheet and use that to make decisions

Example systems are available on line

- www.chiefdelphi.com

Scouting – 4th Man on Field

Alliance Data

- Used when working with alliance members. They may tell you, “We can do anything.” Your coach comes back very nicely and says “Well our scout or our data shows you are having difficulty. Let’s figure out the best strategy.”

Opponent Data

- Used to figure out their weaknesses.

After day 1 of actual competition meet with team to discuss where you and others stand.

- Discuss possible alliance members if you get into the top 8.

Have the scouting leads in on important strategy discussions.

- The worst thing is to ignore your scouts. Students will do a good job if they believe this is valuable.

Match Planning

Gather your data/information on your partners and opponents from Scout leads

- Discuss possible plans internally with your strategy and drive teams

Visit partners and develop a match plan together

- Decide starting positions
- Take into account the space occupied by each robot during match
- Attach time limits for actions
- Have contingency plans, play “What if?” games...

Use your scouting data

- Don't allow partners to oversell their capabilities
- Don't oversell yours

Don't allow other teams to push you around

Match Process

Your round will be called. You must know your round number. Team numbers may not be called.

Team is responsible to get to queue area.

Arrive at queuing with robot and drive crew and check in.

Proceed to marked waiting areas based on alliance color.

- Make sure robot is ready, power up and charge air system if necessary.

Enter the field with robot once the all clear signal is given.

- Wearing gloves, two people lift robot on field
 - Try to place robot in exact location every time for your autonomous program.
 - Coach should stay on field until you are all set up. **Once you leave you may not be allowed back on.**
- One person sets up the controls
 - Signals on field people to turn on robot when controls computer is up and running.
- One person moves cart to designated area

Play match.

Remove robot once all clear signal is given (reverse of entering the field).

- Power off Robot, purge air (if using)

If there are questions about score/penalties, send STUDENT drive team member to Head Ref question box.

- Student must be respectful at all times but can ask for clarification.
 - Video replays are not allowed.

Robot Cart

Long distance between pit spaces and field

- You don't want to carry your robot all that way

No need to make it complicated

- Remember you have to get it to the event
- Should fit through a standard 30" door
 - Robot with bumpers may not fit through 30" door.

Larger pneumatic wheels are better to get over wires and cables.

Per FIRST rules, no music

2105 Watch for height issues through doors. (A dolly might be good enough this season)

Alliance Selection

Occurs a few minutes after the last qualification match is played and always before lunch

All teams should have a representative available on the field

The top eight alliances are brought out on the field

- Then each gets to pick their partners for eliminations (1-8 then 8-1)
- They can pick amongst each other. If so, the next ranked teams move up.

Most teams develop a pick list even if not top eight

- Concentrate not only on top teams but on your third choice.
 - Many times this is decisive
- Picking Suggestion:
 - Make sure team representative can see team from the field.
 - Team Coach sits in stands with strategy team
 - Have white board and marker to write down a team number for pick ,large enough for your representative on the field to see.
 - This greatly eases the burden of the team representative on the field and prevents mistakes.

Remaining top ranked teams are replacement robots

Alliance captains stay on the field for a quick meeting with Head ref

Receive time out and replacement robot tickets

Eliminations

Some events allow extra pit crew members near the field

- Determine who those would be if allowed

Very little time between matches especially during the finals

Make sure you are able to reset your robot within 2-3 minutes

- Have extra batteries with you
- Bring necessary tools with you

Keep in contact with the Head Ref if you have questions about time outs and replacement robots

Award Ceremonies

Expected that all teams stay for the ceremony

- Never know if you will receive an award
- Respect for your fellow teams
- If you have to leave for flights, travel issues or whatever, let a representative of competition committee know you are leaving.

Awards can be split between the Friday and Saturday ceremonies

- Most are choosing to do all ceremonies on Saturday
- Encourage Students to say “Thank You”

After ceremonies ask students to thank 10 volunteers each

- These events run on all volunteer help. We must remember to thank them.

Have Fun

There is a lot of stress at events especially if you are doing well

- Keep the mood light
- Geeks do not experience failure too often. May be down when they lose.
 - We had athletes tell them, “Hey sometimes you lose, learn from it.”
- Keep team from taking it out on drivers
 - We say, “Hey this is a robot we all built. They are operating it.” We are all in this together
- Encourage your team members to walk around and look at other solutions
 - Get to know your other teams
 - Learn from the other teams
- Seek each student ask how they are doing. Ask what they are doing
 - If they are, tell them they are doing a good job
 - Tell them this is how the real world works.
- Teach students to say thank you when complimented. That is all they have to say.

Questions?