Robot Inspector Manual

Revision History	
Revision	**Description**
V25-26.1	Initial 2025-26 Season Release
V25-26.2	Fixed links to Inspection Checklist and Inspection Quick Reference
V25-26.3	Fixed Robot Sign Links, added A4 links
V25-26.4	Vertical expansion limit may be software constrained

Overview

Roles Covered: Robot Inspector

Job Description

The Robot Inspector is responsible for inspecting robots before match play to ensure they are safe and legal. All events have an experienced Lead Robot Inspector that oversees a Robot Inspection crew. Some events have an Inspection Manager who helps with the administrative part of the inspection.

Requirements:	
Technical	Medium
Physical	Low
Administrative	Medium
Communication	High
Pre-event Training	Medium

Time Commitment

A Robot Inspector should expect to spend 1–2 hours at a full day event. Because robot inspections happen at the beginning of the tournament, Robot Inspectors may serve in another volunteer role once inspections are complete. If a Robot Inspector has indicated in their application that they are available for the full day, the Event Director may assign them to another role once inspections are complete. Approximately 4–6 hours of pre-event training and planning is required.

Attire

- Comfortable closed-toe, closed-heel shoes, much of the day will involve standing and walking.
- ANSI Z87.1 or regional equivalent certified safety glasses are required in team pits and competition areas.

Training and Certification

Read and complete all tasks listed in the `Pre-Event Training` section.

Any volunteer who applies to a role will be able to get into the Learning Management System (LMS) using the *'FIRST* Training' button. Roles with the training required will appear in the 'roles missing certification' area. For more help, you can read more about how to access your training.

If you have applied for a role but have not received access to the training, please email training@firstinspires.org. A separate confirmation of the role assignment will come later.

Robot Inspectors should speak to the Lead Robot Inspector, or Event Director, to find out what additional requirements, such as meetings before the event or run-throughs of the space before the event are required.

All Volunteers are expected to read and comply with the Volunteer Handbook.

Roles and Responsibilities

> *FIRST* **is fun for all.** The most important role for a volunteer is to provide a safe, fun and welcoming environment for all *FIRST* participants. When executing the duties of your role, always make decisions with the team experience in mind. Ask for help from event leadership if you feel your required duties conflict with the best team experience.

Robot Inspector

Robot Inspectors ensure that every robot follows the guidelines outlined in the *FIRST* Tech Challenge Competition Manual and are ready & safe to compete on the playing field. The inspection process involves filling out a checklist for every robot and marking the robot as passed inspection via the inspection tablets or on the inspection checklist.

The Robot Inspector reports to the Lead Robot Inspector.

Before the Event

FIRST Tech Challenge tournaments squeeze a lot of activity into one day. One of the keys to running a smooth and successful event is for teams and volunteers to show up prepared. Teams spend countless hours preparing for competition day and we ask our volunteers to prepare for tournament day as well. Robot Inspectors must participate in training before volunteering at an event. They also must pass a certification test. Training and the certification test are provided by *FIRST* Headquarters.

Pre-Event Training

Required reading for training and certification:

Robot Inspector Pre-event Training List	
Requirement	**Resource**
Required	Welcome to FIRST
Required	The Robot Inspector Volunteer Manual (this document)
Required	The Competition Manual, specifically • Section 3 Competition Eligibility and Inspection • Section 12 ROBOT Construction Rules
Required	Team Updates - Combined • Team Updates are posted on a weekly basis. These releases occur on Thursdays around noon (US Eastern Time). Robot Inspectors are required to read the team updates throughout the season and are encouraged to sign up for the Team Update notification emails to help stay up to date.
Required	Robot Inspection Checklist
Encouraged	Inspection Quick Reference
Required	Complete the Robot Inspector Certification Test in the *FIRST* Learning System

	(For volunteers outside of North America without a *FIRST* Dashboard Account use the [PDF to self-certify](#))

Additional Information & Resources

Robot Inspector Additional Resources	
Resource	**Description**
[Competition Manual](#), specifically: • [Section 9 – ARENA](#) • [Section 10 – Game Details](#) • [Section 11 – Game Rules](#) • [Section 13 – Tournament](#)	Optional additional competition manual sections which might provide context relevant to your role as a Robot Inspector.
[Volunteer Q&A System](#)	The Q&A serves as a space for these volunteers to ask questions and receive official answers from *FIRST* Staff and our Global Key volunteers about the Competition Manual and its expected implementation. To access the Q&A volunteers must have an active *[FIRST Dashboard account,](#)* have applied to volunteer in the specific role for the current season, and have a signed consent and release form.
[FTC Team Q&A System](#)	This is a resource for teams; however, you may also find these useful to understand the questions teams ask.
Robot Inspector [Volunteer Calls](#)	Monthly optional volunteer calls to provide support for Robot Inspectors and Lead Robot Inspectors.

Event Day

Report Time

The Event Director or Volunteer Coordinator will confirm the time you should arrive typically via email the week before the event. In most cases, Robot Inspectors will need to arrive at the event as soon as the event opens for volunteers to ensure the robot inspection tables are setup up, and inspection staff are in place when teams start arriving for inspections. In rare cases, robot inspections might begin the day before the event and continue into the next morning in cases where teams weren't inspected the day before.

When Robot Inspectors and Inspection Managers arrive onsite, check in with the Volunteer Coordinator and report to the Lead Robot Inspector.

Set-up

After checking in, the inspection staff should check to make sure they have the appropriate resources and tools needed to complete robot inspections. Some items that are needed for robot inspection include:

Supplies:

- An 18in. x 18in. x 18in. (45.70 cm x 45.70 cm x 45.70 cm) robot sizing tool

- Inspection tablet or inspection checklists*
  - Robot Inspection checklist
- Pens
- Tape measure
- Robot Sign Templates (US Letter | A4)
  - These are to assist teams that may show up to the event without their own robot signs.

Supporting documentation:
- Robot Inspector Manual (this document)
- Inspection Quick Reference
- Copies of the Competition Manual
  - Digital copies of the competition manual are accessible through the Robot Inspectors' tablet, which is the preferred method to access the manual. This ensures the inspectors are viewing the most current version of the manual.
- A copy of the `Registered Teams List`

> Most events will provide a tablet to the Robot Inspectors. This tablet is used for the Robot Inspector to indicate which teams have passed inspection, and which teams are currently in the process of completing inspection. For those events not using tablets, paper copies of the checklists will be used for each team.

Robot Inspection Process

A typical robot inspection crew has a Lead Robot Inspector and several Robot Inspectors. The Lead Robot Inspector will explain the overall inspection process for the event and is the robot rule expert. Feel free to ask the Lead Robot Inspector about unfamiliar robot parts and for help with difficult inspections. On-call *FIRST* Tech Challenge staff are available on event day to aid Lead Robot Inspectors.

It is the responsibility of the **Robot Inspector** to:

- Greet the team. Inspectors are generally the first volunteers a team will interact with.
- Go through the inspection checklist with the team.
- Assess the team's robot and identify if there are illegal parts on the robot.
- Provide guidance to the team on how to address any issues with inspection.
- Identify potential concerns of entanglement (loose cables) or safety.
- Be fair and apply the same thoroughness for every team.
- Treat all teams with *Gracious Professionalism*®.

Always keep in mind that as a Robot Inspector your role is not to fail a team. You are well-positioned and empowered to help teams pass inspection while ensuring a fair competition.

It is the responsibility of the **Inspection Manager** to:

- Provide as-needed assistance to the Lead Robot Inspector.
- Report inspection progress to the Lead Robot Inspector and ensure team inspection status is up-to-date and prominently displayed.
- Ensure the reasons for incomplete inspections are recorded for each affected team.

- Help sequence teams for inspection and manage inspection queueing volunteers if present.
- Perform robot sizing checks where necessary.
- Manage the inspection station while the LRI is away.

Although not an all-inclusive list, the below sections will cover some best practices for robot inspection.

Inspection Checklist

Inspectors are encouraged to guide teams through the inspection process in a conversational manner. While the functional goal of inspection is to efficiently check all of the checklist items, this is an important opportunity to greet teams and demonstrate genuine interest in their accomplishments as one of their first volunteer interactions at an event.

Rather than asking the team how many actuators they've used, consider asking a more holistic question about how the team accomplished a game task. If you don't recognize a part of the robot, ask a student for additional information about its function. Most of the time, it will be clear whether the team has met the requirements. When necessary, reference inspection checklist items and ask directly about the rules that may permit or prohibit a part.

Once the checklist is filled out, congratulate the team for passing inspection or clearly describe any rule violations and work with the team to find acceptable solutions. It is best if the team leaves inspection with a remediation plan that has received preliminary approval from an inspector.

End the inspection session on a high note by complimenting the team or robot. Ask the team if they have any questions about the inspection process.

Starting Configuration Inspection – R101

The robot sizing tool is the official gauge of whether a robot has met the STARTING CONFIGURATION of 18 in. x 18 in. x 18 in. (45.70 cm x 45.70 cm x 45.70 cm). Sizing tools can differ from event to event. Some events may use a box to inspect the size of the robot. Other events might come up with sizing tools that slide over the robot. Either method is okay.

If a sizing box is used, slide the robot into the open end of the sizing tool. Robot contact with the sides and top of the sizing tool is allowed; however, the sizing cube may not be used to hold the robot in its starting configuration. There should be no undue pressure on any of the sides or back of the sizing tool. Slide a flat plate or yardstick over the open side of the tool to verify compliance at the opening of the sizing tool.

Robots are required to demonstrate compliance with the STARTING CONFIGURATION; robots <u>may</u> be initialized to comply with the 18 in. x 18 in. x 18 in. (45.70 cm x 45.70 cm x 45.70 cm) limit.

Horizontal Extension Limit Inspection – R105.A

This year's game has horizontal extension limits as described in rule R105.A. Using the same sizing tool as before, the team should demonstrate the robot's maximum mechanical extension and fit within an 18 in. (45.70 cm) by 18 in. (45.70 cm) horizontal plane, software limits are <u>not</u> sufficient to demonstrate maximum extension.

Vertical Extension Limit Inspection – R105.C

This year's game has vertical extension limits as described in rule R105.C. Some events may have a sizing tool for the specific extension limit; otherwise, use a tape measure or meterstick to confirm the requirements. The team should demonstrate the robot's maximum mechanical extension and fit within a height of 38 in. (96.50 cm).

Robot Signs

Robot signs are vital for match play and are sometimes overlooked by teams. Each team must have two robot signs with their team number as outlined in rule R401. Additionally, teams will need two sets of robot signs as the robot signs indicate the team's alliance for a given match, per rule R402. It may be helpful to have copies of the robot sign template ([US Letter](#), [A4](#)) available as a resource for teams to help get them through the inspection process.

Robot Safety Inspection

Sharp Edges

Inspectors are required to check for sharp edges on a robot that could pose hazards to the arena, team members, or field staff. While rule R202 is important to assess, it's equally important that Inspectors are safe while evaluating a robot for sharp edges. If an Inspector identifies a potential sharp edge that may violate the rule, they may use other tools such as a piece of paper or a spare soft tile to evaluate how sharp the edge is. If either the paper or the tile is sliced on the sharp edge, guide the team to file the edge or cover with tape. It's also important to remember that these are robots and unfinished edges (or even sharp edges due to the nature of making metal extrusion) are a fact of life. Evaluate these sharp edges and corners from a perspective of risk; is there an imminent danger to the arena, team members, or field staff attempting to manage this robot?

Inspection Troubleshooting

Repeated Failures

If a team repeatedly fails inspection, identify the team to the Lead Robot Inspector and ask that they find someone to work directly with the team.

If a team cannot pass inspection, even with help. The Lead Robot Inspector, *FIRST* Technical Advisor, Event Director and/or Program Delivery Partner must decide how to proceed.

> The goal of the inspection process is to ensure all robots are safe and have no unfair advantage during the competition. Within these bounds, the Lead Robot Inspector is empowered to deprioritize some robot construction rules to allow a team to participate.

Re-inspection

If a team makes significant changes to their robot or their programming during the day, they must undergo another inspection. It is not unusual for a team to ask for a re-inspection of their robot.

The Head Referee may ask for a re-inspection of a robot based on observations on the playing field. The (Lead) Robot Inspector will re-inspect the robot and report the results to the Head Referee. If the (Lead) Robot Inspector and Head Referee disagree, the (Lead) Robot Inspector should cite the supporting rule(s) and reason for the ready or not ready recommendation. The Head Referee has the final authority over allowing a robot to compete.

It is unusual for late-season events to require many re-inspections. If a large number of re-inspections are occurring, it may be necessary for the Lead Inspector and Head Referee to work with the FTA (and potentially FIRST staff) to ensure event rules are consistent with global standards.

End of the Day

The role of the Robot Inspector generally ends once inspections have been completed, which is prior to the start of matches. Therefore, some Robot Inspectors choose to leave the event once inspections have been completed. However, some Robot Inspectors may choose to fill another role during the event and will be present for the duration of the event. If possible, Robot Inspectors may assist other volunteers with the teardown of the event.

Team Interaction and Support

When interacting with teams please always consider the team's perspective. The teams have put significant time and effort into preparing for this event and may be feeling very stressed about everything working out as they have planned. **Today is a very big deal for the team and we are here to help!**

While it's our job to help guide the teams to a successful event, it's their responsibility to follow the rules and be on time for judging and matches.

If you feel there is an issue with an individual or individuals from a team that warrants specific intervention beyond just a kind reminder, please work with your Lead Robot Inspector to address the issue.

Teams may only be completely disqualified from awards consideration for very rare egregious actions and only with approval from *FIRST* HQ. The Event Director and/or JA should call the on-call number to discuss the issue.

Emergencies

The Program Delivery Partner, Event Director and the event site host organization are responsible for having safety and security plans in place for each event. Included in the plan should be topics such as:

- A map of all the emergency exits
- Knowledge of where on-site medical support is located
- Shelter in place plans in the case of severe weather
- Evacuation plans

Teams should have their own safety plans before attending the event. Here are some team-focused recommendations for Preparing to Safely Attend a *FIRST* Event.

Lost Children

FIRST Tech Challenge events can be very hectic, and it can be easy for a child to get lost amongst the shuffle of a busy event. Ensure you have a plan prior to the event in the instance of a lost child.

In some cases, the team roster will list Coach phone numbers which can be used to reunite team members, in some regions they collect "Day-of" cell phone numbers from each team at check in. Coordinate your plan with your Program Delivery Partner.

Code Adam Guidelines ([www.missingkids.com/CodeAdam)](www.missingkids.com/CodeAdam) are also a great resource.

Medical Incident Reporting

Event volunteers are not responsible for diagnosing student injuries, handing out medication, or first aid equipment. You and other event volunteers should refer medical issues and emergencies to a medical professional on site, such as an EMT. If an incident or illness occurs at an event, the Event Director, Pit Administrator, or another trained delegate should do the following:

- Call 911 if there is any question whether the injured person/persons require urgent medical attention.
- Respond to the scene immediately. Bring a clipboard, pen, or a electronic device to complete the incident report on the *FIRST Reporting Portal*.
- Complete the incident report for the injured party.

www.firstinspires.org/report

The Event Director or Pit Administration volunteers are responsible for completing incident reports.

Although most incidents will not result in a claim, it is better to act on the side of caution and report them. Should an incident result in a claim after the event, the documents will be on file, complete with witnesses and a written report.

Youth Protection Reporting

Issues that are non-medical but are of concern to a participant/participants should also be reported. Anything that happens during an event that made a youth volunteer, team member or spectator feel uncomfortable or threatened should be addressed.

www.firstinspires.org/report

As appropriate and if you feel safe doing to, speak directly with the offending party and try to quickly and calmly defuse the immediate issue. Call the Event Director and/or the Program Delivery Partner and inform them of the issue and seek assistance as needed with any immediate remediation of the issue.

Ensure all issues are reported in a timely manner using the *FIRST* Reporting Portal. Youth Protection Concerns encompasses a wide variety of one-time or ongoing issues such as suspected abuse, bullying, harassment, discrimination, questionable behavior, or violation to the *FIRST* Code of Conduct.

Reporting Other Issues or Concerns

Feedback about issues such as game play, rule changes, awards, and event management (other than medical/safety issues) are considered program related concerns and not youth protection issues and should be shared with FIRST via customerservice@firstinspires.org or by contacting support.

help.firstinspires.org/s/contactsupport

Please note that match results and award results are final and that we will not review match videos.

Safety

An important priority for all volunteers is to observe their event areas to help promote a safe and orderly space for all the participants. It's likely that various volunteers and event participants will bring concerns to your attention, but you should also be proactive in identifying areas of concern.

Prioritize working with the teams to help identify and correct potential safety issues in the area. Please review the section about Team Interaction and Support for the best ways to work with teams on making changes.

Safety Glasses and Closed Toe Shoes

All volunteers, teams, coach/mentors, and spectators are required to have safety glasses and wear closed toe shoes while in the pit and competition areas. It is important to watch out for anyone entering these areas without proper personal protective Equipment (PPE) and to ask them to put on proper PPE before entering. Some events will have volunteers staffed at the pit entrance with spare safety glasses to pass out. Other events may not have spares to provide.

Important Tools

Public Schedule

The Program Delivery Partner or the Event Director should publish the public schedule of events before the event. This schedule will have a high-level overview of all the activities for the event. It is important that everyone at the event does their best to stay true to the public schedule so that teams and volunteers who have planned their day around these times have a good experience.

Time	Agenda
7:15 am	Doors Open for Staff & Key Volunteers
7:30 am	Judges and Inspectors Report
8:00 am	Doors Open for Teams
8:30 am	Judging & Inspection Commences
10:15 am	Team Check-in Hard Deadline (Check the Competition Manual)
10:30 am	Match schedule is generated and distributed to teams. (Check the Competition Manual) *Note to Scorekeeper: 6 Matches total* (Check the Competition Manual)
10:40 am	Drivers' Meeting with Head Referee & Opening Ceremony
11:00 am	Qualification Matches 1 - 8 *Note to Scorekeeper: 7-minute cycle-time*
12:00 pm	Lunch
12:45 pm	Qualification Matches 9 - 45 *Note to Scorekeeper: 5-minute cycle-times*
3:50 pm	Qualification Matches Projected End
4:00 pm	Alliance Selection
4:20 pm	Double Elimination Rounds 1 - 4
5:10 pm	Award Ceremonies Start & Double Eliminations Round 5
6:20 pm	Projected End of Event
7:00 pm	Doors Close
Occasionally things that happen out of the event's control may impact the schedule. In these cases, work closely with the Event Director to understand the updated agenda.	

Figure 1: Example Schedule for a 30 Team Event

Registered Teams List

The Program Delivery Partner may provide a list of teams registered for the event or the scorekeeper can export a report of all the registered teams for the event. Sometimes this list may change the day of the event based on which teams show up. The Scorekeeper report will have the most accurate information about who is competing at an event. Notes that teams may be competing only in the judging portion of the event and not have a robot present.

Test Event Teams

Number	Team Number	Name	Affiliation	City	State	Country	Rookie Year
1	1	Team Unlimited	PTC & FTC1 Team Unlimited 4-H Club	Sharon	MA	USA	2007
2	7	Tactical Sheep	TechBrick Education/DoD STEM&TechBrick Education	Aberdeen Proving Ground	MD	USA	2007
3	16	bigskyrobotics		missoula	MT	USA	2007
4	18	Techno Chix	Girl Scouts Heart of the Hudson	Port Chester	NY	USA	2007
5	22	100 Scholars	100 Black Men of Atlanta/Georgia Power/Johnson Research and Development/NCR/Lockheed Martin & 100 Black Men of Atlanta, Inc.	Atlanta	GA	USA	2007
6	25	Rock N' Roll Robots	Girl Scouts of Greater Los Angeles/NASA&Girl Scouts	Pasadena	CA	USA	2007
7	99990	Off-Season Demo Team	Off-Season Demo Team				1992
8	99991	Off-Season Demo Team	Off-Season Demo Team				1992
9	99992	Off-Season Demo Team	Off-Season Demo Team				1992
10	99993	Off-Season Demo Team	Off-Season Demo Team				1992
11	99994	Off-Season Demo Team	Off-Season Demo Team				1992
12	99995	Off-Season Demo Team	Off-Season Demo Team				1992
13	99996	Off-Season Demo Team	Off-Season Demo Team				1992

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Figure 2: Competing Team Report

Volunteer Roster

The Volunteer Coordinator or the Program Delivery Partner will have access to a list of applied and assigned volunteers for the event.

Event Layout/Map

The Program Delivery Partner and Event Director should publish a map of the venue before the event. In some cases, details on the map might not be available until the day of the event.

The Event Layout / Map should detail the following:

- Load-In Path
- Parking for Personal Vehicles and Busses
- Team Check-in
- Volunteer Check-in
- Competition Area
- Pit Area (May include the `Pit Map`)
- Judging Room Locations (if applicable)
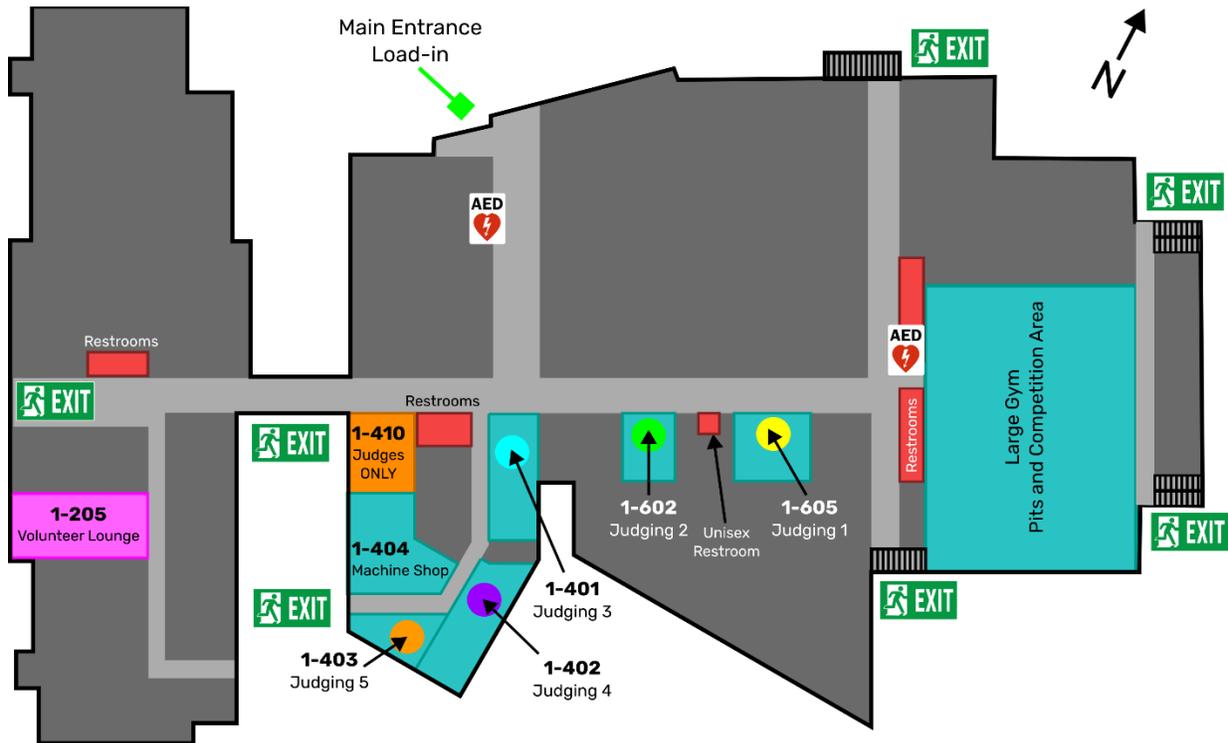- Safety Details as available (Emergency Exits, AED, Shelter in Place Locations)

Figure 3: Example Event Map

Judging Schedule

	Panel 1 *Room 1605*	**Panel 2** *Room 1602*	**Panel 3** *Room 1401*	**Panel 4** *Room 1402*	**Panel 5** *Room 1403*
08:30 AM –	22077 Marcus Minions	8204 Blue Machine	–	27534 RoboChargers - Yellow	25783 Tech Titans
08:50 AM –	13542 RoboChargers - Blue	21171 ITKAN Robotics - M12	27532 RoboChargers - Orange	23344 Technical Turbulence	27536 RoboChargers - Gold
09:10 AM –	26300 Anomaly	27533 RoboChargers - Purple	20482 Wylie E. Robote	12430 Dub East	26693 Triad Robotics
09:30 AM –	23434 Cristo Rey Dallas Robotics	7172 Technical Difficulties	18871 RoboChargers - Green	18227 Area 52	19991 Chuckleheads
09:50 AM –	26542 Apex Genesis	13537 RoboChargers - Red	19564 ITKAN Robotics - MAS	19990 Marcus de-TECH-tives	13552 RoboChargers - Pink
10:10 AM –	27531 RoboChargers - Cyan	24563 Flower Mound Firewall	26722 Tech Support	27535 RoboChargers - Silver	20483 Wall East

Figure 4: Example Judging Schedule

Match Schedule

The match list will be generated on the day of the event after the teams have been confirmed. This schedule will list which teams will play in which alliance (Red or Blue) and it will also list a match start time see Figure 5. Some events will have more than one competition field. Some events will have more than one division, in which case each division will have its own schedule.

Total Number of Teams Competing

Total Matches per Team

ALLIANCE Red or Blue

Total Number of MATCHES

Sample Event Schedule

Teams:11   Matches Per Team:5   Matches:14

Start	Match	Field	Red 1	Red 2	Blue 1	Blue 2
8:00 AM	Qualification 9	1	12758	11536	12494	11282
8:07 AM	Qualification 10	2	12329	12622	8089	12789*
8:14 AM	Qualification 11	1	7135	7078	11780	12758

Planned MATCH Start Time

MATCH Type

Field Assignment

SURROGATE MATCH Indicator

Figure 5: Example Match Schedule

Pit Map

Pit maps are typically provided by either the Event Director or by the Scorekeeper. Having a map of where each team is in the pit is key, as teams, parents or Queuers might need to find. Below are two sample pit maps in Figure 6 and Figure 7. Pit Maps created in FTC Scoring will appear on the FTC-Events page.
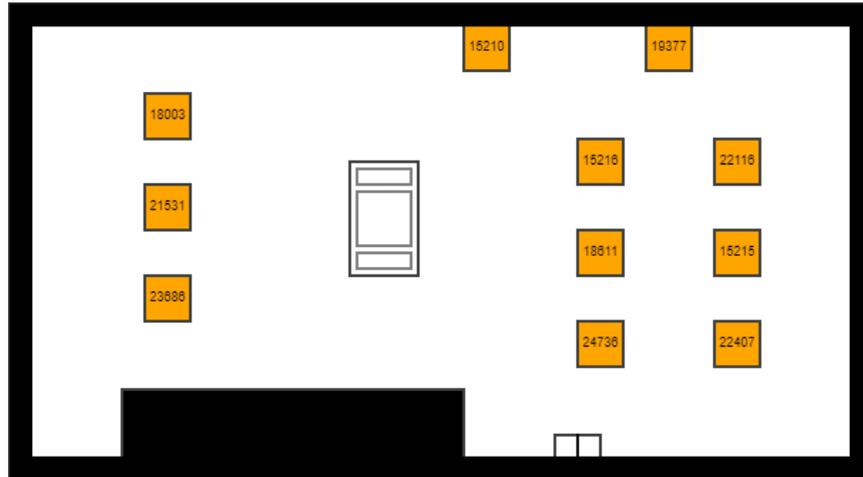

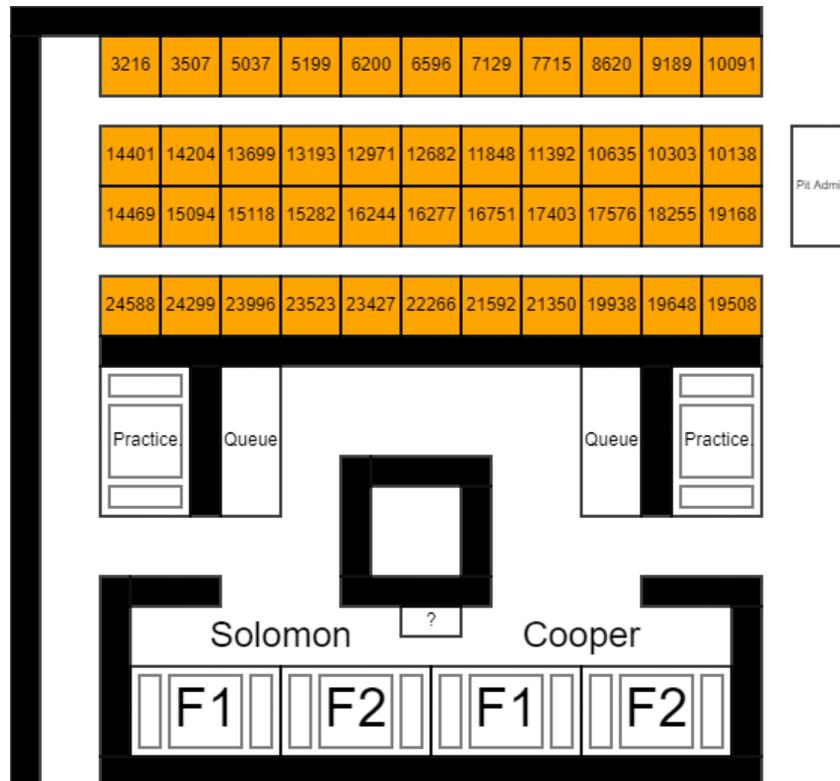*Figure 6: Example Pit Map for a small12-team Qualifier Event*

Figure 7: Example Pit Map for a Typical Regional Championship Event

Useful Links and Information

On-Call Support Numbers

> ### On-Call Support
>
> These numbers are for _volunteer support only_. Teams should not use these numbers to call about rulings or technical assistance.
>
> Administrative, Judge, Referee and Non-Technical Issues: (603)206-2412
>
> Scoring System (FTC Live) or other Technical Issues: (603)206-2450
> Call or use the **built-in chat feature on FTC Live** available for events with internet access

Pre-Event Support

Mon – Fri   8:30am – 5:00pm Eastern Time (UTC-4 or UTC-5)

Contact Support including live chat or email customerservice@firstinspires.org

Program Resources

FIRST Tech Challenge Website   Event Search

Game and Season Resources   _FIRST_ Tech Challenge Blog

Volunteer Resources   Team Email Blasts

Feedback

We strive to create support materials that are the best they can be. If you have feedback about this manual, please email customerservice@firstinspires.org or by contacting support. Thank you!