

Head Referee Manual

Revision History	
Revision	Description
V25-26.1	Initial 2025-26 Season Release
V25-26.2	Fixed QR code export quality on last page
V25-26.3	Added Field Mitigation guide to Pre-Event Training. Added information about Head Referee Event Support in Slack. Clarified Pre-Event Communication & Question Box pointers. Added information about match timing and G301. Clarified process around scoring finalization and score changes. Added to Referee Conferences & Drivers' Meeting notes.
V25-25.4	Edited Scoring Finalization & Score Changes Added Field Staff (Referee) Errors to Match Replay section

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Please make sure to read the entire [Referee Manual](#). The following manual is meant to serve as a Head Referee supplement with information that applies only to the Head Referee role. Head Referees are responsible for all content and training in the Referee Manual.

Overview

Job Description

The Head Referee serves as a role model and a knowledgeable resource for the Referee crew and the Field Staff. The entire Referee crew looks to the Head Referee to be a reference for all rulings on the field and for the interactions with the teams and coaches.

Take the time to study the relevant sections of the Competition Manual. Understanding the intent of the rules is critical to be able to explain as needed to the Referees.

Depending upon the Program Delivery Partner (PDP) or Event Director, the Head Referee may be asked to help with the training for the Referee crew at the event or additional event planning.

Model for Gracious Professionalism®

A Head Referee serves in a very visible role in an event. The Head Referee is frequently front and center, and in the thick of the activity. As such, the Head Referee's actions are very

noticeable. Head Referees should keep a professional demeanor in working with the entire Referee crew as well as all the field staff around the field. A light-hearted, friendly personal style around the field should help to keep the interactions with everyone, including the teams, friendly and cordial.

Time Commitment

Head Referees can expect to spend an additional 2-4 hours for pre-event training and planning, on top of the time commitment for Referees (6-10 hours total).

Core Responsibilities

In addition to the responsibilities of a Referee, the Head Referee also has additional responsibilities. These include:

- Provide leadership over Referees and match gameplay.
- Ensure a qualified Head Referee observes every qualification and playoff match.
- In collaboration with the FTA, ensure that matches are carried out effectively, fairly, and promptly.
- Serve as a knowledge reference and training resource for the Referee crew and other volunteers.
- Monitor the Referee crew to make sure they are making correct calls.
- Communicate clearly & consistently with teams.
- Help manage an event schedule.
- Serve as a role model for Gracious Professionalism® core skills.

Highly successful Head Referees demonstrate excellent Referee skills and the additional following skills, regardless of event structure:

- Expert knowledge of the competition, game, and rules of play.
- Leadership and decision-making skills to work with volunteers and teams.
- Effective time management
- High-level of problem solving
- Active listening to student questions and feedback from other volunteers.
- Empathetic and clear communication with volunteers and participants of all ages.

Prerequisites

- Previous experience as a Referee
- 21 years of age, 23+ preferred

Reporting Structure

The Head Referee works alongside the Event Director and other key volunteers. The Head Referee ultimately reports to *FIRST* Staff.

Before the Event

Pre-Event Training

Head Referees must complete the required reading in this section and are required to pass a certification test prior to serving in this role. The Head Referee must be confident and comfortable with the game rules to be able to reliably make calls during the fast pace of a *FIRST* Tech Challenge event. Learning ahead of time will go a long way towards keeping the event running smoothly and on time.

Resources for training and certification:

Head Referee Pre-event Training List	
Requirement	Resource
Required	Welcome to FIRST
Required	Complete and pass the Referee Certification
Required	Review the Head Referee Volunteer Manual (this document)
Required	Review the Referee Volunteer Manual
Required	Review the Competition Manual – specifically: <ul style="list-style-type: none"> • Section 1: Introduction • Section 3: Competition Eligibility and Inspection (I) • Section 5: Event Rules (E) • Section 12: ROBOT Construction Rules (R) • Section 13: Tournament (T) • Section 14: League Play Tournaments (L) (if applicable)
Required	Complete the <i>FIRST</i> Data Protection and Privacy Training.
Required	Field Operations Guide , which contains training and advice for managing the fields and related volunteers
Required	Field Mitigation Guide , which contains permissible actions for Field Staff to take regarding field issues before, during, and after matches during an event.
Required	Review Field Reset Guide .
Required	Review the Head Referee Training Materials .

Head Referee Pre-event Training List	
Encouraged	Review the Competition Manual – specifically: <ul style="list-style-type: none"> • Section 2: FIRST Season Overview • Section 4: Advancement • Section 6: Awards (A) • Section 7: Game Sponsor Recognition • Section 8: Game Overview • Section 15: FIRST Championship (C)
Encouraged	Complete Strategies for Inspiring Success for All modules .
Encouraged	Volunteer Q&A System <ul style="list-style-type: none"> • The volunteer Q&A serves as a space for these volunteers to ask questions and receive official answers from <i>FIRST</i> 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.
Encouraged	Attend the optional monthly Referee/Head Referee Volunteer Calls .
Required	Complete the Head Referee Certification Test in the <i>FIRST</i> Learning System (For volunteers outside of North America without a <i>FIRST</i> Dashboard Account use the PDF to self-certify)

Additional Information & Resources

Head Referee Additional Resources	
Resource	Description
FTC Q&A System	This is a resource for teams; however, Head Referees may also find these useful to understand the questions teams ask.
Referee/Head Referee Volunteer Calls	Monthly optional volunteer calls to provide support for Referees and Head Referees.

<p><i>FTC Referee Volunteer Slack workspace</i></p>	<p>Join by invitation from the local Program Delivery Partner (PDP). This is an informal community space for Head Referees and Referees.</p> <p>This Slack space also includes an Event Support feature for Head Referees that can be used in addition to or instead of the phone number listed at the end.</p>
<p><u>FTC Volunteer Materials</u></p>	<p><u>General resources for all FTC volunteers.</u></p>
<p><u>FIRST General Volunteer Materials</u></p>	<p><u>General resources for all FIRST volunteers.</u></p>

Additional Pre-Event Activities

Prior Communications

- Discuss Referee & field staff volunteer staffing levels with the Volunteer Coordinator and Event Director.
- Review the latest [Team Updates](#) for important changes to the Competition Manual.
- Communicate with Referees about any event preparation, including optional local training.
- If it is anticipated that there is little or no time for a Referee Meeting at the event due to logistical constraints, the Head Referee should communicate key Referee Meeting Talking Points to Referees prior to the event.
- Ensure that key event details (where, when, how long, etc.) are communicated to the Referees, typically in an email or online event information from the Event Director, Volunteer Coordinator, and/or Program Delivery Partner (PDP).

Local Referee Training

Head Referees are encouraged to coordinate with the Regional Lead Head Referee, Event Director, and/or PDP to determine if they should provide any pre-event Referee training and/or information to Referees.

Recommended Referee Staffing

The Head Referee should collaborate with the Event Director and Volunteer Coordinator to determine an appropriate level of staffing for referee roles.

Referee Staffing Recommendations			
	Single Competition Field	Multiple Competition Fields	Multiple Divisions
≤1 Match Day	1 Head Referee & 4 Referees	(1 * n [^]) Head Referees & (4 * n) Referees	(1 * n + 1) Head Referees & (4 * n) Referees
Multiple Match Days	1 Head Referee & 5 Referees	(1 * n) Head Referees & (5 * n) Referees	(1 * n + 1) Head Referees & (5 * n) Referees

[^]n = number of fields

Examples:

- 1-field Meet (partial day): 1 Head Referee & 4 Referees
- 2-field qualifying tournament held on one day: 2 Head Referees & 8 Referees
- 2 division regional championship with 2 fields per division and matches on a single day: 5 Head Referees & 16 Referees
- 2 division regional championship with 2 fields per division and matches on multiple days: 5 Head Referees & 20 Referees

There should always be a single Head Referee who is the final authority for the event.

While events with multiple fields can function with a single Head Referee, at least one Head Referee per field is strongly recommended. It is recommended that multiple division events additionally have an event-level Head Referee that is not assigned to a field who can help coordinate and disseminate information, manage off-field tasks such as the question box and conversation with other key volunteers, and oversee all divisions to maintain consistency.

A single Head Referee at a multiple field event will likely be a limiting factor in match cycle times, as they must watch every match, be involved in Referee conferences, and respond to teams in the question box.

During a match, a field should have only the recommended number of Referees present. If there are additional Referees at the event, encourage them to clearly stand away from the field to ensure a consistent match experience for the teams. Additional Referees should avoid participating in any post-match Referee conferences. Overstaffing beyond the recommended number of Referees in the table above should be avoided.

For events with long durations of matches (~4 hours or more without a break), Referees should cycle through the Referee positions with extra Referees on break, if they are available. Referees should rotate between the different Referee positions every 5 matches. Establish a consistent rotation pattern at the beginning of the day, e.g., rotate clockwise through the positions, and help the Referees to maintain this pattern. It is recommended that each Referee gains experience at each position to keep Referees attentive and observant and ensure that all Referees are well-versed in the different roles. Occasionally, Referees will be substantially more comfortable with one role over another; the Head Referee may use their discretion to keep a person in a specific Referee role if required for the event to proceed. However, the Head Referee should encourage all Referees to gain experience in all positions.

Conflict of Interest

A Head Referee must disclose any conflicts of interest that they have. Whenever possible, the Head Referee of an event should not have a conflict of interest with any team competing at the event.

A key volunteer, such as the Head Referee, having a conflict of interest, or even the perception of a conflict of interest can affect a team's experience, even if decisions that were made throughout the day were not biased in any way. A volunteer who does not disclose their conflict of interest can compromise the integrity of a *FIRST* Tech Challenge event.

The Head Referee should be aware of the conflicts of interest among the Referee crew and field staff. The Head Referee should ensure Referees are assigned such that they can avoid any conflicts of interest. The Head Referee should monitor and provide feedback to volunteers in the arena during the event to correct behavior that could be perceived as inappropriate. Additionally, the Head Referee should move Referees or change assignments, if needed.

More information about conflicts of interest can be found at: [Conflict of Interest](#)

Event Day

Arena Setup

It is recommended that the Head Referee works with the FTA to check the arena and field setup to confirm that fields are compliant. The Head Referee provides input to help the Event Director and provides guidance related to rules in the Competition Manual.

Volunteer Interaction

Event Director

Prior to the event and on event day, the Head Referee and Event Director work together to execute an effective and efficient event. The Event Director plans the overall schedule and flow of the tournament while providing oversight to all elements of the event function. The Event Director may seek input from the Head Referee on aspects of the schedule, including Referee staffing and the match schedule. The goal is for the schedule to be reasonable for both teams and Referees to ensure smooth flow of the event. Avoid scheduling Matches faster than the field staff reasonably expect to be able to complete them; e.g., do not schedule 4-minute cycle times if 7 minutes is closer to what field staff can expect to be able to accomplish. A schedule that is consistently inaccurate leads to confusion between teams and event staff.

The Event Director has primary authority over all elements of the event outside of the arena including judging and the pits. The event rules in Section 5 of the Competition Manual have shared enforcement responsibility between the Event Director, Lead Robot Inspector, and Head Referee; however, the Head Referee should defer any decisions related to these rules to the Event Director. As a trusted expert on the Competition Manual, the Event Director may consult with the Head Referee about the event rules (E). This can include guidance on understanding the rule itself, or the Event Director may ask the Head Referee to issue a verbal warning to a team given the Head Referee's visible position of authority at the event. In no circumstance can the Head Referee apply gameplay penalties (i.e., fouls or yellow or red cards) for violations of event rules. The correct escalation path for violations of event rules is for the Event Director to contact *FIRST* Headquarters.

FIRST Technical Advisor (FTA)

As a fellow event leader, the Head Referee and FTA collaborate to ensure that matches are carried out effectively, fairly, and promptly. A gracious and professional relationship between the FTA and Head Referee is critical to a smooth and successful event. *FIRST* strongly recommends that FTAs and Head Referees follow the **FTA & Head Referee Workflow** outlined in the [Field Operations Guide](#). Before the start of qualification matches, the FTA and Head

Referee should meet to discuss the workflow and any other touchpoints. For example, teams may ask questions in the question box that are best answered by the FTA.

Volunteer Coordinator

Upon arrival at the event, the Head Referee should check in with the Volunteer Coordinator. This serves as an opportunity to confirm the final level of staffing and meet any unfamiliar volunteers.

Referees & Field Staff

The Head Referee should manage Referees and coordinate with other field staff, such as field reset. Coordinate with the appropriate technical field personnel on any field or field reset issues. At some events, this may be the FTA or the Field Supervisor. As the event's expert on the Competition Manual, these roles may seek guidance from the Head Referee. If asked, work with these volunteers to ensure that they have a sufficient understanding of the Competition Manual to carry out their assigned tasks.

Team Interaction and Support

Answering Team Questions

One of the key responsibilities of a Head Referee is to address questions from teams and to provide fair, consistent, rule-based answers to their concerns. Per Section 13.4, each event must provide one or more designated question boxes where teams can interact with the Head Referee. While the Head Referee has many responsibilities, including monitoring the question box to see if a team needs support. If possible, address the team's concern immediately. If it is not possible to address their concern immediately due to other priorities such as an active match, the Head Referee should acknowledge the team and inform them that they will return to hear them out shortly, e.g., after the next match.

It is important for the Head Referee to make sure to patiently listen to the questions from the students. Make sure to consider their points and to hear them out completely. They are often very passionate about their concerns and that passion typically becomes more heated if they are not allowed to clearly and completely express their concerns.

If there is a language or communication barrier with student team members, the Head Referee should work with the team to find a reasonable accommodation. For example, an adult associated with the team may act as a translator in addition to the one student and one silent observer. The discussion should still be had with the student representative through the translator.

At the end of the discussion, it is a good idea for the Head Referee to reinforce any positive behaviors displayed by the students. Thanking them for having a calm, intelligent discussion

and wishing them good luck with the remainder of the event will help with keeping a positive environment around the arena.

The Head Referee should not be afraid to correct errors, but it's not possible to be perfect – the Head Referee should do their best with what is observed by themselves and Referees during the match. The Referee crew is human. If, in consulting with the Referee crew, the Head Referee determines that the team has a valid concern, please reference [Score Changes and Match Replays](#) sections of this document for next steps.

Inappropriate Question Box Behavior

In general, the Head Referee should not allow a team at the question box to:

- record the discussion without explicit permission from the Head Referee.
- bring more than one student representative and one silent observer (adult or student).
- have the silent observer contribute to the discussion.
- only have an adult mentor or coach come to the question box without a student team member.
- show photos, videos, artistic renderings, etc. for Head Referee review.
- engage in an argument instead of a reasoned discussion.
- ask for a volunteer's personal details such as full name and/or contact information.

The Head Referee is empowered to:

- politely remind the team representatives of the non-compliant behavior and wait to begin the discussion until they comply.
- remove themselves if the team representative(s) refuse to comply after politely being reminded of the rules.
- reinforce that the Head Referee rulings are final and not to be discussed at excessive length.
- provide a team with the [FIRST contact](#) information to submit a complaint, if needed.

If the interaction in the question box is rude or disrespectful and this is not corrected after a polite reminder, the Head Referee should understand that this is not acceptable behavior at a *FIRST* Tech Challenge event. While the Head Referee is the ultimate authority in the Arena, the Head Referee is empowered to involve additional event or local leadership and, ultimately, *FIRST* Headquarters support for team behavior that is disrespectful, rude, or that egregiously disregards Head Referee instructions.

FTC Scoring System

Head Referees should be familiar with the Event Management System and the scoring and penalty tablets which will be used for live scoring in order to help Referees input scores accurately.

More information about the scoring, penalty, and Head Referee tablet features is in the [guide found here](#).

Head Referee Tablets

Head Referees are encouraged to use a tablet device to access the Head Referee features in the scoring system. The Head Referee should check with the Event Director to determine if the event will provide the device or if the Head Referee should bring their own device.

The Scorekeeper can help the Head Referee log into the Head Referee account which will give them access to several tools during the event, including an active match display, notes, timers, cycle time information, and scoresheets.

Cycle Time Reports

Head Referees who are assigned to their events in the Volunteer Management System (VMS) will be able to access their system time reports after the event by logging into <https://ftc-scoring.firstinspires.org/> using their *FIRST* Dashboard login information. Reviewing this information can help provide quantitative feedback on how the Referee crew worked together so that the Head Referee can revise their plans for future events.

Referee Meeting

The Head Referee should plan to arrive at the event early to meet with the Referee crew. The Referees work very closely when assessing penalties and finalizing the score of each match. Having introductions in the morning as well as reviewing their assignments will make for a great start to the day. This is an opportunity to come up with a communication plan with all the Referees.

Recommended talking points are available in the Head Referee scoring system tablet under “Referee Score Tracking” > “Head Referee” > “Notes” under the “Meeting” drop down, or they can be found in the Referee Meeting Talking Points section. These notes can be edited or replaced, as appropriate.

Drivers’ Meeting

One of the Head Referee’s responsibilities is leading the drivers’ meeting that takes place the morning of the event, prior to the start of any qualification matches.

The drivers’ meeting should emphasize key rules and interpretations and reiterate any recent changes or clarifications to the most current revision of the Competition Manual. It should serve to clarify any misunderstandings the teams may have about game, robot rules, or scoring. These may vary by region and event.

The meeting is an opportunity to make sure that all the teams understand the match flow such as when and where they should queue, the order the robots should be placed onto the field, the sequence of the match, and the cue for the reset of the field and the removal of their robots. The FTA may handle this part of the meeting and/or may have additional information and reminders for teams.

During the drivers' meeting the Head Referee should describe the process for teams to ask questions. Make sure to emphasize the timing for questions. It is also critical at the drivers' meeting to point out the location of the question box where the team member(s) should wait to ask their question.

The Head Referee should make sure to allow time for questions from the teams. Depending on the size of the event and the noise level where the drivers' meeting takes place, the Head Referee will possibly need to repeat questions so that all attending the meeting can hear the questions as well as the answers. Talking points are available in the Head Referee scoring system tablet under "Referee Score Tracking" > "Head Referee" > "Notes" under the "Meeting" drop down, or they can be found in the Drivers' Meeting Talking Points section at the end of this document. These notes are a good starting point that can be added to or modified, though remember to be expedient and allow time for questions.

Field Setup & Reset Process

The FTA, along with the Head Referee, are responsible for the prompt flow of the matches. From the end of the previous match to the start of the next, the Head Referee and the FTA work together to ensure proper robot removal, score certification, field reset, etc. Each of these roles has their areas of responsibility. For the Head Referee specifically, those responsibilities are:

Pre-Match Setup

1. During Pre-Match Setup, the Head Referee and Referee crew should confirm robots, operator consoles, and drive teams are appropriately setup per the rules.
2. The Referee crew should enter whether the team and/or robot are present on the tablet. The scoring system automatically handles the score impact for a team not being present for the match.
3. The Head Referee should check the state of the field to ensure there is no field damage requiring repair and the field setup is accurate prior to the start of the next match.
4. Once the Head Referee confirms that the field is setup correctly and the FTA has returned control of the field to the Head Referee, the Head Referee should verbally announce to the teams that they should be ready, indicate that the field is about to be randomized, and that once randomized they may not touch their controllers. Upon receiving active, affirmative recognition (e.g., thumbs-up) from all teams, the Head

Referee should either signal the Scorekeeper or initiate randomization via their tablet to determine the randomization from the Event Management System and then move the obelisk accordingly.

- a. The Head Referee is responsible for the final obelisk position (rotation and physical location) prior to match start, even if another member of field staff rotates it.

If the state of the readiness on the field changes between teams affirming that they are ready and the start of the match, the Head Referee has the discretion to correct field issues such as scoring elements that have moved. Teams that have communicated that they are ready but later indicate that they are not ready should either earn a violation for making an adjustment to their robot/operator console or not make the change.

The Head Referee should not re-randomize the field due to a team's actions.

The Head Referee does not need to re-randomize the field if a minor field issue that does not impact randomization is corrected after randomization, such as placing a scoring element in the correct preset position.

The Head Referee should use their discretion to re-randomize the field for larger field issues that impact randomization or take a long time to resolve such as the field timer display getting disconnected.

5. When the field is ready and randomized, the Head Referee should signal the start of the match through one of the following:
 - a. A continuous, clear, and active signal, such as a sustained thumbs-up over their head to the Announcer. When an Announcer and Scorekeeper are present, the Announcer should confirm the Scorekeeper is ready, as well as the Head Referee.
 - b. By loudly and clearly announcing "Three, Two, One, Go!" at an even pace such that the Scorekeeper and all teams at the field can hear, in the absence of an Announcer.
 - c. By loudly and clearly announcing "Three, Two, One, Go!" at an even pace such that all teams at the field can hear and initiating the match start on "Go," in the absence of an Announcer and Scorekeeper.

1. Confirm that the Referee crew has completed score certification. Teams should not enter the field to retrieve their robots until scores have been certified.
2. Notify teams to press the (■) stop button on their driver station app. This is an important safety step prior to teams retrieving their robots from the field.

The Head Referee is not responsible for checking the driver stations to ensure that each team has pressed stop. However, they must make a clear announcement to all of the teams such that they have been prompted to comply.

3. Allow drive teams to enter the field to retrieve their robots.
4. The FTA should now take charge of the field.

Match Timing (G301)

The Head Referee is a key participant in ensuring the event stays on schedule while providing a positive experience to the teams. The match schedule provides teams with an outline of their day and serves as an important resource to ensure a smooth, consistent, and predictable event flow. The [Field Operations Guide](#) provides more information about collaborating with the other Field Staff and key volunteers to ensure a smooth event flow. However, G301 is the responsibility of the Head Referee and is one of the key methods used to ensure that events proceed as planned while providing equitable time to teams to prepare for their matches.

G301 is the “late policy” for teams. Teams may not delay the start of the match and doing so puts them at risk of penalties under G301. However, G301 provides allowance for teams making a “good faith effort” to become match ready and timelines for the Head Referee to enforce if they are not doing so. The Head Referee must be familiar with G301 to enforce the timing rules fairly and consistently.

The Head Referee tablet, available in the scoring system and discussed in the FTC Scoring System section, automatically calculates the timing of the match in compliance with all relevant rules and provides a convenient button to start the 2-minute timer for G301.

Figure 1 provides a flow chart for the application of G301. The flow chart is sufficiently detailed to capture all scenarios – the application of G301 in each scenario will be simpler than what is shown. The text of the Competition Manual is always the primary source for G301. This figure is provided as an alternative representation to aid in the comprehension and consistent application of the rule.

and cards that the Head Referee is aware of are entered before match results are initially posted.

Head Referees should not hold match results while doing tangential activities such as making notes or *briefly* informing teams of rule violations.

Referee Conference

Occasionally, in answering a team's questions, it is useful to hold an impromptu conference with the Referees. This also encourages consistent application of the rules throughout the course of the day. Gather the crew and discuss the situation as needed. Make sure to allow the entire crew the opportunity to speak if they wish.

Sometimes a brief conference is a valuable tool for defusing dispute. After the Head Referee listens to a team's questions it may be useful to step away, confer with the Referee crew, and then provide the answer. Even if the conference doesn't impact the decision that the Head Referee would have made in any way, taking the time to discuss the question with the crew helps the team feel that their concerns were heard, understood, and valued, even if the final decision doesn't go the way they are arguing for. Make sure that the short conference happens away from earshot of the teams that are asking (also away from others that may eavesdrop). Also keep in mind that matches must keep moving forward; this meeting should be short in order to keep the event schedule moving on time.

Referees should be cognizant of any extra people or recording devices that can capture a Referee meeting. A Referee conference is a private discussion, only with relevant referee(s) and possibly FTA(s). Extra volunteers and team members should not be part of a Referee conference. During a Referee conference, Referees should avoid being adjacent to the audience or team spaces, highly visible on a stream, near any microphones, or near any other recording devices.

Score Changes

At times, Referees may become aware of an incorrectly recorded score or foul, or identify a rule violation that requires updating match results after match results have been posted. Referees are instructed to discuss these discrepancies with the Head Referee. Scoring achievements or violations must have been observed by Referees. Anything that was not observed live by Referees should not be added or altered from the in-match result.

Permitted score changes include correcting a minor foul to a major foul after match results have been posted, if a major foul was the correct penalty for the violation that was observed by the Referees, removing a duplicate foul entry, or adding a scoring achievement a Referee observed but accidentally was not recorded appropriately.

If a score change is necessary and will change the outcome of a match – specifically, the win/loss/tie results or Ranking Points earned – the Head Referee should be sure to alert the appropriate parties based on the following:

<p>Before match results have been posted</p>	<ul style="list-style-type: none"> • Inform the Lead Scorekeeper not to post match results until the issue is resolved/scores are updated. This might require assistance from the Lead Scorekeeper to override the scores in the Referee tablets. • Let the Emcee/Game Announcer know there will be a delay in match results.
<p>After a match results have been posted</p>	<p>Prior to publishing updated match results:</p> <ul style="list-style-type: none"> • Inform the Lead Scorekeeper that a match score must be changed, and the changes that must be made. • Gather the teams impacted by the change to let them know what is changing, and why it is changing. • Let the Emcee/Game Announcer know that a previous match result will be updated and posted. <p>Once those parties have received proper communication:</p> <ul style="list-style-type: none"> • Coordinate with the Lead Scorekeeper and Emcee/Game Announcer to have the updated match results posted and announced.

The Head Referee must work with the Scorekeeper(s) to ensure that scores are correctly updated and released based on the timing outlined above. Once match results have been submitted and posted, the Head Referee cannot make adjustments to any match results from the Head Referee tablet and must consult with the Scorekeeper.

In the case of a score change that will impact the ranking points earned during a match, the Head Referee should communicate with the Announcers that a score update needs to be posted and announced. A score change that does not change the win/loss/tie outcome of the match or the ranking points earned by one or more alliances does not require an announced updated score posting.

This need to pre-share the match outcome score changes is even more critical during the playoff matches. Make sure to communicate with the Announcers for the event prior to the beginning of the playoff matches to help them understand the timing of possible team challenges to help avoid premature announcement of match outcomes – and potentially incorrect identification of alliances advancing during the playoff matches.

Taking the time to manage the announcement of match outcomes during playoff matches will help avoid considerable upset from the teams involved.

Match Replays

Generally, match replays are rare and are a result of an arena fault. The circumstances in which a match should be replayed during an event are listed in Section 13.3 of the Competition Manual. The prerequisites for a replay are:

- Field staff stopped the match early due to safety concerns, OR
- There was an arena fault and:
 - At least one team in the match in question must request the replay.
 - The Head Referee has determined the arena fault must have reasonably affected the outcome of the match.

Scheduling a match replay should be done by the FTA and Head Referee and clearly communicated to teams. Match replays must comply with rules in Competition Manual Section 13.

Field Staff (Referee) Errors

Some errors by field staff not covered in Section 10.8 are considered arena faults. Any adjustment or delay in assignment of a penalty or scoring achievement (including those made after the MATCH), including permitted Score Changes is not a field staff error. However, a

Referee making an incorrect call during a match that impacts how an alliance plays the match is considered a Field Staff error that may be eligible for a match replay if the error impacted the outcome of the match. For example, if a Referee called a violation that indicated to an alliance that they were automatically awarded RP, that alliance stopped pursuing scoring achievements during the match that would aid in achieving that RP, and the in-match violation was deemed to be incorrect, the field staff error is grounds for a match replay.

False Starts

Generally, a “false start” to a match occurs because one or more teams started Auto before the match start signal or because the scoring system did not start the match timer. False starts sometimes occur due to miscommunication or nerves.

Avoid false starts by:

- Establishing and consistently executing signals with other volunteers like announcers and scorekeepers.
- Remembering to signal for randomization.
- Identifying potential causes of a false start such as audio bleed in a multi-division event. Warn teams of these issues and remind them to wait for the correct cue.
- Reminders to teams of the match process that will be followed.

If a false start occurs:

- If the timer has not started but all teams have started, get the timer started and teams should wait until the timer has caught up with the end of Auto before proceeding with their transition activities.
- If the Head Referee can reasonably determine that it was an arena fault (e.g., error by field staff), but no damage occurred requiring field element repair, robots should be stopped & reset, and the match re-started as soon as pre-match setup is completed again.
- If the false start is the error of an individual team, the match should proceed as normal. G401.A applies for teams that false start.

Alliance Captains' Meeting

The Head Referee is responsible for having a brief meeting with the teams who are competing in the playoffs. Typically, this only involves the alliance captains (i.e., one individual student from each alliance lead); however, there can be a reasonable accommodation to include one representative from each team participating in playoff matches in cases where an issue like language barriers is likely to arise.

This short meeting is held just after alliance selection. The Head Referee should provide a quick rundown of the playoff match flow as well as some of the rules listed in Section 13.6 of the Competition Manual. In addition, the Head Referee should emphasize a few key differences between qualification matches and playoff matches.

Recommended talking points are available in the Head Referee scoring system tablet under “Referee Score Tracking” > “Head Referee” > “Notes” under the “Meeting” drop down, or they can be found in the Alliance Captains’ Meeting Talking Points section.

Tracking Warnings, Cards, Escalating Violations, and Ranking Point Impacting Violations

The Head Referee is not expected to track every violation given in each match. The Head Referee must track violations that can escalate over multiple matches – including verbal warnings, minor fouls, and major fouls. Additionally, the Head Referee must record all violations that result in impact to ranking point eligibility, ranking point awards, yellow cards, and red cards during the event.

The Head Referee should take notes in a way that is helpful for them. As an example, recording the rule number, team number, match number, the violation given, and the reason for the violation. The Head Referee is encouraged to either use the notes feature on the Head Referee tablet or work with the Scorekeeper to print out the Head Referee Tracking Report from the scoring system. Rule violations with ranking point impact must be communicated to the Scorekeeper and correctly input alongside the violation in the match score on the Match Control Dashboard.

If multiple Head Referees are at an event, they must coordinate taking notes in a way that ensures that key feedback and escalation is communicated to the other Head Referees. Any notes taken through the notes feature of the Head Referee are shared with all other Head Referees; however, whether notes are taken with this tool or not, direct communication with other Head Referees is recommended for escalating violations. All Head Referees must ensure that when a violation with an escalation path is called, they confirm whether this is the first violation or a subsequent violation in order to escalate appropriately.

STEM for Everyone™

FIRST makes reasonable accommodations for persons with disabilities who need and request accommodations.

The Head Referee may make exceptions to rules to allow for reasonable accommodation given the exceptions do not create an undue hardship or cause safety concerns.

The Head Referee should work with other Key Volunteers, including the FTA, Field Supervisor, and Event Director to ensure reasonable accommodations are provided to those who need them.

Accommodations around the arena can include, but are not limited to:

- allowing Drive Team members to wear items such as noise-blocking headphones and earbuds used as hearing aids
- allowing Human Players tools used to assist in dexterity/reach
- allowing a Drive Team member to hold part of the operator console during AUTO
- allowing an additional person as a translator (e.g., sign language) to assist with communication in the Question Box
- providing alternative accessible routes to reach parts of the arena, pits, or stands, depending on the venue
- providing supplemental visual or audio cues at the same time as in the *FIRST* Event Management System.

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!**

In general, Referees and other Volunteers should direct questions to the Question Box to ensure that questions are being appropriately escalated to the Head Referee. 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 the Head Referee feels there is an issue with an individual or several individuals from a team that warrants specific intervention beyond just a kind reminder, please ensure the correct stakeholders for the team are aware. Here is a generally acceptable process when working with a student or team who the Head Referee needs to change their behavior:

The ABCs of Managing Team Behaviors	
<u>A</u>sk for an Adult	Do not directly reprimand a student one-on-one without an adult from their team present. Ask the student to bring an adult who is responsible for the team to meet you, before moving forward with any discussion about the concerns at hand.

The ABCs of Managing Team Behaviors	
<u>B</u>e aware of the Environment	Is the environment conducive for the feedback you are about to give? Is it loud in the area where you are? Are there other teams around that may hear the reprimand? Moving the conversation to a quieter, more private space as needed can be helpful.
<u>O</u>(ffer a) <u>C</u>lear Explanation	Explain the concern to the team and offer clear examples of the behavior that is concerning.
<u>D</u>iscuss any Questions	Offer the opportunity for students and adults to ask clarifying questions
<u>E</u>xplain Next Steps	Outline with the students and adults what the next steps are if the issue is not corrected. Certain behaviors may include the risk of yellow cards

Note: the only person at an event who can issue a yellow/red card is the Head Referee. Please refer more severe issues to *FIRST* Headquarters.

Be cautious about passing on any negative feedback about any teams directly to the Judges or Judge Advisor (JA), because it’s not possible to know all the contributing factors around such a complaint or observation. If there are issues which are repeated or egregious follow the process for [Team Interaction and Support](#) and inform the Program Delivery Partner (PDP). The Judge Advisor may seek feedback from the Event Director to determine if there is any relevant information to provide the Judges for their evaluation process.

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 (PDP), 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 (PDP).

Code Adam Guidelines (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.

The Event Director or Pit Administration volunteers are responsible for completing incident reports. The incident reporting person should follow the best practices for incident reporting:

Best Practices for Incident Reporting	
Be Calm	Anyone handling incident reporting should have a calm demeanor. They should be able to collect information and talk to witnesses without assessing fault.
Be Concise	In all conversations with the injured, witnesses, spectators, and/or media always say "the incident is being investigated" without any further comment. It is not the job of the report collector to provide any opinions on the situation at hand.
Be Risk Conscious	Do not imply liability or any payment, as no one knows for sure until all the facts are collected.

Best Practices for Incident Reporting	
Be Prepared	Those taking in incident reports should be able to communicate with the insurance company if necessary. They should also be aware of who they need to share incidents with, including the local Program Delivery Organization (PDP) or the Event Director.

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.

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 (PDP) 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.

Referee Meeting Talking Points

Introductions

- Referees should provide any conflicts of interest
- Review Referee assignments for the event
- Review any position rotations

Safety

- Provide appropriate reminders about safe attire and actions around the field.
- Set an example by adhering to and enforcing FTC safety rules.

Referee Role

- Be friendly and encouraging – make sure this is a fun and positive experience for all teams.
- Remind the referees why they are there, to make this a memorable event for the students.
- Warn a team if they are getting close to being penalized. (must be consistent with all teams!)
- Make the necessary calls, even if something happens unintentionally.
- Be fair and consistent to all teams.
- Be friendly and encouraging – make sure this is a fun and positive experience for all teams.
- If you think a team is violating a rule in the middle of a match, do not try to get confirmation from another Referee - say something! If the call is not right, we will not give the penalty, but the behavior can persist without the referee saying anything.
- Be sure of a call and stick to it, Referee decisions are final.
- Referees are encouraged to attend practice matches (if applicable) to get an idea of the intensity of the gameplay. During practice matches the rules are not enforced, but this is an opportunity to instruct the drivers and pre-empt violations during the competitions.

Referee Logistics

- Where to stand for each role -- Don't stand in front of the field!
- What is each Referee watching at the field
- Which Referees to communicate with and how (verbal, hand signals, using a flag/stick)
 - Leave/Base scoring
 - Recording Fouls
- How to call violations:
 - General fouls

- Incrementing warnings/fouls (e.g., Pinning)
- Referee Conference
- Match pace (cycle time)

Team Questions

- Direct all match questions to the Head Referee. Do not discuss or argue rulings with team members (or others affiliated with the team such as coaches, parents, siblings, etc.).
- Do not view any video replays or photographs of a match to make the call.

Match/Rule Overview

- Give a high-level overview of the game (especially if there are new referees):
 - Pre-Match Setup
 - Robots – Starting Configuration, Robot Sign, preloads, starting positions
 - Must Init an OpMode (does not have to be AUTO)
 - ARTIFACT starting locations
 - Drive Team & Alliance Area
 - Referee Positions/Roles
 - Calling fouls: when, how (verbally, with a visual indicator from a flag)
 - Randomization
 - General
 - Expansion Limits
 - ARTIFACT & PATTERN Scoring
 - AUTO
 - LEAVE Scoring
 - AUTO interference (G402)
 - quickly input PATTERN scoring
 - Transition
 - No powered movement! No change in state for the field.
 - TELEOP
 - Human Interactions
 - Robot Interactions
 - Protected zone contact
 - BASE & DEPOT
 - When does scoring end? How to input fouls.
- Go over important rule updates from most recent Team Updates
- Common rule violations to watch for
- Allow some time for Referees to practice on scoring tablets (for new refs, if no practice matches),
 - Remember to push to the next screen when the period is over!

Drivers' Meeting Talking Points

- Welcome/Introduction
- FTA -- introduce them, when to ask for them, how to get their attention
 - Wi-fi/Hotspot announcement recommended
- Safety
 - Safety glasses required, over the eyes, in queuing and at the field
 - Shoes with closed toe & closed heel. No crocs or sandals.
 - No headphones in queuing or at the field (unless accommodation)
 - No entanglement hazards
- Queuing/venue specific things
 - Where not to walk & what tables to set up on
- Recent rule updates/hot topics
 - Inspection/Reinspection
 - G301 – Delay of Match
 - G408 – Control Limit = 3
 - G417.A – Robot contacting opponent Gate
 - G418.B – Frequently associated with G417.A – removing artifacts from opponent ramp typically by opening their gate
 - Human players –
 - G431.B – Major for human contacting an artifact in contact with robot
 - G431.A – Major + Yellow Card for human touching a robot
 - G432.D – Minor for entering artifact into, removing an artifact from zone, or moving an artifact within part of the field other than the loading zone.
 - G434 – keep number of artifacts out of play to 6 or fewer
 - Robot-Robot interaction
 - Protected Zones have penalties for contact
 - Make it obvious! (BASE scoring, clean Human Player Loading, etc.)
- Q&A with teams
- Question Box reminders for future questions
 - Includes off-field issues, reinspection, scoring issues, & “what if” questions
 - 1 student, 1 recommended silent observer, no pictures/video, official rules/Q&A are great!
 - Have a specific question!
- Good luck & have fun (wrap-up message)

Alliance Captains' Meeting Talking Points

Congratulations! All the talking points from the drivers' meeting still hold.

Playoffs

- Double Elimination Bracket: [point to the bracket being used: 2-Alliance: 13.7.3, 4-Alliance: 13.7.4, 6-Alliance: 13.7.5, 8-Alliance: 13.7.6 or multi division]
- Both Teams play every match for the Alliance. All Alliances play at least 2 matches.
- There are no backup or replacement teams (T703), & there are no team-requested timeouts

Match Setup (10.3.4)

- If setup order matters:
 - first red robot (as determined by the red Alliance lead)
 - first blue robot (as determined by the blue Alliance lead)
 - second red robot
 - second blue robot

Delay of Match (G301)

- An Alliance has eight minutes (8:00) from posting the score from the previous match that they competed in until their robots to be set up on the field, ready for their next match (T206B)
- If the 8-minute timer runs out and you are not making a good faith effort to become match ready, G301 violation applies to the Alliance.
- A match may begin early if both Alliances are ready to begin a match ahead of time.

Team Questions (T402B)

- Questions must be asked before the next round of matches. Ask questions ASAP!

Yellow & Red Cards (10.6.1, T705)

- Cards from Quals have been reset. Warnings do not reset (except for Delay of Match: G301)
- Cards & disqualification of a team in Playoffs applies to the entire alliance
- Yellow card for 1 robot = yellow card for every robot in alliance
- Red card for 1 robot = disqualified robot = disqualified alliance = loss of match
- Yellow card for robot 1 plus yellow card for robot 2 = red card for the alliance = loss of match

Other Logistics [*subject to coordination with FTA/Field Supervisor & depending on venue constraints*]

- Teams competing in Playoffs may bring up to 3 additional team members (pit crew), and a reasonably small tool box/spare batteries/etc. to queuing. (T704)
- Alliances are assigned a queuing table for the remainder of the day
- Robots should not leave the arena until they are done for the day.

Q&A with captains

[Provide at least 15 minutes after this meeting ends before Playoffs Match 1 is scheduled to start.]

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) <i>Note to Scorekeeper: 6 Matches total (Check the Competition Manual)</i>
10:40 am	Drivers' Meeting with Head Referee & Opening Ceremony
11:00 am	Qualification Matches 1 - 8 <i>Note to Scorekeeper: 7-minute cycle-time</i>
12:00 pm	Lunch
12:45 pm	Qualification Matches 9 - 45 <i>Note to Scorekeeper: 5-minute cycle-times</i>
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
<i>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.</i>	

Figure 2: 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.

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 3: Competing Team Report

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)

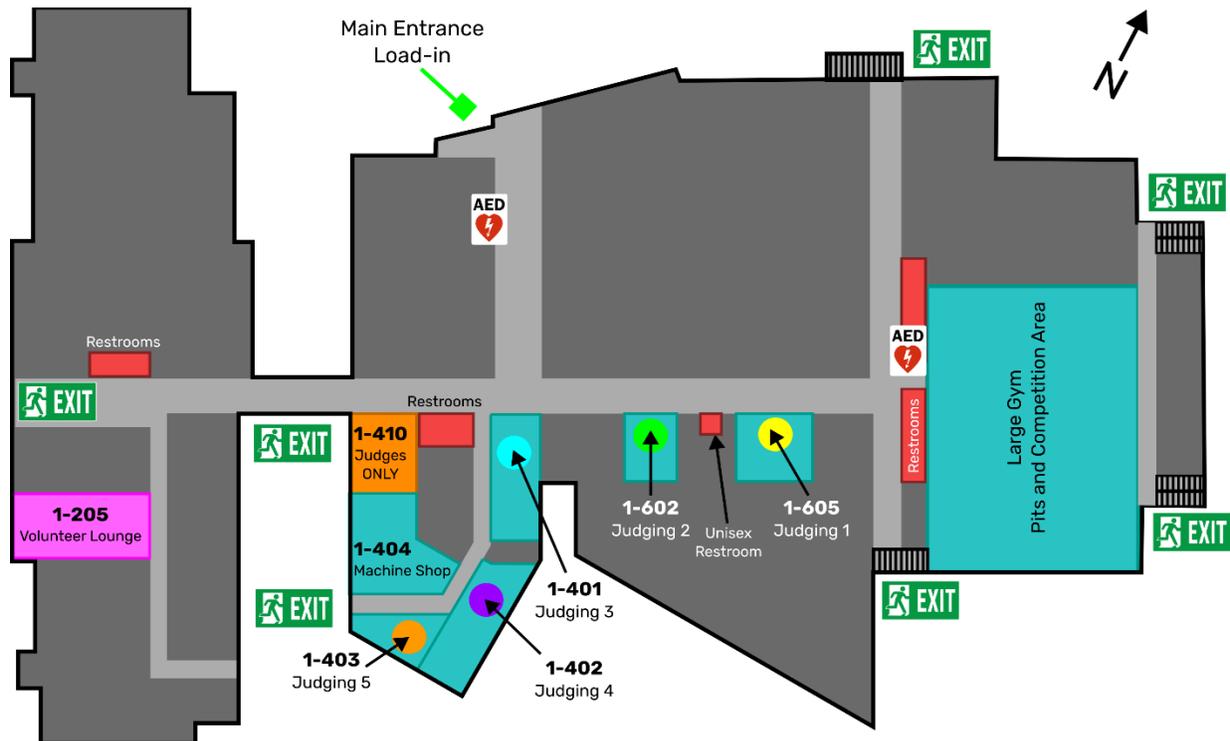
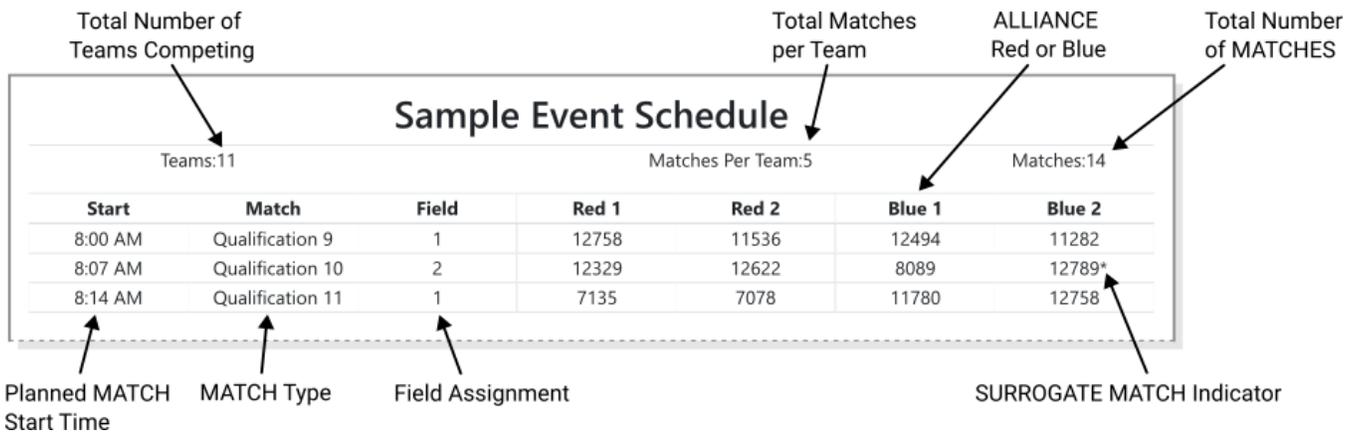


Figure 4: Example Event Map

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.



The table is titled "Sample Event Schedule" and includes summary statistics at the top: "Teams:11", "Matches Per Team:5", and "Matches:14". The table has columns for "Start", "Match", "Field", "Red 1", "Red 2", "Blue 1", and "Blue 2". Annotations with arrows point to various parts of the table: "Total Number of Teams Competing" points to "Teams:11"; "Total Matches per Team" points to "Matches Per Team:5"; "ALLIANCE Red or Blue" points to the alliance columns; "Total Number of MATCHES" points to "Matches:14"; "Planned MATCH Start Time" points to the "Start" column; "MATCH Type" points to the "Match" column; "Field Assignment" points to the "Field" column; and "SURROGATE MATCH Indicator" points to the asterisk in the "Blue 2" column for the 8:07 AM match.

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

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.

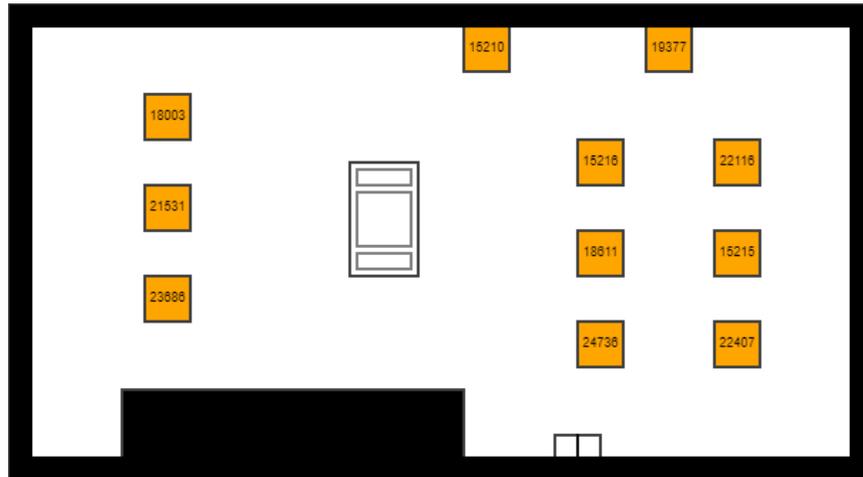


Figure 6: Example Pit Map for a small 12-team Qualifier Event

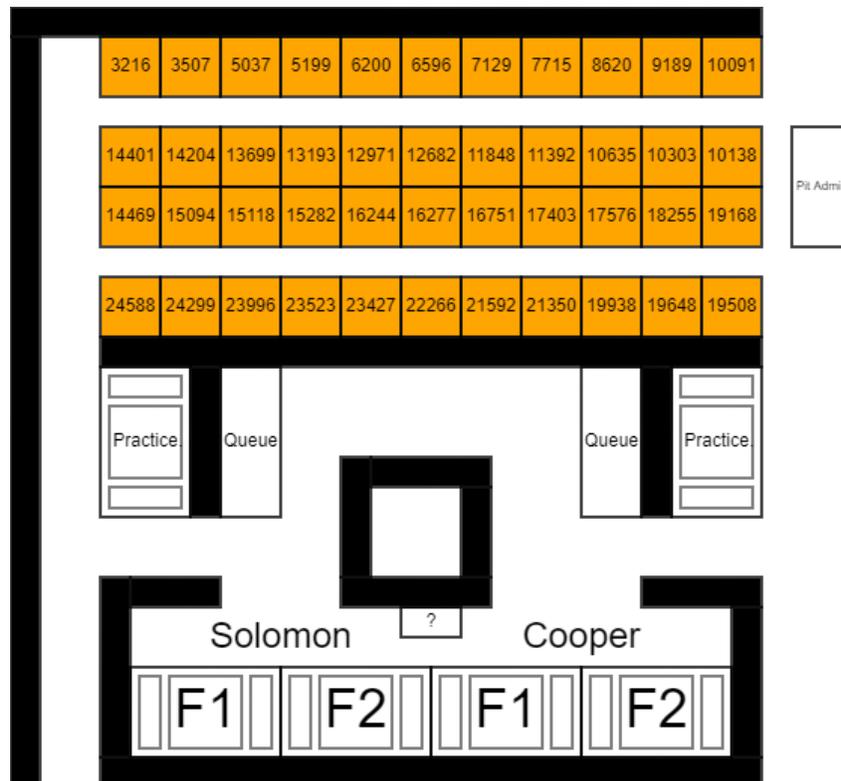


Figure 7: Example Pit Map for a Typical Regional Championship Event

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, use the **built-in chat feature on FTC Live** available for events with internet access, or Head Referees can use the Event Support feature in the Referee Slack.

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