

Section  
**5**



FIRST® Robotics Competition

# THE TOURNAMENT

## TABLE OF CONTENTS

- 5 THE TOURNAMENT ..... 2**
- 5.1 OVERVIEW ..... 2
- 5.2 PRACTICE ROUNDS..... 2
  - 5.2.1 Schedule..... 2
- 5.3 QUALIFICATION MATCHES ..... 2
  - 5.3.1 Schedule..... 2
  - 5.3.2 Match Assignment ..... 2
  - 5.3.3 Qualification Score (QS) ..... 2
  - 5.3.4 Ranking Score (RS) ..... 3
  - 5.3.5 Coopertition Score (CS)..... 3
  - 5.3.6 Match Point Exceptions ..... 3
  - 5.3.7 Qualification Seeding..... 3
- 5.4 ELIMINATION MATCHES ..... 4
  - 5.4.1 Alliance Selection Process..... 4
  - 5.4.2 Backup Teams ..... 4
  - 5.4.3 Elimination Match Ladder ..... 5
  - 5.4.4 Elimination Scoring ..... 5
- 5.5 TOURNAMENT RULES ..... 6
  - 5.5.1 Safety Rules ..... 6
  - 5.5.2 Eligibility..... 6
  - 5.5.3 Referee Interaction Rules ..... 6
  - 5.5.4 Yellow and Red Card Rules..... 6
  - 5.5.5 Field Reset Rules..... 7
  - 5.5.6 Timeout and Backup Team Rules..... 7
  - 5.5.7 Special Equipment Rules..... 8
- 5.6 CHAMPIONSHIP ADDITIONS ..... 8
  - 5.6.1 Championship Pit Crews..... 9
  - 5.6.2 Championship Backup Teams ..... 9
  - 5.6.3 FRC Championship Match Ladder..... 10

## 5 THE TOURNAMENT

### 5.1 OVERVIEW

Each 2011 FRC Regional or District Competition and the 2011 FRC Championship will be played in a tournament format. Each tournament will consist of three sets of matches called “practice matches,” “qualification matches,” and “elimination matches.” The purpose of the practice matches is to provide each TEAM a chance to run its ROBOT on the playing field prior to the start of the competition matches. The purpose of the qualification matches is to allow each TEAM to earn a seeding position that may qualify them for participation in the elimination matches. The purpose of the elimination matches is to determine the event Champions.

### 5.2 PRACTICE ROUNDS

#### 5.2.1 Schedule

The practice rounds will be played on the first day of each competition. The practice round schedule will be available on the morning of the first day. Practice rounds will be randomly assigned with each TEAM being assigned an equal number of rounds. At some events, additional rounds may be available on a standby basis. Each practice round will be conducted as a “competition match” with approximately two minutes for set up, two minutes and fifteen seconds of regular game play (including operations), and one minute to clear the field.

### 5.3 QUALIFICATION MATCHES

#### 5.3.1 Schedule

The qualification matches will consist of a series of matches, with an ARENA reset between each MATCH. The qualification match schedule will be available as soon as possible, but no later than 1 hour before qualification matches are scheduled to begin.

#### 5.3.2 Match Assignment

The Field Management System (FMS) will assign each TEAM two ALLIANCE partners for each qualifying match played using a predefined algorithm. The algorithm employs the following criteria:

- A. Maximum time (in number of matches) between each match played for all TEAMS
- B. Minimum possible number of times a TEAM plays opposite any TEAM
- C. Minimum possible number of times a TEAM is allied with any TEAM
- D. Minimize the use of SURROGATES.
- E. Even distribution of matches played on Blue and Red ALLIANCE (without sacrificing A, B, C and D)

All TEAMS will play the same number of qualification matches **except** if the number of TEAM appearances (number of TEAMS multiplied by number of rounds) is not divisible by six; in that case the FMS will randomly select some TEAMS to play an extra MATCH. For purposes of seeding calculations, those TEAMS will be designated as SURROGATES for the extra MATCH. If TEAMS play a MATCH as a SURROGATE, it will be indicated on the match schedule, and it will always be their third match.

#### 5.3.3 Qualification Score (QS)

Qualification points are awarded to each TEAM at the completion of each qualification match and are dependant on the final score:

- Each TEAM on the winning ALLIANCE will receive two (2) qualification points.

- Each TEAM on the losing ALLIANCE will receive zero (0) qualification points.
- In the event of a tied score, all six TEAMS will receive one (1) qualification point.

The total number of qualification points earned by a TEAM throughout their qualification matches will be their qualification score.

#### **5.3.4 Ranking Score (RS)**

Each TEAM on the winning ALLIANCE will receive a number of ranking points equal to the unpenalized score (the score without any assessed penalties) of the losing ALLIANCE.

Each TEAM on the losing ALLIANCE will receive a number of ranking points equal to their final score (with any assessed penalties).

In the case of a tie, all participating TEAMS will receive a number of ranking points equal to their ALLIANCE score (with any assessed penalties).

The total number of ranking points earned by a TEAM throughout their qualification matches, divided by the number of matches played (excluding any SURROGATE matches), then truncated to two decimal places, will be their ranking score.

Note: because your ranking score is derived directly from the match scores of the losing ALLIANCES in the matches you play, it is in your best interest to support your opponents and win by helping each ALLIANCE score as many points as possible.

#### **5.3.5 Coopertition Score (CS)**

Any borrowed MINIBOT which scores points by legally triggering the TARGET during the MATCH receives one (1) Coopertition point for the FRC TEAM registered for the event that is affiliated with the MINIBOT.

The total number of Coopertition points earned by a TEAM throughout the qualification matches will be their Coopertition score.

#### **5.3.6 Match Point Exceptions**

A SURROGATE receives zero qualification points, zero ranking points, and zero Coopertition points.

A TEAM is declared a no-show if no member of the TEAM is in the ALLIANCE STATION at the start of the MATCH; a no-show TEAM will be disqualified from that MATCH.

During the qualification MATCHES, TEAMS can be individually disqualified in a MATCH. A disqualified TEAM will receive zero qualification points, zero ranking points, and zero Coopertition points.

In the very unlikely case that all three TEAMS on an ALLIANCE are disqualified, all three TEAMS on the winning ALLIANCE would get their own score as their ranking points for that match.

#### **5.3.7 Qualification Seeding**

All TEAMS in attendance will be seeded during the qualification matches. If the number of TEAMS in attendance is 'n', they will be seeded '1' through 'n', with '1' being the highest seeded TEAM and 'n' being the lowest seeded TEAM.

The FMS will use the following seeding method:

- TEAMS will be broken into tiers based on their qualification score. A tier is made up of all TEAMS with the same qualification score. Tiers will be seeded in decreasing order by qualification score.
- Within each tier, TEAMS will be seeded in decreasing order by their ranking score.
- If any TEAMS within a tier have the same ranking score, they will then be seeded in decreasing order by their highest match score.
- If any TEAMS within a tier have the same ranking score and the same highest match score, then they will be seeded based on a random sorting by the FMS.

## 5.4 ELIMINATION MATCHES

At the end of the qualification matches, the top eight seeded TEAMS will become the ALLIANCE Leads. The top seeded ALLIANCEs will be designated, in order, ALLIANCE One, ALLIANCE Two, etc., down to ALLIANCE Eight. Using the ALLIANCE selection process described below, each TEAM will choose two other TEAMS to join their ALLIANCE.

### 5.4.1 Alliance Selection Process

Each TEAM will choose a student TEAM Representative who will proceed to the ARENA at the designated time (typically before the lunch break on the final day of the Competition) to represent their TEAM. The TEAM Representative for each ALLIANCE Lead is called the ALLIANCE CAPTAIN.

The ALLIANCE selection process will consist of two rounds during which each ALLIANCE CAPTAIN will invite a TEAM seeded below them in the standings to join their ALLIANCE. The invited TEAM must not already have declined an invitation.

Round 1: In descending order (ALLIANCE One to ALLIANCE Eight) each ALLIANCE CAPTAIN will invite a single TEAM. The invited TEAM Representative will step forward and either accept or decline the invitation.

If the TEAM accepts, it is moved into that ALLIANCE.

- If an invitation from a top eight ALLIANCE to another ALLIANCE Lead is accepted, all lower ALLIANCE Leads are promoted one spot and the next highest seeded unselected TEAM will move up to become ALLIANCE Eight.

If the TEAM declines, that TEAM is not eligible to be picked again and the ALLIANCE CAPTAIN extends another invitation to a different TEAM.

- If an invitation from a top eight ALLIANCE to another ALLIANCE Lead is declined, the declining TEAM may still invite TEAMS to join their ALLIANCE, however, it cannot accept invitations from other ALLIANCEs.

The process continues until ALLIANCE Eight makes a successful invitation.

Round 2: The same method is used for each ALLIANCE CAPTAIN'S second choice except the selection order is reversed, with ALLIANCE Eight picking first and ALLIANCE One picking last. This process will lead to eight ALLIANCEs of three TEAMS.

### 5.4.2 Backup Teams

Of the remaining eligible TEAMS, the highest seeded TEAMS (up to eight) shall remain on standby and be ready to play as a BACKUP TEAM. If a ROBOT from any TEAM in an elimination match becomes inoperable the ALLIANCE CAPTAIN may have the highest seeded BACKUP TEAM join the ALLIANCE. The resulting ALLIANCE would then be composed of four TEAMS, but only three TEAMS will be permitted to continue with tournament play. The replaced TEAM remains part of the ALLIANCE for awards but cannot play, even if their ROBOT is repaired.

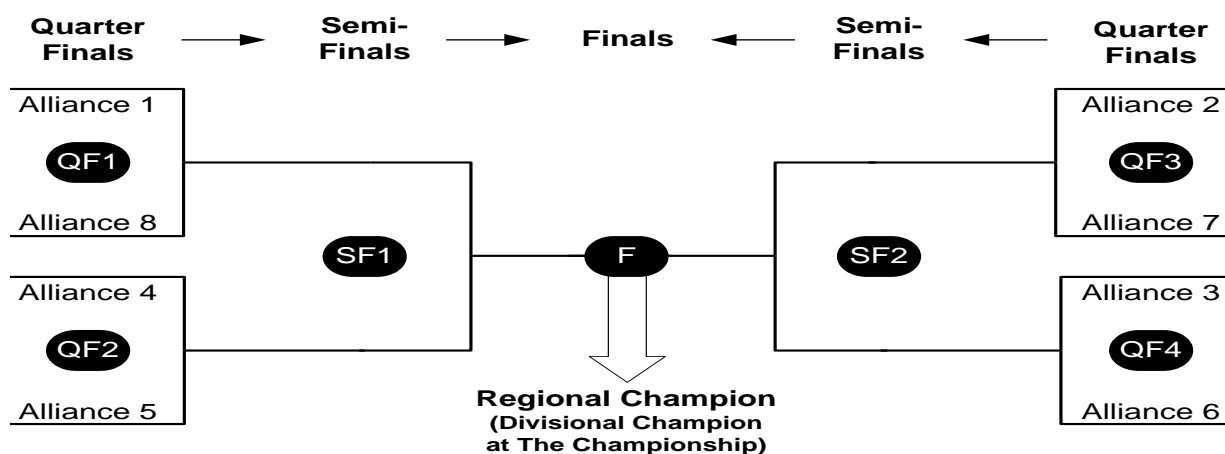
The original three-TEAM ALLIANCE shall only have one opportunity to draw from the BACKUP TEAMS. If a second ROBOT from the ALLIANCE becomes inoperable, then the ALLIANCE must play the following matches with only two (or even one) ROBOTS. It is in the best interest of all TEAMS to construct their ROBOTS to be as robust as possible to prevent this situation.

- Example: Three TEAMS, A, B and C, form an ALLIANCE going into the elimination matches. The highest seeded TEAM NOT on one of the eight ALLIANCES is TEAM D. During one of the elimination matches, TEAM C's ROBOT becomes inoperable. The ALLIANCE CAPTAIN decides to bring up TEAM D to replace TEAM C. TEAM C and their ROBOT may not play in any subsequent elimination matches.

In the case where a BACKUP TEAM is called up to the winning ALLIANCE, there will be a four-TEAM Champion ALLIANCE.

### 5.4.3 Elimination Match Ladder

The elimination matches will take place on the afternoon following completion of the qualification matches. Elimination matches are played in a ladder format as follows:



In order to allow equal time between matches for all ALLIANCES, the order of play will be:

- QF1-1, QF2-1, QF3-1, QF4-1,
- Then QF1-2, QF2-2, QF3-2, QF4-2,
- Then QF1-3\*, QF2-3\*, QF3-3\*, QF4-3\*
- Then any QF replays due to ties\*
- Then SF1-1, SF2-1, SF1-2, SF2-2, SF1-3\*, SF2-3\*
- Then any SF replays due to ties\*
- Then F-1, F-2, F-3\*
- Then any F replays due to ties\*

(\* - if required)

### 5.4.4 Elimination Scoring

In the elimination matches TEAMS do not earn qualification, ranking, or Coopertition points; they earn a win, loss or tie. Within each bracket of the elimination match ladder, the first ALLIANCE to win two MATCHES will advance.

In the case where the MATCH SCORE of each ALLIANCE is equal, the tie will be broken by awarding one (1) additional point to the ALLIANCE that won the MINIBOT RACE. If there was no MINIBOT RACE winner, the MATCH will be replayed.

## 5.5 TOURNAMENT RULES

### 5.5.1 Safety Rules

- <T01> All competition attendees must wear safety glasses while in the ARENA.
- <T02> Radio control mode of ROBOT operation is not permitted in areas anywhere outside the ARENA or practice field. ROBOTS must only be operated by tether when not within the ARENA or practice field.

### 5.5.2 Eligibility

- <T03> A TEAM will only be allowed to participate in a MATCH and receive qualification, ranking, and Coopertition points only if it has passed inspection. If it is learned after the start of the MATCH that a TEAM did not pass inspection, the TEAM's entire ALLIANCE will receive a RED CARD for that MATCH.

Please take note of this rule change for 2011. It is important that TEAMS make sure their ALLIANCE partners have passed inspection. Allowing a partner that has not passed inspection to play with you puts you at risk of disqualification. We recommend that you check check with your ALLIANCE partners early and help them to pass inspection before your compete together.

### 5.5.3 Referee Interaction Rules

- <T04> The Head Referee has the ultimate authority in the ARENA during the competition, but may receive input from additional sources, particularly Game Design Committee members, *FIRST* personnel, and technical staff that may be present at the event. THE HEAD REFEREE RULINGS ARE FINAL! The referee will not review recorded replays under *any* circumstances.
- <T05> If a TEAM needs clarification on a ruling or score, a pre-college student from that TEAM should address the Head Referee after a field reset has been signaled. Depending on timing, the Head Referee may postpone any requested discussion until the end of the subsequent MATCH.

### 5.5.4 Yellow and Red Card Rules

- <T06> The Head Referee may assign a YELLOW CARD as a warning of egregious ROBOT or TEAM member behavior at the ARENA. A YELLOW CARD will be indicated by the Head Referee standing in front of the TEAM'S PLAYER STATION and holding a yellow card in the air after the completion of the MATCH. In the first MATCH that a TEAM receives a YELLOW CARD, it acts as a warning.
- <T07> Once a TEAM receives a YELLOW CARD, its team number will be colored yellow on the audience screen at the beginning of all subsequent MATCHES as a reminder to the TEAM, the referees, and the audience that they have been issued a YELLOW CARD.
- <T08> A TEAM will be issued a RED CARD (disqualification) in any subsequent MATCH that they receive an additional YELLOW CARD. This will occur after the completion of the MATCH. A RED CARD will be indicated by the Head Referee standing in front of the TEAM'S PLAYER STATION and holding a yellow card and red card in the air simultaneously. The TEAM will still carry their YELLOW CARD into subsequent matches.
- <T09> If the behavior is particularly egregious, a RED CARD may be issued without being preceded by a YELLOW CARD, at the Head Referee's discretion. The TEAM will still carry a YELLOW CARD into subsequent matches.

- <T10> YELLOW CARDS do not carry forward between qualification matches and elimination matches. All TEAMS move into the elimination matches with a clean slate.
- <T11> If a TEAM is disqualified during a MATCH for a reason other than receiving an additional YELLOW CARD, they will receive a RED CARD. This will occur after the completion of a MATCH and will be indicated by the Head Referee standing in front of the TEAM'S PLAYER STATION and holding a red card in the air.
- <T12> During the qualification matches, a TEAM that receives a RED CARD will receive zero qualification points and zero ranking points. The rest of the TEAMS in their ALLIANCE will still receive the earned qualification points and ranking points.
- <T13> During the elimination matches, a TEAM receiving a RED CARD will cause the disqualification of their entire ALLIANCE for that MATCH.

### 5.5.5 Field Reset Rules

- <T14> At the conclusion of a MATCH, all players shall remain in their assigned locations until the Head Referee issues the “field-reset” signal. Once the Head Referee issues this signal, the “match-reset” period will begin. The ARENA must be cleared of ROBOTS, MINIBOTS, and OPERATOR CONSOLES from the MATCH just ended, and the ROBOTS, MINIBOTS, and OPERATORS CONSOLES for the following MATCH must be placed in position and ready to start before the expiration of the “match-reset” period. Field Attendants will reset the ARENA elements during this time.

Teams are expected to use utmost care in removing MINIBOTS from the TOWERS and mitigate risk of a MINIBOT falling uncontrollably. If a MINIBOT is seen as unsafe, the REFEREE may consider it a violation of Rule <S01>. MINIBOTS seen as egregious threats to safety may earn the TEAM a YELLOW or RED CARD.

- <T15> Robots will not be re-enabled after the conclusion of the MATCH
- <T16> The qualification match schedule will indicate ALLIANCE partners and match pairings. It will also indicate the ALLIANCE color assignment, “red” or “blue,” for each MATCH. Before queuing for a match, the ALLIANCE members must choose which TEAM will occupy each of the three possible locations for each of the ROBOTS and HUMAN PLAYERS.
- <T17> If, in the judgment of the Head Referee, an “ARENA fault” occurs that affects either the play or the outcome of the MATCH, the MATCH will be replayed. Example ARENA faults include broken field elements, power failure to a portion of the field, improper activation of the field control system, errors by field personnel, etc.

### 5.5.6 Timeout and Backup Team Rules

- <T18> There are **no** time-outs in the qualification rounds. If a ROBOT cannot report for a MATCH, the queuing manager must be informed and at least one member of the TEAM should report to the field for the MATCH to avoid receiving a RED CARD.
- <T19> During the elimination rounds, if circumstances require an ALLIANCE to play in back-to-back MATCHES, they will be granted an additional minute of set-up time to reset and allow their ROBOTS to cool down.

- <T20> In the elimination matches, each ALLIANCE will be allotted one TIMEOUT of up to 6 minutes. If an ALLIANCE wishes to call for a TIMEOUT, they must submit their TIMEOUT coupon to the Head Referee within two minutes of the Head Referee issuing the arena reset signal preceding their MATCH. When this occurs, the Time-out Clock will count down the six minutes starting with the expiration of the arena reset period. Both ALLIANCES will enjoy the complete 6-minute window. In the interest of tournament schedule, if an ALLIANCE completes their repairs before the Time-out Clock expires, the ALLIANCE CAPTAIN is encouraged to inform the Head Referee that they are ready to play and remit any time remaining in the TIMEOUT. If ALLIANCES are ready before the 6-minute window, the next MATCH will start. There are no cascading time-outs. An ALLIANCE may not offer their unused TIMEOUT to their opponent.
- <T21> If during a TIMEOUT an ALLIANCE CAPTAIN determines that they need to call up a BACKUP TEAM, they must submit their BACKUP TEAM coupon to the Head Referee while there is still at least two minutes remaining on the Time-out Clock. After that point, they will not be allowed to utilize the BACKUP TEAM. Alternatively, an ALLIANCE CAPTAIN may choose to call up a BACKUP TEAM without using their TIMEOUT by informing the Head Referee directly within two minutes of the Head Referee issuing the Field Reset Signal preceding their match.
- <T22> In the case where the ALLIANCE CAPTAIN'S TEAM is replaced with the BACKUP TEAM, the ALLIANCE CAPTAIN is allowed in the ALLIANCE STATION as a thirteenth ALLIANCE member so they can serve in an advisory role to their ALLIANCE.
- <T23> In any case where a HEAD REFEREE has to stop an ELIMINATION MATCH (e.g. due to ARENA fault or a safety issue), it will be replayed immediately. ALLIANCES do not have the option to request either a TIMEOUT or BACKUP TEAM. The sole exception is if the replay is due to an ARENA fault that rendered a ROBOT inoperable.
- <T24> If an ELIMINATION MATCH is replayed per <T23>, the Head Referee has the option of calling a TIMEOUT without charging any TEAM with a TIMEOUT.

### 5.5.7 Special Equipment Rules

- <T25> The only equipment that may be brought on to the ARENA is the OPERATOR CONSOLE, reasonable decorative items, and special clothing and/or equipment required due to a disability. Other items, particularly those intended to provide a competitive advantage for the TEAM, are prohibited.
- <T26> Devices used solely for the purpose of planning or tracking strategy of game play are allowed inside the ALLIANCE STATION, if they meet ALL of the following conditions:
- Do not connect or attach to the OPERATOR CONSOLE
  - Do not connect or attach to the FIELD or ARENA
  - Do not connect or attach to another ALLIANCE member
  - Do not communicate with anything or anyone outside of the ARENA.
  - Do not include any form of enabled wireless electronic communication (e.g. radios, walkie-talkies, cell phones, Bluetooth communications, WiFi, etc.)
  - Do not in any way affect the outcome of a MATCH, other than by allowing TEAM members to plan or track strategy for the purposes of communication of that strategy to other ALLIANCE members.

## 5.6 CHAMPIONSHIP ADDITIONS

For the 2011 FRC Championship, TEAMS will be split into four divisions. Each division will play exactly like a Regional Event and produce the Division Champions. Those four ALLIANCES will then proceed to the Championship Playoffs to determine the 2011 FRC Champions.



Procedures in Sections 5.1-5.5 apply during the Championship, with the following additions:

### **5.6.1 Championship Pit Crews**

During the elimination matches, extra TEAM members are often needed to move the TEAM ROBOT from the TEAM's pit area to the queuing area and into the ARENA. For this reason, each TEAM is permitted to have three (3) additional "pit crew" members who can also help with needed ROBOT repairs/maintenance. We suggest that all TEAMS assume they may be chosen for an ALLIANCE and think about the logistics of badge distribution and set a plan prior to the pairings. It is each ALLIANCE CAPTAIN'S responsibility to get the TEAM'S badges to the TEAM pit crew members.

Only TEAM members wearing proper badges are allowed on the ARENA floor. *FIRST* will distribute these badges to the ALLIANCE CAPTAINS during the ALLIANCE CAPTAIN meeting, which takes place on the division fields. These badges will provide the necessary access to the ARENA for pit crew members.

### **5.6.2 Championship Backup Teams**

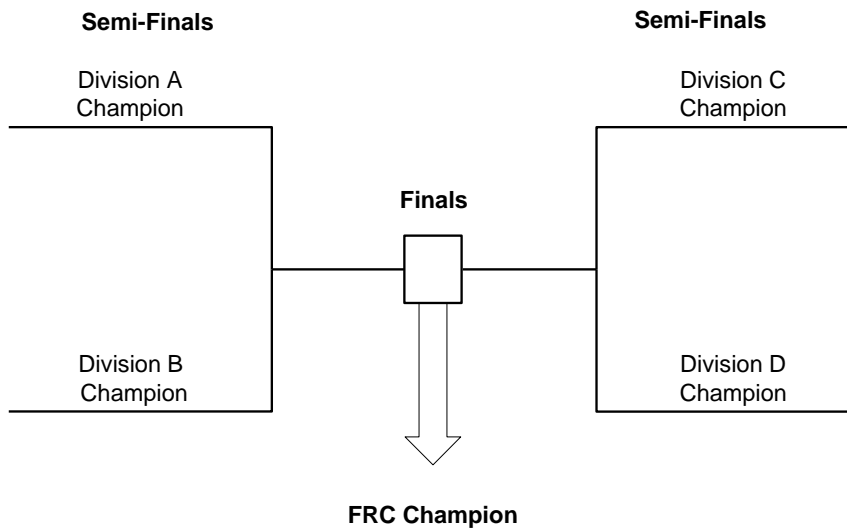
If an ALLIANCE has not previously brought in a BACKUP TEAM, and a ROBOT becomes disabled during the Championship Playoffs and can not continue, the ALLIANCE may request a BACKUP TEAM. The ALLIANCE CAPTAIN will be presented the option of having one of the three lead Division Finalist TEAMS, chosen randomly, from their division join the ALLIANCE as a BACKUP TEAM.

If an ALLIANCE has won their division with a BACKUP TEAM and moved on to the FRC Championship Playoffs, the BACKUP TEAM continues to play for the ALLIANCE in the Championship Playoffs.

As noted in Section 5.4.2, the original three-TEAM ALLIANCE shall only have one opportunity to draw from the BACKUP TEAMS. If the ALLIANCE has brought in a BACKUP TEAM during the division elimination matches or the Championship Playoffs, they cannot bring in a second BACKUP TEAM. If a second ROBOT from the ALLIANCE becomes inoperable during the Championship Playoffs, then the ALLIANCE must play the following matches with only two (or even one) ROBOTS.

In either case, the replaced TEAM remains part of the ALLIANCE for awards but can not rejoin tournament play, even if their ROBOT is repaired. If the ALLIANCE wins the Championship Playoffs, the FRC Champions will be all three original members of the Division Champion ALLIANCE and the BACKUP TEAM.

### 5.6.3 FRC Championship Match Ladder



The FRC Championship matches will play exactly like the Semi-Finals and Finals of the elimination matches.