2026-2027 Field Mitigation Guide

This guide includes some potential issues which can occur with the 2026-2027 *FIRST* Tech Challenge competition field and the recommended mitigation measures field staff can take if they occur. The intent of this guide is to provide guidance to volunteers and events so they can ensure a fair and consistent experience for all competing teams.

> **TOP TIP:** Before performing any mitigation fixes, ensure the field is assembled correctly. Reference: the CAD file and other field resources available at ftc.game/field

1: A field component is visibly damaged or defective.

Mitigation 1.1: To troubleshoot any field build issues, to resolve potential defects, or to purchase replacement components, it is recommended to contact AndyMark Customer Service.

2: A Hive was observed to tip at the wrong capacity during match play.

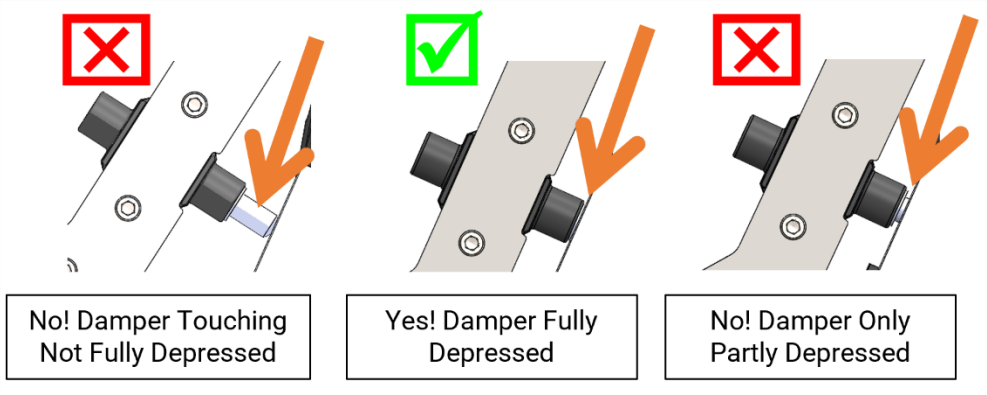
When not occupied with other duties, field staff should keep an eye on the performance of both Hives on each competition Field. After setup/calibration, Hives should not need recalibration unless something is adjusted or becomes physically damaged. Even so, volunteers should always be on the lookout for unexpected behavior.

Mitigation 2.1: If a Hive is observed tipping at the wrong capacity, or if a team or volunteer reports unexpected Hive behavior, it is important to investigate at the earliest convenient opportunity by performing a calibration check. Volunteers should test the Hive using the Field Acceptance Checklist criteria 2.2 to 2.7 to validate Hive behavior.

> **Note:** For the purposes of Competition Manual rule T201 and potential match replays, a Hive misbehaving during a match does not necessarily constitute a “broken field element”. Since there is some amount of expected variability in Hive behavior, **only** a calibration test can identify whether a Hive is within the field specifications. Field Staff should inform the FTA and Head Referee that a misbehavior was observed in a match but then more importantly, whether the Hive subsequently passed a calibration check or not.

Mitigation 2.2: If it appears that a Hive consistently behaves differently during matchplay than during testing it is possible the calibration tests are not being performed correctly. There are two common sources of error:

1. Only one variable should be changed at a time during testing. Changing multiple variables can result in an inconsistent calibration.
2. Calibration tests specify that the Hive Damper should be fully depressed for each test. If the damper is not fully depressed it will result in the Hive tipping too easily during testing, which may result in a Hive being too difficult to tip during match play.



3: During a Field Acceptance Check, a Hive is found to be out of calibration.

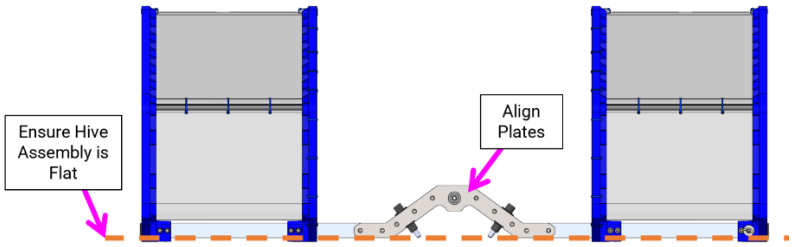
Some variation in Hive operation is expected within the boundaries described by the calibration process in the Event Field Setup Guide. Prioritize consistent operation among Hives on a given field first, and consistent operation across competition fields second.

Mitigation 3.1: Inspect the Hive for any physical damage and repair any obvious issues.

Mitigation 3.2: Ensure all assembly bolts on the Hive are tightened. If these bolts are left loose, the Hive may gradually become “tweaked” over time during normal gameplay.

Mitigation 3.3: Conduct the Hive Calibration process described in the Event Field Setup Guide (and shown in Appendix A of this guide).

Mitigation 3.4: If calibration is difficult or unsuccessful, remove the affected Hive Assembly from the Frame Assembly and place it on a flat surface. Loosen the screws on the Pivot Bearing Plates and realign the Hive Assembly prior to tightening. Then conduct the Hive Calibration process described in the Event Field Setup Guide.



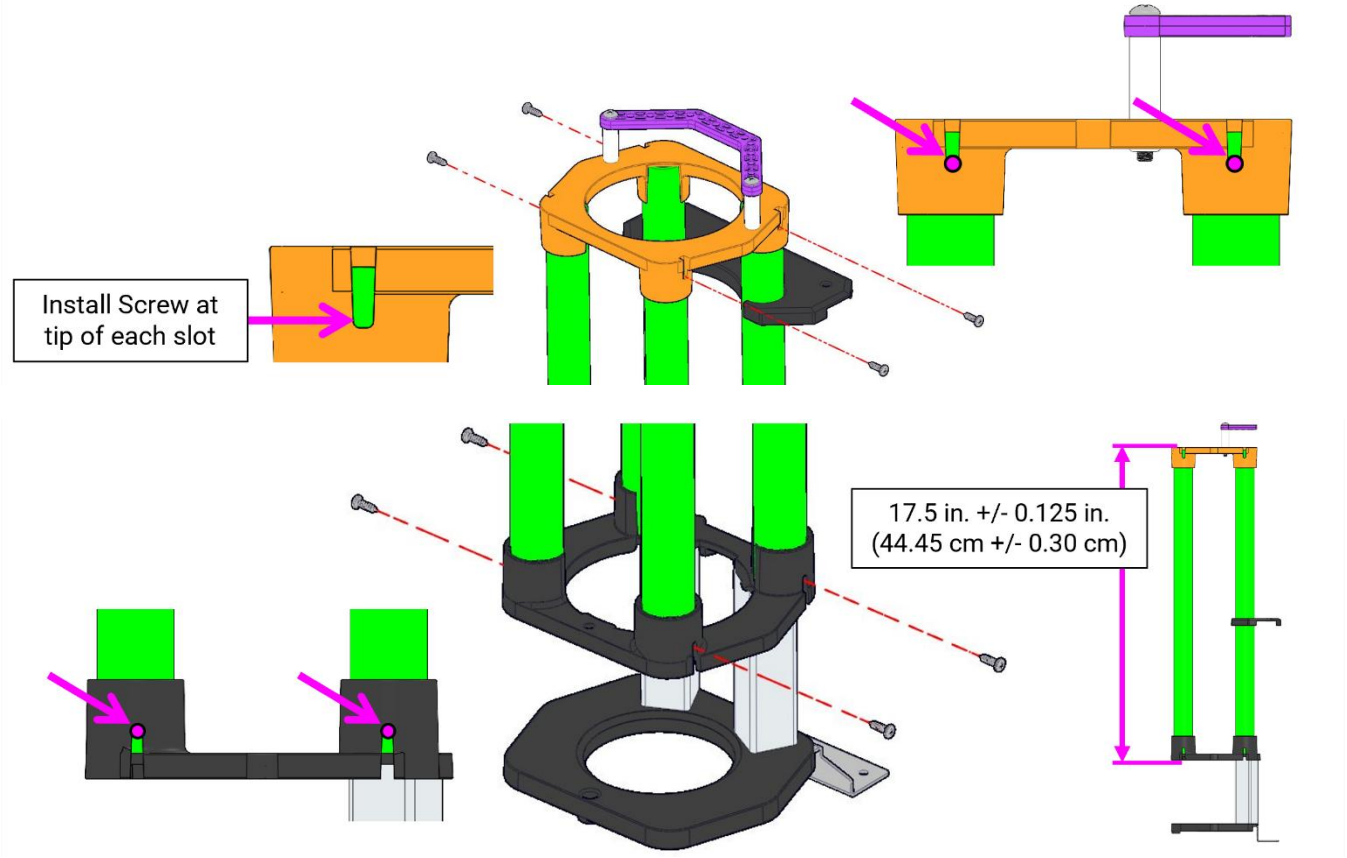
4. Flower top opening is too low or too high.

The Flower top opening should be **21.5 ± 0.25 in.** (54.6 ± 0.65 cm) from the tile floor. If the Flower is too tall, the pipes may not be fully inserted into Flower Middle Ring or Flower Top Ring.

Mitigation 4.1: Remove screws from Flower Pipes and ensure Flower Pipes are fully inserted into the Flower Middle Ring and Flower Top Ring. Before re-inserting the screws, check the height of the assembly is **17.5 ± 0.125 in.** (44.45 ± 0.30 cm) from the bottom of the Flower Middle Ring to the top of the Flower Top Ring (see below).

If the assembly is **too tall**, ensure the Flower Pipes are fully inserted. If the assembly is still too tall, it may be necessary to shorten the pipes. Please contact AndyMark to double-check the correct length of the Flower Pipes prior to making a permanent change.

If the assembly is **too short**, it may be necessary to fasten the Flower Pipes without fully inserting them into the Flower rings.



5. Field Elements are “shifting” relative to the Tile seams.

The Field Elements, including all four Flowers, and the Hive Structure should **not** significantly move from their nominal position. In some circumstances during normal gameplay, robot-to-field interaction may cause some Field Elements to shift out of place. This could involve the Field Perimeter “flexing” away from the foam Tiles. It could also involve Field Elements “sliding” in the seams of the foam Tiles and/or deforming the teeth of the tiles.

Mitigation 5.1: If a Field Element shifts out of position, it should be corrected at the first available opportunity. Field Staff should always work to keep the Field as close to the published specifications as possible.

> **Note:** For the purposes of rule T201 in the BIOBUZZ competition manual and potential match replays, a field element “shifting” does not necessarily constitute a “broken field element”. In most situations, these shifts will still be within the published field tolerances. If something is found to be outside the published specifications, inform the head referee and FTA about the deviation.

Mitigation 5.2: Check the field straps. The field perimeter straps are important to the rigidity of the perimeter and field elements. If elements are routinely shifting, inspect the field perimeter straps and confirm they’re correctly positioned and tensioned per the Event Field Setup Guide.

Mitigation 5.3: If issues continue to occur, field staff may take appropriate measures to prevent elements from shifting. This may include bracing field perimeter walls, or applying additional fasteners/tape as needed. In these circumstances it is important to ensure any adjustments made are consistent for both red and blue alliances, and across all competition fields.

6. Tile teeth have been deformed or damaged by Field Elements shifting.

Mitigation 6.1: First, return the shifted Field Elements to their correct location. Tape can be used to reinforce the tile seams and/or tile teeth. This will stiffen the foam such that it deforms less and will better anchor the Field Elements in place.
Any reinforcing tape should be applied such that it cannot be contacted by robots or scoring elements and will not negatively influence gameplay.

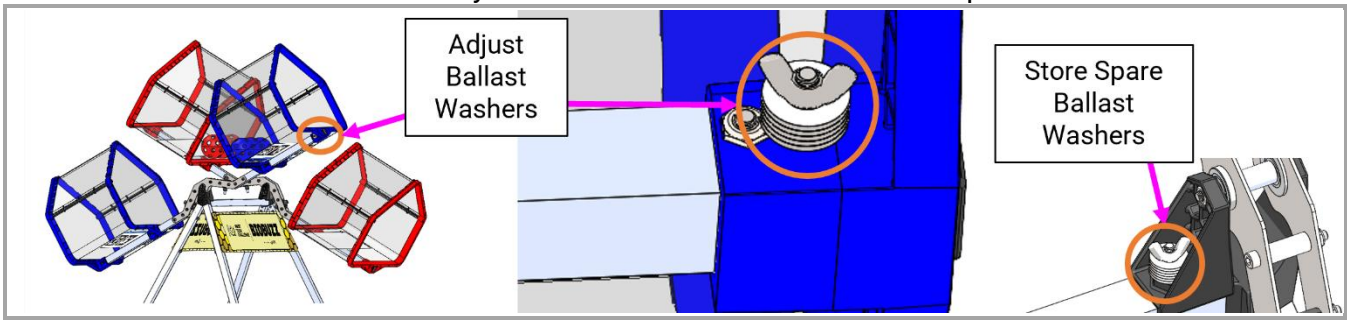
Appendix A: Hive Calibration Resources

The following content is taken from the Event Field Setup Guide. This and other resources can be found in the Playing Field section of the *FIRST* Tech Challenge 2026-2027 Game & Season Materials.

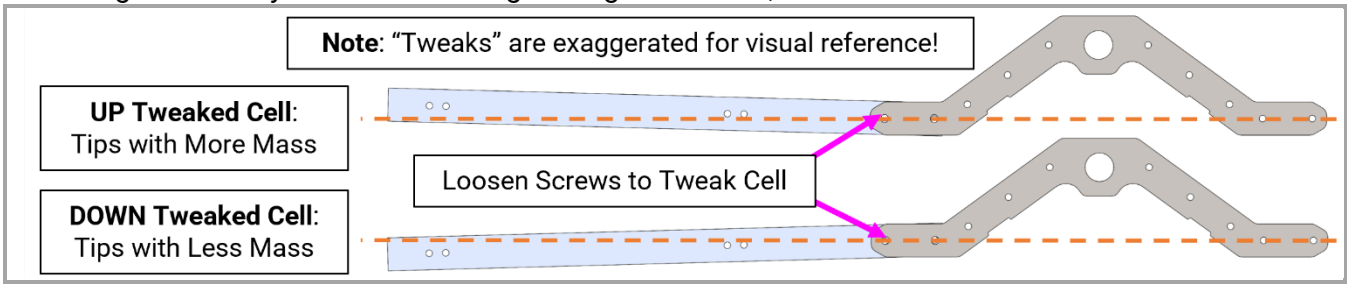
Each Hive should be calibrated to tip when [2] combinations of scoring elements are placed in an upward facing Cell:
- [8] Pollen + [0] Nectar, and
- [3] Pollen + [3] Nectar.

Calibration & Tuning Methods

The **Hives** are calibrated by adding to or removing **Ballast Washers** from the **10-32 x 2.0 in. (5.1 cm) Long Screw** at the end of each **Cell** nearest its opening. They are retained by [1] **10-32 Wing Nut**. Unused **Ballast Washers** are similarly stored on the **Frame** near each **Hive** pivot.



Even though two Cells are linked as one Hive, each individual Cell needs to be calibrated. Due to variations in Hive construction, some Hives are “tricky” to calibrate. If during the calibration process adding a Ballast Washer causes the Hive to tip “too easily”, and removing a Ballast Washer causes it to “not tip”, it may be necessary to “tweak” the attachment of a Cell.
Each Hive should be built “flat” (see Step 7.7 in the Initial Field Element Assembly Guide), but adjustments can be made by loosening the screws that attach the Cell to the Pivot Bearing Plates and “tweaking” the Cell by hand before re-tightening the screws, as shown below.



Calibration & Tuning Suggestions/Notes:

- Confirm your Hives are built correctly. Missing parts (or extra parts) will affect calibration.
- It makes things go faster to have scoring elements prepared. This can be done using the Scoring Element Trays; place [8] Pollen in one and [3] Pollen + [3] Nectar in another.
- To ensure correct calibration, every time you tip the Hive, ensure the Damper is FULLY compressed before performing the next test.
- A Wing Nut is approximately the same mass as a Ballast Washer. To save time uninstalling / reinstalling Wing Nuts, it is recommended to use an "extra" Ballast Washer instead of a Wing Nut until the end of the process. Be sure to validate the final calibration after the Wing Nuts are installed!
- Pollen & Nectar should be "gently placed" in the back of the Cell contacting the Hive Back Skin.
- [3] Pollen + [3] Nectar has less mass than [8] Pollen. If the Hive is "too hard to tip" perform tuning with [3] Pollen + [3] Nectar. If the Hive "tips too easily" perform tuning with [8] Pollen. (Then validate your tuning with the other combination of scoring elements!)
- The Cell being calibrated is referred to as the "Test Cell," and the Cell on the other side of the Hive is referred to as the "Opposite Cell."
- When testing a Hive, the calibration of one Cell affects the other. The Ballast Washers added to make the Test Cell tip with less weight will slightly increase the weight required to tip the Opposite Cell. (But this is not 1:1.)

Calibration Requirements:

Hive State	Test Action	Desired Result	Requirement
[3] Nectar + [1] Pollen	**2nd Pollen** is "Tossed In"	No Tip	Necessary
[3] Nectar + [2] Pollen	**3rd Pollen** is Gently Placed	Tip	Preferred
[3] Nectar + [2] Pollen	**3rd Pollen** is "Tossed In"	Tip	Necessary
[0] Nectar + [6] Pollen	**7th Pollen** is "Tossed In"	No Tip	Necessary
[0] Nectar + [7] Pollen	**8th Pollen** is Gently Placed	Tip	Preferred
[0] Nectar + [7] Pollen	**8th Pollen** is "Tossed In"	Tip	Necessary

Revision History		
Revision	**Date**	**Description**
V26-27.1	10/16/2026	Initial Release
V26-27.2	11/12/2026	Inserted additional Hive Mitigation Details. Renumbered Mitigations accordingly. Added Section 5, Section 6, and Appendix A.