

## “Spanking the Children”

### A Brief History of Penalties in the FRC:

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For all you newcomers to FIRST, I thought it would be good to shed a little light on the subject of FRC game penalties with a history lesson. Hopefully this will bring some clarity for this volatile topic and highlight what a mess this entire subject has become.

Our team has been participating in the FRC for 19 years and has lived through the good, the bad, and the ugly of the evolution of FRC games.

We participated for our first 8 years in FRC without ever getting a penalty. (Gasp!, What?, How can this be?). This is because in the early years of FRC, there were no penalties. Prior to 2004, there were no point penalties in FRC games. Teams could be disqualified for certain egregious actions, like flipping, pinning, or entanglement. These DQs were quite rare and typically we would only see one or two DQs per tournament. Refs were reluctant to call these fouls due to their severity, so it took a blatant infraction to be DQ'd.

This lack of penalty rules was not always a good thing. Way back at the beginning, robots were slow and underpowered. Over time, the battery got bigger, the motors got better, and the robots got faster. The collisions got harder and the damage got worse. There were no bumpers yet. The Power/Weight ratio of some FRC robots today is now about 5 times what it was 15 years ago. The venerable CIM motor was added to the KOP in 2002 (Who remembers when 2 CIMs was a strong drivetrain ☺). In 2002, 2003, 2004 we saw an ever escalating pattern of violence. Many tournaments degenerated into “robotic beatdowns”. Elimination rounds in 2003 and 2004 were essentially a big slugfest where fast armored boxes attempted to smash those who chose to actually try to play the game. The boxes often won. Clearly changes were needed.

**2004:** Raising the Bar: FIRST introduced point based penalties for gameplay infractions. Some of these penalties addressed goaltending, pinning, and human player errors. These seemed appropriate. The infamous “breaking the plane” of the goal was ridiculous. Why put a penalty on me related to my goal? Defensive teams quickly learned they could cause teams attempting to score to gain this penalty. The age of the “FRC penalty draw” was born and it continues to this day. We got our first ever FRC penalty in 2004 when a team rammed us into our own goal. We redesigned our machine to prevent this, but teams continued to try all season, since this was an effective strategy despite rule changes which attempted to help. Most of the refs just watched the plane and not the action causing the infraction. There were no penalties for ramming, and without bumpers, the violence continued. You could intentionally flip your opponent in autonomous without concern, and this was actually a legitimate strategy for some. Most of the penalty calls were just a nuisance and did nothing to really control the gameplay. The 2004 Championship was one of the most violent events ever (who remembers the Wildstang Piñata?).

**2005:** Triple Play: FIRST introduced more point penalties. There were numerous 10 point penalties and the dreaded 30 point “contact in the loading zone” penalty. Most of the small penalties were avoidable if teams paid attention. The 30 pointer was death and could be easily gotten by accident during normal gameplay action. This was severe enough to be a game killer if called and swung many matches. It was called inconsistently and for the first time, the referees had the ability to determine who won by enforcing a singular decision. Unfortunately, there were still no penalties defined for contact actions so teams could freely ram you from behind while you were attempting to score and flip you over, jam your robot inside the pyramids, etc. Most of the penalties in 2005 were awarded for things that were more or less inconsequential to the actual gameplay. This was the first year you could add bumpers, but they were part of the weight budget so no one really did. Collisions were still pretty hard, and this was the first year for 4 CIMs so robots moved faster than ever before.

**2006:** Aim-High had “periods” in the game and there were penalties for “off sides” zone violations. These were rather easy to get, but were not very severe compared to the average total game score. These could be avoided if you paid attention to the clock and were mostly a nuisance. There were still no real penalties for contact, and defensive teams learned that they could use the on-field ramp to flip their opponents with impunity. Wedges were disallowed on robots for the first time in 2006, but there was a wedge on the field which worked just as effectively. Refs spent a lot of time watching human players’ hands and feet instead of watching the robots on the field.

**2007:** Rack and Roll. This game was extremely frustrating. The scoring was not very well balanced and there were even more penalties for more trivial reasons. FIRST required everyone to have a flag mast on their robot, but never seemed to have considered that a tube could inadvertently get trapped on it. If this happened, your match was over because you would get penalties for every tube you handled after that and there was no way to get it off. Other teams could actually put tubes in your robot and could invalidate your ability to play. Again, there were lots of penalties for lots of trivial things that really didn’t matter. Violence was still pretty much unchecked and strategies of pounding the offense into the rack while they attempted to score abounded (ask Karthik about this sometime).

**2008:** Overdrive. 2008 marked the beginning of the dreaded term “contact inside the bumper zone.” To me this was the beginning of the insanity. I was honestly convinced that the GDC had lost their minds. They designed a game in which you were asked to pick up an object which was larger than your robot, and then gave vicious, multiple penalties if you touched anyone when trying to do so. They gave penalties for robots coasting into one another after power was cut at the end of the match, and they gave zone violations if robots collided in autonomous. There were huge blind spots on the field, lots of traffic congestion, causing multitudes of penalties which teams could not control. There was no remorse, no apology, and a lot of referee smugness. There was huge inconsistency in how refs called penalties, and a harsh ref could control the outcome of the tournament. After week one, I was so upset that I came very, very close to quitting FRC forever. Eventually, the refereeing got somewhat better, but the game was always compromised by a collection of penalty rules which seemed to have been written by people who had never built or driven a robot.

**2009:** Lunacy: At least the name was fitting☺. On the upside, there was almost no way to get an on-field penalty since the robots were forced to be boxes with no extensions. Almost all the fouls came from human players, but then, so did most of the game points.

**2010:** Breakaway: Good game, bad rules. Again with the minutia. There were 2 ways to score points and about 30 ways to get a penalty. This game was very problematic. You could get multiple penalties on a single scoring attempt if the ball chattered on the floor while you were moving, but you could flip your opponents by pushing them into the ramps without much worry of recourse. The field automation would award gigantic DOGMA penalties to teams at random, and the reffing staff was told they were not empowered to override the computer's decision despite what they saw with their own eyes. Robots could get penalties for accidentally driving over a ball which the drivers could not see in the giant blind spots behind the bumps. Penalties swung many matches and compromised the entire competitive experience. I invited a group of 30 people from my church to the Troy district event this year. None of them had ever seen an FRC event before. I interviewed most of them afterwards. The universal response was "Robotics seems pretty cool, but I don't understand the game and why there are so many penalties?" Fail. If you are trying to make a spectator sport (and I think we are) then the public must be able to comprehend what is happening on the field. The insane "loser's points" based scoring only made understandability of this game even worse.

**2011:** Logomotion: This was a great game and the penalty rules in this game were actually pretty good, however the refs still could control the game. The gameplay was pretty segregated so it was hard to get penalties during the main game unless you played defense. Offense was pretty safe (as it always should be). Loading zone line penalties were the only real risk and good drivers could usually avoid these. The minibot situation was pretty maddening. Decisions around timing of the minibot launch were entirely up to the referees to decide, and this was a millisecond decision. The towers often did not work and we were all basically told "they work because FIRST HQ says so" even though they clearly did not. Teams were forced to lose matches which an entire arena saw them win because of faulty sensors on the field.

**2012:** Rebound Rumble: Pretty good penalty rules in this game. The game was again mostly segregated into halves, so unless you played defense you were pretty safe from penalties. Most teams in offensive roles stayed pretty penalty-free, and the safe zone for scoring made offense a good choice for most teams. The whole Co-opertition bridge scoring in Qualifying still defies logic for me, but apart from this, the overall game was pretty good and was a thrill to play and fun to watch.

**2013:** Ultimate Ascent: Many consider this to be the best FRC game ever. The penalty load in this game was pretty light and apart from occasional fouls due to collisions by the tower or loading zone defense, the game played pretty cleanly. The safe zone around the pyramid made offensive gameplay the primary goal for most since defense was very hard to mount without high risk. Notice a trend here? The best games put the penalty risk on the DEFENSE. Good game designs provide freedom for those who rise to the game challenge; but if you choose to attack, beware.

**2014:** Aerial Assist – A return to chaos. Everything about this game seem to be a backslide on quality. Much like bad games of the past, the penalty rules favor the teams playing defense. Like 2008, the playing object is large enough that it cannot be collected without reaching out, and doing so brings great risk to those who try. The magnitude of the 50 point technical foul is completely disproportionate with the average match score and is effectively an automatic loss at least 90% of the time it is given. After 3 weeks of play, the average team contribution per match is still only 20.6 points, so 50 points is a game killer. These penalties are given very readily for seemingly trivial actions. Contact penalties used to require a team to inflict damage in order to get, but this year you can get a technical foul for being attacked. This is completely wrong. The 50 point penalty for a Human Player hand wave is preposterous. FIRST chose to put the player station very close to the field. Saying the “the penalty is harsh due to safety concerns” is a pretty weak argument; the design is bad, fix the design or lessen the penalty, don’t punish the teams.

In my opinion, Aerial Assist is the worst game design since 2003. I think is worse than 2008. This is tragic because the core part of the game design is actually pretty good, but the penalty administration is absurd and destroys the thrill of playing due to the persistent overhanging fear. The GDC seems to have expected much higher average scores than we are seeing to justify such large penalty values. They seem to have missed the fact that with only one playing piece, there will always be at least one team with nothing to do but play defense and attack the offenders, and without a safe-zone the attacks are incessant. Expect violence to escalate as the season progresses and teams learn better how to draw technical fouls from those attempting to rise to the challenge of the game. This has already been repeatedly demonstrated as being the fastest way to get a big score.

The GDC has the power to make changes. So far they have not really acted on this ability even though there is much evidence that they should do so. We are all paying customers and we pay millions of dollars for this experience. As such, we should expect them to work hard to provide us with the best experience possible and to correct obvious mistakes. I am disappointed thus far with Aerial Assist; it does not live up to the standard of excellence I have come to expect from the FIRST organization.

Clearly the FIRST GDC is capable of making great robot games; they have proven so 3 times in a row in 2011, 2012, 2013. I am hopeful that with some minor changes, Aerial Assist can live up the expectations set by LogoMotion, Rebound Rumble and Ultimate Ascent.

Harsh penalties are like giving your kid a spanking. It can control behavior, and may get the GDC what they think they want, but this comes at a price that they do not seem to completely understand. Harsh, punitive controls lessen the experience for everyone; the teams, the crew, and the audience. Worst of all, it is the youngest teams who are getting spanked the most. How will this affect their perceptions of FIRST and their desire to return in the future?



**“The price of inaction is far greater than the cost of making a mistake.” - Meister Eckhart**