

RAGE Robotics

Team 173



Rhode Island District Event (RIDE)

March 23-25, 2018

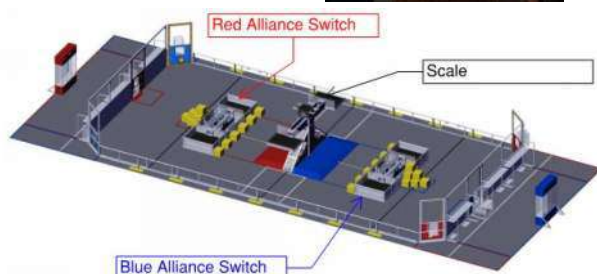
After waiting for 4 L O N G weeks, we attended our first competition this past weekend at Bryant University in Rhode Island. RAGE arrived around 4:30 pm on Friday and unloaded the trailer—the robot, pit façade and tools. By 5:00, when the go-ahead was given to begin setting up, RAGE was ready and our final prep had begun. When the robot was put in the bag, there was a list of items that the group wanted to test and work on and the pit crew got to work quickly.

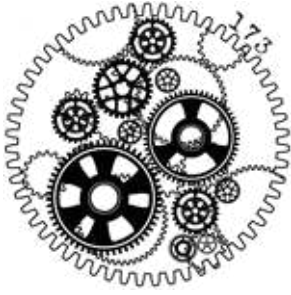
To Do/Wish List before our first match:

- Test autonomous programs on the practice field.
- Install cube handler
- Test/repair elevator
- Have the drive team test out the controls (this didn't happen yet!)
- Have the electrical group install a few more limit switches
- Change the gear ratio for the cube handler elbow from 256:1 to 64:1
- Check out the field and evaluate any blind-spots/"danger" zones
- Pass inspection!



FIRST Power Up Summary—The premise behind this year's challenge is that we are trapped in an arcade game. With our two alliance partners, we will work to defeat the boss and escape. To defeat the boss, we will be collecting power cubes (approximately 13" x 13" x 11" cubes) using them to earn power ups (a temporary advantage during the match) and control 2 field elements—the "switch" and the "scale". Both elements work similar to a seesaw—if our alliance places more cubes (i.e. weight) on our side of the element, the switch or scale tips in our favor and we "control" that element. We earn points for each second that we control our alliance switch or the scale. We can also prevent our opponents from accumulating points by adding cubes to their switch to prevent them from gaining control. The "end game" for this year's game is to climb the scale—lifting our robot at least 12" above the scale platform. This can be accomplished by using the 13" wide rung that is secured to the side of the scale or by lifting our alliance partners. In order to have all 3 robots climb at the end of the match, cooperation between alliance partners will be essential since there is not room for all 3 to use the climbing rung provided. A rendering of the field is shown below and the kickoff video can be viewed at <https://www.youtube.com/watch?v=HZbdwYiCY74>.





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We had quite the list and our plan was ambitious but the kids were ready and dove right in. In 5 hours (and we used every last second available) we were able to accomplish the following:

- Test autonomous– we found on the first run that the robot drove in reverse. Jared was able to troubleshoot, find a few negative values that should have been positive, and re-write the code so that we were ready for our first match.
- The cube handler was installed and tested.
- The elevator...this continues to have problems but it has limited functionality. As is, we can lift a cube a couple of time before the pulley system jams up. Some additional work is still needed, but the programming code is correct and the controls all work.

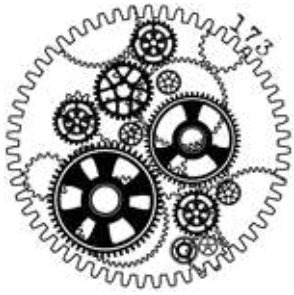


- Drive team got to test the controls on the practice field and after the initial confusion when the joysticks were placed in the wrong positions, they were ready to go.
- 2 more limit switches were installed and the electrical and programming group continued to collaborate.



- The cube handler gear ratio was changed (luckily the electrical group had been prepared with extra motors all wired up).
- The drive team took a tour of the field and discussed strategies, blind areas and checked out the view from each drive station.
- As for inspection....we got inspected and found that our robot was 6mm too big when the cube handler was lowered. Before full-on panic set in, we figured out that the brackets holding the cube handler wheels could be shifted back (just a few new drilled holes were required) and the problem was solved. With the adjustments, the team was working until the last available minute so that we would be ready for re-inspection first thing in the morning.





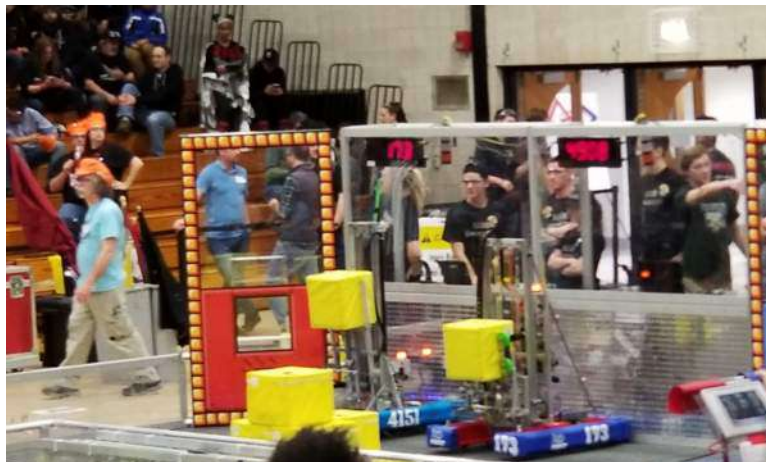
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On Saturday, the pits opened at 8:00 am and RAGE was ready to finish up with a few minor tweaks and get the robot inspected. We were scheduled for a practice match around 9:30 and the team was ready to see the robot in action! Green smiley face is good news—RAGE passed inspection! On to the field for a practice match!



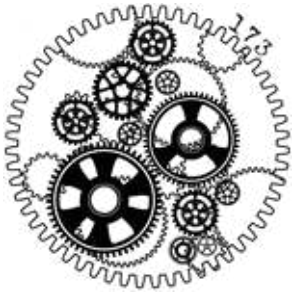
Following Opening Ceremonies, RAGE was ready to take the field. We didn't have to wait long—we were up in Match 3.



Match #	Time	Red 1	Red 2	Red 3	Blue 1	Blue 2	Blue 3	Result
3	11:14	6620	1757	1973	4151	4908	173	
12	12:17	3236	4796	173	5846	2168	3466	
16	12:45	1153	5000	1517	173	2168	1740	
22	2:27	1350	173	2262	1740	1973	3236	
32	3:37	5112	6328	1100	173	3719	1922	
39	4:26	173	5846	1757	175	4176	2079	
48	5:29	1973	7164	173	61	125	3719	
52	5:57	125	173	6620	157	78		
59	6:46	1100	4908	2262	1729	173	6333	
66	10:05	173	6328	175	190	3623	126	
75	11:08	4048	173	78	1277	3466	190	
80	11:43	61	157	173	175	3466	121	

Qualification Match Schedule



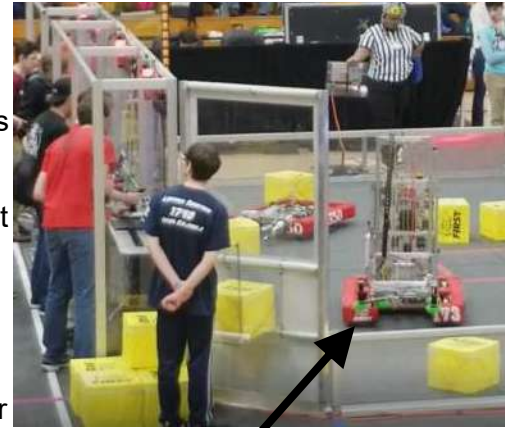


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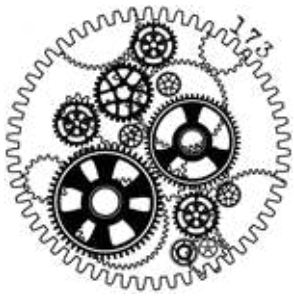


Over the course of Day 1 we had 9 of our matches. Our first match seemed to go perfectly—we placed a cube in our switch and blocked our opponent's switch. We didn't attempt the scale but were able to execute all of our goals for match 1. The drive team identified a few things that needed to be tweaked and the pit crew got to work. It was in the 2nd match that the problems began and after each match, the pit crew had a growing list of repairs that were needed. The good news was that once one problem was fixed, the repairs seemed to hold. The bad news was that we seemed to encounter an unlimited number of problems. We managed to bend the rod in one of the cylinders that controlled our cube handler, the elevator had various problems throughout the day, the radio popped off (bring in the zip ties!), a limit switch was sheared off, the elbow of the cube handler hyper-extended (owww!), our downward controls on the lift were removed in an attempt to alleviate some of the elevator problems, the gripper geometry was altered so it was a bit narrower to better hold the cubes, there were random connection issues with the drive station, and the encoders needed to be recalibrated. I'm sure there were more....



With all of the issues, the RAGE students didn't stop battling, didn't get defeated and kept tackling each and every issue as they came up. We had students in the pit after each match, during lunch and after the last match each day ready to go and keep working. So while there were problems, the students were able to show what they have learned this build season and with limited adult input, get the robot back on the field each match. From a mentoring standpoint—this is true success. A #1 ranking or a blue banner at the end of the day would be nice but we are getting there!





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At the end of Day 1, RAGE was ranked 33 out of 41. We had 3 matches on Day 2 to up our rank and get our robot ready for the playoffs. Our first match didn't go as planned—we got hung up on the opponents scale and accrued a whole bunch of penalty points. Our next 2 matches went great and we finished strong, placing 8 cubes in the vault and showing we could be consistent and quick. We ended the qualifications ranked 29 out of 41—an improvement from the morning but left us in the nerve-wracking position of waiting to see if we'd be chosen for in an alliance. It wasn't in the cards for us this weekend and we weren't invited to join an alliance. We did get some extra robot time that afternoon to continue making improvements and got to watch some excellent competitive finals matches.

As far as the robot goes, we are in a much better position entering Hartford and we hope to come back strong!



Did someone say scouting??

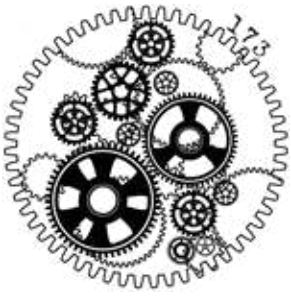
Our scouting group was busy all weekend as well, generating info about our alliance partners to help with developing match strategies. For the past 2 years, the group has been able to set up at the competition (in the lobby, in a corner or any other out of the way space they could find) and set up a table with their computer, printer and scanner. We were informed this weekend that that was against the FIRST rules (oops!). The scouting group came up with a new plan (that was kind of a RAGE theme this weekend) and managed to set up in the stands and still gather the information from their app. Feedback from the team was that the app was easy to use and there weren't too many hiccups! Collaboration with the drive team was key and Sam and the drive team were chatting before and after each match.



Here is what was planned...



Here's where they ended up—with some improvisation and extension cords...



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And there is still more....

The non-technical groups also had their work cut out for them this weekend. The Chairman's group had their presentation at 11:20 on Saturday morning. They were well prepared and had an excellent practice run first thing in the morning. The group's beaming faces said it all after the presentation was done—they nailed it! Our mentor who was allowed in the room took some notes but had all positive feedback. The Chairman's Award is the most prestigious award that *FIRST* gives out and this group put their heart and soul into the required essays, presentation and video. In the end, Team #78, AIRStrike, won the award but with 5 follow-up visits to our pits for additional questions from the Chairman's judges we have to believe we were in the running.

In addition to the Chairman's Award, the team submitted a Business Plan and led the cheering with some improvised RAGE signs, a custom flag and LOTS of noise!



Up next is the Hartford District Competition the weekend of 4/7 and 4/8 at Hartford Public High School!

For additional updates, please check out our website (www.ragerobotics.com), like us on Facebook (RAGE Robotics), follow us on Instagram ([ragerobotics173](https://www.instagram.com/ragerobotics173)) or Twitter ([@RAGE173](https://twitter.com/RAGE173)).

To watch our competitions, check out www.thebluealliance.com and search for New England events!