



Warrior Racing

Road Warrior 11 Lincoln 2017

After returning from the first competition in Barrie, Ontario at Formula North "Rose" was off to the second competition at Formula West where our team broke records and received the most points in team history at a competition. Read on to hear all about the details of the event and how we reached our success!



 **10th**
Overall
Formula SAE Lincoln

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Cucchiara



Formula SAE Lincoln

Lincoln Airpark, Lincoln, NE

June 21st - June 24th, 2017



After returning home from Formula North, the members of Warrior Racing got right to work in preparation to meet our goal of a top 5 finish at Formula Lincoln. Formula North gave us a look into how RW11 could perform and what were strengths and weaknesses of the team. We had roughly two weeks in between competitions to work out all of the bumps and make the car competition ready for Lincoln. There was an issue with the engine that unfortunately cut short testing time. However, the team worked hard to resolve this issue as quick as possible. Once completed, the car was out testing late into the nights with the little time we had before competition. In

order to maximize the value of our limited testing time, team members Arjun Venugopal and Andrew Cucchiara developed a DOE test. The DOE test gave us a solid direction for car setup for all the dynamic events. This saved us time and hassle as we would have not been able to set the car to achieve maximum results.

Formula Lincoln is the competition held in Lincoln Nebraska that our team has attended for the past 4 years. The previous year we had broken a team record with a 10th place finish. This year we set our goal to be in the top 5. After testing with every last ounce of time we had, we packed up our shop Monday evening and left bright and early on Tuesday to Lincoln. We arrived safely to the competition site, Lincoln Airpark, at 5:30 pm making it in time for registration a day earlier, saving crucial time the next day. The team rested up after the long day of driving across the country through Michigan, Indiana, Illinois, the rolling hills of Iowa, and the vast openness of Nebraska to wake up early again for the very first day of competition.

The first day of competition, Wednesday, was spent setting up the paddock, completing final preparation for technical inspection, getting through technical inspection, and staying cool and hydrated in the searing heat. Like any competition, it is very important that you get through technical inspection the first day in order to dedicate the time on Thursday getting ready for static events and completing the other 3 parts of the technical inspection process. Going through tech inspection, the inspectors checked every system on our car to ensure it is safe, rules compliant, and ready for the track. There was a slight hiccup as they confused the sound of the electric water pump with the fuel pump and thought the kill switch was working properly. After that misunderstanding was resolved, we were given our very first sticker at competition! We passed and were ready to complete the remainder of tech on Thursday: brakes, tilt, and noise.

Thursday was a very busy day for Warrior Racing, we tackled all the static events, had the remainder of tech inspection to tackle, and withstand the searing Nebraska heat. In the morning, the team effectively split up with members working on preparing for the business presentation event and others helping drivers pass egress and preparing the car for the tilt, noise, and brakes tests. The presentation team, Noah Lovins-Wilusz and Erin Kronell, gave a spotless presentation complete with a coordinated video simulation of RW11, created by veteran team member Brandon Horsch. They were happy with their performance and were excited to hear the results. Returning back to the status of the car, the team rolled the car over to the tilt test where RW11 would be tilted at a 45 and 60 degrees to find fluid leaks and determine if wheels would come off the ground in a high speed corner. Rose passed these tests with flying colors and 1 more tech sticker was placed on the nose.



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The next test involves running the car for the first time at competition, noise! This is where the design of the exhaust system gets to shine and it sure did! We passed noise the first time well clear of the limits set by the rules. After passing noise, we were straight into the brakes event to show the inspectors the car was capable of



locking the brakes. After a couple attempts, the car finally passed brakes and we had all 4 tech stickers heading into the main static event, the Design Event. In design, Warrior Racing was able to communicate to the judges what we had done for RW11 which included integrating new designs such as the pneumatic shifting system, new suspension design to adapt the smaller tires, and a revised data acquisition system. These highlight the major changes from RWX to RW11. Overall, the design event was a success; each team member that made the trip to Lincoln presented to the judges which reflected the contribution of each team member in the design and manufacturing of RW11.

Following the design event, we were rushed for time to get to the cost event, which would end the static portion of the competition for us. We ended the cost event on a high note with absolutely no errors in our cost report, which has never happened in team history. The cost team also presented a real case scenario of how they would manufacture an impact attenuator if a 15% cost reduction was required. They proposed two well thought out scenarios and received 19 out of 20 points. Since RW11 is in the top 10 lowest priced cars at competition as shown in the cost report, Warrior Racing was audited to possibly find discrepancies in the cost report. However, no further errors in the cost report were found. At the end of Thursday the team walked away with all four tech stickers and well executed static events we were eager to hear the results! After a long day, the team was excited to go back to the hotel and sleep in what felt like arctic air after spending the day in 94+ degree heat and sun most of the day.



After a good night's rest the team arrived early to the high temperatures of Lincoln Airpark to take on a day of dynamic events. The team spirit was brought up when the static scores were posted. 10th place in marketing with 65 points and 2nd place in the cost event with 87 points were great accomplishments to start out the day. The design event scores were posted later in the day and we achieved 110 points, the most in team history at Formula Lincoln, and tied for 7th place overall in the design event!

We spent Friday morning getting the remaining drivers passed the egress test and scrubbing in a brand new set of tires to maximize car performance and traction. After scrubbing in tires, we set off to complete the acceleration event first. During testing we felt we had a great chance of getting a top time in this event. RW11 achieved a fastest run of 4.44 seconds, a new record for a Road Warrior and a top 15 time overall! Now we were out off to skid pad to demonstrate RW11's steady state handling ability. With the fastest times in the 5.0-5.1 second range, we knew we would be in for a good time based on testing. We achieved and overall time of 5.3 seconds, again another solid top 15 time overall!



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Off to autocross in the afternoon, RW11 was poised to set another top time. Mike Warmbold (pictured left) completed both runs with a time of 61.18 seconds. Data was pulled from the car and analyzed in an effort to coach the second driver on the lines and where to push. The setup was also tweaked in an attempt to make the car faster. For the 3rd run, RW11 set her fastest time of the day and under 60 seconds with a 59.248. With only 1 more run remaining, the team made the call to bring RW11 back into the dynamic area pits, look at more data, talk to the driver, and tweak on the car to maximize the performance for an all out attack to get the best time possible. RW11 was sent back out for her final run of autocross. Things were looking good and Rose

was storming down the 200+ foot straight when disaster struck. The car didn't make the corner and came to a stop outside the main track area. The safety crew pulled Rose back to the dynamic area pits where it was found the throttle broke. If it wasn't for the safety measures put in place by the rule makers, the end could have been much worse. The team examined the problem and quickly developed a plan to fix the issue. With the help of University of Nebraska, we were able to use their shop to do some precise machining work. Warrior Racing spent a couple hours in the Cornhusker shop making repairs and sharing pizza and jokes to make the mood of the situation more enjoyable. Once repairs were finished, we set off for the hotel to get some rest before the most important day of competition.

Endurance is the final, and most important, event between us and the conclusion of Formula Lincoln 2017. We were incredibly nervous because we felt we had a great chance at securing an overall position in the top 10. Despite the many setbacks and long working nights during the season, we were ready to see Rose make it through endurance. RW11 started endurance after the lunch break at 12:30pm. Typically the weather is scorching hot, well into the upper 90s and sometimes creeping into the 100 degree range. This day was very cool for Lincoln, only in the 80s. Michael Warmbold was our first driver and his fastest lap was 89.296 seconds. Mike laid down fast and consistent lap times despite a spin on his final lap which cost about 20 seconds. Veteran driver Mohammed Kakli was strapped in for the 2nd stint and was ready to bring Rose home. The laps wound down quickly and before we knew it, RW11 crossed the line to finish endurance. Still in the dynamic area, the three members found what they could, which happened to be water, and celebrated as though they had champagne. Clearly the team was excited to see RW11 cross the line and finish with a competitive time.



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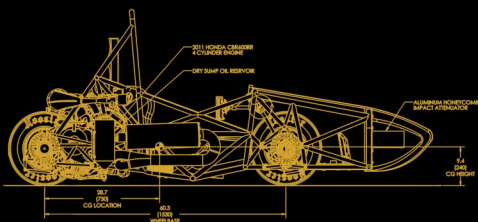
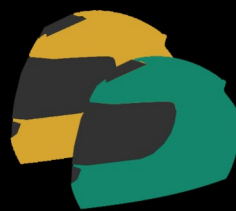
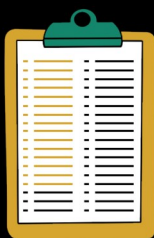
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Formula Lincoln was the most successful competition for Warrior Racing to date. While we matched our 10th place finish from the previous year, we scored more points overall. Also, only 2 other teams were able to repeat their top 10 finish from the previous year, pretty rare company for sure. We are proud of our achievement as the top finishing non-aero car, with teams moving to aerodynamic devices, it makes competition much more difficult as a non aero car, but we are able to persevere without aero and show that we are a competitive and consistent team at the national level. We could not have these string of results without all of those who support us, from sponsors, family, friends, and most importantly, Wayne State University. To those of you on that list, we cannot thank you enough for helping us achieve another great season for Warrior Racing! This summer we have been active with community events and testing, and we will share our summer activities in the next upcoming newsletter. Stay tuned!

Event	Time	Points	Place
Cost	—	87	2nd
Presentation	—	62.9	10th
Design	—	110	7th
Acceleration	4.440	83.6	14th
Skid Pad	5.303	43.8	14th
Autocross	—	75.2	27th
Endurance	1482.090	160.8	16th
Overall		686	10th





Most Total Points in Team History
686.0

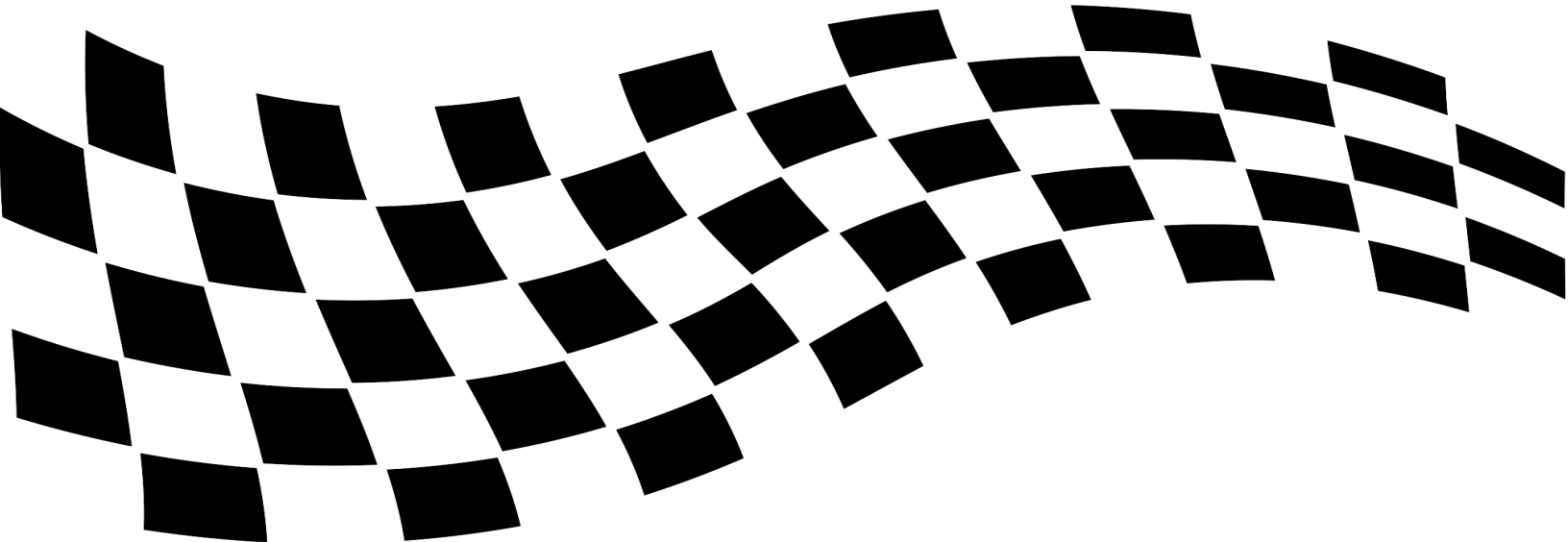


Sponsor Updates



<http://basementburgerbar.com/>

We would like to give a HUGE thank you to Basement Burger Bar for becoming our latest sponsor!!! After long nights testing and working in the shop nothing is better than a great burger shared with our friends and families. We had a successful fundraiser at the Basement Burger Bar right in Detroit where we make our car and we will be back many times. Thanks again!



Warrior Racing 2016-2017 Sponsors

Our team's success is made possible through the generous donations and support from the following companies. Without them our team would not have the resources needed to provide invaluable hands on experience and to manufacture our formula cars. From all members of our team, thank you Warrior Racing sponsors!

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