

The 2011 Polar Bear Racing (PBR) Formula SAE team began design in late July of 2010 with one of the youngest teams in UMSAE's history. At that time a total of 5 of the 8 section heads had just completed their first year of their Engineering degree. Team goals were set early to govern the designs and ensure the team remained on track. A mission statement was created for the team and is as follows:

“The goal for the 2011 PBR Formula SAE car is to optimize the functionality and performance of a Formula SAE racer derived from past knowledge and experience. This derivation will give our team the opportunity to begin manufacturing and physical testing far prior to any previous design.”

Keeping in mind the mission statement agreed on by the team, design began on PBR's second iteration of a composite chassis race car. Small changes began to shape the 2011 vehicle's design as the team prepared for their second season attending two international competitions.

With the majority of issues of building a composite chassis flushed out in the 2010 design and build, the team completed design and began manufacturing during the month of February. PBR Formula was now over a month ahead of the 2010 timeframe and on track with the mission statement. As the month of May approached the team began to buckle down and had the car competition ready only hours before loading the trailer for the 17 hour journey to Brooklyn, MI. For the first time, the University of Manitoba would be competing with a completed composite chassis at Formula SAE Michigan.

Formula SAE Michigan: May 10-14, 2011

May 9-10, 2011 – The Journey

Packed and ready to leave Monday May 9th at noon, the team, a group of 16 members, piled into a ¾ ton truck graciously donated by Manitoba Hydro and two accompanying vans. After smooth cruising for 17 hours, the group pulled up to a cabin on Lake Columbia, MI that would serve as the team's home for the next five days.

Following early registration 5 miles down the road in Brooklyn, MI, the evening of the 11th gave the team the opportunity to tie off loose ends, including an electrical issue that would plague the team for the next day and a half.

Wednesday May 11, 2011 – Day 1, the Beginning

Already registered, the team rolled into the paddocks Wednesday morning and began the long wait for tech inspection. While waiting the group continued working on the finishing touches. This included applying sponsor decals, running through mock inspection to ensure all issues were resolved and continued work on the electrical issue that was still outstanding.

As 8pm rolled around, the team had not yet been called to display the car for scrutineering. Because of this, the team had the opportunity to remove the car from the grounds and continue working on the 'details'.

Thursday May 12, 2011 – Day 2, the Long One

At 3:30 a.m. the majority of the formula team was rocked awake by the loud roar of a formula engine. Instantly the 16 people in the small cabin realized that our team's Engine Lead Bryan Sprange, and Co-Team Lead Bryce Gryba had solved that plaguing electrical issue by nearly re-wiring the entire vehicle. After a few short hours of sleep, the team was up nice and early and heading back to the track in high spirits.

Day two of competition is known to most as the Static Events day. This includes meeting industry professionals in the Design Event, marketing your vehicle in a Sales Presentation and defending your manufacturing processes to the Cost Event judges.

The static events started early. Aspiring team leader Carolyn Blonski, supported by the team's other Co-Leader Keith Edie, participated in the Sales presentation at 9:00 a.m. The pair's presentation was professional and well received. The judges acknowledged the effort put in with a scoring of 43.44 out of 75.

Representing car number 95 on the side, the PBR Formula team rolled into the design bay at 10:30 a.m. after visiting the tech inspection judges once. The design judges were amazed with the team's quality of work. Countless hours ensured the pristine finish of the car. One judge was even quoted saying "amazing, the best I've seen" when referring to the report submitted accompanying the design event. The team's hard work had paid off, scoring 100 out of 150 points in the event and falling short of the event semifinals by only one position.

After a quick correction to the battery mounting location, the team breezed through a re-inspection and applied the car's first inspection sticker before heading to get their second sticker by successfully tilting the car to 60 degrees without fluid leakage.



Kyle Leblanc showing his speed during the tech inspection.

As 2:00 p.m. rolled around, the group made its way to the Cost Event defense, where it was determined by the judges to be one of the top reports. This meant that for the third straight year, the team would have to undergo a cost audit. As the judges dug deeper into the report and began removing components of the car for comparison,

an error was found. The processes involved in the manufacturing of the composite chassis were incorrect. Being only the second year with the composite design, the team happily brought home 24th position and a learning experience for future events.

Friday May 13, 2011 - Dynamic Day One

With all two of three tech stickers acquired, the first step of the day was to pass the noise and brake inspection. With the exhaust noise level reaching 108dB, team member and driver, Kyle Leblanc was allowed a run at the brake test which the car successfully passed. With all three tech inspection stickers it was off to the dynamic area.

The first was skid pad. Kyle Leblanc took to the figure 8 track and successfully completed the team's first dynamic event with a carbon fiber chassis, a milestone that was two years in the making. With high spirits following the completion of the skid pad, driver Bryan Sprange was strapped into the car and ran a 4.4 second 75 meter acceleration run. This would prove to be good for 29th place in the event. Bryce Gryba, the team's third driver, climbed into the cockpit for the team's final run at the skid pad. Running a 5.79 second run would leave the team with a respectable 56th position in the event.



Bryce Gryba setting a great time in the skid-pad.

Once the morning dynamic events closed, the team took to the paddocks for vehicle checks before heading out to the autocross track for the afternoon dynamic racing. The team's fourth driver, Keith Edie, used the lunch break as an opportunity to put the car through the paces on the practice track. This would prove to be a costly mistake, as in the meantime the other teams had begun to line up for the afternoon racing. Bryce successfully completed the first two autocross laps but unfortunately an off course penalty swayed the results.

After a long staging period for the teams second driver, the event closed with the car only 2 spots from starting proving the decision to take the car on the practice earlier to be a mistake.

Though only two of four runs were completed in the autocross event, the team began final preparations for the following day's endurance, happy to still be alive and to have completed all events.

Saturday May 14, 2011 – Endurance

Saturday morning the team rose early learning they would be the second car on track for the day's endurance event. Knowing that the car should outperform the other teams in the heat the drivers, Keith and Bryan, were excited to get behind the wheel. With rain the evening before the track was classified as 'Damp' giving the teams the option of which tire to run. On wet condition tires Keith set out on track passing the car ahead within the first lap. After fourteen laps the checkered flag was waved and University of Manitoba was the first team in for a drivers change. Bryan strapped in was out on track. The slower cars ahead along, with the increasingly dry track created a frustrating drive. With one lap remaining Bryan was flagged by the marshals for over aggressive driving. After a deep breath and a quick warning, he was back on track completing the endurance event. For the first time since 2009 the PBR Formula team had successfully finished all events and Bryan had set a team fastest lap on the course of 65.136 seconds.



2011 Polar Bear Racing – Michigan Competition Team

Car Number	Team	Sales	Design	Cost	Acceleration
95					
	Polar	43.44	100	80.93	51.07
Possible pts:	Bear	75	150	100	75
Place:	Racing	56 th	14 th	23 rd	29 th

Skid Pad	Autocross	Endurance	Total
17.45	7.5	57.8	358.2
50	150	400	1000
56 th	57 th	31 st	43 rd out of 120

Formula SAE California: June 15-19, 2011

With only four weeks between Formula SAE Michigan and California, the team had plenty of work to prepare for the upcoming event. After a strong showing and completing all events in Michigan, the team was ready to up the ante and improve on the previous results. Strain gauges were fitted on the suspension and thermal analysis was completed on the brake system, making the 2011 California competition car UMSAE's most vigorously tested vehicle to date.

Wednesday June 15, 2011 – Day 1, Laid Back and Relaxed

After a long 36 hour drive the team arrived in California during the afternoon of the 14th. Some quick vehicle preps and a good night's sleep allowed the team to be up and rolling to the track at 5am. This ensured the team a paddock in close proximity to all the events. The team registered early and obtained tech number 20. The team's pre-competition preparation allowed for a relaxed morning while waiting for the inspections to open. The only tasks left to complete before inspection were changing the number decals and attaching the undertray diffuser, as it had been removed for transport. At 4pm the team rolled the car up to the inspection bay where the car was reviewed, passed and rolled out just as quickly as it had arrived. The team was ecstatic about the ease of inspection. The team was able to pack up the trailer and head out for dinner shortly after.

Thursday June 16, 2011 – Day Two, Static Day

Excited about the results of day one, the team was eager to get to the track to begin the second of four long days. First in line to receive fuel at 7:30am, the team was able to complete their second of three tech stickers before 10am, the scheduled design event time. A great design event showcased the car's highlights and goals that the team had accomplished throughout the year. The team rolled away from the design event at 11am, leaving the judges very impressed. Later that day, the team was happy to hear they received 8th position in the event. Only a single spot from the event semi-finals for the second competition of the summer.

With two hours to spare before the cost event, the team was able to complete the third and final tech sticker by passing the noise and brake inspections. For the first time ever, the University of Manitoba had successfully received two complete tech inspections in the same summer.

Continuing the success of the previous two summers, the team was excited to receive 3rd place in the cost event at 1pm. For three years straight the team has received one of the top three positions in the event.

The final event of the day would be the Sales and Business presentation. Again, Keith and Carolyn put on a great presentation, improving the position received in Michigan by 39 places finishing 17th overall.

Friday June 17, 2011 – Day Three, Dynamic Day One

For the first time in recent memory the team would be starting the Dynamic Days with no thoughts of outstanding technical stickers. With all three stickers on the car the team was able to focus its attention on vehicle set-up and preparations for racing. The two events in the morning would be skid-pad and acceleration driven by Bryce Gryba and Kyle Leblanc. Pre-competition practicing proved to be very helpful as Kyle set a personal and team best 5.526

second run in the skid-pad which was good for 21st position. Bryce's top acceleration time of 4.471 seconds was tarnished by a cone penalty and the team would have to settle for a 4.649 seconds and 26th positions.

Still running smoothly, the team had a couple hours to adjust any needed vehicle variables and prepare for the autocross in the afternoon. Not wanting a repeat of the Michigan competition the team had the car out on the track fairly early in the event. Bryan Sprange set a great time 73.006 seconds which would not be matched by the team's second driver Keith Edie. Bryan's early time would hold on for 28th position in the event.



Bryan Sprange putting on a great show in the autocross.

Saturday June 18, 2011 – Day Four, Endurance

With the strong 28th position finish in autocross, right in the middle the middle of the pack, the team was eager to get out on track with some quicker cars compared to Michigan. Keith was first on track and completed 10 laps of the 1.1 km course with a fastest lap time of 72.053 seconds. With no mechanical issues arising, the driver change went flawlessly and Bryan was strapped into the car. Bryan ran a quick 72.761 second lap his fourth time around the track when three short laps later trouble hit. The team watched anxiously as Bryan's lap times started to fade, first to 90 seconds then to 110. Unsure of the problem and with no communication with the driver, the team feared the worst. As only one lap remained, the team watched eagerly as Bryan brought the car around the corner, patting the front roll hoop as if to encourage her along. The marshal at the finish line dropped the checkered flag with the car crawling across the line. Bryan released the steering wheel throwing both hands in the air as high as his wrist restraints would allow. For the first time ever, the University of Manitoba Polar Bear Racing team had successfully completed two entire competitions in a single year!



Keith Edie making team fast lap during endurance.

Later that day the team discovered the problem with the car was a worn clutch. The design of the chassis did not allow the clutch linkage to move with the continued wear. The mistake cost the team a few points but was a mistake the team will learn from and not make again.

Even with the slowed times on the last few laps of the endurance; the cars fast speeds and good performance in the first 16 laps brought the team up to 19th place in the event.

With the competition now complete, the final results were posted. The University of Manitoba 2011 Polar Bear Racing Team finished 15th overall out of 80 teams registered for the Formula SAE California competition. This is the formula team's highest result to date. After a late night celebrating the success, the team was ready for the 36 hour drive back to Winnipeg.

Car Number	Team	Sales	Design	Cost	Acceleration
68					
	Polar	59.7	110	84.25	40.3
Possible pts:	Bear	75	150	100	75
Place:	Racing	17 th	8 th	3 rd	26 th

Skid Pad	Autocross	Endurance	Total
22.24	37.35	160.9	514.8
50	150	400	1000
21 th	28 th	19 st	15 th out of 80



2011 Polar Bear Racing Formula SAE Team

Back Row (L-R)

Dr. Paul Labossiere – Faculty Advisor

Keith Edie – Team Leader

Lionel Dueck

Caroline Allard

Bryan Sprange – Engine Lead

Cody Bjornsson

Simon Cooke – Drivetrain Lead

Andrew Smith – Suspension Lead

Corbin Johnston

Bryce Gryba – Team Leader

Malcolm Symonds – Faculty Advisor

Front Row (L-R)

Quillan Daniel

Kevin Harlow

Steven Pham – Chassis Lead

Mahmoud Alzaibaq – Electrical Lead

Samantha Robertson

Carolyn Blonski – Braking and Uprights Lead

David Slonosky

Gethin James – Aerodynamics Lead

Kyle Leblanc – Controls Lead