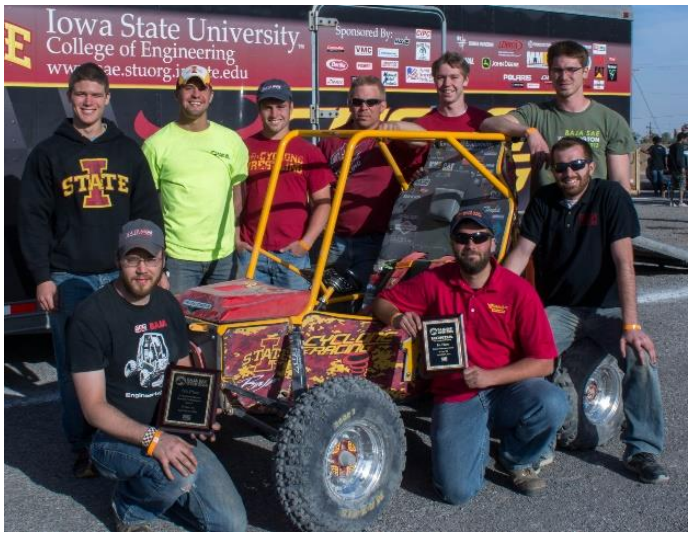
SAE BAJA SPRING 2014 NEWSLETTER

This past week the ISU SAE Baja team competed in the SAE International collegiate design competition at the University of Texas at El Paso. The cyclones won 1st place in the longest, most strenuous event, the endurance race. The ISU Baja team pulled an overall 7th place finish out of over 100 collegiate teams from both national and international institutions.

In the competition, all teams are challenged to build an off-road vehicle that can race through and survive extreme terrain. Teams from around the world compete and are judged on real-world engineering principles including design, cost and performance.



The team at UTEP shows the awards.

ISU's SAE Baja team was founded in 1986 and has been designing Mini-Baja vehicles every year since then. Recently, the team has been working its way up the leaderboard and earning multiple top-ten rankings in dynamic events including the endurance race at Rochester last year.

By working with new sponsors and software, the team has designed a car that has an even higher potential this year. The 2014 design led by junior Technical Director Andrew Tauke has significant improvements to the frame and drivetrain while still improving manufacturability, body, controls, and suspension.

The overall weight of the vehicle has been reduced by nearly 20 pounds by removing unnecessary frame tubes, reinforcing shock nodes, utilizing CNC tube bending, and using ANSYS software to validate strength and safety.

The drivetrain has also been lightened by multiple pounds and reinforced to accommodate the tunable CVT's belt tension. The heat-treated, hardened gears and normalized half-shafts are an improvement over past designs and have yet to see failure.

At the beginning of the competition, other teams commented on the sleek look of the car and the cardinal red and gold urban camouflage body. The judges also liked the ergonomics of the spacious seat and smooth throttle and brake controls. After four hours of endurance, our driver only had one complaint: “Elbow pads, elbow pads, elbow pads!”

The team got an early start on the first day of competition – Thursday, April 23 – preparing the car for both technical inspection and the Briggs and Stratton engine tune-up. The team’s sales presentation was judged and scored in the top 25% of all teams. During down time, the team gave assistance in any way possible to numerous teams, including Rayat Bahra Institute of Engineering – who made the trip from India.

On the second day of competition, the team was placed early in line for technical inspection to ensure the car followed rules and was safe. After two minor rule discrepancies, the team fabricated and welded a new primary frame member to the front bottom of the car and a secondary frame member to the rear of the car for rigidly mounting the gas tank. Inspectors approved the vehicle changes and gave the team the go-ahead for participating in break check and the dynamic events that followed.

Quick repairs were made for technical inspection.

ISU’s design presentation was given on Friday afternoon and received 110 out of 120 possible raw design points. Speaking with judges after the conclusion of the design event gave the team valuable design feedback for further improvements.

Saturday brought with it the many dynamic events that teams compete in to test many aspects of vehicle performance including hill-climb, acceleration, maneuverability, and suspension and traction. ISU started strong with a top ten hill climb driven by senior Drivetrain team leader Erik Rasmussen. The hill was incredibly steep with limited tractive ability – allowing only three teams to overcome its graveled slope. ISU’s first run was cut short at ten feet from the top due to rugged terrain, and the second was declared out of bounds over a line unseen by the driver.

Hill climb

The maneuverability track was mastered twice by Rasmussen due to the excellent shock tuning and tight turning radius of the car, yielding a top five overall score for the event. GoPro video analysis also helped give the team valuable feedback on continuous car performance.

Aerial turnaround

The suspension and traction course was rough and driven by Drivetrain team leader Levi Benning. After an awesome airborne flip turnaround at a log pit during the first run, the car was undamaged but did not complete the course. The crowd cheered at the flip and was disappointed during the second run when the car's engine died before entering the easier tail end of the course.

The team went to Briggs and Stratton to identify the problem and found an aluminum chip in dirty carburetor to be the culprit. Briggs and Stratton got the engine running again for the final Acceleration run. At the end of the day, ISU was placed eighth in acceleration giving them the eighth starting spot for the endurance race.

Final inspection was completed on the car early Sunday morning to prepare for the endurance race beginning at 9:45 am. The endurance race accounts for 40% of the competition points. Benning was released and conquered the rugged terrain for the next four hours. Thanks to the durable design of the car, many parts of the car were worn or bent, but none failed.

Endurance race

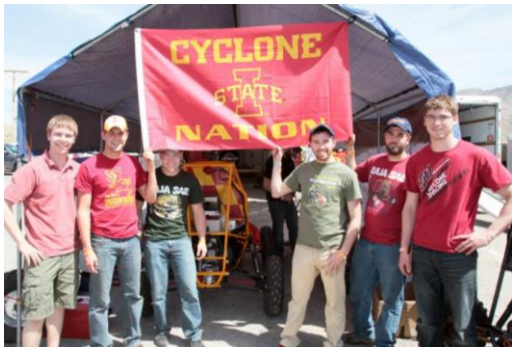
Quick pit stops for fuel were also crucial in passing the leaders in a close endurance race. Other cars may have been faster than ISU's, but they also experienced time-consuming break-downs.

GoPro endurance footage

Even though Benning had radio contact with the team who had live standings, he had no idea he was going to be the first car to receive the checkered flag. The car was immediately impounded for another inspection and its engine was taken to make sure no rules were broken. The team received a cash prize from Honda and a brand-new engine from Briggs and Stratton.

The team received plaques for 1st place endurance and 7th place overall at the UTEP competition. ISU SAE Baja will compete at two more events this year in Pittsburg, KS on May 22-25th and Peoria, IL on June 4-7th. Before that, there is work to be done in the shop repairing and preparing for the next competition.

The ISU SAE Baja team extends a huge thank you to all of the sponsors who helped make a finish like this possible. This feat of engineering and teamwork could not have been possible without their generous support and contribution throughout the course of this year. The entire Iowa State Baja team has great appreciation for all sponsors and looks forward to continued future relations and the high performance that results.



The team at the trailer