THE CAR

Marking a significant advancement in the evolution of Brown FSAE designs, the focus of the 2008 car was to create a better-packaged and highly adjustable car. The team spent a great amount of time designing adjustable components which could be modified during testing in order to tune and refine the car. Overall, the design changes led to a 47 lb weight reduction over the previous year (more than 10%), without compromising stiffness or performance. Unfortunately, the enormity of the design changes left us extremely minimal testing time before Detroit, which is portrayed in the competition results. However, we plan to use the design advancements made in 2008 for a similar car in 2009 which will allow us to bring the goals of 2008 to fruition in 2009.

As has been traditional, a general focus on reliability led us to finish all the dynamic events in Detroit. The most noticeable change in the 2008 car is the disappearance of the rear bay which had previously supported the differential and rear suspension points. The design of the 2008 car mounts the differential to the chassis via adjustable CNC machined aluminum pillow blocks. The rear suspension is led forward to the engine mount tubes, and the muffler mount is relocated onto the chain guard.

The team’s experience with composites continues to grow at an ever increasing rate. For the first time we attempted a one-piece carbon fiber intake. As with most first time undertakings the process was difficult involving among other things, a 4 hour bake inside a team member’s oven to melt the mold wax. While not the prettiest piece of composite work to be produced by Brown, it was deemed useable. The aforementioned undertaking was an enormous learning experience, and we plan to use the acquired knowledge to create a greatly improved intake on the 2009 car.

Improvement in the ergonomics continues through a pedal box which has become easier to adjust in order to accommodate the height of each team member. This is simply done by pulling on two rings attached to pins and sliding the box into place. The seat is a comfortable carbon fiber and sheet aluminum construction with removable padding (embroidered with the team logo) to fit members of different sizes.

Overall, the packaging on the car is incredible; everything fits, barely.

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\begin{array}{|c|c|c|}
\hline
\text{Overall} & 47^{th} & 363 / 1000 \\
\text{Endurance} & 31^{st} & 99 / 400 \\
\text{Autocross} & 71^{st} & 30 / 150 \\
\text{Acceleration} & 65^{th} & 31 / 75 \\
\text{Skidpad} & 66^{th} & 7 / 50 \\
\text{Design} & 37^{th} & 80 / 150 \\
\text{Cost} & 32^{nd} & 81 / 100 \\
\text{Business} & 83^{rd} & 36 / 75 \\
\hline
\end{array}
\]
THE COMPETITION

The year ended with another exciting competition in Detroit. The weather was fabulous; something we hope won’t raise the freshmen’s expectations for the coming year. The car ran smoothly without any major failures. We passed through tech on the first try, a huge accomplishment. An issue with brake biasing gave sophomore driver Luke Angelini ’10 plenty of time to practice his launches before driving the drag event. The business and design presentations passed effortlessly as the team demonstrated their knowledge of the car from both perspectives. The team did not make design semi-finals, mostly due to a lack of test data. As we did not have time to test the car, this was not a huge surprise. However, since the team spent such a significant amount of time designing and building the car, it was actually ready to go once assembled. This was a reward at the competition, allowing us time to use the practice pits to give some of the driver’s seat time before the dynamic events.

Each of the dynamic events was successfully completed, with car remaining intact the entire time. Junior Hector Inirio displayed amazing talent in the autocross while seniors Ky Krieger and Saben Murray cruised through the endurance race, each passing their share of competing cars. The Dean of Engineering, Gregory Crawford, joined us for the last day of the competition to support the team during the race.

THE TEAM

This year’s freshmen project was to design a soap box car for a race sponsored by Red Bull and conveniently held in Providence. The Red Bull car was designed over the summer so that the new members could start the fabrication and assembly from the beginning. The project was a wonderful chance for new members to work in the shop and practice using the tools while the upperclassmen were occupied by designing the 2008 car. The retention rate for this year was extraordinary as a result of this project, making this year’s

‘08 Vehicle Statistics

<table>
<thead>
<tr>
<th>Overall Weight</th>
<th>433 lb</th>
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</thead>
<tbody>
<tr>
<td>Weight Distribution</td>
<td>45 F / 55 R</td>
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<tr>
<td>Wheelbase</td>
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</tr>
<tr>
<td>Front Track</td>
<td>48 in</td>
</tr>
<tr>
<td>Rear Track</td>
<td>47 in</td>
</tr>
</tbody>
</table>

Vivette El Fawal ’09 adding decals to the car
The Red Bull soap box race saw 50,000 spectators lining the western slope of Waterman Street and 57 teams from across the country flying down the straw-bale lined street under the dominance of gravity. While the event saw many outrageous designs, our entry was influenced by the styles of the specific formula cars we know so well. Essentially a steel space frame coffin with racing slicks, the “Drag Racer” drew great attention from the pit crowds; although in retrospect the attention may have been focused on the certain members of our team dressed in drag acting as pit crew.

The team’s five seniors have graduated and started off on their own separate lives. Saben Murray and Jared Sluctor have moved out to California to work for the NASA Jet Propulsion Lab. Gil Breingan has returned to Pennsylvania to work for the TREC Group, an engineering consulting firm. Ky Krieger is currently searching for a job. Adam Greenbaum has chosen to remain at Brown for a master’s degree in solid mechanics. We wish them all luck and will miss their presence in the shop this coming year.

THE FUTURE

The plan for the coming year is to make few dramatic changes to the car and spend more time in the testing, tuning, and training phases to take advantage of the improvements in design made last year. This requires faster design and fabrication periods, an area where the team tends to enjoy spending too much time. This change in mentality will provide a slight challenge to the team in the coming year but we are ready to take it on. The change is aided by the solid design of the ’08 car which requires few changes. The team hopes to use some time at the beginning of the fall to test the ’08 car. The information acquired in testing will tell us what changes are necessary as well as allowing us to compare simulated analysis with real data.

The 2009 team is a young but strong team. The influx in new members this past year has created an extraordinary pool of talented sophomores. They have proved time and time again that they are committed to the team as well as very assertive and competent future engineers. We were impressed with the abilities of the younger members this past year, and as these students continue to learn and take on new responsibilities they will become completely invaluable to the team. We look forward to the coming year as it brings a set of new challenges to the plate.

A big thank you goes out to all of our sponsors. All of us learn a tremendous amount every year. We are better engineers and better people because of this project. It would be impossible without you.