RENSSELAER MOTORSPORT

VOLUME # 6

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ANNOUNCEMENTS

Check out our website—we've made some changes! www.formularpi.org

We now have a team Instagram: rensselaer_motorsport

Like us on Facebook

Join us at Reunion and Homecoming Weekend! See page 3 for more details about our events.

A Note from the Team Leader

Yuriy Slabicky, Team Leader

After an explosive end to competition in May, we are back at the drawing board and the chassis table, getting ready to build RM21! Throughout our time at Michigan, we were told one mantra repeatedly by the judges: "Verify and Validate." The team has taken that to heart—we plan on changing little of the grand design, instead using what we have as a baseline for the future, with the end goal being a strong showing at the Design event, as well as creating a resilient, reliable machine.

Recruitment is in full swing, and it is great to have some new faces around the shop. Along with our continued work with the Admissions Office, as well as the upcoming Auto Show in conjunction with The Office of Alumni Relations, we're really hoping to embed ourselves as part of the Rensselaer experience.

With a fresh group of leaders and a fresh outlook on competition, we're prepared and eager to put Rensselaer back on the map.

—— *Upcoming Team Events* ——

October 7	National Manufacturing Day
October 10	Design Review
October 11	Rensselaer Auto Show
October 11	RM20 Driving Demonstration
October 11	Shop Open House
October 12	FSAE Alumni Reunion
October 16	STAR Program
October 18	Fall Transfer Open House
November 22	Team Thanksgiving

RM20 testing the acceleration of the corners over varying road features.

CSA Team Update

Chassis, Suspension, Aerodynamics

Jay Marion, CSA Design Lead

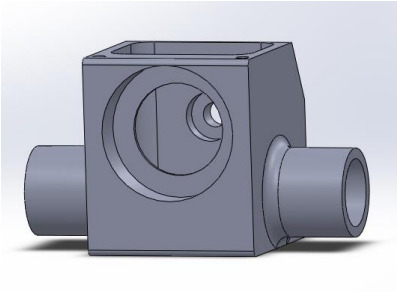
The semester seems to be flying by and the chassis team is well underway with design and fabrication of this year's car. The chassis tubes have been profiled and are currently on the way to campus along with our bent roll hoops. Once all these parts arrive, major fabrication will begin with the welding of the space frame chassis.

While the chassis is being fabricated, extensive design work is underway elsewhere on the vehicle. The main goals of the chassis team this year involve validation and improvements on existing designs. While we're pleased with the on-track performance of RM20 during testing and competition, there is still room for improvement. Using RM20 as a working test vehicle, a data acquisition system is being implemented through collaboration between the electrical and chassis teams. Physical testing using RM20 has already occurred and will continue this semester as long as Troy weather permits. Using this data, we hope to validate our design decisions on RM21 using values from physical testing. Once the new chassis is ready, we will transfer the data system to RM21 and adapt its use for tuning and optimization of the vehicle.

Outside of data collection, we are also hard at work developing an aero kit for this year's vehicle. Following an extensive change to the aerodynamic device rules for the 2014-15 season, the aero team is working with a new set of design constraints. The rear wing must be narrower, and the overall height of both wings is reduced. RM21 will also feature Rensselaer Motorsport's first vacuum formed body kit in almost a decade, giving this year's car a more streamlined look than in years past.

Technical Feature: Steering Box

Kyle Dieterle, Rules and Safety Officer



The steering box is an integral member in the steering subsystem for the racecar. The steering box converts rotational motion from the steering wheel into linear motion to pivot the tires. When the driver turns the steering wheel, the rotational movement is translated from the steering wheel, through the steering column, and into the steering box. Inside of the steering box is housed the pinion spline, which meshes with the steering rack. This mating of gear teeth is what converts the rotational motion from the steering wheel into linear motion through the steering rack.

The steering box also acts as a protective barrier for the pinion spline and steering rack, as it keeps lubricant inside of the steering box while preventing any debris from interfering with the mating gear teeth. Lubricant is used to promote smooth gear teeth meshing, ultimately allowing for easier steering. If any debris were to invade the gear teeth meshing, the steering could possibly lock up, which could make for a dangerous situation if the car is being driven.

Schedule of Events

Friday, October 10, 2014
Design Review (6 – 8 p.m.) – Location - East Campus Athletic Village – Harkness Room
Join us to discuss meeting the unique challenges of designing a Formula SAE style vehicle, as well as our plans for manufacturing of the RM21 car. A lengthy Q&A session ensures that your participation will make this review a success!

Saturday, October 11, 2014
The Auto Show (9 a.m. – 4 p.m.) – Location - Near the East Campus Athletic Village
We have invited the Rensselaer community to display any vintage, modern, or collector car (or motorcycle). The Auto Show will take place during FanFest and will give everyone the opportunity to enjoy great automobiles! Register and bring your car to display, or come and enjoy the vehicles of others!

Demonstration – Location – Edgehill Terrace
The opportunity to see our car in action is not to be missed! We will be demonstrating the unique features of Formula SAE style vehicle including, but not limited to: maneuverability, handling, braking and cornering. Spectators are invited to watch course-side.

Shop Open House (4 p.m. – 6 p.m.) – Location - Bumstead Garage
Stop by Bumstead Garage to reminisce with old team members and meet the current team. Open to all alumni and guests, especially those who are Formula SAE alumni.

Sunday, October 12, 2014
Racecar Reunion (10 a.m. – 2 p.m.) – Location – Bumstead Garage
Work on one of our functioning racecars. Participate with other alumni in time trials and challenges to show the current team how it's done! Lunch will be provided.

How to register for the weekend events:
For all events (except The Auto Show)
Registration for all of our events, except if you are participating in The Auto Show, can be done through the RPI Reunion & Homecoming website – The link below will take you to their page!
http://alumni.rpi.edu/s/1225/index_reunion_social.aspx?sid=1225&gid=1&sitebuilder=1&pgid=4291&content_id=5806

Note: To register, you must login to the alumni website. If you have not already created an account, you'll need your alumni ID, which is printed on the mailing label of Rensselaer magazine, or is included in all email from the Alumni Relations Office. If you can't find your ID, or have trouble logging in, contact the Office of Alumni Relations at (518) 276-6205 or alumni@rpi.edu.

Register your car for The Auto Show
Planning to bring a car for The Auto Show – More information and how to register your car is available here.
http://www.formularpi.org/car-show/

Sponsor Spotlight: Harbec

HARBEC is excited to be sponsoring the Rensselaer Motorsport team again this year. Over the last several years, we have found the students to be exceedingly knowledgeable, professional, and prepared. The Rensselaer engineers are world class and we are honored to be involved with these young minds full of such potential. Over the past years, HARBEC has donated SLS components that utilize glass filled polyamide material. Selective Laser Sintering (SLS) is an additive process where layers of powder are deposited, then solidified with a computer-driven laser to form a 3D model. Selective Laser Sintering produces complex and finely featured parts with exceptional accuracy and unlimited design flexibility.

A little bit about HARBEC:

HARBEC's mission is to provide tightly toleranced prototypes, tooling, machined components and quality injection molded parts in a sustainable manner with a social conscience. They provide superior customer service, satisfaction and timely delivery of custom engineered solutions. HARBEC proudly fosters an atmosphere of encouragement and respect for the health and prosperity of their customers, employees, and the global community. HARBEC regularly works with engineers to find solutions for difficult problems. They offer capabilities and solutions for the consumer product, sporting goods, defense/aerospace, transportation, medical, marine, and energy industries. Harbec provides "from start to part" solutions for our customers, including engineering support, use of innovative materials, problem-solving, prototyping, and high volume production.

Bottom end of our HondaF4i.

EDE Team Update

Engine, Drivetrain, Electrical

Jake Kalish, EDE Design Leader

With the semester starting and car manufacturing beginning to pick up, the EDE team has found itself with plenty of promising new members. These new members will become the back bone of the engine team as we step into the design phase. With the numbers we currently have, we plan on refining the engine package: intake, exhaust, differential, and cooling.

Every year the engine team takes one of the main subsystems and completely redesigns it to be optimized and improve the performance of the subsystem over that from the year before. This year, that project will be the differential. Currently we run a Cam and Pawl style differential. This type of differential is phenomenal for acceleration because it forces both rear wheels to have the same rotational velocity; however, for autocross, it is less than ideal. Because it does not allow for a difference in rotational velocity between the rear wheels, it produces undesirable handling characteristics. This year we plan to implement a Limited Slip Differential. This style of differential allows for a differential rotational velocity between the two rear wheels (they can turn at two different speeds), and transmits more driving torque to the wheel that has the most grip. The limited slip differential is ideal for our application as long as it is designed to be fully adjustable. Making the move to this style of differential would drastically improve our lap times. As we come out of a turn, not only would we be able to have a difference in wheel speed, reducing over steer, but it would also direct our drive torque to the outside tire, which has more grip than the inside due to body roll, allowing us to accelerate faster out of turns. Needless to say, the EDE team is excited about the direction the team is headed this year, and hopes to return RPI to its rightful place of top twenty at competition this year.