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With 2008 coming to a close quickly, and the fall semester over, UB Motorsports would like to announce that the preliminary design of the UBMS09 is completed. Over the past few months the team has been hard at work designing and optimizing different systems on the vehicle. Read on to learn some of the more specifics of our different systems and what they are doing.

Suspension Team

The suspension team has finished its design for the 2009 vehicle. The configuration consists of unequal length, non-parallel A-arms, for the best compromise in wheel control. The team has decided to try direct actuating coil-over dampers, and will be using Penske 7800 series dampers, as they provide the best value for our application. We have been in contact with Indy Motorsports and they have been helpful with many questions about the dampers. For the rear we will be using a Satchell link suspension, as it provides the best compromise in handling and packaging for a solid rear axle setup.

We will be performing some tests to determine if carbon fiber is an acceptable material to use for our A-arms and Satchell links in our school’s materials laboratory. These tests will consist of tension, compression and bending experiments to determine compliance and ultimate failure. If
these tests show that carbon is not reasonable, then we will use 4130 steel for our links.

The steering geometry has also been completed. The main inspiration for the design came from an article written by Eric Zapletal. The rack and pinion design allows us to take advantage of the maximum forces our tires can produce around large corners, while minimizing drag losses around the tight corners we encounter in FSAE.

We will begin to manufacture components for the suspension and steering within the next week, and with a lot of work and a little luck, have a completed suspension by the time classes resume in January.

**Chassis Team**

Our chassis design is completely finished and ready for manufacture! This year’s design utilizes a more reclined driver position which makes the overall structure vertically shorter. This, along with the use of thinner walled tubing in some sections allowed us to shave off 8 lbs. from the frame alone, an 11% decrease in weight. Preliminary computer FEA studies allowed us to achieve a 50% increase in torsional stiffness, the main measure of strength for a vehicle chassis. New designs in the structure include the two rear most tubes being mechanically attached with fasteners, which will allow us easy access to the engine and drive train components. Combined with our simple solid-axle rear suspension system, we will be able to completely disassemble the rear half of our car in less than 15 minutes.

Currently our tubes are being CNC cut and bent by Cartesian Tube Profiling in Ontario, Canada. Their services will save us over 100 hours in tube end notching and will give us an accurate tube kit to work with. The jig fixtures are now being manufactured by Custom Laser Inc., which will allow for easy assembly and welding of our chassis kit. Thanks to these and other out-sourcing connections we will be able to manufacture our car in an efficient and timely manner. Welding will begin right after Christmas. A special thanks to Lee McElhnnney for his continued support and welding services.
**Electrical Team**

For 2009, we are looking to implement a new launch control circuit to give the drivers a way to control the rpm during acceleration runs. The system is simple to implement, and requires no modifications to the software or internal ECU hardware from the 08 car. We are hoping to have a steering wheel mounted momentary switch that would engage the circuit along with a master cutoff on the dash panel to prevent inadvertent engagement of the system during normal operation.

A dash panel is also in the works for the new car to provide critical information on engine oil temperature, engine oil pressure and the air/fuel ratio. The gauges will be small, easily readable, and will feature night-time illumination to allow us to see them during testing, as that is mostly done after dark due to the traffic on campus. There will also be the required master shut off switch, a switch to shut the fuel pump off independently of the rest of the vehicles’ circuits, and the illumination switch for the gauges.

We are also hoping to finalize a new stator/magnet design to allow us to run a lightweight aluminum flywheel which will improve engine response times and help to shed weight from the engine and car as a whole. The benefits would be substantial, and we’re pushing to have a design ready before the chassis gets back to from the chassis shop.

The new ECU housing will also feature the team's logo, which we are hoping to have engraved by the machine shop and then it will be painted our school colors.

**Powertrain Team**

UBMS09 will utilize the same Briggs Vanguard V-Twin and Gaged Engineering CVT as last year, but with several major changes. A new intake system tuned around partial wave reflectance and optimizing air flow through from the throttle body to the valves will be utilized to increase peak power from 36HP to approximately 44HP (according to GT Power Simulations, yet to be confirmed by testing). A new exhaust system improves the torque curve, with 80% of the peak torque available at idle (according to GT Power Simulations, yet to be confirmed by testing).

The rest of the Drivetrain will be re-tuned to take the greatest advantage of these engine improvements. Data from last year’s CVT performance has been analyzed and a large amount of tuning work has been planned for the spring semester to optimize the shift ratios and engagement/stall RPMs for acceleration. The final drive ratio has also been redesigned around the maximum longitudinal thrust the tires can provide to minimize tire spin off the line.
UB Motorsports would like to thank Fast By Gast for sponsoring the team for the 2009 season. Since 1973, Fast By Gast has been specializing in transmission building and repair as well custom work on cylinder heads, blocks and crankshafts. In order to help the UBMS09’s engine to flow air better, Fast By Gast has ported the cylinder heads for optimal airflow. For more information on Fast By Gast be sure to check out their website at www.fastbygast.com.

UB Motorsports would also like to take this time to announce that Mary Karl will now be taking over for Greg Robbins for sponsorship coordination on the Formula Team. Thank you Greg for all of your work this past year! The next UB Motorsports issues will be brought to you by Mary.

Lastly, with the holiday season approaching, UB Motorsports would like to wish a safe and enjoyable season to all of our sponsors and supporters. 2008 has been a great year, and the team looks forward to 2009 and working with all of our sponsors and supporters!

Thanks again!

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