CURRENT EVENTS

RW-3x Project Captain Status Updates

Hello Buckeye Current friends, family, alumni, and sponsors! February was a relatively calm month as the team buckled down to make significant progress on each project. The deadline for many RW-3 projects align with the end of Ohio State's Spring Break, March 18th, which is right around the corner. Each respective project captain has outlined the overall scope of their project and the remaining steps necessary for completion.

Project: Balance Wiring // Captain: Zach Salyer

The balance wire fusing project is focused on integrating fuses for the balance and sense wires connected to the batteries. Fusing increases the safety and robustness of the wire harness. By using connectors to attach the wires to the board, we no longer need to route the balance wires onboard the vehicle, increasing the available space inside the bike.

Currently I am designing an enclosure to protect the PCB from splash and to cover the active traces. Then the balance/sense wire routing must be adjusted to integrate the fuse boards. The boards must then be manufactured and installed.

Project: Cooling Lines // Captain: Daniel Mikrut

Last year during Pikes Peak, the cooling system was quickly redone in order to solve an overheating problem. It worked for the time being, but was quickly thrown together, leaky, and the sensors never worked quite right. My job is to redesign the lines and set cooling fitting standards to make the process more simple in the future. This will allow the bike to be cooled properly without leaks, and allow data to be properly collected for analysis.

The CAD model is 90% complete and only needs a few details to be completed. A parts list is being generated and once the order goes out and is shipped to us, its only a matter of out with the old and in with the new. After the loop is completely assembled, it will be pressure tested to make sure there are no leaks.

Project: Suspension // Captain: Luke Chen

Based on the race data analyzed from last year's competition, the team decided to increase compression damping in the forks to further increase the bike's performance.

Currently, the forks are waiting to ship to Traxxion Dynamics for a revalve service. The next step for this project is to receive parts and install them on the bike. Once that is complete calibration testing is the final step.

Project: Battery Pack // Captain: Rachel Hawthorn

The goal of the battery pack project this year is to ensure that our rider has enough energy and power to finish the race. We determined that by using the same pack design with a new cell chemistry, we can better meet our overall vehicle power and energy requirements.

Currently the pack is in the process of being assembled. Cells will be placed in each plastic shelf, with thermistors routed throughout the pack. Nickel bus bars will then be spot-welded to the cells. After the bus bars are installed, the wire harness for each shelf will be spot welded to the nickel. Each shelf is then encolsed in a plastic layer. Finally, the shelves will be installed into the battery subframe and then into the motorcycle.

Project: DDU Display // Captain: Nick Haber

My project encompasses all of the sensors on the bike as well as our datalogging unit, a Bosch DDU-9. I am working on adding new sensors such as strain gauges to the bike so we can get better data from testing sessions.

I am currently designing a circuit to amplify the output of the strain gauges so that the DDU-9 can read the data. Once completed, the strain gauges will be mounted on the motorcycle's frame with each strain gauge connected to an amplifier, so the DDU-9 can read the output.

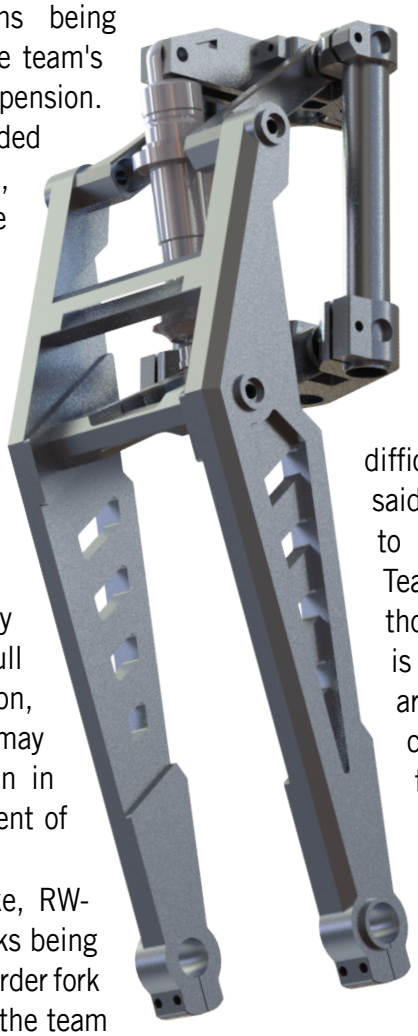
Project: IDU Enclosure // Captain: Hannah Jencson

The purpose of this project is to create a design for the enclosure on the back of the IDU (integrated drive unit) which we call the backpack. The design must reduce space, enclose all necessary components, and meet IP and high voltage requirements. The enclosure is made up of three parts, the base, mid, and lid. The base must be modified to fit a new, larger fuse while keeping the same fastening points. The mid must also fit the new fuse using the same fixture points, while also also reducing empty space left when unnecessary components are removed from the backpack. The lid must cover the enclosure using the fixture points on the mid and base.

The base modifications are complete, and the redesign of the mid is underway. Once completed, designs for the lid will begin and fasteners and other materials will be ordered. After the lid design is finished, the design will be reviewed and sentout to be 3D printed. Once the printing is complete, it will be installed on the bike.

Technical Highlight: RW-4 Front Suspension

One of the many custom designs being finalized for the development of the team's future vehicle, RW-4, is the front suspension. "The main focus of the design is divided into three areas: kinematics design, mechanical design, and vehicle dynamics simulation." Project captain Aaronn Sergent said. "With kinematics design, we are concerned with rake, trail, wheelbase, motion ratio, natural frequency, and dive characteristics. Mechanical design involves structural analysis and topology optimization, specifying mechanical connections internal and external to the assembly, and verifying range of motion and resolving any interference within that range. Though full vehicle testing is the ultimate verification, developing vehicle dynamics models may highlight the cause of phenomena seen in testing and should aid future development of the design."

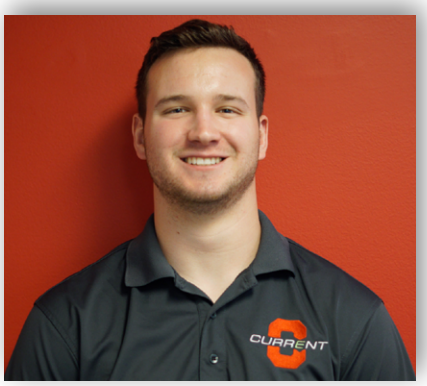


The forks on the team's current bike, RW-3x, are a telescopic design while the forks being developed for RW-4 are a double-link or girder fork design as seen in the graphic. Although the team is moving forward with the girder design, the option of using telescopic forks will still be available for future competition possibilities. "Our RW-4 suspension design supports the ability to swap between the telescopic fork and the girder fork, which greatly improves the adjustability of bike performance." Team member Liang Dong said.

Creating an optimal custom suspension design, however, does not come without difficulty. "The hardest part is learning," Dong said, "We couldn't realize how much we needed to know about this topic until we started". Team member Yupeng Cheng echoed Dong's thoughts, "So far, what really challenges us is the kinematics design. All the parameters are linked in some way and one small change can have a huge effect, so all we can do is try countless times until a correct solution is found."

The team plans to finish mechanical design work in the next couple of weeks and move on to prototyping and testing so that testing can be completed by the end of the summer.

Aaronn Sergent



Hometown: Dover, Ohio

Year: Senior

Major: Mechanical Engineering

Hobbies: Outdoor activities

Projects: "In past years I have worked on projects such as electronics enclosures and the low-voltage wire harness and last year I held the role of Project Manager. This year I am currently working on the alternative front suspension design featured in this month's tech highlight."

Favorite Team Memory: "It was awful at the time, but looking back at the first week of Pikes Peak 2017, it is my favorite memory. The small group of us who were there for Tire Testing worked night and day to get the bike operational, and it was exciting experiencing the result of the combined drive and passion of the group."