E-Racer

Week 5 (2/21/08 – 2/27/08)
February 27, 2008
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Work Completed

This week centered on making more specific designs for mounting and modifying of various components, including the braking actuator and seat mounting, and modifying the brake cables. This week I also tried to finish attaching the seat supports but encountered an unforeseen problem which will be resolved next week. Unfortunately, all of the projects I am working on (with the exception of the design of some parts) involve using the machine shop, which was closed on Friday due to the snow day as well as over the weekend.

However, this week I was able to start attaching the side supports to the seat using brackets purchased at Mansfield Supply. I worked on this with Mike Marquis. We attached the brackets to the support which will be attached to the back of the seat and then realized that since the back of the seat tapers, the supports will not lie flush against the seat once we attach the brackets connecting the supports to the bottom of the seat. To resolve this issue, we will bend the bottom brackets so that the supports will be even with both the back and the bottom of the seat.

This week I also worked with Mike to determine precisely how the actuator will be mounted to the go-kart. Last week, I realized it would be a good idea to add mounting space by welding sheet metal to the go-kart and mounting the actuator on the sheet metal. This would also be advantageous because we could design the sheet metal to accommodate the designed mounting scheme for the actuator before we weld the sheet metal. Figure 1 below shows how the actuator itself will be attach to the sheet metal; on the right, two vertical pieces of metal with holes in them will be welded onto the sheet metal to align with the hole in that end of the actuator. Then, a nut and bolt will be put through this mechanism to secure the actuator on this end. On the other end, a curved bracket will be made or bought to fight around the actuator and screw into the sheet metal on each side of the actuator.

We also decided that the modification of the brake cables would probably best be accomplished by joining them and then routing them over a pulley, which in turn would be connected to the actuator. A pulley would be used so that we could be assured that the same force would be applied to the left brake and the right brake. Figure 2 below shows how the actuator will be attached to the pulley and the brake cables.
The brake cables will be modified by taking the ends out of the brake handles currently on the go-kart, and then shortening from the other end. This can be done because the ends of the cables near the actual brakes are secured using screws, which can easily be removed and then cut after the cable is pulled to the desired length. On the other end of the cables, the cables end in small metal cylinders, which will be joined together with some sort of bracket which we will either make or buy.

Finally, Mike and I worked this week to design the optimal plate for mounting the bottom of the seat. As I mentioned last week, we have decided to first weld a piece of sheet metal to the frame of the go-kart and then attach the seat to this frame, as well as three of the points of attachment of the restraint. Mike and I have decided that we will put two holes in the sheet metal to align with the two threaded holes in the bottom of the seat. However, these holes align with the frame of the kart, so I will talk with Rich and Serg as to whether they think we can remove small parts of the frame without sacrificing strength. In addition to the two holes for the seat, we will design the plate to have two threaded holes for each of the side restraint attachments. The third restraint attachment (in between the legs) will be attached to one of the same holes as the seat. Figure 3 below shows the design of this plate.

**Future Work**

In the next two weeks, I plan to accomplish several tasks:
- Finish attaching the side supports
- Manufacture/buy installation hardware for the back and bottom of the seat
- Install/weld hardware for seat installation (install up to the point of adding the seat itself)
- Make mounting for actuator (design and manufacture mounting but wait to attach to frame)
After the control box is complete, which will hopefully be by the time the above tasks are complete, I will spend the subsequent two weeks doing the following:

- Modify brake cables, which includes cutting the cables, installing the pulley, and integrating with the joystick
- Install mounting for the actuator
- Install the actuator, including integrating with the control box and brake cables

Once work with the joystick is finished, which will presumably be well within the next four weeks, I will spend the following two weeks doing the following:

- Manufacture and attach the joystick mount
- Install the joystick including some sort of enclosure to encase the joystick hardware
- Install the seat and restraint

I also plan to speak with Rich and Serg at length during the design of each of the above modifications to get their opinion as to whether certain modifications are ideal in terms of safety and efficiency.

**Project Review**

The project is progressing well at this point, with a few minor bumps along the way. Much of the “smaller” integration and installation tasks which I have been working on have taken considerably longer than expected, but the next few weeks should be very productive. The group as a whole continues to make progress and the communication between all group members continues to be positive. The current budget is approximately $540.00, with no big purchases planned.

**Hours Worked**

Time spent on the project 2/20/2008 – 2/27/2008: 13 hours