Weekly Progress Report
Week 5: 2/17/09-2/24/09

Travel Computer Mount

The travel computer mount is now complete. The L bars have been shortened at our client’s request. We will be obtaining a release form this week, so Sean can begin using his new computer mount. Figure 1 shows the completed model.

Figure 1. Completed computer mount.

Assistive Jumping Device

I focused my efforts this week into the design and construction of a bracket that would attach the vertical rail to the crane trolley. My initial thoughts were to utilize the hook that came with the crane because it would surely be strong enough. Figure 2 shows the crane hook. The crane hook fits around the bolt of the trolley shown in figure 3. I would need to make a solid connection between the hook and the rail. I could not simply hang the rail because this would allow for too much motion. The issue with the hook is that it had a relatively low surface area. Also, since the hook was made of steel and the rail of aluminum, welding would not be an option. I decided that a bracket similar to the crane hook with greater surface area would work the best. This means that the bracket and rail will be supported by the bolt of the crane trolley which can withstand loads of 2500lbs.
I went through the scrap metal at the machine shop to find a thick piece of steel that I could use to make an attachment to the crane hook that could be bolted into the steel. I was thinking of looping a piece of metal around the crane hook and bolting down each side of the rail. In the process I found a thick metal plate with a circular cutout in the top. The crane trolley bolt fit perfectly through the cutout. Essentially, this piece is the original crane hook with greater surface area, and therefore ideal.

I then began brainstorming ways to bolt the rail to the metal plate. There were pre-existing holes in the plate and in the rail; however, they were neither large enough nor positioned correctly to sustain high loads. I also thought that there should be more horizontal support to keep the rail straight under torque. I decided that cutting grooves in the plate to recess the guides of the rail would reduce this problem. Figure 4 shows the metal plate and the grooves to fit the guide rails. Figure 5 is a close up of the rail guides that will fit into the cut grooves.

Figure 2 (left). Crane trolley hook.
Figure 3 (right). Bolt of crane trolley.

Figure 4 (left). Machined crane hook with grooves to recess rail guides.
Figure 5 (right). Close-up of rail and side guides that will fit into grooves.
After lying the rail down along the grooves, there was just enough room to fit a layer of neoprene between the rail and the machined crane hook. The neoprene will increase the friction between the rail and the hook to further stabilize the rail, and ensure proper function of the system.

Once everything was lined up, I mapped out where I would drill the holes in the rail and the machined crane hook for a strong attachment. I decided to go with three 5/16in bolts to really maintain a strong attachment point. Blaine and I drilled the holes in both the metal plate and the rail and purchased the bolts and hardware at Mansfield Supply. Figure 6 shows the final bracket design. Figure 7 shows how the bracket will fit along the bolt of the crane trolley between two sheets of neoprene and large metal washers.

![Figure 6 (left). Vertical rail/ crane trolley bracket.](image1)

![Figure 7 (right). Installed vertical rail/crane trolley bracket.](image2)

I also contacted a few companies about ordering a customized tension spring which we could use to suspend the harness and offer shock absorption. Our main goal for next week will be to design and test the suspension system. We are still unsure of whether we should use bungee cords or a spring and rope system to suspend the harness. We also must find a place where we could hang the crane trolley in order to test the entire system thus far.

I spent approximately 12 hours working on the project this week.