Work Completed

During the beginning of this week, I spent the majority of my time working on the arm support system. I drilled holes in the three pieces of 80/20 stock so that they could be attached together. Bolts were used to attach each piece together with nylon washers between the individual pieces. The nylon washers serve as a way for the pieces of 80/20 stock to rotate around each other with minimal effort and a low coefficient of friction. Ny-lock nuts were used at the ends of the bolts because they will not back-off or loosen from the bolts. Also, if the 80/20 pieces don’t rotate easily enough or they rotate about each other too easily, the ny-lock nuts can be loosened or tightened to the users discretion.

Once the beginning part of the arm support was constructed, we then began analyzing and designing the next component of the design. Figure 1 shows a basic diagram for our design. The upper component of the arm support will be attached to two-180 degree pivot braces which will allow the support system to pivot through 180 degrees. These pivot braces will be able to move vertically therefore allowing the upper support component to move vertically. As we designed this, we notices some problems which need to be addressed as soon as possible. As you angularly adjust the support, you are not able to adjust the horizontal distances of the support system. As you move the support up using the 180 degree pivot braces, the support system moves away from the body. We are discussing a way of mounting the upper component of the design to a horizontal piece of 80/20 so that it can move horizontally to allow full adjustability.

Another problem we face deals with the forces acting on the end of the support system and the brakes used to keep the support system in a static position. As discussed before, 440 in-lb of force will be acting on the 180 pivot braces with a 400 lb man sitting in the wheelchair using the support system. This force needs to be counter-acted by the 80/20 brakes used to keep the support system static. We are not sure whether the brakes will be able to counteract such a large moment; however, the only way of knowing is to construct the design and test using weights. We will not be able to figure this out until the design is complete.
I also spent time during this week working on the paintbrush/marker wrist attachment. The base was completed last week so this week I began analyzing the holder component of the design. Before welding pieces together, I bolted a scrap metal tube to the PVC base to ensure successful rotation. The tube was able to rotate about the static PVC base; however, I noticed a problem with the design. Currently, I am using a completely threaded bolt. This poses a problem during rotation because the spring or washers get hung up on the treads. I will have to change from a completely threaded bolt to a partially threaded bolt.

From Figure 2 and Figure 3, you can see that the holder unit moves more than enough to enable rotation. Because of this, I plan to cut the base down to half its size to make the unit more compact. This will still allow the proper room for rotation but it will make the unit lighter and smaller.
Future Work

During the sixth week, more construction will take place. I plan to put more work into the paintbrush/marker wrist attachment as well as the arm support. Now that all the analysis is complete on the holder component of the design, I plan to construct this component. I will order the proper size aluminum tube for the holder and cut, drill, tap, and weld the component.
Also, time will be spent furthering the processes of the arm support. We now have the clamp to attach the arm support to the wheel chair, so we will began working on the attachment devise. We also plan to put more work into the infinite adjustability of the arm support design. We need to make the design move linearly towards and away from the user as well as move up and down.

**Project Review**

Week five has been a very productive week. We received all the parts that were ordered and began construction on both the components of our project. The work completed on the holder unit of the paintbrush/wrist attachment device turned out as planned. Work on the support system is also progressing in the right direction. We plan to finish the attachment component of the support system and then move to the lower component which puts us right on track with our time schedule.

**Hours Worked**

Hours spent on the project for Week 1: 13.00