Project Identity

Adjustable Back Angle Controller
Week 8
March 28, 2007
Steven Frisk

Work Completed

The adjustable bed began to take shape this week. One of the major events which took place this week was purchasing the materials for the bed back construction and motor mount. We then began the construction of both of these parts. I also began to formulate a practical way of implementing a force sensitive lever.

On Wednesday the 21st, after our meeting last week, the entire group made a trip to Mansfield Supply. During this trip, we picked up two 2”x48”x1/8” cold rolled steel. These two bars will make the majority of the motor support, which will be explained later. We also purchased four 48” long 2”x2” angled iron for the construction of the bed back.

The general design of the motor support has remained the same from the beginning. That is that two plates will be used to support the motor. Each plate will have a 1” diameter hole cut into it, as well as a 1 inch wide slide with a length of 16.5 inches. These two plates will then be placed on either side of the jack, with the whole welded to the pin of the jack which is closest to the motor, and the slot sliding over the far pin of the jack, as shown below in Figure 1.

![Figure 1: Milled Motor Support Plates on Jack](image)
These bars will then bend out about half an inch to either side, so that the motor can fit between them. A steel band of some sort will then be welded to the inside of both plates. This band will be capable of expanding to allow the motor to be easily inserted and removed from the apparatus. The band will then be able to clamp down on the motor so that both the weight of the motor will be supported, as well as preventing the motor from twisting while it drives the jack.

We also cut the angled steel for the bed back. The design we have chose is a 38.25” wide by 37” long bed back. This bed will have two rails running down the middle of the bed back to guide the wheel on the jack. These two rails will then be supported by cross members originating from the corners of the bed back, as shown in figure 2. This design will incorporate a rail system, and adequate strength, while keeping the weight of the bed back as low as possible.

The last task which I have performed this week was to design a realistic plan for the control lever. The basic design has been shown previously. However after playing with the springs we intend to use I realized they would have to be supported in some manner to preserve their linear force versus displacement qualities. To perform this, I plan to attach a bar to both the top and bottom of the bar, as well as to the top and bottom of the box, which would fit within the springs, without interfering with the motions of the springs and handle. For the two bars on the box, a 0.3 inch diameter rod can be used, which is cut to less than 3 inches in length. These two bars can be attached to the box top and bottom via welding, soldering or a screw. The bars on the handle will be the same dimensions as the two box bars if they are simply welded to the handle.
However, if one bar is used which is about 6.5 inches long, and a hole is cut through the handle, the bar can be slide through with equal lengths on either side, and then it can be securely soldered in place. The bars are used to keep the springs from buckling in the middle instead of compressing.

**Future Work**

In the following week, I plan on acquiring a proper ring to secure the motor to the jack. Once we have this ring, the metal plates can be bent accordingly so that the motor fits properly within it. We are also hoping the caster wheel will come in by Friday, so that we can measure out the rail width, and put together the bed back completely. Last, I plan on figuring out which materials would be required to put together the lever ad box system, and how it can be secured to the bed its self.

**Project Review**

At this point, the bed back is beginning to come together, however we are still waiting for the caster wheel, so we can make sure the track dimensions are correct. We also have a good design for the handle, and now need to implement it by creating a box for the handle and welding it to the bed. We also have a working control circuit however it requires a program to make it variable, and reversible, which is still in the works. At Mansfield Supply we spent $72.59 on parts for the bed back, and motor support, which leaves us with a total of $600 left in our budget.

**Hours Worked**

13 hours