Work Completed

This week we were not able to work in the lab much due to the inclement weather; so we focused more on the drawings rather than the actual construction. We have rescheduled our hardware trip to Wednesday afternoon. Figure 1 below shows the slotted steel angle support (left) and typical door hinge (right). The plan is to support the plywood backing with a steel frame and the slotted steel is our best option for screwing it place. I found 18 gauge slotted steel angle at 1 ¼” x 3’ for $6 each. I estimated about 5 pieces needed to construct the back and wheel track. The truss supports will be built with that same slotted steel except it won’t be angled. Two door hinges ($12 each) will be used to connect the pieces of the bed together and allow lifting of just the back. This steel hardware along with the sheet of plywood and small bolts will be purchased at Mansfield Supply on Route 195. Otherwise, they have also been similarly priced online at Aubuchon Hardware (http://www.hardwarestore.com).

Figure 1: Hardware to be purchased through vendor or at store

The jack will lift the load vertically, eliminating all angle changes. Since the jack would no longer tilt with the back of the bed, a wheel will be attached to the top of the jack and ride in the track placed on the back of the bed. As the jack rises, the bed back will rise smoothly along the wheel-in-track system. A simple polyurethane fixed castor wheel would be sufficient. Figure 2, next page, is the photo of the wheel that will be ordered this week. It is rated for 275lbs of force. Its overall height is 2-3/8”; which still gives plenty of clearance under the bed when it is attached to the top of the screw jack. Some kind of parallel metal bars, like the slotted steel angle plates, can be built around it on the back of the bed to
roll straight on track. This will be all purchased or ordered by the end of the week. It will consist of plywood or plastic backing with steel support bars as described above. Figure 3 below shows a profile view of the back of the bed with the wheel attached.

Figure 2. 11 Series General Duty Castor

Figure 3: Profile of Bed Back with Wheel Riding on Track

Future Work

In the coming week we will place a purchase order on the polyurethane wheel and take a trip to the hardware store to pick up final pieces to start construction. The construction will begin as soon as we have the hardware. We plan on doubling our efforts in the lab to ensure this device is built in time. Future expenses include labor and cost of welding (~$80), a castor wheel for the track (~$17), plywood to finish framing the bed (~$25), and steel for the framing of the bed back and motor cage (~$150).
Project Review

At this point all ordered parts have been received and the bed frame has been modified so that we can start connecting our device together. The DC gearmotor has also been modified so that there is a nut attached to the rotating shaft for easy connection to the screw jack. We have tested this connection and learned that it can withstand the torque. This boosted our confidence in creating a working model. I have submitted a purchase order for the wheel castor and expect to receive that in a few weeks. We are still within budget with about $672 remaining. We have currently spent about $1328 of our $2,000 budget.

Hours Worked
12 hours