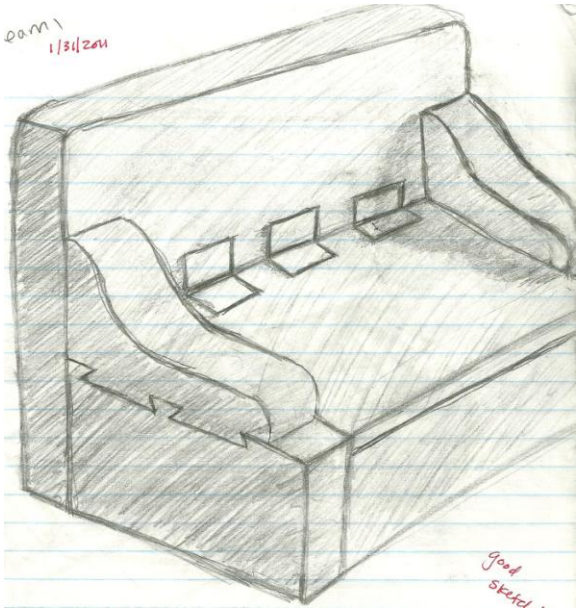
THE SLOUCH COUCH

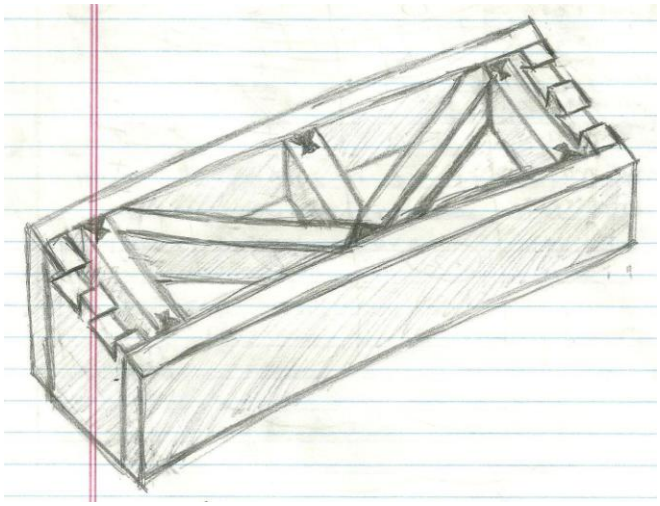
EDSGN100, Section 19, Spring 2011
Instructor: Liz Kisenwether

(From left to right)
Rod Kern-costing
Steven Rementer-construction
Alexa Norian – final deliverables
Albert Berardocco- sales pitch

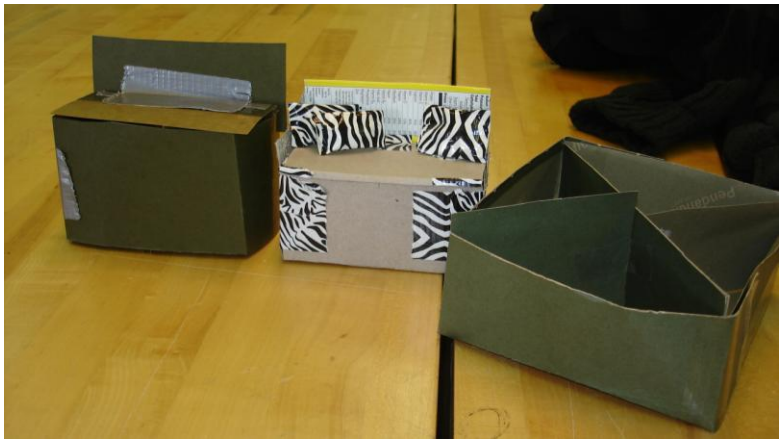
The Problem: The dilemma put forth was that there was no low cost, yet reliable piece of furniture meant for confined spaces, such as dorm rooms, available for purchase that could be disassembled with ease. The solution was to find a way to build one, either a table or chair variation, which was made solely out of corrugated cardboard and water-based glue that could support 100 or 160 lbs, respectively. The challenge was to use these materials in an efficient way, minimizing costs without jeopardizing quality. It had to be constructed in a way that made it easy to disassemble and fit under a 12-inch bed while still being aesthetically pleasing.

Concept Development: Before designing, we had to figure out what the consumer wanted. To do this, we each surveyed four or more college students (the target group) and did online research before we met together as a team again and from our results constructed a list of needs that seemed most important to the consumers, including low cost, multifunctional, comfort, and easy to store. With this list, we used selection matrices, first with screening and then with scoring for our top three designs, which were a couch with seat storage, a hammock, and a beanbag type chair. After evaluating each design, the couch became a clear winner and we moved on from there and sketched what we thought an appropriate couch design would be that would fulfill the most needs on our list (pictured below).





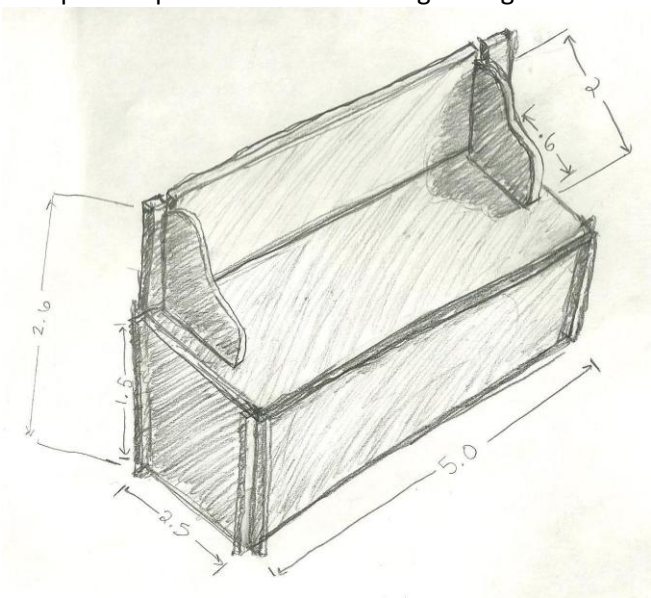
Next, we built models taken from the sketches. The left two are modeling the full couch and the right shows the inside that would be constructed to add support when used as a couch and add organization when utilized as storage.



We evaluated the pros and cons of all the designs and from there adjusted the design, mainly the inside support system making it able to support more weight. We accomplished this by adding more X's, our choice structure for support beams.

Testing: Our team was in charge of constructing an 8-inch high cylinder to test for crush data. We built it out of cardboard and rolled it, sealing it with glue. After it dried for one week, we did the crush testing and it withstood 188.4 lbs on average, making the shape a fairly reliable choice for a support column in the furniture. However, when compared to an 8-inch square or 16-inch X shape, it crushed under less weight. Since we were designing a couch, a square support system made sense from the start, and the crush data confirmed that it was the right route. For the internal supports and storage organizers, the X shape seemed to look the most aesthetically pleasing and proved themselves a front-runner after the crush testing, which is why we choose to use them.

Final Design: Our final design consisted of a rectangular shaped base with a backrest, arms, and a storage feature inside. The inner support was fashioned using the X support system and created multiple compartments ideal for organizing while taking advantage of the storage aspect of the design.



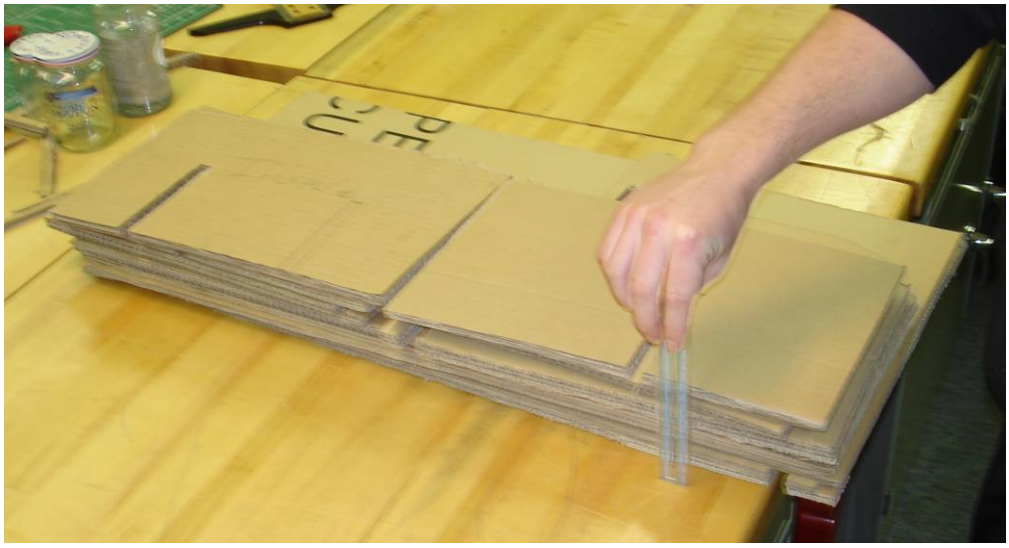
(Sketch of final design with dimensions in feet)

(Inside of base)

The couch was assembled by creating slits in the individual pieces and positioning the slits of adjacent pieces together, sliding them into place, demonstrated in the pictures below.

It assembles and disassembles with ease, making it functional and realistic to have in such a small place, making it a good solution to the original problem. With only having to slide a few pieces in and out of place, it is practical for dorm rooms or apartments when quick seating is needed for more or unexpected guests.

Once disassembled, the Slouch Couch met the requirement being able to be stored under a 12-inch bed. As well as being able to withstand more than 160 lbs.



(Showing with a ruler all the half-scale pieces stacked up is less than 6 inches)

Our final product came out nicely, meeting all of our customers' needs, including comfort that the backrest provided. Below is a picture of the final half-scale Slouch Couch, showing all the pieces assembled and its basic structure.

Costing: Below is a list of all the sheets of cardboard needed for the construction of the Slouch Couch, what part of the couch the sheet made up, and their sizes.

8 sheets inside – (2.5' x 1.5')
2 sheets inside-(5' x 1.5')
4 sheets sides-(2.5' x 1.5')
2 sheets front -(5' x 1.5')
2 sheets back –(5' x 2.6')
1 sheet seat-(2.5' x5')
4 sheets armrest-(2' x .6')

Total = 118.3 sq ft
Cost of cardboard per sq ft= $0.10
Total cost of Cardboard = $11.83

Cost of glue= $0.25 per oz ($1.99 per 8 oz)
http://glue-for-sale.info/product/0/8-oz.-Elmers-Carpenter-Wood-Glue/
Glued 50 sq ft of cardboard, .5oz of glue needed per sq ft
Total Cost of Glue = $6.25

Labor time= .5 hours with a machine (1 hour without: 35 min cutting cardboard, 20 min gluing, 5 min assembly)
Labor rate = $16.20/hr
Total Labor Cost= $16.20(.5)= $8.10

Total Cost for one Slouch Couch= $11.83 + $6.25 + $8.10 = $26.18

Retail Value= $26.18(1.5)= $40

Lessons Learned: If we had another four weeks to do this project, one thing that we would fix would be the seat. The seat in our final design was just sitting on top of the bench, not secured in well. It helped with the ease of disassembly but wasn't so practical for sturdiness and support because it could possibly slip out. In addition, since it is a couch, more than one person at a time is going to be sitting on it, meaning ideally it should hold twice the amount of weight. It did hold more weight than it was supposed but if we were going to make it even stronger and had more time and materials, we would have laminated the seat. It wasn't necessary for this assignment because without seat lamination, the inside and structural supports still withstood the weight, but if we wanted to enhance the durability of it, that would have been an easy fix. Our team worked very well together and we finished the project with time to spare. With that said, I think our time management was our strong point. Even though everyone had their assigned role, we all worked together and got it done efficiently while maintaining the quality of the product. If we were to change anything about how we approached this project, we would prepare better by knowing approximately how much cardboard we would need, solving the problem we ran into at the end where we were scrambling around to find large enough pieces of cardboard to finish our couch. If we knew how much we needed from the start, we could have collected it all at once while the supply wasn't depleted.