Profits from our electric appliance repair venture have not met expectations, so your fearless instructors have decided to expand their famous line of foamcore furniture. This year we will add the Robusto-Recliner, the perfect dorm room accessory, and cheap too!

Your team assignment is to design, build and test a chair that meets the following specifications:

1. Your chair must function in two positions, an upright sitting position, and a reclined position. In keeping with the spirit of a recliner, changing the chair position should be accomplished quickly and easily.
2. In the upright position, the seat should be approximately horizontal to the ground with the seatback making an inclusive angle of approximately 95 degrees with the seat.
3. In the reclined position, the seat back (or the seat and seatback together) should tilt back an additional 20 degrees (again, approximately).
4. The seat height must be 16 plus or minus 1/2 inch from the ground.
5. The seat must have a minimum area of 75 square inches.
6. The back must have a minimum area of 75 square inches.
7. The chair must support our “Test Sitter”, reported to weigh 230 lbf.
8. “Test Sitter” likes to lean back like most people, so you need to provide for a 40 lbf back load, applied at a point 23 inches above the floor, In the upright position, this load will be applied horizontally with a spring scale while “Test Sitter” occupies the chair. In the reclined position, the load will be applied at the same point of the seatback as close to perpendicular to the seatback as the test rig will allow.
9. The entire chair must be constructed from a single 32 by 40-inch piece of foamcore.
10. Since economy is the primary objective, only the foamcore and elmer’s glue may be used as construction materials.
11. Aesthetics are an important aspect of selling the chair, so you may decorate your chair with construction paper, markers, or other materials as long as they do not contribute to the structural integrity of your design.
12. Bonus points will be available for a) an integral cupholder that will hold a standard 12 oz can of non-alcoholic beverage, and/or b) an integral foot rest for the reclined position.

Two sheets of foamcore will be provided to your team for practice designs.

Your team deliverables are your Robusto-Recliner design ready for testing, and a 3-5 page written report that continues the format that we have been practicing. During this module we are discussing Newton’s laws, vectors and moments. Therefore a force (or free body) diagram of your chair (loaded as described) with a discussion is a necessary component of your report. How did consideration of the forces on your chair affect your design? An overall drawing of your chair design must be done using Mechanical Desktop, although your free body diagram and other explanatory sketches may be done by hand. Other items of interest are a discussion of how you came up with your design concept, sketches of your final design, results of any preliminary testing, and lessons learned for future chair designs.

Schedule:

Your first task is to “research” alternate chair designs. An “idea generation report” is due Tue-Wed, 10/14-15 at team meeting time. This “report” consists only of approximately six rough hand sketches of possible designs for your chair, a list of sources you consulted while investigating chair designs, and a cover sheet with team name and the usual information.

Recliner testing, Tuesday-Wednesday, October 28-29, 2003, team meeting time.
Report Due 5pm Wednesday 10/29/2003
Submission will be on-line, linked to webpage developed in A&S. more details later.