STRUCTURES WING TESTING PROCEDURE

To be completed by Nov 1st 2004

IF CHOOSE NOT TO VOLINTEER TO DO THIS PLEASE TELL YOUR GROUP ASWELL AS Venno1@aol.com ASAP

Background: The overestimated weight of the aircraft is 20 lbs and is going to be designed to pull 3 gs of force with a safety factor of 2.5. This will exert a force of 150 lbs. These 150 lbs will be distributed over both the left and right wings, and so, each wing will therefore have to carry 75 lbs.

Goal: In the group you worked with to make a wing, create an excel graph of the weight applied to the wing tip vs. the deflection at the wing tip with force applied.

Procedure:

1. Weigh your wing and record the result in the data section below.
2. With the bottom of the wing facing up, sandwich the wing tip of your team's wing section in a foam wing bed that is 4 inches long. In other words, you just want the last four inches of one end of the wing placed in the foam bed. Be sure that the edge of the bed is flush with the edge of the wing.
3. Jut the wing out over the end of a table so that the four inches of wing tip sandwiched in the foam is aligned with the edge of the table, and the rest of the wing is sticking out freely over the ground.
4. To hold the wing in place, put a piece of 1x4 wood (which can be found in the box with the sand bags) on top of the foam wing bed so it is perpendicular to the wing. You should now have made a T shape.
5. With the other wing tip hanging off the end of the table, clamp the wood wing tip sandwich to the table's edge. Be sure that the foam bed and the wood are all flush with the table's edge. Also, don't clamp over the actual wing itself, but over the wood ends (the two tips of the top of the "T"). This device will keep your wing from moving. If the wing moves clamp down with more force, but be careful not to crush your wing!!.
6. Using Cardboard and duct tape, create a "fence" or wall about 5 inches high around the edges of the wing that is hanging over the table and along the edge of the clasping device. This will keep the bags of sand on top of the wing from sliding off during testing.
7. Apply four half kilo bags of sand evenly across the wing.
8. Record the weight applied to the wing, and by measuring the distance from the floor to the wing tip, note and record the deflection of the wing in the data section below.
9. Remove the four half kilo bags that you just placed on the wing and replace with 4 one kilo bags of sand also evenly spaced.
10. Repeat step 7 through 9, until 24 kg is reached.
11. At this point find weights around the room and substitute bags of sand with these weights. THE WEIGHTS MUST EVENLY DISTRIBUTE THEIR WEIGHT ALONG THE ENTIRE WING (most likely by spanning the entire wing). While doing these measurements be sure to increase the weight by no more than four half kilo bags (2 kg) each time.
12. If your wing fails before then. Take a detailed note of how the wing failed as well as how this failure could be avoided if the wing were to be redesigned. Take

pictures if possible. Also note how much weight was applied before the wing failed.

13. Data:

Wing weight:_____ Total weight applied:_____

Deflections table of top of wing facing up:

Mass applied (kg)	**Deflection (in)**
0	
2	
4	
6	
8	
10	
12	
14	
16	
18	
20	
22	
24	
26	
28	
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50	