Pull Test Machine for the 10G rule..

Being the CD for the Tulsa Gluedobbers September stunt contest and the passing of new pull test and line size rules for PA made me start thinking about how we are currently doing Pull Tests and how difficult it would be to translate the new 10G pull test to the old fish scale method of pull testing. I was aware of several ingenious pull test machines that worked well. The problem was they all adjusted the pull weight using fixed weights and I just couldn't see how that could easily be translated to the new rules. Started thinking about how to design a pull test machine that could simply be set to a scale that represents the models weight and be automatically set for the proper 10G pull test.

After conferring with a fellow club member Lee Thiel we came up with this sliding weight design. I believe it's the ultimate answer to the new pull test requirements plus it eliminates the age old problem of having an inexperienced person possibly pulling on someone's airplane. It also takes at least one human factor out of the equation.. Believe me if someone pulls a bellcrank out or a leadout breaks it doesn't matter who or what is at fault, the guy holding the scale takes the heat.

Our pull test machine is a bit complex and requires the builder to have access to a welder, basic metal working tools and at least a drill press. Lee and I built 3 for the Gluedobbers field so we could have one set up in each pit area. It really isn't as complicated as it looks on the drawing, much easier than building a stunt ship. All necessary raw material and parts can be purchased either from On-Line Metals, http://www.onlinemetals.com , McMaster Carr, http://www.mcmaster.com, and/or a local metal supplier. I would recommend looking locally for at least the 1 X 2 inch steel tubing and 30 pound chunk of steel used for the sliding weight. I would estimate shipping costs alone would make looking locally first well worth the effort.

I have tried to include enough details in the plans to give anyone with a little metal fabricating skill enough information to be able to build their own version. Some non critical details and measurements are not on the drawing but should be easy to figure out. Our version has ball bearings in both the pivot and weight slide but believe it's not really necessary. This version uses Delrin for slide bearings and gives you the option of adding bearings to the pivot. The tubing from On Line Metals is what they call normalized and the 1/2 inch thin wall is a good fit inside the thick wall tubing. I believe with a little lubrication this fit will make an almost friction free pivot.

Every piece of steel was cut with an inexpensive Black & Decker 14 inch abrasive chop saw including cutting one 2 X 6 chunk of steel into two pieces. We were lucky and found a 2 X 6 chunk of steel in the scrap pile that weighed a little over 60 pounds. Cutting it in the middle gave us two 8 3/4 inch long weights that worked out to be just about perfect at a little over 30 pounds. We didn't have enough 2 X 6 steel to make a weight for the 3rd machine so we found a long enough piece of 2 X 2 steel to cut into three 8 3/4 inch pieces. These were welded together to make the 3rd weight.

I created a graphic of the scale needed (shown on the bottom of the drawing) that will print 3 sections of the scale on standard 8 1/2 X 11 paper. I used a laser printer with clear laser adhesive film in 8 1/2 X 11 sheets. Clear full sheet labels for ink jet printers are available at Office Depot but I had to go on-line to find clear laser paper. I would guess an ink jet printer could be used especially with the added layers of film and clear paint over the printing.I just felt laser print would be less likely to fade over time from being out in the sun. Should you have access to a laser, clear laser film can be found at http://texascraft.com/hps/ the stock number we purchased is HPGC8511GGL.

The whole machine was painted with black Rustoleum including the 2X6 wood base. I masked off a strip on the previously painted wood support and used a spray can of White Rustoleum to give me a white background for the scale. Cut the 3 sections of the scale out of the full sheet and used my Monokote sealing iron to laminate clear film over the printing to protect it. I used Oz Cover but believe any low heat clear model covering could be used. Trimmed and carefully applied over the painted stripe. I then sprayed the whole scale with clear Rustoleum to seal the edges and add another layer of protection.

This is a link to the plans which can be printed on standard 81/2 X 11 paper. Right click and select "Save As" to save it to your hard drive.
Link to plans/PullTestMachine.pdf

The scale image below can also be downloaded from . Link to/PTscale.jpg
You should be able to print it using almost any graphics program. You might need to play with margin settings, stretch settings etc. till it prints the proper size. Do your testing with plain paper before you print the real deal.

Operation is about as simple as it gets, pit boss asks pilot what his airplane weighs in ounces, he sets the sliding weight pointer to that weight on the scale, locks the slide, hooks up the control handle and says pull. When the flag drops it's a done deal. It is impossible for the pilot to over pull because the higher the weight is raised the less pull on the lines.