

Wing Dethermalizer Systems for the Boomer P-30

This document outlines methods of providing a dethermalizer system for the Boomer P-30 design for which the wing is allowed to come free or pop-up in flight.

The basic kit design as of revision 'B' includes the standard pop-up horizontal stabilizer system. This may prove to be inadequate to halt flight when flying with strong lift present. The pop-off wing is a method that removes all possibility of continued flight and offers the highest probability of model recovery. The method featured for the Boomer design is a lever system that allows use of the existing wing hold down dowels and rubber band method of securing the wing. This method still provides the wing positioning range of 1/2". The system has been proven and is suggested as a prime method to D/T the Boomer. Weight impact is negligible-the lever system and tail wire loop can be offset by removal of the existing tripwire and associated stab pop-up elements.

The wing pop-up method is a more benign system than wing pop-off, but much more effective than tail pop-up alone. The advantage of this method is less potential damage to the model upon contact with the ground. Be advised that the wing in the pop-up position still remains in a flying attitude even with the fuselage pointing downward some 45 degrees. In strong lift conditions this can still be problematic for model recovery. It is a simpler system to rig however and has the least impact to the basic design of the Boomer.

Wing Pop-off System

Review all drawing sheets for details before starting. Most of the work involves the pylon area. It will be easy if the model has not been assembled yet, and you can plan this retrofit as you proceed. Even a completed model can be easily reworked for the new system.

For a rework effort, lightly sand the canted surface of the pylon top where the balsa fillers will be installed to secure the lever assembly. 200 grit sandpaper to remove any floral spray or colored dope works best. Next, measure from the pylon trailing edge for the forward balsa filler edge and mark with pencil on the pylon top. CA bond a 1/16 balsa filler with one edge on this line. Shave the filler from this edge forward to remove weight and streamline as shown on the side view of the pylon. Using a piece of 1/16" diameter wire as a gauge placed against the edge of the first filler, apply the aft left and right hand fillers with one edge

butting against the wire. With the wire removed, this forms the slot for the tube bearings on the lever assembly. Shave the aft fillers down as shown on the pylon side view to remove weight. Sand the edges to match the pylon sides flush. Apply a coat of dope to seal the wood, then sand lightly to remove fuzz.

Install the 1/16 dia. X 5/8" long aluminum tube turnaround post through the pylon as shown on the drawing. Make a hole through the pylon using a sharpened 1/16 diameter wire as a drill. Be careful to make this hole as clean as possible for good strength, as the tube will have side load applied by the lanyard tension. Install the tube and secure with thin CA. Next, remove the 3/32 dia X ¼ long timer spring lanyard bung tube if installed on the pylon. This same tube is now installed on the opposite side of the pylon directly ahead of the turnaround tube as shown by hidden lines on the drawing.

(Note to builders of Boomer versions prior to revision 'B'; the bung tube and plug replace the pylon wire loop previously used to anchor the D/T spring. Instead of adjusting the length of the lanyard by tying, testing, adjusting and retying, the bung tube (3/32 OD alum) and plug allow the spring to be positioned easily to apply proper force for timer calibration. Install the lanyard through the tube and push the plug into place to pinch the lanyard against the side of the tube. If lightly pinched to start you can adjust by pulling the lanyard tail to tension the spring. Once the calibration is set on the timer, the plug is then firmly installed and secured with a drop of cellulose cement to retain but not permanently bond in case adjustment is needed later. A good bung plug is a cutoff round toothpick end.)

Remove the stab D/T tripwire if installed. Sand and clean up as necessary-seal the area with dope if needed.

Install the wing D/T lever assembly into the slot formed by the balsa fairings on top of the pylon. Check for freedom of movement-there should be no binding with the balsa fairings on either side of the lever and the horn ends should clear the pylon sides during rotation forward. Install small segments of 1/16 OD aluminum tube on each horn and lightly crimp about 3/32 above the bend in the horn. Apply thin CA to insure they stay in place. These serve an important function in keeping the wing bands from sliding any lower than this under tension and fouling the release action of the lever. Your greasy lube soaked fingers make this highly probable in use, so do not omit this feature!

You are almost there now. Install a short length of "Spiderwire" (fishing leader

material-6 pound test) to one end of the timer actuator spring. This will come from the bung tube, under the right side of the turnaround tube, over the lever and down under the left hand side of the turnaround tube to the spring. Leave some excess to allow positioning of the spring to calibrate the timer. Next, make a lanyard loop about 2 ¼” inches long and tie onto the other end of the spring. Use CA to secure the knots on the spring, but do not do this for the looped lanyard until you test the timer. You may need to make longer or shorter and it will be easier if not glued to the spring.

Now test the system with the timer. No need to install the wing yet-just adjust the tail lanyard to tighten or loosen the position of the spring and get your timer release set to satisfaction, as done for the stab D/T setup. Just make sure you have the lanyard routed correctly to arm the lever assembly. Do not pull into tension using the spring-grasp at the tail end of the spring to set, then stretch the spring using the timer lanyard to arm the timer.

Now install the wing using one ¾” diameter dental bands on each side as done previously. In practice, you would install these bands to hold the wing on during the winding phase. If not already set, the lanyard would be positioned to secure the lever assembly and the timer engaged with the spring tension. Now, remove one of the bands from the aft wing dowel end and pass under it, stretching aft to engage the lever assembly horn on that side. Repeat for the opposite side to arm the wing for pop-off. For initial testing, just use one band each side. Also, arming the timer is best done with the model in the stooge to allow both hands to assist.

Observe that both bands snap free when the lever assembly trips. There is a possibility the bands will snap back onto the ends of the dowels if these are left too long. If this appears to be happening, shorten the dowel until just enough protrudes on either side to secure the rubber bands. Make sure your release is consistent before attempting to fly the model. The wing bands can be retained with the model after release by capturing them with a small dental band applied over the ends of the wing peg and against the wing bands. Use ¾” diameter dental bands for wing mounting (2) on each side. 1/16 x 2” commercial bands have been tried as well, but these seem a little too soft for mounting the wing. Functional test the system for anything other than the dental bands noted if you plan to substitute.

Remove the spring and lanyard-touch up paint the pylon for areas sanded or marred by the rework if desired. Reinstall the spring lanyard, test for timing and

that part is ready to fly.

Make the .015 wire wing connector eye for the wing lanyard. Install this on the aft surface of the inboard panel wing spar WS-1, right hand wing panel at the polyhedral break as shown on the drawing sheet 3. Form a small glue fillet of medium CA on either side of the wire and dust with micro balloons or baking soda to fill. Test for secure and strong installation.

Form the .015 wire tail cone loop. The length is necessary to spread the release shock load into the skin of the tail cone. The stub end of the fuselage does not extend very far into the cone, and will likely break off if subjected to strong force, so don't just drill a hole in it for a lanyard tie-off! Sand any finish in the area of the wire bond, then perforate the tissue covering to allow medium CA to penetrate into the balsa skin. Position the wire and secure with medium CA and micro balloons as done for the wing connector eye. This completes all the airframe hardware required for the system.

Make a wing lanyard using Spiderwire tied directly to the loop on the right wing. Allow some slack in the lanyard such that it drapes under the horizontal stabilizer and does not influence the rigged position of the wing in any way. Install a number 14 swivel snap assembly (fishing tackle) onto the end of the lanyard, which in turn snaps onto the tail cone wire loop. The wing spins around quite rapidly on decent, and without the swivel feature the lanyard quickly resembles your fully wound rubber motor by the time the model reaches the ground!

For existing models already built with pop-up stab; you may keep all of this intact and just provide a place to hook the D/T tension line onto the fuselage in place of the tripwire assembly. It is not necessary to continue the stab pop-up, but the functionality of the incidence adjustment screw, stab tilt, etc. still rely on a tensioning method at the stab trailing edge. It is possible to simply apply a dental band onto the connector eye that has been looped around the tail cone wire loop to provide this force if you would like to remove the tensioning line and guide tube for weight saving.



Trip wire assembly installed



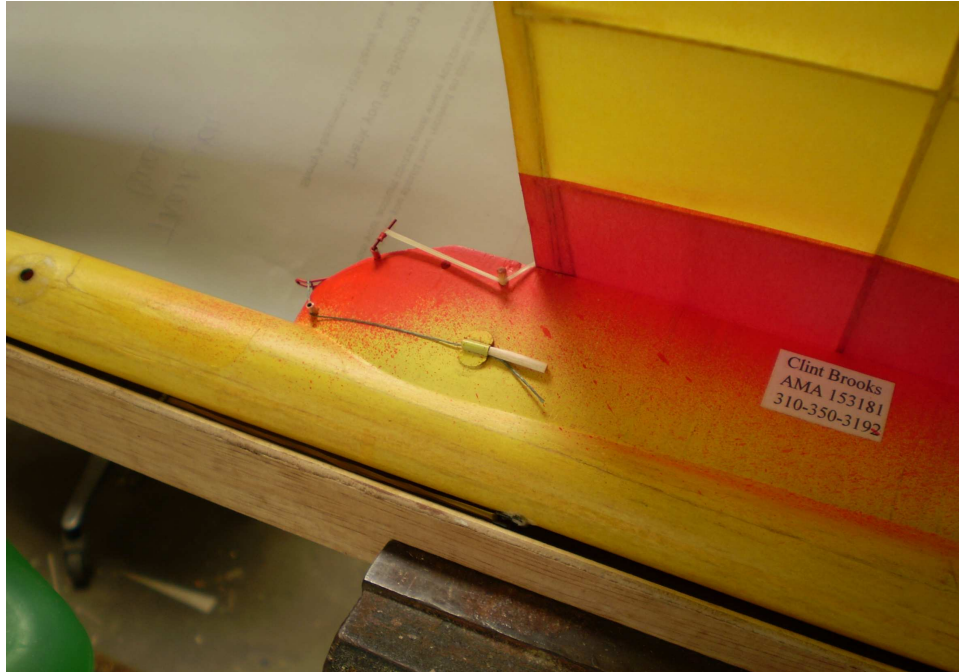
Actuated position



System armed



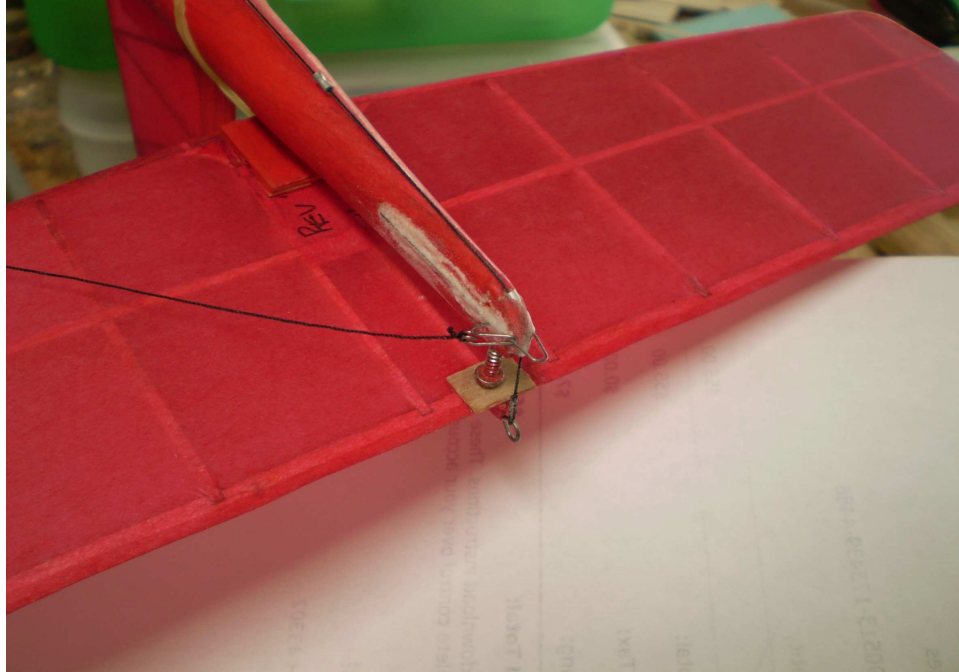
Armed system-bung tube and plug (temp plug shown)



Armed system with wing installed (temp plug still used in example)



Another view of system armed and ready to fly



Tail hook setup-install swivel snap to loop! Black line is wing lanyard.



Stab pop-up lanyard secured for retrofit

Wing Pop-up System

The wing pop-up system still utilizes the stab pop-up feature, therefore no need to alter the existing tripwire installation, lanyard, etc. relative to the stabilizer system. The best way to set up the model is to rig as required to fly with the stab pop-up alone to start. Perform the glide and power trimming steps as described in the construction manual. Once the wing position is firmly established based on your best trim settings, mark with pencil on top of the pylon recess area where the trailing and leading edge of the wing is located. Remove the wing and proceed to finalize the wing pop-up system.

If not already done, install the 1/16 diameter turnaround post through the pylon at the location shown on the drawing. Use a length of sharpened 1/16 diameter wire to form this hole and make a neat installation. Make sure the left side of the post is projecting out as shown on the drawing. The bung tube will need to be relocated to the opposite side of the pylon as indicated by the hidden lines if doing a retrofit. This could be the initial installation position and run the longer lanyard using the thru pylon fairlead holes and turnaround post for initial flight trimming and stab pop-up alone.

Using the leading edge location mark you made on the pylon, position 1/64 plywood discs approximately on center to this line on the sides of the pylon as shown on the drawing. The lanyard will draw the leading edge of the wing straight down based on the location of the fairlead holes, so these need to be located using the leading edge marking as the center line. The plywood discs provide wear surfaces for the lanyard and prevent cutting through the balsa pylon sides.

On the inside of the recessed area of the pylon, install 1/32 balsa doublers where the lanyard will pass through and also at the wing trailing edge area to allow more support for the pop-up stress imposed on the pylon sides here. Carefully sand the doublers flush to the top edges of the pylon.

At the trailing edge marks, bond a small segment of 1/16 square with the forward edge on the line; these will trap the wing from sliding aft. Notch the pylon sides down to the pylon floor just ahead of these stops to allow the wing T.E. to drop down when popped-up. The wing will notch it anyway if you don't, so go ahead and make the relief. Keep it minimal to avoid losing the wing incidence angle, as the notch is basically at the point the wing seats to the pylon edges. Taper the T.E.

stops as shown on the plan to reduce weight and provide a finished appearance then seal these areas with clear dope.

The wing will need to have 1/8 wide fillers added at the forward center rib in order to mount the leading edge hook (available at fabric stores-use the smallest size dress hook; also known as bra hooks too I guess..) A small piece of 1/8 square balsa bonded to either side of W-1 at the wing center works well-seat against the WG-1 gusset and the rib, contacting the first turbulator spar. Shave the top side flush to the rib profile-a small flat formed with an emery board works best for the hook to seat against.

Add the 1/32 balsa doublers ahead of the short support spar on the top edge of the center rib W-1 for the rear band hook. Sand to match the rib profile and seal these areas with dope. Cover the wing before installing the leading edge hook and rear band hook.

Install the leading edge hook approximately as shown on the drawing. Having the hook slightly aft of the leading edge on the upper wing surface insures the line tension is directly down against the leading edge for positive seating to the top of the pylon. Install the band hook on the wing center line. Use thick CA and micro balloons to create strong glue fillets for these items.

Use the sharpened 1/16 diameter wire to auger the fairlead holes through the plywood discs, on center to the leading edge line. This is best accomplished with the hole angled up slightly as you start on center of the disc. The hole needs to break out just above the floor of the pylon, although it won't hurt anything if it comes through the floor slightly too. You want to make sure you have good edge margin to the top of the pylon edge, so take care not to let the hole break out at the top edge or close to it. If this happens, just scrape off the discs, fill the balsa areas damaged, install new discs and drill again. Make sure the holes are clean and the lanyard will feed freely through them.

Slip the lanyard tail through the two holes , from left side to right side and feed through the bung tube and lightly secure with a plug. Position the wing to pick up the lanyard segment trapped by the two pylon sides through the hook on the leading edge. It helps to bend the hook down slightly to keep the lanyard from slipping out while attaching the wing. With the lanyard captured by the forward hook, set the wing down on the pylon and attach using two 5/8 or 3/4" diameter dental bands through the rear hook an onto either end of the wing peg. Without

tensioning the lanyard, the wing will remain in a pop-up position in the manner of the tail.

To set for flight, pull the lanyard tight from the left side to draw the wing down. Pull in front of the spring and draw the lanyard around the turnaround post and hold against this with a finger. Use your other hand to grasp the timer lanyard end and lightly stretch the spring until the lanyard is engaged over the timer arm. Adjust the tension in the spring to get the timer calibrated to your satisfaction. When all is set, cutoff the excess lanyard tail, leaving about 1 inch to allow for future adjustments. I also install a short length of 1/16 OD alum tube that is crimped and bonded onto the tail end. This is a safety in case the bung plug should work loose or fall out enough to allow the lanyard to slip under tension. In theory this will keep the lanyard from pulling through the pylon fairlead hole and being lost, but unlikely to happen. But wouldn't that blow your day at a contest if it did!

The wing will not forcefully pop-up under static conditions. It will pop up quite smartly in flight, so no need to overpower the wing bands. You may also want to consider a safety lanyard for the wing to fuselage should something go awry and the wing departs for some reason during D/T.

Check the assembled model for any trim adjustments-there will probably be very little to consider if this was already set on a tested model. Counterbalance the left wing tip if the weight of the wire loop on the right hand wing is a problem on the pop-off system. Good luck with flying-practice using your system before entering competition to learn the best sequence of events, pre-flight considerations, etc. relative to either method.

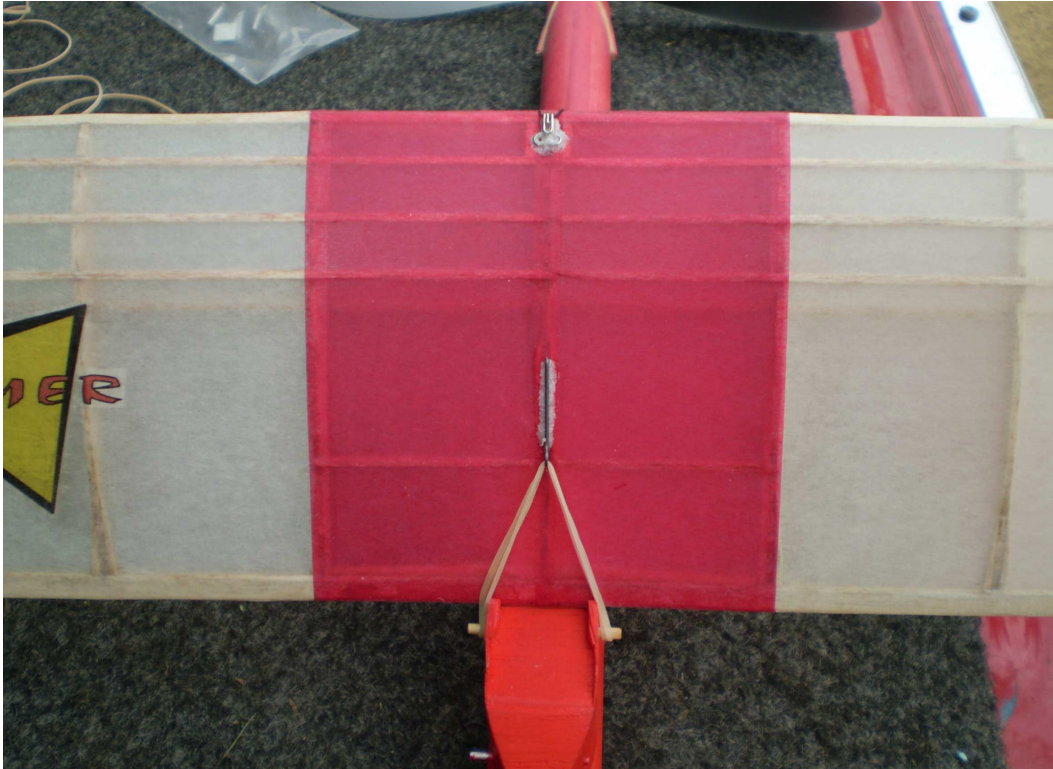
Written by Clint Brooks
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Wing pop-up; bung tube installation-note L.E. pencil mark on pylon floor



Wing pop-up right side detail; note T.E. stops and notching



Wing pop-up looking down on center



Pop-up wing left side detail



Pop-up wing deployed



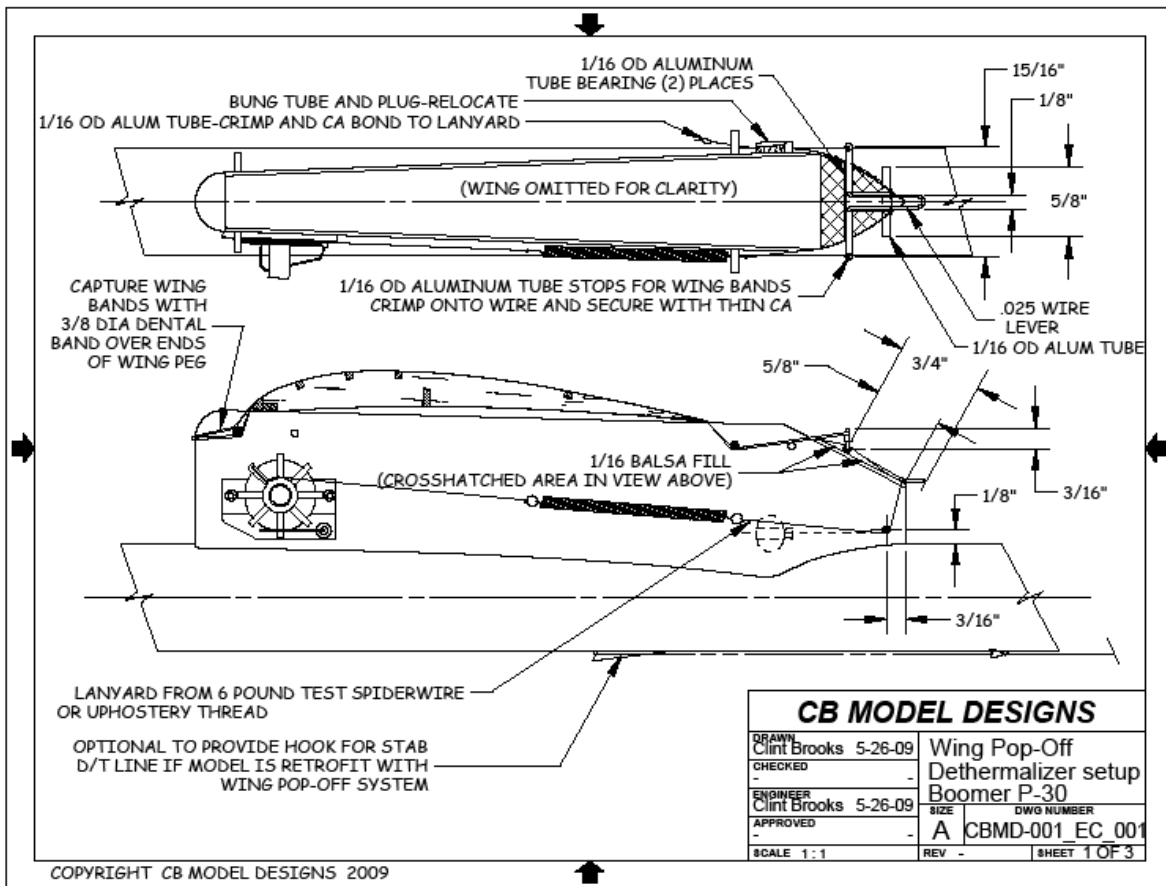
D/T configuration in flight-wing will remain parallel with ground



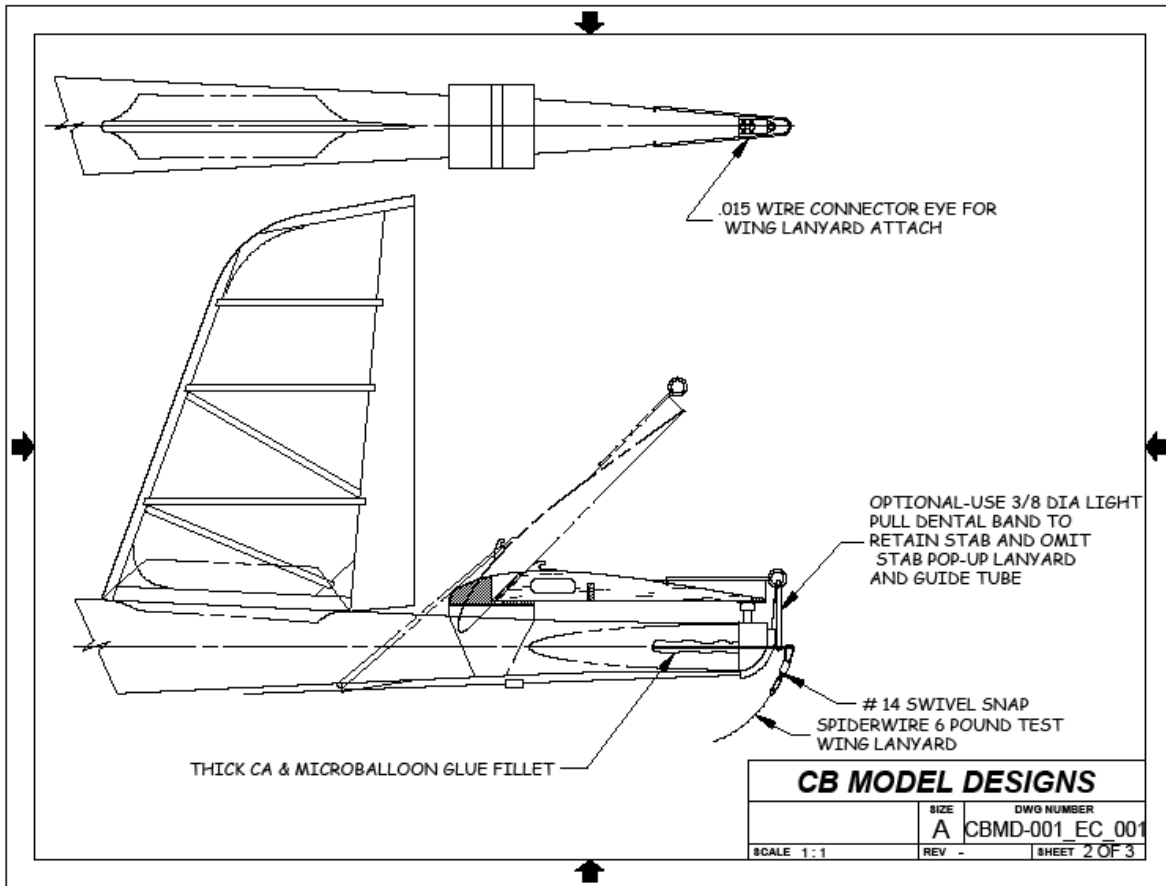
Wing D/T armed-stab tripwire ready to load



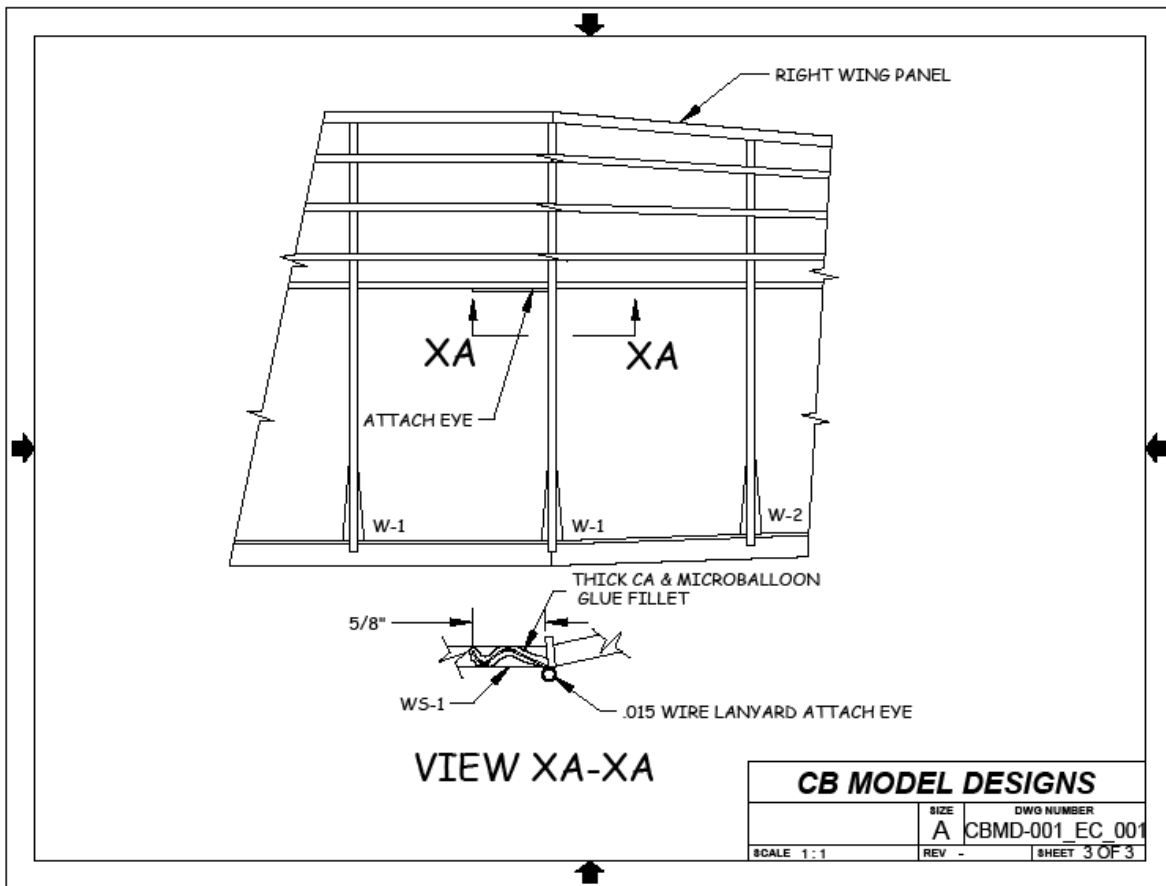
Another view of the wing D/T armed and ready to fly-I countersink the fairlead holes a bit to ease the wear on the lanyard.



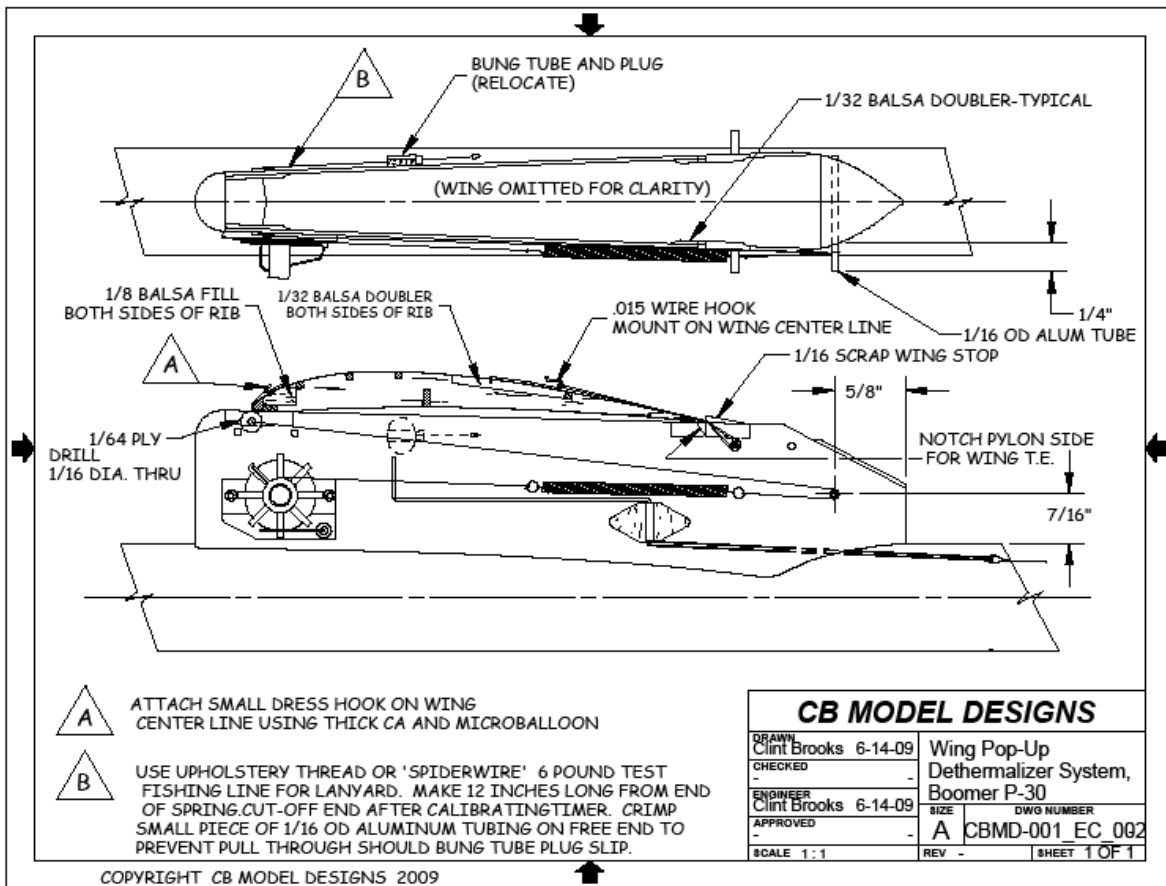
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