

Building a 33% Scale Piper PA-22 Tri Pacer from the Wendell Hostetler Plans



Royal Aero Club of NSW Aircraft Line up in 1960

I came across the old photo above when I was looking for some scale details for the Chipmunk I was building at the time. It's a line up of all the available aircraft for charter and pilot tuition owned by the Royal Aero Club of NSW back in 1960.

The two planes that I have circled above were the two types that I flew as a know all QANTAS second year apprentice ground engineer. The low wing DH Chipmunk and the high wing Piper Tri Pacer.

The Tri Pacer was considered a bit ho hum by us smart arse kids but it was a very pleasant and easy to fly aeroplane.

I have built and re-built Chippies ad nauseum but I thought it would be a nice bit of nostalgia to make a decent model of the Tri Pacer I flew so many years ago, so here we go again, VH-RST in a quarter scale or bigger is the project.

The usual starting point is to collect some data on Tri Pacers in general and try and get some specific data on VH-RST.

I was lucky in that one of the magazines I subscribe to ran an article on PA-22 Piper Tri Pacers from 1951 to 1960 and I was able to identify that VH-RST was a 1957 model finished in Daytona White and Cadillac Red.



Colour scheme and model now sorted. It was time to see if there were any plans I could build from.

The Tri Pacer turned out to be a pretty unpopular aircraft to model, there were tons of Cessnas etc but the only plans I could find were old Vince Miller plans drawn back in the 1980's or a set of Wendell Hostetler plans drawn in 2003. The Hostetler plans were 33% of full size which was probably bigger than I wanted but there were a few accessories available so, easy choice. I ordered a set and a fibreglass cowl.





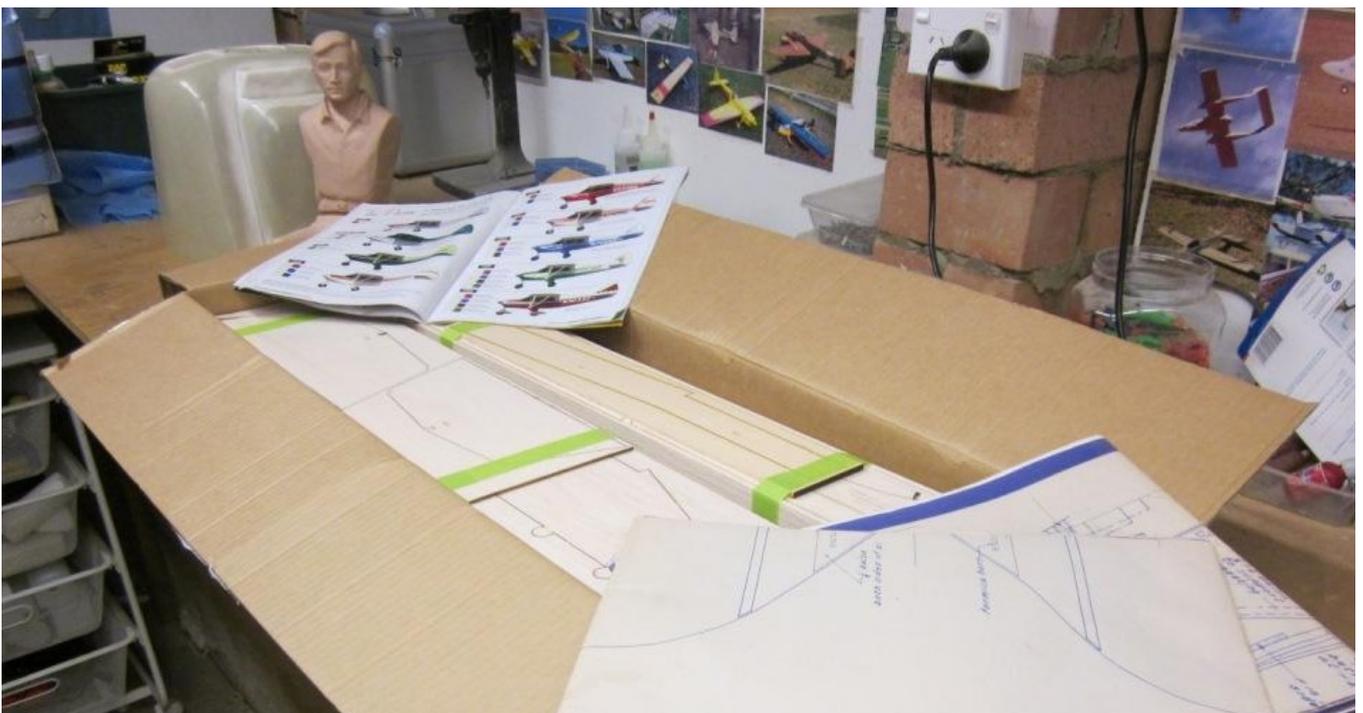
A 1/3rd of full scale model, even a small aircraft as a Tri Pacer is still a pretty big bird and it will be over 81" long with a wing span of 115" in the old currency or roughly 2 metres long with a wing span of 3 metres.

After receiving and studying the plans I was put off by having to cut out a gazillion ribs, formers and ply bracing

so the project went on the back burner for a while as I mucked about with my usual warbirds.

A year goes by pretty quickly when your an old bloke and being prickled to do something about making the thing I cranked up my computer to see what it would cost to get a laser cut kit of parts from the States and yes, there was a guy who could supply a kit but I would need a second mortgage to ship it to Australia. So back on the shelf again.

I thought I would try to get one of the local kit makers to have a go and sent the plans to Bob Phippen of Wolf Models in Queensland but he had trouble scanning them as they are the old blue print type. Back on the shelf again. More time went by until I heard of and contacted Brad Heller of Laser Cut Kits of Australia to see if he would cut me a kit and yes, no trouble, a week or two and it will be on your door step. At last!



The kit arrived as promised and I had a very substantial box full of balsa and ply. Christmas is early...

Where to start. After identifying all the bits I started by gluing all the ply parts that required laminating up to the thickness on the plan.



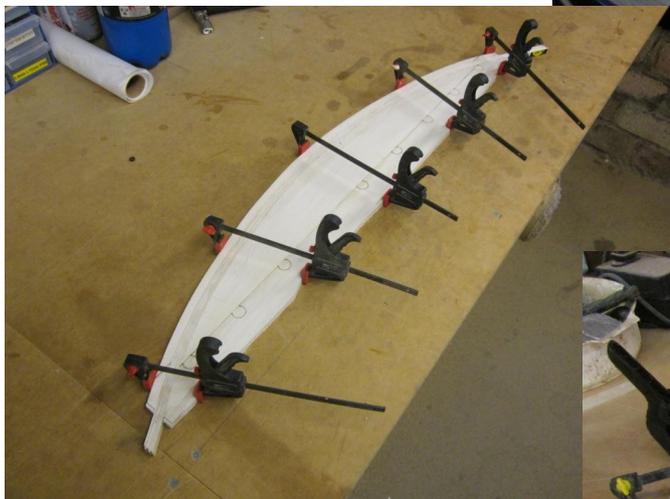
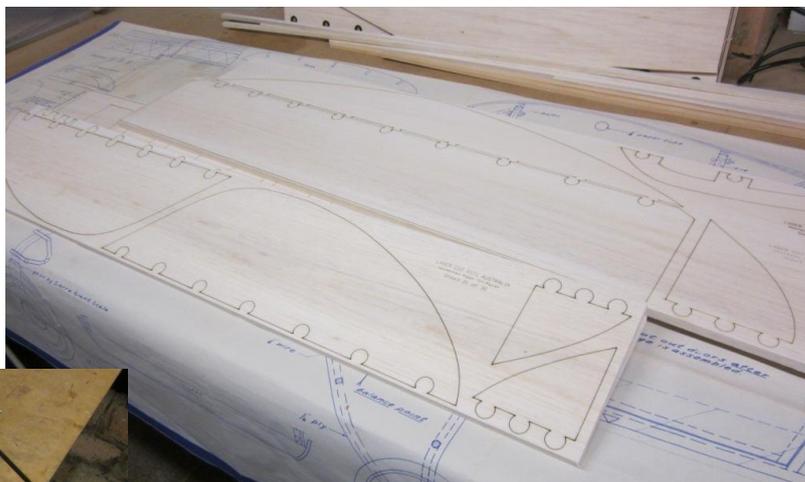
These bits are the wing joiners, main U/C floor and firewall all glued with Tite-bond wood glue.

Next job is tail feathers. The plans show solid 3/8" balsa stabiliser, elevators, fin and rudder and Brad had faithfully supplied as per plan but we are trying to build a nice scale model here and solid tail feathers is asking for trouble with having to add nose weight to balance as well as looking wrong. I am going to laminate outlines and add ribs similar to picture below.



The solid parts that Brad has supplied wont go to waste as I can use them for formers to bend laminating balsa strips around.

All of the formers were taped on the outside edge with Aust



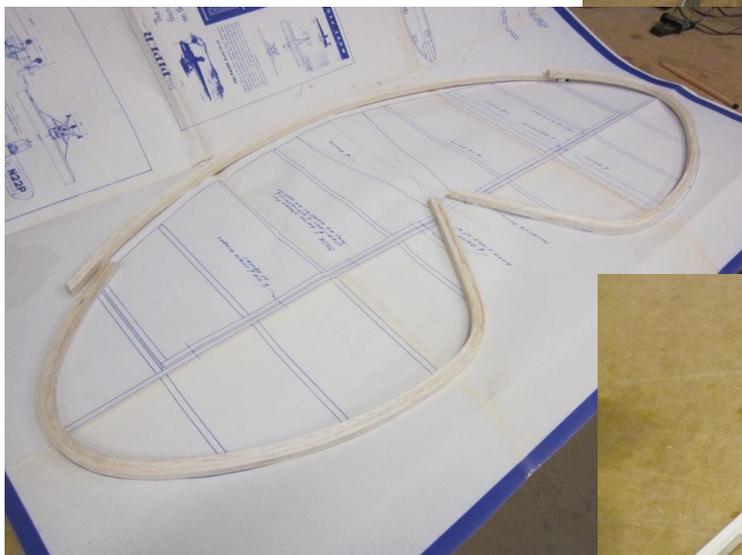
Post packing tape to stop the lamina-

tions sticking to them.

The above is the leading edge of the horizontal stabiliser.



I used 8 laminations of 1/16" balsa glued with ordinary old Aquadhere and left overnight in the jig to cure.



Above is the outline of the stab and elevators and to the right is a finished fin and rudder.





The stab and elevators are more or less finished now but I still have to work out a way to mount the stab as per the full size which pivots on the elevator hinge line with the incidence being trimmed for hands off flight at the leading edge, from memory there was about a 25mm gap between the inside end of each stab and the side of the fuselage.

I am going to try and hide the elevator horns inside the covering at the back of the fuselage and operate them with a pull pull setup but I will have to wait until I have put the fuse together to get the right position





The fuselage construction is a little confusing. The start is a balsa stick frame with solid balsa fitted between the framework to just behind the cabin and then the sides are completely sheeted on the outside with 1/8" balsa sheet.

The door positions on the left and the right sides of the Tri Pacer are in different positions so the left and right side frames have to be made accordingly with the doors being framed and able to



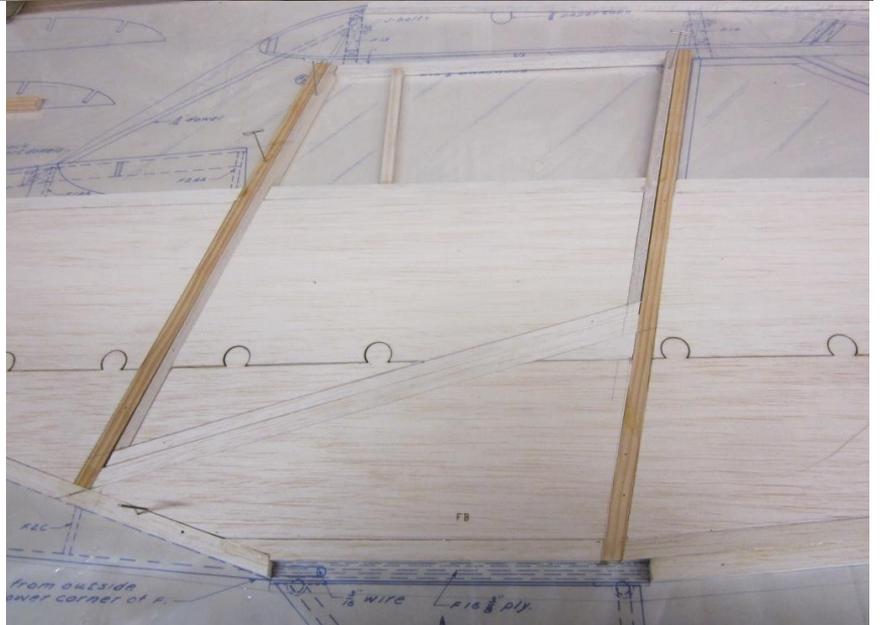
be cut away from the fuselage later in the build.

Pictures on this page are of the left side with the rear door.



The picture above shows 6 sheets of 1/8" x 3" x 36" scarf and butt joined to create the large sheet required per side.

This picture is of the right side with the front pilots door still attached to the frame.



The pilots door is in front of the wing struts so has to have the diagonal bottom sill for clearance.



Finished right side with outer sheeting.



The two sides will form a box like structure that will have frames and stringers attached to the outside to form the fuselage shape.

The base of the fuselage is the undercar-

riage plate and both sides were epoxied to the plate after squaring everything up.

After the plate to sides join was cured I epoxied the firewall to the sides using Techniglu. You can see in the picture that I have fixed the firewall in position with epoxied dowels

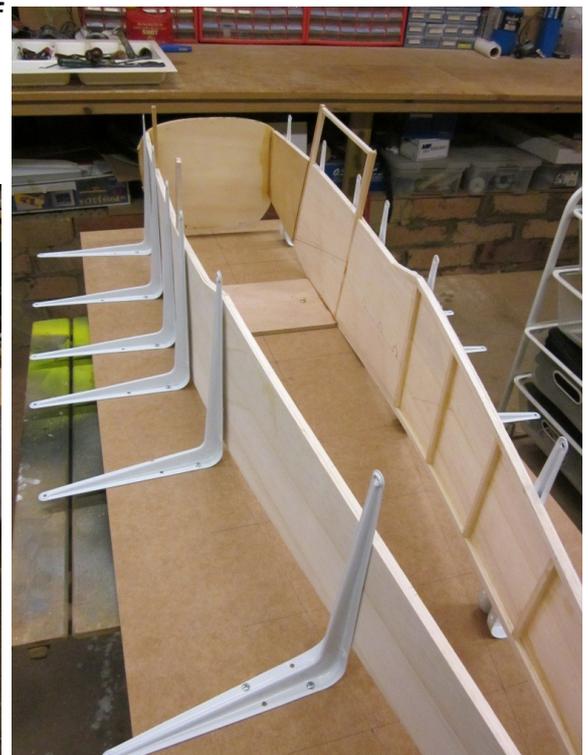


The next challenge is to fit the cross members and frames but after a preliminary play it was obvious that if I wanted a square and true fuselage I would have to make a jig the full length of the fuselage to ensure the sides were vertical and followed the overhead profile on the plans This was a bit of a hassle as the jig had to be made from a bit of MDF 1800 x 600 x 16mm and 12 x 300mm el cheapo right angled brackets.



A centreline was drawn down the MDF sheet and the outer profile of the fuselage was plotted from the plan at each frame point. The position of the undercarriage plate was transferred to the jig and the fuselage was screwed to that position through the U/C plate.

The sides could now be bent to conform to the overhead profile and when a bracket was screwed to the jig at the outline of the profile I could eliminate any distortions. All that remained was to cut and glue the cross members and reinforcing gussets





Cross members and frames are fitted and the fuselage is now rigid and ready for the wing mount, longerons, frames and planking. I'll leave the fuse in the jig until I have finished the wing mount as it will be critical to get the mount level with the right angle of incidence.



The plans don't show any way of mounting the stab and fin so I'll have to make up something there as well and it too will need accuracy with having the stab level and with the correct angle of incidence.

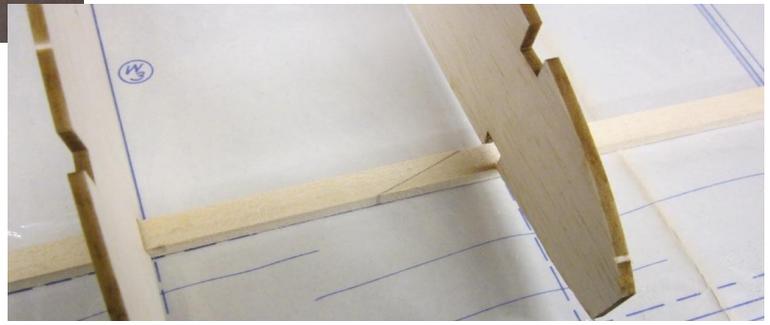
I had to do some more ordering of the basswood that is used in the wing mount so while I was waiting I laid out the wing plans for a look. It's a pretty simple wing so I thought I'd knock them over before the wood arrives.



First step as usual with laser cut kits is to laminate all the parts that require extra thickness or strength. I use PVA and plenty of clamps and job done. One thing I have learnt along the way is it is far easier to wipe surplus glue off when wet using a wet rag than it is to have to sand it off when dry.

All eight basswood main spars required splicing to achieve the required length

which was a bit of a chore but all done and glued with West Systems Techniglu. I'll stagger the splices so no two will be in the same place along the wing.



The wings are attached to the fuselage with ply tongues going into wing mount boxes attached to the main spars and supported by wing struts, all pretty standard fare but I wouldn't like to apply too much negative G on this arrangement.

Come to think of it I never did see a Tri Pacer flying inverted.

The ply wing boxes were epoxied to the main spars, all the ribs were fitted over and another pair of main spars fitted to the top to finish the basic framework of the wing





It's a pretty simple wing and easy to put together with laser cut parts. The starboard wing was made first and then the port wing was made.

It was easy to make a mistake here as the plans only show a starboard wing but the ribs are spaced equally so it wasn't a hassle until I got to the tips. I couldn't re-

fer to the plans for the tip position so in the end I positioned the tip by putting both wings back to back and then gluing it to the last rib before doing the tip surround.

Meanwhile my stuff had arrived from RC Headquarters so it's



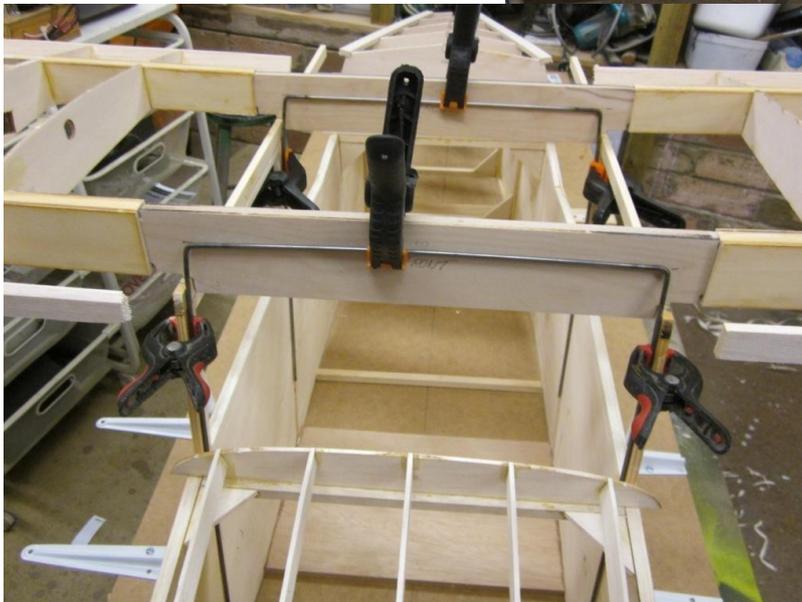
now up to making the wing mount on top of the fuselage.

This is going to take a bit of time to get right as the mount is based on beams stuck onto the tops of the spruce cabin frames reinforced with piano wire hoops epoxied to cross beams and the cabin frame.



The wing joiner beams are two large pieces of 3/8" aircraft grade plywood that have to be fitted into the wing mount boxes made up in the root of the wings. Careful sanding and shaping enabled me to get the first look at how big this thing is.

The complete wing and joiners were then placed on the



lengthwise cabin beams and measurements taken to ensure the wings were at right angles to the center line and I still had the plus one degree angle of incidence and then glued in place.

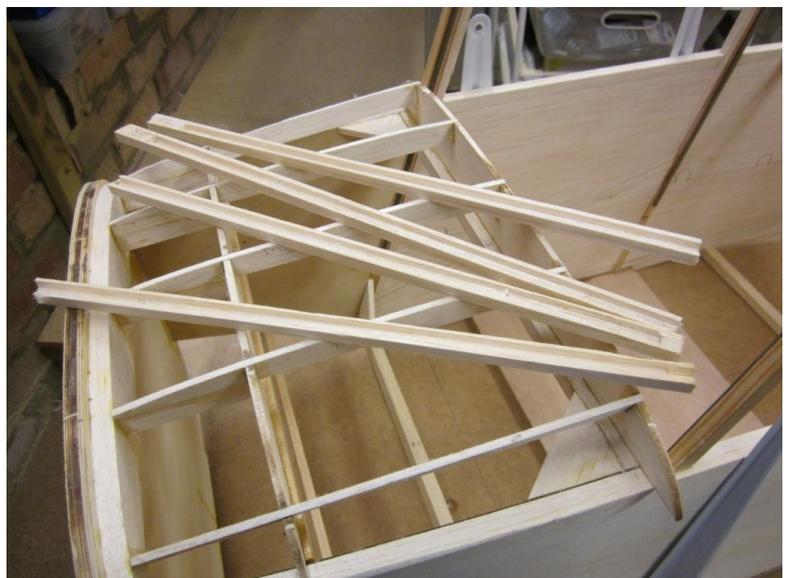
The 1/8" dia wire hoops are next and were tacked in position with CA prior to being epoxied to the spruce verticals.

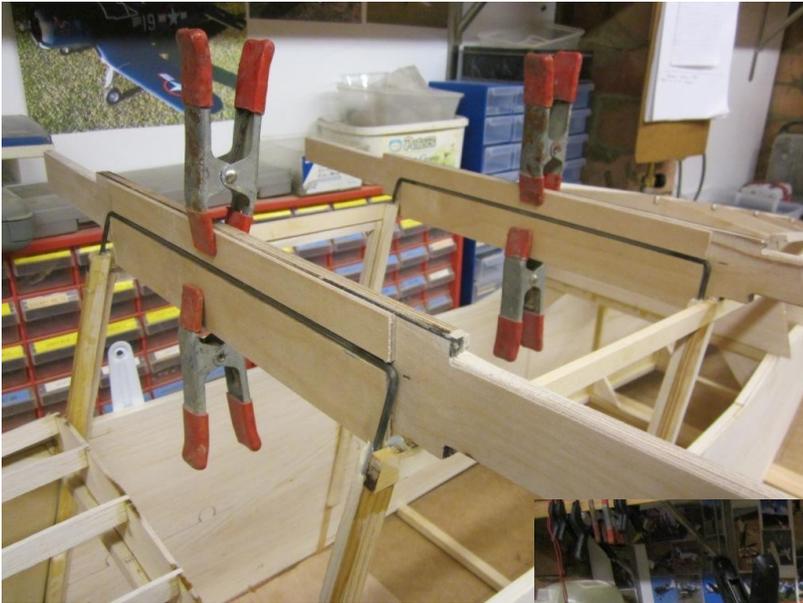
I have made four pieces of hard balsa with a 4mm x 4mm

stopped trench in them which will be filled with Techniglu and clamped over the wire for the full length of the vertical spruce frame.

The horizontal part of the wire will be boxed in with aircraft grade ply and more Techniglu.

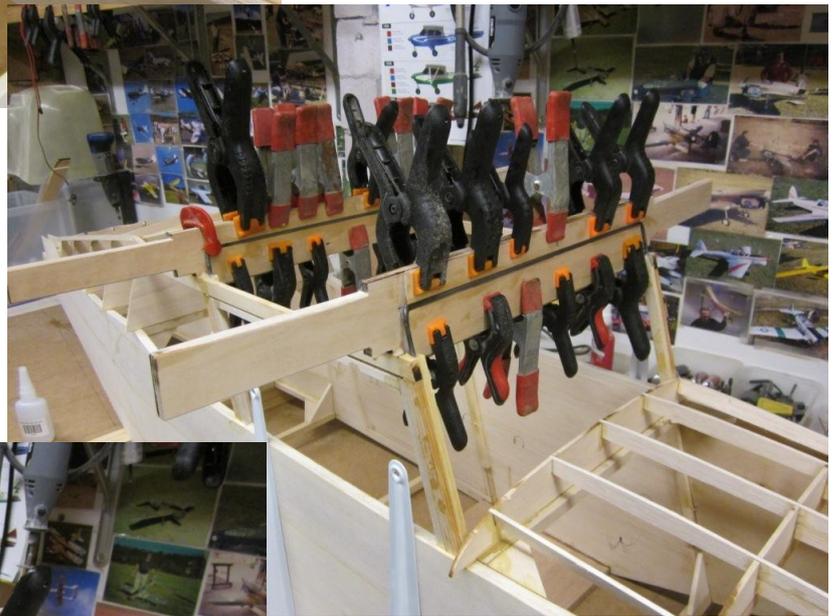
Thanks Baz for the tip on this Techniglu stuff it's great to work with being thixotropic.





The plans call for attaching the wire hoops to the wing beams with “J” bolts but my concern that with the vibration of a big gasser up front they would eventually come loose. This led me to boxing in the wires with aircraft ply and epoxy

I made up four pieces of 1/8” ply the same thickness as the wire, glued them in place and then glued the cover piece over.



The cabin frame and wing mount is surprisingly rigid now. Good one Wendell.





The back of the lengthwise cabin beams had to have a number of saw cuts to half thickness to be able to bend to join up with the first of the rear deck frames. Decent size 3/8" gussets with CA worked well here. To finish up, all the saw cuts were filled with thin CA.

All the frameworks are now finished. I have the fuselage in its basic box section and the wings and tail feathers are semi complete. All are now ready for the detail to be added that will transform them into the true shape of the Piper Tri Pacer.



To be continued

Cheers
Stan