

**Building and Flying a Ziroli P40E Kittyhawk... Instalment 10**  
**Balancing the Plane and Running In DL50.**



**Weights & Balancing:**

On her feet for the first time. The cheap camera I use isn't too good with accurately reproducing colours, especially when I use the flash. The bottom picture on page 7 is a more accurate picture of the models colours.





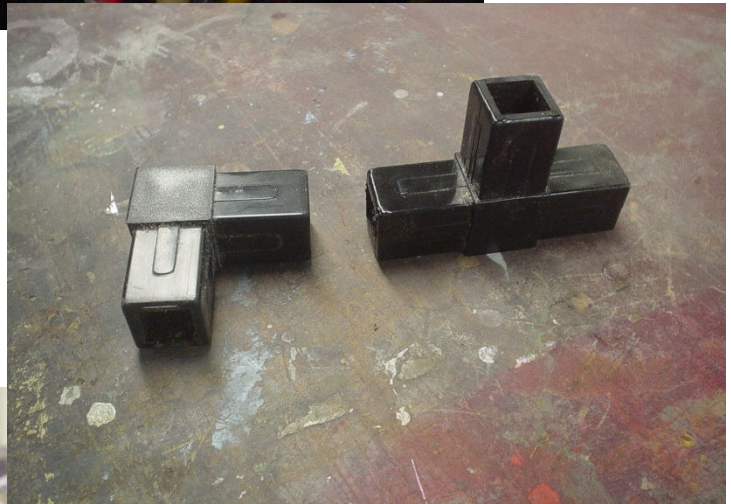


### Balancing:

The fore and aft balance of any aircraft is critical to how it will fly. Fighter planes with small horizontal stabilisers especially so.

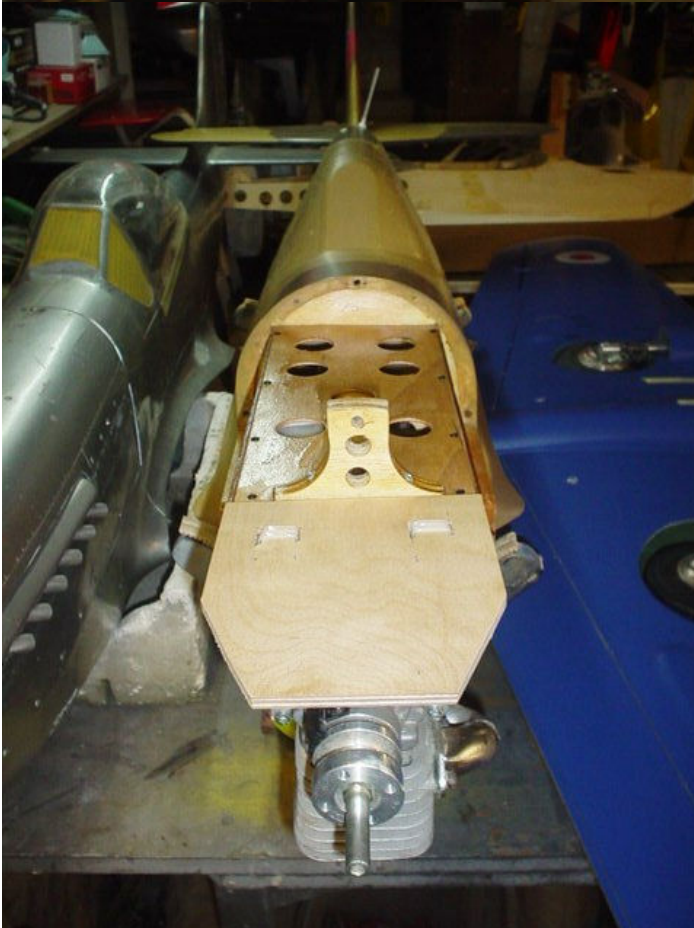
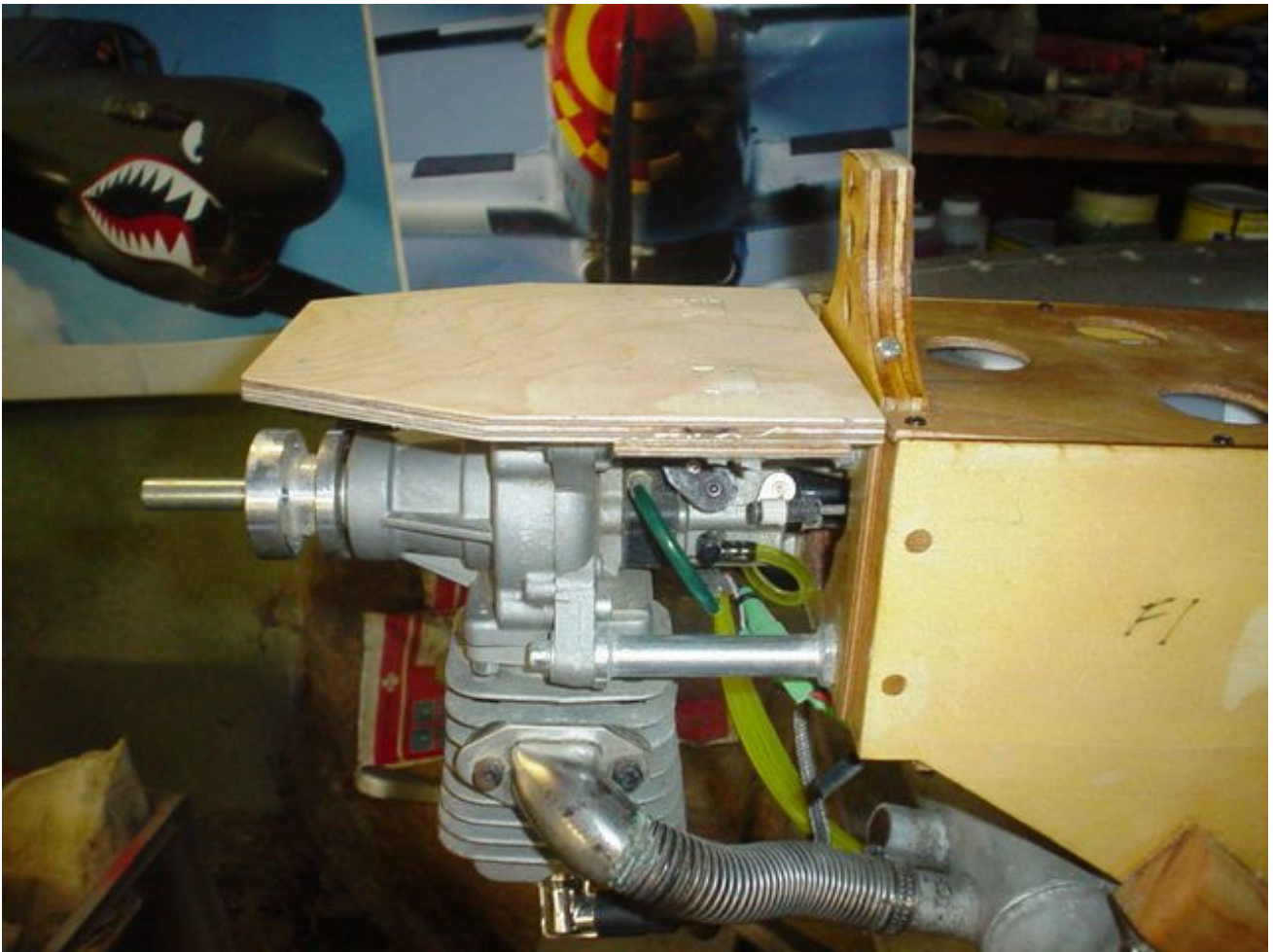
I made this balancing stand some time ago when I found the old finger under the wing tip method too rough.

Its made from pieces of 25mm square aluminium box section with plastic fittings called **Qubelock** in the corners and in the centre for the uprights.



You can see from the picture that the padded angle feet on the top of the stand pivot on ball bearings. The centre line of the axle gives a perfect indication of the balance point.



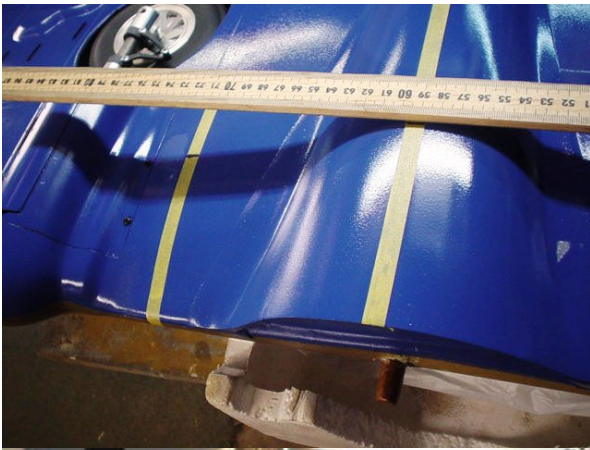


To longitudinally balance models of these old fighters seems invariably to require adding weight in the nose. I suppose this is because the ratio of engine weight to fuselage weight is very different from full size to model.

To add the minimum weight to achieve a balance you need the longest lever you can get at the front of the plane. I've made up a 6mm ply plate and attached it to the motor stand offs with large cable ties. Sheet lead will be bolted to the very end of the plate which will be right behind the spinner to achieve a balance.

The plane will be balanced with dry tanks and wheels retracted..





The C of G for the P40 is 4 1/4" back from the leading edge at the wing root.

I've put some tape down where the balancing frame feet will rest and marked on the tape the balancing line extended from the root measurement.

The plane is then hoisted with the block and tackle over the frame, lowered and positioned



on the marks on the tape. The hoist is slackened until the plane is wholly supported on the feet of the balancing frame. The slings are not totally removed but are left slack to restrict any large amounts of tail or nose down movement.

Strips of sheet lead are then placed on the cowl in the position of eventual attachment until the thing balances with loose slings.







I ended up having to add 393 grams of weight to get the correct dry balance.

The lead strips were bolted to the 6mm ply plate with 2 x 10-32 cap head screws into Nyloc nuts.



This picture shows the achieved length of the front lever from the C of G.

The cowl fits over and the spinner hides all.  
Finished done.....



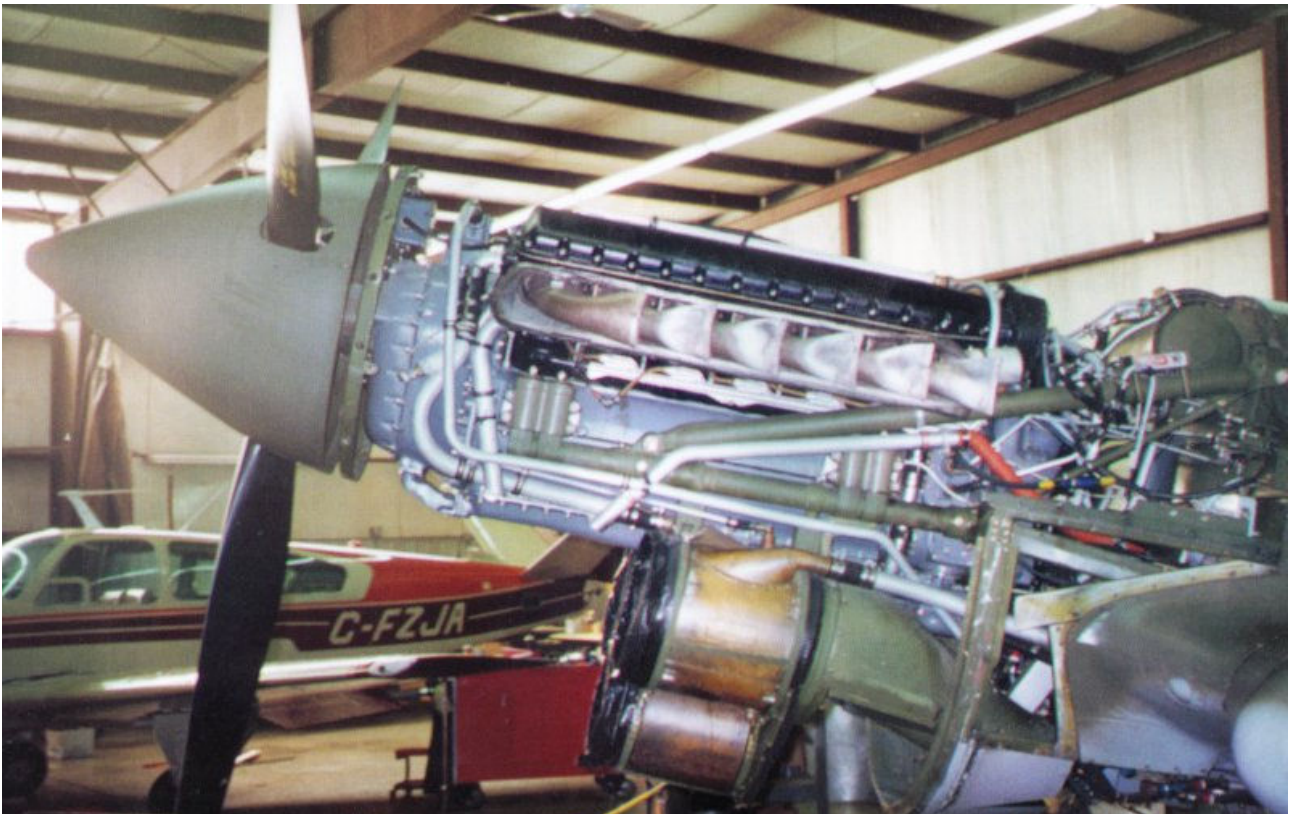


Weigh In: Complete model, after balancing, slung up from the rafters for weigh in.



14 or so kilograms is not a big deal for the size of wing this thing has.





Running In the **DL50**:

Home motor run in area. Plane on table tied to the handrail of the deck at the rear of the house. The neighbours love it !!







Running this motor has turned into a right shemozzle.

Attempt 1: Motor started OK but it wouldn't transition from idle to full revs. The needles were set to the factory recommended settings, 1 3/4 turns out for the high and 1 1/2 turns out for the low but I had to move them well away from this to get the thing to go to full throttle and even then I was only getting an unstable 5500rpm. As soon as I pulled the throttle off it would stop...Great...%\$&#@&.

Attempt 2: I suspected that the carby had crap in the internal mesh filter so removed the motor from the plane to get access. The filter did have some crap in it in the form of sort of flakes of varnish so replaced filter, put it all back together and ran it again and it worked or sort of worked. The bloody thing will hold 5500rpm but is very flaky in the low end with an unstable idle and occasionally stopping. This does not inspire confidence if one has to abort an attempt to land and need to throttle up for a go around.

Attempt 3: This motor is over propped with the narrow 21 x 12 so I swapped it to a narrow 20 x 12 that the **DL50** in the Hurricane can spin at 6500rpm but the best it could do was 6000rpm.

Attempt 4: Removed motor to check ignition timing. Timing was spot on the 28 degrees recommended. Replaced motor in airframe.

Attempt 5: Maybe the exhaust system is creating too much back pressure so off came the complete system and replaced it with a Pitts muffler. There was minimal improvement at top end and no change to erratic idle.

Attempt 6: Removed motor. Stripped down back end of motor looking for any air leaks around the reed valve and carburettor insulator block, nothing obviously wrong but re-assembled using silicone gasket goo on all the faces. Replaced motor in airframe. Ran motor. This is a mini eureka moment as the motor will now idle and now revs out to 6100rpm with the big prop. The static thrust is a substantial 10.1kg but I still don't trust the thing. I had to lean the idle needle to about half the factory setting to get a good low down performance. This leads me to the diaphragm needle and seat settings. Altogether, still a bit suss I'm afraid.

By now I'm getting pretty jacked off with all the crawling about to adjust needles and having to remove and replace the motor a zillion times so after a rush of blood I have ordered a new carburettor, new inlet reed valve block, new **Jtec** pitts muffler (the current one wouldn't fit inside the cowl) and a **Mejzlik** 20 x 10 three blader. Progress has now ground to a halt with Bowlyie only 4 weeks away. Motor running WIP. If purchases don't fix, motor will be RIP...



Attempt 7: Bite the bullet time. I've just had an email from **Jtec** to say that it will take 14 days for them to make the special muffler that I have ordered and another two weeks for delivery so that plus the fact that all the other stuff I have ordered for the **DL50** comes from **Tower** in the US, **LXRCMODEL** and **SDSHOBBY** in China means a four week delay. It is now the 16/3 and Bowlyie is on in three weeks. Too bloody late....No option but to order a new motor express delivered by **EMS**. It is a **DLA56** from **LXRCMODEL** . I



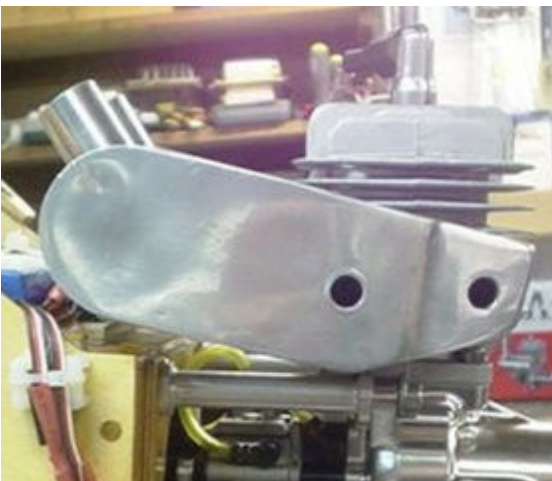
wanted to order a **DLE55** but they seem to have been withdrawn from direct sales

Four working days later it arrived. It looked OK and had the same footprint and length as the **DL50** to make installation a breeze. It was 50grams lighter than the DL so I will have to rebalance the plane.

The ignition unit is a new design and it requires a 2S LiPo 7.4V so I had to replace



all the motor wiring as per picture. I still had to get around the exhaust fouling the cowl problem and found that one of the marine guys at my son's boatshed could do aluminium



welding. He cut the front off the muffler at thirty degrees and welded a plate over and around the front mounting bolt tube and Voila! It now fits. Thanks Chris.

To finish the system, I cut off the stubs under the muffler and extended them with S/S flexi pipe to finish at the first bulkhead. The muffler stubs and the flexi pipes are joined with high temp silicone tubing held in place with cable ties .







All systems done **DLA56** bolted in plane and away we go. Fill carby and a couple of flicks with the choke on and she fired. Choke off and away she went. I was immediately impressed with the regular idle and smooth transition. The idle was a rock solid 1500rpm and a brief run at full throttle showed 6000rpm with the

big carbon **Bolly** 21 x 12 three blader. Static thrust was in excess of 10Kgs.

The whole thing only weighs 14Kgs so there is ample power.

I will run about 6 tanks of fuel through it, first without the cowl and then with the cowl on checking temperatures as I go.

Next step is to do some on field taxing tests to ensure correct wheel alignment and then a thorough check of all nuts and bolts before I can get the plane statically certified, finally a couple of certification flights.



If the plane is still with us I can then think seriously about having a go at Bowylie....I'm not going to rush it though and I can fall back on the Bronco if I have to. I do have ample time though to have both the P40 and the Hurricane ready for our next WRCS Scale Day on the 15th May. I think the two of them in the air at the same time would be a great sight.

Next issue, with a bit of luck, will be all about flying ..

Cheers  
Stan