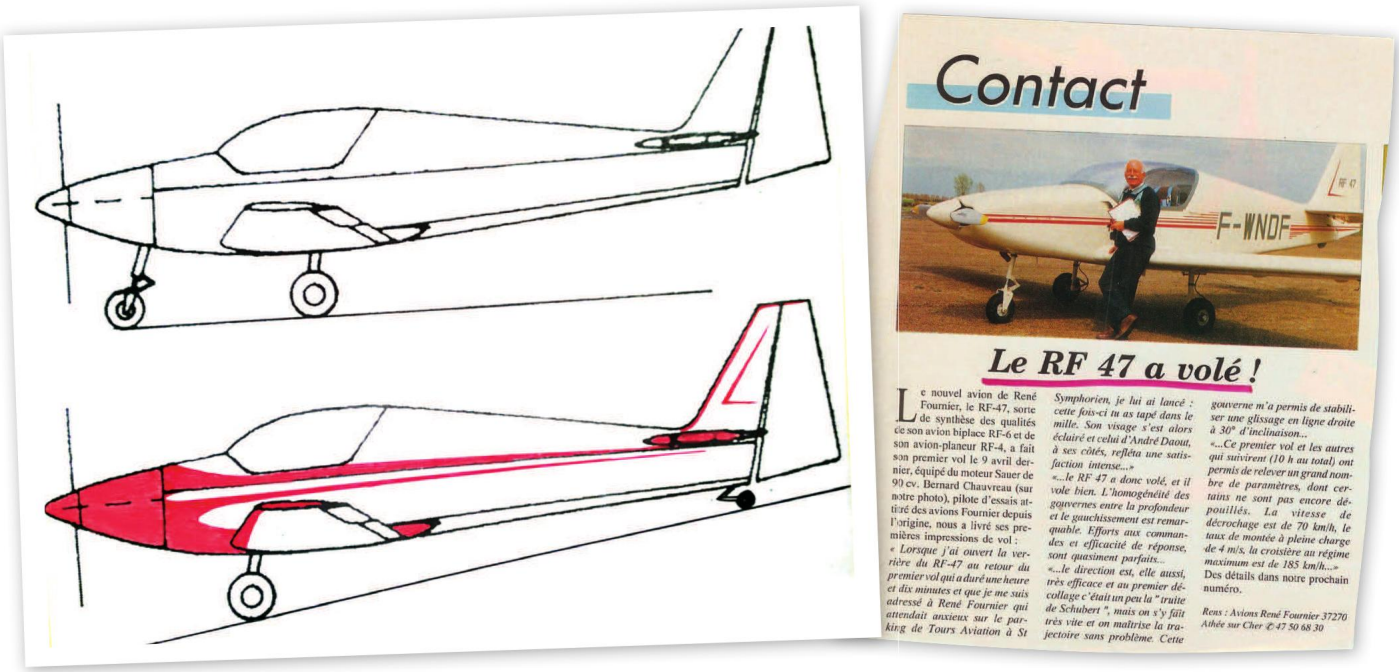


Contact

F-WNDF

Le RF 47 a volé !

Le nouvel avion de René Fournier, le RF-47, sorte de synthèse des qualités de son avion biplace RF-6 et de son avion-planeur RF-4, a fait son premier vol le 9 avril dernier, équipé du moteur Sauer de 90 cv. Bernard Chauvreau (sur notre photo), pilote d'essais attiré des avions Fournier depuis l'origine, nous a livré ses premières impressions de vol :

« Lorsque j'ai ouvert la verrière du RF-47 au retour du premier vol qui a duré une heure et dix minutes et que je me suis adressé à René Fournier qui attendait anxieux sur le parking de Tours Aviation à St Symphorien, je lui ai lancé : cette fois-ci tu as tapé dans le mille. Son visage s'est alors éclairé et celui d'André Daoud, à ses côtés, reflèta une satisfaction intense... »

« ...le RF 47 a donc volé, et il vole bien. L'homogénéité des gouvernes entre la profondeur et le gauchissement est remarquable. Efforts aux commandes et efficacité de réponse, sont quasiment parfaits...

« ...le direction est, elle aussi, très efficace et au premier décollage c'était un peu la "truite de Schubert", mais on s'y fait très vite et on maîtrise la trajectoire sans problème. Cette gouverne m'a permis de stabiliser une glissage en ligne droite à 30° d'inclinaison...

« ...Ce premier vol et les autres qui suivirent (10 h au total) ont permis de relever un grand nombre de paramètres, dont certains ne sont pas encore dépouillés. La vitesse de décrochage est de 70 km/h, le taux de montée à pleine charge de 4 m/s, la croisière au régime maximum est de 185 km/h... »

Des détails dans notre prochain numéro.

Rens : Avions René Fournier 37270 Athée sur Cher ✆ 47 50 68 30

RF47 Recovery part 2

After importing the damaged Fournier, Bob's real work begins. Restoring this one-off prototype to flying condition will be no walk in the park...

Words & photos: Bob Grimstead

I was the owner of the sole but badly damaged aerobatic prototype Fournier RF47 and had Tim Wakeman of Recovair bring it back from Belgium's Grimbergen airfield. On the long drive home, I pondered the enormity of the job I had undertaken to get this poor, broken little aeroplane flying again.

The engine was a Volkswagen. I knew about those, had performed major surgery on several, and reckoned rebuilding one was within my capabilities. The battered and holed airframe and tail components, however, were other matters entirely. Still, I reflected on LAA Chief Engineer Francis Donaldson's words "The wing is undamaged, that's the most important and complex part. The rest can be repaired, even if it means building a new fuselage".

ABOVE: **Bob's sketched plan for tailwheel conversion and the aircraft as first flown**

BELOW: **Tim Wakeman of Recovair trucking the Fournier RF47 prototype from Belgium's Grimbergen airfield.**



Despite his positivity, I still didn't sleep too well that night.

The next morning I made room along the side of my hangar for this wing, positioning its purpose-built trestle in readiness. Unfortunately, although Tim's truck's crane's arm was long enough to drop the wing into position, my hangar's eaves were too low for it to reach in all the way. Generously, fellow LAA member Patrick Elliot helped us carry it the last five metres into place. Strapping it down by the tie-down rings, I zipped back home to meet Recovair's second delivery.

Our drive is narrow and kinked, so Tim trans-shipped the fuselage, spare canopy, tail components and crate of bits into a van and a trailer. Despite having no crane he, his mate and my friend Alan carried the comparatively light fuselage into our garage. After the Recovair guys left we took some silly in-cockpit photographs.

Surveying this scene the following morning, it was hard to know where to start. I had reassembled other Fourniers, but all this repair work seemed very daunting. Still, as the Chinese say, 'the longest journey begins with but a single step'.

Nevertheless, before that I needed to make my garage into

a proper workshop. There were a few things I wanted there. Improved lighting so that I could properly see what I was doing. A sturdy, flat, dead-level, square and true sixteen-by-four-foot bench on which to repair the fuselage. And something to lift the fuselage and move it around.

The lifting thing was easy. On-line I found a one-tonne hydraulic engine crane for £99 including delivery. That arrived next day so I quickly assembled it and used it to shift the fuselage to the other side of the garage and make room for building that bench. My sister had just re-decorated a room, so their old carpet went down on the concrete floor.

I had made benches before in Australia, using a framework of cheap and easily available thin-walled two-by-four-inch mild steel box-section 'patio tubing', held together with self-drilling Tek Screws and topped with sheets of half-inch Medium Density Fibreboard (MDF). Searching on the web for this stuff, I fell at the first hurdle. It's not available here in Britain. The nearest I could find was much heavier grade 3mm thickness steel. Fortunately, this was available at my local stockist, Rudgwick Metals, where the ever-helpful Jane not only cut it to precisely the correct lengths for best use of the material, but also waived their delivery charge. Eight-by-four-foot sheets of three-quarter inch MDF had to →



While the cran arm of Tim's truck was long enough to drop the wing into position, the eaves of Bob's hangar were too low for it to reach all the way in.



After the Recovair guys left Bob couldn't resist posing for a 'garage flying' shot in his new aquisition



Bob quickly assembled and used the newly purchased engine hoist to shift the fuselage to a pallet on the other side of the garage



The two big sheets of MDF laid on the floor to make a dead level surface before building the bench upside-down on top



The framework balanced precariously in approximate position for final check measurements before locating it precisely



The finished product: a dead flat, absolutely level, sixteen-foot bench for the fuselage repair



be specially ordered from Travis Perkins.

Meanwhile I set to fitting and wiring five fluorescent neon lamps over the planned position of my bench. They didn't provide as much light as I had hoped, so I glued sheets of aluminium foil around them to reflect and disperse light, minimising shadows.

When that two hundred pounds-worth of steel was delivered I cleaned off its filthy preservative before painting it with good old Hammerite and using Screwfix's Easydrive self-drilling screws and angle brackets to construct it. I laid those two big, heavy sheets of MDF on the floor, making a dead level surface on which to build my bench upside-down.

I used measuring tape, set square and spirit level to get everything accurate. This was heavy engineering compared with the precision work I would be doing with that wooden airframe, but I was trying to practice achieving the daunting plus-or-minus one-millimetre accuracy specified on Fournier drawings.

I now had to invert this huge, rigid and weighty structure and



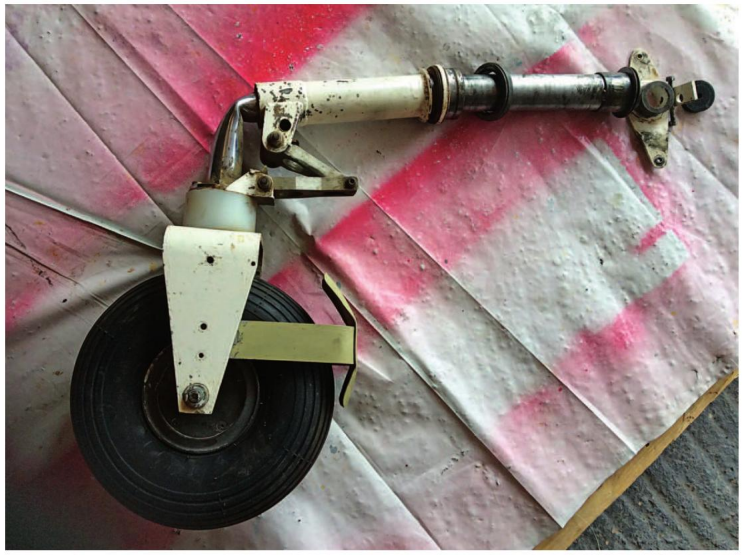
The empennage laid out on the newly constructed bench so Bob could assess the various pieces

position it accurately. The engine hoist was perfect, so I lifted the bench to slide out the heavy MDF, dragged the framework across the floor, and then tilted it before measuring to locate it. Running outside to photograph each stage, I was startled by a great crash. Looking up, I saw the bench had somehow fallen upright of its own volition without (thank goodness) actually damaging anything. My final task was dragging it across the floor to allow access around the far side.

To my relief, once I screwed that MDF in place and painted it all white, I had a dead flat, absolutely level sixteen-foot bench on which to jig the fuselage for repair. That was going to be a long and complex job, but I had no idea how such jigs were made, so I decided to tackle the smaller tasks first to gain experience. I laid out the entire empennage to assess the various pieces. This was not a pretty sight. One elevator was undamaged, although fortunately this was the complicated left one incorporating the trim tab, but every other component required varying amounts of work. Two things were evident: I needed proper instruction in aircraft woodworking techniques and I wanted expert advice on precisely how to tackle each job.

So I enrolled on one of the LAA's woodworking courses run by that knowledgeable and experienced homebuilder, Dudley Pattison. This one-day course was useful revision and I learned a lot, but little about the specifics of my particular repairs. For instance, while the familiar RF4D has slim ply trailing edges to all its control surfaces, this RF47 had thin, pre-bent strips of folded aluminium fixed with small alloy rivets. I could see that straightening the badly crumpled parts would be →

I laid out the entire empennage... This was not a pretty sight



RIGHT: **the nose-leg had been bent into a complete right-angle**

impossible, but I couldn't work how to replace only a short strip of this without splitting the ribs when removing those rivets – even if I could obtain or make replacement strips of the correct thickness and angle.

Some of the other repairs might be more straightforward, but still I dithered. Should I Dremel out the rudder's old balsa? Where would I get such a big lump of that hardwood? Might more easily available Celotex do instead? Indecision ruled.

There was one thing I didn't need to fix – the nose-leg, which had been bent into a complete right-angle – because the components for its alternative tailwheel undercarriage were 'in the box'. Opening this big crate did indeed reveal sockets for the main legs, so I hurried to the airfield, removed those legs from their fittings behind the main spar, temporarily bolted these alternate sockets onto its front face and inserted the legs. They fitted! So now I was saved quite a lot of money, time and effort.

Using the aeroplane's documented weight and balance information revealed that moving those main legs forward was compensated by removing the nosewheel and replacing it with a standard Fournier tailwheel unit, while the weight saving of nearly ten kilos was significant



BELOW: **the reason the aircraft was force-landed – a valve had broken loose and gone into the works**

and greatly appreciated. But what would it look like?

Ten minutes with printer and scissors revealed that it should be even prettier than the tricycle original. René is an artist as well as an aircraft designer and his RF4Ds' sharp white and primary colour scheme enhanced its lines beautifully. But this prototype was painted in boring overall cream with multiple thin pinstripes. Transferring the RF4D scheme on to the RF47's side view made it look both sleeker and more like its progenitor. I pinned several of these pictures around my study and workshop for motivation.

The Sauer engine came next. The insides of two cylinders and their heads presented a very sad sight and this was the direct cause of all that airframe damage. It appeared that the valves and springs had recently been replaced by somebody inexperienced in overhauling Volkswagen engines. A misaligned rocker had resulted in one of the collets escaping, followed by that valve being released and getting hit by its piston. It had clearly taken a while for the engine to stop, so the valve had broken up and its remains had been pounded around inside the combustion chamber, holing the piston, with some bits escaping into the next cylinder. It might have been possible to obtain replacement Sauer parts, but I was warned against approaching the company's principal, who knew about this reported failure and apparently would be disinclined to help. Also Sauer parts were notoriously expensive.

For a while I contemplated buying an aerobatic ULPower engine. Its extra thrust and inverted capability would be very useful in my displays, but knowledgeable friends and a critical Facebook group persuaded me against that, plus one of those engines would cost more than my entire repair budget. A European Fournier expert said "use a Rotax" but that would require new engine mounts with all the associated stress analysis palaver and LAA modification delay, plus all the extra weight and plumbing of its cooling system. And I would have to decide on somewhere to put the radiator that wouldn't spoil the RF47's lovely, clean lines. Others advised I should buy a second-hand Limbach or Grob engine if I could find one, but like the ULPower, those would need new engine mounts. My eventual inclination was to build a new 2100cc Volkswagen engine incorporating whatever components of the old Sauer that I could, a task I knew was within my abilities—unless of course one of those other powerplants should suddenly pop up as being available, particularly if it came with engine bearers. Anyhow, there was no point building an engine until I had a serviceable airframe, so I decided that should come first.

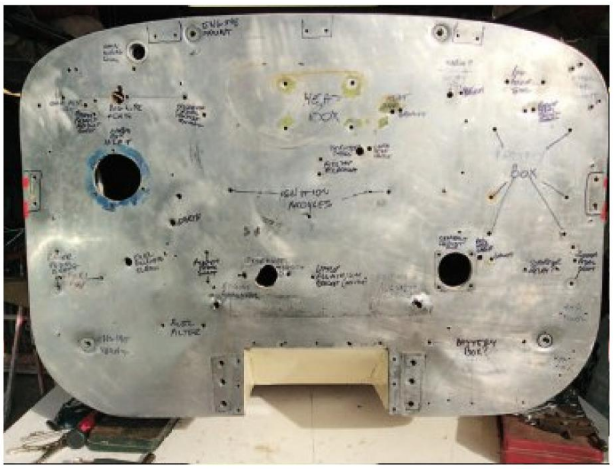
The same went for the scuffed, cracked and dented cowlings. Yes, there was a spare upper half, but that was old and worn. Even if it fitted the current lower cowling, that was badly damaged. I did have the original moulds but it was a long time since I had last made complete fibreglass components. Again, I decided that I should put that to the back of my mind until the engine problem was solved.

At this point Francis Donaldson suggested that he might come and look at this rare and exciting aeroplane, assess the damage and discuss repair schemes. In the mire of several quandaries as I was, this idea delighted me, although he asked me to strip off the fuselage's fabric first. Fired with enthusiasm, I enlisted my visiting son James's help to hoist the fuselage up on to my big new bench where it should be straightforward to remove the fabric. But first I needed to dismantle everything ahead of the firewall because it was obvious the wooden structure behind it had been damaged when the nose-leg got broken.

Having recently been the victim of haphazard airframe dismantling, I was determined to do this properly. You never know how long these things will take, or even whether somebody else might inherit the job, so I made a mock-up firewall out of scrap plywood, transferring all the parts to that, also marking



Mock-up firewall made from a scrap piece of plywood...

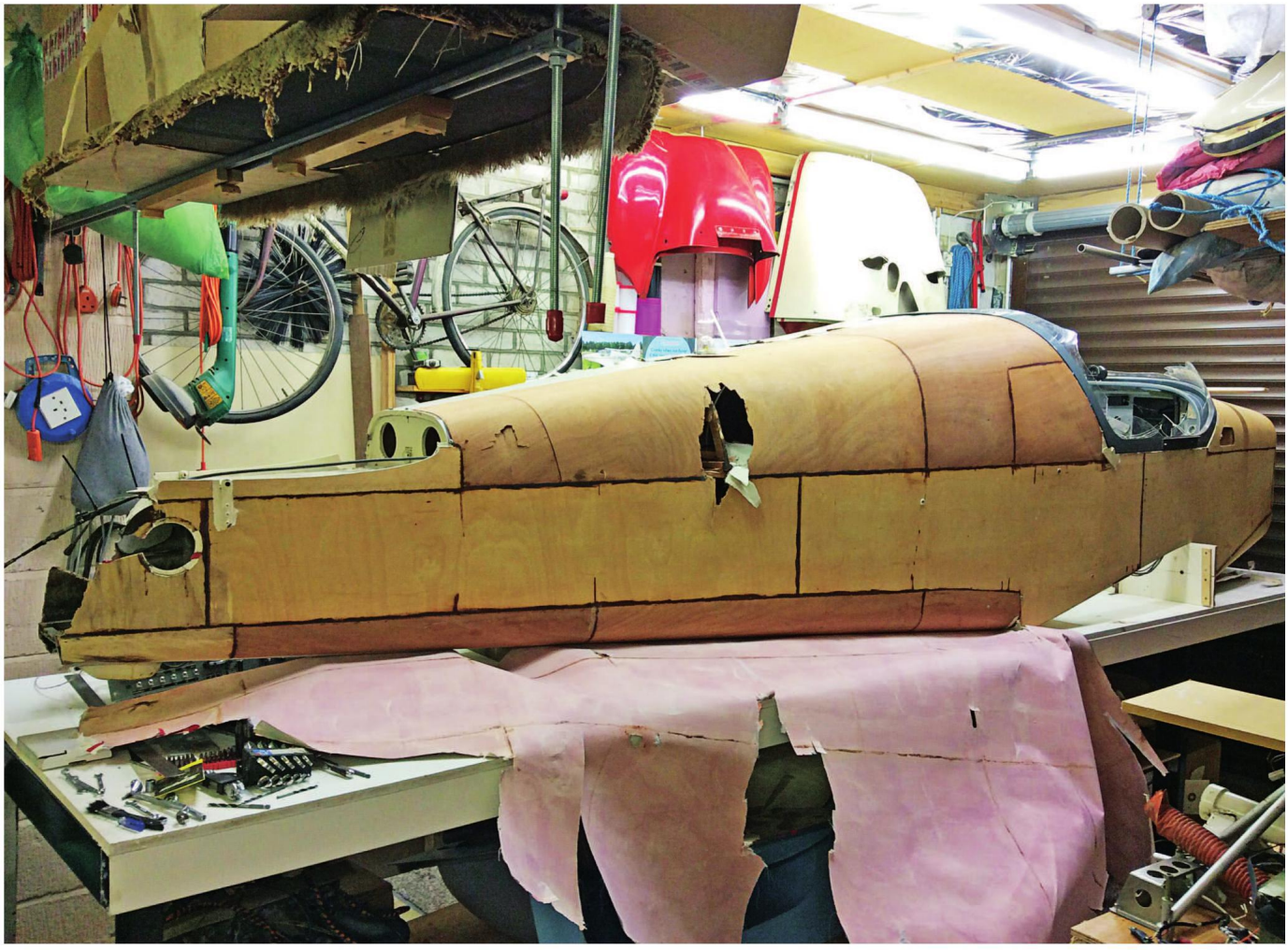


ABOVE: **... and component positions marked on the actual thing, as they were removed**

You never know how long these things will take...

the stainless steel protecting sheet with component positions. During this I became even more dismayed at the way the wiring, tubing and control cables had simply been hacked through without care or regard for any future repair.

Ensuring that all bolts, screws and other fasteners were meticulously kept with their components took a couple of days, but it was satisfying work and clear progress. After the firewall, I could strip the fabric. It was important to strip the fabric in one sheet, retaining it as a template for the new covering, so that all seams, joints, reinforcing strips and cut-outs would be correctly positioned. I rolled this on to an old cardboard tube, a snowstorm of flakes flying in all directions from its old, embrittled paint. I had to raise the fuselage to remove the belly fabric, but didn't need solvent or a heat gun as I had with the rotted cotton on →



my RF4Ds. This polyester stuff just peeled right off.

Dismay and frustration would repeatedly become features of this project. Scrutinising the naked fuselage, despondency returned. Such an awful lot of damage was revealed both externally and inside. What really irked me was that it was all so unnecessary and could have been completely avoided with a little forethought and patience during the aeroplane's recovery. I sighed.

The following day Francis arrived to inspect my project. He immediately identified by their broken ends that the longerons were Douglas Fir rather than traditional Sitka Spruce. Expressing admiration for its design and construction (by skilled craftsman Jean-Claude Désiré of sub-contractor Siravia) he was clearly captivated. But what really heartened me was his positive 'can-do' attitude to all that damage. "You can buy

Scrutinising the naked fuselage, despondency returned. Such an awful lot of damage...

trailing-edge strip from Wag Aero that might be a suitable substitute. You must cut away this to inspect inside, but I don't think you'll have to do much more. You only need to scarf in a new piece of ply here". I scurried around behind him like the acolyte I was, scribbling notes and annotating the various parts in soft pencil.

After Francis departed, I sat down with a Scotch to consider the work ahead of me. That fin, rudder, tailplane and elevator all seemed repairable and within my capability, although I might well have to make a couple of attempts at each repair to get things absolutely right. The replacement canopy would probably need fettling but that wasn't too big a job. There were also the two cowlings, perhaps repairable but probably in need of replacement—although I did have the moulds. Then I had to devise a tailwheel system and make it fit. I had to rebuild that ruined engine. I had to jig and repair the very badly damaged fuselage, re-fit the fin and, finally, reassemble and bolt everything together again. That alone had previously taken nearly a year with my RF4D.

My initial optimism faded when I considered just how long all these individual tasks would take if I added up the time involved. What I had originally envisaged as a twelve-month spare-time project was becoming more and more protracted. I finished my Scotch and went to bed. Things always look better in the morning.

ABOVE: **Bob carefully stripped off the fuselage fabric in one sheet, so it could be used in future as a template**