

TECH TALK DECEMBER 2008

DOCUMENTATION

The following documents have been updated, and the latest versions have been included in the current website:-

Build manual - fuel system – chapter 30
XS 912S engine installation manual – fuel system chapter
XS914 engine installation manual fuel system chapter

Changes in the above relate to positioning and installation of fuel filters, and under seat draining in case of fuel leaks.

XS Owners Manuals, monowheel, trigear and motor glider.

Changes in the above relate to propeller windmilling page 3-3, and to the magneto rpm check page 5-7. Owners should print those pages and substitute them in their manuals.

REPAIR TECHNIQUES

The L.A.A. website has a technical leaflet (3.13) devoted to the correct techniques for repair of composite structures. This should always be referred to in case of Europas needing repair.

OUTRIGGERS

Andy Draper has kindly sent the following article concerning outrigger latching, which should be of interest to all monowheel owners:-

The Europa mono-wheel aircraft's outriggers are designed to extend and latch down when the flaps and landing gear are extended for landing and have been proved to do so with regularity over the several thousand landings that the fleet has built up to date. However, should an outrigger partially extend but the latch not close properly, the first that the pilot will know about it is when the wing on the affected side drops and scrapes along the ground. The outrigger leg will be forced into its retracted position and cause the flap on that wing to retract as well; the flexibility of the flap control system allows for this to happen without damage being caused to it or the flap trailing edge. With sufficient speed, runway width and pilot's presence of mind it is possible to turn towards the down going wing (this has more effect than use of aileron) to raise the wing, but this assumes that he/she is ready or, at least half expecting this to happen. In the early days with the Europa prototype G-YURO, when un-commanded outrigger retraction after landing was not uncommon, we quickly developed this technique to avoid more serious consequences. Almost always, the outrigger latched itself after the recovery.

I recall one occasion when a quick save had to be carried out following a demo flight and, as it had happened to me before and I knew what to expect, the other pilot thankfully never noticed that we'd had a problem. He probably did wonder why I'd swerved a bit for apparently no reason during the landing roll, though. It

should be pointed out that a fundamental flaw in the latch geometry was discovered and put right before any customer aircraft had suffered this particular problem. My previous experience had also prepared me, when rolling out after landing a newly finished Europa, and I noticed the port side outrigger wheel overtake me on the runway after its pivot bolt had fallen out! Fortunately this happened just at the point where I needed to turn left off the runway anyway and not even the outrigger's wheel fork got damaged.

It is not impossible that mono-wheel pilots may suffer a landing in the future with an outrigger that has not properly latched down. Should an outrigger leg collapse and the wing drop to the ground, the leg's upper fitting will contact the ground before the wing tip (just) and, particularly if you are on grass, the leg upper fitting will dig in and could easily trigger a ground loop. In fact this very thing has happened recently to Nigel Charles in his Europa. Nigel had been operating G-MIME for several years with several hundred landings to his credit without the hint of a problem from his outriggers and so he was taken completely by surprise when it happened.

So, how to minimise the risk of an outrigger not latching down properly? Some points (there may be others that I haven't thought of) to consider are:

- Ensure that friction in the system, especially at the leg pivot and latch plate OR4, is at a minimum by replacing worn parts, checking the leg pivot bolt is not too tight, regular cleaning and lubrication.
- If grease is used, make sure you use a type that will not stiffen too much at low temperatures.
- Check that both the OR11 and OR12 springs are present and in good condition.
- Ensure that the various bolts that connect the mechanism components together are installed correctly. Installed the wrong way round, a bolt tail may contact the W21 side plates whereas the other way round the bolt head will be well clear. Those bolts to look at are the one connecting the latch arm OR4 and push-rod OR5 together and the one through the top of the outrigger leg fitting. This latter bolt must have two thin washers or one thick washer under the head to ensure that the bolt tail is sufficiently clear of the side plates.
- Check that, when the flaps are fully down, the bolt through the flap hinge arm which the OR12 spring attaches to is 5 – 7mm ($\frac{3}{16}$ " – $\frac{1}{4}$ ") away from the front of the slot in OR5.
- When carrying out a ground check, apply some back pressure on the outrigger to simulate the drag that would occur during the approach to check that the latch engages properly. Someone clever enough could probably calculate what force to apply at the wheel to simulate the drag at, say 50kts, but getting the feel for how much force is required to prevent proper latching to take place would still be useful without this information. To reduce the chance of the latch 'hanging-up' just before snapping down over the latch block, the bottom corner of the latch arm OR4 could be radiused or chamfered to encourage earlier latching. Don't try to modify the latch block; it is case hardened steel.
- Carry out flap/gear extension on the base leg at a speed of around 70kts or less, rather than at flap limiting speed. It should not be necessary to

lower the gear hard in an effort to slam the outriggers down. As the main landing gear has quite a mass to it, this practice carries the danger of doing damage elsewhere if done as a matter of course.