mainair sports

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SERVICE BULLETIN NO.29 - 27th June,1988 - Circulation - all owners.

The Bedford Fatality. - Two people were killed outright on a 1984 Gemini Flash and evidence points to the front strut separating in flight allowing the trike unit to swing backwards bending and breaking the monopole, destranding and breaking the internal wire and allowing the cockpit and occupants to fall 1000' to the ground.

I was asked to visit the AIB at Farnborough to inspect the wreckage and discovered that all pieces of the three section front strut had been home made, not one was the correct length nor drilled or sleeved correctly. The bottom 1" section to which the centre section is fitted with a ¼" bolt was fitted into the 1 1/8" outer tube by only 3", was made from a piece of non standard thickness tube and was held with a single 1/8" aluminium pop rivet instead of being full length and integrally fitted to the steel stub fixing bolt.

The workmanship was amaturish and extremely poor. Many other parts of the aircraft were home made such as the control frame side which was made from a piece of dull anodised tube and again was pop riveted into place. The strut supporting brackets were not fitted, the main trike connection block was home made from steel which was painted and rusting, the fuel system had been extensively modified and the aircraft had been changed from its section 'S' standard when permitted by us in 1985.

The aircraft has had a very chequered history and at this stage is not known exactly who produced the home made and completely sub standard parts which failed and caused the loss of two lives.

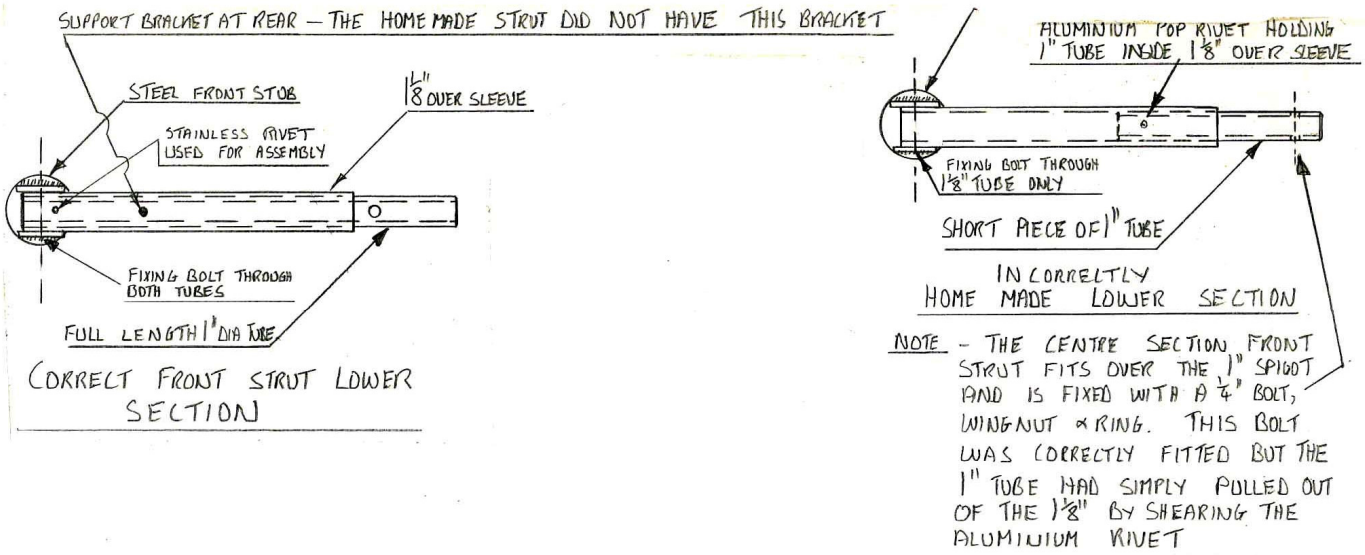
We have to say as strongly as we can that such home made parts have no place whatsoever on the aircraft we manufacture. We deplore the practice of private, unqualified owners, manufacturing replacement parts without access to the design drawings, material specification or the information needed to ensure the part produced is correctly made. The consequences as can be seen can be horrific.

Recommendations.

A). No owner should fit a non-factory produced part to his aircraft unless the producer has our full authority to manufacture such a part.

B). All owners of used aircraft should carry out a detailed inspection of all structural components of their aircraft paying particular attention to the front strut, monopole, keel, undercarriage, wing keel, control frame, cross tubes, leading edges and all other components looking for evidence of replacement IE, mis-matched anodising, holes drilled but not used, aluminium pop rivets (we only ever use 1/8" stainless steel or 3/16" and 1/4" monobolts) etc. If you are not qualified to do this, then find someone who is.

C). The front strut assembly should be carefully inspected and worn or elongated holes and deep chaffing will call for replacement of the part with Mainair factory issue components only. Slight chaffing is expected and acceptable where the 1 1/8" sleeve slides over the 1". The bottom section is made from a 1" tube with a 1 1/8" oversleeve and the 1" tube should be full length and exit from the bottom where it is fixed to the stub. - ensure the continuity of this tube - see drawing below.



D). Mark 2 Monopoles - Since 1985 we have been fitting an additionally sleeved monopole with a stronger internal safety wire. Whilst we cannot say that the monopole would be strong enough to carry the loads after failure or miss rigging of the front strut, we do recommend that all older aircraft have the Mark 2 monopoles fitted prior to further flight. Mark 2 monopoles can be identified by a No. 2 stamped right at the bottom - no number means its a mark one.

2) Front Strut Back Up.

We have investigated the possibility of a front strut back up system in the past and have met problems in ensuring a 100% assembly reliability. A back up may well have prevented this accident but since the parts were all home made, a factory designed system would not fit. In addition, the standard of workmanship leads us to conclude that the person responsible had no concept of basic engineering loads and quite obviously would not consider fitting a back up since relying on a 1/8" dia pop rivet in shear shows a complete lack of awareness of the possible consequences.

However, microlights are continually developing and we believe we now have the ability to produce a 100% back up system and once we have trialed prototypes will offer them to all owners via a service bulletin. Remember of course that back ups are no cure for careless and irresponsible action.

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3) 503 Upright Engine Covers.

It has been noted that some fibreglass engine covers have caused chaffing of the rear seat webbing supports where they fit around the location tube for detaching to fit the rear seat tanks. The cure for this is simply to file away the fibreglass edge to ensure it is at least 1/8" away from the webbing. Simply pencil mark around the area whilst the cover is fitted and file back to the line. We have taken steps to increase the clearance on production aircraft.

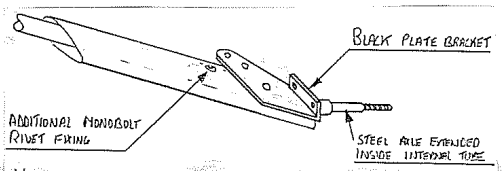
4) Side Wires and Cable Terminations.

We had a report of strand breakage in the side wires of a 180 hour Gemini Flash 2. This seems to happen right at the end of the termination and is unusual at 180 hours. The wires are "lifed" at 250 hours but the "life" does have a safety margin built into it. We think early failure of this kind is caused by either rigging damage where the wire is bent over at the termination and then straightened out and/or over tightened eye fixings which do not allow the terminal to move freely around. It is insufficient for the bolt fixing to be slack enough to allow rotation around the axis of the bolt. There should also be enough slack to allow the end of the termination to describe a small circle to cater for any rotational vibrations which might be set up in the wire. All wire end fixings should be free to move and care must be taken when rigging or de-rigging to ensure the wires do not get bent at the terminal end.

5) Alpha Rear Axles.

Microlights continue to be crashed hard into the ground owing to pilot error, frequently by low hour/experienced pilots or students. All metal structures have a limit at which things break and we have recently had evidence of the limits of the Alpha axle assembly. When the springs are bottomed (600 plus kg) and the load continues to be applied, something has to break and we have discovered that the first thing to go is the internal round tube into which the axle is fitted. Because at the time the axles are splayed well out with the tyres flattening increasing drag loads, the internal tube can break on the front side allowing the axle stub to rotate outwards dramatically increasing the drag loads and in severe circumstances tearing out the drag link causing loss of the undercarriage.
On Gemini trikes, the front strut would break, the seat frame would fail or the keel bend. The Alpha suspension absorbs all this load and puts it somewhere else but we consider it prudent that a seat frame/keel failure is better than an undercarriage loss. We have therefore modified the axle attachment to prevent rotation at overload and this can be carried out on any aircraft if so desired. In addition the drag links have an additional strengthening sleeve at the end fixing. It is necessary for the machine or rear axles and drag links to be returned to the factory for this work which takes about 4 hours. We emphasise that this is a precautionary modification only and is a means of preventing more serious damage in a crash or very hard landing situation. The work will be carried out at a cost price of £50.00.

Modified axles can be identified by a monobolt fixing just beyond the black aluminium plate bracket to which the spat and struts are attached - see drawing.



MODIFIED ALPHA AXLE LEG

6) Alpha Tyres.

Owners operating from hard runways have been complaining of very poor tyre life and we subsequently discovered that our supplier had himself been supplied with tyres which are virtually the same but are made from a seemingly softer grade of rubber than the ones we have used for the past 8 years - about 3000 tyres, some school owners complained of tread wear in less than 8 hours ! Any owner who has suffered excessive tyre wear of this type should get in touch with us, particularly if operating from hard runways and all owners are urged to carefully examine all their tyres.

The Alpha suspension does add to tyre wear as the suspension rises and falls particularly on take-off and landings, causing slight scrubbing so greater tyre wear can be expected, but even we accept that 8 hours is too little !

7) Rear Steering.

The "add on" rear steering kit for Alpha's is very convenient to fit, not requiring disassembly of the front end, but it can cause problems owing to restriction by the rear cockpit support tube.

We do not recommend nor like to operate aircraft with rear steering which in our opinion should only be fitted to training and sales demonstration aircraft. The potential for passengers to jam up rear steering on all makes of microlights is well known as the new experience of flight can cause them to be completely unaware of exactly what their feet are doing. If you have bought a used Mainair aircraft with rear steering fitted we urge you to remove it to prevent problems and ask all dealers and traders in our aircraft to do likewise.

8) Fire Risk from Re-fueling.

There has been considerable discussion on the potential for fire caused by static discharge during re-fueling. We have raised this with the CAA and their response of the 24th May forms part of this bulletin. However, it can only be good practice for owners to connect earthing leads between fuel tanks, funnels and containers to ensure that all components are the same potential to reduce any risk of static discharge causing a fire.

IMPORTANT NOTICE : UNLESS YOU PURCHASED YOUR MAINAIR AIRCRAFT AFTER THE IST JANUARY 1988 THIS IS THE LAST BULLETIN YOU WILL RECEIVE UNLESS YOU RETURN THE COMPLETED SLIP.

We have hundreds of records which we know are no longer valid. We have to take positive action to ensure bulletins reach the correct owner. If you do not complete and return the attached before the end of July the record containing your information will be deleted from our files.

Name:

Address:

I confirm I am the present owner of the aircraft detailed below and wish to continue receiving airworthiness bulletin.

Aircraft Registration G -
Trike Serial No. (Note - stamped on edge of seat frame channel).
Wing Serial No. (Note - stamped on nose plate).

REMEMBER - RETURN TO US BEFORE THE 31ST JULY 1988 OR YOUR RECORD WILL BE DELETED.

Aircraft purchased after the 1st Jar will automatically remain on our records to the original owner.