mainair sports

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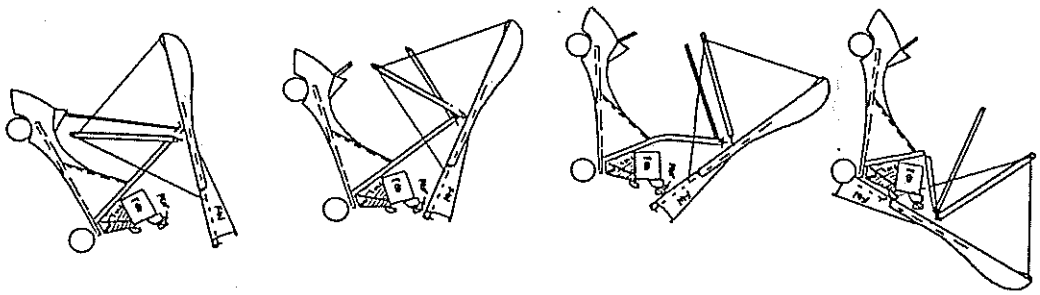
1. Accidents Previous bulletins have outlined serious structural failure accidents, and despite extensive investigations we are still unable to state categorically what happened. However, reasonable assumptions, based on witness reports and the examination of the structures, allows us to guess with some certainty as to what is going wrong.

Roll accidents. Witness statements point conclusively to the aircraft being operated outside the designed and tested flight envelopes in the two roll induced accidents. Quoted bank angles vary from: "60°", "80°", "90° and more", "85°" to "excessive flying" "spectacular flying", "very, very steep banks", after which the aircraft was rolled to a similar bank the opposite way to conduct a figure 8 manoeuvre. At this point the roll continues and we suspect a negative load is applied to the wing which, because of the sweep and extremely positive pitching characteristics, causes the wing to 'arc' away from the trike unit with devastating force. The bar is snatched from the pilot's hands and smashed through the front strut. The rest is inevitable. The following simplistic diagram will illustrate the sequence:



The aircraft all showed signs of severe negative loading supporting the above. Leech lines torn out and strained, battens bent and broken, propeller and fuel tank contact marks on the wing fin and keel tube. Monopoles bent and broken rearwards, front struts bent and broken forwards, control bars bent and broken from impact with the front strut. The list goes on. However, although the sketch shows full inverted flight , look at it again as though from directly above in a plan view. It is perfectly feasible that the negative load could occur from a very fast, 90° to 90° roll reversal, as the low wing is rapidly accelerated sideways through the air to become the high wing.

To give you an example of the sort of forces involved, rig testing of the Flash wing at just 2½° of negative air flow caused the control bar to pull forward with a force of 175lbs at only 57 mph. Imagine the force at 70 mph or, say, 5° of negative air flow. There is just no way a pilot can remain hold of the bar. We believe trike inertia and poor piloting is behind the roll inversions. As the aircraft is flown from one steep bank to the other, the pilot is reacting against the trike unit, and unless he holds off the forces correctly, the inertia of the trike unit reacting against the wing can cause the bank to exceed that intended - perhaps up to 90° or more. If the air speed is decaying and the pilot then pulls in to get air speed - a natural reaction from an ordinary pilot - the result will be a further decay in airspeed, continuation of the roll and a negatively loaded wing.

Pitch induced. The aircraft manuals and your flight instructor will tell you about stall practice and stall behaviour. Flown properly and with correct pilot imput, stalls are easily handled, but if a pilot deliberately holds very slow flight to enter a deep stall, or purposely conducts a whip stall - mild or severe - he can get into deep trouble. Pushing out the bar during high speed manoeuvring can also result in stalls at much higher speeds than you expect. A very deep stall can result in the wing dropping sharply down, and if the bar is pulled back just as the nose drops, it is conceivable that the wing will accelerate rapidly around and under the trike unit. To regain flying speed and recover from a very deep stall the wing has to accelerate and it may be impossible for the low mass, aerodynamically clean wing to accelerate fast enough when restrained by the high mass of trike, pilot and fuel.

During investigative testing we video recorded, both from the ground and on the aircraft, a whole series of extreme manoeuvres, including barrel rolls, wing overs, stalls and very steep turns - all flown by our company test pilot, Geoff Ball. To say the film is spectacular is an understatement. Control bar movements from 90° to 90° are tiny and almost undetectable. Pilot imput is sensitive but positive, and corrections are being made for one manoeuvre before the other one is completed. The film shows just how dangerous and how near the edge the aircraft is being flown - and that is with a qualified and skilled test pilot.

THIS SORT OF FLYING BY OWNERS IS DANGEROUS, STUPID, AND WILL EVENTUALLY RESULT IN YOUR DEATH OR SERIOUS INJURY.

The aircraft is not designed, tested or manufactured to be flown as an adrenalin or ego booster. It is not aerobatic. Do not show off, throw the aircraft around, put it through its paces or go out to prove a point. The bank angle of 60° is a limit; treat it as such or you may find yourself suddenly in a situation you cannot handle. How often do you drive your car to its limits? Why treat your aircraft any differently.

We state categorically that if you operate your Mainair (or any other) aircraft in a sensible and considered manner, respect the limits, and operate it as it was designed to be operated, it will give you hours of pleasurable, safe flying. Neither the CAA, AIB or ourselves have found any evidence at all of aerodynamic or structural fault in the design or manufacture. We do make high performance flex-wings and, like powerful cars, they have to be treated with respect or their capabilities may result in flight outside your own piloting skills.

The microlights we manufacture all have a very high power to weight ratio which is made even more so when being flown by a light-weight pilot in a lightly loaded condition. It is quite evident that in these circumstances the aircraft will be much lighter to fly, much more responsive, and the potential for flying to speeds and attitudes higher than allowed is much greater. BE ESPECIALLY CAREFUL TO REMAIN WITHIN THE FLIGHT LIMITATIONS WHEN FLYING SOLO.

Enclosed with this bulletin is a page which should be read, considered and added to your aircraft manual. A warning placard for fixing to the wing control frame is also being produced and when available will be freely supplied. We ask all pilots to reconsider their approach to microlight flying and realise that the limitations are put there because the design demands it. Please treat and make sure others treat microlight flex-wings as capable, fun aircraft intended for A-to-B pleasure flying. If you know of owners who have a reputation of putting in the odd very steep wing over, or diving steeply or any of the other manoeuvres which are patently outside the flight envelope, then ask them to stop because it is dangerous and can so easily go wrong.

2. Rear Fuel Tanks or Models. The tank dip pipe is made from a heavy duty plastic hose and positioned to draw from the bottom of the tank. We had a report from an owner who said that he found the dip pipe bent forward and above the bottom level. Investigations suggest that storing the trike folded down may result in the pipe sagging out of position, and although it recovers within a short time, a quick flight with low fuel after a long storage period may result in a problem. Tanks should be cleaned from time to time and a good tip is to drain them by siphoning using the engine feed pipe disconnected at the selection valve and hanging into a container. If you lift the front wheel about 6" to simulate flight attitude, this will show you the exact moment the fuel runs out and it should happen with less then $\frac{1}{4}$" in the bottom of the tank.

   We are having a spring steel retainer made which will clip onto the pipe and hold it firmly onto the tank base. In the meantime, all owners should look at the dip pipe and make sure it's hanging correctly.

3. All Flash Wings. The 2 pull-back cables for the cross tubes are clipped together with a cable tie for convenience. This sometimes sticks and separates meaning you have to fish around for the second wire. A cure is to clip the tang of the second wire onto the pull back cord in the same way as the first wire.

4. Monopole and Keel Fretting. Previous bulletins drew your attention to chafing between the monopole and fuel tanks. Always secure the seat tank tightly with the strap and a 6" piece of propeller tape on the tube will eliminate the problem for older aircraft. The examples of chafing we have seen are unsightly rather than dangerous, but the better condition you maintain your aircraft in the better its resale value.

5. Rotax Pullstart. A 10 hour - 462 suffered a pullstart failure caused by the breaking of an internal spring. The spring will break if you release the cord quickly. When you have pulled to full extention, let it recoil back slowly to prevent problems.

6. Fuel Pipe - Robin Engines. An owner told us of a problem with an inverted Robin engined Gemini in that the fuel pipe had perished and split where it is curved tightly to fit the fuel pump. This aircraft is probably over 2 years old but we remind all owners to replace fuel line at the first sign of ageing and before it gives you an in-flight problem.

7. Alpha Side Struts. The rear suspension on the Alpha has proved itself an exceptional feature. However, it is possible to reach the limit of even this system. If a very heavy landing is made (and this is masked by the suspension itself) and the suspension has reached full deflection, hitting a rut or similar can cause the tube itself to fail at the axle fixing.
   We emphasise that this can only occur after a very heavy landing and when all the travel has been taken up but advise owners that good though the system is there are limits.
   We have modified production machines by fitting an internal sleeve in the bottom section of the side strut and machines so modified are marked with a letter "S" under the bottom rubber boot. This modification can be carried out to owners aircraft if desired but it is necessary for you to return the complete side strut since it is a factory modification only. Obviously there are many aircraft operating perfectly satisfactorily with the standard struts and this modification is recommended only if you operate from very rough fields or frequently fly at high loads.

8. 462 Carburettor. Rotax have recognised that the 462 can sometimes be difficult to start and we are testing a new style carburettor. The problem is getting fuel into the cylinders. Closing off one fuel bowl vent and blowing hard into the other through the small plastic pipes is reputed to solve the problem.

NOTICE

THIS FLEX-WING AIRCRAFT IS CERTIFIED FOR NON-AEROBATIC FLIGHT ONLY. MAXIMUM BANK ANGLE 60°. MAXIMUM PITCH ANGLE 30° UP OR DOWN. NO SPINS, WHIP STALLS, TAIL SLIDES OR WING OVERS.

WARNING.

LOSS OF FLIGHT CONTROL MAY RESULT FROM NEGATIVE LOADING WHICH CAN OCCUR FROM STEEP PITCH AND/OR ROLL MANOEUVRES IN EXCESS OF THE ABOVE VALUES. IT IS DANGEROUS TO CONDUCT STEEPLY BANKED REVERSE TURNS, (FIGURE OF 8) WING OVERS AND DEEP STALLS AND TO FLY THE AIRCRAFT AT SPEEDS BEYOND VNE. POSITIVE ACTION MUST BE TAKEN TO AVOID YOUR OWN AND OTHER AIRCRAFT'S WAKE TURBULENCE.

BE AWARE OF THE FLIGHT LIMITATIONS AT ALL TIMES AND OPERATE THIS AIRCRAFT IN A SENSIBLE AND CONSIDERED MANNER.
POSITIVE LOADING MUST BE SUSTAINED AT ALL TIMES.

Flex-wing aircraft have suffered structural failure as a direct result of pilot control loss. If a sustained negative load is applied in flight the trike unit is capable of contacting the wing structure with great force and severe structural damage will result. It is very dangerous to fly the aircraft outside the limits stated and it is not designed to offer any aerobatic capability whatsoever.

Pilots should not attempt steep wing overs and roll reversals since the inertia of the trike unit may cause the bank angle to exceed that intended. As a guide, if the control bar upright tubes are level with the horizon you are at a bank angle of 65° and have exceeded the limitations. The flight limitations are maximum values. There is no reason why they should ever be reached in ordinary flying.

Please fly this aircraft sensibly, maturely, and in a responsible manner. See also further information on page 13 and 13A.