



## AIRWORTHINESS ADVICE NOTICE

TYPE AFFECTED: Standard Libelle 201 and  
Standard Libelle 201B.

SUBJECT: Miscellaneous airworthiness information.

BACKGROUND: This AN records airworthiness information which is useful to know. The Libelle is a common glider, about 50, in Australia, faults have developed and it is well known by many. The life extension survey provided by Streifeneder, the STC holder, for the 3,000 hr survey is comprehensive and shows up many faults, some of which can slip by normal inspections. Many issues are wear related even at 3,000hrs. Streifeneder knows the type and its issues very well and provides excellent help, advice and parts.

Many criteria are not specified in the manual. These are specified in the Survey which was produced by Glasflugel long ago. Streifeneder repairs Libelle in Europe and has worked out or knows solutions for many issues, some of which are detailed below. The survey is well worth doing and allows it to be brought back to almost new condition.

### APPROVED MODIFICATIONS:

1. Glasflugel Technical Note 201-12 allows the conversion of Standard Libelle to Standard Libelle 201B. The only change is the addition of water ballast bags as the changed operating limits (higher speeds and weights) have already been incorporated. Because the Type designation is changed by adding water ballast bags the CTO should be contacted regarding updating the Certificates of Registration and Airworthiness.
2. Glasflugel Technical Note 201-16 describes the optional installation of 1/8" cables in the rudder circuit to replace the original 3/32" cables. This modification involves the replacement of the 8 mm 'S' tubes with 9 mm 'S' tubes. This modification was incorporated at the factory for serial numbers 498, 502-504, 522-527, 531 and 536.

SIGNED:

CHIEF TECHNICAL OFFICER

For and on behalf of:

**THE GLIDING FEDERATION  
OF AUSTRALIA**

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3. Glasfaser Technical Note 201-30 describes the optional installation of factory winglets.

4. Glasfaser Technical Note 201-34 describes the installation of an optional wing root fairing.

#### DEFECTS:

1. One case has been reported where the airbrake handle broke off due to corrosion of the main tube under the chrome plating. Wherever parts have been chromed the potential for hidden corrosion exists and they should be carefully checked.

The handle was repaired by rewelding the handle and reinforcing it with a 'U' bracket welded to both the handle and the pushrod.

2. Freeplay

Rudder flutter case:

The rudder drive is by a gimbal/ skew-bar mechanism at the rudder. This develops freeplay in a number of wear points. Many Libelle and other Glasflugel gliders with the same mechanism have had repairs done to reduce this freeplay.

Note that most gliders cannot develop freeplay in the rudder but with the Glasflugel system it can and this is critical.

The inspection of one glider in 2017 did not recognize the freeplay was beyond acceptable and when the glider was taken for its evaluation flight to Vne it started a rudder flutter that did not die down until the speed was greatly reduced. Luckily it suffered no further damage and landed safely.

The freeplay on the trailing edge of the rudder was 14mm at 372mm chord, being 3.7% of chord. It appeared no other potential faults contributed as the ASI was within tolerance, it was not that high altitude to affect true airspeed significantly and the pilot did not exceed Vne. Obviously a combination of small effects could have influenced it.

The gimbal bearings and the fiberglass bearing that the gimbal pin drives were worn. New gimbal parts were obtained from Streifeneder and the drive was tightened up. They also supply a Teflon powder that mixed with resin refills the hole in the rudder. They supply instructions on order. <http://www.streifly.de>

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Specified freeplays:

The flight manual does not specify freeplay but the Service Life Extension Program specifies:

Aileron  $\pm 1^\circ$  radial

Drive bushes in aileron - no play allowed.

Ball-bearings in aileron drive attach plates - no play allowed.

Hinge bearings – max play 0.1mm

Fine paint cracks spaced 10-25mm and parallel to the trailing edge are harmless.

Elevator  $\pm 0.5^\circ$  radial

Axial or radial play in bearings of rear attachment - max play of 0.1mm allowed

Front tailplane attachment - nil play allowed.

Rudder  $\pm 0.5^\circ$  radial

Top hinge - max play allowed 0.1mm.

Lower hinge/drive - no noticeable play in any direction allowed

Airbrakes  $4^\circ$  (movement around pivot)

Airbrake support arm bearings - max play allowed 2mm (at end of support arms).

Tailplane tip (vertical play) 5 mm

Tailplane tip (horizontal play) 5 mm

Wingtip for-and-aft 20 mm maximum

Airbrake drive: Max of 3mm play with locked airbrakes.

### 3. Airbrake drive

One 3,000hr Libelle had significant freeplay in the airbrakes. During the repair it was understood from Streifeneder that this is well known and the cause is the gearbox buried in the wing root. There was also play in the airbrake bushes. After repair it was tight and had little freeplay. Notes by owner/ repairer:

3.1 Non-compliant in radial free-play and lateral movement. Radial free-play turned out to be an accumulation of lost motion from the actuating lever all the way through but 90% in the actuator cross-tube and drive pins. Ultimately this was an easy fix with supplied over-size pins and a bit of fitting (in other words this can be easily fixed at a form 2 it isn't a big job). The lateral play however necessitated holes in the wings and replacement of the pivot bushes. We replaced ALL bushes as we had the opportunity to do so. The result is a system with near zero free-play.

3.2. When dismantling the air brake drive arms note the centre arm is supposed to have an oval hole (on initial disassembly it looked horribly worn - see photo below). If we had "fixed" this (as was my initial reaction) we would have caused ourselves untold pain!



#### **THIS CENTRE HOLE IS MEANT TO BE LOSE!**

Note that removing the pivot bolts required hole in the wing and it was unknown which side were nuts and which side bolts. It turned out one wing was one way and the other reversed. There is no telling.

3.3 The actuator arm on one gearbox was found to be bent and cracked (too much over-center). The arm is integral with the gearbox and only accessible through a hole in the root rib. With advice from Streifeneder we were successful in welding the arm in situ. A botched outcome would have been catastrophic as it would entail replacement of the gearbox requiring it be cut out and glassed back into the wing. I comment that Streifeneder was familiar with this problem....suggesting it isn't unknown and perhaps needs looking at regularly. When derigged it isn't difficult to inspect. Make sure the overcentre is correctly set all the time.

Beware the gearbox has plastic gears and the assembly is in FRP. It was very technical to weld it in place without causing damage.



#### NEWLY RE-WELDED ACTUATOR ARM INSIDE THE WING

4. A defect report submitted detailed a Libelle main wheel failure. The main wheel was of an original design which had previously cracked and weld repaired. Any welding on an aircraft must be performed referencing approved data and carried out by a welder holding a CASA maintenance authority. Any cracked wheel should be replaced by a serviceable unit. TOST offer a replacement wheel assy. Note that the TOST replacement may require a redesigned axle.

#### MAINTENANCE TIPS:

**1. Airbrake overcentre.** It is common for the overcentre forces on the airbrakes in the Standard Libelle to be quite high regardless of whether the older upper and lower divebrakes or the newer upper only divebrakes are installed.

Adjustment of the overcentre is quite difficult requiring cutting a hole in the wing rear spar to obtain access to the gearbox to adjust the overcentre. Provided pilots are aware that the over centre forces are high this problem is not too serious however the force required to operate the airbrakes should not exceed 18 kgf.

Aircraft with serial numbers between 95 and 520 may have their airbrake shaft modified in accordance with drawing 201-49-2 (this drawing is available from the GFA Secretariat) which increases the lever arm from 50 mm to 65 mm.

When checking the dive brake extension from the wing the divebrake must extend a minimum of 108 mm from the top of the wing.

**2. Rudder cable fairleads.** Experience has shown that it is possible for the nylon fairleads which the rudder cable passes through to move in the fibreglass thereby restricting rudder movement.

If the fairleads are found to be loose they should be nicked or grooved to give a mechanical bond before they are laminated back in place.

**3. Pushrods in the fin.** As per GFA AD688 inspection showed significant corrosion in the lateral tailplane mount/elevator actuator axle and supporting bearings of a Libelle 201B. These were extremely difficult to access. Probably cause was a pee tube in the past. Good photographs of the corrosion were obtained using an endoscope camera inserted and maneuvered through the rudder pushrod cut out in the lower fin web. Holes will need cutting in the FRP to gain access and repair. Eg photo:



#### **4. Position of Inspection Openings:**

(Survey list from Glasflugel)

Inspection openings are only allowed to be cut with sufficient edge clearance in undisturbed areas of the wing skin as follows:

Rootrib	350mm
Wing leading edge	60mm
Wing spare caps	45mm
Brake boxes	45mm
Aileron/ Flap webs	30mm

Only these areas are free from extra reinforcements or angle layers and can be repaired again without difficulty.

**NOTE: The content of this Airworthiness Notice may not be subject to amendment. Any technical data referenced is advisory and must be validated using type certificate holders current data.**