

Zenair Europe

Service Letter



This Service Letter (SL) has been issued by Zenair SARL (Europe).

S.L. Number:	ZE-2009-06																		
Date of issue:	November 25, 2009																		
Subject:	Aileron counter-balance weights.																		
Affected Models:	All CH 601 XL/CH 650E models built and operated as ULM (MTOM of 450 kg + 5%) as defined by LTF-UL standards (or similar).																		
Serial Number(s)	All affected models																		
Manufactured by:	Czech Aircraft Works (CZAW) and others.																		
Purpose:	Extensive GVT have thoroughly demonstrated that the Zodiac aircraft is not subject to flutter when built and flown within specifications. The UK LAA, who first developed and tested this modification, affirms that it will provide redundancy against potential flutter within the aileron control system should the system not be suitably assembled or properly maintained.																		
Directed Action(s):	<p>This upgrade includes two (2) extra ribs per side to support the ballast arm, the ballast arm and the ballast. See references for exact materials, dimensions, locations and installation details.</p> <p>Parts include:</p> <table border="1"> <thead> <tr> <th>DESCRIPTION</th> <th>PART NUMBER</th> <th>QTY.</th> </tr> </thead> <tbody> <tr> <td>Aileron Ribs</td> <td>6 - W2 - 2</td> <td>2L +2R</td> </tr> <tr> <td>Ballast Arm</td> <td>(see drwg.)</td> <td>2</td> </tr> <tr> <td>Ballast Weight Shim</td> <td>(see drwg.)</td> <td>as reqd.</td> </tr> <tr> <td>Ballast Weight</td> <td>(see drwg.)</td> <td>2</td> </tr> <tr> <td>A4, A5 Rivets + hardware</td> <td>Misc.</td> <td>(see drwg.)</td> </tr> </tbody> </table> <p>Note: This modification can be installed on hinged ailerons as well as on hinge-less ailerons.</p>	DESCRIPTION	PART NUMBER	QTY.	Aileron Ribs	6 - W2 - 2	2L +2R	Ballast Arm	(see drwg.)	2	Ballast Weight Shim	(see drwg.)	as reqd.	Ballast Weight	(see drwg.)	2	A4, A5 Rivets + hardware	Misc.	(see drwg.)
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Effective date:	As determined by builder/aircraft owner.																		
Compliance:	<p>Optional.</p> <p>Caution: Local requirements may vary - always comply with applicable regulations.</p>																		
References:	<ul style="list-style-type: none"> UK LAA Drawings: UK Balanced Aileron (Figure 4) Pages 2-5 of S.L. # ZE-2009-06 LAA Document Number: LAA MOD/162B/004 																		

Remarks:

Compliance with this Service Letter should be recorded in the aircraft's maintenance log.

Address inquiries concerning this Service Bulletin to your nearest Zenair representative or to:

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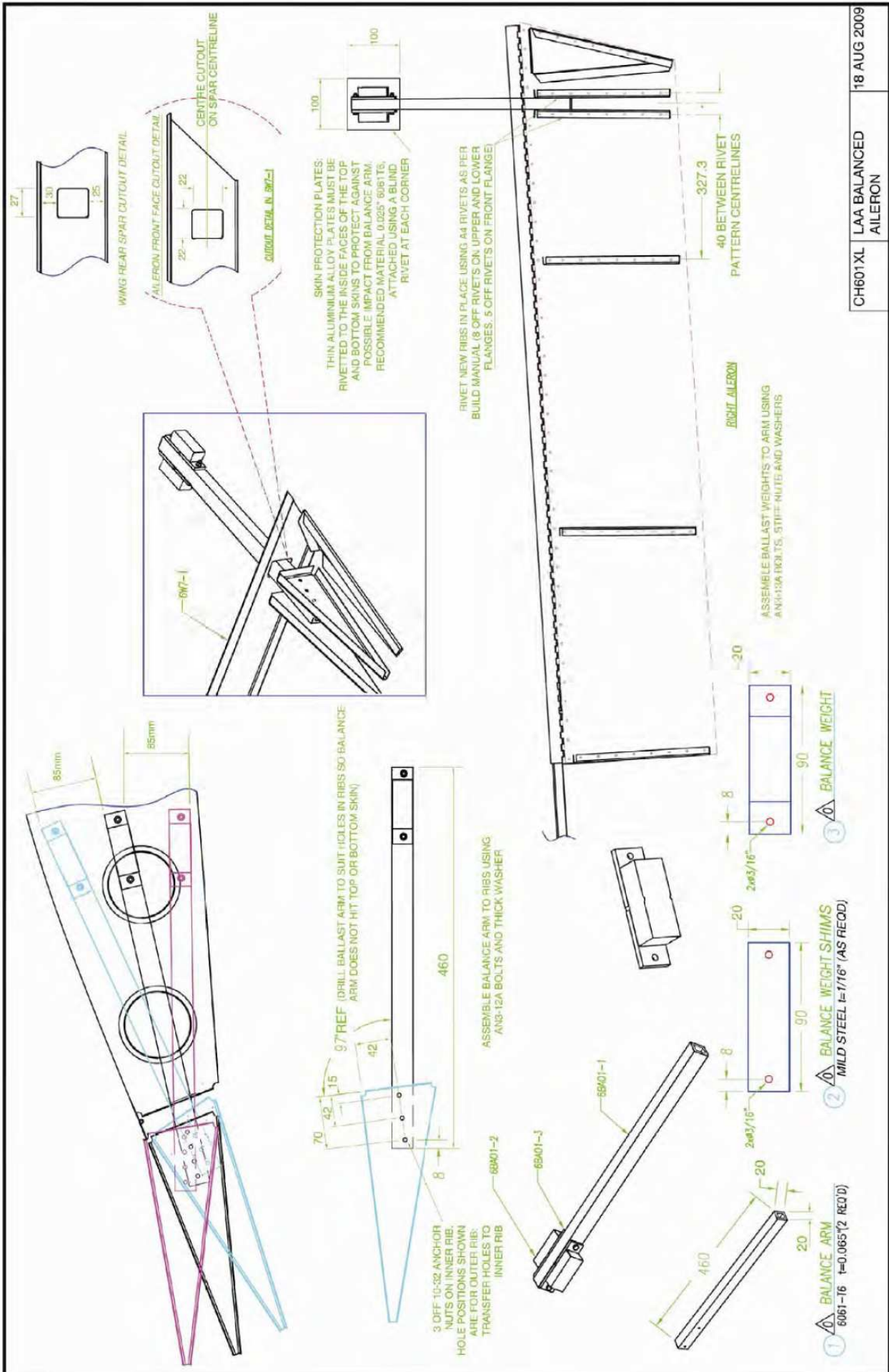


FIGURE 4

The following instructions are an excerpt from “LAA MOD/162B/004” and were provided to UK owners by the UK LAA. These instructions provide one way (there are others) of installing their proven design of aileron counter-weights on the Zodiac CH 601 XL.

Modifications and Checks on Ailerons and Aileron Control System

1. For this modification, the wings need to be [removed and] supported upside down on trestles, it is recommended that the wing is laid upon an 8' x 4' board and old carpet or similar is used to protect the wing skin.
2. Check that the flaps are fitted with flap up stops per standard Zenair drawing 6-S-3 (as also called for by per Zenair Service letter ZE-2009-01). If not fitted, these must be fitted before further work.
3. With the flap pressed against the flap up stop, lightly clamp the aileron to the flap to set the aileron in a neutral position, using 'G' clamps and short wood strips.
4. De-rivet and remove the wing tip and aileron tip for access.
5. The mass balance arm is supported by two new aileron ribs which must be fitted into the outer ends of the ailerons, see Figure 4. Using masking tape on the aileron and a fine felt tip pen, mark on the aileron upper and lower surfaces the centreline of the mass balance arm. Note that the mass balance arm is to be installed parallel to the other wing ribs, it is NOT perpendicular to the aileron leading edge. Continue this line around the leading edge of the aileron.
6. Mark the rivet lines for the inboard and outboard support ribs on the aileron upper and lower surfaces, using masking tape to protect the wing skin, this also stops the drill skating. These lines must be exactly 20mm inboard and outboard of the centreline for the mass balance arm. Mark out the rivet positions on these lines by following the rivet spacing of the other aileron ribs. Careful measurement is required here to ensure that the mass balance arm ends up as a snug fit between the aileron ribs.
7. Mark out the 22mm x 22mm square hole in the face of the aileron leading edge, centred spanwise on the mass balance arm centreline and vertically on the centreline of the aileron's forward face. Note this is intended to provide a 1 mm clearance all around the 20 mm box section mass balance arm.
8. When you are satisfied that all is correct with the measuring and marking out then cut out the square hole in the front face of the aileron. Remember the golden rule 'measure twice – cut once'. When cutting the hole, avoid sharp corners or blemishes which could cause stress raisers in the aileron front face. Now drill the aileron skin for the rib rivet holes pilot size.
9. Project the mass balance arm centreline forward from the aileron onto the wing and drop a perpendicular line from this line down the rear face of the wing rear spar. Mark out the mass balance arm slot in the rear spar, centred on the mass balance arm centreline. This slot should be 27mm wide and you should leave 30mm of material at the top and 25mm at the bottom, these dimensions are to the inside of the rear spar channel. Remember the wing is upside at this point –in other words bottom of wing is currently uppermost. Cut out this slot. Avoid sharp corners and blemishes which could cause stress raisers in the spar.
10. With a felt pen, mark the rivet lines on the flanges of the aileron ribs, exactly 10mm from face of rib web, do not drill. Mark out and pilot drill the three bolt holes in the web of the outboard aileron ribs only.
11. Insert the inboard rib into the end of the aileron, push it in and square it up so that the rivet line on the rib flanges appears central in the inboard set of rivet holes in the skin. Transfer drill the rivet holes through the rib flanges pilot size. Fit the inboard support rib using grip pins (Cleco/Avdell). Trial fit the mass balance arm through the slots and against the inner aileron rib, trial fit the outboard aileron rib, square up the outboard rib while pressed against the mass balance arm so that the rivet line marked on the rib appears central in the pilot holes in the aileron skin. When all is snug and centred, transfer drill the rivet holes into the outer ribs pilot size and Cleco the outer rib in place.

More...

12. On one face of the mass balance arm, mark out a transverse line 36mm from the end and another intersecting lengthwise line along the centerline of the 20mm wide face. This represents the centre hole for the middle bolt of the group of three which will attach it to the ribs.
13. Fit the mass balance arm between the two ribs and locate it so the intersection of the lines just drawn on the arm appears centred on the central pilot hole of the group of three in the web of the outermost aileron rib. Adjust the angle of the arm so that the front end of the arm is exactly halfway between the upper and lower wing skins – failing to do this will prevent the aileron having sufficient movement.
14. When you are happy with the position of the arm, (check twice...) drill pilot size through the three pilot holes in the web of the aileron ribs, through the outer face only of the box section mass balance arm. A tip here is to place a spare pilot drill bit in the first hole as you drill the second and third hole, to prevent the arm's position wandering.
15. Slide the mass balance arm out forwards and out of the wing, then, using a pillar drill, extend the holes perpendicularly pilot size right through the arm. Relocate the arm in the aileron, and then extend the pilot holes right through the inboard ribs, ensuring that front end of arm remains equispaced between upper and lower wing skins.
16. *Fourth inspection. Check position and alignment of mass balance arm and ribs, position and quality of slots, bolt and rivet holes*
17. Disassemble all the components from the aileron and open up the three bolt holes to 4.8mm
18. Fit anchor nuts to the inner rib.
19. Clean up/de-burr, etch prime and paint as necessary. Reassemble using JC5A, Duralac or similar jointing compound and bolt and rivet into place.
20. Remove clamp between ailerons and flaps
21. *Fifth inspection. Check assembly of mass balance arm and ribs to aileron, free movement of aileron and at least 12 degrees aileron deflection available up and down*
22. Make good paintwork and refit aileron tip
23. Drill mass balance arm 4.8mm diameter two places to suit bolts attaching mass balance weights, which must be fitted so that the front end of the weights are flush with the front end of the arm. Trial fit balance weights to arm for balancing, using AN3-13A bolts, stiffnuts and thick washers.
24. Adjust balance weights to achieve 100% static balance. This means that with the wings level and the aileron free, the aileron should hang level and the trailing edge not tend to rise or fall of its own accord. Nudging the aileron either way from neutral should result in equal 'overshoot'. To achieve this, balance weight can be ground away or additional weight added as required, with one or more additional rectangular steel plate 'shims' sandwiched between existing weight and mass balance arm, substituting for additional packing washer. Additional balance weight will be required if aileron is fitted with optional aileron trim system and aileron trim servo. In this case a 16mm x 16mm x 100mm long mild steel bar, suitably painted for corrosion proofing and inserted within the front end of the tubular mass balance arm has been found to provide the required extra weight. It must be assembled with JC5A, Duralac or similar corrosion-preventative assembly compound and held in place by the existing through-bolts.
25. Prime and paint aileron mass balance weights, final fit aileron balance weights using JC5A, Duralac or similar corrosion-preventative assembly compound.
26. Make up four skin protection plates 100 mm square from 0.025" aluminium, prime and paint, and rivet to wing skins directly above and below mass balance weights, using an Avex A4 rivet in each corner. These plates are to protect skin from denting or fretting in the event of contact from mass balance weights in service.
27. *Sixth inspection. Check 100% aileron mass balance has been achieved, fitting of mass balance weight and skin protection plates. To check accuracy of 100% mass balancing check that when a one pound coin is placed on the aileron trailing edge, the aileron trailing edge tends to fall, and that with the pound coin repositioned on the front end of the mass balance arm, the trailing edge tends to rise.*

28. Using a tank cutter, or similar, make round inspection hole 1 ½" diameter in wing tip rib, centred approximately 300mm forward of wing rear spar and half way between upper and lower flanges. Inspection hole can be filled with plastic bung, (eg 'Barrel plug' p/n VP59 from Component Force, tel 01634 245999) or similar.
29. Re-rivet wing tip in place using Avex A4 rivets. Make good paintwork to scheme.
30. *Seventh inspection. Remove access panels at aileron bellcrank position in lower wing skin, check that there is no sign of cracking, loose or pulled rivets in the aileron rib or associated bellcrank mounting structure visible beneath, in particular at rivets attaching vertical channels 6-W-6-10 to rib (see Zenair drawing 6-W-6).*
31. Refit wings to fuselage per Zenair drawings (...). Reconnect flaps, aileron cables, pitot-static, fuel and electrical connections.
32. Set aileron cable tension to 20 Lbs +/- 5 Lbs, measured in the cockpit in the balance cable. It should be noted here that the cable tension should be measured on the balance cable as control stick asymmetry causes a variance of tension between the LHS and RHS drive cables. When satisfied, wire lock aileron cable turnbuckles.
33. Re-connect aircraft battery.
34. *Eighth inspection. With the aileron circuit rigged it is now possible to inspect the whole system for operation, ensure that there is no undue friction in the system, the ailerons are correctly centered and have a minimum of 12 degrees up and down travel, governed by the primary stops. The aileron mass balances are not intended to act as primary stops, but may act as secondary stops. Ensure that there is positive clearance between the mass balance and the wing skin at full deflection. Check cable tension, flap drive connection, re-fitting of seat pans, correct fitting of wings to fuselage, pitot-static, fuel and electrical connections.*

For more details, the complete text of "LAA MOD/162B/004" can be found on-line at:
(Copy the link below and paste it in the address bar of your browser...)

<http://www.lightaircraftassociation.co.uk/engineering/Zenair%20Docs/Zenair%20CH%20601%20XL%20-%20MPD%20release%20Modification%20Instructions%20-%20fourth.pdf>