



Photo-Guide

(ZE-2009-05 & ZE-2009-07)

The following photo-guide is for educational purposes only. It is intended to assist owners and/or aircraft mechanics with the installation of elements from from 6Z-1G and 6Z-2G as part of Service Letters ZE-2009-05 and ZE-2009-07 for the ULM version of the Zenair CH 601 XL/650. Other photo-guides (also available from www.zenairulm.com) address other aspects of the ULM "upgrade package".

The methods and sequences proposed in this guide are suggestions only; they were developed by experienced builders to simplify the installation process of these upgrades.

Notes: **1)** Photos depict scenes from both Right & Left wings and from various angles to best illustrate the instructions being given.
2) By following the procedures in this photoguide, no new inspection hole will be required in the wing to install the required parts.

If un-explained variations and/or unclear discrepancies between the photos and the drawings are found, the drawings take precedence and should be followed.

A note about the parts: Parts supplied in the Zenair kits are of correct material, have all the necessary bends (with grain in proper direction), and are of approximate size to ensure proper fit. Because there are often slight differences between airplanes, holes are not pre-drilled in these kits and cut-outs will need to be made so that each part fits each aircraft "just right". The installer needs to fit and trim as necessary and file & finish all sharp edges and corners. Also, remember to de-burr all holes prior to final assembly. Application of Zinc chromate (or similar) is optional.

For more information on allowable tolerances and on building standards applicable to Zenair designs, see "Construction Standards for Zenair Light Aircraft" available from the Builder Section of the Zenith Aircraft website: www.zenithair.com

To better serve aircraft builders and owners everywhere, Zenair reserves the right to modify and/or update its photo-guides at any time and without notice. Check website for latest edition of guides.



Inspect and inventory all the parts in your “upgrade kit”. Drawings are available on-line with the Service Letters at: www.zenairulm.com



Disconnect the ailerons from the aileron-rods for each wing.



If installed, remove trim motor access-hole cover. Cut wires in order to allow for removal of aileron.

Note: Label before cutting.

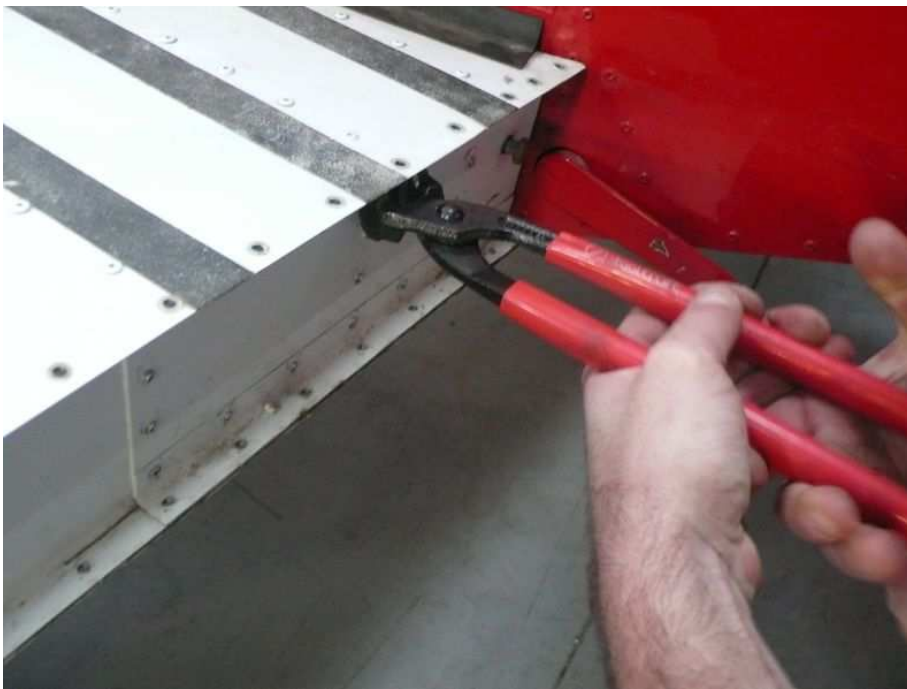


Drill and remove the entire rivet line that holds the ailerons to the wings.



Drill and remove the entire rivet line that holds the flaps to the wings.

Carefully remove the ailerons and then the flaps from both wings.



Drill out and remove the rear-spar root-doubler.

Note: If rivets are installed from the inside, shear off the protruding back-ends and use the drill to remove remaining rivet.



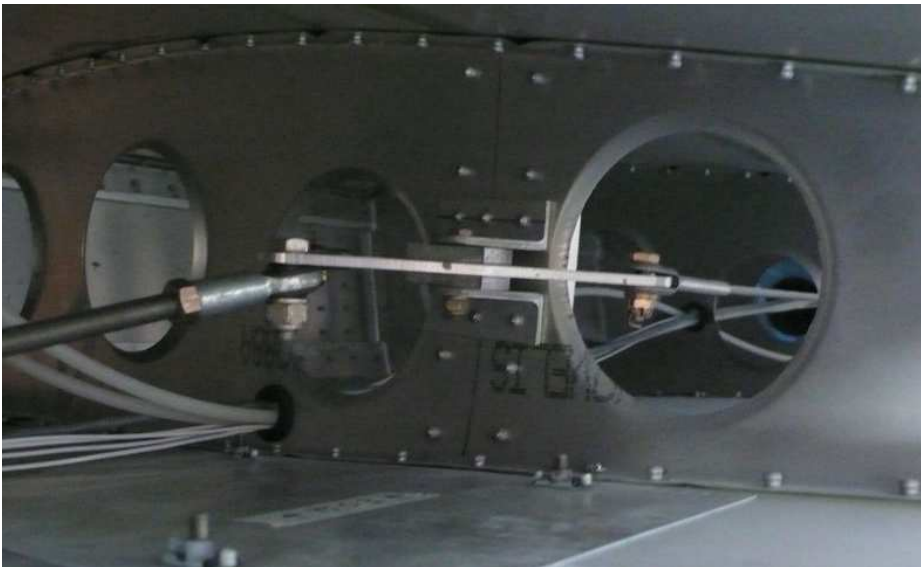
Drill out and remove rivets holding the rear-spar to the rear ribs.



Drill out and remove all remaining rivets holding rear-spar to wings. Remove the nut and bolt at rear-spar attachment bracket.



Remove entire rear-spar from wing. Caution: this piece is very flexible and easily damaged when not properly supported.



Locate aileron bellcrank and remove bolt at nearest cable connection.



Locate original bellcrank support channel (6W6-10) and remove all rivets. Note: Channel flanges may be bent to facilitate access to rivets...

If desired, bellcranks may be detached from their support angles (6W6-11) prior to removal of the rivets.



Use the original Channel as a template to trim new parts (6Z-1G-1) to correct size, and to locate new rivet holes.

Recommended: Only drill one positioning hole at each end; then use holes in actual rib for remaining hole locations.

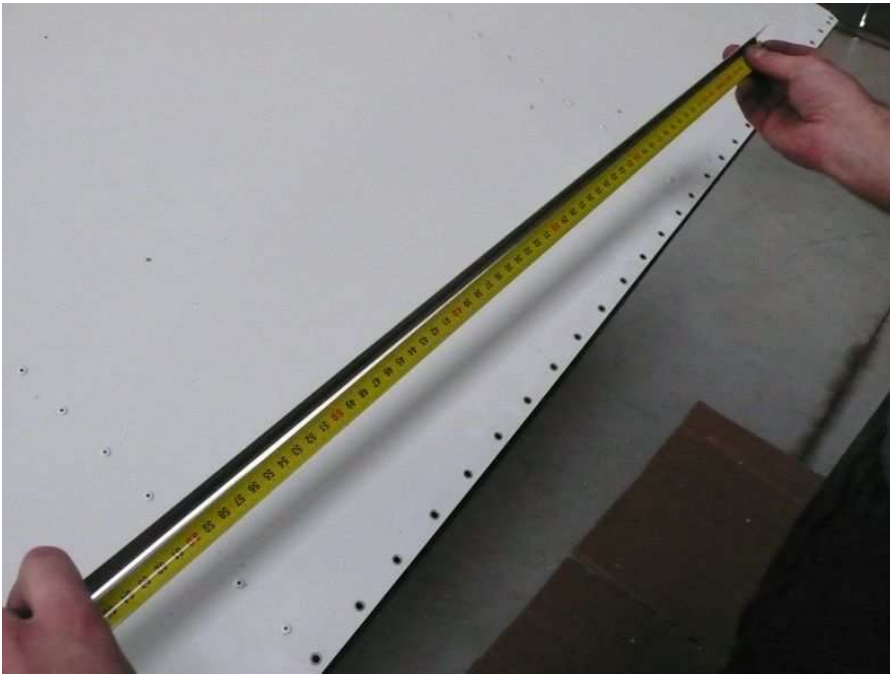


Use tin snips to trim parts to size.

Smooth-out all rough edges and round sharp corners with a file.



When drilling out a rivet, remove head first, then pull remaining part out from behind. Accumulated heads can be removed from the drill bit using a pair of pliers, as illustrated above.

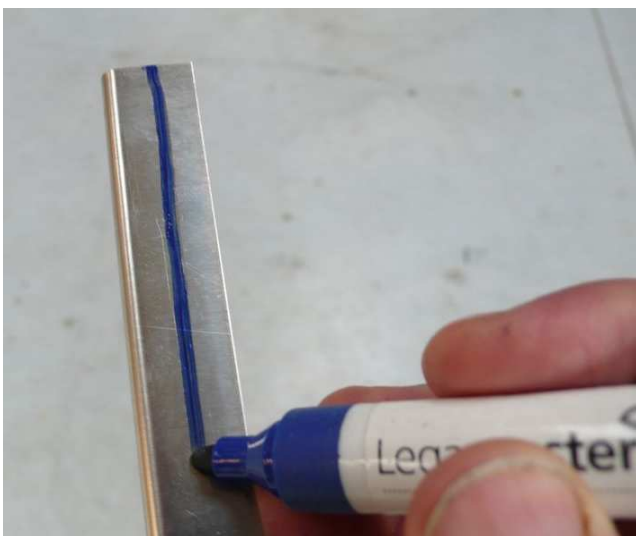


Measure the distance between ribs and cut four appropriate lengths of "L" angle (see drawings for locations).



Attach two "L" angles to the "U" Channel with 2 rivets each.

Caution: the two "L" angles will NOT be parallel due to wing taper.



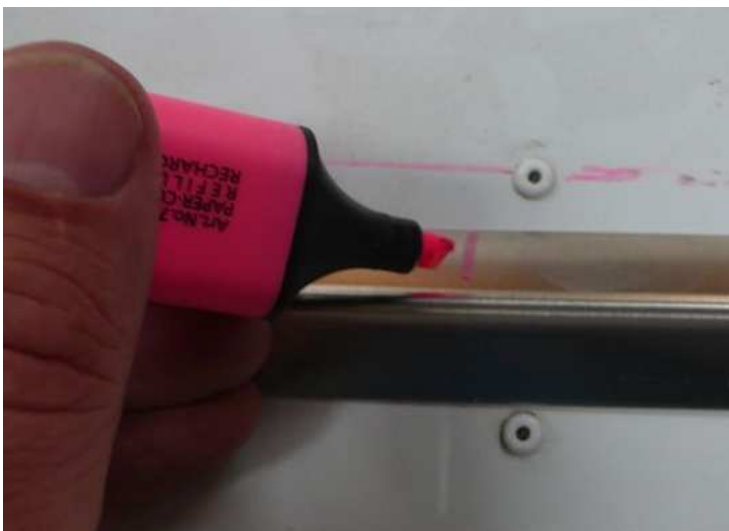
Trace a line down the center of the "L" angle flange (to be located later through holes in skins).



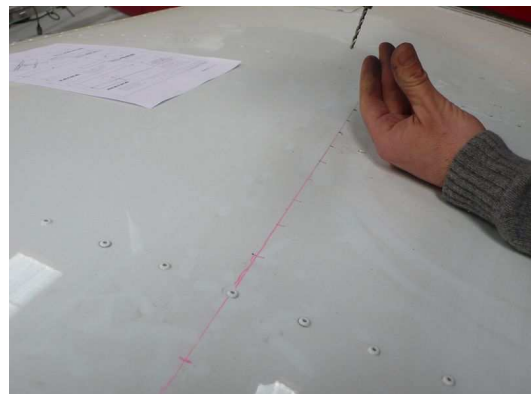


Trace a line on the top and bottom surface of each wing, to mark the location of the “L” angles.

Location is set by the “L” angles attached to the Bellcrank Support Channel.



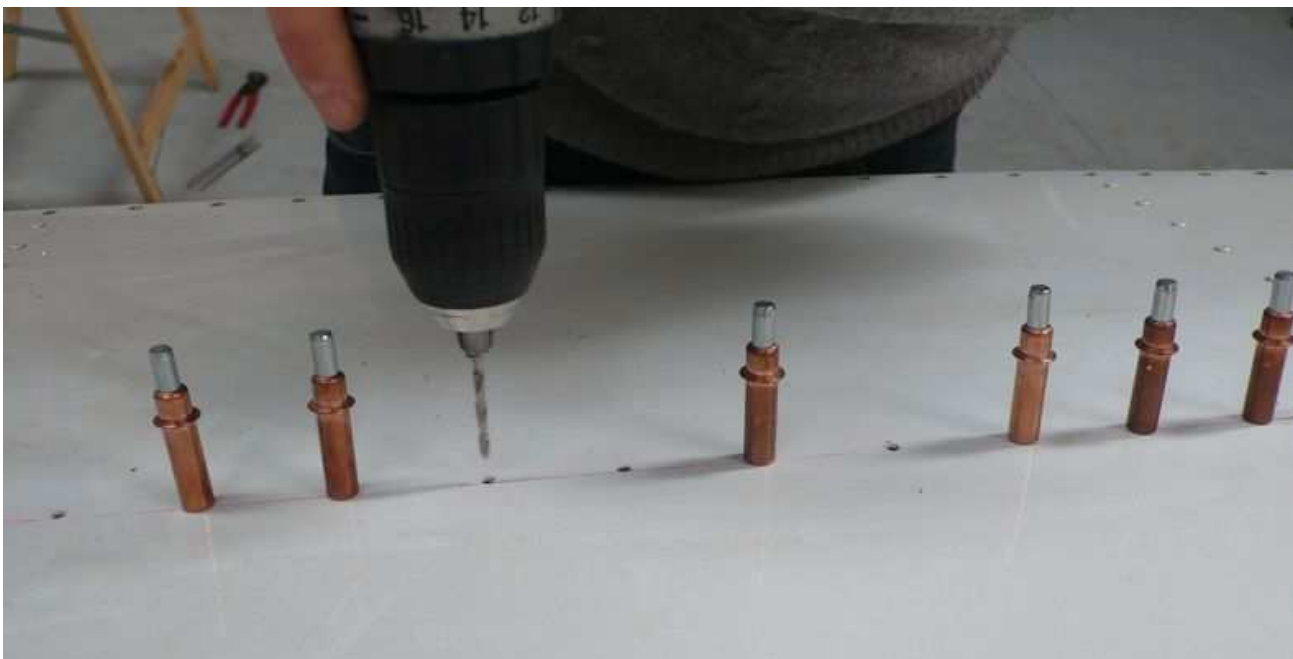
Mark the location of the rivet holes along the lines (pitch 40 between ribs 6 and 7; pitch 50 between ribs 7 and 8).



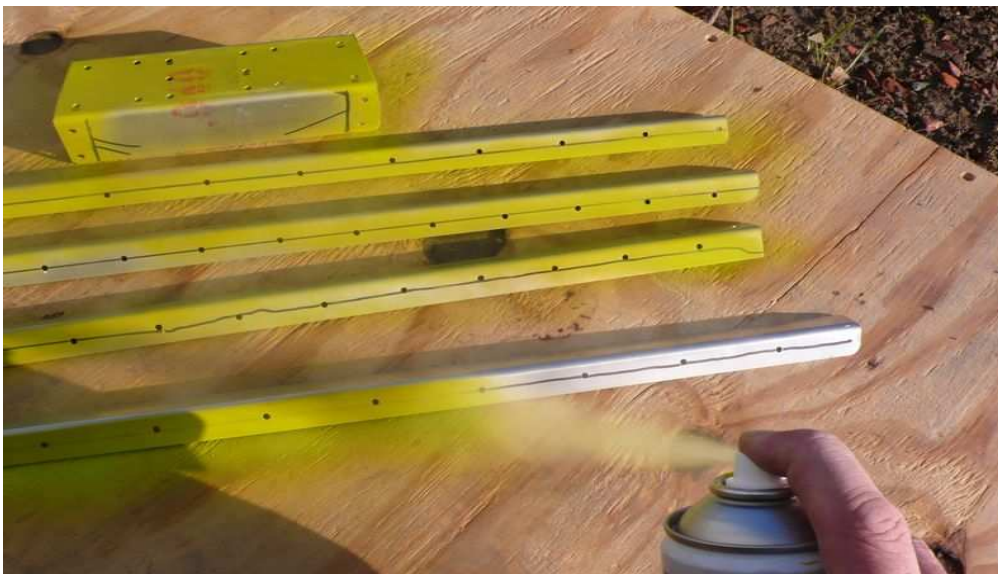
Drill holes through skins. Note: support skin from below while drilling (i.e. with a piece of wood).



Position the "L" angle inside the wing so that you can see the center-line through the holes in the skin. Drill and use clecos to hold parts in place while drilling rest of holes...



Remove all parts again to deburr holes and to file sharp edges and corners.



Application of Zinc Chromate (or other corrosion inhibitor) is optional. If used, apply lightly.



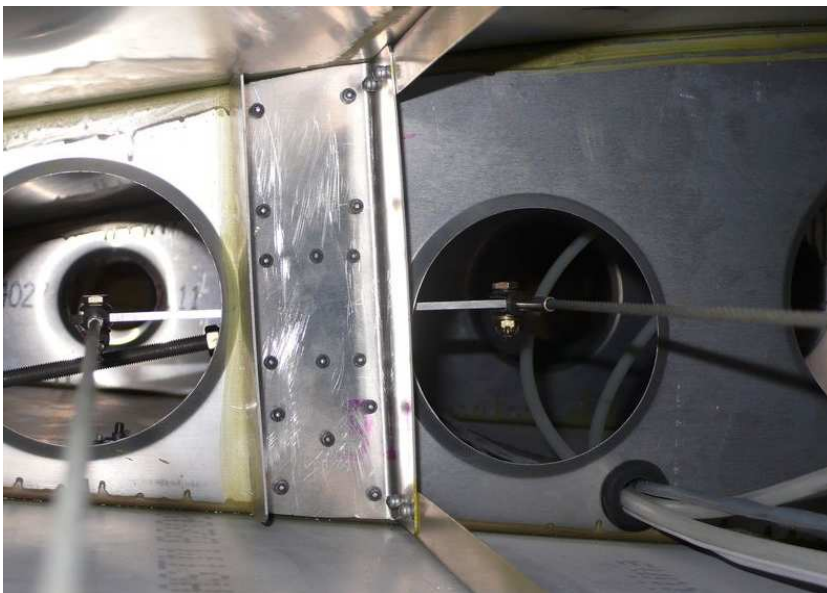
Clean out all loose rivet-heads and other filings, dust, etc. Use of a vacuum cleaner is recommended...



Rivet the "L" angles to the Bellcrank Support Channel and position entire assembly back into wing again, using clecos.

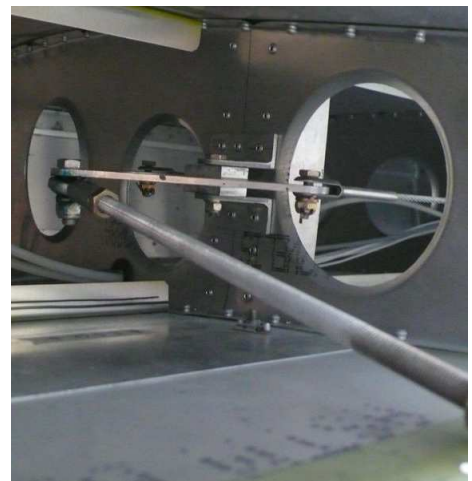
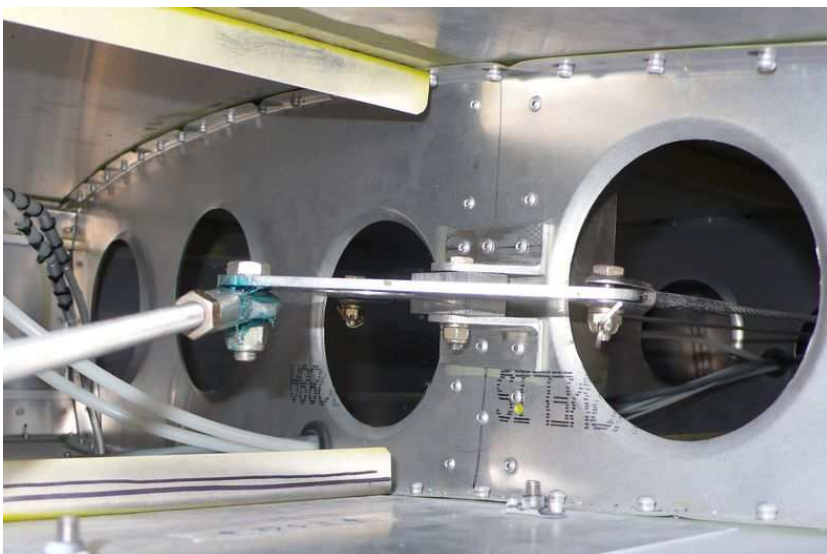


Once in position, rivet all parts in place.



Once all parts are riveted in place, re-install aileron bellcrank and re-connect the cables.

Recommended: Grease all bearing surfaces and rod-ends.





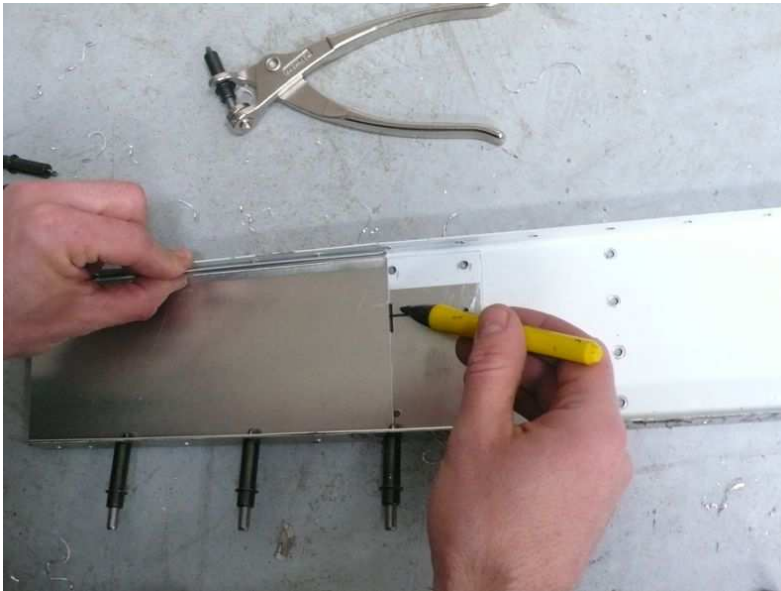
Remove all drilled rivets, burrs, filings, etc. from skins and rear rib flanges.



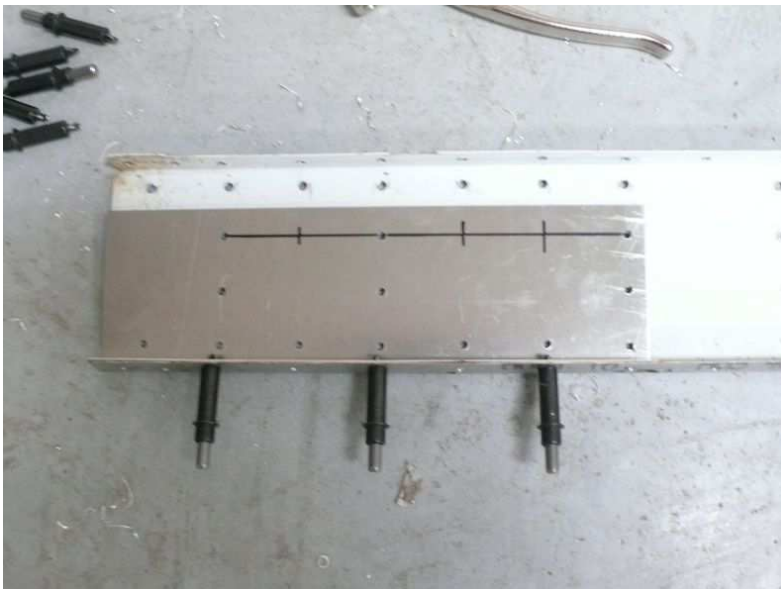
Position and clamp the Rear Channel Doubler (6Z-2G-3) to the rear spar at root. Back-drill through flange, and cleco in place.



Back-drill through rear-spar web and cleco in place.

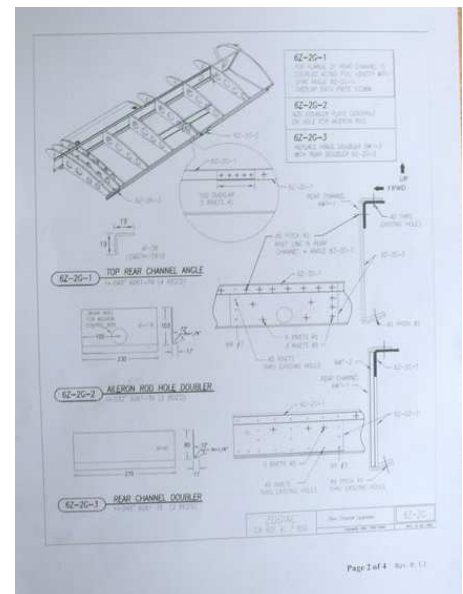


Use a square to mark location of three new (additional) rivet holes.



Location of Rear Channel Doubler with markings for new holes/rivets.

Always refer to drawings for correct rivet size and locations.



Drill holes for new A5 rivets.



Mark a center line on the Aileron Rod Hole Doubler (6Z-2G-2)



Position and clamp the Doubler on the rear spar.



Back-drill holes along flange. Cleco in place.





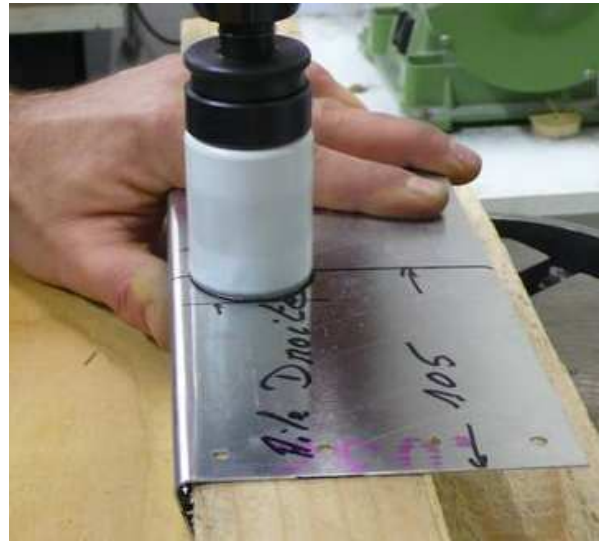
Back-drill through existing holes along web. Cleco in place.



Mark the position of new rivets.



Drill to the required size; use clecos to maintain parts in place.



Use a hole-saw in order to cut the 38 mm hole for the aileron rod. Use a drill press for best results.



Use a file to remove all sharp edges; then reposition on rear spar to confirm proper alignment of all holes.





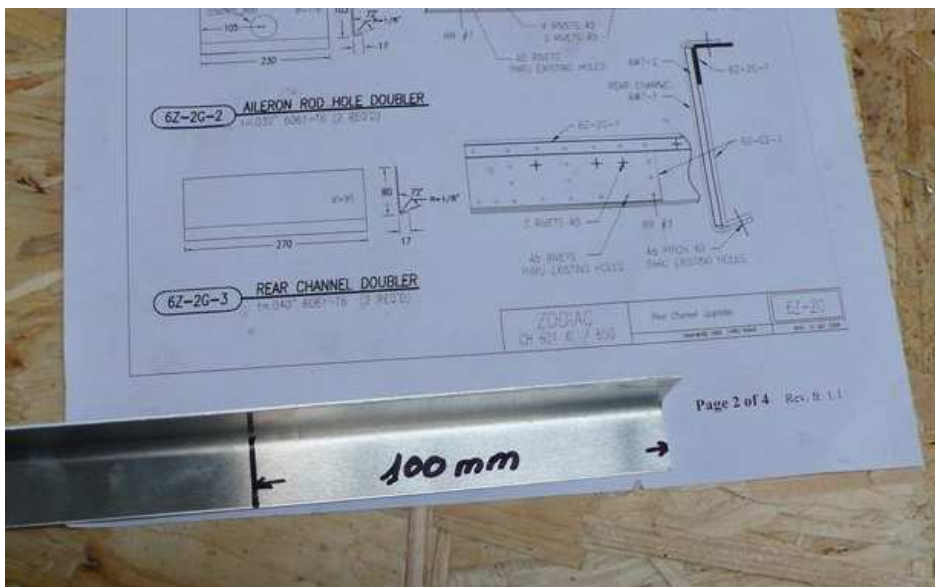
Old aileron-stop may be re-installed. Note that the two holes on the lower flange will have to be re-drilled in order for rivets to fit. Try to elongate holes in aileron stop, not in the rear spar flange.



Locate and drill the added holes in the doubler.



Remove parts, deburr and clean, then re-install.



Find the four Top Rear Channel Angles (6Z-2G-1) and mark the 100 mm overlap distance on two of them.



Position the angles onto rear spars and clamp in place. Back-drill through top spar flanges into the doubler angles.



Drilling on the edge of a wood tabletop works well; use clecos.

Note: Clecos can be put right into table-top to support the work.



Measure and mark the rivet line on the new doubler.



Drill the entire rivet line (using clecos to hold everything in place).

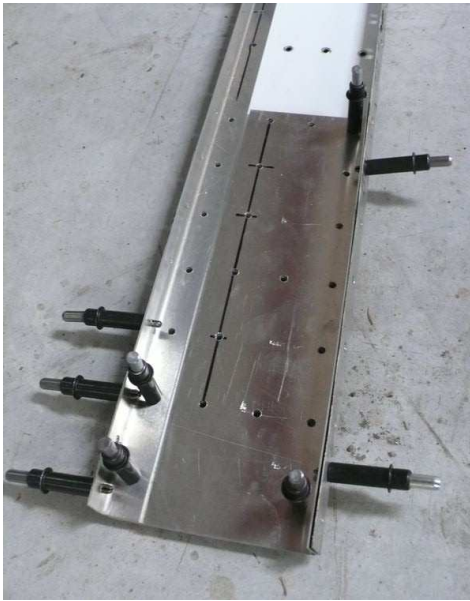
Take apart to deburr and clean.

Position the rivets (using more clecos than illustrated below left!) and set the rivets with the rivet gun.



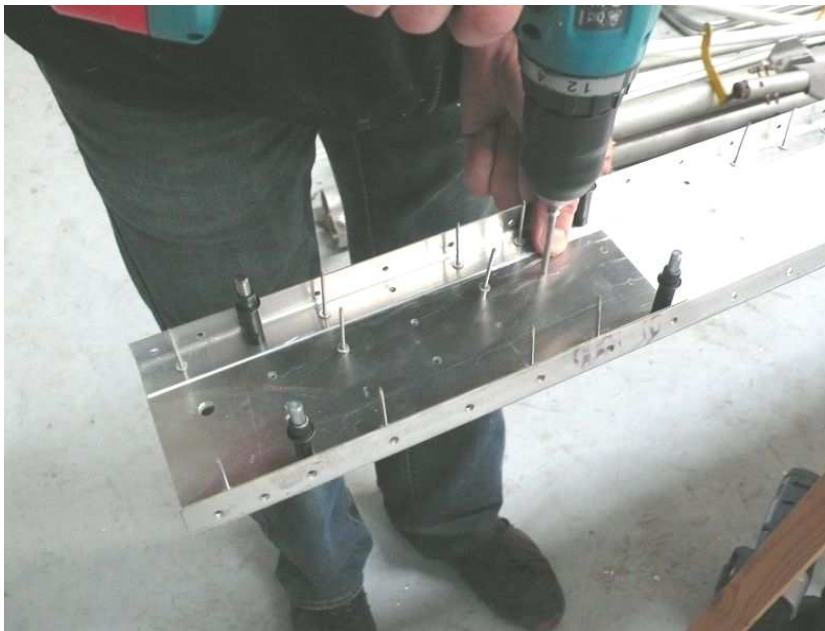
Note: Always hold the riveter perpendicular to riveted surface. If there is interference, it may be necessary to grind down the riveter body.





Finish marking, drilling, cleaning and riveting remaining doublers.

Above: Use a drill press (if available) to back-drill 5/16 hole for rear attachment bolt.

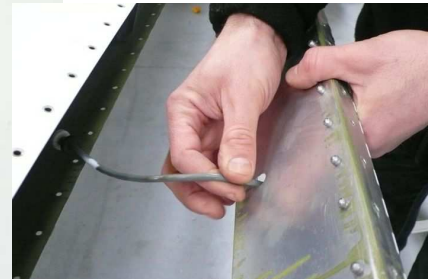


After setting rivets, remove any remaining burrs or sharp edges; then paint to match rest of wings.



Carefully insert re-enforced rear spar into position (at trailing edge of wing).

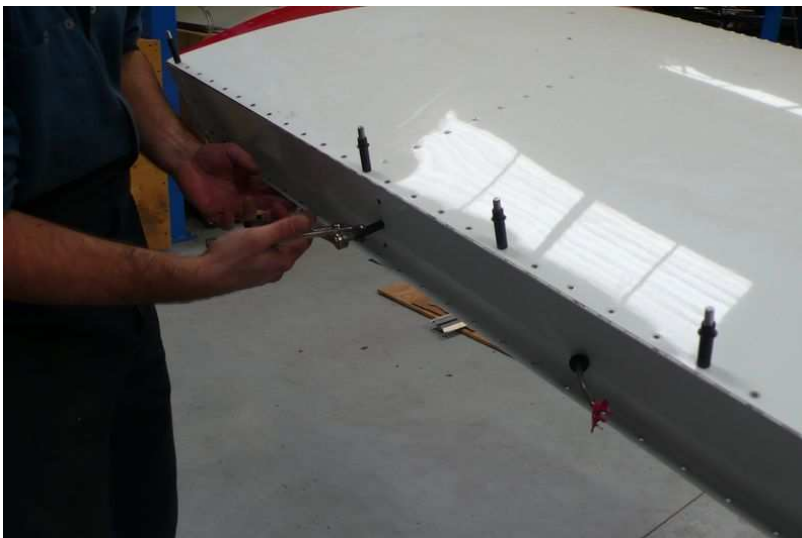
If installed, thread wires from the electric trim through the appropriate hole (use a grommet).



Make sure the aileron rod-ends are properly positioned.

Cleco everything in place.





After confirming that everything is in place*, set the rivets through the trailing edge rivet lines (where there are no flaps or ailerons).

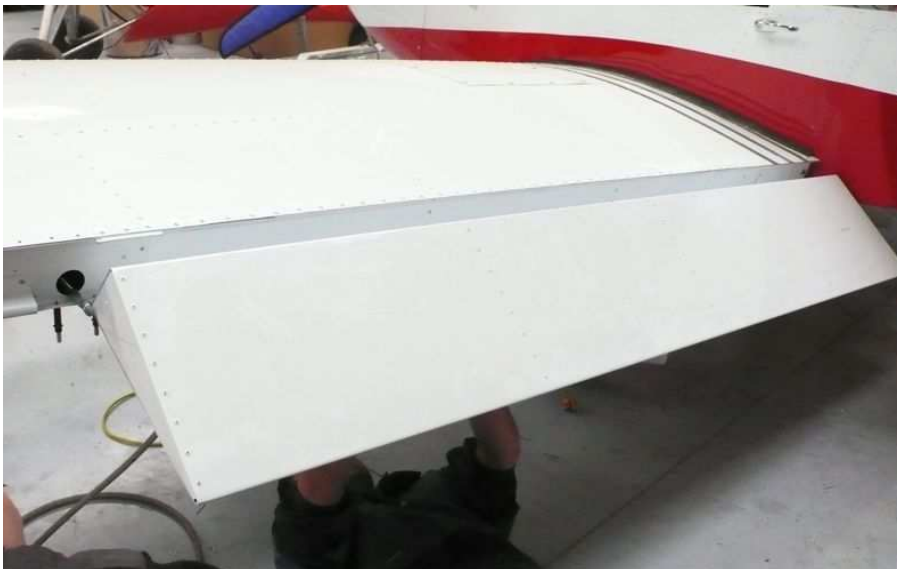
Do not forget the flap stops!

Then set the rivets on the spar web, through rear ribs.



*For extra assurance, the wing angles may be confirmed with a protractor prior to setting the trailing edge rivets.





Set the flaps into position first, before the ailerons.

Slide the flap onto flap actuator pin, then slide the hinge between the spar and the bottom wing skin.

Cleco in position.



Position the wing root attachment bolt.



Then set the rivets.





Set the ailerons in position by sliding the hinge between the spar and the top wing skin.

Cleco in position.



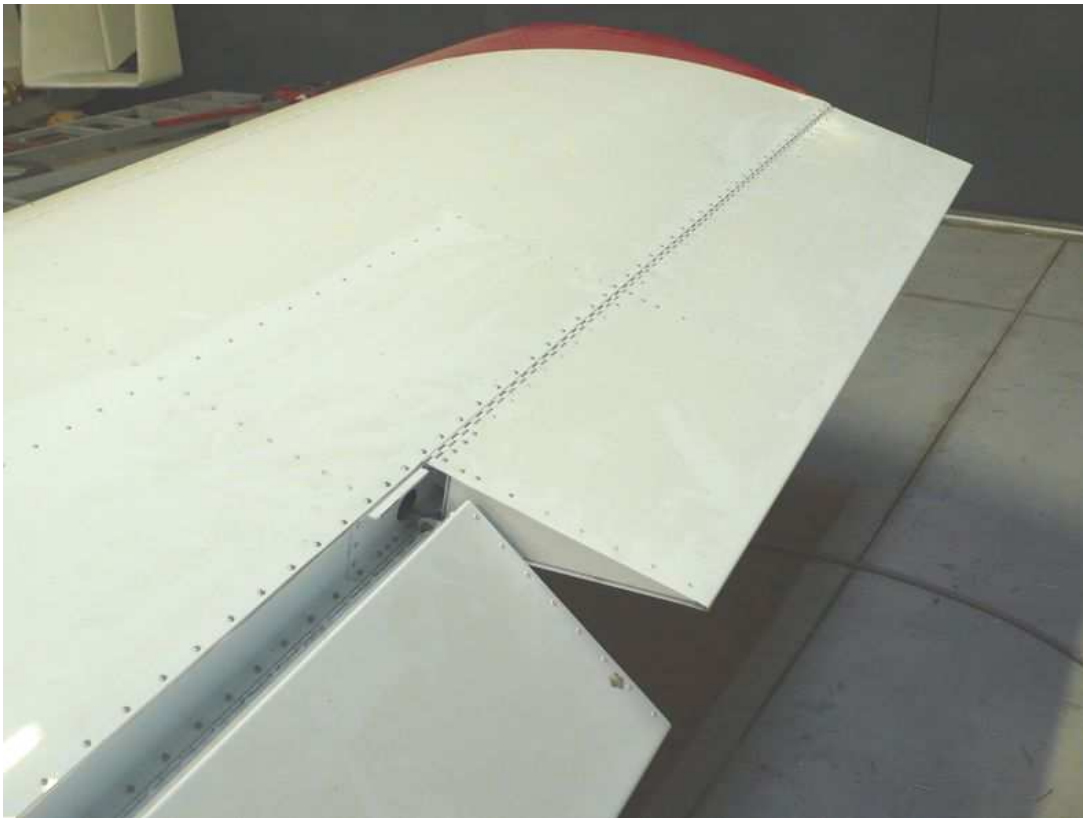
Set the rivets.

Join the aileron to the control-rod end with the intended bolt.



Reconnect the wires for the electric trim motor. Confirm appropriate movement, seal and close inspection plate...





This completes this section of the upgrade process for the ULM version of the Zenair CH 601 XL & CH 650E.



For additional photo-guides covering the installation of other upgrade elements, visit zenairulm.com

