



A Mahindra Aerospace Company

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Service Letter

Subject

Wing Strut Removal and Installation

Applicability

All GA8 and GA8-TC 320 aircraft.

Amendments

Issue 1: Initial issue. GippsAero Reference GAE12#2414.

Background

Operators incorporating the requirements of SB-GA8-2017-174 have requested guidance and enhanced procedures to aid removing Wing Strut Assemblies.

Whilst this Service Letter does not constitute approved maintenance data, it outlines the procedures we use to remove and install Strut Assemblies both here and during re-assembly of aircraft overseas which can be considered as acceptable to GippsAero as the aircraft OEM and type certificate holder.

Removal Procedures

Preparing aircraft and Supporting the Wing

1. Put the aircraft on a stable, level surface such as inside a maintenance hangar.
2. Make the aircraft safe for maintenance by at least electrically isolating the aircraft by disconnecting the aircraft battery.
3. Apply the aircraft park brake or otherwise chock at least the main landing gear wheels.
4. When the aircraft is stable, work can start. Support the wing by shoring underneath the lower wing skin at the first Rib outboard of the strut attachment point as described in Chapter 7-20-10 of the GA8/GA8-TC 320 Service Manual and shown in Figure 1. Concurrently, shore and/or put a jack under the opposite wing to help aircraft stability – use of a Tail Stand at the rear of the aircraft can also help.

The wing can be supported using an adjustable lifting jack, however use a length of padded soft timber or a padded wooden contour board with the jack pad to prevent damage to the wing. Make sure that the wing jacking point is still accessible as it may be used later on.

Only raise the jack sufficiently to take the weight of the wing – an assistant can make a visual check by watching the aircraft's wings to make sure the aircraft remains level during the shoring procedure.

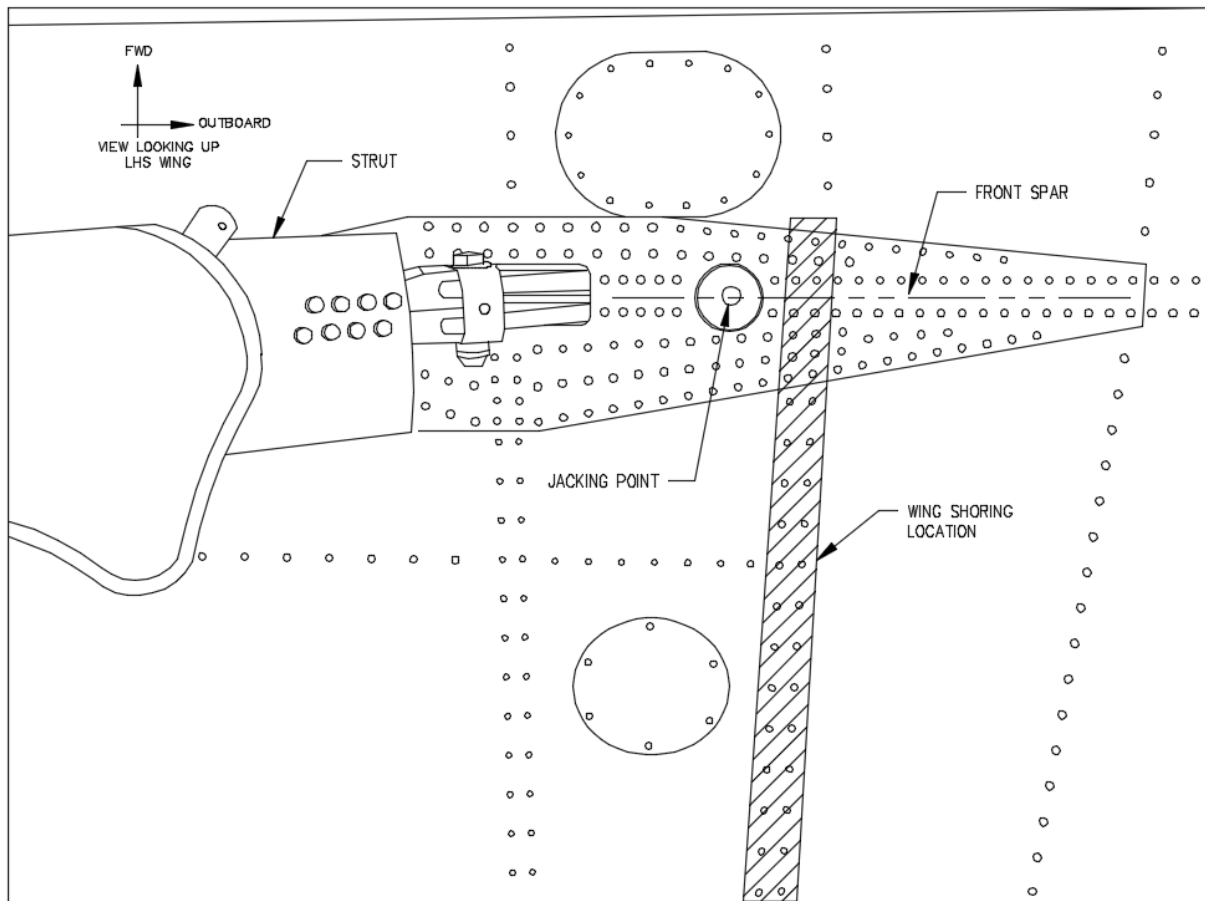


Figure 1 – Wing Shoring Location

Removing Strut

1. Remove fasteners securing Wing to Strut and Strut to Fuselage Fairings and slide Fairings toward centre of strut. Make sure Fairings are away from the Strut fitting bolt heads at both ends of the Strut.
2. Remove cockpit access panels to get access to the lower strut bolt. The RHS access panel is shown in Figure 2.

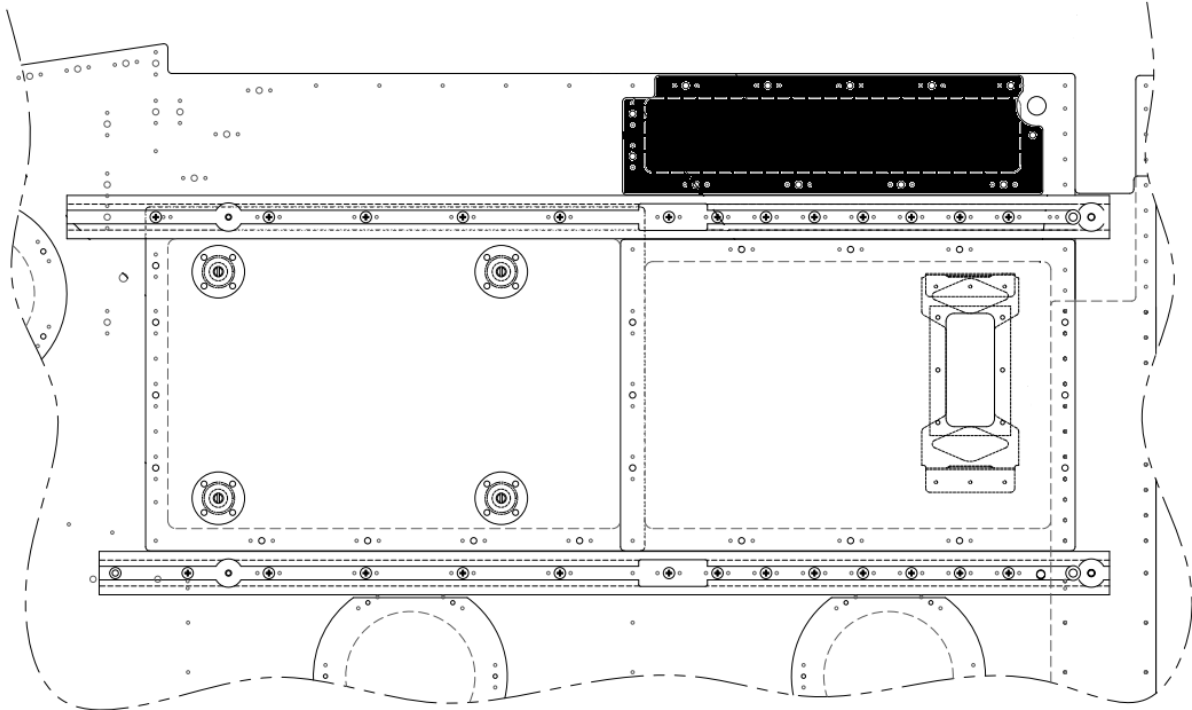


Figure 2 – RHS Cockpit Access Panel for Lower Strut Bolt

3. Remove nuts and washers from upper strut bolt.
4. Support Strut Assembly to prevent it from falling. Generally as the Strut Assembly has a mass of around 20 lb an assistant can hold the Strut Assembly for the next operation, however consult your applicable work health and safety regulations related to manual handling for any limitations that may apply to lifting heavy items.
5. Remove the upper strut bolt. The bolt is designed to be a close tolerance fit in its holes, so it may require driving from the hole. Do not attempt the remove the bolt by unwinding it – this will damage the lug fastener holes.

To drive the bolt out, use a pin punch of around 0.5" diameter, a sacrificial drift made from a soft material (such as aluminium) or a piece of timber and drive the bolt from its bore using a hammer or mallet. Be careful not to strike the threaded end of the bolt – it is good practice to put a sacrificial nut on the end of the bolt, tighten until it is flush with the surrounding bolt material and strike the nut rather than the bolt. The sacrificial nut will help protect the threads from damage.

Be very careful not to strike and damage the Strut Fittings.

6. Once the upper strut bolt is out, temporarily support the Wing Strut if required.
7. Remove nuts and washers from lower strut bolt.
8. Check if the Strut can be removed by pulling upper end of Strut away from wing. If so, remove lower strut bolt by using the same procedure for the upper strut bolt and remove Strut from aircraft.

If not, continue.

9. Remove the upper wing to fuselage Fairings as shown in Figure 3.

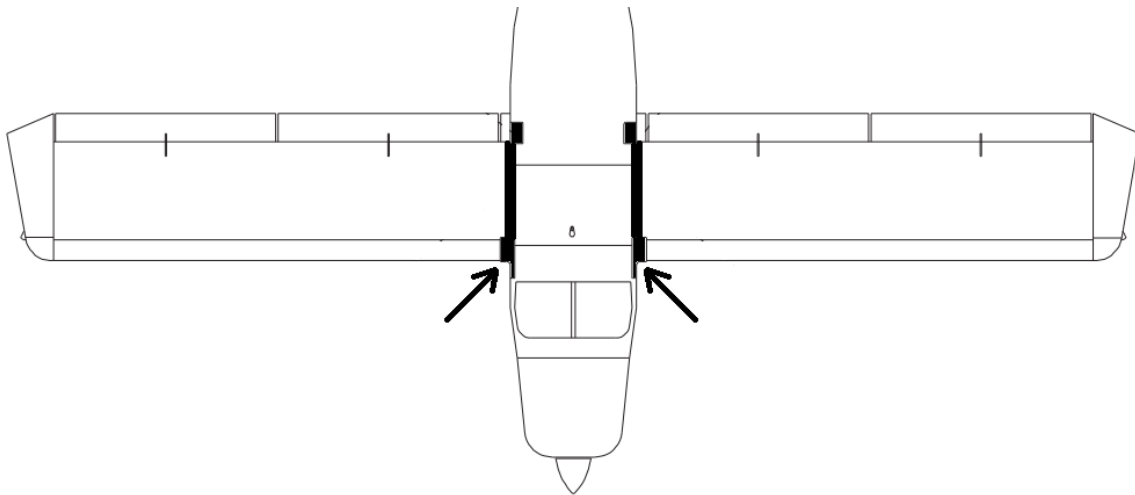


Figure 3 – Upper Wing to Fuselage Fairings

10. To help in disconnecting the Strut from the wing, one method is to jack the affected wing up. Jacking the wing up will help overcome 'stiction' between the lug faces inside the strut to wing joint. Another method is to have an assistant push the wing up from underneath the front and rear wing spars at the wing tip.

These methods may or may not require the wing spar to fuselage attachment bolts to be loose, and depends upon how much friction exists at the spar to fuselage joints; as guidance typically GippsAero personnel do not loosen the spar to fuselage bolts however it may vary in your case.

For the left wing, strut disconnection may also be helped by looking at the Wing Rigging and the position of the rear spar adjusting bushes as described in Chapter 57-10-10 of the GA8/GA8-TC 320 Service Manual. If the left wing adjustment is towards either the upper or lower ends of its adjustment range, mark and record the positions of the rear spar adjusting bushes and move the bushes until the wing returns to a neutral position.

11. If using the jacking method:

- a. Put a wing jack under the wing jacking point and slowly raise the wing until it starts to lift, making sure that the aircraft wheels stay on the ground. Have an assistant watch the aircraft's wings from a distance to guide the jacking process. Get another assistant to watch the wing root rib area to make sure the fuel lines, control cables, electrical looms and pitot-static sense lines are not strained, crushed or otherwise damaged during the procedure.

If the strut to wing joint starts to separate during jacking, stop and pull the Strut down and away from the wing. Lower the jack until the wing returns to its shoring support.

- b. If the joint does not separate, put a piece of soft timber up against the Strut bolt heads and tap the free end of the timber with a hammer or mallet. Be very careful not to strike and damage the Strut Fittings. The combination of wing jacking and short sharp taps with the hammer will help overcome any stiction between lug faces in the same way an air driven impact wrench helps loosen nuts or bolts; once the joint separates pull the Strut down and away from the wing.

12. If using the manual method:

- a. Have an assistant push up on the underside of the wing at the wing tip. The assistant should stand on a stable work platform and push only on the lower wing skin at the front and rear spar rivet lines as shown – not on the unsupported skin. Get another assistant to watch the wing root rib area to make sure the fuel lines, control cables, electrical looms and pitot-static sense lines are not strained, crushed or otherwise damaged during the procedure.

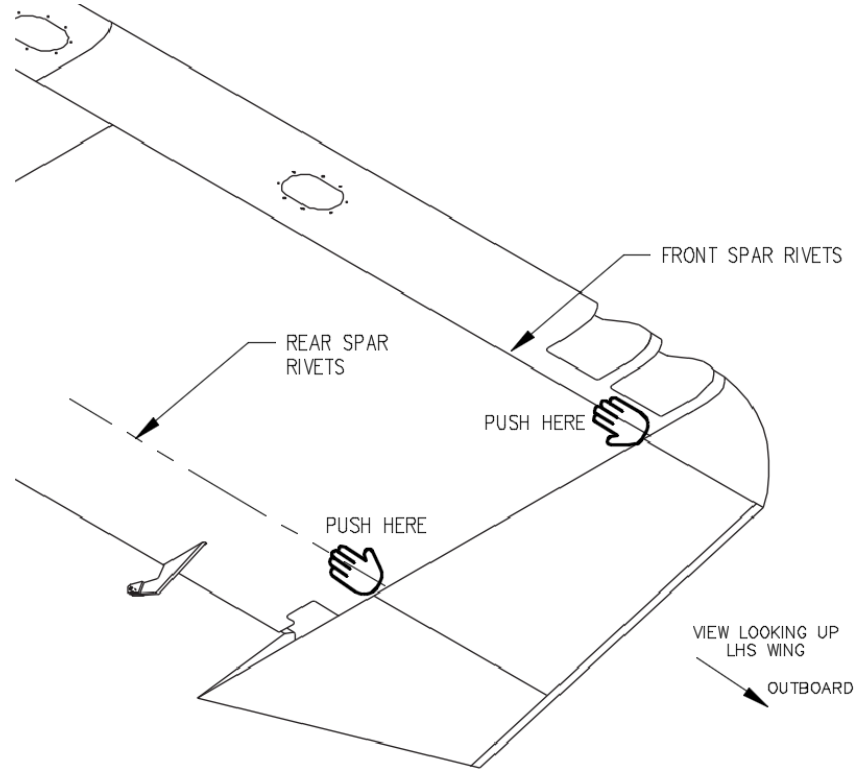


Figure 4 – Manual method

If the strut to wing joint starts to separate during pushing, stop and pull the Strut down and away from the wing.

- b. If the joint does not separate, put a piece of soft timber up against the Strut bolt heads and tap the free end of the timber with a hammer or mallet. Be very careful not to strike and damage the Strut Fittings. The combination of pushing and short sharp taps with the hammer will help overcome any stiction between lug faces in the same way an air driven impact wrench helps loosen nuts or bolts; once the joint separates pull the Strut down and away from the wing.
13. Once the Strut is away from the wing, remove the lower strut bolt and remove the Strut from the fuselage. If the strut to fuselage joint does not separate easily, put a piece of soft timber up against the Strut bolt heads and tap the free end of the timber with a hammer or mallet. Be very careful not to strike and damage the Strut Fittings. Once the joint separates, pull the Strut away from the fuselage.
14. De-jack the wing until it returns to its shoring support.

Installing Strut

1. Apply a thin layer of general purpose airframe grease to the mating surfaces of the strut fittings, wing strut fittings and the fuselage attachment 'lugs'.
2. Align the lower Strut fittings and the fuselage attachment 'lugs'. Keeping the Strut horizontal, push the Strut until the joint has aligned and lift or lower as required to align bolt holes. Insert a serviceable lower strut bolt and loosely install a serviceable nut to prevent the bolt from dropping out.
3. Once the lower strut bolt is in, Swing the Strut up until the Strut upper fittings meet the wing strut fittings. Observe the relative positions of the fittings – normally the wing strut fittings toe out slightly from the front spar.
4. Put a clamp (G, hand or adjustable) on the shanks of the wing strut fittings and hand tighten until the fittings align. Normally at GippsAero the fittings need to come together by about 0.010" to 0.020" to achieve alignment with the upper Strut fittings – do not close the gap between the strut fittings by more than 0.040".

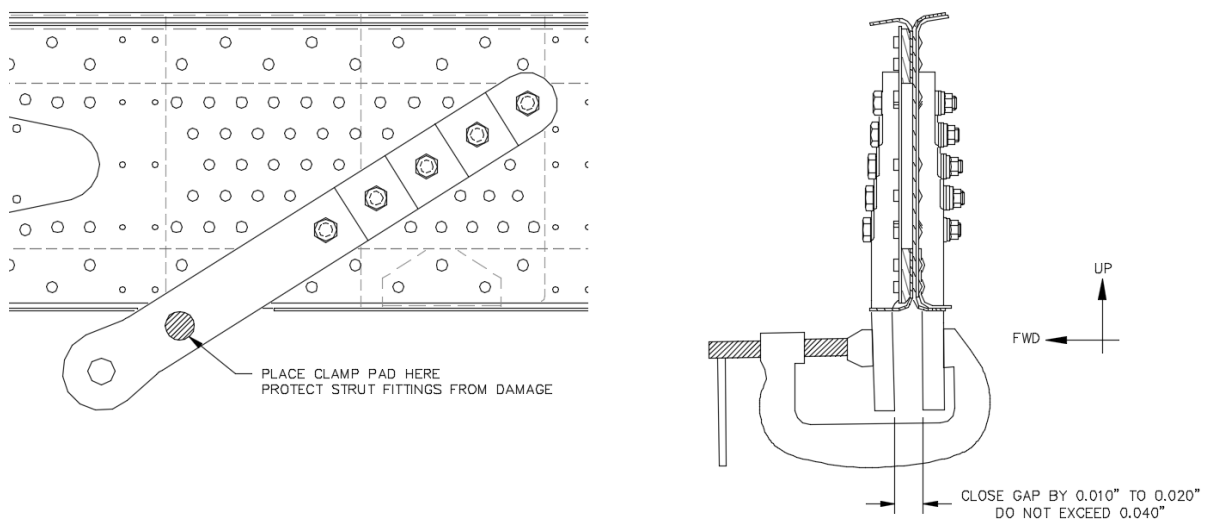


Figure 5 – Wing Fitting clamping

5. Once aligned, push the Strut up until the joint is aligned. If required, put a piece of soft timber against the Strut bolt heads and tap the free end of the timber with a hammer or mallet until the fastener holes are aligned. Do not use a bolt to align the fastener holes – this will damage the Strut fittings.
6. Insert a serviceable upper strut bolt. Install serviceable nuts and washers on the lower and upper strut bolts as shown in Chapter 57 of the GA8/GA8-TC 320 Illustrated Parts Catalogue. Torque the AN316 nuts to between 55 and 65 lb.ft.

Completion

1. If the left wing rear spar adjusting bushes were adjusted during strut removal, rotate until they align with marks made during disassembly. Read the Wing Rigging procedure in Chapter 57-10-10 of the GA8/GA8-TC 320 Service Manual and do any checks required. Check that the fuel lines, control cables, electrical looms and pitot-static sense lines were not strained, crushed or otherwise damaged during strut removal.
2. If any wing spar to fuselage bolts were loosened during strut removal, tighten and torque as required by Chapter 20 of the GA8/GA-TC 320 Service Manual.
3. Replace removed strut to wing, strut to fuselage and wing to fuselage fairings. Replace any removed access panels.
4. Remove wing shoring.
5. Check the paint on rivet and bolt heads on the Strut and lower wing skin. If paint is damaged, touch up using a topcoat that meets MIL-PRF-85285 in a colour matching the surrounding area.
6. If disconnected, re-connect the aircraft battery.

Support

Should you require any further information please contact our Customer Support Department:

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