Service recommendation #5 March 8th 1994, rev 11/15/95

General Landing Gear repairs and alignment for Luscombe 8 series non-silflex gear.

The upper and lower gear legs (and silflex legs) are heat treated units. They MAY NOT be welded or repaired by application of heat unless normalized and re-heat treated to attain their full strength and durability. If inspection reveals welding repairs in the field, it is recommended that those legs be replaced. Toe in MAY NOT be adjusted by heating and bending the legs as we are frequently asked. This was done on some early tube and fabric airplanes, but this service is not appropriate for Luscombes.

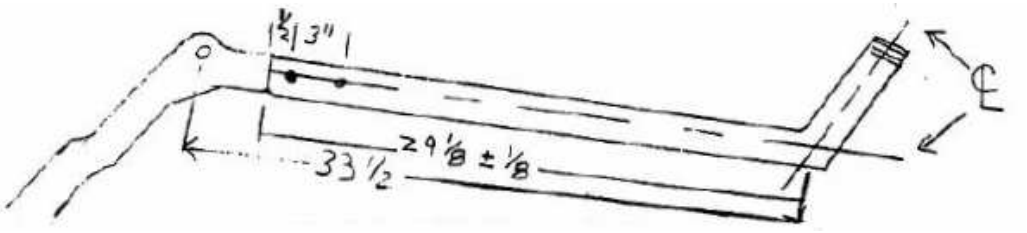
Alignment of the landing gear assembly 08311 (two piece units)

This job is most easily accomplished **inside on a level hard surface floor** with **both** main wheels off the ground about six to eight inches or .2 meters.

Support the airplane in a level attitude both longitudinally and laterally. The level lines are the horizontal splice plate on the fuselage side, and the front carry through spar. Be sure to support the fuselage at bulkheads and formers to keep from damaging the skins.

Drop a plumb line at the tail post centerline (spring attach bolt) and the fuselage center using either the oleo mounting bolt, or the top center engine mount as reference. Snap a chalk line between these points. This is your reference line.

Gear dimensions
The top mounting hole is specified at 1/2" from the lower leg's top edge. Some aftermarket legs are longer or shorter requiring an adjustment of this installation dimension. Distance from the top of the lower strut (measured on the leg centerline) to the axle centerline of the gear is 29 1/8" +/- 1/8" for prop clearance. Distance from the top of the strut to the center of the top hole is 1/2" +/-1/8". From Centerline of the top hole to Centerline of the bottom hole is 3", tolerance is + 1/64" – 0".



Toe in Adjustments
Factory specification is for neutral toe-in (0 degrees from A/C centerline). Ground handling will be improved with up to 1 degree of toe out, and would be considered to be within dimensional tolerance. Avoid toe in where possible as it makes the airplane "skittish" on the ground.

Mark the lower leg to the dimensions above with a circle around the leg. Measure up the upper leg from the existing hole an appropriate distance and mark it. This is usually 1/2 inch but may be more or less depending on the overall length of the gear leg (see gear dimensions). Install the lower leg to the line marked on the upper gear leg. Rotate the lower leg until the axle is approximately perpendicular to the aircraft centerline reference. This can be measured with a carpenter's square on the axle tube and a tape measure to the centerline reference we snapped earlier. Clamp the leg in place. Draw a string or straight edge down the front or rear of the axle shafts from right to left to visually check alignment. Readjust and clamp the leg in position as needed. Drill a small (1/8 to 3/16) hole in the approximate center of the top mounting point/line approximately 1/2" from the top of the Lower gear leg. Drill in the front wall of the tubing only until alignment is set and assured Expand this hole to 5/16ths in small increments.

Remove the leg and locate the lower mounting hole (front side only) in a similar manner using measurements taken from the upper gear leg.

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Reinstall the lower leg and drill the rear holes in the lower leg tube only AFTER having properly aligned and drilled the front holes and only after having checked the toe in three times. A similar starter hole and expansion to size is a good method to use since the existing upper leg hole will help center the drill as it becomes close to the proper size.

ALTERNATE REPAIR
If the alignment above was done incorrectly, it is possible to slot the Lower leg mounting holes across the tube up to 1/8" to align the gear. DO NOT slot the upper leg holes.

When slotting is completed, drill a small hole and tap it for a 3/16ths set bolt midway between the two main gear leg mounting bolts. This is a safety precaution in case the main mounting bolts were to work loose and un-adjust the toe in as set. The bearing area of the bolts/tube if properly torqued will lock the lower leg in place if ONLY the outer gear leg is slotted. An alternative method using oversize bolts is discussed in a service letter dated 6-1-46. Either method is acceptable and reliable, however the "slotting" method minimizes the number and complexity of the parts to be modified.

Caster Adjustments
Install the upper gear legs. These have a 2 to 3 degree forward sweep welded in, to properly position the axle/wheel at the +3 distance from the datum (leading edge at level) this distance may be adjusted by up to an inch fore and aft with the jack strut S-9 adjustment fork.

Camber adjustments
The Luscombe gear legs are welded in place to set camber. The left leg is hinged directly to the gearbox. The right leg is hinged through a shackle to the gearbox, and is less indicative of camber problems since it "follows" the strut motions. Camber at the wheels is adjusted by the length of the center suspension spring. This spring should be 8" in length when un-loaded. Up to 1/4" in shims is authorized and were used from the factory. Tolerance beyond this should be repaired by replacing the spring as it may have become unsprung through use or age. DLAHF can provide serviceable or new springs for installation. Loose tie rods can affect the caster adjustment but is not generally the problem. The tie rods and jack struts should never be tightened to such an extent as to make a "bow" or bend in the lower leg noticible visually.

Shackle modifications
Several service difficulties have been attributed to the Right gear shackle pin and shackle forging deformation.

The right gear is mounted to the gear box through a shackle and pin. In service this pin has a propensity to bend since it is captive on only one end and then only with a cotter pin. It has also been noted in service that the lower bolt through the forward and rear gear bulkheads, with which the shackle is mounted, tends to freeze in the shackle from a lack of lubrication. There are several modifications which will improve the service life and lubrication of this gear part.

1. After removing the shackle, drill a 1/16 th inch hole through one wall of the mounting bolt tube (bottom of the "U") for lubrication of the center section of the bolt. (preferrably the outboard & accessible wall) Lubricate this often and freely.

2. The current production shackle has only one hole to locate the shackle pin on the forked shackle end. It is suggested that the other side of the shackle also be drilled with a 1/16th hole. Instead of using cotter pins to lock the shackle pin in place, use a spring steel roll pin, driven in with a small punch and hammer.

Safety this pin in position by threading a small piece of safety wire through the middle of the rollpin and tie it off to itself. This modification will reduce the lateral working of the shackle pin and place it in a consistent shear load condition (as designed) rather than allowing a bending load to develop on the
pin and shackle assembly.