Suspense Surrouding Soundly Suspended Suspensions

I believe that any thorough restoration involves a complete strip down to the bare shell of the body, and it is at this point that I wish to begin this series of articles designed to assist Citroen owners in getting the best out of their car regarding steering, roadholding and braking. This instalment is intended to provide a method of attacking the problems involved in front end rebuilding when there is no access to all those wonderful items such as jigs and weight distribution scales. A few tools to assist in aligning the job once the majority of reassembly has been completed will need to be made. These can be made from easily available materials in any workshop possessing a vice, vernier, hacksaws, files and an electric drill. Details of these tools will be given where applicable.

Part 1 - Getting it straight

Closely examine the coque (hull) of the car to assess whether there has been any distortion due to accident damage. Points to watch are: the four mounting bolts of the cradle must be parallel and must form a perfect rectangle. Measure the distance between centres of each bolt both vertically and horizontally. Distance between left upper and right upper and between left lower and right lower should be identical. If not, there is a twist in the coque which must be eliminated at this stage. Measure also the distance between bolts diagonally. This is critical. If all is well here, proceed to Part 2, The Cradle; if not, then proceed as follows.

A steel plate ½ inch thick must be made to hold three of the four bolts true. Assuming that three out of four bolts are true and square, place the plate over the three true bolts.

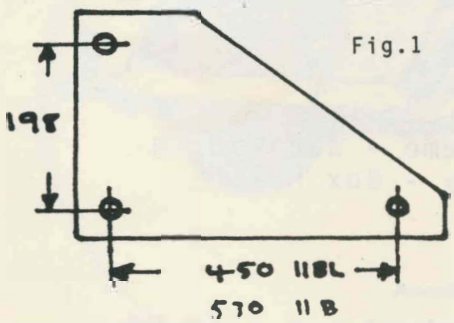


Fig.1

You will need to hire a Porta Power available from most tool hire firms. Place this device across the bolts horizontally and apply pressure until the diagonals are equal.

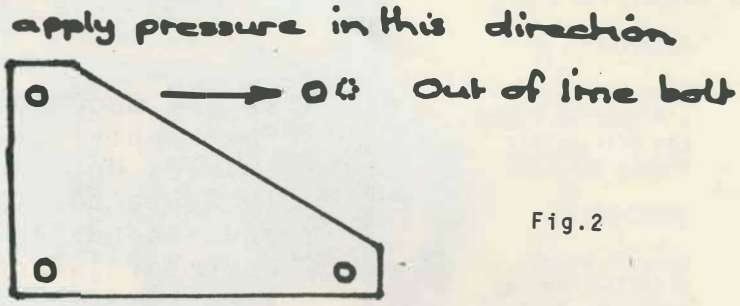


Fig.2

Once squareness of the four bolts has been achieved, then it is essential to check the alignment in parallel to the centre line of the car. Out of line bolts can be bent back using a metre bar and some judiciously applied heat from an oxy torch.

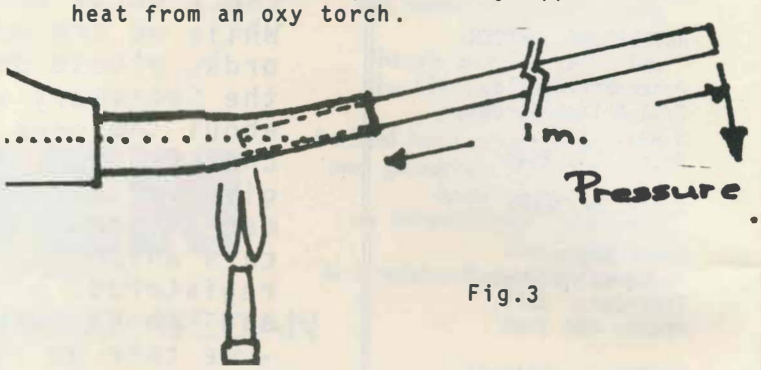


Fig.3

Next it is necessary to check the vertical alignment of the cradle mounting face in order that the cradle, when bolted up to the coque, is not twisted. If welding has been carried out on panels or seams of the sponsons (front horns) then distortion may have occurred, pulling the bolt nearest the weld back. Test both sides with a plumb bob and line (chassis mounted level).

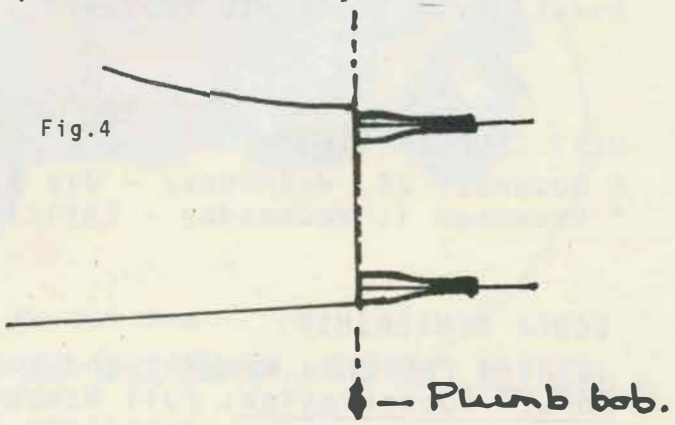
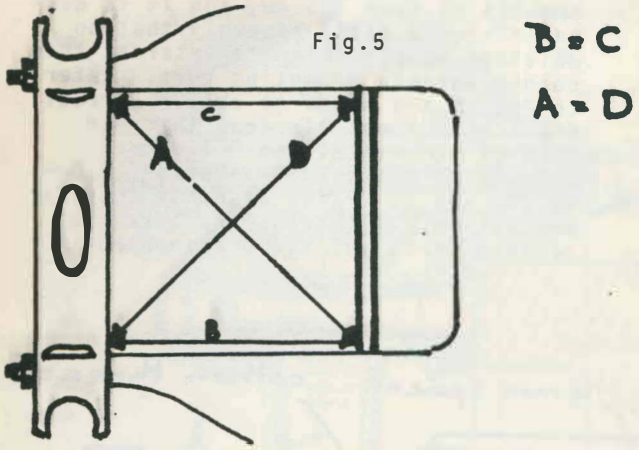


Fig.4

Place shims on the bolt to correct any discrepancy. Then offer up the cradle after having checked the cradle for distortion (Part 2). If the cradle is true, the mounting faces should contact the rear of the cradle without force (grease the bolts first).

Now check the cradle for perpendicularity to the car's centre line. Distance from torsion bar rear mounting bracket holes should be equal, as should the diagonal measurements.

Fig.5



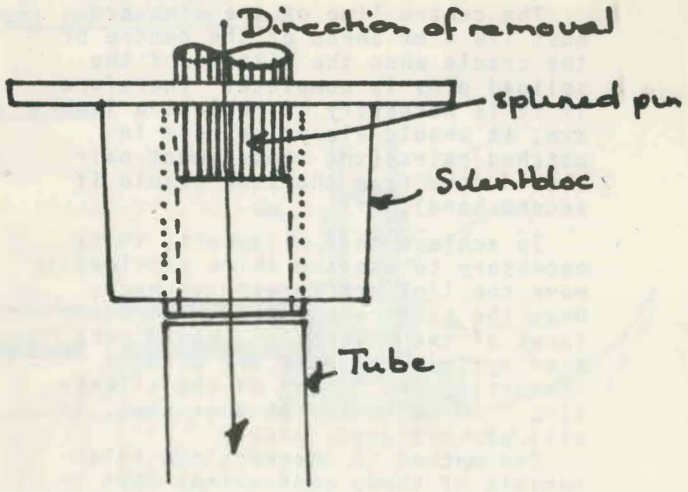
Now having checked all this, let's look at the cradle.

Part 2 - The Cradle, Lower link arms and Sundry Appendages

Begin by examining the cradle very carefully for dents and other potentially structural damage. Strip the cradle down completely if the silentblocs are to be replaced. If they are not, then be very sure that the lower links are free from any play. Be careful because moisture can affect the splined pin in the link arm and in the silentbloc (most likely the front silentbloc).

If silentblocs are due for replacement, an old torsion bar can be cut in half to use as a drift. Mount the silentbloc on a stout steel tube corresponding to the inner splined section's diameter.

Fig.6



A hefty sledge hammer will provide the motive force on later (post-war) cars. But earlier cars need an 80 ton press (anyone got one lying in their box of bits?). Remove towards the rear.

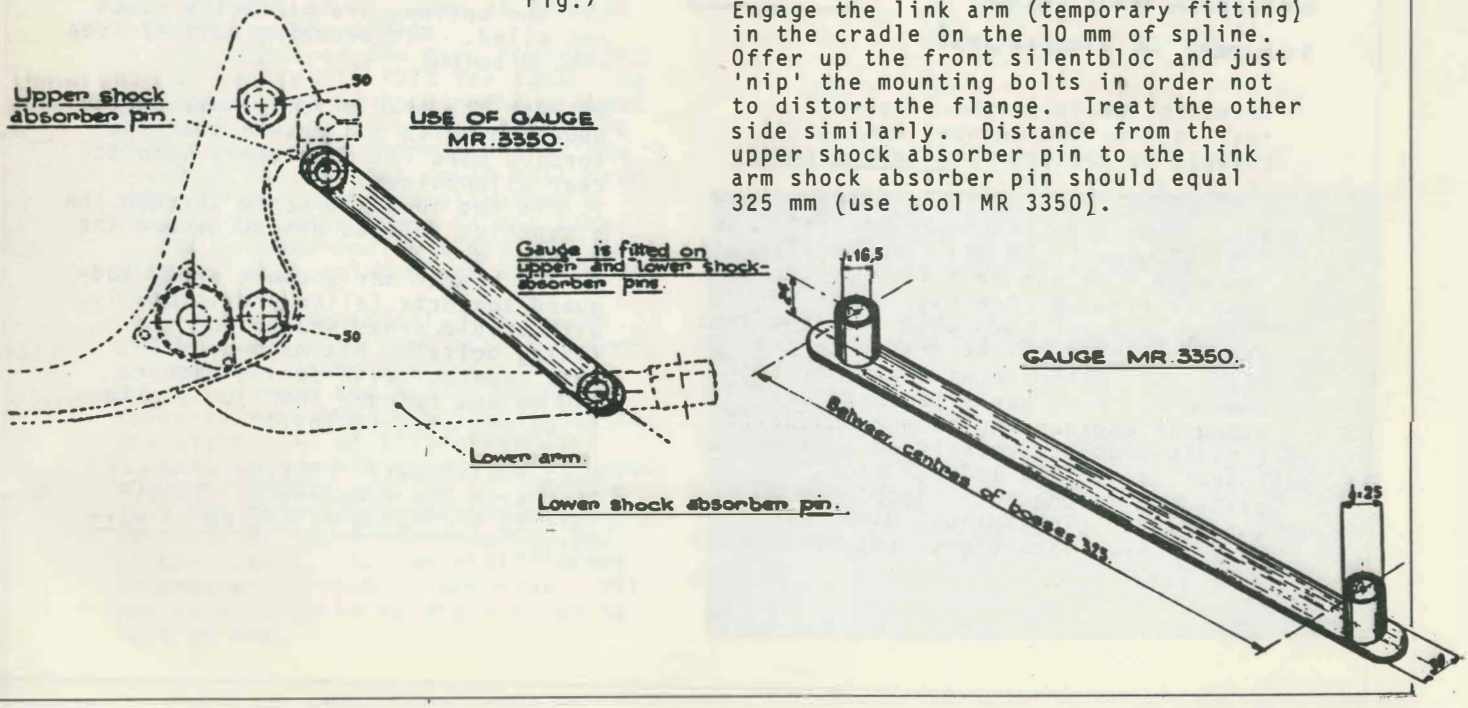
Once dismantled, lay the bare cradle on a known flat surface (the kitchen table! - check it with a spirit level first, preferably when the wife's out). If the cradle is twisted it can only be straightened out with great difficulty, and I recommend that you look for a new one. Next test that the cradle pushes onto the coque (previously checked and known to be true). It should slide on easily and sit home without force (grease the mounting bolts first).

Part 3 - Assembly of the Cradle

While all the previously described Procedures may seem lengthly and troublesome, I cannot overstress their importance. Once you are satisfied here, reassembly can begin.

Engage the splined pin in the rear silentbloc so that it protrudes 10 mm from the inner face. This allows the link arm to be engaged provisionally. Bolt the silentbloc to the cradle. Engage the link arm (temporary fitting) in the cradle on the 10 mm of spline. Offer up the front silentbloc and just 'nip' the mounting bolts in order not to distort the flange. Treat the other side similarly. Distance from the upper shock absorber pin to the link arm shock absorber pin should equal 325 mm (use tool MR 3350).

Fig.7



The centre line of the link arm must lie 4 mm ahead of the centre of the cradle when the fitting of the splined pins is complete. Therefore if it is necessary to replace a link arm, it should always be done in matched pairs (the replacement pair should come from the same cradle if second hand).

To achieve this alignment, it is necessary to use the shims provided to move the link arm forward or back. Once the shims are fitted, the inner faces of the silentbloc should rest hard against the link arm without distorting the rubber of the silentbloc. Be patient with this step, it will pay dividends later.

One method of checking the relationship of these centrelines that I have used successfully is shown below.

Fig.8

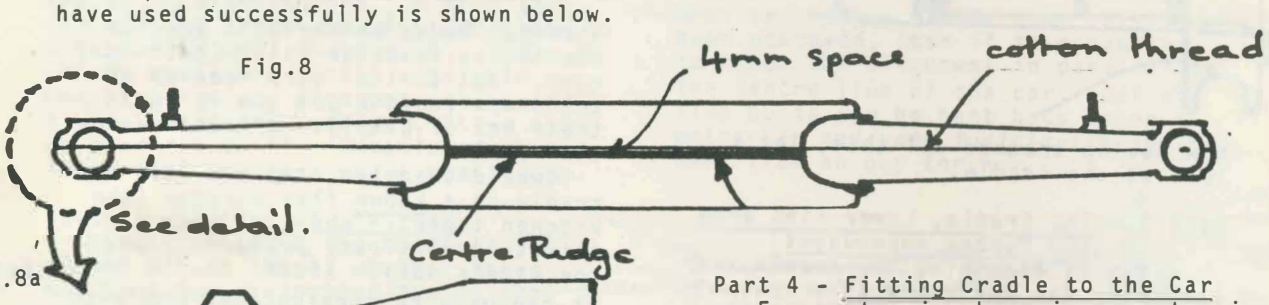
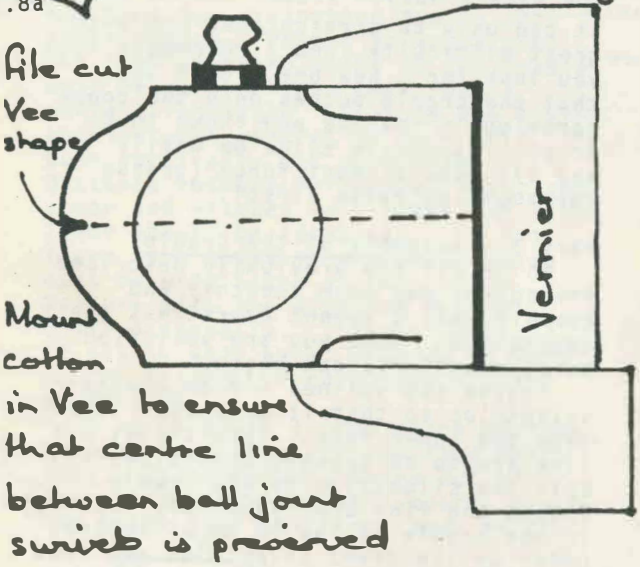


Fig.8a



Mount cotton in 'vees' to ensure that centre line between ball joint swivels is preserved. Ensure accuracy in filing the 'vee' cuts.

Complete the fitting of the splined pins, observing the depth of 33±0.5 mm for 11BL (L15), 36.5±0.5 mm for 11B(B15) measured from the rear face of the rear silentbloc (see Fig. 9).

Once you are sure that the link arms sit 4 mm ahead of the cradle centre line, the splined pins may be fitted completely into the silentbloc by using an engineering hammer and drift (cradle supported evenly on a solid object, e.g. 12"x 12"x ¼" steel plate over a concrete floor). Once the splined pin is flush with the rear of the silentbloc, complete the fitting with your half-torsion bar drift used earlier during dismantling. It is a good idea to use some Loctite on the splines when refitting used splines. The length of spline bearing in the front of the link arm bore only amounts to some 1.5 cm, and it is essential for a tight assembly that no moisture is permitted to enter at this point, thereby promoting rust. Refer to Fig. 8 and notes to obtain correct depth of splined pin from the rear face of the silentbloc. Tighten silentbloc bolts to 4.5-5 mkg (32.5 - 36 ft. lbs.). Paint assembly thus far protecting all threads and bores to receive parts yet to be assembled.

Part 4 - Fitting Cradle to the Car

a. Engage torsion bars in rear torsion bar mountings, the adjusting screws having been cleaned, well oiled and turned right back. Left hand bar is identified by two paint marks and right hand by one. Some bars are also stamped on the end faces.

b. Pass bars through until the rear end contacts the firewall.

c. Engage the cradle to the hull mounting bolts and provisionally fit cradle fixing nuts (40 mm box spanner)

d. With the aid of a strong lever (axe handle etc. through ball joint mount to avoid chipping paint), lower link arm about two splines (an assistant is necessary). At this point introduce the torsion bar. If the assistant jiggles the link arm lightly, the bar can be fitted by hand providing all the splines are perfectly clean and oiled. Fit securing bolt 47 (see Fig. 9 below)

e. Push the cradle fully home on the mounting bolts and ensure that the torsion bars fit completely into the rear silentblocs.

f. Fit the long set screw through the silentbloc splined pin to secure the torsion bar.

g. Fit bumper bar support arms, mudguard supports (align provisionally with cradle cross member and its fixing bolts). Fit main mounting nuts together with spring washers (40 mm box spanner 1880T). Tighten to 20 mkg (145 ft lbs.).

Next instalment: Fitting of upper link arms and preparation of ball joints, including salvaging of worn units.

Fig.9 HORIZONTAL SECTION ON CENTRE-LINE