IRS! PART 4

End floats & pre-loads

Lower Fulcrum Shaft Bearings and Adjustment

Jim Patten follows the strip-down of Jaguar's pre-XJ40 independent rear suspension. This instalment covers the fitting of bearings and adjustments.

"That boy there, at the back, Simkins major, pay attention. If you thought Latin was bad then you are in for a very nasty surprise – it's the IRS period now!"

That's right, it's brain teaser time but, if you took my advice and made your preparations, then your mind should be ready for anything. Actually it's quite easy really; what we are setting out to achieve is a hub bearing end float of 0.002in-0.006in and a fulcrum shaft bearing pre-load of 0.000in-0.002in. The hub bearing adjustment is possibly one of the less understood areas on this rebuild. So often I have heard of people trying to effect adjustment on the nut by the technique of 'wind up as far as it goes and back off a turn'. Wrong, and if you've done that, into the corner you go with the pointed hat on.

The correct method is to use shims behind the bearing as will be outlined in the following sequences. We have adopted a slightly different method from the manual but the end result is the same. But first the new bearings have to be pushed in. If you have not the facilities of a press then a local machine shop will do the job for you for a nominal sum.

This shows the lower fulcrum shaft with its component parts prior to assembly in the hub carrier. As there is a bearing in each end of the shaft, each side is a mirror of the other. They are fitted on the shaft as follows. Left to right are: the shims to centralise hub carrier in the wishbone, retaining washer on seating ring for the oil seal, container for oil seal and felt seal, seating ring for oil seal, bearing, spacer sleeve and shims fitted between sleeves for pre-load.

To set up for the assembly procedure it will be necessary to knock-up a simple jig. Use a piece of plate steel approx. 7in x 4in x 3/8in. Drill and tap a hole to receive the lower fulcrum shaft so that the shaft can be retained as shown.

Position a spacer to an approximate size of the lower wishbone outer forks on the shaft first followed by the seating ring for the oil seal, bearing, spacer sleeve and an excess of known size shims and the second spacer sleeve.

Press in the two end bearing tracks and then slide the hub carrier over the shaft and push the other bearing and seating ring on. Fit a large washer (the inner wishbone fork outer thrust washer is perfect) and the nut and tighten to 55lb/ft. Swivel the hub carrier around to settle the bearings and take a measurement using feeler gauges between the washer and the machined carrier face.

We are looking for a mean pre-load of 0.001in. We obtained a reading of 0.013in (end float). To get the required pre-load, shims to the value of the end float and the pre-load figure, that is 0.013 + 0.001 = 0.014 should be removed from the centre of the fulcrum shaft.

Use a dummy shaft (that is one that measures the same as the width of the hub carrier) to assemble the components.

Build up the shaft from the centre out: correct shims, spacer sleeve, bearing, seating ring for felt seal, spacer between bearing and container, felt seal, container for felt seal and tap the retaining washer into position.

Bind the ends using a good quality tape.

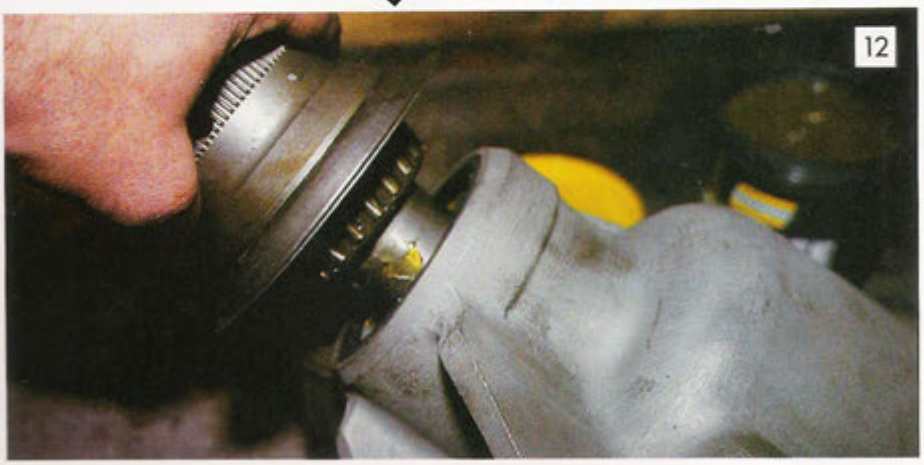
Hub Bearings and Adjustment

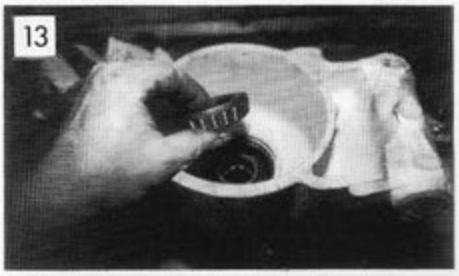
Position the oil seal track before pressing the inner bearing on to the hub using an hydraulic press.

Tap the outer race tracks into position in the bearing housing.

Using a piece of threaded rod and two thick spreading washers of the same diameter as the bearing seats, place through the housing with the washers placed each side of the seats and wind until the seats are fully pressed into place. The pressure needed here is considerable – if you can use an hydraulic press then do so. Add outer seal.

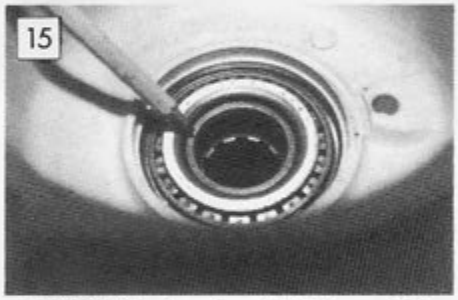
Offer the hub (with the bearing greased) to the hub carrier.



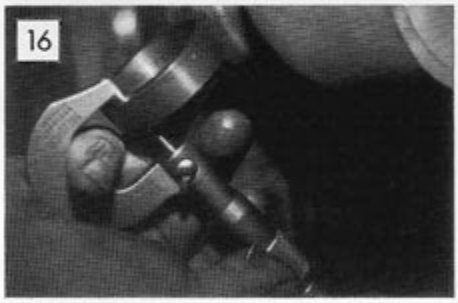


Place the other bearing (greased) in the rear of the hub.

Back to our piece of threaded rod. This time it is needed to pull the bearing home.



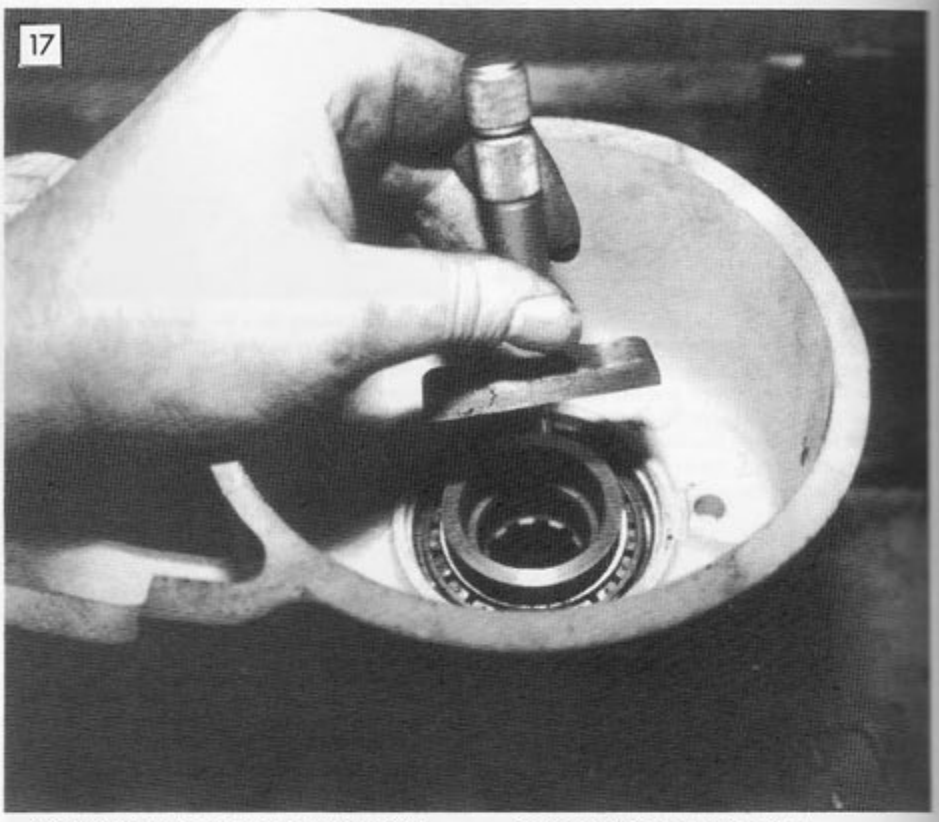
With both bearings home it will be seen that the hub shaft sits lower than the bearing centre. We need to establish the thickness of shim required to sit on the hub shaft and be proud of the bearing centre by 0.002in – 0.006in to give the required end-float.



Take a piece of machined brass to sit on the bearing centre. Accurately measure its thickness using a micrometer.

That concludes this gruelling exercise. It might seem a little daunting but honestly, as soon as you get the idea it is almost (but not quite) simplicity itself. This episode's advice is to toddle off to the off-licence for your favourite tipple (I still had a bottle of Cabinet Sauvignon from the Guenoc winery) and forget about the IRS until the next issue when we look at the brakes.

All the work involved in this strip-down has been entrusted to Alan Slawson, specialist in rear end rebuilds 07831163158 to whom our thanks go for his help in this feature.



Read this through a few times until you fully understand what is happening.

Using a depth micrometer take a measurement (a) from the top of the brass ring to the base of the hub shaft and note it (it being 0.622in here) down.

Subtract the thickness (b) of the brass ring (ours was 0.5in) from 'a' to give the gap (c) (0.122in in our case) between hub shaft and bearing centre.

Add to this the required end float (d) to give the thickness of the spacer required (e).

Spacers are available in 0.003in increments and are lettered for identification. They start at A for 0.109in and finish at R 0.151in.

Now putting our algebraic equation together we have:

$a - b = c.$

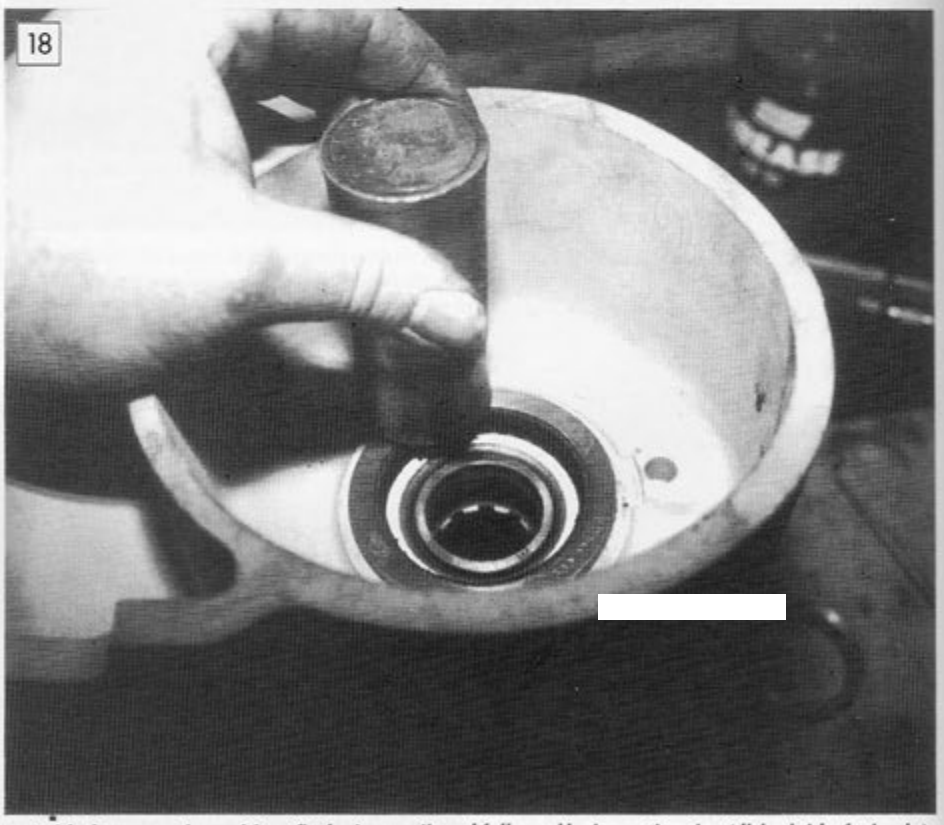
That is: $0.622 - 0.500 = 0.122.$

$c + d = e.$

Now we have to work slightly backwards in our sums to choose a spacer that will give us the end float.

Looking at the list we find that we can use F (0.124) or G (0.127).

We had a G and that gave us an end float of .005in, $0.122 + 0.005 = 0.127.$



With the spacer in position, fit the inner oil seal followed by its seating ring (dished side facing in).