

Winter Project Dec-Jan 2009-2010 Peter Kitching Rear Axle Rebuild: Rolls-Royce 25/30 1936 - GRM23 – Reg. AV8692

During the past two years I noticed that oil was running from the central wheel nut locking spline following a long run. This turned out to be from the inner half shaft oil seals.

With the exception of specialist work I have always managed to do all the work on the cars I have owned myself including: paint spraying, electrical and any mechanical work that needed to be done, therefore I decided to 'bite the bullet' and remove the axle during the winter months and carry out any necessary work that I would encounter.

There is an absence of information on axle work for the 25/30 series so I have decided to compile a simple article with some pictures and basic information, and include this article for members who like me are able to complete the work themselves.

The first thing I did was to remove the battery with its carrying box, and once the prop shaft was removed, I then removed the hubs (I made the special tools a few years back). Then I stripped down the rear brake assemblies to arrange to have the brake linings replaced (the hand brake shoes were found to be serviceable).

Next the car was placed on two three ton axle stands. The rear spring shackle pins were removed to allow the axle to drop down to undo the U bolt nuts and drop the U bolts complete with the rear jacks, and then lift the axle off the springs. This was quite easy with the use of a trolley jack, the picture shows the axle still in place: 1



You can now see the axle placed on smaller axle stands ready to strip down. The brake backplate assembly on the left of the picture shows the hand brake shoes before removal and the brake cam shafts. The back plate is on a spline and if it had not been so seized the whole assembly could have been slid off the axle complete with the brake cam shafts. This would have given me access to the U bolt nuts and would

have saved me the bother of removing the rear spring shackle pins, but as you can see further on I decided to over-haul the springs anyway: 2



I was now able to remove the two axle tubes from the differential housing, then remove the two side plates from the centre housing and commence stripping the crown wheel assembly to re-



move the half shafts (not as easy as it sounds; this car is cleverly designed). At the top of the picture lies the pinion (I have replaced the two bearings, one is a double roller bearing) in that assembly (another two special tools made to do this). One of the oil seals is shown in its housing on the left side of the casing: 3

This picture, 4, shows the centre casing split with the crown wheel assembly, now external:



Now the crown wheel and planetary wheels are exposed with one half shaft removed ready for cleaning and inspection: 5



Picture 6 shows the differential casing with the bearings replaced, I replaced all the bearings and the two inner half shaft bushes while I had

the differential stripped:

Another shot of some well engineered parts (74 years old this year) the shafts had acceptable wear so I just replaced the brass bushes, one shown in the centre of the crown wheel and the other in the planetary wheel housing flange bottom left: 7



I had to have this bearing replaced by Fiennes Restoration. Another special tool, some heat and two men on the bar of the tool were needed to remove the nut! I also had the brake shoes relined by this company and as I was in the south visiting one of my sons, it was not far to travel and gave me the opportunity to have a look around Will Fiennes premises (very impressive):

The brake shoes after relining with the paper protection still on: 8

One of the main shoes with its parts fitted showing the auxiliary shoe on the right of the picture, there are two small springs (hidden) to the left of the pin on the auxiliary shoe. To the right of the pin the gap when set is 12 thou. by means of the adjusting bolt shown with a locknut: 9



Picture 10 shows the offside brake assembly in situ (you need plenty of split pins when you work on a vintage R-R). I have inserted a drive dog into either end of the axle to support the half shafts and take the weight off the new oil seals. You can just see the hand brake has its own brake shoes (inboard) which can be an advantage when descending a hill as they work separately to the main shoes. The large castle headed nut in the centre keeps the back plate in place. Once this

is removed it should allow the whole brake assembly to slide off the spline: 10



In picture 11 the pinion has been replaced (drive coupling on the right). But first I checked that the teeth were nicely positioned in the crown wheel before assembly with some 'engineers' blue' I also gave the axle two coats of paint before its replacement in the chassis, this also shows a better view of the smaller handbrake shoe:



Underneath is the offside rear jack which is clamped to the spring 'U' bolts, ready for a lick of paint. The split pins had to be drilled out of the 'U' bolts and the threads cleaned up with a die nut. I also run a tap through the castle headed nuts (I think I need my floor re-painting!)

At the top right of the picture is the shock absorber, part cleaned and nearly ready for some paint (I overhauled all the shock absorbers a few years back as some were not working correctly): 12

Before refitting the axle I took the opportunity of painting the underside of the back end, including the fuel tank. The second picture shows the rear spring eye rebushed with a new shackle pin inserted, although the flash has not given the best result. 13 and 14



The spring hangers on both sides were removed and the top bushes replaced. The pins showed signs of wear, but because of the amount of work required to remove these pins, i.e. body off and possible heat required to release the tapers of the inner side of the pins, I decided instead to dress and grease the pins: 15

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Picture 16 shows a sample of the spring leaves after cleaning. On either end of the top four leaves are grooves and a hole is drilled through to allow oil via the lubrication system to feed the spring leaves, shown



on the right of the picture: Plate 17 is interesting: It shows the spring manufacture and all relative data. The poundage I see is 1196 lbs (just over half a ton):



With the springs now rebuilt and the bushes and pins replaced, the axle is now back in place sitting on the springs, along with the rear built-in jacks and the 'U' bolts tightened down and split pinned. The lubrication pipes have also been replaced after cleaning and checking that the oil was passing through to the various parts. The brake cables and rods were then reconnected. 18

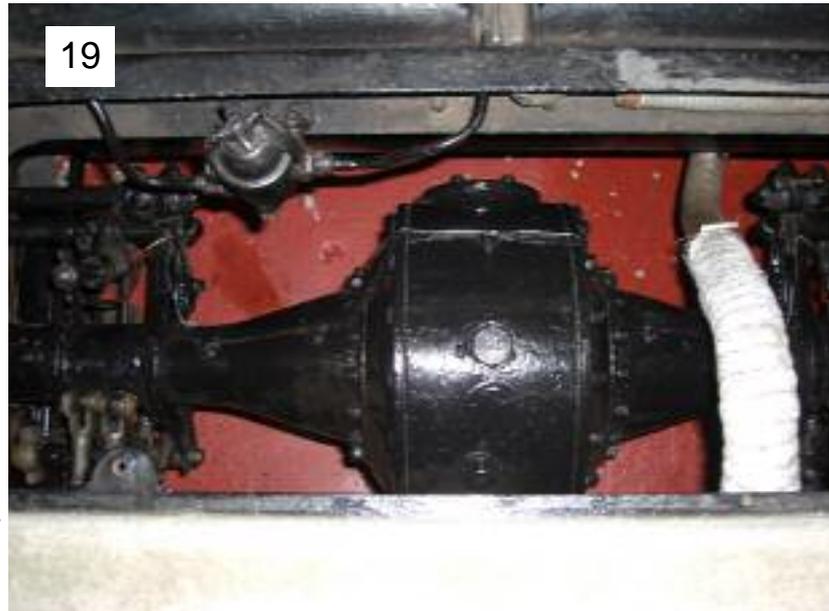


It was now time to join all this to the rest of the transmission by bolting on the prop. shaft (more split pins!) Finally the oil was topped up to the correct level and the battery box and battery

were fitted.

The shoes are now ready for a possible cut, before fitting the drums and rear wheels:

Another shot of the axle in place taken from inside the car. The exhaust tail pipe is on the right covered with a heat shield on the top where it is near the seat base panel when in its place: 19



A shot of the brake drum and road wheel securing assembly. The cross shaped drawer (on the right) I made to draw off the brake drum (it fits inside the wheel nut): 20



Finally the brake drums are now in place, springs greased ready for gaiters to be fitted. I managed to fit



the drums without the need of the brake shoe cutter, by giving the shoes a slight dressing and remove any high spots: 21

It's nice to have this work finished now, as I started in December and most of the time the weather has been freezing!



The finished project , how it looks normally:

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Peter Kitching