

A 'Rough Guide' to renewing Half Shaft oil seals - Nuffield, Leyland & Marshall Middleweight Tractors with 'Flanged' rear axles

This guide covers a wide range of tractor models, from 'Drum' brakes, through 'Dry Disk' brakes to oil immersed 'Wet' brakes. This being the case many variations between the text and the tractor model being worked on will occur. In general though the axles and shafts are very similar.

Care must be taken whilst carrying out this task - the axle is very heavy and should be supported with a suitable lifting device or jack. Block the front axle to prevent the tractor from tilting. If a cab is fitted then consideration should be taken to its removal, this will allow easier access.

Two methods of seal renewal are given, the first is the 'Official' workshop manual method using available special tools and the second an 'Alternative method' where the special tools aren't available. In both cases the relevant rear wheel must be removed. **(Note; The alternative method has been revised due to conflicting information)**

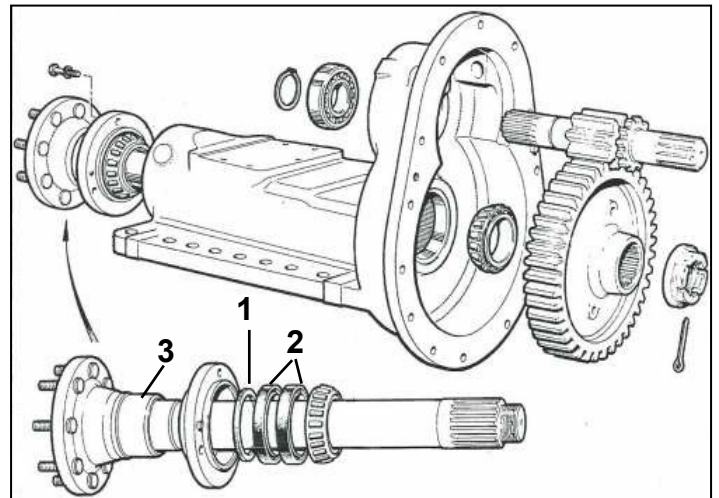
Dismantling (Official Method)

Drain the transmission oil - Approx. 12 gallons (54.5 ltr) and remove the axle assembly. The R.H. Side has the diff lock fitted to it.

Remove the split pin and final drive gear nut then withdraw the final drive gear.

Remove axle end cover bolts and, using the extractor bolt holes provided, 'break' the seal between the cover and the axle case - note; the inner bearing is a press fit on the shaft, therefore this operation will not remove the shaft from the bearing.

Press out the axle shaft or drive it out with a copper hammer at the splined end, taking care not to damage the retaining nut thread - the inner bearing will remain in the axle case, as will the outer bearing outer race, the outer axle shaft bearing inner race and sleeve will come away with the axle shaft.



If available use special tool 18G 47 C & 18G 47 AF (Bearing puller) to remove the outer bearing and seal housing - a suitable press can be used as an alternative, remove the seals - note; the sealing arrangement consists of a fat impregnated felt seal (1) and two oil seals (2). If the oil seal sleeve (3) is worn or damaged it must be replaced. If a new sleeve isn't available a new one can be machined to the correct size and fitted with 'Loctite' to retain it in position. To remove the old sleeve it can be drilled and expanded with a chisel until it loosens.

Reassembly

Reassembly is a reversal of the dismantling process but some points need special attention.

If fitting a new seal sleeve it should be heated and pressed onto the shaft so that it is tight against the register.

Smear oil around the seals before re-fitting.

Heat the bearing to aid re-fitment and make sure it's fully 'home'.

Once the shaft and reduction gear are refitted to the axle case the large nut should be tightened enough to give a pull of 2.2kg to 4.0kg on a spring balance pulling on one of the wheel flange studs. If the split pin hole doesn't line up, tighten the nut slightly until the split pin fits (A new split pin should be used). If new bearings are fitted the pull on the spring balance should be increased to 5.4kg to 8.0kg. The shaft should be rotated a few times to settle the bearings. This pre-load condition replaces the original instruction to have end-float. When too much end-float exists this can be the cause of oil leakage at the seals. (On tractors with the smaller stud pitch diameter the readings should be 3.0kg to 5.0kg & 7.7kg to 10.0kg respectively)

Use new gaskets where applicable.

If the oil is 'old' consider using new oil, it may prevent future problems.

Alternative Method

Note:- This method can only be used on 10/42 & 10/60 tractors onwards. On earlier tractors prior to these models the complete half axle must be removed, there's a selective spacer behind the large gear that can drop.

The first major difference in this method is that the complete hydraulic unit must be removed from the tractor, this is to allow access to the nut on the end of the half shaft. On the plus side the axle casing doesn't need to be removed!

Dismantling (Alternative Method)

Drain the transmission oil - Approx. 12 gallons (54.5 ltr) and remove complete the hydraulic assy. The hydraulic unit is heavy, use suitable lifting equipment.

Remove the large square hydraulic filter and the split pin from the final drive gear nut. With a suitable socket or wrench remove the nut from the end of the half shaft.

Remove the axle end cover bolts and, using the extractor bolt holes provided, 'break' the seal between the cover and the axle case - note; the inner bearing is a press fit on the shaft, therefore this operation will not remove the shaft from the bearing.

Position a mechanical automobile type 'Scissor Jack' between the ends of both half shafts. Extend the jack and with a bit of luck the shaft can be extracted. (The bearings are a press fit) The large drive gear will drop when the shaft is removed. The inner bearing will remain in the axle case, as will the outer bearing outer race, the outer axle shaft bearing inner race and sleeve will come away with the axle shaft. (Note, a hydraulic jack can't be used due to space between the shafts and the fact that it would have to lie on its side!)

If available a suitable press can be used to remove the seal housing and bearing. If a press isn't available gentle heat applied to the bearing inner race may be sufficient to expand the bearing enough to be able to remove the housing and bearing. Remove the seals - note; the sealing arrangement consist of a fat impregnated felt seal and two oil seals.

Reassembly

Reassembly is a reversal of the dismantling process but some points need special attention.

If the oil seal sleeve (1) is worn or damaged it must be replaced. If a new sleeve isn't available a new one can be machined to the correct size and fitted with 'Loctite' to retain it in position. To remove the old sleeve it can be drilled and expanded with a chisel until it loosens.

Smear oil around the seals before re-fitting.

Heat the bearing to aid re-fitment and make sure it's fully 'home'.

Once the shaft and reduction gear are refitted to the axle case (Care must be taken to refit the inner bearing to the shaft, it will be behind the reduction gear and difficult to get at. Once the reduction gear is on its spline the large nut can be fitted and used to pull the bearing into place) the large nut should be tightened enough to give a slight pre-load on the bearings. If the split pin hole doesn't line up, tighten the nut slightly until the split pin fits (A new split pin should be used). Care must be taken during this operation to ensure that the pre-load isn't too high! This pre-load condition replaces the original instruction to have end-float. When too much end-float exists this can be the cause of oil leakage at the seals.

Use new gaskets where fitted. (Note, later tractors used Loctite 510 as a sealant between the hydraulic case and gearbox)

If the oil is 'old' consider using new oil, it may prevent future problems. The hydraulics should be adjusted to ensure correct operation.

Note; Both of these methods ignore the fact that various brake, electrical and/or hydraulic linkages need to be removed and replaced, different models will have different arrangements too numerous to catalogue here. All fixing bolts etc. must be torqued to the correct value.

Errors & Omissions excepted