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Eric Goes Toyota

(AND GETS A NEW ENGINE - PART 6)

RICHARD LONG







Eric's engine rebuild, as reflected via previous articles in the DM, has come along way since finding the original engine block cracked and the acquisition of a replacement block. In the last article, the intriguing art of crankshaft balancing etc. was covered in depth; which showed the importance of having this work undertaken and equally important the shortcomings of not having the procedure carried out. Part of the rebuild spec I requested from "J&E Engineering Services", was to have the timing chain cover modified properly where it fits on to the front crankshaft seal. This article looks in to that process, along with the rear seal on the crankshaft being fitted as a hand-in-hand operation plus notes on the oil pump overhaul and improved pressure output.

The Daimler V8 front crankshaft oil seal is normally achieved by a close tolerance fit between the timing cover and the crankshaft damper hub, which has a screw pattern machined into it and feeds any engine oil back towards the inside of the engine. The problem with this is that although the hub is a close fit within the timing cover there is a gap and a gap means a leak. Advances in sealing technology and the introduction of rotary shaft seals means that this is an area that has improved vastly; providing the opportunity for classic vehicles to benefit from modern day oil seals and their leak free attributes. Concentricity between the hub and the seal housing is of paramount importance here to ensure an oil tight seal. Firstly, the original timing cover is mounted & secured on a flat plate using the outer timing cover bolt holes. The timing cover and mounting plate, or location plate if you wish, is then clamped to the CNC milling machine and the centre of the crankshaft hole is obtained by means of a dial test indicator (DTI).

The original close fitting part of the timing cover is cut out and removed, once that is complete the timing cover is then removed from the mounting plate without releasing the clamps; which ensures correct set up for the next machining operation. A steel boss is prepared in the lathe which is TIG welded to the inside of the timing cover – it is worth mentioning that TIG welding is the preferred method, as the generated heat and distortion is kept to an absolute minimum which is highly important. When completed, the timing cover is then mounted back onto its location plate, as before, at which point the new steel boss is machined to the correct outer diameter of the new oil seal. The crankshaft damper hub is set up in the lathe and machined to the inside diameter of the new seal. Modifying the timing cover in this way may seem over complex, when compared to other conversions on the market. However, one of the main benefits of this modification that Jonathan the owner of "J&E" provides is that the outside appearance of the timing cover is not altered in any way; plus it maintains the original design specifications and aesthetics just as Edward Turner intended. Referring to an article I submitted a couple of months ago, I should also add that no after market red paint is applied to the finished product – which means no potential oil way blockages from peeling paint !!

Of note, if you are considering having your timing chain cover modified and wish to have it carried out to the very high spec level as mentioned above, then Jonathan is able to modify your own cover or supply on an exchange basis. For further details and to discuss your requirements, his business advert is in the Directory section at the rear of the DM.

With the timing cover now modified, the rear crank seal was next on the list. The rear crankshaft oil seal in the V8 saloon is a two piece rope design. These can be a real headache to fit as the two seal halves require sizing to ensure correct clamping against the rear of the crankshaft. A dedicated sizing tool is used here as the first part of the engine assembly operation.

The sizing tool ensures correct concentricity between the main bearing housing and the dimensionally correct oil seal diameter. Incorrect sizing of this rear oil seal will lead to problems - too big and it will leak, too tight it will burn, go hard and leak. It needs to be just right and Jonathan provides exactly the correct fitting procedure and tolerance. In essence as with all machining and engineering processes it is either 100% correct or 100% incorrect – there is no middle ground, which other engineering companies seem to be happy with.

On completion of the above two operations, attention was turned to the oil pump. The pump, which came from my low mileage cracked block engine and in good condition, was stripped completely, vapour blasted and tolerance checked. The pressure relief valve was polished and its bore honed to ensure free movement. The idler gear was re-bushed to eliminate wear and the face plate of the pump was machined ever so slightly which removed about .004" of metal. The driven gear is then checked for free movement within its guide bore, which again is honed. This specific overhaul procedure ensures the pump will deliver much better oil pressure than the standard fitted OE unit, which does cause for concern for V8 owners but now negated. The pump is then primed using specific assembly lube and then reconstructed using new fittings and lock washers throughout. As with the timing cover, it did not receive any after market red paint.

As mentioned early on in the series of articles, a procedural and comprehensive photographic record accompanies any work undertaken at J&E. This is given to the customer, via USB stick, on completion of all engineering work undertaken. It not only complements the cars maintenance history file, but provides the owner / customer with an insight to all the machining work carried out.

The next part of this series will reveal the final elements of machining and the initial engine rebuild; suddenly it looks to be taking shape and the completed engine rebuild goal is within sight. To be continued.....