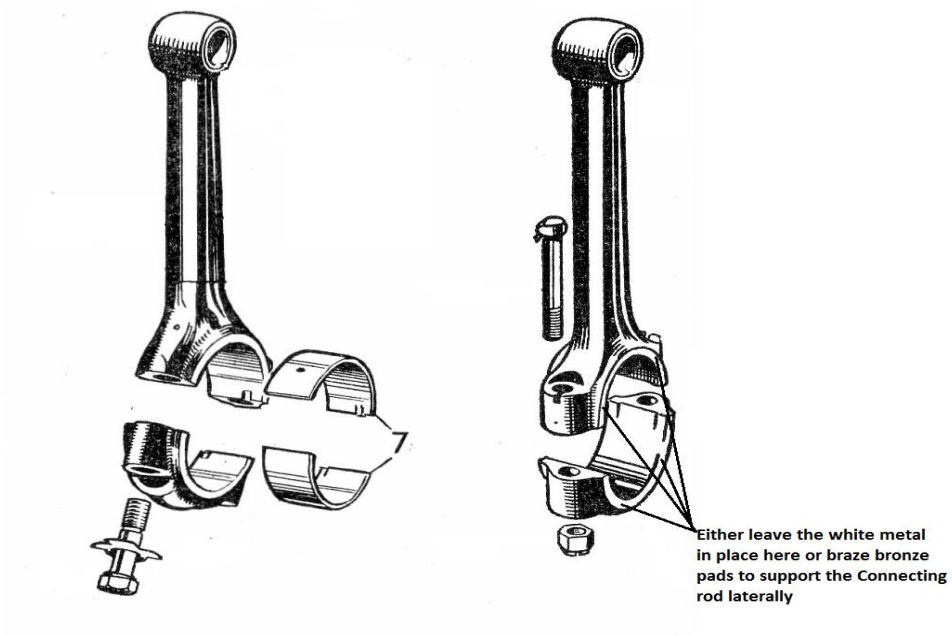
The Riley RM Centre Information Slip

Assembly Hints for RM181 Big End Shells



Firstly a potted history of why the bearings supplied are the size that they are, and require the crank to be ground initially to an unusual undersize. As you most probably know the early 2½ engine was fitted with babbit bearings whose design dated back to before the 2nd World War. However the crank and other main engine dimensions were drawn in metric measurements, so the bore is 80.5 mm, stroke 120mm, big end diameter 60mm main bearing diameter 65mm and so on. Taking the big end journal we find that the nominal size is 60mm or 2.362 inches. To grind it the normal 10 thousandths of an inch undersize to take the journal to the first normal undersize would result in a size of 59.7408mm or 2.352 inches. The minimum under size according to the manual is -1mm or minus 40 thousandths of an inch (thou), resulting in a crank size of 58.98mm or 2.322 inches. So the factory whilst seemingly designing the engine to metric sizes recommended standard 10 thou regrind increments. The ideal situation for supplying replacement shells for those wanting to convert from Babbit to shell bearings would of course be to fit RMB2/ Pathfinder shells. Unfortunately these later shells have been unavailable for many years but it has been discovered that in all major dimensions the bearings from a Bedford truck can be fitted to adapted rods. Both early RMB1 type and later RMB/2 or Pathfinder, rods can be adapted along with the specially sized crank regrind to allow fitting of these shells. The Bedford engine was designed in the US and so was designed to imperial dimensions. So the nominal crank pin diameter is 2 3/8inches or 2.374inches or 60.3 mm.

To fit these Bedford shells the bore of the connecting rod should be bored to the Bedford recommended diameter of 2.5195/2.520 inches or 63.995/64.008mm, this size allows both the early babbit type and later shell type rods to be converted to these easily available shell bearings. In amongst all these figures it will be noticed that the standard Bedford crank pin is 0.012 (12 thou) larger than a standard Riley crank. Attempting to fit the first or -10 thou under size Bedford shell would still be 2 thou oversize on the standard Riley crankpin. Therefore the first available size that can be used on a Riley crank is the -20 thou Bedford shell. **NOTE this requires only 8 thousandths to be removed from a standard Riley crankpin.**

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Housing dia (Bore through the connecting rod) for above Bedford shells 2.5195/2.520 inches or 63.995/64.008mm.

RM181/20, Big end shells 2½ minus 08 thou (-20), Crank pin Dia 2.354
RM181/30, Big end shells 2½ minus 18 thou (-30), Crank pin Dia 2.344
RM181/40, Big end shells 2½ minus 28 thou (-40), Crank pin Dia 2.334
RM181/50, Big end shells 2½ minus 38 thou (-50), Crank pin Dia 2.324

When converting babbit type rods either leave the white metal on the edges of the rod to give the rod side support or braze and machine pads onto the connecting rod to give the same result.

You should discuss any size changes with your machinist before removing any metal from either the crank pins or the connecting rod, and both understand what you are trying to achieve, the odd sizes have confused even very experienced engine machinists resulting in one case of an unusable crank.

For 1½ owner's your lot is simpler because your machinist will be dealing with the standard undersizes as listed for both the Riley engine and the BMC engine which both have the same sized standard crank. Your machinist will simply grind and polish your crank to obtain the correct bearing clearance as specified for the BMC engine. All these details will be in their bearing catalogue. The actual conversion of the rods is as described above for a 2½ with regard to controlling the end float of the rod on the crank.

Housing dia (Bore through the connecting rod) for above BMC 1800 B series shell bearings 2.020/2.5215 inches or 51.333/51.346mm.

To repeat all the above dimensions should be investigated, checked and agreed with your machinist, this is a classic case on do it once and do it right.

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