Procedure for Fitting ‘Full-floating’ Rod Bearings

Acknowledgement

I must acknowledge the value of Dale Hays’ YouTube video from 2015, entitled “Flathead Ford 21A - Full Floating Rod Bearing Sizing”, in providing a tangible vision of the goal in this exercise. Here is the link to that video:

https://www.youtube.com/watch?v=CyVLsPdbhS8

Applicability

First and second generation Ford & Mercury V8 engines (1932 -1948). Later third generation engines used insert style rod bearings for which this procedure does not apply.

Forward: A few words about clearances

Using a 1939 Mercury engine (239 c.i., keystone block) as an example, where the crankpins (rod journals) have been machined 0.010” undersize and new +0.010” rod bearings are used:

- The nominal diametral clearance when new was ~.001” between ID of brg and crank pin OD & ~.001” between OD of brg and ID of the rod – for a total clearance of ~.002”. Ford considered a total clearance of .005” as the limit for acceptable service.
- Std crank pin OD was 2.139”; with .010” regrind, OD is now 2.129” (as measured); new brg ID (as measured) is 2.130”, which yields .001” clearance.
- With rod big end ID at Std (2.360”), as measured (new) brg OD of 2.359” yields 0.001” clearance.
- Total clearance: .001” + .001” = .002”
- Std brg thickness (new) was .1095; replacement brg thickness (BT) as measured is 0.1145”. To confirm this is correct for .002” total clearance:
  - BT = (Rod OD – required clearance – journal OD)/2 = (2.360 - .002 – 2.129)/2 = .1145”

Preparation

Do not go out to your shop mid-winter, turn on heat or stoke up the woodstove and then immediately get to work on this. Ensure that the shop is at or near stable room temperature before you begin and that both the rods & bearings have had adequate soak time in that environment. If not, it can take some time for the mass of the connecting rods to adjust. The (thinner) bearings will warm up much more quickly, in particular as you’ll be handling them almost continuously once you get underway.

Measure bearings to ensure you have the correct thickness for your rod/crank combination (i.e. standard or undersize crankpins). See the notes above.

Measure rod big end inside diameters (ID) to determine whether they are in spec (including out-of-round) and resize if required. Also ensure that the rod bore surfaces are clean, smooth & rust free.

Tools required **(Photo 1)**:

- Outside micrometer
- Inside micrometer (or snap gauge)
- Torque wrench
- Soft-faced hammer
- Scotchbrite pads (fine)
- Magic marker



A **connecting rod vise (Photo 2)** is preferable for holding the rod but is not an absolute requirement. A regular vise with soft jaws should suffice.



Torque the rod caps to the appropriate spec for your rods and type of nuts used.

Scuff each bearing halve on all surfaces first, using a **fine** Scotchbrite pad (Grey #000). Light scuffing may have to be repeated throughout the fitting process.

As a tip, **use magic marker** on the edges and crown of each bearing halve to allow you to see ‘witness marks’ on the first and each subsequent fitting. This will guide you as to whether (and where) further tapping is required.

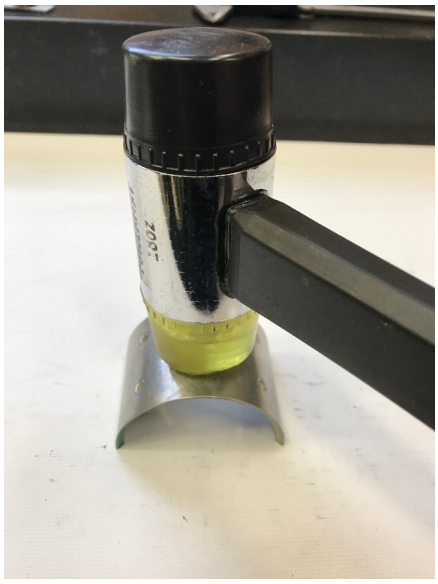
Procedure

Note: This procedure needs to be done to suit each rod **pair** sharing the appropriate crankpin (e.g. rods for cylinders 1 & 5 share crankpin #1).

- Check each bearing halve against the outside micrometer set to the nominal (standard) rod bore diameter (in this case 2.360”) in order to assess where adjustment must be made.
- If too wide, using a soft faced hammer on a smooth surface, tap lightly on the edge to ‘close’ the bearing up. **(Photo 3)**



- If too narrow, tap lightly in the centre (i.e. on the crown or arch). **(Photo 4)**



- Tap evenly from the centre to each edge in order to avoid distorting (twisting) the bearing.
- **Be extremely patient and sneak up slowly on the correct fit! This precaution cannot be stressed enough! Keep in mind how much such bearings cost these days!**
- When fitted correctly the halves should slide up and down in the rod end using only light (one finger) pressure. See the video link under ‘Acknowledgement’ above to see how it should look/feel.
- Be sure to mark or segregate the bearing halves according to the correct crankpin (1,2,3 or 4) when fitment is completed.

Additional Comments

Unless one or more halves in the set slipped through Quality Control at the manufacturer - and provided you are patient - you should be able to get any quality set of bearings to fit using this procedure.

For some bearing pairs it may be that little or no adjustment is required. For others it may seem that you’ll never quite get there but then, after just one more tweak, bingo - the bearing halves fall into the rod bore as they should and as demonstrated in the YouTube video.

An argument could probably be made that even without this sort of fitting process the bearings would ‘find or be beaten into’ their appropriate shape after just a few combustion cycles following engine startup. Maybe, maybe not. Considering the cost of rebuilding these engines in the current era however, it makes sense to afford the bearings their best possible shot at getting an oil wedge established (and the bearings ‘floating’ nicely) from initial startup and on into continued operation without the risk of damage to the bearing and/or rods & crankshaft. That is what this procedure accomplishes, in my opinion.