# Tech Tips: Setting Crank Thrust

Like many kids growing up in the '50's, I was enamored of picture-books. They dominated my bookshelves, were easy to "read" and carried my mind to imaginary adventures faster than suffering through the tedium of word- books. As time progressed, The Hardy Boys opened some literary cracks only to be closed again at the University when studying electrical engineering. So with this article, I return to my youth with an effort to share some pictures while sharing some tips. Please be advised that the sequences and procedures advanced are simply my own. Others may do it both better and more simply.

The following composition addresses setting the crankshaft endplay for L/K/N/P, but not the M and J. The latter employ a ball bearing whereas the former use a babbitted thrust washer and front flanged plain bearing. The process begins at the lathe where the babbitt on the first main bearing flange is machined to a total flange thickness of .195" prior to installation into the front engine housing. At the conclusion of line boring, depending on the machine, a radial thrust cutter trims the babbitted flange to .187". (The machine I use is a Tobin Arp TA-14). This effort insures that the machined flange is perpendicular to the axis of the crank.  The photo below shows a picture of this set up and another photo displays the main components now under discussion: front housing with babbitted housing installed, thrust washers (only one used), crankshaft and bevel gear.


The thrust on the K/P/L/N is set by a babbitted washer retained by an extension of the front main bearing pressed into the front housing and the babbitted thrust on the rearward side of the front main bearing. The distance between these two components must need be set .002" greater than a machined flange on the Phoenix crank, as

shown above( or a separate thrust washer on the original crank) and a washer behind the bevel gear which drives the generator. (You might have to read this twice). The only part that needs attention once the line boring is accomplished is the babbitted thrust washer. An assortment of thrust washers of different thicknesses are seen in the above photo.

Before I continue, a story: Much of which is purchased in any after-market is "almost right" and merchandise coming from England for the MMM cars is no exception. It is wise to pay careful attention to what one has purchased. My Swedish father-in-law had an expression, "*lite snett är engelskt*." Roughly translated, this means, "a little crooked is British." So do not be surprised if you find that a new bevel gear does not to fit the crank nose. In this case, it is a newly purchased gear whose internal bore is .0018" smaller than standard, with an internal gear bore hardness at 56C Rockwell and even more inconveniently, has a keyway broached into the bore. The Phoenix crank, whose gear journal rarely differs from 1.000" (the correct diameter) is double nitrided discouraging anything but a prolonged effort with a crank polisher equipped wtih coarse belts to address. Not wishing to alter the one component that is "correct," it is better to tackle the one which deviates from standard.

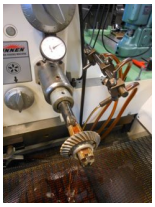
**Tip One**: The internal bore of the gear can be honed with a conventional mandrel, a service provided by some local machine shops, but only with some preliminary work on your part. Very few shops will have the correct keyway hone because of expense and the standard hone can not work conventionally because the expanding stone gets caught in the keyed bore.

1. Cut a stip of hardwood, preferably oak or ash, to a width that allows it to be press fit into the keyway.

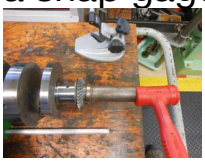
2. Dress the wood to just proud of the bore and drive it into the

internal keyway. Trim the wood to the internal bore size. Use a stout  bar of steel as a buck and a soft hammer for this affair.

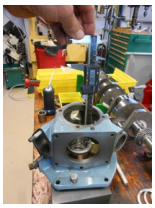
3. The internal bore may now be honed with a conventional mandrel because the expanding stone may bridge the keyway gap. I use a fine honing stone and hone to "same size" which provides a light drive to fit onto the crank journal.



4. The gear may now be fitted to the crank with a hollow mandrel tapped with a soft mallet. (**Tip Two)** A bronze/brass end brazed onto the end of the mandrel will protect the gear on assembly. The distance between the crank and the gear can now be measured using a snap gage and micrometer.

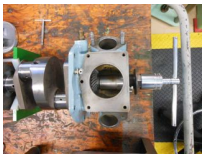
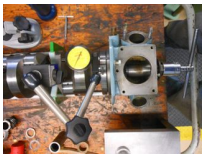


5. Setting the front housing on a surface plate, install either a new thrust washer or an old thrust washer onto the nose of the main bearing and measure the width of the assembly. A slide caliper is a convenient tool for the purpose as shown below. Note: I keep a number of thrust washers on hand to insure I choose one that when assembled to the nose of the main bearing, is proud of main bearing boss.




6. The measurement difference between the gap created by the bevel gear on crank and the thrust washer mounted into the housing can now be calculated. Using a thrust washer of greater thickness, this can be machined to size. **(Tip 3)** A convenient method for machining is to employ the use of double sided machine tape onto the table of a milling machine.  The thrust washer can then be fly cut to the exact dimension calculated. Bridging the thrust washer across the T-slot facilitates measuring the washer's width. With the thrust washer removed from the table, dressing its surfaces on a plate of glass using WD-40 and 400 grit wet dry paper can yield a smooth surface and gain the .001-.002" thrust clearance needed.


7. To test the success of the effort, mount the front housing onto the nose of the crank and assemble the bevel gear onto the crank nose. Torque the whole assembly with a long sleeve, dummy crank flange and nut and then dial indicate the clearance by sliding the front casting axially.

It is important to note that this effort to set the crank end thrust can be accomplished without the crank installed in the crankcase. An added benefit is that the generator can now be installed onto the front engine housing and the clearance set with visible ease between the skew gear and the generator gear.

This article has grown to become more "wordy" than I had wished. I apologize. If you have become bored by the words, perhaps the photos might provide better inspiration. The effort has been to show how someone "in the business" has accomplished the task and perhaps encourage the owner to modify what tools she or he has available to accomplish the task as well.

Good Luck.

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