SERVICE BULLETIN
Issue #2
Tech Tips - June 2018

Make: HD **Model: XA** **Year: 1942 & 43**

The NEW cages are here!!!
22575-42 Retainer, roller bearing


Fig #1

After a year of redesigning, modifications and improvements, we are proud to release, in Fig #1, the brand new roller cages for the 1942 Harley XA. This bulletin contains some detailed technical information while comparing the original design to the new high tech version. We will also be discussing some of the common challenges that led to product failure with original XA bottom ends.

Q: Are XA connecting rod roller retainers (cages) the same, similar or interchangeable with any other model of Harley?
A: No...they are not. As rod roller cages and connecting rods were not made one piece on the XA. Both of these were split in to two parts at manufacturing for assembly and servicing.

Q: Why do we see so many original versions of connecting rod bearings failing or piling up on XA models?
A: There are a couple of reasons but one of them is that the original factory cages were defective straight from the motor company.

Q: What are the main reasons these OEM cages were defective?
A: 1) Rectangular openings for individual rollers were not precision machined but stamped out of flat bar stock then curved to the proper radius to fit the connecting rods. This process effected cage roller openings even more as they opened up by about 0.042" = 1.067MM on the outside diameter of the cage.

2) The cages were made out of material that was far too thin. They were only 0.1440" = 3.66MM thick. Black cages here in Fig #2

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Fig #3

Q: Why would it matter if the original cages were too thin?
A: 1/4" roller diameter is 0.250" = 6.35MM in Fig #3. From this we can see that the rollers are quite exposed on the inside diameter of the factory cages. As we found out after many miles, rollers can slightly wear the cage partitions in between the rollers then the roller jumps on it, causing instant lock up of bearing, splitting the connecting rod. This can also cause damage to the crank shaft bearing surface and in some cases also break off part of the bottom of cylinder collar.

Q: I've heard it suggested that if the cages are not available, we should fill in the space with loose, longer rollers only, with no cages. Will this work?
A: 1) There are a couple of challenges with loose rollers and no cages. One, as you can see in Fig #4, you will end up with a gap of 0.094" = 2.38MM between first and the last rollers.

2) Rollers need cages to keep them running straight as a guide. Excess gap and no guide will allow roller to eventually start running on the angle. Once this occurs severe damage to crack assembly may happen.

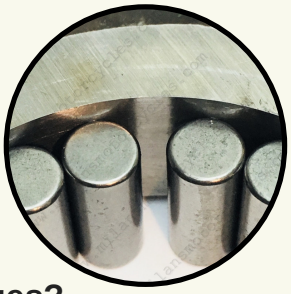
Fig #4

Q: Did the Motor Company ever address this issue of faulty cages?
A: To our knowledge, no. The XA model never progressed in to full mass production, the war was over and the XA project died.

Q: Is there a solution to the XA roller retainers - cages?
A: Yes, a couple of decades ago this was a huge problem that we discovered, so we designed and manufactured a new modern cage. This newest release is an update from our original cage design.

Q: What material are the new cages made out of?
A: Originals were made of steel, our new cages in Fig #5 are made out of aircraft aluminium alloy type 7075 that provides around 70 KSF tensile strength and about 60 KSI of yeald strength.

Q: Did Harley ever make aluminium cages in their engines?
A: Yes they did on other models and for many years.


Fig #5

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Fig #6

Q: Is the new design the same as the original XA?
A: 1) In Fig #6 you can see the thickness of the cage has been increased to 0.234" = 5.94MM. That is over 60% increase compared to the factory design.

2) Rectangular openings are precisely machined with the exact same dimension on the inside and outside diameters of the cage, for proper roller guidance and support.

3) Additional improvement was made to each rectangular roller opening with four 0.078" = 2MM diameter passages, one in each corner. See figure #7 below

Q: Are these new cages made by hand or on CNC?
A: The first batch we manufactured in the 90's were actually manually made on a milling machine and lathe. Our current generation of these new cages are now all made on CNC.

Q: When were these aluminium cages first put into service?
A: We successfully manufactured and ran the initial version of these in the 1990's.

Q: How do we get a hold of replacement rollers?
A: We offer a few different over size rollers also, including .002" = 0.051MM O.S. that option was never offered by the Motor Company for this XA model.

Q: What other improvements have been made?
A: 1) **Weight** - Factory 0.56oz=16G VS ours 0.31oz=9G less weight by 56.7% means less resistance for rollers to push cages mainly in acceleration.
2) **End gap** - Factory 0.074"=1.88MM VS ours 0.034"=0.86MM improvement of 54%
3) **Friction surface area** (on outside diameter of the cage)
Factory 2.55 sq. in. = 16.452 sq. mm. VS ours 0.384 sq. in. = 2.477 sq. mm. That is a reduction of 664% compared to stock.

Fig. #7


Q: Are the new cages readily available?
A: They are currently manufactured in Europe, thanks to my brother Tomas but in very limited quantities. Please contact us for pricing and availability.