

Honing the transmission mainshaft bearing

To get 23 rollers in, or with a new trap door, hone the main shaft bearing race.

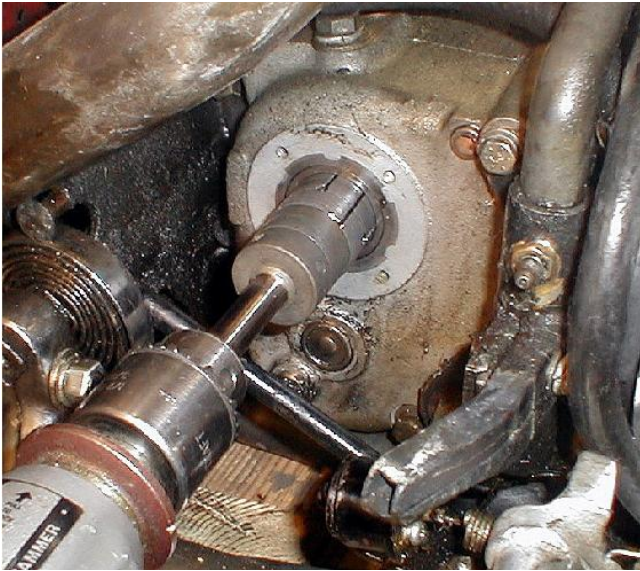
My problem was a mainshaft race in [my 1977 Sportster](#) was a tad oversize, and the proper number of stock roller bearings would not fit. I could not get that last roller to pop in.

My first hack was to use a brake hone. Once I touched off the bearing with a proper line hone, I could see the brake hone belled out the bearing so contact was only in the center. It ran like this for years, a testament to the overdesign of the old Iron Sportster transmission.



The transmission mainshaft bearing is in the right rear of the engine case. This bearing sleeve is belled, or egged out, due to my trying to expand it with a three-stone brake hone.

You have to use a special line-hone to do this. It costs 800 dollars. See the end of the article for suppliers.



Here you can see another mistake. I chucked the proper line hone into a drill and used forward and reverse to cut the race. Turns out I cut too much, and made the bearing so oversize, even the largest oversize rollers did not tighten up the mainshaft. Use the handcrank. I was stuck a bit since I felt I had to take the bell shape out of the bearing. In most cases, you are just trying to align the trapdoor bearing and this one. A few turns is all it might take. I later replaced this bearing sleeve when this loose mainshaft caused the countershaft bearing to get eaten up. Yeah, it really was that loose. I would guess 10 or 20 thousandths. The mainshaft is not supposed to go "thunk thunk" when you wiggle it.

For the grinding compound I used Clover Compound. This tin came in a package of two, "Coarse" and "Fine". (duplex cans E120/A280) I was careful enough to use the fine compound. I did not want the hassle of contaminating the hone with two types of compound, and having to clean the hone when I changed over.



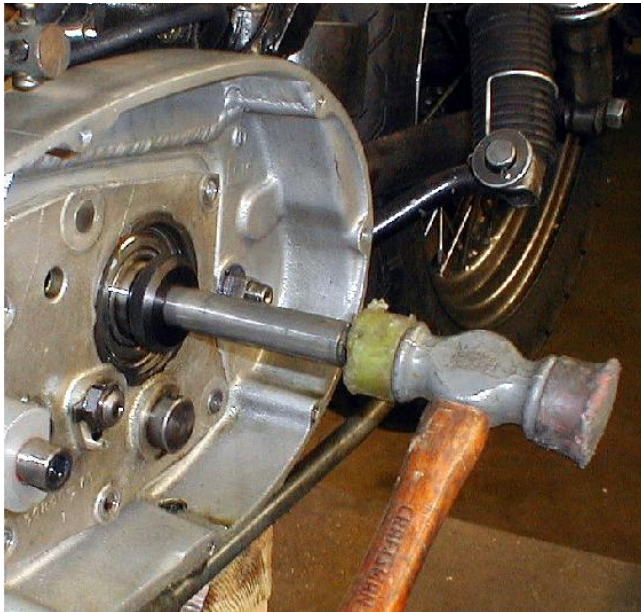
OK, so a little compound, you don't need much and if its dry you can add some 60-weight oil or whatever you have laying around the garage.



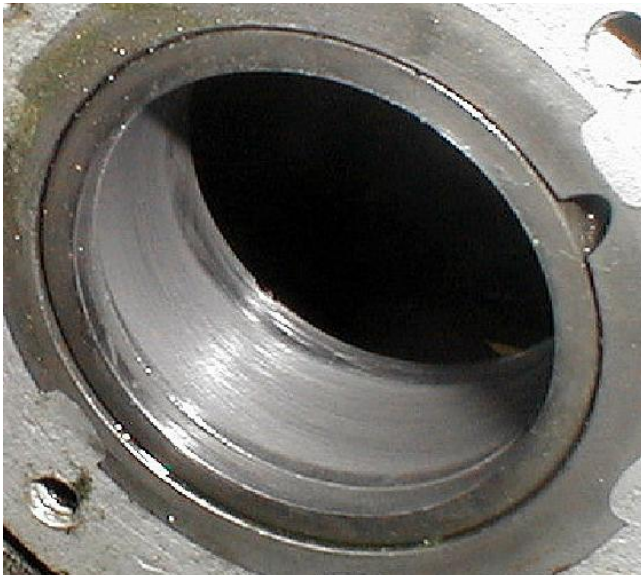
You expand the hone by turning threaded collars at each end. You use a tool similar to a shock absorber adjuster. You can see it along side my thumb. You can see an identical collar on the other side of the hone with little holes around its periphery



where the tool engages. The smudges on the shaft are not lapping compound, that is anti-seize.



Here I am using a drift to tap in the hone guide that comes with hone. It is generally wrong to hammer on a bearing race. This one is a bit lighter than a press fit, it's OK as long as you use a rubber mallet. Duncan Keller taught me the real secret is to have the trap door out and hold it in your hand.



The combination of rubber mallet and having the trap door unsupported allows you to get away with it. The same policy applies with the clutch gear that goes in this bearing. Its OK to tap it in if you are gentle with it.

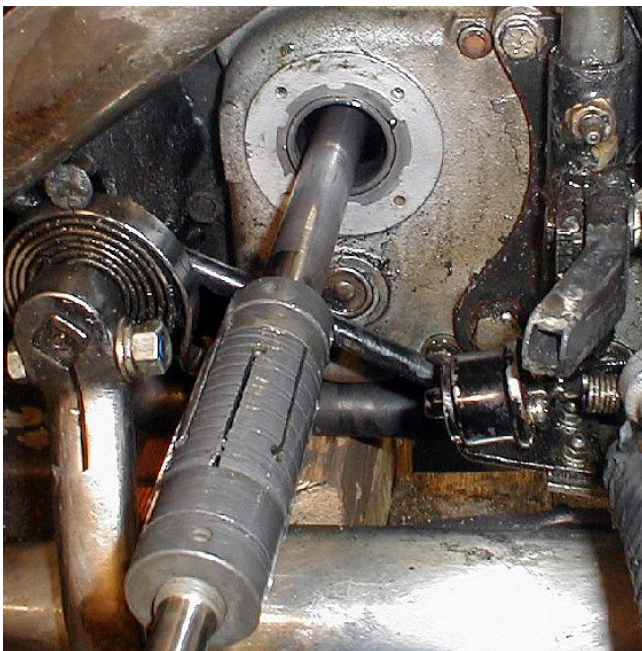
You can see in the previous picture that the hone is now squaring off the bearing race. It is silvery across more of the depth than the first picture above. Unfortunately, I was such a hack using the brake hone before, that by the time I got a nice uniform lapped appearance across the whole surface of the bearing race, the race was way oversize, even for the oversize rollers you can buy. The real solution then is to push out the race and instal a new one. Then just touch that race with the hone to align-bore it to the trap door. I did end up doing that, and will link to it when I get it posted.



You can expand the hone a bit as you grind away. Once again do not use a drill like I did, the hand crank is plenty fast and you won't overbore it like I did.



In theory the hone will expand the same if you tighten it from either end. I like to reef it in a bit on both sides. Go slow. You can see how the sheetmetal tool engages the holes in the hone collar. Don't use a drill.



So there you have it, a pretty esoteric fix, but the drag racers tell me this is critical to keep from blowing up transmissions.

Oh, and a great tip from the XL Forum. Don't use grease to hold the 23 rollers in place as you try to get the tranny back in. Just don't install the circular clip, slap the tranny in, then add the rollers, the washer and the snap ring from the outside. Its a big job since the transmission work is more consuming than a top end job, You have to take the primary completely apart and you usually have to take at least the front exhaust pipe off to get the sprocket cover.

You may have noticed [my 1977 Sporty](#) does not look like any other. I cut off the starter pocket and had a pal weld up the case and primary cover. I installed a dry clutch setup running wet with Barnett fibers and springs. I got tired of sprocket covers breaking, so I made a steel perch for the kickstarter and made my own clutch mechanism for the dry clutch setup. That was a bit of a failure since it still does not have enough leverage and the clutch pull is pretty stiff.

One nice thing is I can get the tranny sprocket off without breaking the chain, that is really nice. I unhooked the kickstarter for this so it just hangs down. The other "custom" thing is the rear brake. I welded on early model peg mounts so I can run the 1975-76 peg with the brake stuff. The 1977 rear break is a bit kludged for me. I don't like this setup much better, the cable keeps breaking. For my money the mechanical shaft rear break was the best setup. I will be thinking on a way to adapt that to a right-side-brake bike like the 1977.

As of 2015 the only supplier for the line hone lapping tool is [Eastern Motorcycle Parts](#). The pictures go with the table on the last page.



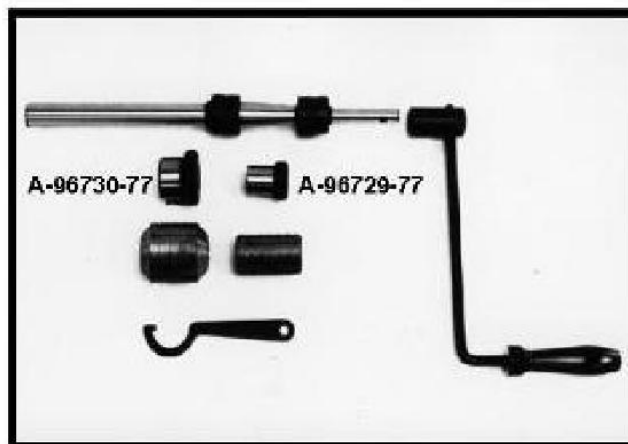
ENGINE
A-96710-40



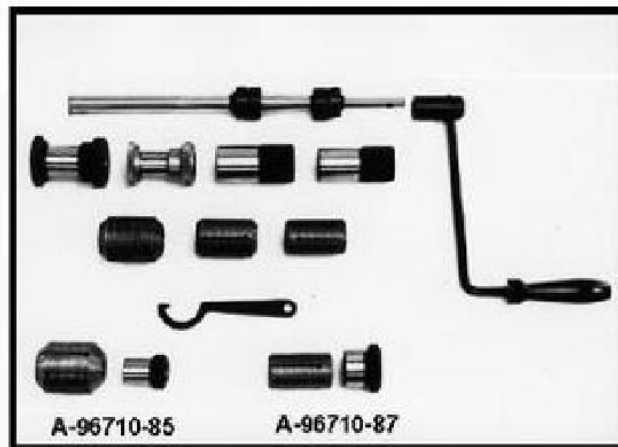
ENGINE
A-96710-40B

The pictures go with the table on the last page.

You need A-96710-77 unless you already want or own the crankcase lapping tools. In that case you can buy the transmission lap separately. The pictures go with the table on the last page.



TRANSMISSION
96710-77



ENGINE & TRANSMISSION
96710-80

The pictures go with the table on the last page.

Eastern Motorcycle Parts number	Replaces OEM	Description
A-96710-40	96710-40	Crankcase lapping tool, engine, Big Twin 1929-present, Sportster 1952-1976.
A-96710-40B		Crankcase lapping tool, engine, Big Twin 1929-present, Sportster 1952-. Includes extra lap head and pilot: 96718-88 (1.562) for Sportster 1987-present.
A-96710-77		Transmission lapping tool, Big Twin 1936-1976, Sportster 1952-1983.
A-96710-78		Lap head, transmission, 1.300" cast iron, Sportster 1952-1984.
A-96710-79		Lap head, transmission, 1.870" cast iron, Big Twin 1936-1977.
A-96710-80		Engine and transmission lapping tool, Big Twin 1930-present, Sportster 1954-1977.
A-96710-85		Lap head and pilot, transmission, 1.870" cast iron, Big Twin 1937-1977.
A-96710-87		Lap head and pilot, transmission, 1.300" cast iron, Sportster 1952-1984.
A-96710-89		Lap head and pilot, engine, 1.562" cast iron, Sportster 1987-present.
A-96711-81		Spanner wrench for lapping tools, Big Twin 1930-present, Sportster 1952-1977.
A-96712-40	96712-40	Lapping shaft only, engine (with nuts and spacers), Big Twin 1930-present, Sportster 1952-1977.
A-96712-40A		Lapping shaft only, transmission (with nuts and spacers), Big Twin 1930-present, Sportster 1952-1977.
A-96714-40	96713-40 96714-40	Drive handle and arbor, engine and transmission, Big Twin 1930-present, Sportster 1952-1976.
A-96715-40	96715-40	Guide sleeve, engine lapping tool, 1-1/2", Big Twin 1930-1954.
A-96716-40	96716-40	Guide sleeve, engine lapping tool, 1-3/8", Big Twin 1955-1957, forty-five 1929-1973.
A-96717-40	96717-40	Lap head, engine, 1.500" cast iron, Big Twin 1930-1954.
A-96718-40	96718-40	Lap head, engine, 1.375" cast iron, Big Twin 1955-1957, Sportster 1954-1976.
A-96718-58	96718-58	Lap head, engine, 1.750" cast iron, Big Twin 1958-present.
A-96718-88		Lap head, pinion shaft, 1.562" cast iron, Sportster 1987-present.
A-96727-56	96727-56A	Guide sleeve, engine lapping tools, Timken bearings, Big Twin 1955-present.
A-96728-56	96728-56A	Guide sleeve, engine lapping tools, Timken bearings, Sportster 1954-1976.
A-96728-77	96728-77	Guide sleeve, engine lapping tools, Timken bearings, Sportster 1977-present.