

89 inch Evo build up part two

Here we are back again this month with the continuation of a buildup of a 1986 Evo engine by Knucklehead Motorworks that will surprise many a Twin Cam owner and get great fuel mileage as a bonus. When we left you we had the engine pressure tested and had started the disassembly process and will take it from there. Now we will remove the breather gear and the oil pump assembly and inspect them for any signs of excessive wear, and find some slight signs that some debris has passed thru the breather gear and then thru the return side of the oil pump. Here is where part of my experience comes in. I know that the heads and cylinders had been removed sometime in the past by the type of gaskets used on the cylinder base and heads in the engine at this time. The damage is very slight and the components can be re used because the debris was probably small particles of gasket material.

Now is the time to check the breather timing (pic 1) and if modification to the case is to be done, do it at this time because we will be cleaning the parts at least a couple of times later on. The same goes for the rear intake camshaft lobe to crankcase clearance for the new higher lift cam to be installed. With these checks and modifications done I carefully split the cases, clean the cases and then mark the clearance for the additional stroke needed in the right crankcase and cut it out in the mill and when this is done. I use my past experience and cut the crankcase for the clearance that the connecting rods will need when the new stroker flywheels are installed. (PIC2) With this done we set the cases aside for now. When the flywheel assembly is cleaned off and dry and the sprocket and pinion bearings removed I place the flywheels in the truing stand and measure the run out (PIC3). I see that there are run out numbers painted on the rims of the flywheels, these numbers were put on by the factory worker that either had trued the flywheels at the factory or by an inspector. The flywheels still have the same run out in the same positions as they were recorded 25 years ago. I had used the word (inspector) and yes back in the mid eighties thru the mid nineties Harley did a lot of quality inspections during the manufacturing process.

Now we break down the flywheels, remove the pinion shaft inspect and measure it to see if it is suitable for re use and inspect the connecting rods lower bearing race's and crank pin. With the gaskets carefully removed from both ends of the cylinders and the gasket surfaces checked for flatness place the cylinders in torque plates and check the bore conditions and sizes (PIC4). We find that once again the parts in this engine look extremely well and determine that if I had to I could just deglaze the cylinders and re ring the pistons and put her back together, but we are building a larger engine so I order the engine kit from S&S with the first over bore piston size available. I check my notes on balancing factors that I have comprised throughout the years and think that a 60% factor will work fine, but and yes I know that things can and do change. The balance factors that have been used in Harley Davidson engines are one of the things that have changed. Harley has used factors that range between 50 and 60 %. What's the big deal you may ask, it is only 10% of a difference, and VIBRATION is the difference. Harley used 50 % in the early motors with heavy flywheels for the most part and the percentage rose thru the years up to the 60% used on Evo's. Along came the Twin Cam and we are back to about 52% for a balance factor, why? It isn't any different than a EVO inside is it, it's newer and it revs faster, so why the change. The Twin cam flywheels are heavier than the Evo wheels; I also know that balancing a stock Evo that sits in a Softail frame at 54-56% can smooth out a bike that suffers from excessive vibration that was balanced at 60%. So I confer with S&S to make sure that 60% is the best factor to use in this stroker application in this frame. According to S&S 60% is still the best factor so I have them balance the wheels with the parts that I am using in the assembly.

The cylinder heads are disassembled, cleaned and inspected for wear. (PIC4) Again we find that this engine is in fine shape here also, the valves are ok but will be replaced as well as the valve spring sets with performance parts that are from the aftermarket world and will further enhance the power output of the engine along with providing some additional reliability. The camshaft from Andrews Products chosen for this build has a valve lift of .495 which is close but higher than the stock lift, the duration is significantly longer though. The valves are sourced from Baisley Performance and include a nitride coating to help reduce wear to the valves along with better shapes to help promote additional air flow thru the engine. The valve springs chosen are of a heavier wire than stock although the spring pressure on the valve at rest on the valve seat is not too significantly high (PIC5), about 155 lbs at installed height. After I complete the "mild port work" and the new 3 angle valve seat work I check and verify this pressure on all 4 spring packs and



Picture 1



Picture 2



Picture 3



Continued on page



Picture 5

Picture 4

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