Are you having trouble with your Oil Pump?

Then Try This!

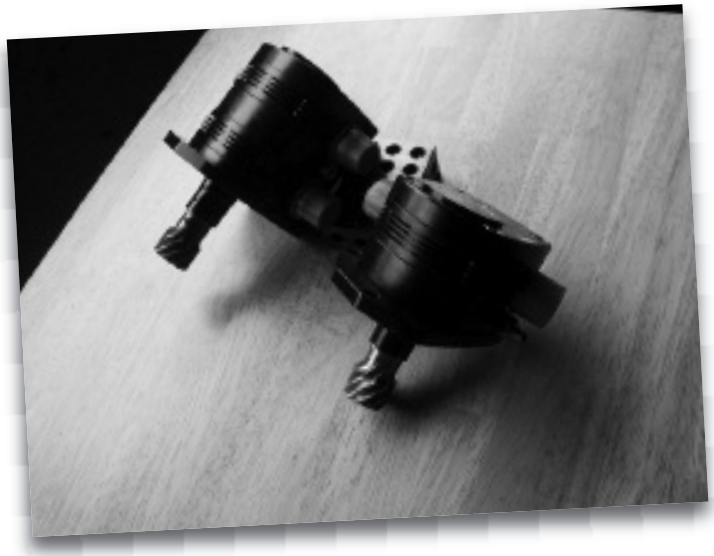
Good news this time for 'Kent' based engines. John McCoy of Omnitech Engineering and Roy Johnson of HTP (High Tech Performance oil pumps) have developed a new oil pump and oil system to retrofit and upgrade the Kent based engine. The Kent engine is the basis for the classic Lotus Twin Cam Ford push rod engines used in the Seven and various Lotus race cars, as well as the Ford Cosworth 'BD' series of engines. John McCoy has developed a complete oil system, including the pump and fittings as well as wet sump oil pan, everything needed to make the engine last longer and gain performance. There is also exciting new information on the Kent block: it is coming back. Yes, new blocks will be available from Ford, so they should be good!

The Ford Kent engine oil system by John McCoy

The Kent based engine goes back many years. Its early history began with the motor being fitted into the 1959 Ford Anglia. With a capacity of 996cc, the unit developed 39bhp (29 kW) at 5,000 rpm. From then it evolved though several incarnations, most notable being its many race applications. It was Lotus, Colin Chapman and Cosworth Engineering that brought the engine into the performance arena, and they had several reasons for doing so: it was compact, light, small and had a good bearing area, the bottom end was obviously quite stout, and it could support many cylinder head combinations. Continuous development resulted in many power units ranging from its 39hp base configuration, to those used in Formula Ford, Formula Junior, Formula Atlantic Cosworth BDD, and the top of the range, the 300hp Cosworth BDG. These innovations all essentially used the same bottom end or bearing area, changing out the cylinder head for more power and efficiency.

The engine's long history of applications is stunning, and the service this engine has given is outstanding. In today's applications, it is being pushed even harder, power outputs of today are optimized by modern refinements in cylinder head design and manufacture. Modern technology has, in fact, given this engine a new lease of life, boosting its performance far beyond original specification.

Standing back and looking at the engine's design as a whole, there is one key component that has yet to be updated, Yes, you guessed it, the oil pump.



The pump used today is essentially the same as it always has been, and now pushing 50 years of service, is badly in need of technological improvements. It utilizes a gear and rotor (impeller), turning within a gear housing between faces in a housing bore (see above). This is a common design found in the automotive industry. The design has always worked fairly well if it is manufactured with tight tolerances and kept clean. However, if debris passes though the pump, the impeller tips are easily damaged, and further, if the debris gets caught in between the impeller/gear and the housing bore, the clearances will become enlarged. The result of an increase in these clearances is loss of efficiency, causing cavitation which aerates the oil.

The principal problem in mass production with this design is related to precision, or lack of it. Mass production manufacturers can't afford to hand-fit and measure pump clearances. The housing is sand cast or die cast, then machined, at plus (clearance) tolerances. The gear impeller shafts are run in the housing, without bearing support, and as the pump warms up, a further increase in clearance occurs. This extra clearance decreases the pump's efficiency. Add to this scenario the new thinner synthetic oils, and the pump will increase cavitation even more, thus supplying oil aerated, which results in higher engine heat, and eventual bearing failure.

Through the frustration of keeping his own race engines alive, and his pursuit to make more torque and power, John McCoy of Omnitech Engineering sought out a better pump. His solution was to take advice from one of the world's best pump designers, Roy Johnson of Johnson's HTP.

Roy took one look at the existing design and shook his head, observing, *"same story – again."* It seems that Mr. Johnson is making a good business of upgrading old engines merely by upgrading the oil pump. He has done pumps for Harley Davidson, Mopar, Chevy, and Ford, working on old engines that just don't seem to last, until now! His efforts have made big impacts in Nextel Cup, circle track, and drag racing.

According to Johnson, the heart of the problem is the typical pump design, and its inability to pass foreign material, compounded by lack of precision and/or excessive clearance. The stock pump has essentially no heat sinking capability, thus as it heats up, critical internal dimensions change. Present manufactures offer up high volume or high pressure pumps to attempt to fix the problem. Mr. Johnson points out, "*you can't fix an oil leak with more aerated oil. But rather, the pump needs to have minimal slip of the oil, designed more like a hydraulic system, and the supply of oil needs to be as pure as possible.*"

John McCoy took his advice and installed Roy's pumps on two of his most problematic cases, his own Twin-Cam Escort, and a Can Am race car fitted with a highly-built Buick-Rover engine.

The result after three seasons of brutal race punishment: change the rings, timing chain, valve guilds and springs, and put them back into service! The engines ran cooler, oil temps lower, oil stayed cleaner, and the bearings look like they were just installed.

Jay Ivey confirms these findings as well. "*On back to back tests," he claims, "we noted the motor took longer to come up to heat with the Johnson pump.*" This is an indication that the oil going into the motor is pure, not aerated, factors that obviously extend bearing life.

According to John McCoy, his experiments on the engine dyno showed he was able to drive oil pressure down, thus make more power. Robert Yates, a renowned Nextel Cup engine builder, confirms this discovery. They have lowered pressures, and noted decreased oil temperatures and more power.

In fact, lowering oil pressures conflicts with the historical norm of "*10 psi for every 1000 rpm.*" Mr. Johnson expresses his highest frustration regarding this rule of thumb, "*Getting the traditional engine builder to treat an engine like a hydraulic system and lowering oil pressures is like pulling teeth with your fingers!*" As noted by McCoy, "*We gained at least 10 % more power lowering from 80 psi to 60, and noted lower operating temps. The only conflict we have noted was when using cross drilled cranks, we where unable to lower pressures as much.*" Fortunately, most crank manufactures have moved away from cross drilling, rather drilling the oil tangential to the journal.

Considering the prices these engines have escalated to, even in relatively stock form, it would certainly make sense to take a look at Roy's pump. It is now being produced for the Kent based engine and is available in as many as three stages, wet or dry sump configured. The current version requires a remote oil filter and an oil supply bung added to the main oil galley (see middle right).

Ford will soon be re-casting the 711M block, the back bone of Formula Ford racing, and Jay Ivey has been instrumental in the promotion of this project. With advice from John McCoy, and after his testing, he has asked Ford to provide an oil bung on the casting like the one John McCoy installs, and similar to the all-alloy BDG block.

For those who have wet sump applications, Omnitech has a race-proven oil pan. The Johnson pump will take in the oil from the side of the oil pan (see lower right), thus achieving a full windage tray and a far simpler pan design. Omnitech will also have a weld-in kit available soon.

The oil pump/oil system will be available as a complete kit. Included will be fittings, pump, and an interesting oil pan that should resolve oil starvation during high cornering loads. Don't forget the system will also free up power and could result in cooler oil temperatures!

For further information on the new Kent oil pump and systems, visit www.omnitech-engineering.com. I enjoy going to the Omnitech website because John McCoy always seems to have interesting projects, information and sometimes parts for sale on his site. Roy Johnson of HTP also has an informative website, http://johnsonsoilpumps.com. Reading through the website article on engine oiling will help you further understand why this new system is so important.

If there is a product, service or technical information article you would like to share with me and the club, feel free to contact me by phone on 520-378-4665 or e-mail me on elanmarcos@msn.com. Many thanks to John McCoy of Omnitech engineering for doing all the research, writing, and of course all the development work on the 'Kent' oil pump system.