BUILD-UP OF A KILLER KOHLER K241

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I recently performed an engine rebuild on a 10 hp Kohler K241A for a friend's Cub Cadet 106 that he's restoring. He requested some mild modifications just to add a little extra to the performance. As the pictures for the original Killer Kohler article turned out rather poorly, I thought a photo shoot of this engine going together would be appropriate.

After teardown, the block was sent out for boring .010 over from standard, acid dipping to clean up, and valve seats cut. Mounted up to the engine stand, it was ready for a mild port and relief job.

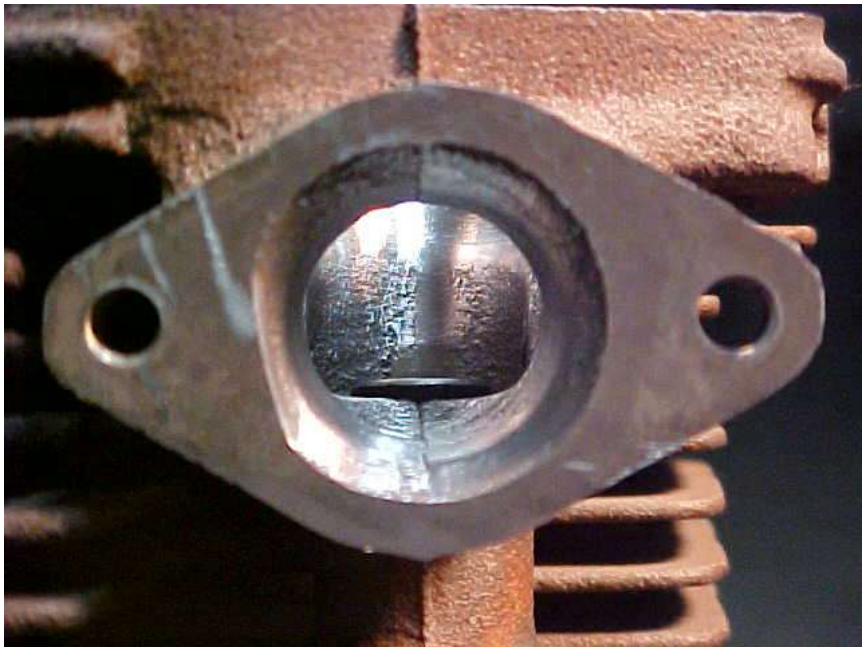
The deck was first to get some grinding work. The stock valve pockets are machined in from the deck face and have rather sharp edges for gas flow to traverse. This is what the stock deck surface looks like.

Blending these edges and taking out all sharp corners is known as a “relief”. The modification increases volumetric efficiency by creating less restriction to gas flow. This is a partial relief, as pockets are blended into the existing deck face. A full relief extends a full depth cut all the way to the bore circumference. The material is not very thick on the block casting in this area thus I’m leery of doing full reliefs on Kohler engines.

From the side, a little more dramatic view is seen.

The intake and exhaust ports are next. The stock intake port is formed by a sand core during casting and has the typical rough surface found on cast iron blocks.

Some careful grinding using medium grit stones and emery flapper wheel smoothes out the surface and allows a flow improvement. A mirror finish is not necessary, but just smooth to the touch.



The inside radius of the port is a very important area to blend. Some blocks have rather sharp corners here that need to be blended into a smooth continuous radius

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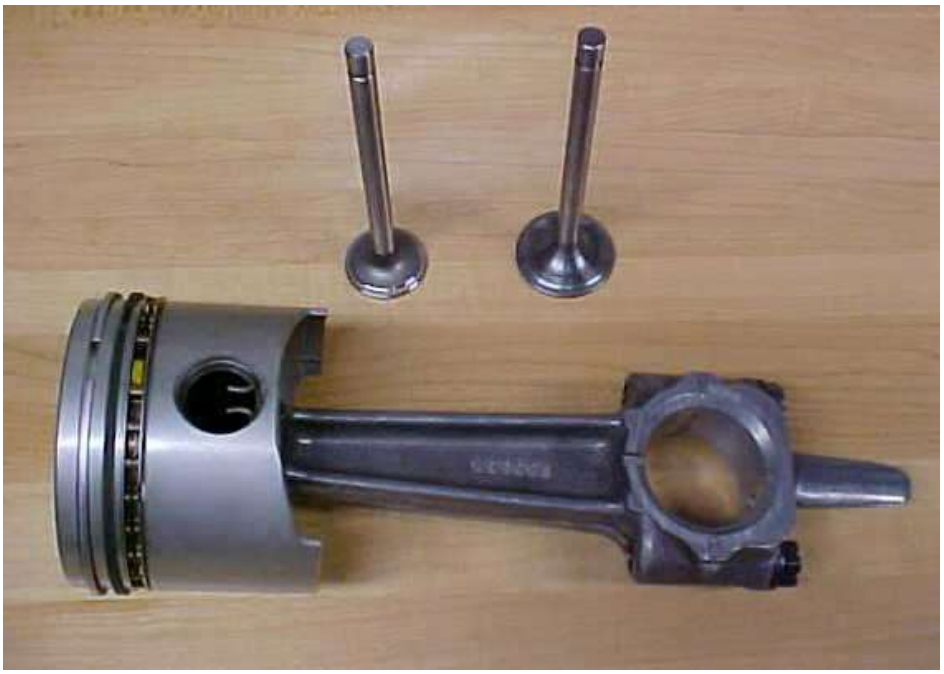
The exhaust port gets the same treatment, although not as extensive. Removing sharp corners and blending are performed here.

Next, all chips and grinding dust is blown out of the ports using compressed air. With the block now prepared, assembly can begin. First the pto-side ball main bearing is pressed into place, the governor gear is assembled into the block, lifters oiled and dropped in, then the camshaft is fitted.

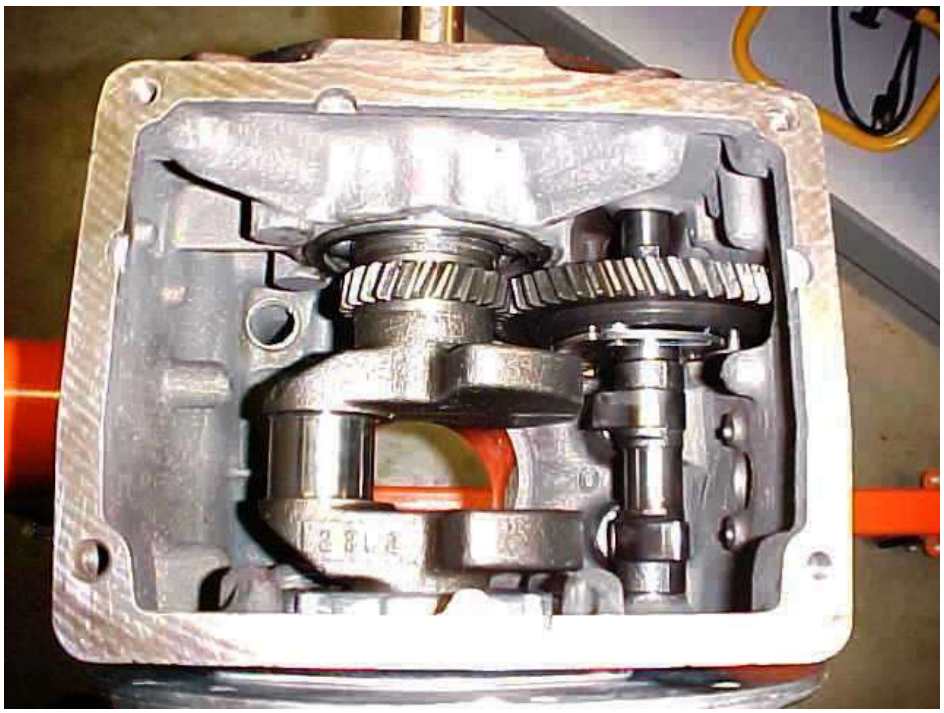
This engine is running the stock camshaft and lifters as requested by the owner.

The valves were in very good condition and the intake was reused, after a regrind. The exhaust valve was replaced with a new Stellite valve. They were both chucked in the drill press and all sharp corners gently radiused with a hand file. The intake valve head underside was polished with emery cloth.

A new .010 over piston and rings was fitted to the original rod. This engine was in amazing condition - the rod and crankpin both measured no discernable wear and were right on the nominal dimensions. Either the previous owner never ran this very much, or he took impeccable maintenance procedures. Thus, the original connecting rod and crankshaft were refitted.

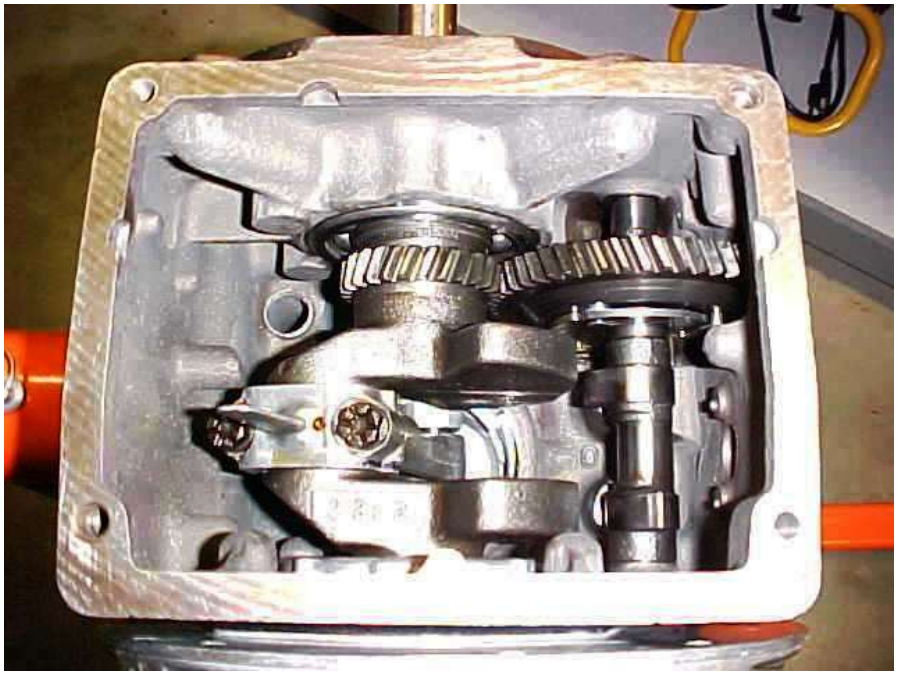


Next, the crankshaft was installed after aligning the timing marks.

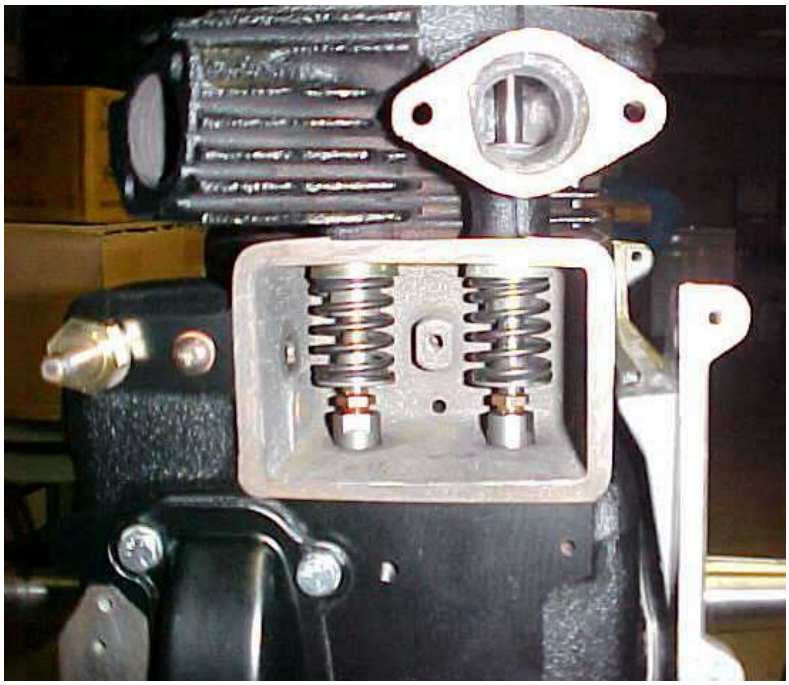


The bearing plate was then fitted using one black and one brown gasket, and bolts torqued to 35 foot pounds. Note new grade 5 bolts fitted. Crank end clearance was checked and found to be .005 in., right in tolerance range.

Piston and rod were then loaded into the bore using a ring compressor and plenty of oil. Rod oil hole was oriented toward camshaft. Rod bolts then torqued to 28 foot pounds in three stages, then loosened, then brought back to 24 foot pounds, as per the manual. Here is the rod and piston installed.



Then the valves were lapped to the seats using a fine compound. After removing all traces of lapping compound, the springs and keepers were installed. First though, some Never Seize grease was applied sparingly to the exhaust valve stem for initial lubricant. Regular 30-weight oil was used on the intake stem. Valve clearance was set to intake = .008 and exhaust = .017.



Here is a view from the deck

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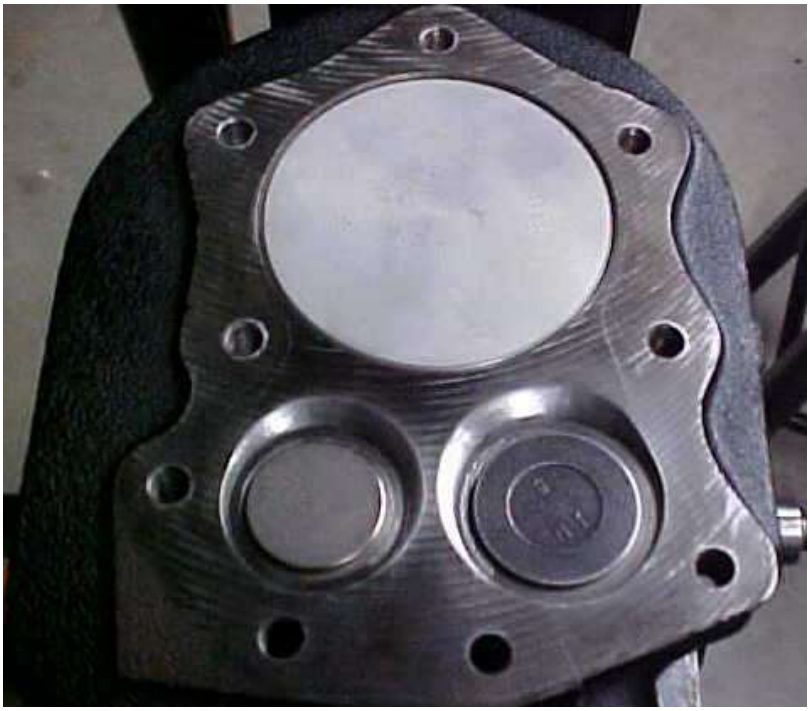
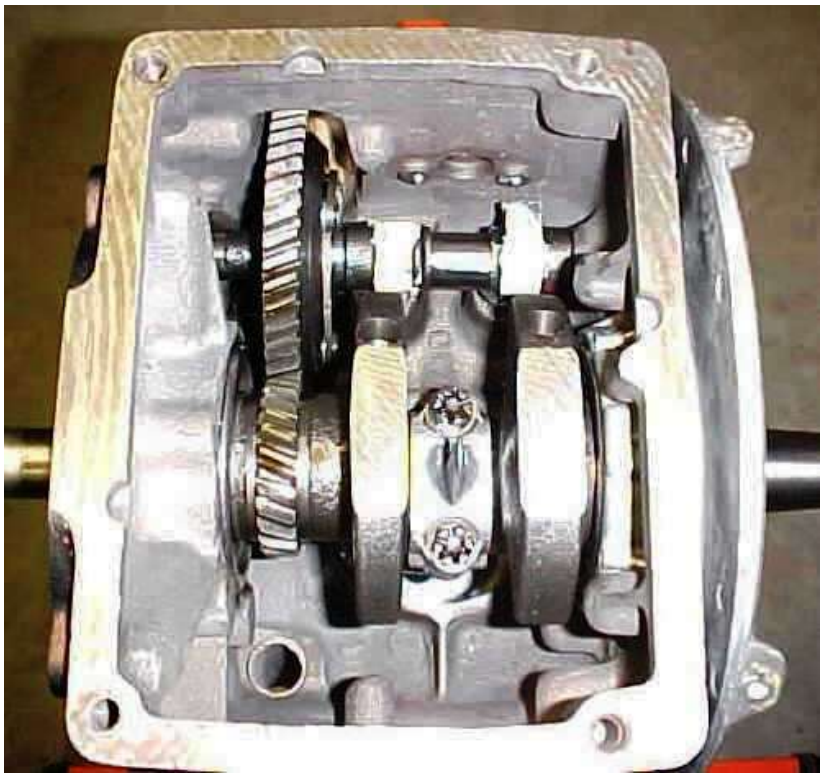


Now the engine was ready for its oil pan, but prior to that, some white lithium grease is applied to both intake and exhaust cams for pre-lube.



Oil pan was then fitted and new bolts torqued to 35 foot pounds.

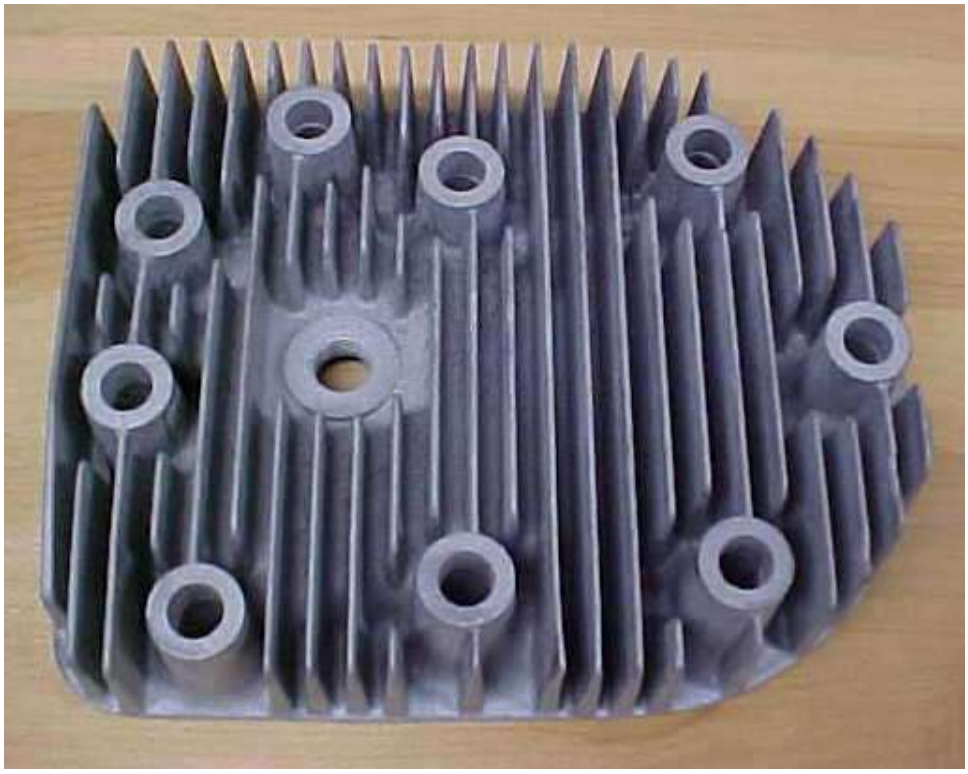
Breaker points were next using a steel push rod. Note the attachment screws. I replace those blasted slotted head screws (that always drop and get lost) with socket head cap screws. Using a hex wrench (Allen wrench) offers a much better grip on the screw and it is held securely when negotiating those close quarters when engine is in the tractor frame.

Screw size is #10-24 X 3/8 and four are required – two for the points and two for the cover.

Before fitting the breather cover, I coat the gasket with silicone grease. This prevents it from sticking when checking valve clearances. The gasket lasts for many cover removals.

This engine "gets the treatment" with billet, red anodized breather and fuel pump covers.

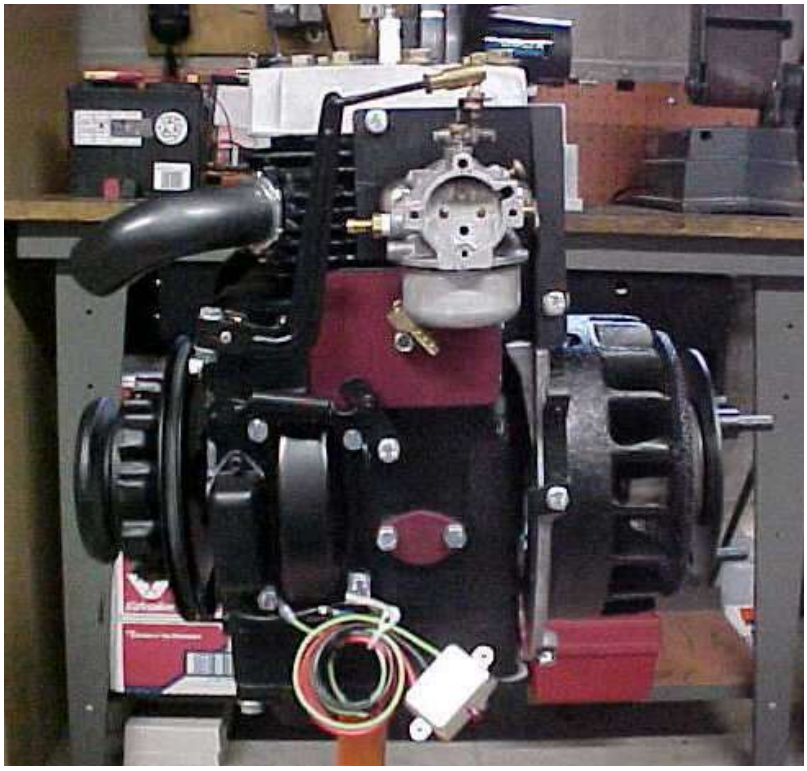
The cylinder head was bead blasted and cleaned up nicely.



The sealing surface was decked .025 in the mill to raise compression ratio slightly.

Prior to fitting the head to the block, all bolt holes were chased with a well-oiled tap. This assures accurate torque values.

The remainder of the components were then assembled to the engine, including carburetor, governor linkage, and exhaust stub. A PointSaver is also installed, and a Bosch “Blue” coil will be used to complete the ignition system.



The PTO clutch was also reconditioned while apart. The owner wanted a black engine thus all parts were sprayed with Krylon Barbeque Black, a high-temperature paint available at True Value hardware stores.

Flywheel and clutch drive plate get painted too.

This completes my job on the rebuild. The owner will be painting and reassembling the rest of the components. It was a fun job, made better by the payment received for the labor involved.

I hope some of these tips prove useful to those rebuilding their Kohler engines. The billet breather covers, PointSaver, and Bosch "Blue" coil are available through my website, www.kirkengines.com.