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# ENGINE MASTERS

HOT ROD

## LS-XTREME!

### 775HP

### 436-CUBE CHEVY LS

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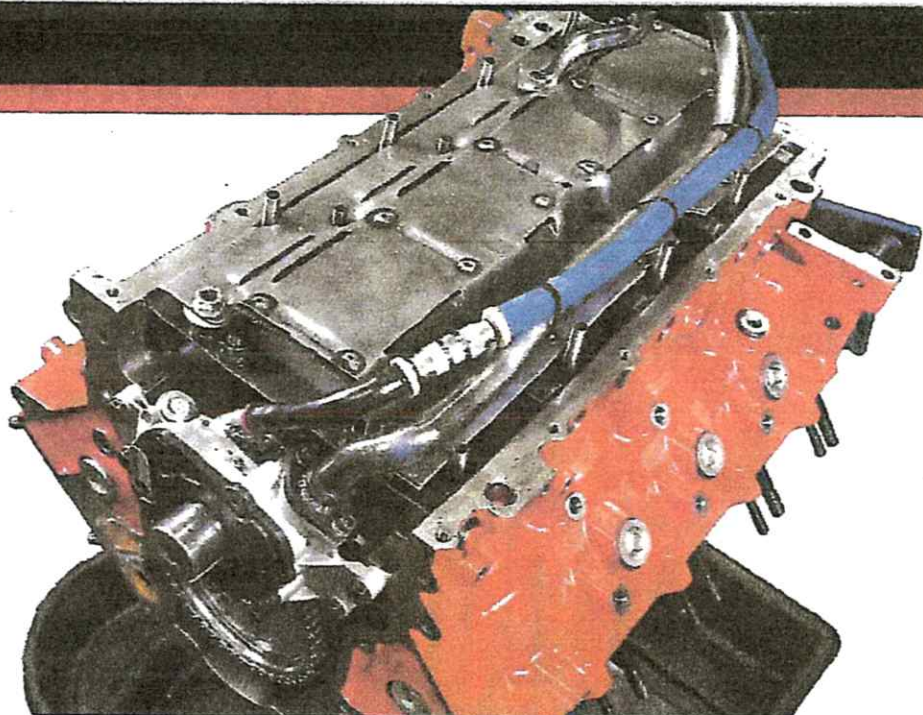
with the deeply skirted block and cross-bolted mains. By its very design, the LS was destined to be a superstar of the performance scene.

When contemplating an engine combination to compete in the 2013 AMSOIL Engine Masters Challenge, the advantages of the LS series engine were not lost to Judson Massingill of the School of Automotive Machinists (SAMs). Jud had been an early adopter of the Chevy LS and has years of success with LS power on the dragstrip. The LS would be the basis of the build, the only question being how it would be configured.

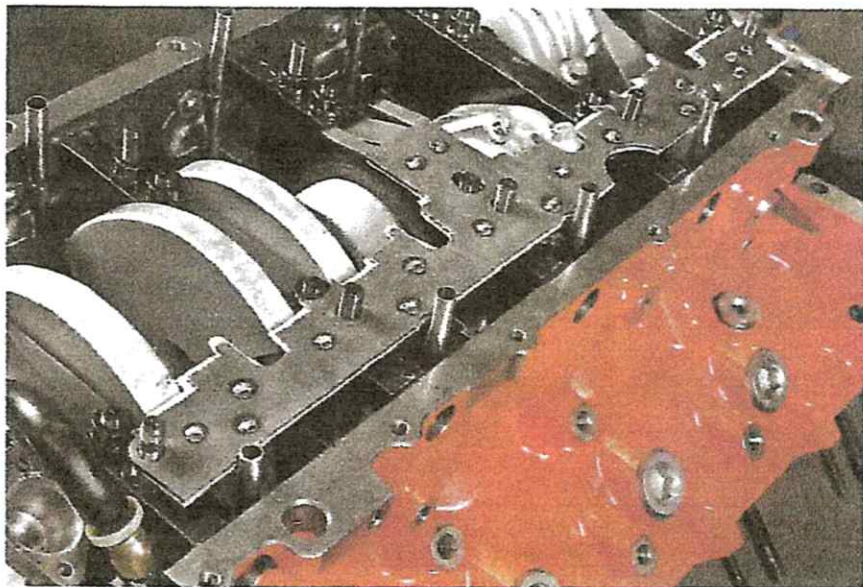
### The Bottom End

As an OEM engine, the LS engine was offered with both aluminum and iron blocks, in a variety of bore sizes and crankshaft strokes. While the production block can be the basis of a very powerful build, the SAMs team elected to go with the GMPP LSX block. As Jud explains, "The basic thing is the strength of the block to keep the cylinders round and straight. That is why we prefer a cast-iron block to the aluminum blocks. Also, this block has the six-bolt pattern for the heads, and it accommodates a bigger bore. We have used one of these blocks in our drag car for the last five years, and when we take the engine down to freshen it, we observe that the cylinders stay round. Our experience with this block made us confident that it was the right choice for this build."

Jud continued, "We decided to build the engine to 436 ci, going with 4.164 inches on the bore and 4.00 inches on the stroke. We were thinking the larger engine capacity would help with power down low. The crankshaft is a billet piece from Bryant, and the main thing on the Bryant crank is that it is a very strong and lightweight crank; it is made of premium metal. It probably is not needed at this horsepower level, but even if we decide to do something more serious with this engine later, we will not have to worry about the crankshaft. We used a Scat 6.00-inch H-beam rod, which gives us a compression height of 1.240 inches. We don't like anything below about 1.200 inches if possible, because the piston can get unstable. I'm not too much of a believer in the rod length theories, and I know there is a lot of debate on the topic, but our main thing is that the center to center



A look inside the crankcase with the oil pan removed shows a bottom end well protected from power-robbing oil splash and windage. The tubes opening below the pan rail direct oil from the top end to below the rotating assembly, while the Schumann oil pump redirects bypass oil back to the pickup tube.



Removing the windage tray reveals the very effective crank scraper, painstakingly fitted to the rotating assembly. The scraper features a Teflon edge. Note the open breathing area adjacent to the main caps, allowing air pressure to move freely within the crankcase.

of the rod connects the pistons to the crank. We have been building engines for a long time and we really do not see enough difference to register."

The pistons are custom-dished forgings from Diamond. As Jud tells us, the block choice, along with the stroke and piston, all work together. "The LSX block has a longer cylinder than a conventional LS block, and that keeps the skirt from hanging out of the bottom of the cylinder at bottom dead center. We

do not even like a 4.00-inch stroke in a street LS using a production block. The piston comes way out of the cylinder at the bottom, and that lets things rattle around; you need to put more oil ring in it, and that adds friction. With the LSX block, you can go with the longer stroke and still keep the piston stable in the cylinder."

Jud detailed the piston crown configuration as an important aspect of the build. "What we like is a small