

Got a question for John? Email him at [ceeditor@amasautomotive.com](mailto:ceeditor@amasautomotive.com)

# Pumpers Or Thumpers?

**READER'S QUESTION:** My 1970 L-46 (350/350HP) FOUR-SPEED HAS BEEN IN OUR FAMILY FOR MANY YEARS, IS NEARING THE 90,000-MILE MARK, AND IS PRETTY TIRED; COMPRESSION READINGS AVERAGE ABOUT 120# AND IT'S BEGINNING TO USE OIL. THE CAR IS IN GREAT ORIGINAL SHAPE OTHERWISE, SO I'M PLANNING TO HAVE THE ENGINE REBUILT THIS WINTER.

ONE OF MY CLUB MEMBERS SAID I SHOULD TAKE ADVANTAGE OF THE REBUILD AND INSTALL A SOLID LIFTER CAM INSTEAD OF THE HYDRAULIC CAM IT HAS NOW TO GET MORE POWER, LIKE THE LT-1 HE HAS. I'M NO MECHANIC—COULD YOU EXPLAIN THE DIFFERENCE BETWEEN HYDRAULIC AND SOLID LIFTERS AND WHAT THE ADVANTAGES OR DISADVANTAGES WOULD BE OF MAKING THAT CHANGE?

**RESPONSE:** Lifters ride on the cam lobes and translate the rotary motion of the lobes into linear motion to move the pushrods and rocker arms to open and close the valves. They also meter pressurized oil through the hollow pushrods up to the rocker arms to lubricate the balls the rocker arms pivot on and to help cool the valve springs.

Hydraulic lifters have an internal plunger, spring, and check valve arrangement that uses oil pressure to ensure that there is zero clearance in the valvetrain at all times, regardless of engine temperature. The bottom end of the pushrod sits on top of the plunger, which has a pressurized oil cavity below it. When the cam lobe raises the lifter, the pressurized oil has already taken up clearances, so operation is quiet and there is no need for regular valve adjustment. The hydraulic lifter continuously manages valvetrain clearances.

Solid lifters have no moving parts—they simply translate rotary to linear motion and meter oil flow to the pushrods. The different thermal expansion rates of all the parts involved require that there must be some clearance in the valvetrain at all times to ensure that the valves are fully closed when the lifter is on the cam's base circle. The beginning and end of a solid lifter cam lobe profile has opening and closing "ramps" to take up the clearances gently (relatively speaking) when opening the valve to avoid "hammering" the parts, and to

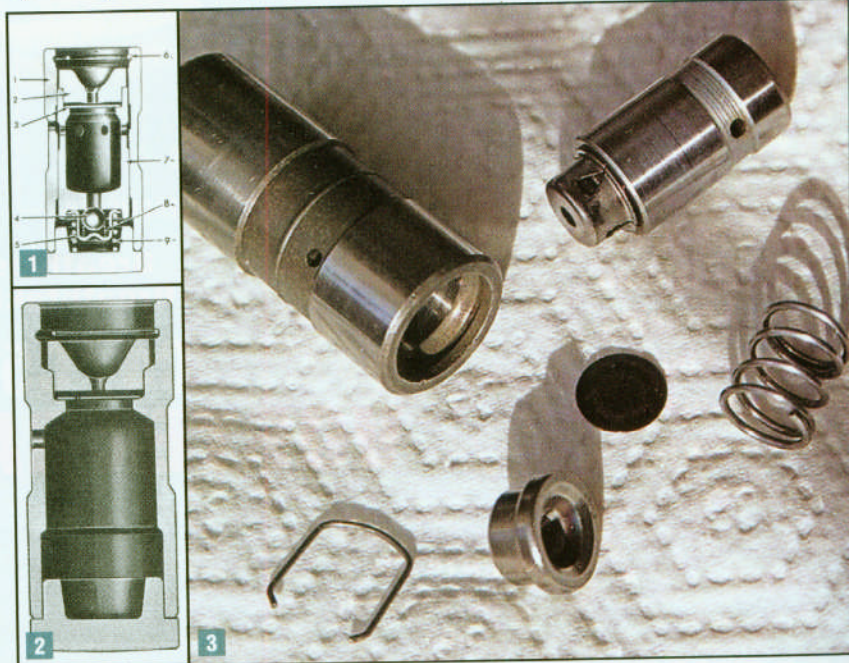
close the valve gently so it doesn't "bounce" off its seat.

The advantage of hydraulic lifters is quiet operation and zero maintenance. The added weight of the lifters and limitations of the lifters' hydraulic system dynamics at high rpm limit the

aggressiveness of the cam lobe profile and the maximum rpm capability the system will permit.

The advantage of solid lifters is that they will allow the engine to rev higher, thus producing more peak power (assuming the more aggressive cam profile complements the design of the other engine components). However, occasional maintenance (valve adjustment) is required, and they're noisy.

Your call, but in your case, with a mostly original car, I'd stick with a stock rebuild approach and stay with the hydraulic cam and lifters. Federal-Mogul/Speed-Pro, Crane, and others have "blueprint" duplicates of the original L-46 cam. ■



1 A typical hydraulic lifter—the plunger (item #7) moves up and down independent of the outer shell to take up valvetrain clearances, and its position is managed by the pressurized oil cavity and check valve at the bottom.

2 The solid lifter has no moving parts, so the pushrod seat at the top sees exactly the same motion as the outer shell; occasional maintenance is required, and they're noisy.

3 The parts of a hydraulic lifter; the outer shell, inner plunger and check valve, plunger spring, oil metering disc, pushrod seat, and plunger retaining clip.