



Unsung Hero

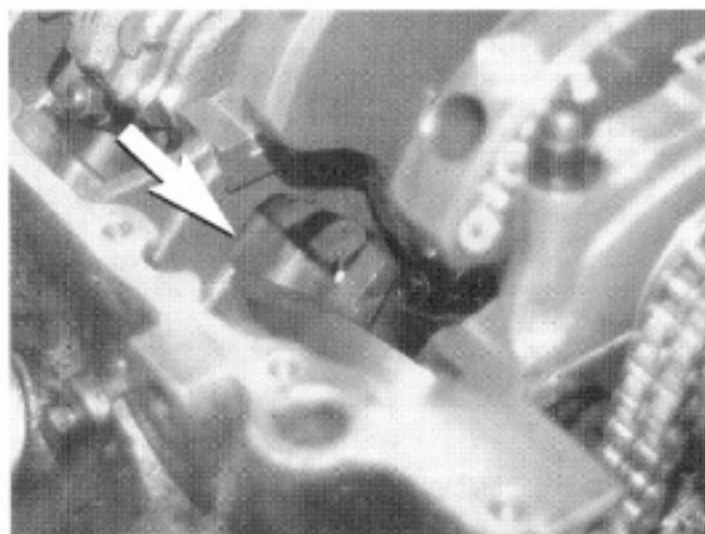
THE 403 OLDS MAY BE THE MOST OVERLOOKED PERFORMANCE ENGINE EVER

By Scott Parkhurst

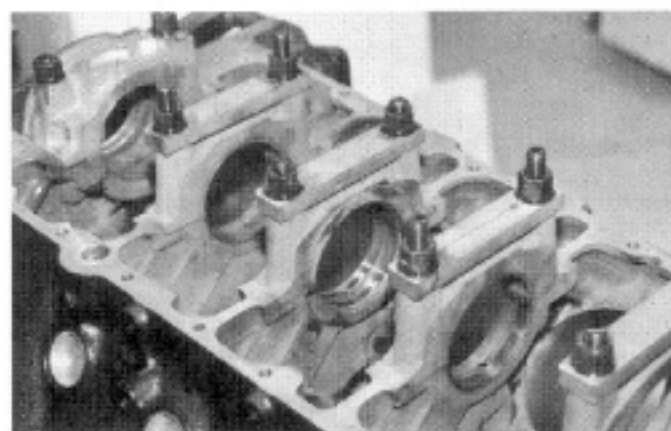
While speaking with Olds guru Joe Mondello recently, we asked what interesting things he had going together in the shop. When he said he had a strong 403 Olds going together, we snickered and said we wanted to cover a real performance engine, not a smog motor. He corrected us and explained a few facts

that piqued our interest. First, the 403's 4.350-inch stock bore was an eye opener. That seemed like an awful big bore, and a little research showed it was. The 454 Chevy has a 4.250 bore, the Ford 460 has 4.362, the Mopar 440 is 4.320, and the big 455 Olds has a 4.125-inch hole. With a small 3.385-inch stroke and the big bore, the

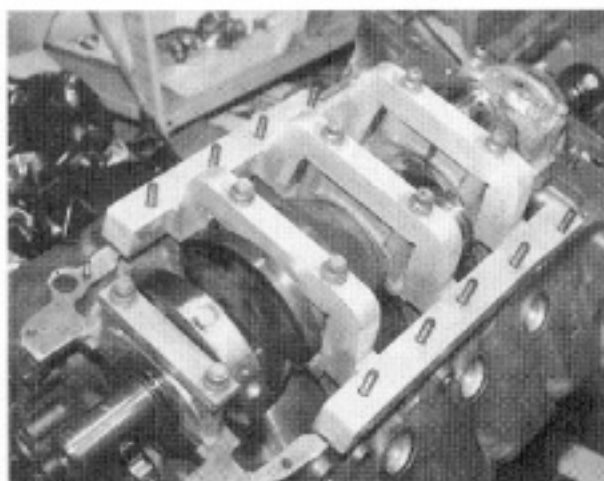
potential of the oversquare engine became clearer. Many of the best racing engines were oversquare, with huge bores and small strokes. Engines like this need to use rpm to make power instead of long, torque-producing strokes. We asked why these engines didn't really gain the reputation it seems they were due, and



The 403 Olds is easily identified by its "windowed" main webs. (arrow) Most 403s had them, and they are sufficient to support a decent street engine. Taking advantage of the other design elements of the 403 will more than make up for the lack of material here. If spotting the main webs is too difficult, maybe the big "403" cast into the block will make it easier to identify.



Strapping the main caps (as shown here on a 455) is an effective way to stabilize the mainline. Joe recommends this for all high-performance Oldsmobiles, but especially the mainline-challenged 403.



If you really want to get serious, Mondello sells this billet cradle for the bottom end. By spreading the load over such a wide area, the main bearings are fully supported and can handle the extra twists produced by high cylinder pressures and sky high rpm.



The factory connecting rods are fine for the 403 once they have been through standard prepping and resizing procedures. Note the polished beams and upgraded bolts, along with time-honored lightening and balancing tweaks that have become standard on all performance engines.



After sliding the cam in place, we can see how critical clearances to the timing cover are. Joe wants to make sure this roller stays put, and you can see that he takes his measurements with a gasket in place for accuracy. You will also note the gasket retention modification made to the intake manifold mating surface at the front of the block. Sealing these wide blocks is critical, and giving the gasket a place to grab is cheap insurance.

Joe pointed out a few facts for us.

The 403s came with a lowly 7.8:1 compression ratio, and power outputs were understandably low. The engines came out in the smog era, and were burdened with all the nasty necessities required for EPA approval. The cars the 403 V-8 was available in were all quite heavy. The gaudy Trans-Ams had gained a lot of weight by the mid-'70s, and any engine would be working hard to move nearly two tons of steel.

We looked over the 403, and collaborated with "Dr. Olds" to develop a performance plan. With a bit more compression, a good set of heads, and a camshaft that would allow the engine to breathe, maybe we could squeeze some serious power out of this almost forgotten Rocket.

The block was a good place to start. Joe explained to us that 403 blocks came in two basic incarnations, "solid" and "windowed" main webs. Most of the blocks were of the less-desirable windowed vari-

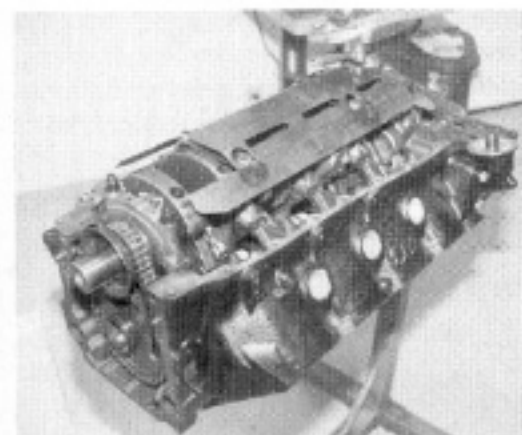
ety, with large square openings cast directly through the main webs. This lack of meat in the critical web area would seem to be reason for concern, but naturally Joe has addressed this, and reassures us that the windowed block is fine for a strong street/strip buildup, with some minor bottom-end strengthening modifications. There were only 2,500 non-windowed 403 blocks made, so they are pretty rare. Most of Joe's 403 research has been accomplished on the more common windowed blocks for obvious reasons, and he has learned how to make them live to 5,500 rpm in stock shape and more with some bottom end mods.

Joe had a 403 block handy, so we looked it over. The two-bolt main caps on their spindly windowed main caps didn't look very comforting, but we had to trust Joe. He showed us how he has developed custom straps to strengthen the mainline, along with ductile steel main caps, and a complete low-end girdle, if need be. The engine we focused

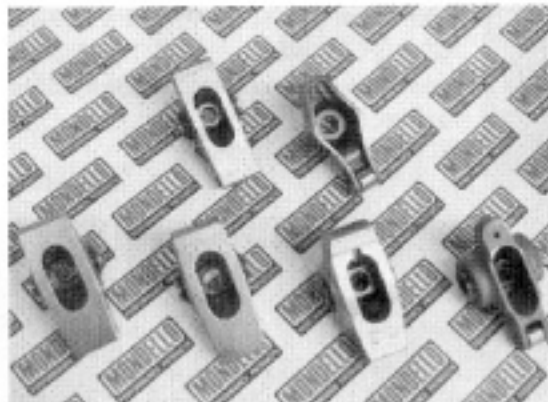
on was to be a stout street/strip piece, so the strapped main caps would be fine.

The crankshaft selection for the 403 offers three basic choices. The stock cast-iron crank is fine for street use, but Joe recommends a step up to either a nodular-iron crank from an Olds 350 (identified by a large "N" cast into the forward counterweight), or a forged steel piece from an early 330 Olds. The 330 engines were made from 1964-67, and are quite rare. Parts do exist, however and the cranks are out there. The only problem with running a forged 330 crank is that the flywheel bolt pattern is different than the later 350 and 403 cranks. Luckily, Mondello makes billet steel flexplates for this application, and flywheels for the gear rowers. Most of us would opt for the cast nodular 350 crank, and this is what our subject engine was equipped with.

The 6-inch connecting rods on the 403 were actually quite good to start with, especially in fully prepped form. Mondello's rod preparation procedure consists of shot



This 403 short block is all together and waiting for an oil pan. Things to note here include the windage tray, clearanced pump, and custom oil pickup. If you think oil control isn't a big deal in the Olds, you'd be wrong. What you can't see is the ported oil passages, restrictors, and improved drainback mods that Joe has found to be essential in keeping Rocket motors alive.



Many different rocker arm options are available to the 403 builder. As we discussed in the text, many different cylinder heads can be used, and this opens up the door on rockers too. Here are six different Olds rockers, and stock stamped pieces are yet another option for street engines. Different designs, manufacturers, and ratios account for the wide selection. Mondello stocks all of these parts, and can advise you which would work best for your application.



With our oil pan in place, Joe turned us on to this cool mini starter he recently began selling. Considering the fun any Olds owner has with header routing, we think one of these high-torque mini starters would be a good move. The small size makes working around the pipes easier, and it has more torque than the factory units.

peening, grinding, polishing, side notching, resizing, and outfitting these connecting rods with ARP bolts. The rods are then re-heat treated after these procedures are complete, and they are good for 7,500 rpm and 700 hp. For engines running at 5,500 rpm or less, this heat treating is not necessary. These numbers are excellent for a stock reworked piece from any factory engine. There are aftermarket rod choices available, but for our goals the Mondello-prepped stockers were more than adequate, and more budget-friendly, too.

Piston choices are nicely varied also, as stock replacement pistons are readily available from Badger, and will yield an 8.43:1 compression ratio with an 80cc combustion chamber. With this same 80cc chamber, Speed-Pro forgings are offered with an 8.08:1 ratio, and a Mondello/Arias silicon forged slug can also be had, producing a 9.5:1 squeeze. On Oldsmobile heads, 10cc is worth approximately one point of compression, so if your heads have a different chamber volume, you can do the math and figure out

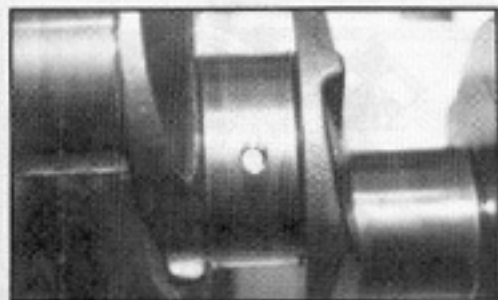
what you need.

There are many different cylinder heads out there for Olds engines, and all of them can be made to work on the 403. The new Edelbrock aluminum head offers the greatest promise, and with its enhanced breathing characteristics and large valves, is sure to be a hit with a slew of 403-urged Trans-Am owners. The big valves have lots of space inside the big-bored 403, and even the 455's largest-valved heads can feed the 403 without worry of valve interference. That big

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OLDS OILING ISSUES

As much as we love Oldsmobile engines, the factory oiling design was only adequate. We've talked about Olds oiling system improvements in the past with other Olds stories we've done, but we feel it is important to go over this critical point again.



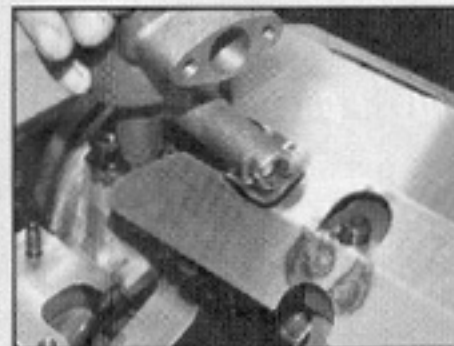
Crankshaft Details

Joe ensures that all of the oiling holes in the crank are clean, smooth, and burr-free. He details the edges of every hole for the smoothest possible transition and improved oil flow. After all those years porting heads, Joe is not scared to take the grinder to the cranks.



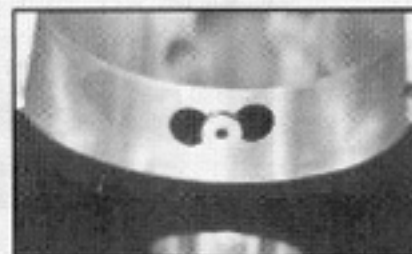
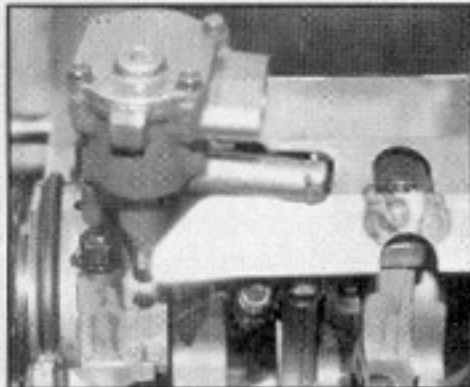
Blueprinted Pumps

Being the "heart" of the oiling system, the pump needs to be perfect. Joe recommends that oil pressure on high performance Oldsmobiles should be about 60 psi at 2,000 rpm. If you need more pressure out of your pump, a heavier oil pump bypass spring (PN PS-110) is available from Mondello. You can also shim the existing spring up to .080 in either direction to achieve the necessary oil pressure. The oil pump gears must be of equal length, and they should project .008-.009 out of the pump body. The oil pump body may require surface grinding to achieve this dimension. The oil pump cover gasket is .010-inch thick. Following these recommendations will result in adequate oil pressure for your Rocket. If you don't feel like dealing with all this, call Joe and get one of his pumps.



Windage Trays

Oldsmobile produced a bunch of windage trays for different engines. Joe recommends not taking any chances, and starting with a new piece (PN CT-850) that will require hand clearancing for the closest possible fit. Each windage tray installed at Mondellos is custom trimmed for each engine. This ensures the best possible efficiency.



Oil Restrictors

Mondello recommends restricting the passages to the top end in an effort to keep oil on the reciprocating assembly. He has a kit for this (PN R-105) that installs in the passages between the crank and the camshaft. The bearings will require elongation of the oiling hole for this modification, but it is not difficult.

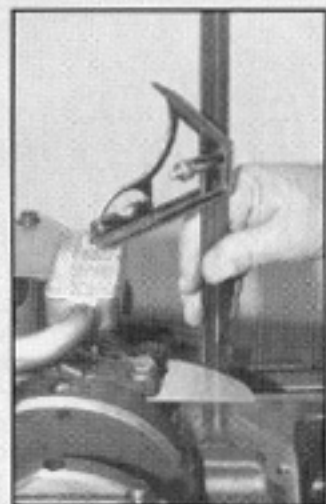


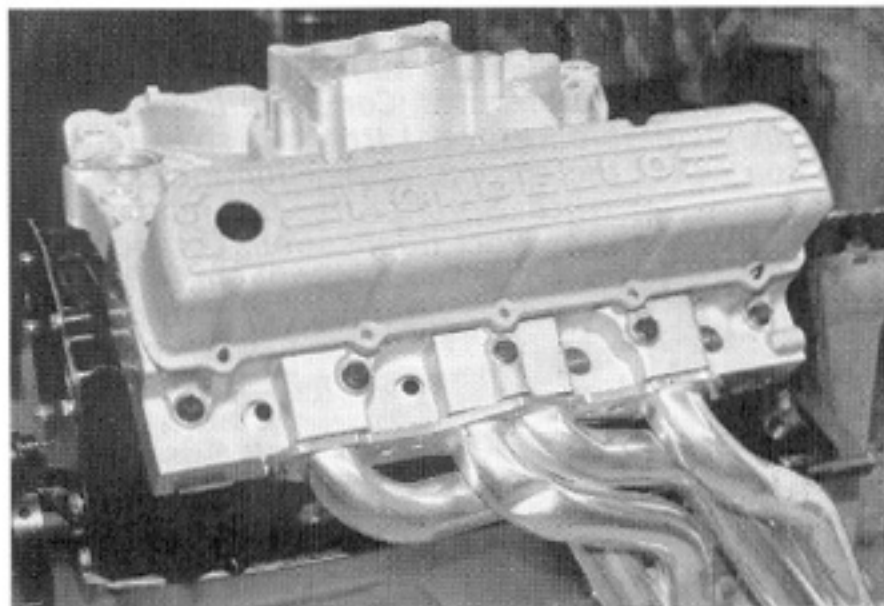
Oil Passage Porting

Like the cranks, the passages from the oil pump to the crankshaft can see major benefits from porting. Removing excess flash, easing the transitions, and smoothing out the corners allows the precious lubricant to flow freely.

Pan Fitment

Aftermarket pans and pickups are definitely the way to go, but they require some special massaging too. The clearance between the pickup and the pan should be between .250 and .500-inch. Measure this carefully, and don't forget to include the gasket thickness. If the oil pan doesn't want to bolt on, and you cannot see anything around the perimeter that would be holding it up, check the number 2 main cap studs. If these studs are not bottomed out in their holes, they will probably hit the pan. If you still have contact after bottoming the studs out, you can grind on the studs a bit to shorten them. If you've bottomed out and ground your studs, and still have a clearance issue, heat the pan above the number 2 main area, and tighten it down (without the pan gasket in place) while it's still hot. Then allow the pan to cool, install the pan gasket, and everything should be fine.





Head choices for the 403 range from the factory smog heads, to the decent 350 heads, to these killer Edelbrock aluminum castings. We think 403s weigh plenty already, and addition of these lightweight and efficient heads is the only way to fly.

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bore offers plenty of clearance, and there's much less shrouding of the valve.

There are some minor modifications necessary to bolt some heads on the 403 block. Small-block 350 heads will work, but the head bolt holes through the head must be enlarged to 17/32- or 9/16-inch for bolt clearance. This is not a difficult procedure, but it is necessary. The intake valves on the 350 head should also be enlarged to a 2-inch diameter (up from the factory 1.875-inch sizes) for better performance. Due to a different valve cover bolt arrangement, the 350 valve covers can be maintained. All of the 403's valvetrain pieces, including pushrods and rockers, are a direct bolt-on for the 350 heads. The earlier ('68-'72) 350 heads are the best choices for a performance-minded small-block head. They have casting numerals over the number 1 (or number 8) exhaust port that will be a 5, 6, or 7. The number 5 casting is the best design, with its 70cc combustion chamber and well-sized port runners. Minor port work on these number 5 castings can add an additional 50 hp, and make for a great set of street heads.

Intake choices are also plentiful, with Edelbrock's line of Olds parts addressing all but the most exotic buildups. The Performer RPM Olds 350R (PN 7111) would be our choice for reliable street and strip performance, with the Performer (PN 3711) coming in a close second for street use. Equipped with a reworked Quadrajet or appropriately sized Holley, Edelbrock, or Carter carb (around 750 cfm), power would be more than adequate. Several manufacturers are offering EFI conversions for Oldsmobiles now, and those seeking perfect fuel distribution would opt for one of these systems. Ignition choices range from the simple, reliable HEI system to complete high-energy setups from MSD and others.

Like all performance engines, camshaft choice would be directly relative to the vehicle's weight and designated purpose. Joe is more than willing to work directly with 403 owners to ensure they get the absolute most out of their engines, and will assist in cam selection.

The 403 Olds was conceived at a time when performance was a dirty word, and may have been considered a compromise when it was first produced. With hindsight being 20/20, we can now see the full potential for this engine design. Without a doubt, the 403 may now be remembered as the unsung hero of the Rocket family, with a little help from Joe Mondello.

PHR

SOURCE:

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