# Rebuilding My 750 Veloce Engine: Part 1

## My father warned me about engines like this: “It will eat your wallet and time; buy that used TR3.”

### *The revolutionary Alfa Romeo 750 Giulietta*

Alfa’s first venture into the small car segment was spectacular. That little engine’s inception is a great example of collateral engineering from an aero division. A derivative was quickly developed to produce almost twice the power originally envisioned because it breathed so easily at high revolutions. But weaknesses were found racing these little 750 Giuliettas. The transition to the 101 series around 1959 fixed those weaknesses, with more rigid castings, the use of better steel and more lubrication.

Improvements were made even before the 101. The first 750 heads had smaller bearing caps on the camshafts. Veloce blocks were made with much deeper main bearing caps and their considerably heavier cast oil sump not only cooled the oil, it also added much needed rigidity to the crank case. Giulietta guru Claus Menzel (RIP) told me that the factory carefully dressed rough forgings for standard connecting rods and then shot peened them for a ridiculously long time to create Veloce rods. Rather than do that again, all 101 rods were forged using better steel but for Veloces again they were well dressed to remove stress risers followed by a lot less shot peening. And 101 heads are known to stabilize the liners in 750 blocks. These heads weigh 33 vs. 27 lbs.

I have rebuilt an unusual variety of engines at two restoration shops during my early years at university, but never an Alfa Romeo. Semiretirement was the perfect time to start building engines again. A somewhat precious 0121-1600 was my first Alfa build, no worries about wishful engineering or parts issues. Claus harvested it with other mechanical components from a decomposed 1600 SS twenty years ago when he got Low Nose SS #0070. I bought the lot for my #06440 Sprint. A couple of years ago I wrote a blog about why that 1600, and my rebuilding process and testing. [www.enjoyclassiccars.com]

It takes practice to buy a good Giulietta. I bought two Sprints and kept the best one. However, many times I regretted buying my 750 Spider Veloce via a man who’s

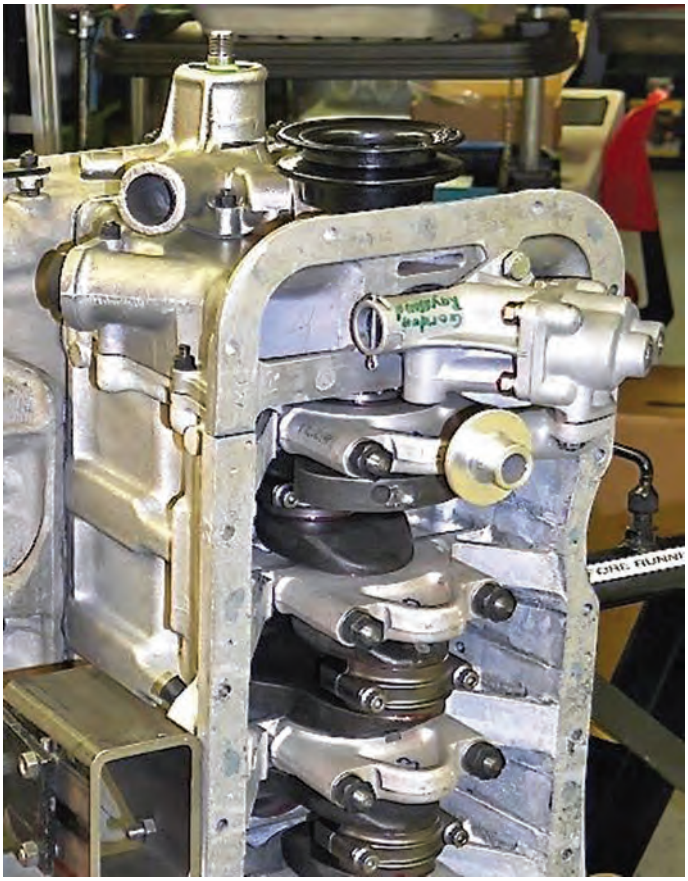
*My 750 Veloce running on the test stand. Photo Bill Gillham*

business with Alfas is similar to St. Peter. My first regret was probably in 1996 when Claus said: “That cylinder head is junk because oversize cam followers disappeared long ago and are unique.” That triggered a flashback to my puppy love for a Giulietta. Back then my father, with the same accent as Claus, said: “Aluminum and high revving means constant repairs, buy that TR3.”

Little did I know then. That head was not to be the major challenge. A 750 Veloce engine has more issues, deep down from under engineering or over achieving.

And Bill Gillham’s crew was equally challenged repairing the life-cycle history of increasing abuse inflicted on my #04396 Spider body. Best he could say was that she had all of her original panels and parts except for an older nose. She was raced like a greyhound, not loved, and no history was preserved except for stickers on the windscreen.

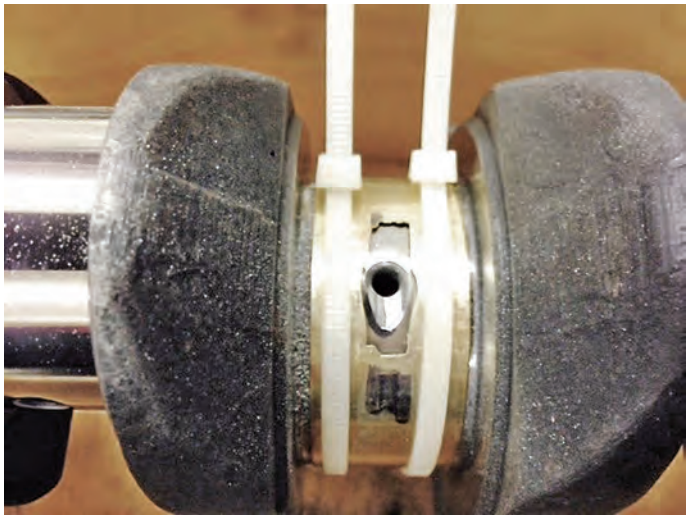
Like most Veloce engines, my # 31377 had a rough life. Two Veloce blocks from Claus' shed had holes behind the intake side motor mount, illustrating the 750’s achilles heels – oil flow to even numbered main bearings decreases as revolutions increase; connecting rods become dangerous after life near a Veloce’s redline; and the oil pump is simply too small.



*The 101 oil pump with pickup neck for Veloce sump – the square "O" ring (not shown) must fit well. Also visible are the big ends of the Carrillo rods*

### *Starting from the bottom of the engine*

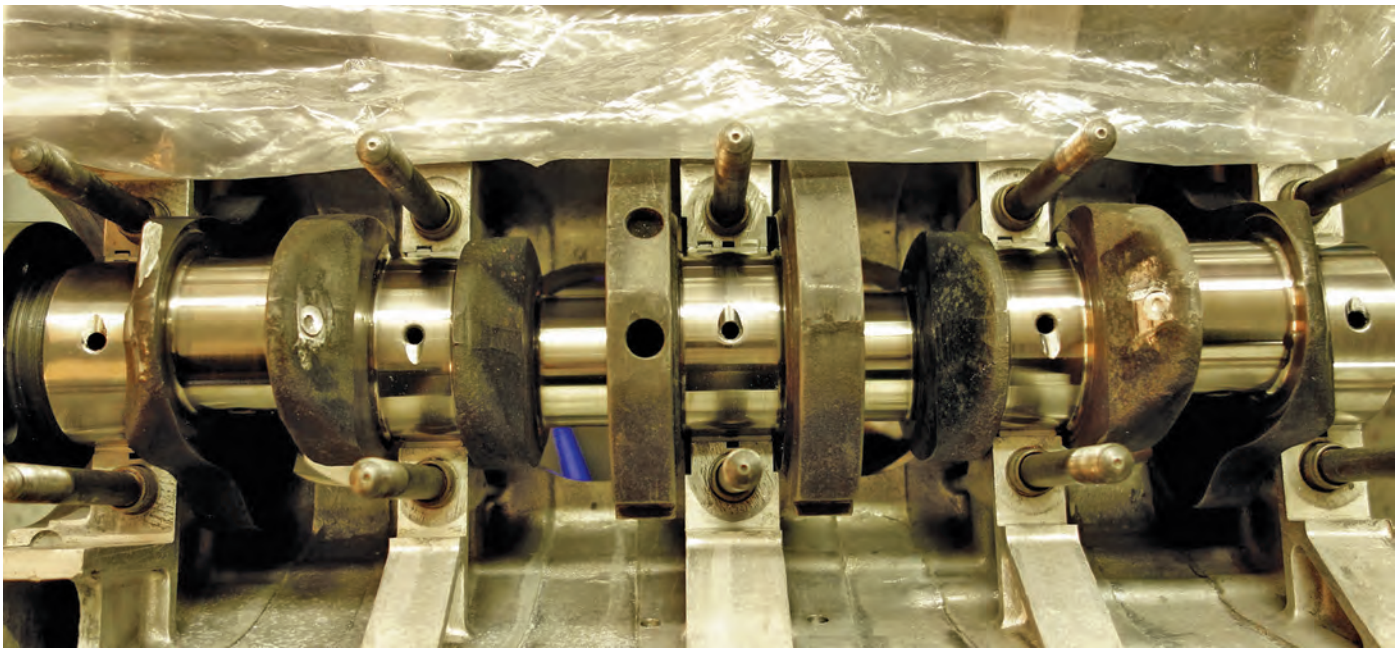
A good beginning for a 750 engine build is to fix its oiling issues. First, do what Alfa did for the 101 series – install that taller oil pump* for more volume (photo above). Some machining to gain room for it in the 750 Veloce's aluminum oil pan is required. Use photos of a 101 Veloce pan as a guide or buy the excellent reproduction



*A temporary shield protects the journal*

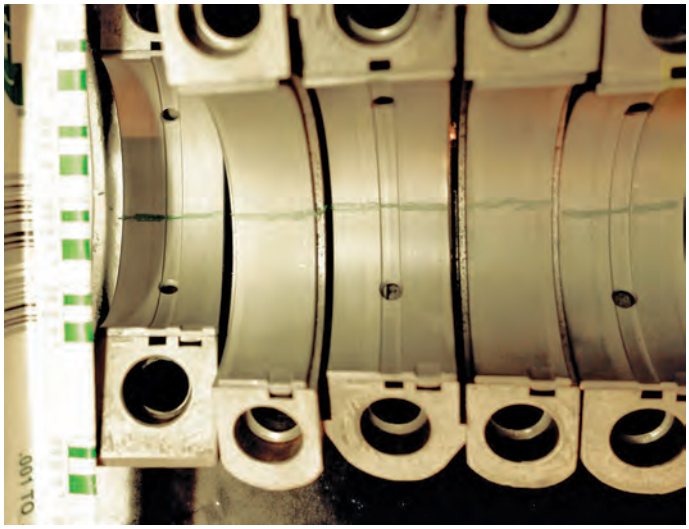
pan assembly developed by Classic Alfa. I didn't need another windage tray and sump trap. That lowered the cost by 30 percent. (I learned about 101 Alfa oil pump problems from Bill Gillham. Gordon Raymond, Alfa Romeo BB moderator, built my pumps. He could write a whole "Letta" about oil pump evolution, lessons learned, and blueprinting them for a specific applications and weight of oil.)

Instead of drilling additional oil supply holes into the block and cross drilling the crank, I chose this time to rely on the simple bench-top enhancement that racers like – "tear-drop" the oil holes for better flow (photos above and below). At least re-chamfer these holes aggressively if your crank is reground. The tear-drop shape has to aim toward rotation on the odd numbered mains to scoop up more oil from the grooved shells, and away from rotation on the other six. Increasing circulation removes a lot of heat.



*Note the change in direction of the "tear drops" and new tapered plugs installed*

Don't undersize your crankshaft just because it has some imperfections on the journals. If it can be polished and remain within the loose size of clearance specification, its good enough to prepare further. Make sure a previous re-grind hasn't compromised the radiuses at the margins of the journals. This can decrease its strength by more than one or two regrinds. Of course make sure it is straight. They can warp from improper storage. But most cranks can also be straightened with heavy blows transmitted by a special chisel while it is supported on soft V-blocks. Also make certain it shows not even a hint of a crack especially around mains #4 and 5. Of course, clean, clean, clean those oil passages after drilling out those aluminum plugs. There will be dirt in the blind ends that modern oil could dislodge.



*Main bearing shells with Plastigage gap reference*

I decided pounding in new tapered plugs as the factory did is good enough for a street engine. However, applying Loctite first made me feel I did more. The finishing touches for the crank are hardening followed by a light polish, then trial assembly with the timing gear, slinger and pulley and flywheel for balancing. I would not reuse the old flywheel bolts, nor connecting rod bolts. And always keep in mind, factory service manuals are written for cars still under warranty, not for ancient and abused parts.


*OEM 750 Veloce rod is in the foreground for comparison*

Main bearings for 750 engines are unique. I bought a set of "King" bearing shells to Plastigage (green soft "wire" to squeeze) my crank's clearances (photo top right) and to look for mis-alignment issues (the mains in my 1600 block needed to be align honed). Then I found NOS Vandervell bearings on eBay – a name I could trust. Claus claimed that Federal Mogul bearings are "hard" which means that the shells don't trap dirt readily, journals get scratched and harmonic vibrations are not dampened. There is no supply problem with rod bearings, as they are the same as for the 101-1300/1600.

Reed Cearley rebuilt both of my tunnel case transmissions because Bill Gillham convinced me that my Giulietta Veloce deserved preservation and it really doesn't need a fifth gear. I mention this because Reed also made a valuable contribution to my engine. He implored me to stop, back up, and buy new connecting rods. My Veloce rods were already magna-fluxed, re-bushed, blueprinted, balanced with new bolts and installed. But when he said Carrillo's "I" section rods don't require notching the cylinder skirts and cost less than the wider "H" section rods which made them famous, I was sold (photo left). Now I can relax when I let her sing.

By now the reader will be surprised that my only concern with this 750 engine was an unsalvageable cylinder head. In the next installment, I will describe how and why my 750B Sprint came to the rescue of my Spider's engine, and my work and the choices I made getting the best from where the power and music is made.

*Peter Pleitner*

*Photographs by the author except where noted*