Self Service

BY GORDON JENNINGS

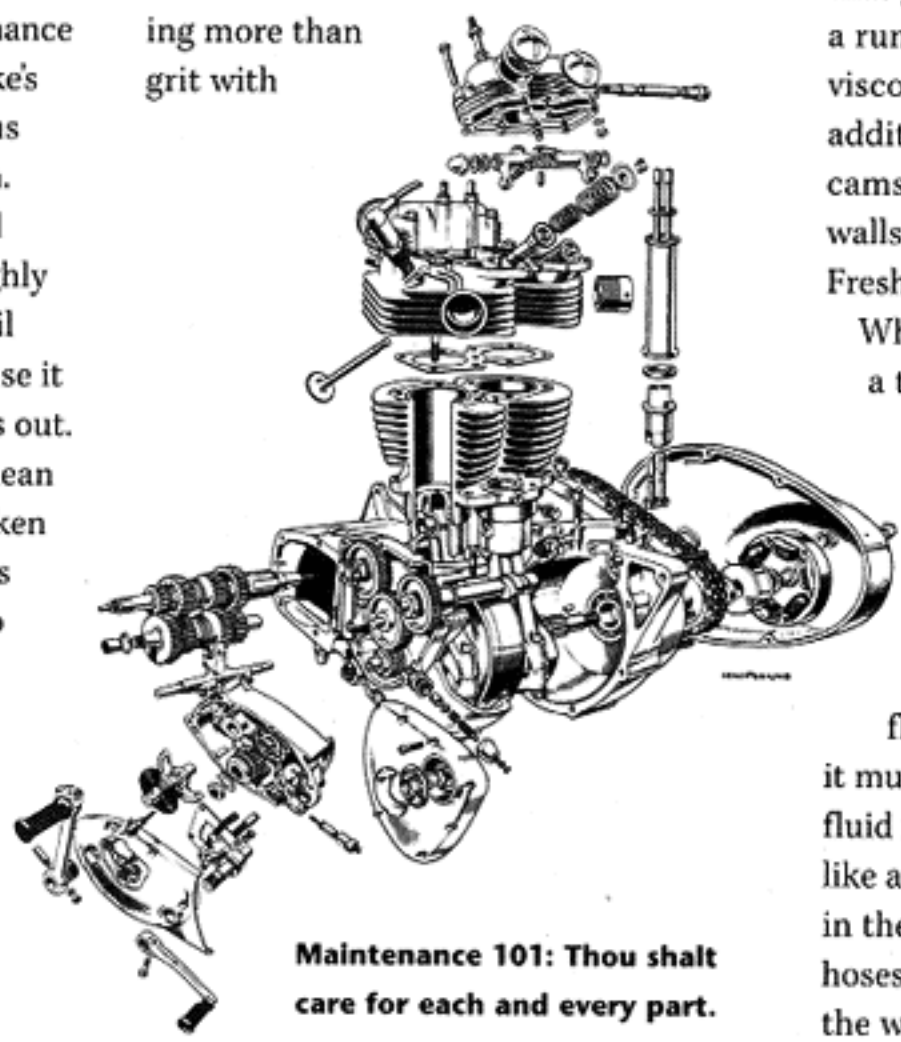
Motorcycle maintenance, especially when it involves a new one, often gets done in the fog of a mild anxiety attack. There's so much to know, so many dire service manual warnings to heed, so few assurances an owner has done enough, or done the job right. If the manual says to set valve clearances with the engine cold, what is cold enough? If it says to change oil when the engine is warm, how warm should it be? There are no universal answers for these and other maintenance questions, but knowing why your bike's manual tells you to perform various chores may help make sense of them.

Owner's manuals recommend oil changes at intervals that only roughly reflect the engine requirements. Oil must be periodically changed because it becomes contaminated and it wears out. When I say contaminated, I don't mean by all the carbon particles that blacken used motor oil. These are benign as long as they don't clump together to clog oilways, and the detergent/dispersant additives in good-quality motor oils keep that from happening. The contaminants that do damage are silica (silicon oxide) and acids.

Engines pump about 10,000 gallons of air for every gallon of fuel consumed, and take in with that air plenty of grit. A good pleated-paper air filter stops everything bigger than a micron in diameter, and the smaller stuff mostly just floats harmlessly around in the 0.001-inch minimum-thickness oil films separating moving parts. But there are places, and times, when submicron particles do get into the act. Each time you drain your bike's oil the fine grit leaves with it.

Oil filters are a second line of defense for any micron-plus grit that gets past the air cleaner, and they also trap oxidized oil clots and the flakes of metal that seem always to pop off gear teeth and other heavily loaded parts. You almost always find metallic particles in an engine's crankcase, meaning that the oil stayed thick enough to hold such detritus even when hot. So, if it's convenient (or fun) to go on a long ride before an oil change, do it. But if time pressures mean you can only run the engine a couple of minutes to stir up the oil before pulling the plug, do that. The only real difference is that cold oil takes longer to drain.

You'll be draining more than grit with that oil. You also get rid of acids formed in the combustion process, which have a severe corrosive effect when their vapors condense. These acids collect in mufflers until exhaust gases raise their temperature above the dew point of the acids. The same is true inside the engine, where the upper cylinder walls are exposed to acid etching during the early warm-up period. And it is the etching, far more than abrasion, that causes cylinder "wear."



Maintenance 101: Thou shalt care for each and every part.

Careful, concerned owners who take the time to warm up engines before riding away cause more acid damage. Impatient types who ride immediately away get a fast warm-up and the least acid damage to both engine and exhaust system. They'll get beat-up pistons if they redline a cold engine, but if they show some restraint until the engine is warm enough to run without help from the choke, no damage will occur.

Oil, whether the old-fashioned refined stuff or synthetic, does wear out. It is made up of long-chain molecules that get sheared into shorter chains in a running engine. This means oil loses viscosity with time in service; it uses up additives that prevent scuffing between cams and followers, rings and cylinder walls; all the other helpers are exhausted. Fresh oil is a fresh start.

When you're thinking oil change, have a thought for the oil in your motorcycle's fork. It, too, oxidizes, depletes its additives, and needs periodic replacement. Use a high-quality oil made specifically for fork duty.

Draining and replacing brake fluid is another piece of tedium, but it must be done, because DOT 4 brake fluid is hygroscopic, and attracts water like a red sportbike draws cops. Moisture in the air will go right through brake hoses and contaminate brake fluid. Once the water is in there it lowers brake fluid's boiling point and causes corrosion, neither of which is good.

One of the most important motorcycle maintenance points is the air filter, at least on newer models. The old metal-mesh air cleaners didn't do much beyond keeping low-flying birds out of the engine; they didn't need servicing. Keep an eye on pleated-paper filters, because if they become blocked the engine gets no air and delivers no power. Don't try to save money by washing and reusing paper filters. You can't get them clean, and if the pleats split your engine will be breathing unfiltered air.

Most of the free-flow accessory air

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filters—foam, fuzz or gauze, in one or multiple layers—lead air through a maze, and airborne grit gets stuck on the maze's oiled inner surfaces. Filters of this type are blockage-resistant and effective, but must be occasionally cleaned and re-oiled.

If you'd ever seen the inside of an engine that had breathed through a racy-looking intake trumpet/velocity stack you'd never allow your bike to ingest unfiltered air. Particles around 20 microns in size do terrible things to rings and cylinder walls. Most larger grit goes in the carburetor and out the exhaust pipe, doing no harm. Inevitably, though, some particles will be passing the valve seats when the valves drop closed, and the result will be dimpled metal and a big first step in the direction of burned valves.

Don't neglect valve clearances, or any other part of the valve gear. It is especially important to replace timing belts, as used by Ducati, at the recommended intervals. If the timing belt breaks, the carefully orchestrated dance of valves and pistons gets out of step, to the detriment of both. The same mechanical disaster occurs if a timing chain breaks, and that can happen if you fail to follow the chain-tensioner service procedures for engines (older ones, mostly) not blessed with automatic tensioners.

Valve clearance adjustments are more important than you may believe. We all know that if clearance is set too tight the valve may not completely seat. When the recommended settings are between 0.002- and 0.006-inch, the lower figure represents the manufacturer's worst-case estimate of cam lobe run-out. The wider clearance is the most slack that will still make use of the cam lobe's quieting ramp, a period of slow lift in which all the clearances between cam and valve are taken up before the serious valve-lifting begins. Any valve clearance within the recommended limits is plenty good enough.

Valves' openings and closings have a wearying effect on valve springs. You know how a coat hanger gets hot when you rapidly flex a short piece of it? The steels used in making valve springs are much fancier than coat hanger wire, but experience the same "hysteresis" (internal friction), with heating and fatigue. If you do your own wrench bending, always check the valve springs for free length and tension at coil-binding before you reinstall them after a valve job. Lengthy or hard service will make them sag enough to require replacing.

Chain maintenance in this time of sealed, O-ringed links has become largely a matter of protecting your bike's sprockets (if any) with spray-on lubricants and timely chain replacement. I like the spray lubes because they're a mix of grease and a volatile solvent. After they've been sprayed on the chain the solvent evaporates and leaves the grease in place.

Owner's manuals for chain-driven bikes generally give a specification for chain wear, which will translate into something around 1.5 percent. If your motorcycle has a chain with $^5/_8$-inch pitch, then 20 links should measure 12.5 inches from the center of the first pin to the center of the last. The wear limit is reached when the 20-link reach has become 12.69 inches. Don't ignore chain wear unless you want to buy new sprockets. Worn chain rides too high in the sprockets' teeth and bends their tips.

Keep an eye on your bike's battery: Motorcycles' voltage controls are not all they might be, and their batteries are small. It's a combination that tends to cook down the electrolyte, unless your bike has one of those "waterless" batteries that has a catalytic element in the top to recombine oxygen and hydrogen bubbling up from between the plates.

The greatest killer of batteries is winter storage. You garage your bike before Christmas (in Minnesota, before Halloween) and leave it there until April (in Minnesota, Memorial Day). In this period of inactivity the battery attacks itself, white lead sulfates fogging its plates, leaving it unable to deliver any useful power or to take a charge. You can sometimes revitalize a battery by pouring off its electrolyte, banging it to dislodge the sulfates, flushing them out with distilled water, and refilling the cells with fresh electrolyte. Or, you can leave the battery on a trickle charger/battery tender all winter, checking its electrolyte level every week or so. Do this, and your battery will last for years.

Drain all the fuel from your motorcycle, especially its carburetor float chambers, when you store it for winter. That gasoline will form all kinds of nasty varnishes if left stagnant for months. Here's the bottom line: Drain the fuel now, or risk having to rebuild your carburetors in the spring. And be sure you have enough antifreeze in the radiator (if any) when you park your bike in an unheated garage.

Your bike's manual will give you the basics about what kind of spark plug it needs. Stick to the recommended heat range, even though you fancy yourself such a red-hot rider you need colder plugs. You can help the sparking process by switching to those fancy plugs with precious-metal center electrodes. If you use that kind of plug, you can open the gap slightly and compensate in some part for the typical motorcycle's limp ignition system. If your motorcycle's recommended plug gap is less than 0.035-inch it needs this help.

Be careful installing plugs, especially if they have 10mm or 12mm thread diameters, as these cross-thread more easily. If you can't screw in a plug with your fingers, chances are you have it cross-threaded. Run a new plug down finger-tight until it clamps the plug washer, then give it $^1/_4$- to $^3/_8$-turn with a plug wrench. If you're reinstalling a plug, tighten it an eighth-turn. Remember, plugs don't hold the cylinder head in place and don't have to be tightened as if they do. Tightening plugs until the threads creak invites thread stripping.

Whatever else you do, never subject your motorcycle to a hosing at one of those do-it-yourself car washes. The blast of hot, soapy water won't just lift bugs and road grime, it'll force its way past seals and into swingarm bushings and wheel- and steering-stem bearings. Do the cleanup by hand, and tell your motorcycle how much you appreciate its exertions on your behalf. Who knows—perhaps a kind word will help. MC

I invite readers' comments, suggestions and even criticisms. My e-mail address is gj@wheelbase.com; call me at (805) 239-2192, 9:00 to 5:00 PDT, or fax (805) 239-0855.