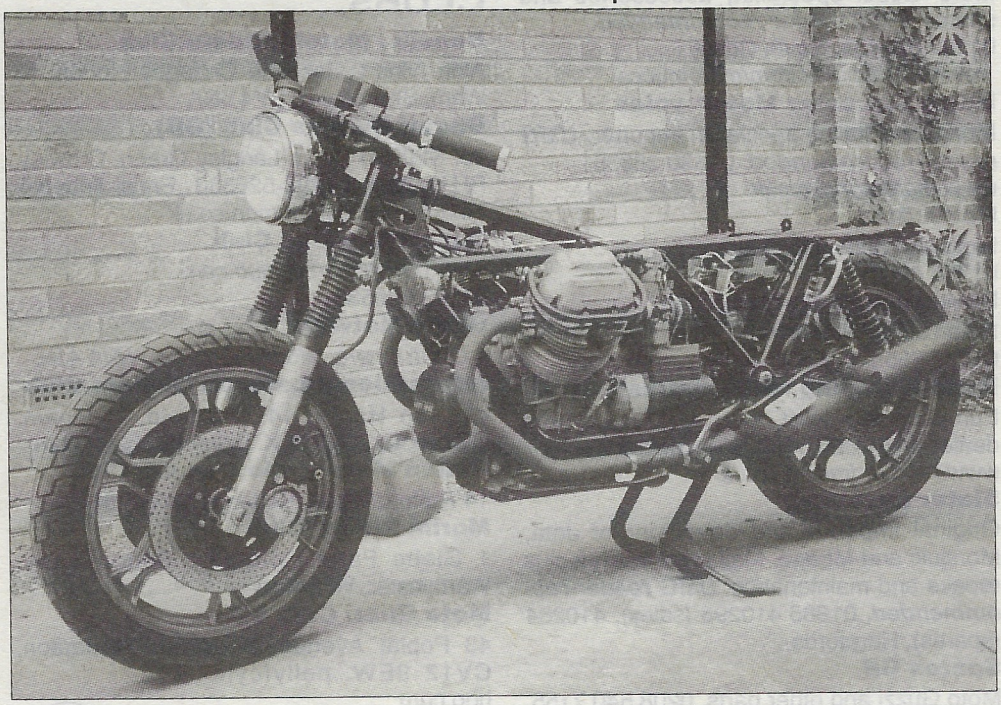
Moto Guzzi Hints & Tips

Mike Holmes Gives Expert Advice



Winter is upon us again and traditionally it's this time of year when you take the bike off the road and sort out all those little jobs that need doing (it helps to have a warm garage!). This a compilation of hints and tips and things to watch out for pertaining to Moto Guzzi 850/1000cc twins, all those sharing the same frame and other common parts from 1976 onward. Some of these I discovered for myself or were told or read about, eventually producing a comprehensive list that includes sensible modifications and the normal maintenance items.

ENGINE MODS

Replace cam chain and sprockets with straight-toothed (in preference to helix) crank to camshaft and oil pump gear train.

Add a sump extension but still using oil capacity of three litres total. Extension increases crankcase capacity only to keep surface of oil out of reach of crankshaft, as the shearing forces to the crank can be considerable on impact -- not to make room for more oil! So after fitting, the 'min' mark on the dipstick becomes the 'max' mark.

DO NOT try to make your Guzzi go faster by trying to get more power out of it via tune-up conversions (although port polishing is a valid route). This will kill it. As a case in point, I am currently required to replace my cam followers which have worn out. This is largely a result of having extra-strong, racing-type valve springs (nothing to do with me), so replacing the followers

alone is not sufficient if further premature replacements of same are to be avoided. If you want it to go faster, the trick is to dump every extraneous scrap of non-essential protuberances sticking out in the breeze, like mirrors and indicators, and lie down on the tank.

The front engine mounting bolt is apt to lock solid with corrosion due to all the spray chucked onto it by the front tyre. At yearly intervals make sure you can loosen this bolt; soak with anti-seize solvent, then lubricate with engine oil before retightening.

ENGINE LUBE

Always use a good quality SAE 10/40W, not 20/50W which is really too thick. When I first had my Spada, I eventually learned (after seizing it twice on 20/50!) that our nearest equivalent was Castrol Grand Prix.

The oil should have additives such as detergents to keep sludge in suspension. (Moto Guzzis are martyrs to sludge.) Without this you will always be cleaning it out of the bottom end on every oil change, or resorting to flushing oil (as was the case with the Castrol). Normal recommendations include Bel-Ray, although my personal favourite is Silkolene Super 4-stroke oil (for 'high-performance' motorcycles). It also includes an anti-corrosion agent. The better the quality, the longer it can stay in, as much as 2000 miles between changes.

Never reuse old drain plug washers, but fit new ones. They're aluminium and make a seal by being crushed on tightening, and aluminium won't do it twice, so it'll leak. The same rule applies to rocker oil feed banjo washers, plus never use copper ones here, they'll just keep leaking (because copper expands more, I think).

It is not necessary to religiously change gearbox oil every six months if it hasn't done the mileage. If it still looks healthy just check the levels (it's all that's done for a car).

BRAKES

If you have the old style, plain steel caliper pistons, replace them all with the later teflon coated alloy ones. The bare steel ones always rust and then won't slide properly in the cylinders, becoming misaligned. This causes the pads to wear unevenly, becoming wedge-shaped, resulting in serious loss of efficiency and rapid wear. Since I changed my pistons, pads now seem to last an extraordinarily long time! Use copper sealing washers at all brake unions, not aluminium which corrode and leak. Consider getting a second hydraulic brake switch added to front master cylinder. Stainless steel braided hoses are worth having.

If the cap of your rear master cylinder incorporates a fluid level switch, scrap it and get a plain cap plus rubber seal. The switch type cap opens the reservoir to air and moisture, and brake fluid is hydroscopic (so it absorbs water, whereupon it is contaminated). Apart from which the float uses up valuable space better filled with more fluid.

An ancient document, its posterity having been assured in the form of various photocopies and containing many wisdoms, called the *Oxford MC Seminar Paper*, correctly mentions Spada rear calipers being oversize, but the authors did not know why. The actual reason (I discovered first hand) is because Spadas include a pressure control valve in-line to the rear caliper; this item replaces and otherwise functions like the usual plain junction block behind the rear frame tube. Distribution of hydraulic pressure is initially equal in the front/rear linked pedal operated system, but the larger rear pads strive to bring the balance of braking forces nearer to 50% front, 50% rear.

NEVER try to make your Moto Guzzi go faster by getting more power with tune-up conversions. These will kill it. Instead, dump every extraneous scrap of protruberance which sticks out in the breeze!

As more pressure is applied, however, the valve closes, diverting fluid forwards for something approaching the more usual separation of 70% front, 30% rear. These valves can be very troublesome when they go wrong. Normally the rubbery seal thingy for the valve becomes distorted with age and won't close properly. It might be cheaper to replace with a plain junction and use long-life pads for less friction. Or replace the caliper altogether...

CARBS

The following applies to all models using the Dell Orto VHB 30C square-slide type (more correctly it's

a flat gate slide type with a second, higher gate upstream so it only looks square).

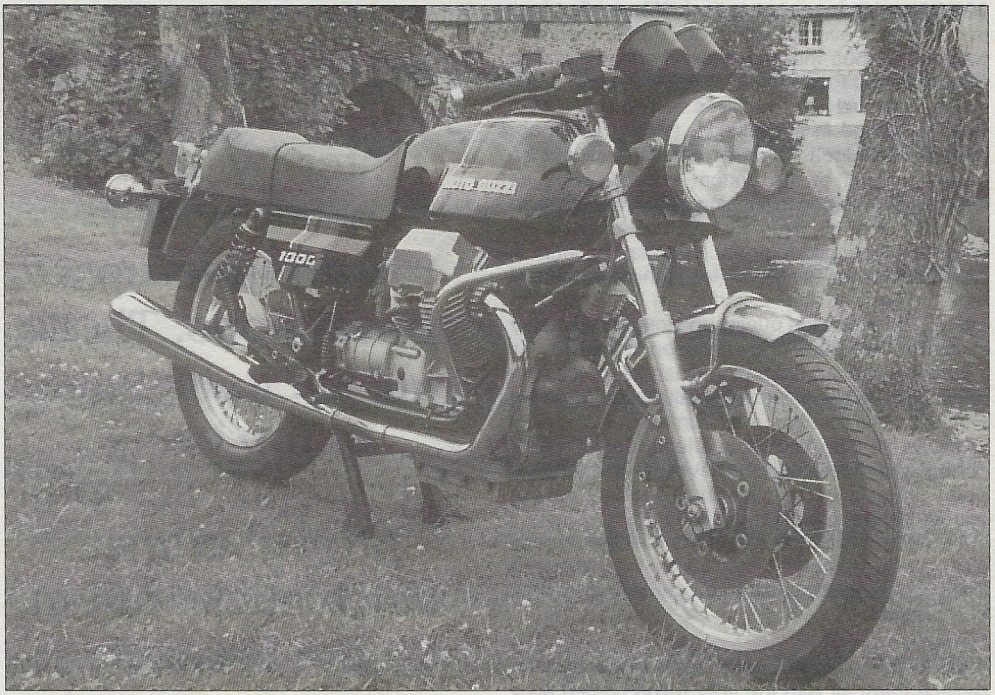
If having no luck trying to balance carburettors to cure what seems to be an out of sync roughness (all other things being equal), try examining the needles. I had this with my Spada but it was much later (after buying new carburettors) that I discovered this upon examining the original needles! The actual vertical positions of these needles tend to vary a lot from one to another, mainly because the needle clip slots in the slides are not consistently equal. Each slide and needle combination should ideally match the other to within 0.5mm (as measured from bottom of slide to tip of needle). Note that one correspondent has successfully added thin washer(s) above or below the needle clip(s) to achieve the required alignment.

Getting tired of that silly little choke switch thingy down below the left hand carburettor on older models? Snaps to the 'off' position as soon as you let go of it, so that the engine immediately gags on neat air and stalls? Wish you had variable choke control for warming up on the move? Invest in an aftermarket handlebar lever (eg Doherty) and equivalent DIY cable kit. This is how you do it:

Modify existing 2-into-1 cable adaptor by sawing through brass pin below lever; discard pin and lever but retain coil spring. Cut new cable outer to approximately 2 – 2.5 x length of original existing choke cables. Rebuild 2-into-1 adaptor with new cable end replacing old pin's position in brass slide. Make sure coil spring is replaced on cable inner under screw-on cap.

At the other end, deduce free length of inner which will keep adaptor spring slightly under compression when fitted to new handlebar lever control in the fully off position. Solder spare nipple onto inner here (needs a competent soldering iron!), trim inner and fit to control. Locate new control beside clutch lever clamp on handlebar.

Realign all cables for minimum bends and tie



2-into-1 adaptor to left hand frame rail adjacent to brake pipe union under tank with a plastic cable tie. Finally, adjust cable adjusters at carburettors for free play of 3 -- 4mm in each cable between 2-into-1 adaptor and choke plunger tops in carburettors while handlebar lever is in the fully off position.

Boy, does it make life easier! The lever also allows you to open the chokes fully as well as have lower settings. To use, start on full choke (cold engine) and drive immediately; gradually slacken off when engine warm enough to pull properly.

AIR FILTER

The original old-style T3, etc, tapered paper air filters and housing basically don't work very well. If you examine a used one you should find that only

the front two inches is actually dirty because suction causes the pleats to close up in the centre. One recommendation is to insert a coil of stiff wire inside the element to support the folds.

Better is to invest in a K&N conversion kit which includes the alternative crankcase breather collector box for the Le Mans (you will also have to swap around your rocker covers). The filters are easier to remove and replace, being washable and reusable. The corrugated element comprises a layer of cotton sandwiched between two wire meshes; prior to use the cotton should be impregnated with the special oil also from K&N. Apparently these were developed for US grass track racing, so they have a 'large capacity for dirt' so shouldn't need cleaning often. Note that you will also need to increase main jet sizes by at least five if not 10, e.g. from 120 to 128 – 130 for 850 models using VHB 30C.

CABLES & PIPES

Get throttle cables to cross over top frame tube under tank and exit forwards outside of right hand frame down tube from steering head, just below nose of tank. This makes for gentler curves and easier operation. If right hand still aches then *do* treat yourself to the lighter throttle slide return springs! Many owners are afraid the slides will stick if they do this – it shouldn't happen if the cables are in good condition and oiled properly and the slides given a smear of grease.

Consider increasing length of crankcase breather outlet hose to run around edge of rear mudguard and point to ground just behind rear number plate. This prevents excess oil smothering the underside of the gearbox. Furthermore plastic cable ties can be used at all hose junctions, which also help prevent the ends splitting.

BEWARE!

Every 20–25,000 miles: normally the universal joint (drive shaft UJ assembly) is on the way out. Any vibration felt through the right foot rest means it's terminal and may actually break. Changing it is actually very easy (but expensive!) as a Guzzi swing arm is one of the easiest to remove and replace on any motorcycle. Also replace support bearing, gaiter and all clips.

At least two owners have found that UJ life expectancy can be *quadrupled* to 90-100,000 miles by soaking the assembly in engine oil once a year, definitely worth investigating! Furthermore the needle roller bearings can be rebuilt with equivalent parts for a DAF lorry steering linkage. I can't confirm that but it would certainly be preferable to recondition the unit than buy a whole new one.

If the support bearing is tight in the swing arm, drive it out using a socket slightly larger than the inner diameter of the race, and inserted down the drive shaft tunnel on the end of an extension bar.

Don't forget to check the splined coupling sleeve that joins the drive shaft proper to drive box pinion. This sleeve can be softer metal so it's cheaper to replace. Also the driveshaft circlips (3) must be tight, else they might drop off.

Every 35–40,000 miles: valve rocker pivot pins have unobtrusively worn out. The pins are only case hardened, meaning that as soon as the surface is gone they'll go downhill quickly. Rocker bushes should be changed at the same time.

As a temporary measure, undo the lock bolts and rotate pins 180-degrees to provide an alternative load bearing surface with some harder metal left on it – assuming this wasn't done before! Also replace the end float control springs and copper washers.

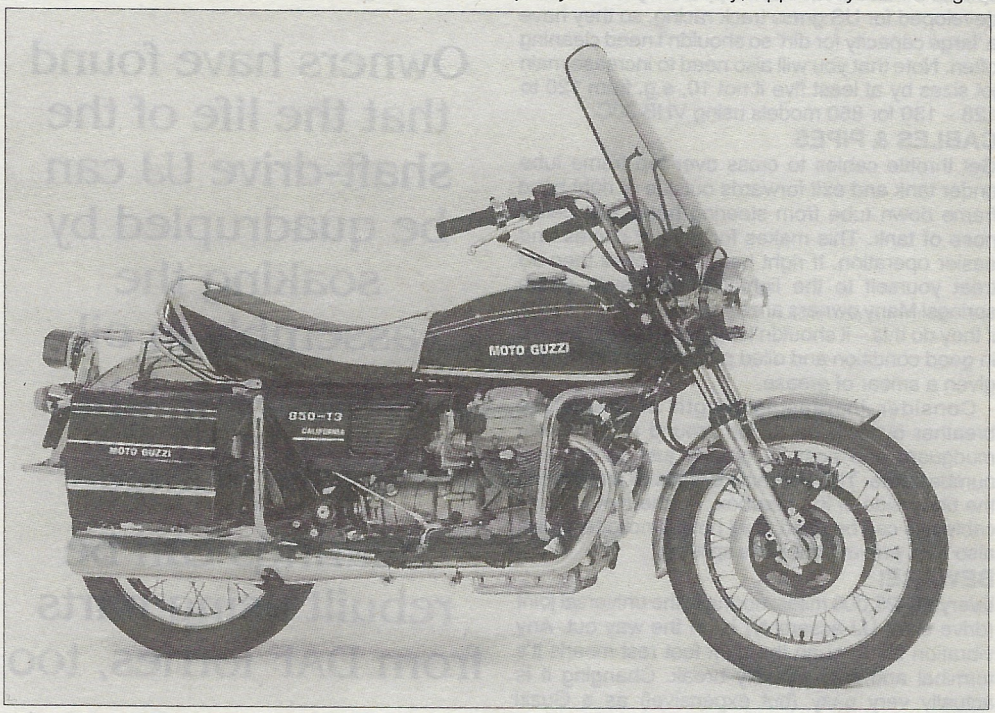
Owners have found that the life of the shaft-drive UJ can be quadrupled by soaking the assembly in oil each year. And apparently the needle roller bearings can be rebuilt using parts from DAF lorries, too

In a similar vein, don't forget that the cam followers are also case hardened and may be worn in the same way, although the actual cams are usually OK. The followers are designed to rotate to spread the wear evenly so watch out for any that don't, as they may have become discoloured and lost their temper due to overheating. (Unfortunately complete removal of the followers usually requires removing the barrel.)

Also: final drive box inner (larger) oil seal may be worn out. You'll know if it is because the rear wheel will be smothered in oil. This seal can be replaced from the outside without dismantling the casing. If this still doesn't cure the leak it may be because the

part of the hollow output shaft under the seal is scored and not smooth, but more likely the outer (small) oil seal has failed. More complicated to replace, but not impossible (see my website www.mc-h.demon.co.uk/finaldrive.htmi).

The camchain does not have an adjuster. Well it does, only it doesn't adjust by itself. Hence the chain eventually tries to chain-saw its way out the side of the timing case. Plus valve timing gets extremely sloppy. Only recourse is to replace it, which requires special tools to get the sprockets off and assuming you can get the cover off (see about front engine mounting bolt above). I'm fortunate in that my current bike's previous owner put on timing gears (smug)...



SPECIAL TOOLS

The usual special tools, which may be borrowed or hired from an owner's club, consist of the following:

Alternator rotor extractor rod – the rotor securing bolt includes the means for removing it. With the bike in gear and a second person standing on the brake pedal, undo the bolt, insert the rod, replace bolt and retighten. The rotor then pops off (be ready to catch it!).

Camshaft locking tool – after removing the timing cover, it anchors the camshaft sprocket to crankcase to allow nuts to be undone.

26mm ring spanner for camshaft nut. A normal socket won't fit thanks to the tacho drive extension.

Crankshaft nut socket – the nut has no flats and requires a special peg spanner. The special socket clears the rotor shaft extension.

Universal 2-legged puller -- use to remove sprockets. These need to be done altogether, and you must mark them to indicate the correct relative positions for reassembly!

UNLEADED FUEL

Although the basic 850/1000 should only burn leaded petrol, I have been assured by several owners that you can run an old Guzzi on lead-free pretty much indefinitely, apparently something to do with valves and seats having hitherto hardened themselves with use. Whatever, the consensus is to see if there are any signs of wear before worrying about it! However, ignition timing must be retarded two-degrees to be fully compatible.

TYRES

Compatible tyres include for the front: Pirelli Strada (MT 69E), Michelin (M 45), Metzeler (Rille), Avon Roadrunner, Avon AM20. For the rear: Pirelli Strada (MT 79E). Michelin (M 45), Metzeler (Block C7), Avon Roadrunner, Avon M21.

The originally specified Pirelli Phantom is now obsolete. My personal experience is that the newer Strada tyres are superior to the OE Phantoms even – there's better traction in bends, so you don't get

that vague sensation any more if you have to throttle off in a corner, normally a must-never!

The *Oxford Paper* mentions that the then-new 'Dunlop TT100s look promising though some early reports hint at weaving if used in pairs on Spadas'. I can confirm that this was indeed the case! Much too hairy all round; Avon Roadrunners were better, but still exhibited over-steer. The *Oxford Paper* suggests a Continental ribbed front and a Roadrunner rear. It warns not to have too large a cross section on the front, of whatever type. The Mole Valley Guzzisti particularly recommend the Avon M20/M21 set which seem to combine best grip with long life, normally an unusual combination.

IGNITION

When doing static timing there's little to beat the old 'fag paper between the points' technique. Alternatively you can use an ohmmeter, but you may find that you need to disconnect the coils to get a firm reading. It is usual to have to cheat the gap setting on the individually movable (left hand cylinder) set to get it opening accurately.

The mechanical advance mechanism can get worn and sloppy if very old or not looked after properly, so oil it sometimes! For hopeless cases, the magnetic reluctor type Lucas RITA electronic ignition, by Mistral Engineering, can be fitted which of course negates all further timing maintenance entirely, and is likely a lot cheaper that getting another timing unit.

One interesting detail about the RITA system is that, unlike most of the others (even the magnetic types), the entire mechanical advance mechanism is replaced with just the rotor, or 'reluctor', on the remaining shaft, so this is the *only* moving part. How the advance then works is a bit difficult to describe; basically it exploits the principle that changes in the magnetic field of the pick-up unit are increasingly stronger at higher speeds. The amplifier is then tripped earlier the faster it spins.

The advance curve seems to be less aggressive, which serves to improve low end to midrange pulling power; the normal (mechanical) advance is steep-ish to 3000rpm, then shallower to 6000rpm. Be aware though that the coils are replaced with two 6-Volt types that are fired simultaneously. This generates a wasted spark halfway through the right cylinder's induction stroke, but normally this shouldn't be a problem.

Electronic ignition requires good quality plugs. Use (Japanese) NGK plugs and caps, especially the caps! These have rubber seals not only for the HT lead, but also the plug's porcelain insulator to keep water out. (Bosch plugs used to be good, not recommended for electronic ignition).

SPEEDO/TACHO CABLES

These are often breaking – sometimes when a new model is being reviewed by a magazine journalist! I used to break one speedo cable and two tacho cables per year on average. The cause is not that obvious – it's actually due to rust because of water getting into the sleeves at their lower ends. This is what you do to fix it:

Remove each inner from the top (instrument) end of its sleeve. Clean and regrease as normal (as part of routine maintenance – if rusted then replace). Next, inject 2–3 squirts of engine oil down empty sleeve using a pump action oiling can, then refit cable inner, reattach to instrument.

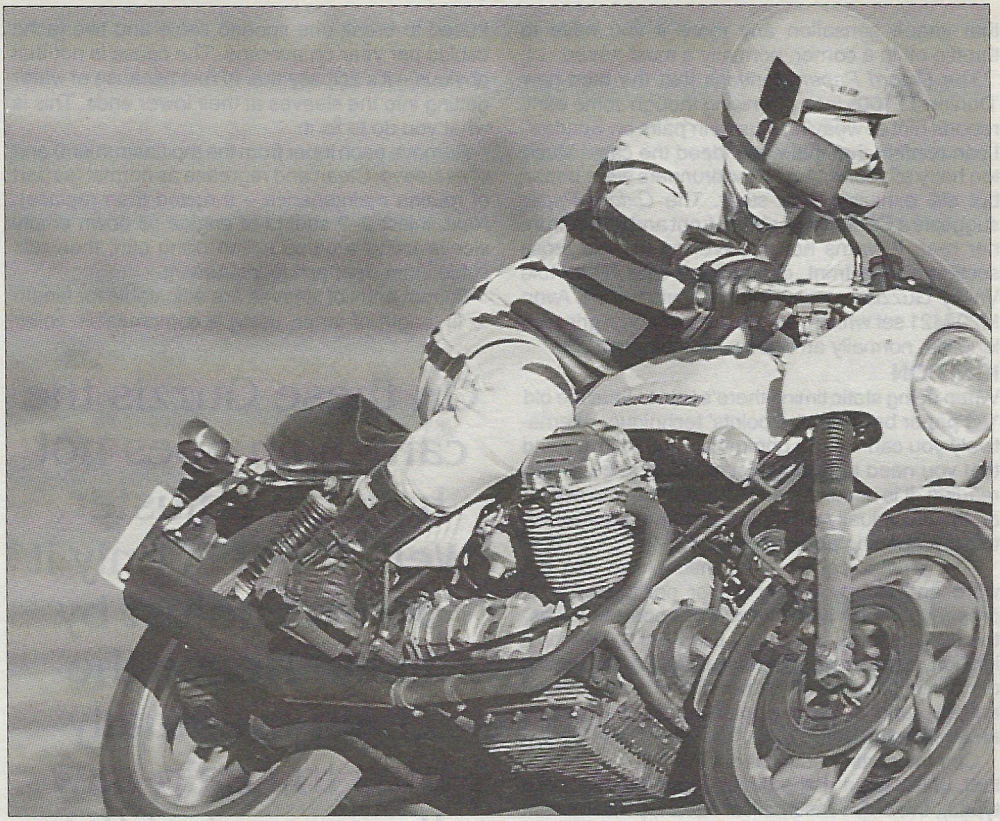
Bottom ends of sleeves are adjustable for length to fit length of inner, using a compressible collar and knurled screw down cap. This cap has (or should have) a tapered sleeve intended to keep weather out, only it doesn't. So wrap insulation tape around tapered sleeve and main cable sleeve to seal gap, and bind in place with a plastic cable tie to stop it unwinding. No more broken cables!

On these Guzzis the camchain does not have an adjuster. Well, it does, only it doesn't adjust by itself. Hence the chain eventually tries to chain-saw its way out of the timing case. My bike has timing gears fitted...(smug)

FORKS

Fork gaiters aren't necessarily pretty, but they keep the weather off the stanchions and road grit out of the seals.

To refill fork oil you need to remove the large top cap on each fork stanchion. If you can't get an allen key big enough, find a long bolt with an equivalent size hexagon head, and get your friendly local person with oxyacetylene equipment to put a right-



angled bend in the shank. Use tool to undo cap after removing central damper bolt. If it's stiff, apply torsion with aid of long tube slid over tool and strike down vertically onto bend above head with hammer. The *Oxford Paper* mentions that many front-end handling problems can be due to unequal or worn fork dampers. The paper recommends heavy duty ones or at least a matched pair.

Spadas, having the fork mounted upper fairing, *must* have a steering damper. Le Mans I/II's may get away without one (well, mine can), if the steering is a bit on the light side.

ELECTRICAL ISSUES

Contrary to popular myth, Moto Guzzi electrics are actually very reliable. This is because the most vital bits, such as starter motor, generator, rectifier, regulator, etc, are all made by Bosch, same as BMW's use. Ignition is Italian (Magneti Marelli); the bolted-on timing body thingy is actually a car distributor and the points are off a Fiat.

Given that they only work one quarter as hard as for a car engine, each having only one cylinder to cater for (there are two separate ignition circuits), the points can last absolutely years. The dodgy bits are the peripheral switches and lights and things, because the build quality of the primary bits means there's no money left over to buy decent ancillary bits. It wouldn't be Italian otherwise.

Early Guzzi handlebar switches tend to be strange and tacky and made of plastic. Especially those of the LM Mk1 where distances between left/right and off positions of indicator switch seemingly measured in angstroms.) Consider getting better alloy-bodied Japanese ones from a scrapped CB400 or something.

Do Guzzis still hold the record for having the hugest battery on any motorbike? A direct replacement (usually much cheaper) is the type 037 (38A/h) car battery (as per mid 70's British Leyland Morris Marina, etc). If in doubt show the man what the old one looks like. These may be got really cheap from certain car spares vendors; my last one cost 20 quid in 1995...

If the red charge light stays on a long time after starting it's because the brushes have gone wonky or have stuck in their holders, even if they're not badly worn down otherwise and look OK on merely whipping the cover off for a visual inspection. Only

recourse is to get new ones (but you might be able to remove rough spots if they're just sticky). You need a beefy soldering iron if replacing to remove and reconnect the wires.

Alternator brush springs are exactly the same as the starter motor brush springs. Worth knowing if you lose one in the grass sometime (like I did!) and need to get a spare.

It's worth bearing in mind that there are three main enemies for anything electrical or electronic: 1) Oxygen combines with nearly all metals to form an oxide layer. All such oxides so formed are electrical insulators. 2) Water is an electrical conductor. Causes switches and relays to be 'on' when they should be 'off' if it gets inside them in any great quantity. Also causes tracking between HT leads and ground, and between battery and rectifier terminals (and I don't want a long discussion about how it's actually minerals or impurities or whatever in the water that actually make it conductive). 3) Oil is an electrical insulator. Causes loose connectors to become open circuit if it gets between them. However oil is an invaluable aid to keeping water out of electricals, providing all contacts and connections are clean and tight. Thus WD40 becomes an indispensable tool.

Never just twist two wires together and wrap in insulation tape. It always causes trouble later. Use a crimped join, a Scotchlok or even a screw terminal block. Such nylon-bodied screw terminal strips (for household DIY) are handy spares to carry.

HORN!

If replacing your bike's horn with louder, dual 2-tone ones, you can't simply connect these where the old one used to be. People who do this usually end up having their horn button contacts spot welded together because such horns typically draw in excess of 10A. You need to provide a separate supply for the horns directly from the battery, with its own fuse (15--16A), and have the horn button operate a relay. In the bike circuit the relay's coil takes the place of the original horn.

The same technique should be applied to alternative higher powered headlights -- existing wiring, switches and connectors can't handle the increased current, and consequently there is no greatly discernible increase in light output using original wiring and switches.

GENERAL

The home mechanic's golden rule: if there's nothing wrong with it, leave it alone!

On the subject of ergonomics, you may find dog-leg style handlebar levers are easier to use than the standard shape, even for the clutch (normal levers need hands the size of dinner plates!). The usual argument against a dog-leg lever for the clutch is that of possibly restricted travel so it's difficult to fully disengage, but since it's invariably impossible to get a stationary Guzzi in neutral while the engine's running anyway this is largely academic...

A stainless steel exhaust system is highly desirable and if for an 850 T3 or similar layout you might still get a very good deal from Armour Motor Products at Bournemouth, 01202 519409.

When you drop a Guzzi on its ear 'ole it usually manages to smash the spark plug and cap on that side. A pair of rocker protection bars also keep rocker covers and cylinder fins away from the concrete and are much less expensive to replace.

PROP STANDS

The short prop stand as fitted to Le Mans, Spada and similar early models produces a radical angle of lean (especially on Le Mans 1!), and is so far forward that if you have a substantial amount of luggage on the back it becomes unsafe. For some time I was carrying a small block of wood around everywhere to put underneath to compensate when I parked (or find an uphill gradient going in the right direction), which was a real drag.

Everybody wants the long version as used on the G5 and California models so consequently second-hand ones are very hard to obtain and in any case you also need to change the bottom frame rail as it has a different fitting. Buying new is prohibitively expensive (I'm always amazed how much a relatively simple piece of steel costs; I don't care if it was reshaped in a factory), so I resorted to the following modification for my own original stand.

The length was increased by cutting through the leg approximately where frame stop is located, for the insertion of a piece of steel tube (welded). This extended the stand by 19–23mm. Finally, train the prop stand to stay down when fully extended by not oiling the pivot. Simple, really...

INDISPENSABLE GOODIES

Cable ties for securing hoses and tying anything to anything else. Spiral-wrap for sleeving HT leads and brake hoses to prevent chafing. WD40; the magic stuff. Nuff said! Aerosol switch cleaner/degreaser: electrical cleaning agent. Aerosol engine cleaner, the water soluble kind that washes off.

FURTHER INFO

See the following web pages:
My site with many Guzzi pages:
www.mc-h.demon.co.uk.
Mole Valley Guzzisti:
http://website.lineone.net/~mole_valley-guzzisti/index.htm.
For older 750cc models:
www.s3750motoguzzi.co.uk/
Finally, *Mistral Engineering* (020 8501 2161), for Lucas RITA electronic ignition kits and parts.