Cycle Test

SUZUKI GS750

Suzuki's first four-stroke, in developement for four years, is all of the following: smooth, modern, comfortable, dignified, supple and good-handling. Oh, and one last thing: boy, is it ever fast.

● *Notes from tester: "The route: freeway to foot of Angeles Crest Highway, gas, then brisk but not berserk over the Crest, then an average of 85mph cruising for the next 100 miles until the GS went on reserve at 138 miles. During the 100-mile quick-step at least 35 miles were covered at 100mph indicated. On a downhill section on Edwards Air Force Base the speedometer indicated 133mph. I maintained this speed for more than ten seconds. When I pulled up to my house in the desert the bike settled into an even, unperturbed idle. Ordeal? As far as the bike was concerned, there had been no ordeal. It was business as usual."*

The GS-750, Suzuki's first four-stroke, is many things, can do many things and will immediately locate Suzuki, performance- and technology-wise, at the top of the 750 pile. Spared the flash, chrome, filligree and doo-dah often associated with the street-offerings of Japan's fourth-largest motorcycle manufacturer, the GS has been allowed by its stylists and designers to speak for itself with the comfort of its suspension, the integrity of its chassis and the broad-spectrum capabilities of its engine. It is a state-of-the-art four-stroke, four years in development, more impressive than Honda's CB-750 in most respects and superior to the Yamaha XS750D shaftie triple in everything except suspension compliance. It is subtle, dignified, understated, fast, long-legged and capable. It is not simply a brilliant first effort; it is a brilliant effort, period, and it has a long, long future.

Suzuki has grown a mite weary of its own conservative image and with its propensity of producing, in the big-bore category, almost-Superbikes. The latter allegation is correct—the RE5 and the water-cooled 750 *are* almost-Superbikes—but the former, while to an extent self-inflicted, is not. A company that has churned out bullets like the X-6 Hustler, odd-balls like the GT-550 and GT-380, violations of fundamental precept like the 500 twin two-stroke Titan, and new-technology-trippers like the GT-750 and RE5 can hardly be called conservative. The GS750 is conventional-looking—Suzuki has been burned enough by trendy styling to avoid it with this bike—but it is hardly conservative. Its 12.75-sec. quarter-mile ET puts it behind only the Kawasaki 900, in terms of acceleration, and no bike in its class has red-line engine speed set so high (9500 rpm).

GS750 comes in two colors: blue and red. Instrument illumination comes in one: red, aviator-style.

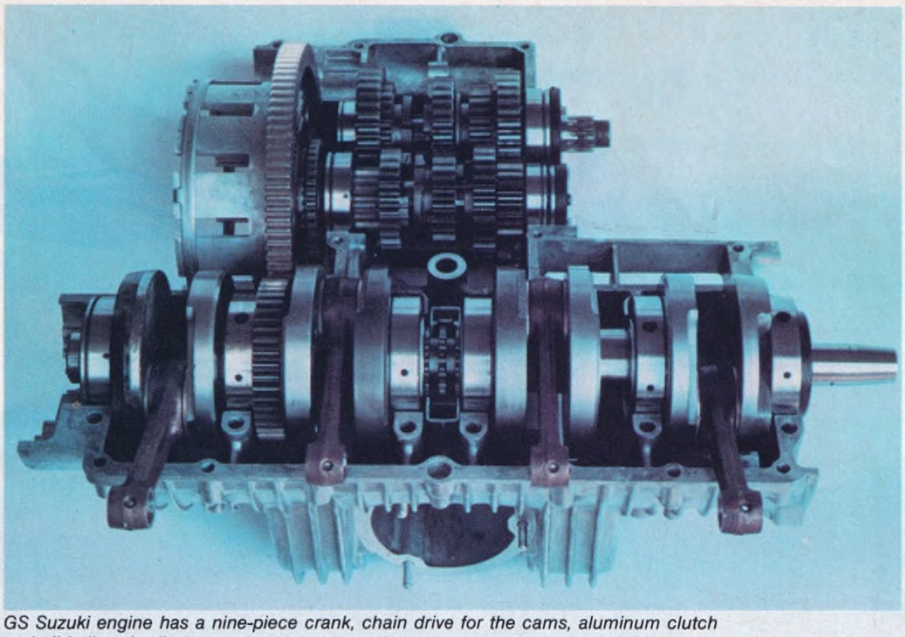
What was Suzuki after when they set out to build a four-stroke four-cylinder? All the usual things. They wanted it to be a "super-performance" motorcycle; they wanted it to have a touring capability; and they wanted it to reflect Suzuki's almost obsessive concern for reliability. They were certainly tempted to follow Kawasaki's lead by introducing their first serious four-stroke in big-motor trim and hedge their bet with engine performance bordering on the demonic, but considerations of the market as perceived in Hamamatsu finally produced a 750cc engine. Those considerations are as follows: the total size of the 750 market is one million units; 90% of them are Japanese-made; Suzuki presently controls only about 13%. Besides, they confided, a 750 is "easier" than an 860 or better, and the 750 size was more in sync with Suzuki's admitted lack of four-stroke experience. This shortcoming yielded what the engineers considered to be their most difficult task: striking an attractive compromise between performance and reliability.

Only two years or more on the market can establish the GS's reliability credentials; spend a minute in the saddle and you'll know all there is to know about its engine performance.

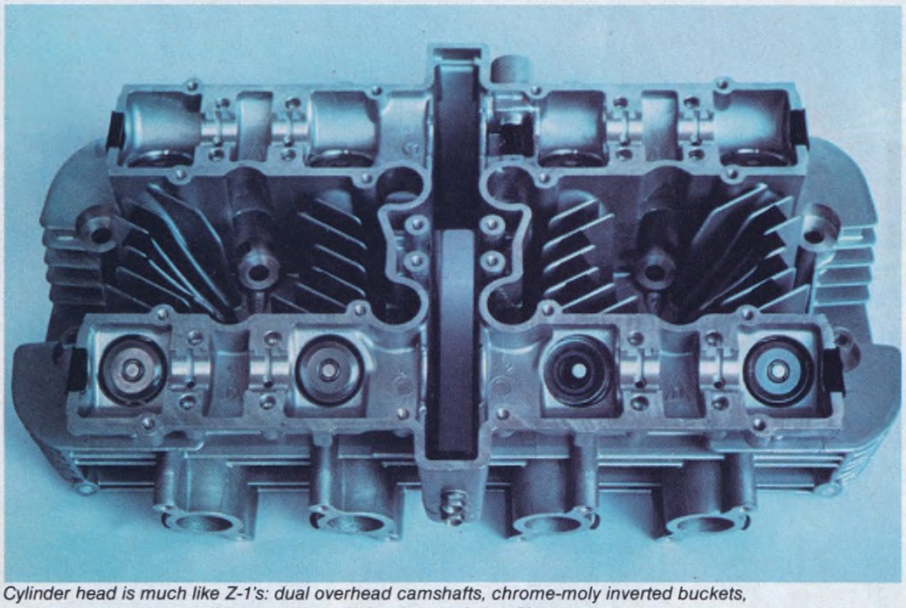
Notes from tester: "Most astonishing big-bike motor since Z-1 and BMW R90/S. One of only four real Superbikes available. Even after hearing staff opinions and seeing quarter-mile times I wasn't convinced it could be that impressive. After riding I found it more impressive, engine-

SUZUKI GS750

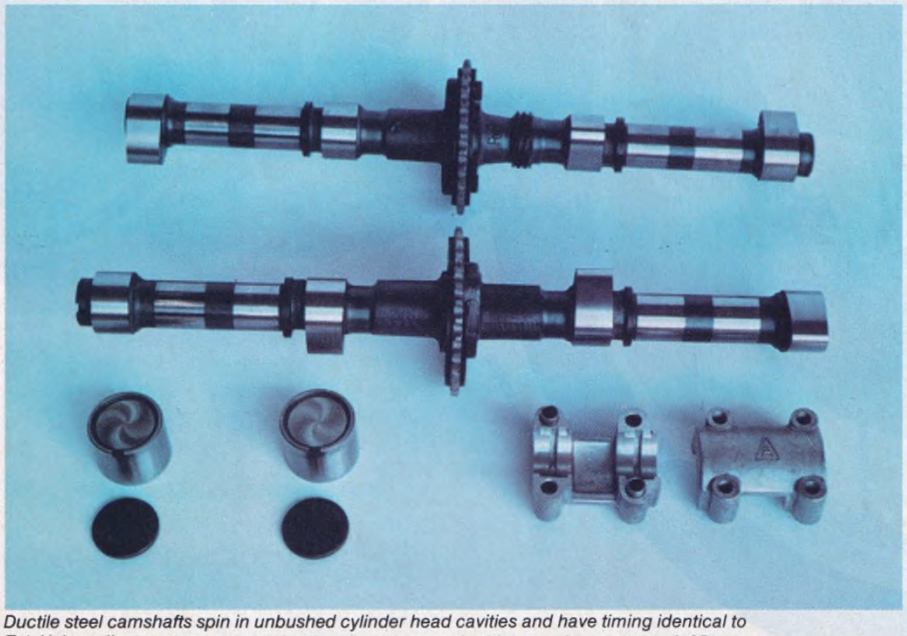
PHOTOGRAPHY: DALE BOLLER



GS Suzuki engine has a nine-piece crank, chain drive for the cams, aluminum clutch and all ball and roller bearings. Cavity beneath crank houses replaceable oil filter.

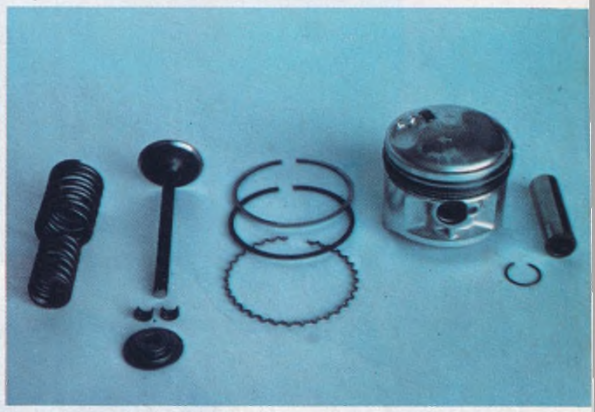


Cylinder head is much like Z-1's: dual overhead camshafts, chrome-moly inverted buckets, a center tensioner and offset ports for cylinders #1 and #4. Plugs are easy to change.



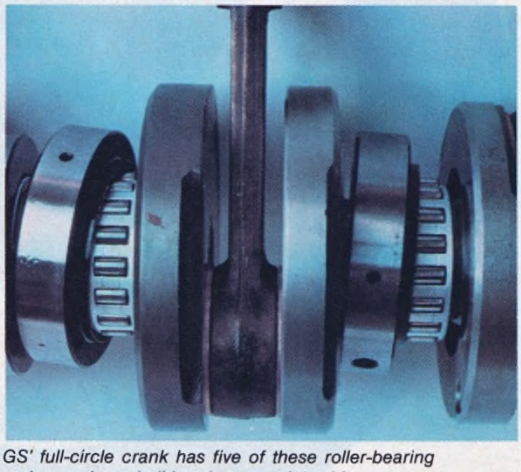
Ductile steel camshafts spin in unbushed cylinder head cavities and have timing identical to Z-1. Valve adjuster shims are made of tool steel, come in thickness increments of .05mm.

Shallow-hemi combustion chamber houses 36mm inlet valve and 30mm exhaust. Valve angle is 31.5 degrees.



Up-and-down stuff: ART cast pistons, rings made by Nippon and Riken, inner and outer valve springs.

Clutch has special center spacer/bearing for easy removal; basket's cushioning springs alternate rates.



GS' full-circle crank has five of these roller-bearing mains, and one ball bearing on points side.


SUZU
Shusai Nagaoka

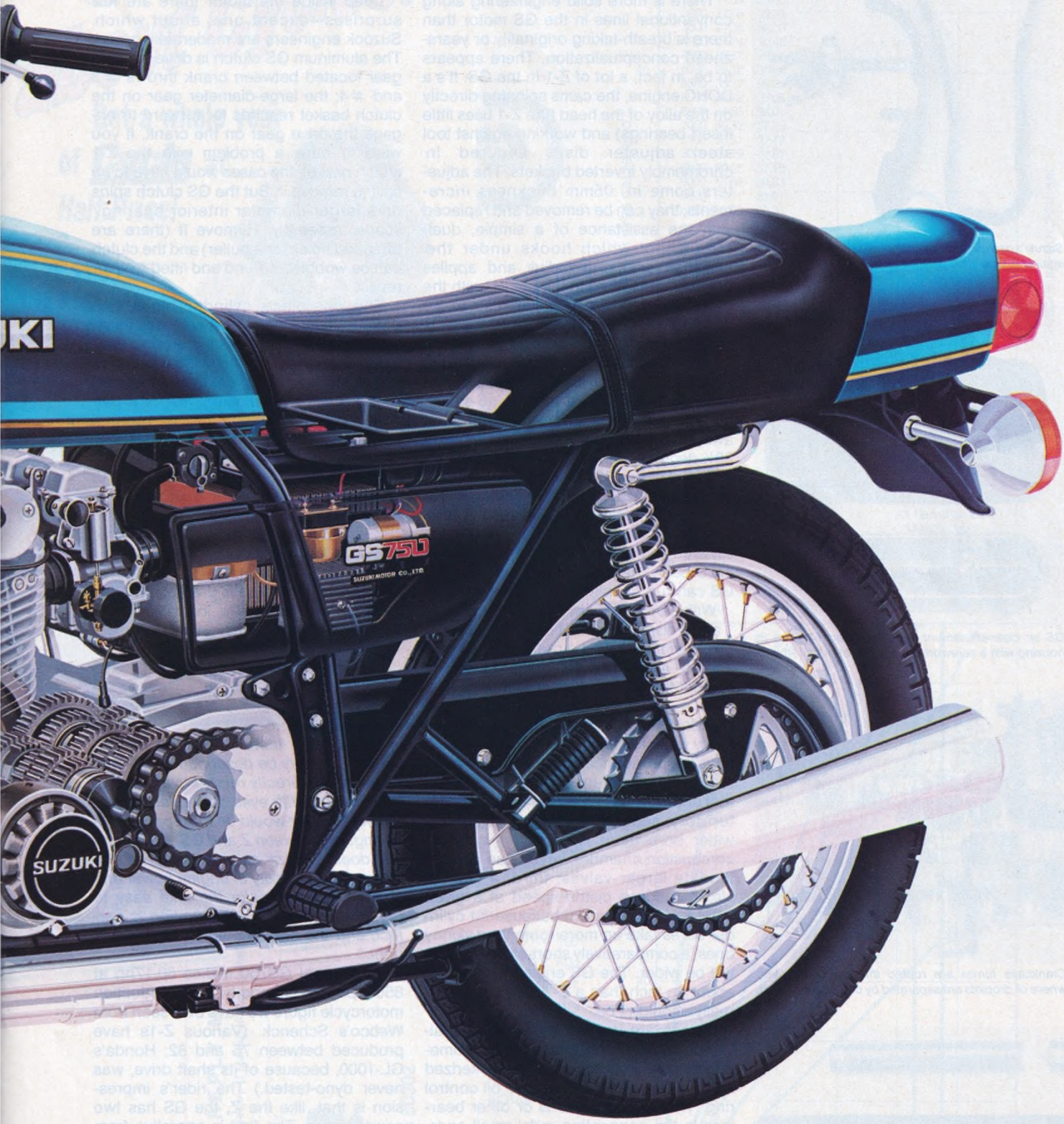
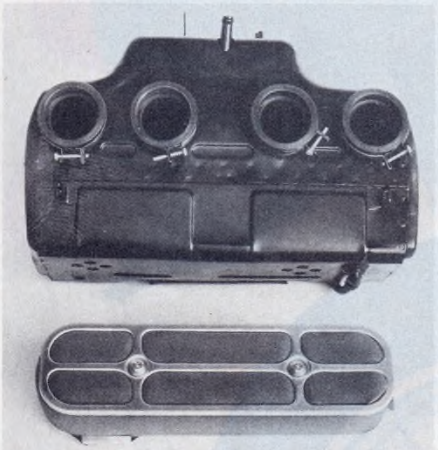
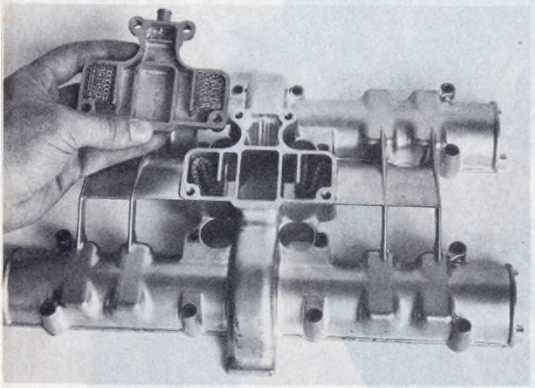


ILLUSTRATION: SHUSEI NAGAOKA

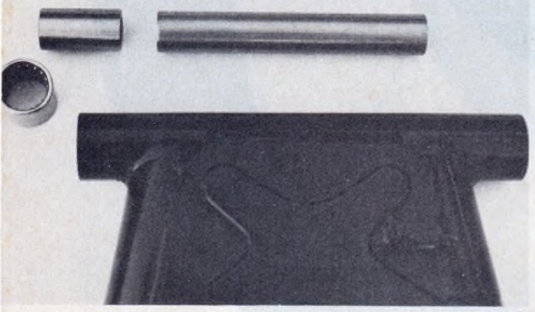
Suzuki's new-dimension cam chain tensioner pushes against a long shoe and never needs to be adjusted.



GS air cleaner element must be detached from its housing with a screwdriver; is made of polyurethane.



Crankcase fumes are routed through cam cover, where oil droplets are separated by coated wire mesh.



Heavily-reinforced GS swing arm is supported on needle bearings—unique on chain-drive street bikes.

SUZUKI GS750

wise, than I could put into words."

There is more solid engineering along conventional lines in the GS motor than there is breath-taking originality or years-ahead conceptualization. There appears to be, in fact, a lot of Z-1 in the GS. It's a DOHC engine, the cams spinning directly on the alloy of the head (the Z-1 uses little insert bearings) and working against tool steel adjuster discs secured in chromemoly inverted buckets. The adjusters come in .05mm thickness increments; they can be removed and replaced with the assistance of a simple, dual-radius tool which hooks under the camshaft with one radius and applies unloading pressure to the bucket with the other, allowing the adjuster disc to be popped out. The GS's bore size is 65mm—one millimeter smaller than the Z-1—and Suzuki's engineers have selected Z-1-size valves for it: 36mm inlet, 30mm exhaust, arranged in a shallow, no-squish hemi combustion chamber and tilted away from the bore axis at an angle of 30½ degrees. Valve timing is identical to a Z-1: inlet opens 30 degrees BTDC, closes 70 degrees ABDC; exhaust opens 70 degrees BBDC, closes 30 degrees ATDC. The exceptionally deep valve seats are sintered iron, and the exhaust valve heads have been Stellited; this means that the GS can run happily on lead-free gas.

With a bore size about the same as a Z-1 and a displacement of only 750cc, you'd guess that the GS is a pretty short-stroke engine—and you'd be right. It's stroke measures 56.4mm, almost 10mm shorter than a Z-1 and 6.6mm shorter than a Honda CB-750. It's configuration has many effects: first, the engine doesn't have the pronounced buzz inherent in the Z-1 and the later-model CB-750, a buzz that until now has come with four-cylinder territory; second, with a proportionally wider bore there is room for a larger combustion chamber, which can accommodate larger valves; third, a shorter stroke reduces piston speed at a given RPM level; and fourth, because fat cylinder bores take up more room than skinny ones, a comparatively short-stroke engine will be wider. The GS engine is wider by about an inch than a Z-1 motor, which it really shouldn't be.

Pistons are Japanese-traditional shallow-dome cast ARTs fitted with a chrome-edged cast iron top ring, a Parkerized second ring and a three-piece oil control ring. There are no inserts or other bearings in the connecting rods' small ends. Below the flash-coppered rods spins a nine-piece pressed-up roller crank that will distress hot-rodders but no one else. Roller cranks are tough and they don't need much oil pressure, but unless you have access to a very complicated jig and a 20-ton press, there's little you can do to help an ailing one except remember it fondly as it heads for the trash bin. The mains are all rollers except for one: there is a caged ball bearing inboard of the points plate.

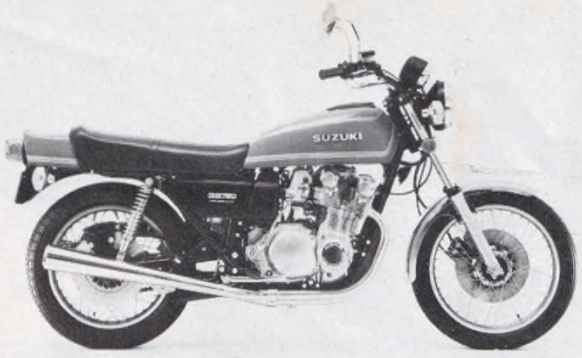
Deep inside the motor there are few surprises—except one, about which Suzook engineers are moderately proud. The aluminum GS clutch is driven from a gear located between crank throws #3 and #4; the large-diameter gear on the clutch basket reaches far forward to engage the drive gear on the crank. If you were to have a problem with the Z-1 clutch basket, the cases would have to be split to remove it. But the GS clutch spins on a larger-diameter interior bearing/spacer assembly. Remove it (there are threaded holes for a puller) and the clutch can be wobbled around and lifted free for repair.

The one-piece cylinder block has pressed-in cast iron liners with wall thicknesses of 4mm and o-rings around their bases to seal the junctions between liner, cylinder block and crankcase. Attached to the rear of the block is Suzuki's patented never-fiddle cam-chain tensioner. It works like this: a spring-loaded plunger presses against the curved shoe that contacts the cam chain; a bevel has been cut on the rear of the plunger; another mechanism, consisting of a ball, another shaft and another spring is secured at right angles to the first plunger. The ball rides on the plunger's ramp, and as the cam chain wears or stretches pressure applied to the ball adjusts the location of the plunger and maintains perfect tension. The device also compensates for the engine's dimensional changes as it heats and cools, and results in a greater life expectancy for the chain, the tensioning shoe and the sprockets.

Notes from tester: "Engine performance can only be described as perfect. Acceleration directly related to amount of throttle turn. With eyes closed, an experienced Z-1 rider would be hard-pressed to distinguish between Z and GS, except the GS doesn't buzz as noticeably as the Kawasaki. Versatility of engine power and spot-on gearing make the bike easy to use in any situation. Carburetion is perfect, and the engine's noise level is just right."

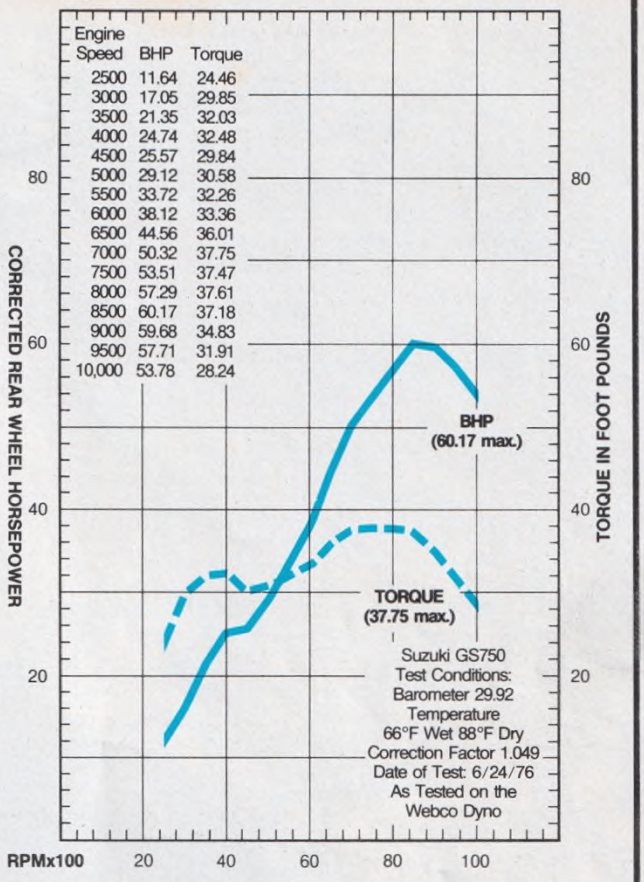
The Suzuki GS750 makes 60.17hp at 8500 rpm, the second-highest production motorcycle figure we have ever seen from Webco's Schenck. (Various Z-1s have produced between 75 and 82; Honda's GL-1000, because of its shaft drive, was never dyno-tested.) The rider's impression is that, like the Z, the GS has two power-bands. The first is operative from idle to 6000, and provides good economy, pleasant cruising and no tangible threats to anybody's peace-of-mind. It lopes along at the speed limit turning about 4000 rpm with enough torque on tap for easy, fifth-gear passing bursts. Ridden with any kind of moderation the GS re-

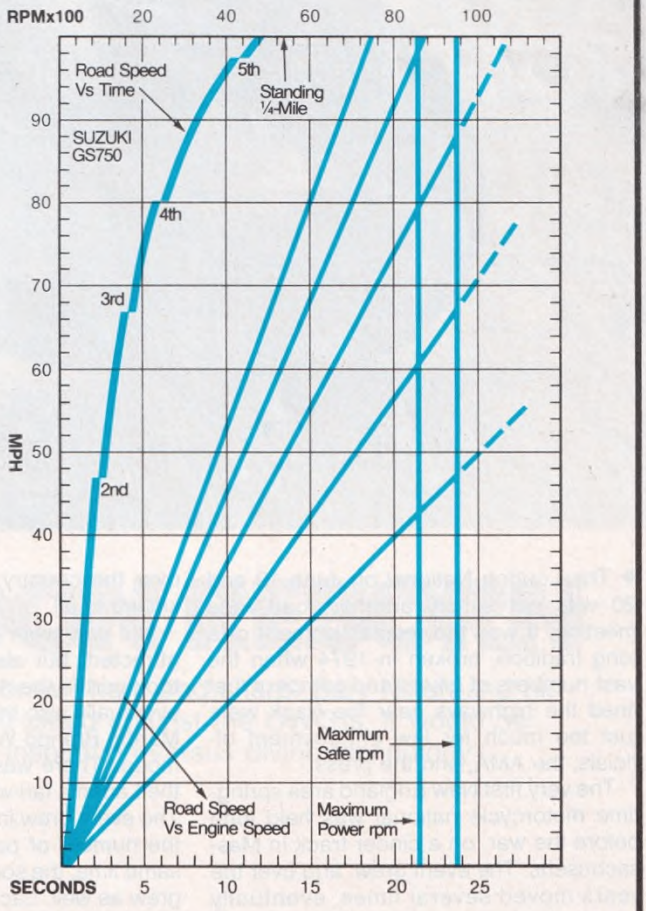
(Continued on page 96)



SUZUKI GS750

Price, suggested retail	$2195
Tire, front	3.25H19–4PR Bridgestone or Inoue
rear	4.00H18–4PR Bridgestone or Inoue
Brake, front	9.61 in. x 1.40 in. (244 x 35.6mm)
rear	10.04 in. x 1.45 in. (265 x 36.8mm)
Brake swept area	91.3 sq. in. (589 sq. cm.)
Specific brake loading	5.83 lbs./sq. in. at test weight
Engine type	Four-stroke DOHC Four
Bore and stroke	2.56 x 2.22 in. (65 x 56.4mm)
Piston displacement	45.6 cu. in. (748cc)
Compression ratio	8.7:1
Carburetion	4, 26mm Mikuni VM26SS
Air filtration	Polyurethane foam
Ignition	Mechanical breakers, two coils
Bhp @ rpm	60.17 @ 8500 rpm
Torque @ rpm	37.75 lbs/ft @ 7000 rpm
Rake/Trail	27°/4.21 in. (107mm)
Mph/1000 rpm, top gear	13.4
Fuel capacity	4.95 gal. (18.1 liters)
Oil capacity	3.6 qts. (3.4 liters)
Electrical power	3-phase AC generator, 12V 200W
Battery	12V 14AH
Primary transmission	Straight-cut gear
Secondary transmission	Takasago chain, #630 SO
Gear ratios, overall	(1) 15.12; (2) 10.45; (3) 8.12; (4) 6.61; (5) 5.65
Wheelbase	59 in. (1499mm)
Seat height	31.5 in. (800mm)
Ground clearance	5.9 in. (150mm)
Curb weight	532 lbs. (241.3 kg)
Test weight	697 lbs. (316.2 kg)
Instruments	Tachometer, speedometer, odometer tripmeter, oil, neutral, turn signals
Standing start ¼-mile	12.75 sec. @ 104.77 mph
Average fuel consumption	39 mpg
Speedometer error	30 mph, actual 29.66 60 mph, actual 59.17





bet the bike would gyrate pretty hard on Racer Road. But it doesn't. It'll pitch around if you stick a stand or a header junction into the pavement, which can happen if you hit a bump in the middle of a corner and the full weight of the bike mashes down on the suspension, but by and large it's an exceptionally good handler. If the front fork had more rebound damping and the same amount of compression damping as it has now, it'd be fabulous. In fast, smooth sweepers the bike's front end hunts up and down on its sliders. The up-and-down doesn't translate into left-right-left, so the feeling is more a lack of precision than a wallow. Still, I think the compromises have been made properly; for 99 percent of all riders the GS is an awfully good handler, and for 100 percent of all riders it sure has a comfortable suspension."

The GS's seat is only average in terms of comfort; it's a component that the engineers are still working on. The cover creeps and wrinkles, and the foam tends to bunch up in the middle. There's a lot of room for a passenger, and the passenger pegs, although they vibrate more than the operator's (which are rubber-mounted but non-folding), are mounted in exactly the right place.

Note from tester: "The handlebar sucks." And so it does, in all likelihood the result of a comfort-committee run amok. The bend does funny things to your wrists after a couple of hours, and the bar has been pulled back so far that the rider is forced into a bolt-upright position that makes him hold on with his arms and hands instead of simply leaning into the wind behind a lower, shorter handlebar.

The hand controls are all in the right places and all work like they're supposed to. The brown-faced instruments are arrayed in canted pods and illuminated with red lights, which gives rise to two little problems: if you happen to be riding with the sun at your back the reflection off the instrument glasses is inescapable; and however much red instrument lighting appeals to aircraft pilots, there's simply too much of it on the GS. Riding behind the GS's console in the dead of night is like having a small forest fire in your lap: the instrument lights are bright to the point of distraction. Next year, maybe a rheostat to control their brightness.

We have no complaints about the single-disc front brake: it's strong enough to keep you out of trouble but not so strong that it'll get you *into* trouble, and the weight saved by using just one set of components pays big dividends in front suspension control. The rear disc, however, is too strong. Like the CB-750F, the brake stay is in compression instead of tension; arranging it the other way, according to Suzuki, would present problems with hose length variances during chain adjustment. The master cylinder peeks coyly from beneath the right sidecover, and like the front master cylinder, has a transparent body for easy fluid-level-checking.

You have to be careful when you pounce on the rear brake lever, especially if you happen to be downshifting at the same time. It can begin to lock and chatter if you exert a half-pound too much pressure. A change in the mechanical leverages or hydraulic relationships would help, or a switch to harder brake pad material.

Other odds and ends of interest: the ¾-inch-pitch final drive chain is greased during manufacture and the rollers are sealed with tiny o-rings, like the Kawasaki chains, but you still have to lube it to keep the sprockets from wearing; the engine can be disassembled right down to the cylinder base gasket surface without removing it from the frame; the return springing for the carburetors was way too strong on the first two GSs we rode. It was lightened up on the third, and should stay light on all subsequent production models; there's a storage compartment in the tail section for plugs, paperwork, maps, etc.; you need a screwdriver to remove the sidecovers and the air filter element, which is a bit awkward but will keep them from getting ripped off; gear selection was notchy for the first 1000 miles of the test, and then loosened up nicely; like the BMWs, modern Hondas and Kawasaki four-strokes, the GS vents its crankcase vapors into the air cleaner housing; the points breaker cam is attached directly to the right end of the crank, Z-1- and Honda-style, and controls two sets of ignition points.

The GS750 fits in everywhere Suzuki hoped it would. It is the fastest 750 you can buy, has the second most-comfortable suspension (behind the Yamaha XS750D) and generous open-road range. Despite its ultra-squish front fork the Suzuki has enough cornering clearance to make mountain-road lashing a reasonable proposition—but you might want to add heavier oil to firm up the damping; it is quietly stylish, beautifully proportioned, unobtrusive, carefully built and correctly compromised to be many things to many different people people without short-changing any particular enthusiast group. It is without question the best motorcycle in the 750 class. ◉