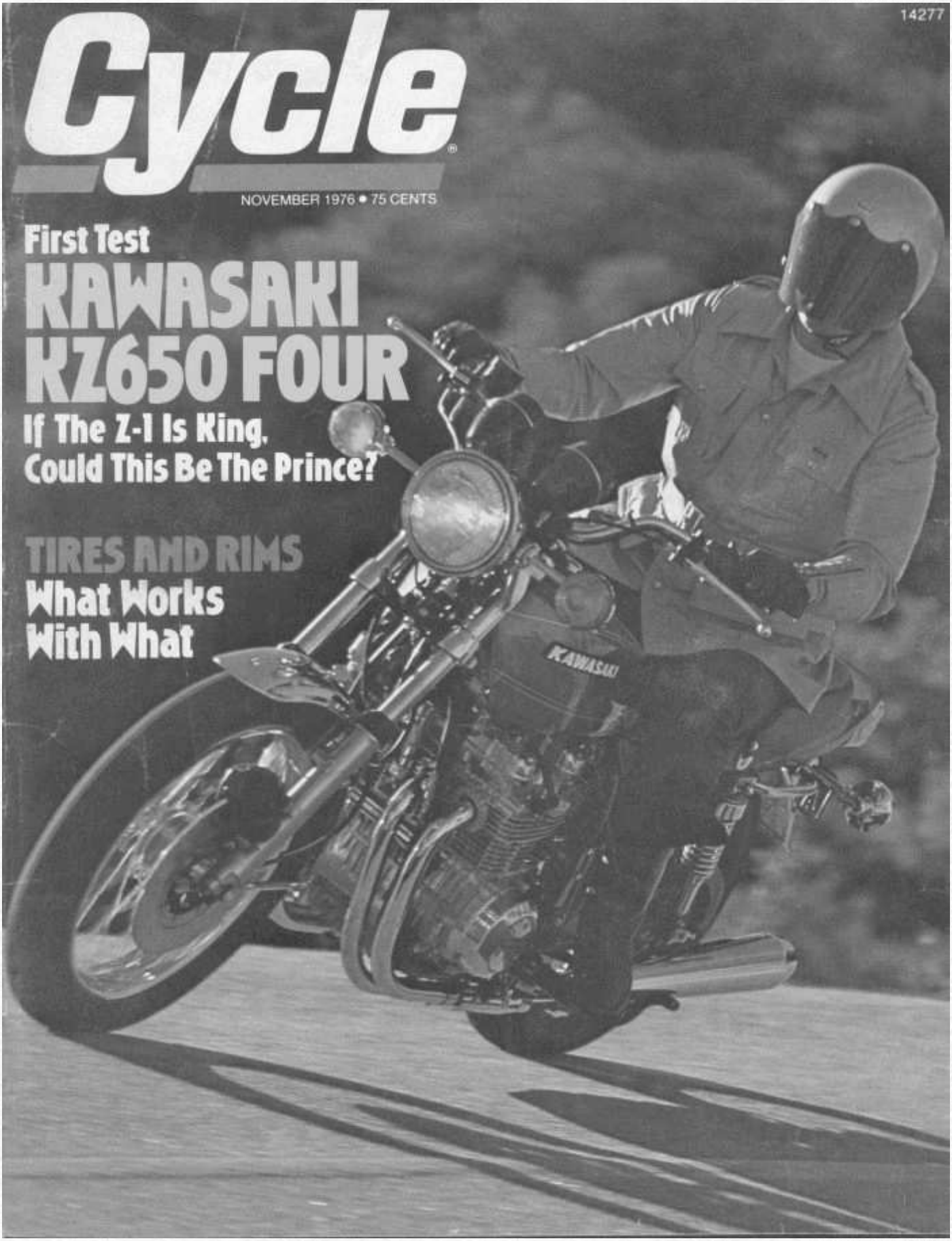
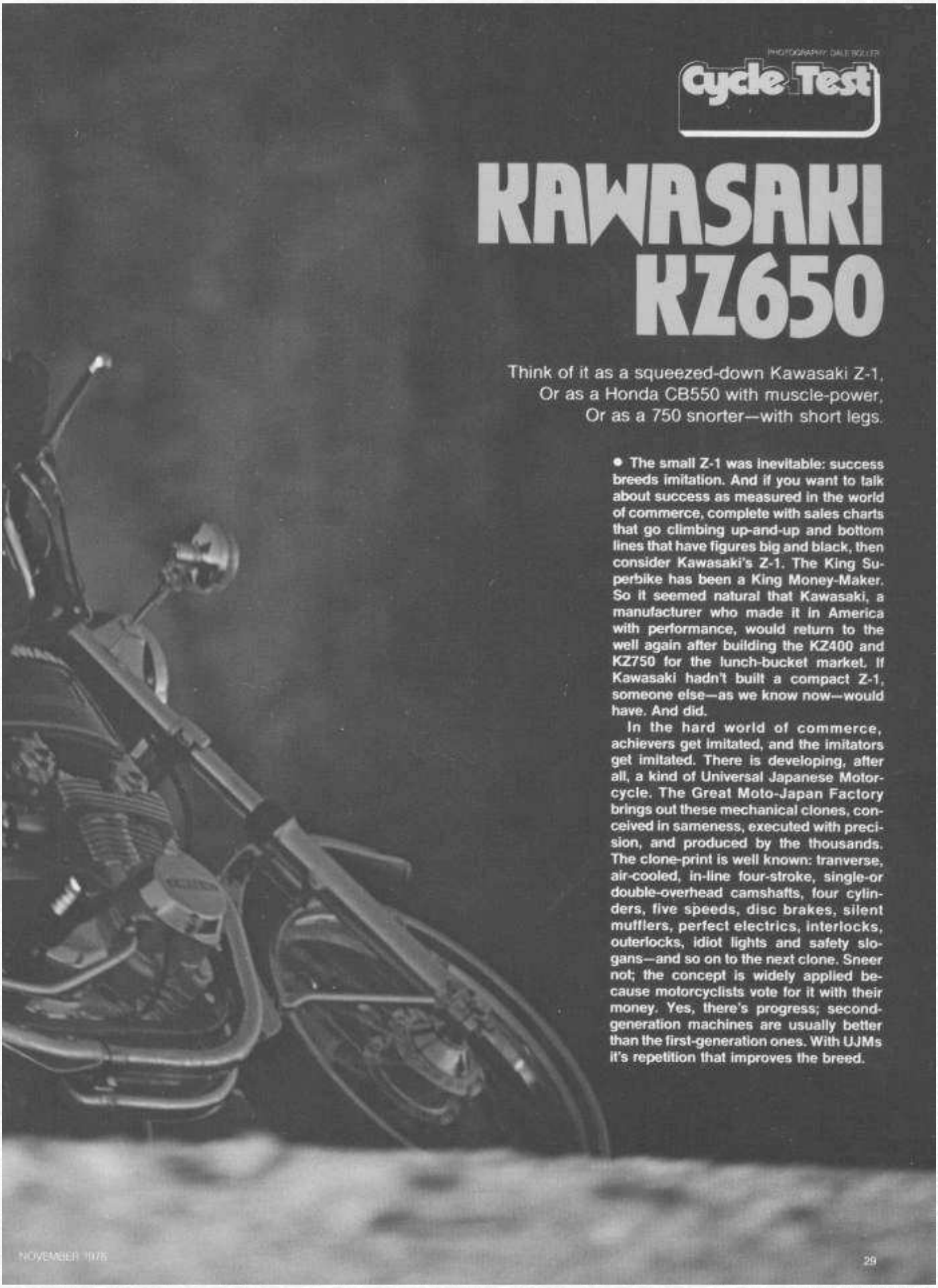
KZ650 Motorcycles ~ Cycle - November 1976





PHOTOGRAPHY: DALE BOLLER

Cycle Test

KAWASAKI KZ650

Think of it as a squeezed-down Kawasaki Z-1.
Or as a Honda CB550 with muscle-power.
Or as a 750 snorter—with short legs.

• The small Z-1 was inevitable: success breeds imitation. And if you want to talk about success as measured in the world of commerce, complete with sales charts that go climbing up-and-up and bottom lines that have figures big and black, then consider Kawasaki's Z-1. The King Superbike has been a King Money-Maker. So it seemed natural that Kawasaki, a manufacturer who made it in America with performance, would return to the well again after building the KZ400 and KZ750 for the lunch-bucket market. If Kawasaki hadn't built a compact Z-1, someone else—as we know now—would have. And did.

In the hard world of commerce, achievers get imitated, and the imitators get imitated. There is developing, after all, a kind of Universal Japanese Motorcycle. The Great Moto-Japan Factory brings out these mechanical clones, conceived in sameness, executed with precision, and produced by the thousands. The clone-print is well known: tranverse, air-cooled, in-line four-stroke, single-or double-overhead camshafts, four cylinders, five speeds, disc brakes, silent mufflers, perfect electrics, interlocks, outerlocks, idiot lights and safety slogans—and so on to the next clone. Sneer not; the concept is widely applied because motorcyclists vote for it with their money. Yes, there's progress; second-generation machines are usually better than the first-generation ones. With UJMs it's repetition that improves the breed.

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There isn't much maneuvering space available within the concept, but there are a few ways that a major manufacturer can distinguish his UJM from others, principally engine displacement and physical size. Once upon a time motorcycles could be blocked out into neat displacement-and-size categories, but today all the market-jockeying has blurred the old lines. Now you can find every gradation in displacement and physical size.

Presumably Kawasaki picked their ground carefully for the new four-cylinder bike. The KZ650 falls into a traditional displacement class, but one that has been virtually abandoned since the demise of the Triumph 650. The 498-pound KZ650 is substantially heavier than the CB550F Honda (455 pounds), but lighter than Suzuki's GS750 (532 pounds) or the Honda CB750F (538 pounds) or the larger Z-1 (542 pounds).

Price-wise the KZ650 walks a centerline. Its suggested retail price of $1995 POE West Coast drops it right between the 500/550 intermediates offered at roughly $1800, and the 750s which list in the $2200 range.

Physically the KZ650 is larger than the CB550 Honda, and that makes the new bike seem much more like a small Z-1 than a big Honda 550. Old-time 650s, such as the lightweight Triumph 650 Bonneville, were big 500s, but the new KZ four comes into the 650 class from the other direction. It could be, and maybe it should be, a 750.

There is another way—and Kawasaki knows it—to distinguish a new UJM: performance. In everyday motorcycle terms, performance doesn't mean suspension compliance, or ride comfort, or ease of round-town handling. Performance means engine performance, horsepower which reads out as acceleration in the quarter-mile. It's the American Standard.

You find no presents under a dragstrip Christmas tree. The clocks respect no reputations, read no advertisements, offer no understanding and give no sympathy. The quarter-mile clocks are indifferent; the times just *are*. Matched against smaller bikes, such as the CB550, the KZ650 is a rocket, covering the quarter-mile in 13.53 seconds and running the traps at 98.14 mph. By comparison, the Honda is sluggish at 14.47 seconds and 93.36 mph. Taken strictly as a 650, the Kawasaki is still impressive. It would hammer any 650, new or old.

But that's not what Kawasaki had in mind. They wanted—and proclaimed—a 650 which would dine on any 750. Outperform is their phrase, and only the feeble-minded could miss the quarter-mile implication. For the record, the KZ650 will choke on hard-running 750s (Suzuki GS750, 12.75 secs at 104.77 mph; Honda CB750, 12.94 secs at 103.92 mph). Kawasaki's representatives conducted their own dragstrip tests under better atmospheric and track conditions than existed on our day at the strip, and their early testing returned figures of 13.14 and 99-plus miles-per-hour. But even these times won't let the KZ650 nibble on the Honda Super Sport or Suzuki's new GS750.

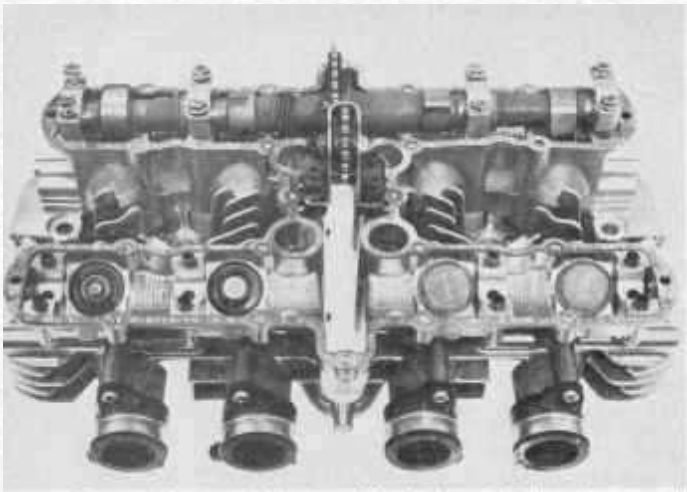
It's too much to ask even a first-rate 650 to run with a really good 750. No doubt some enterprising individual will hype the 650, but a strung-out, mass-produced 40-incher has no place in the Japanese order of things, where manners are mandatory. More performance can be pulled out of the new KZ. It presently holds a new Bonneville record in Modified/Altered/Gas-750cc. For the record the running gear remained stock, but the displacement went up to 738 ccs, courtesy of 66mm racing pistons; different camshafts were bolted in; and a quartet of Keihin 31mm racing carburetors were mated to a ported head. The result was 141.284 mph.

Though the KZ650 engine was designed by Ben Inamura, who also drew up the Z-1 engine, there are some significant differences between the KZ900 (current Z-1 designation) and the new 650. Z-1 valve-adjustment shims ride on the top of bucket lifters, where they are retained in shallow pockets. The cam lobes bear directly against the shims when actuating the valves. This system is very convenient because, with an inexpensive special tool, you can remove and replace shims in order to adjust the valve clearances—without disturbing the camshafts. This system is trouble-free unless someone installs camshafts with steep ramps, or consistently turns the engine into the five-figure zone. Then the camshafts can literally catch the corner of the shims and spit them out. That can't happen with the KZ-650. In an effort to eliminate any potential shim-spitting, hold down engine noise and lower production costs, Kawasaki engineers reduced the shims' size and moved them un 1er the bucket lifters. The KZ650 shims fit into pockets in the tops of the spring collars and rest on the valve stem tips; the whole shim business is between the bucket lifter and the valve, not the lifter and the camshaft.

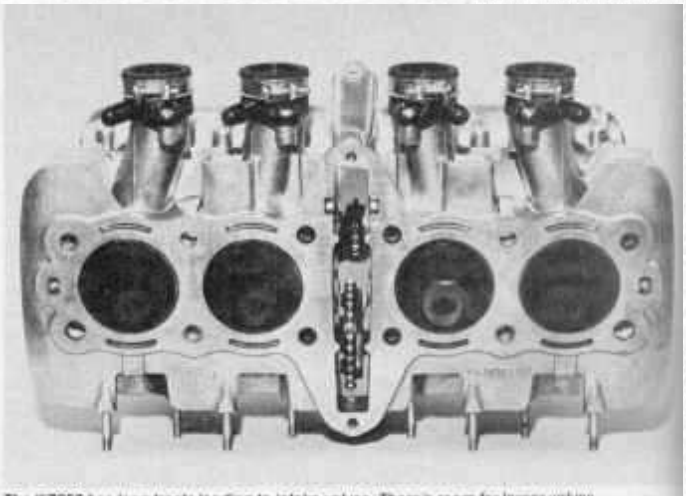
There's one catch. You must remove the camshafts to change valve clearances. It's a job that begins by pulling off the tank and ignition coils, and continues through the removal of the upper chain guide sprocket for the camshaft, etc. Extracting the camshafts is no major job for a competent mechanic (it isn't a minor one, either), and Kawasaki has provided enough scribe marks, legends, instructions and charts so that a novice could perform the operation with a workshop manual for guidance.

At least three problems exist. First, the adjustment procedure will be time-consuming initially and, depending upon the skill of the mechanic, maybe continually. Second, some dealers may wish to avoid,

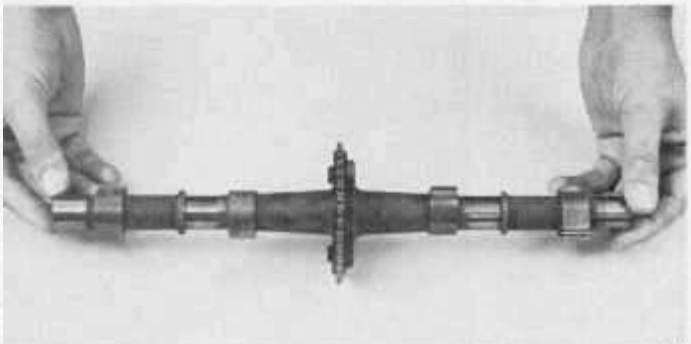
The best part of the new KZ650 is its eager and responsive engine



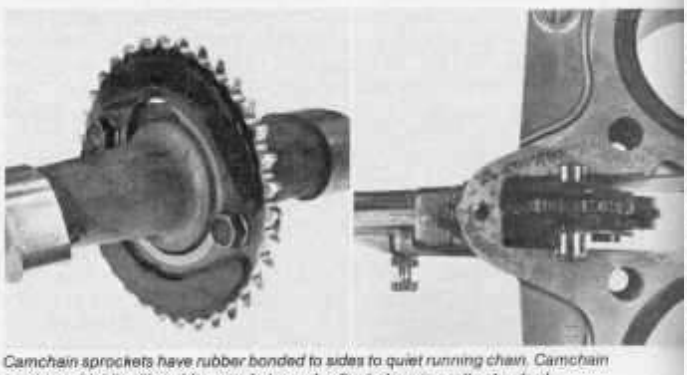
The camshafts run on plain bearings. At far left shim and lifter have been removed; next valve has shim in place; rightside valves have bucket lifters in place.



The KZ650 has long tracts leading to intake valves. There's room for larger valves—and the Bonneville record bike had 66mm bores, four mm over standard.



Each camshaft rides on four plain bearings, and both cams are run at half-crankshaft speed by an endless camchain driven off a sprocket on the crank.



Camchain sprockets have rubber bonded to sides to quiet running chain. Camchain tensioner (right) with guide sprockets, and roller below, is pretty standard.

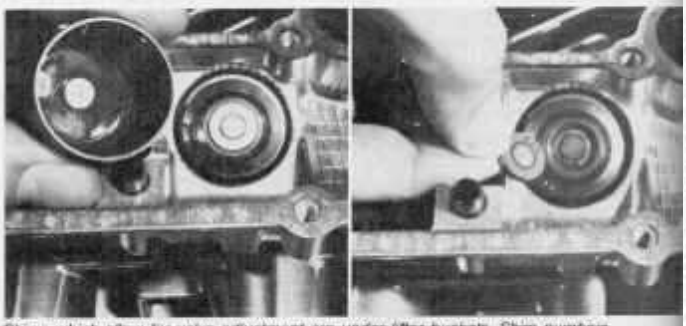
KAWASAKI KZ650

or will avoid, setting the valves, just because it's slower and more difficult than the Z-1 system, or because the dealer doesn't want to hear customers bark about the high cost of tune-ups. Finally, a sloppy mechanic could botch the job by leaving dirt on the plain-bearing surfaces in which the camshafts ride, or by severely kinking the cam chain on its lower crankshaft sprocket by turning the crank with the cam chain loose. The camshafts, incidentally, run on bearing surfaces machined in the head itself, unlike the Z-1 which has bearing inserts. Should a Dirty-Harry mechanic destroy a bearing surface, or mix up the camshaft caps (hard to do; they're matched by number), he would ruin the cylinderhead.

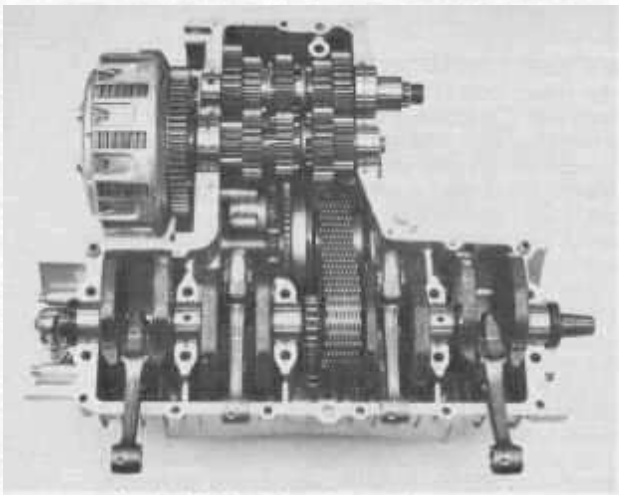
Once set, double-overhead-camshaft engines go a long, long way without further adjustment. Kawasaki specifies a service/checking interval of 5000 kilometers, or 3100 miles. Everything we know about the cam/lifter/shim/valve collar set-up—and Kawasaki's engineering—suggests that KZ650 owners will have a hassle-free experience with the valves after the initial adjustment. Under normal conditions of use, we would expect the KZ650 to run beyond 5000 miles without valve-lash re-setting.

The bottom end of the KZ650 is closer to a Honda CB550 in concept than to the Z-1. Kawasaki's big one has a built-up, pressed-together crankshaft, with one piece rods and roller-bearing mains. The KZ650 has a one-piece crankshaft that spins in insert plain bearings with two-piece plain-bearing rods. A plain-bearing lower end is quieter, cheaper to produce, and easier to manufacture accurately than built-up crankshafts with ball or roller bearings. So long as a well-designed plain-bearing lower end gets enough clean oil at properly high pressures, it works just fine. Pressed-together crankshafts, composed of many pieces, don't necessarily have perfect alignment despite elaborate jigs that fit them together. It's not unusual to see a multi-cylinder engine with a built-up crank that has its crank throws two or three degrees

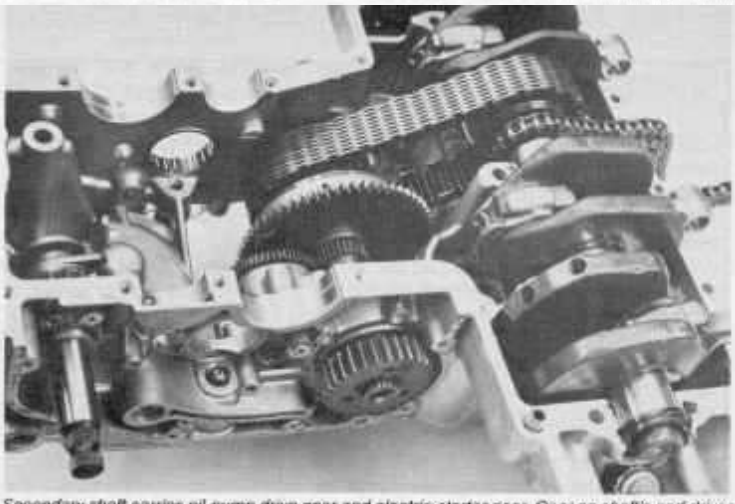
The bearing caps for camshafts are matched and numbered so that a mechanic can't mix the caps when the camshafts are pulled for valve adjustment.



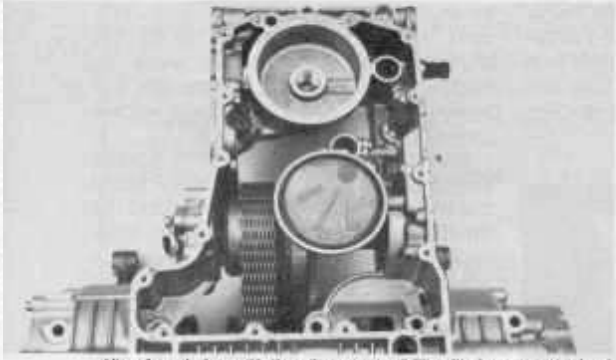
Shims which allow for valve adjustment are under lifter buckets. Shim numbers indicate thickness; this, together with workshop charts, aids adjustment.



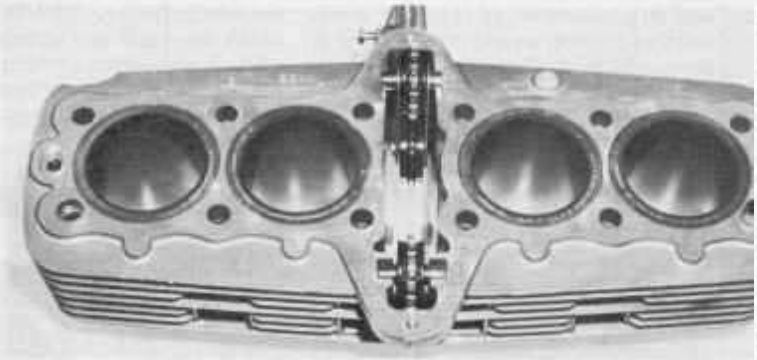
A one-inch Hy-Vo chain carries power from the plain-bearing crankshaft to a secondary shaft behind the crankshaft.



Secondary shaft carries oil-pump drive gear and electric-starter gear. Gear on shaft's end drives the clutch-drum gear. Hy-Vo primary sprocket has a cush-drive on the secondary shaft.



View from below with the oil pan out: oil filter fits into receptacle at top; the fine screen covers pick-up passage for the oil pump.



The 650's liners are thick enough and the cylinder-bore centers distant enough to allow for a considerable increase in displacement. Sprockets and roller are in place in the camchain cavity.

away from their blueprint positions. Quality production can be better controlled machining a one-piece crank. The operations are just simpler.

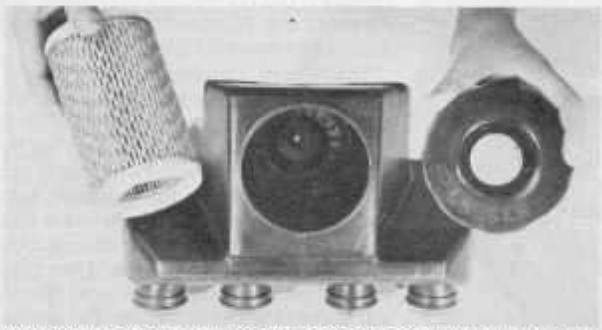
The KZ650 uses a Hy-Vo chain for the primary drive while the Z-1 has a take-off gear machined as part of a crank flywheel. On the 650 Kawasaki the drive sprocket for the Hy-Vo chain is inboard of the number-two cylinder's flywheels and adjacent to the camshaft-drive sprocket located in the center of the crankshaft. The Hy-Vo chain and its sprocket lengthen the crankshaft; an all-gear system, like the KZ-900, would have resulted in a 650 with a shorter crank.

In order to carry the power back to the clutch, the Hy-Vo chain drives a sprocket on a secondary shaft, located behind and somewhat below the crankshaft and its centerline. The secondary-shaft sprocket has a coupler with rubber dampers to smooth the power pulses from the engine. The starter-motor clutch-and-gear system is also on the secondary shaft, as well as the drive gear for the oil pump. And on the far right end of the secondary shaft is the gear that drives the clutch drum.

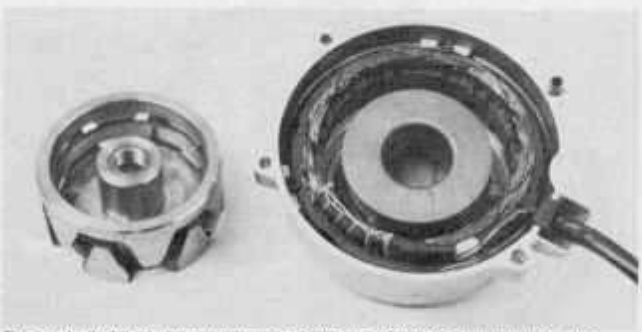
This Hy-Vo arrangement, long used in Honda 350, 400 and 500/550 multis, is less expensive to produce than direct crankshaft-to-clutch-drum primary gearing. In normal service Hy-Vo chains present no problems in motorcycles; however, in cases of extreme abuse and sustained above-redline running, Hy-Vo chains quickly limber up, or fail outright. Any number of highly-modified full-race 550 Hondas have broken engine cases, or worse, that testify to the racing limits of Hy-Vo chains.

The great advantage of Hy-Vo chains for normal, everyday riding is their silence. Gears clatter. Roller chains actually go around their sprockets in a series of flat-sided jerks, going yank/pause/yank/pause. But a Hy-Vo braces itself and then eases into engagement and gently pulls itself out of engagement. The nature of the chain eliminates the yank/pause delivery; the Hy-Vo action is much closer to that of a belt and pulley.

The 650's controlled-field alternator is also more nearly Honda than Z-1 in na-



Molded plastic airbox holds a pleated paper air-cleaner element, which can be changed in a jiffy by lifting the seat, removing the tank and cleaner cap.



This controlled-field alternator is very Honda-like. Rotor fits on crank end; outer armature and interior control-field are in outer cover.

ture. A permanent-magnet rotor sweeps a field through the Z-1's armature windings to generate electricity, and its output—which varies with engine speed—is controlled simply by bleeding off any surplus voltage with a zener diode. But the 650's alternator gets its energizing field from windings fixed in its cover, and the generating windings are likewise fixed. And the crank-driven rotor is just a slotted drum that turns inside the circular gap between the fixed field and generating windings. In this arrangement the slotted rotor effectively chops up the magnetic field so that it reaches the generating windings as pulses, and inductance does the rest. It gives you a heavier alternator than the one in the Z-1, but its output is controlled with an automotive-type regulator, which switches the field on and off according to need, and in that respect it's a big improvement for Kawaski.

The KZ650 also has a better frame than the Z-1. Though it's built on the same pattern as the 900, the 650 has a main backbone tube that's a quarter-inch greater in diameter and has more wall thickness to boot. The 650 engine mounts are far more substantial than the Z-1's tabs, but most impressive are the steel plates which tie the top three tubes to the steering neck; the heavy gusseting extends far enough to join front downtubes with the top-tube braces.

Although the steering neck is better tied to the swing arm pivot-pin mounts, and the engine is lodged in the frame more solidly than the Z-1, Kawasaki's super-strong chassis commitment faded at the swing arm. Apparently Kawasaki figured that the less powerful 650 could do with smaller swingarm tubes than the Z-1—which are marginal in terms of competition use. It's a bit ironic that the 650 hasn't a super-duty swing arm, in view of Kawasaki's obvious concern with the frame. Those who have race-modified Z-1 chassis have discovered a strong, tweak-and-twist resistant swingarm is the first, and most important, step in getting first-class handling from a Z-1.

Kawasaki wanted a quiet-running engine, so the near-49 horsepower 650 features Hy-Vo chain primary drive and a plain-bearing crankshaft. The new KZ has a space-efficient 4-into-2 muffler.

When you sit down on the KZ650, it immediately says big—not small—machine. Perhaps it's the fact that you sink down in the cushy saddle with a whoosh, or maybe it's the 4.4-gallon tank spread out in front of you, or just the comfortable span of the bars.

The safety-interlock conspiracy continues. The KZ650 will not start in any gear or in neutral unless the clutch lever is pulled in. It's cheaper to manufacture the device this way because a neutral-only over-ride (that would allow starting in neutral with the lever out) isn't needed. The lack of in-neutral, clutch-out starting is more aggravating than you might first imagine. Many riders have developed an early-morning cold-starting technique which calls for pushing the start button, reaching under the tank for the choke lever, and then fishing for the exact spot on which the engine will fire and run. You can't do that with the KZ650. It's full choke, pull the clutch lever in, leave the throttle closed, hit the button, get the engine running, and then close down the choke before the engine stops.

And there are a couple more control layout annoyances. Two staffers found the grips too hard for their liking, and the throttle return spring too heavy. More important was the brake-light idiot-lamp which lights up red when the brakes are applied. At night the idiot winker is really intrusive, especially on a winding road where the brakes are used often. The panel light is even more distracting at dawn or dusk, when your eyes are trying to adjust to changing light conditions.

For a Japanese motorcycle, the KZ650 has very good drive-train action. The clutch lever draws quite easily, and engages evenly and gradually over a wide range. The gearbox shifts without difficulty or catches. The shift mechanism has a more positive feel than most Japanese bikes, and persuades the rider it's actually connected mechanically to the gearbox. There's another pleasing thing in the transmission of power: far less drive-line snatchery than is common in some Hondas and Yamahas. You don't shut the throttle, have the revs drop away, and then a half-instant later slow down with a lurch. The relationship between the KZ's pistons and rear wheel may not be as tight as in Italian roadsters (the best in this category) but connection is positive, and it's proof that Kawasaki has made progress in an important area.

The KZ650 exhibited a curious phenomenon that at least three staffers noted. You're running along at 60 mph or so, turning about 4600-4700 rpm on the tachometer, and almost involuntarily you find yourself nudging the gearshift, making sure the bike is in fifth. At some half-conscious level, the KZ650 sounds busy to the rider. Although Kawasaki has gone to great pains to quiet the engine, there's still enough whirring, before you get accustomed to it, to have you gear-check-

ing. It's not exhaust noise, nor is the engine geared too tightly. Mechanically the 650 just makes more noise than a 550 Honda, or the rider picks up more noise from the Kawasaki engine—which actually turns a couple hundred revs slower at 60 mph than does the Honda.

Soon the rider gets the busy thrash behind him, and begins to enjoy the best of the KZ650, which is its engine. The 62 x 54 mm unit is remarkably smooth below 5000 rpm, where most highway cruisers will keep it. Unlike smaller displacement bikes, you can click the KZ650 into the opposite lane at an indicated 60 mph, crack the throttle and develop plenty of passing momentum. In this respect the bike is very 750-ish. While packing double won't paralyze 500/550-class motorcycles, hauling a passenger *and* luggage will flatten their performance. The KZ has enough power to cope with passenger-plus assignments without losing its zing. Only high altitudes took the clout out the engine's midrange, but the 650 still had real punch above 7500 rpm.

Above 5000 rpm the Kawasaki vibrates, enough to make the mirrors useless at 5500 rpm and enough to vibrate everything—bars, seat and pegs—beyond six grand. But there's never so much quaking as to discourage the use of the 650's full powerband.

Assuming you exploit the engine on an empty highway, be prepared for a drastic collapse in gas mileage. Our overall average was 43.8 mpg. But very fast desert cruising yielded figures in the low thirties. At full-wick the four 24mm Mikunis really funnel the gas down the KZ's long intake tracts, and the Kawasaki isn't using the best stuff at the pumps either. The engine has been designed to take lead-free gas, so the KZ runs on an octane level (86–87) about one cut above tomato juice.

Our test bike did have one unhappy carburetion characteristic. After being run hard, the engine would immediately die away at idle, though it would then restart and idle evenly.

Long-distance riders may see in the 650 a new Japanese awareness of saddlery. Kawasaki is on the road to Comfort City, proceeding in fits and spurts. The KZ650 seat provides a good example. The padding is deep-cushion stuff, fit for an easy chair. You can get in 200 to 250 miles on the saddle before it starts to grow teeth. For cushiness it's fine, but the contours (flat top, slab sides) have nothing to do with the loaded-area shapes of sitting humans. With a better, more anatomical shape, the KZ650 might make a long long-distance perch. But we'll never know until Kawasaki catches up on suspension.

At the moment, the front runners in the comfy-suspension derby are the BMW, the Yamaha 750 and Suzuki 750. In terms of eliminating stiction, the Kawasaki isn't in the same league with the leaders; the KZ650 rates with current, 1976 model Honda 750 Fours. The KZ's overall suspension compliance ranks far below the GS750 Suzuki, and everybody still trails Yamaha's 750 and the BMW.

When the KZ's front suspension encounters freeway ripples and seams, the rider gets a telegraphic jarring through the handlebars. That's nothing compared to the stiffing you can get from the rear end, which has the old Japanese one-two: springs too strong, dampers too limp. It's a curious state of affairs. Here Kawasaki is with a second-generation multi that has late first-generation suspension.

Fast mountain riding strengthens that impression. The high-speed handling lacks precision and predictability, thanks to the shocks—and perhaps the swing arm. Once the suspension fluids warm up, in fast corners the bike feels uncertain where it should go, and a good bump in a 70–80 mph arc will produce a wobble. Getting into a decreasing-radius corner at racing speeds with the brakes on will give the feeling that the front tire is sticking hard, but the rest of the machine is pivoting around that point, gyrating with more enthusiasm than we care for.

When the fork oil warmed up, the front suspension would lose about half its travel, as if in a hydraulic lock on compression. This behavior suggests overfilling; although the fluid level was to specifications, we suspect that the specs in this case are in error.

On balance, and if not pressed too hard, the KZ650 handles well enough, has adequate ground clearance for almost all riders (except 200-pound fliers who will ground out the centerstand on the left; it should be tucked in higher), but lacks the crisp handling of the CB750F and the GS750 Suzuki.

The disc front and drum rear brake are nicely matched. The front may be a tad more sensitive than the normal Japanese anchor, but it's always predictable and never fades. The motorcycle doesn't need a rear disc brake; the drum unit is sufficient, happily reluctant to lock the wheel or make it chatter. The Dunlop tires, made in Japan, are very good indeed. They add confidence to compensate for some of what the rear dampers subtract.

To a man, *Cycle* staffers liked Kawasaki's new 650. It's far too competent a motorcycle not to like. Taken by itself and for itself, as one staffer put it, the bike rates as highly satisfactory, bordering on excellent. At the same time no one was wildly enthusiastic about the KZ650; in part because it was bigger and bulkier and heavier than expected; in part because the bike was a half-step behind in suspension development; in part because the 650 represented a kind of refinement through repetition, characteristic of UJMs; and in part because the machine didn't—and couldn't—deliver on its advance performance billing.

The KZ650 is new without being new. That really doesn't matter. But it's also new without being exciting. And that does matter. *

KAWASAKI KZ650

Price, suggested retail	POE West Coast $1995
Tire, front	3.25H19 Dunlop F6
rear	4.00H18 Dunlop K87
Brake, front	10.75 in. x 1.7 in. x 2 (275mm x 66mm x2)
rear	7.08 in. x 1.57 in. (280mm x40mm)
Brake swept area	131.5 sq. in. (848.3 sq. cm.)
Specific brake loading	5.11 lbs./sq. in. at test weight
Engine type	Four-stroke D0HC Four
Bore and stroke	62mm x 54mm (2.44 in. x 2.13 in.)
Piston displacement	652mm (39.8 cu. in.)
Compression ratio	9.5:1
Carburetion	4; 24mm Mikuni VM24SS
Air filtration	Pleated dry element
Ignition	Battery and coil
Bhp @ rpm	48.96 @ 8000
Torque @ rpm	33.25 @ 7500
Rake/Trail	27°/4.25 in. (108mm)
Mph/1000 rpm, top gear	12.68
Fuel capacity	4.4 gal. (16.8 liters)
Oil capacity	3.7 qts. (3.5 liters)
Battery	12V, 10AH
Primary transmission	2.55; Hy-Vo Chain
Secondary transmission	2.63 (42/16); Enuma Endless EK530SH-T20
Gear ratios, overall	(1)15.63; (2)10.93; (3)8.52; (4)6.97; (5)5.97
Wheelbase	56.6 in. (1440mm)
Seat height	31.5 in. (800mm)
Ground clearance	6 in. (152mm)
Curb weight	498 lbs. (225.9 kg)
Test weight	673 (305.3 kg)
Instruments	Tachometer, Speedometer, Odometer, Tripmeter
Standing start ¼-mile	14.53 @ 98.14
Average fuel consumption	43.8 mpg
Speedometer error	
Indicated 30 mph, actual	29.82
Indicated 60 mph, actual	58.60