Riding Impressions: Honda CBR400F, NS250R, Kawasaki KR250, Suzuki GSX-R, GS250FW, Yamaha FZ400R, RZV500

TESTS: Harley-Davidson Softail, Honda VF700F Interceptor

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THE BIKES OF Japan

CYCLE WORLD VENTURES TO THE LAND OF THE RISING SUN TO RIDE THE MAGNIFICENT SEVEN, A BAKER'S HALF-DOZEN OF MOTORCYCLES THAT HAVE NEVER MADE A TIRE-PRINT ON THESE SHORES

by Steve Anderson

Invariably, America only sees about half of the motorcycles made by the Japanese. There's a distinct dividing-line at 400cc in Japan, and models bigger than that usually end up in the U.S., most of them designed with the American market in mind. But there's another whole world of motorcycles sold in Japan that this country doesn't ever see.

These under-400cc bikes proliferate not because they're cheap or make good entry-level machines, but because legislation makes it very difficult to ride a larger motorcycle in Japan. Less than 2 percent of the Japanese market consists of over-400cc motorcycles. So all of the needs that are filled in the U.S. by Ninjas and Intereceptors and the like have to be met in Japan by far-smaller machines.

Boring motorcycles, however, won't cut it. So to serve the home market, the Japanese motorcycle companies have had to learn how to build big excitement into small packages. They've learned well. They've built 400s that run 12-second quarter-miles, and 250s that easily top 110 mph. They've made streetbikes that set new standards of handling, and styled them to look more like GP roadracers than anything else. And they've incorporated technology yet unseen in the U.S. market.

We've known about and lusted after many of these "secret" Japanese models for some time, having seen them pictured in magazines we can't even read. Finally, we did more than dream: we loaded our leathers, our helmets and our computerized test equipment, and headed for Japan. There we rode seven of the most exciting and interesting motorcycles to be found anywhere, and in the process learned a lot about the culture that produced them. We think you'll be as fascinated with our discoveries as we were.

PHOTOS BY K. OTA

Kawasaki KR250

PICKING UP WHERE THE RACE TEAM LEFT OFF

With the stoplight about to turn green, our guide through Tokyo looked back and winced. He was unnerved by the raspy wail of the KR250 behind him preparing to launch away from a traffic light at 8000 rpm. It was a racetrack sound, out of place in most cities. But in Tokyo, even the taxicabs come off the line hard. And to stay ahead of traffic and keep up with our guide's quick and torquey Yamaha RZV500, the peaky Kawasaki demanded dragstrip starting techniques.

Indeed, one way or another, the KR250 brings out the closet racer in the most conservative of riders. That's its heritage. Three years ago, Kawasaki won a world championship with another bike named KR250. But while the street KR owes its basic design to the racer KR, the two share no parts. Both have at their heart a twin-cylinder two-stroke engine that is, in effect, two 125cc Singles mounted one behind the other in a common crankcase, their cranks connected by large gears. Rotary-valve induction is used on both racer and replica, with dual carbs feeding into the side of the crankcase. An exhaust pipe from the front cylinder tucks under the engine; the other pipe snakes its way from the back of the rear cylinder to exit high near the seat. Both KRs are narrow, light and powerful.

That racer heritage shines through in the street KR250. The engine pulls cleanly everyplace, but it's happiest between 8000 and 10,500 rpm. When the engine hits eight grand at full throttle in first gear, the front wheel claws for the sky while the KR leaps forward almost as quickly as a catalyst-equipped RZ350 Yamaha. And the Kawasaki cruises smoothly and effortlessly at speeds unheard of for a 250: 80, 90, 100 mph. Top speed is well over 110 mph. The penalty is that, much like a racing 250, the KR only makes good power in one gear at any given speed. Come out of a corner a gear too high, the engine will drone ineffectively.

Handling-wise, the KR is quick-steering yet stable, and the suspension is supple over small bumps, rather harsh over large ones. The only real handling defect, however, comes from the slightly rearward weight bias: The front end lightens so much under power that the steering can be vague and imprecise when charging out of slow turns.

Still, for a thoroughbred racer that's been tamed for street use, the KR250 has few weaknesses. It's racy enough to be more high-revving fun on the street than just about anything on two wheels.

Kawasaki KR250

Price (in Japan)	$2041
Engine type	liquid-cooled, disc- and reed-valve, two-stroke tandem Twin
Displacement	249cc
Claimed horsepower	45 bhp @ 10,000 rpm
Bore x stroke	56.0 x 50.6mm
Gearbox speeds	6
Wheelbase	53.5 in.
Weight (½ tank)	331 lb.
Weight distribution	46/54 percent
¼-mile performance	13.64 sec. @ 95.51 mph
Calculated speed in top gear at 10,500-rpm redline	112 mph

Honda NS250R

FORMULA TWO GOES COMMUTING

There's a road in Japan, just two hours outside of Tokyo, that twists and winds through rugged countryside like a ribbon draped over a bush. The turns are tight and banked, the surface clean. And on this road, Honda's NS250R is magic. It can brake deeply into the corners, bank through them at radical angles, and charge out like a for-real roadracer. On this road, the NS250R has no match.

Unfortunately, the bike has to be ridden to this magical road. And riding the NS in traffic can be as miserable as riding it on The Road can be fun.

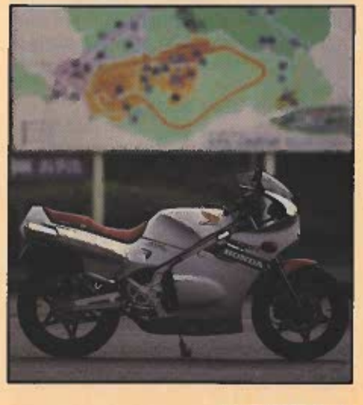
The key to understanding the NS250R's behavior can be found in Honda's brief history with the 250cc two-stroke streetbike class so hotly contested in Japan. Honda first entered the market two years ago with the MVX250, a V-Three patterned loosely after Freddie Spencer's 500cc GP racer. The MVX was pleasantly torquey for a 250, but not as fast as the competition. Nor did it sell as well. So Honda reasoned that if a torquey, civilized, not-very-fast two-stroke wouldn't sell, the answer was to build the opposite—the NS250R.

Mechanically, the NS seems state-of-the-art, powered by a 90-degree V-Twin housed in an aluminum chassis. The reed-valve engine incorporates some sophisticated technology, including Nikasil-type coated aluminum cylinders and an electric ATAC system (similar to the mechanical systems on Honda's CR125/250 MXers) on the front cylinder only. And in styling, the NS is an authentic replica of a real GP racebike, right down to the optional sponsors-decal package.

But not only does the NS look like a circuit bike, it behaves like one. Power comes in with a vicious kick at 8000 rpm, and the engine pulls *hard* right past the 10,500-rpm redline. And the NS can flick into corners with a quickness that makes the bike feel more like a grand prix roadracer rather than a street-going motorcycle.

Indeed, but the NS *is* a streetbike, and problems arise when it is ridden like one. It pulls smoothly but slowly up to 4000 rpm, and from there to 6000 it burbles and bucks. It smoothes out again at 6000, but still doesn't pull with authority until it lunges forward at 8000 rpm. So in traffic, the rider has to choose between putting along at low revs while being passed by mopeds, or surging ahead in the powerband for a second before having to back off. And either way, the NR billows clouds of blue exhaust smoke.

Thus, the NS250R is a flawed gem. On a racetrack or the right road, it sparkles; but on the average street, it has all the glitter of a fouled sparkplug.



Honda NS250R

Price (in Japan)	$2209
Engine type	liquid-cooled, reed valve, two-stroke, 90-degree V-Twin
Displacement	249cc
Claimed horsepower	45 bhp @ 9500 rpm
Bore x stroke	56.0 x 50.6mm
Gearbox speeds	6
Wheelbase	54.1 in.
Weight (½ tank)	339 lb.
Weight distribution	48/52 percent
¼-mile performance	13.70 sec. @ 98.36 mph
Calculated speed in top gear at 10,500-rpm redline	121 mph

Suzuki GSX-R

A 369-POUND, 400cc STRATEGIC STREET WEAPON

Twelve-second quarter-miles from just 400cc—that's what you need to know about Suzuki's GSX-R. It's a motorcycle designed to devastate the competition in Japan's highly competitive 400cc class. And in most respects, the GSX-R does just that.

Radical engine technology isn't behind the GSX-R's phenomenal performance. Its engine is conventional by Japanese standards—a liquid-cooled, 16-valve, inline-Four that first appeared in Suzuki's more-civilian GSX400FW. There, it made only 50 horsepower, so it required a boost before going into something as racy as the GSX-R. That boost was brought about through standard hot-rod techniques: larger valves, more compression, wilder cam profiles. The hop-up wasn't entirely the work of Suzuki's engineers; Pops Yoshimura, who has close ties with the Suzuki factory, helped in the prodding of 59 horsepower from 400cc.

But it's not engine performance that distinguishes the GSX-R from its competitors; it's weight. The bike is a featherweight at 369 pounds, fully 75 pounds lighter than Honda's CBR400F. Even a U.S.-model RZ350 is about two pounds heavier. The aluminum frame of the GSX-R is an aid to lightness, but only attention to detail fully explains the lack of bulk. A perfect example is the twin headlights, which use lightweight plastic lenses rather than heavy glass.

Light weight pays off in more than just acceleration. On the racetrack, the GSX-R is stable while being wonderfully flickable, a combination resulting from what would be slow steering geometry on a heavier machine. The engine is noticeably torquey as well, arousing suspicions that its 59 horsepower is measured only at the brochure, and that its designers knew that removing weight would improve the power-to-weight ratio with less compromise than would leaning on the engine excessively.

The GSX-R works nearly as well on the street as on the track, with a few exceptions. The brakes fade in hard use, and never completely come back, and quick stops call for high lever-pressures. The clutch suffers a similar fate in traffic, becoming grabby and making smooth riding difficult. Those are minor annoyances, though, compared to the toasting the rider's upper body and hands get in hot weather. The blast of air from the radiator is hot enough to turn a pleasure ride into an endurance contest. Fortunately, Suzuki now offers ducts that direct this heat away from the rider.

Nevertheless, the GSX-R is a motorcycle that points the way to a new performance future, one where light weight is as important as ultimate horsepower.

Suzuki GSX-R

Price (in Japan)	$2578
Engine type	liquid-cooled, dohc 16-valve, four-stroke inline-Four
Displacement	398cc
Claimed horsepower	59 bhp @ 11,000 rpm
Bore x stroke	53.0 x 45.2mm
Gearbox speeds	6
Wheelbase	56.1 in.
Weight (½ tank)	369 lb.
Weight distribution	52/48 percent
¼-mile performance	12.78 sec. @ 101.48 mph
Calculated speed in top gear at 12,000-rpm redline	124 mph

Yamaha FZ400R

FOR A CHANGE, THE MOTOR ISN'T THE MESSAGE

PHOTO BY KEN VREEKE

For many motorcycles, it's the engine that leaves an indelible impression, that engraves itself into memory. How could you forget the yowling CBX Six or the quaking torque of an XR1000? That'd be difficult, but it's all too easy for the inline-Four engine in Yamaha's FZ400R to slide from mind.

That's not to say the FZR doesn't leave its imprint. After riding it, you're filled with wonder that any motorcycle can steer so precisely, so positively, and you're left with a new standard for motorcycle handling.

A spec sheet doesn't give a clue that the chassis, not the engine, is the center of interest for the FZR. The engine has all the trendy features: 16 valves, liquid cooling, a large bore combined with a short stroke. But in practice, the engine isn't impressive. It pulls well at low speeds, goes slightly flat in the middle, then picks up again at the top of the rev range. It's a perfectly usable powerband on the racetrack, but more midrange would be welcome on the street.

Looking at the chassis doesn't fully build expectations, either. The frame is reminiscent of the FJ1100's, with rectangular steel tubes wrapping around the sides of the engine instead of over the top. Tire sizes are the same as for the other 400s (16-inch front, 18-inch rear), and steering geometry is only slightly quicker (26-degree head angle and 4 inches of trail).

Whatever the difference, however, it tells you that it's there the first time you whip the bike through an S-bend. The chicane at the end of the front straightaway at Sugo Circuit, for instance, can be taken at around 80 mph on a good streetbike. It requires hard braking, then a quick flick to the right and a hard flop to the left, with no time for a gradual transition. Every other motorcycle we rode at Sugo was work through the chicane, but the FZR sailed through so easily and precisely it left us wondering why we weren't going faster.

This magical handling hasn't come without a few penalties. The FZR does, after all, have a sticker on the side that says "Pure Sports." The seat is thinly padded, if well shaped, and the suspension is stiff enough to make the wheels chatter on a bumpy road. Steering lock is about half that of other streetbikes, so a simple task like turning around in a driveway can be a chore.

Still, we're willing to forgive the FZR far worse than these minor defects in exchange for handling that rivals that of GP machines. It leaves us wondering if the rumored FZ700R can be as good. And praying that it is.

Yamaha FZ400R

Price (in Japan)	$2451
Engine type	liquid-cooled, dohc, 16-valve, four-stroke inline-Four
Displacement	399cc
Claimed horsepower	59 bhp @ 12,000 rpm
Bore x stroke	54.0 x 43.6mm
Gearbox speeds	6
Wheelbase	54.5 in.
Weight (½ tank)	391 lb. (est.)
Weight distribution	n.a.
¼-mile performance	13.20 sec. @ 99.50 mph
Calculated speed in top gear at 12,500-rpm redline	124 mph

Honda CBR400F

PERFORMANCE WITHOUT THE PAIN

In every way, the CBR400F Endurance surprises. It competes in a class filled with fierce sportbikes as uncompromising as a Ducati Pantah; yet the CBR is cushy and comfortable by comparison, without sacrificing anything but the last fraction of racetrack handling. It gives away 75 pounds to the Suzuki GSX-R, but is only marginally slower. With the CBR, Honda has mastered the trick of having the cake and eating most of it, too.

With that weight disadvantage, the CBR400F can't afford any power disadvantage as well. And although its air-cooled, 16-valve, inline-Four doesn't look special, new technology lurks inside the ordinary exterior, hinted at only by the REV acronym cast into the cylinder head. The REV system mechanically disconnects one inlet and one exhaust valve from each cylinder at low engine speeds, and sets them operating again at high rpm. This allows radical cam timing without killing low-speed power.

On the road, the CBR engine with REV lives up to its promise. At low rpm the engine pulls at least acceptably, and even better than that if the standard of comparison is the original Honda CB400 Four. Then, at 8500 rpm, there's a leap in power that's almost two-stroke-like as all 16 valves go to work and send the CBR rocketing toward its 12,750-rpm redline. Amazingly, vibration is almost non-existant, with only a brief bit of buzzing between 5000 and 6000 rpm.

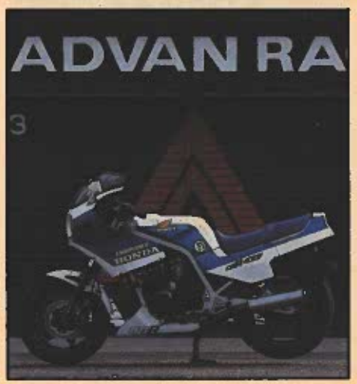
Handling on the CBR is solid, and it starts to feel slightly mushy and underdamped only at racetrack speeds. Motorcycles that work better on the racetrack don't ride as well as the CBR, so the suspension is a very reasonable compromise for street use. The CBR's 16-inch front wheel and quick steering geometry allow it to turn nimbly, but without sacrificing stability. No wiggles or wobbles here.

Sacrifice, in fact, is a word that's not in the CBR's vocabulary. Its seat is soft and well-shaped, the riding position is sport-touring rather than pure sport, and the fairing keeps the wind blast off the rider's chest without bathing him in heat from the engine. The only discomfort comes from footpegs that are too close to the seat, cramping taller riders after a few hours on the road.

There's a lesson to be learned from the CBR. It's that the last few percentage points of performance are often purchased at a dear price. The CBR isn't the quickest or best-handling 400, but it can deliver performance approaching 550-class standards, and do it without pain.

Honda CBR400F Endurance

Price (in Japan)	$2451
Engine type	air-cooled, dohc, 16-valve, four-stroke inline-Four
Displacement	399cc
Claimed horsepower	58 bhp @ 12,300 rpm
Bore x stroke	55.0 x 42.0mm
Gearbox speeds	6
Wheelbase	54.7 in.
Weight (½ tank)	444 lb.
Weight distribution	46/54 percent
¼-mile performance	13.19 sec. @ 99.80 mph
Calculated speed in top gear at 12,750-rpm redline	123 mph



Suzuki GSX250FW

WELCOME TO THE SCHOOL OF THIMBLE-PISTON TECHNOLOGY

Every once in a while, some motorcycle company decides to find the smallest engine displacement that can be divided into four cylinders. Honda did it in 1973 with the CB350F, Benelli responded a few years later with its 250 Quattro, and now there is the Suzuki GSX250FW.

Suzuki's little Four is a technical marvel of sorts. The four-stroke, double-cam, liquid-cooled, 249cc mini-motor has 44mm pistons traveling through a 41mm stroke. Just how big is a 44mm piston? Three of them could fit into a Honda XL600 cylinder without touching each other or the cylinder wall. But even engineers hell-bent for miniaturization couldn't bring themselves to put four itsy-bitsy valves in a space well under two inches in diameter, so the GSX makes do with two valves per cylinder.

The rest of the motorcycle is more normally sized, scaled-down to about 90 percent of a typical 550. Shorter people fit it best, but even a six-footer isn't cramped. The styling, which is reminiscent of an '83 Suzuki GS750E, is only medium-sporty rather than effecting the pure racing look that is typical of the hot-rod 250s sold in Japan.

That's okay, for this 250 doesn't pretend to be a pure sportbike. It can't. First, it weighs 398 pounds with a half-tank of gas; that's 30 pounds more than Suzuki's own 400cc GSX-R, and 70 pounds more than the two-stroke 250s. Second, the tiny, high-tech Four simply doesn't put out much power. Suzuki claims 36 horsepower at 11,000 rpm, which is substantially below the 45 bhp the two-stroke street racers all make. The non-impressive power-to-weight ratio of the GSX leads to non-impressive performance, as indicated by its mid-16-second quarter-mile. The GSX feels particularly gutless when pushed hard, requiring high revs without accelerating very briskly in return.

On the other hand, the GSX250 is a sophisticated, scaled-down sport-tourer for the rider not in a great hurry. It will eventually reach speeds of 90 mph or more on the open road, so it's adequately fast there. When not asked to accelerate hard, the Suzuki loses its gutless feel, and the engine is as about as velvety smooth as anything with reciprocating parts can be. The chassis, which is far ahead of the engine no matter how the bike is ridden, delivers quick steering with big-bike stability. The seat is well-shaped and padded, and the bars and footpegs placed for long-range comfort. All in all, the GSX is the luxury 250 that offers four-cylinder looks and feel in the smallest Japanese multi yet.

Suzuki GS250FW

Price (in Japan)	$1983
Engine type	liquid-cooled, dohc, four-stroke inline-Four
Displacement	249cc
Claimed horsepower	36 bhp @ 11,000 rpm
Bore x stroke	44.0 x 41.0 mm
Gearbox speeds	6
Wheelbase	55.1 in.
Weight (½ tank)	398 lb.
Weight distribution	46/54 percent
¼-mile performance	16.58 sec. @ 77.81 mph
Calculated speed in top gear at 12,000-rpm redline	100 mph

Yamaha RZV500

A GRAND PRIX BIKE WITH STREET MANNERS

Brutal. Peaky. Inhumanly fast. Vicious.

That seems to be what most people *think* the RZV500 ought to be like to ride. But what else could they think? The RZV is the closest thing in years to a street-legal replica of a winning 500cc GP racebike; and Kenny Roberts and his peers routinely complain that the GP bikes have gotten too fast and too hard to ride.

But that's not how the RZV is at all. It *is* a very fast motorcycle that *is* closely related to Yamaha's GP machine, but it's anything but an untamed racer. Instead, the designers have taken the racebike's design, filtered it through their years of two-stroke experience, and produced an amazingly civilized streetbike.

Of course, the RZV looks like the racer, from its beautifully made aluminum frame to its 50-degree V-Four two-stroke powerplant. But important differences exist between last year's race engine and the RZV engine. The RZV has reed valves instead of the racer's disc valves; and both share a design that gears two separate crankshafts together in one crankcase, but only the street engine has a vibration-reducing balance shaft. And while the racer makes around 150 bhp, the European version of the RZV makes 91, and the Japanese RZV we rode has restrictors in the exhaust system that drop bhp to 64.

Which is not to say that the Japanese RZV is slow; it runs high-12-second quarter-miles at 105 mph, with suprisingly good power over the entire rpm range. It pulls strongly from the bottom on up, with the best power coming between 6000 and 8500 rpm. In Tokyo traffic, the RZV could easily be ridden two gears higher than the accompanying four-stroke 400s, so torquey is its engine.

That's one reason why the RZV seems at home on the street. It cruises the highway smoothly and comfortably. The fairing offers good protection and the seating position is not extreme. The engine has the same refinement as the one in the RZ350, with little but the exhaust note and the lack of engine braking to tell you it's a two-stroke. The only intrusion is the engine vibration that buzzes the pegs and grips above 8000 rpm, and at any speed on trailing throttle.

On the racetrack, the RZV lives up to its heritage. The steering is rather heavy, but the bike can be rolled into corners quickly and securely. Only the tires are not trackworthy, allowing the bike to slide prematurely for such a high-performance motorcycle.

But it's no surprise that the RZV does well on the racetrack. The surprise is that a street-going GP replica can have sufficient manners to work as a civilized sport-tourer.

Yamaha RZV500

Price (in Japan)	$3381
Engine type	liquid-cooled, reed valve, two-stroke, 50-degree V-Four
Displacement	499cc
Claimed horsepower	64 bhp @ 8500 rpm
Bore x stroke	56.4 x 50.0mm
Gearbox speeds	6
Wheelbase	54.1 in.
Weight (½ tank)	417 lb.
Weight distribution	47/53 percent
¼-mile performance	12.90 sec. @ 105.19 mph
Calculated speed in top gear at 10,000-rpm redline	142 mph

秘密東洋

Beyond Pit-Road

HONDA RACING CORPORATION

by Ken Vreeke

Standing in the lobby of HRC, we are surrounded by the ornamentation of battle: silver victory cups, gold world-championship medallions, photographs of Freddie Spencer, Mike Baldwin, Eddie Lejeune, David Bailey and the rest of Honda's hired guns. In the center of the white-tiled vestibule is an enormous scoreboard, labeled "'84 Race Guide," that keeps track of more than 20 separate world and national championships, with blood-red squares woven like bull's-eyes into a white background. Each bull's-eye denotes a win at a championship event, and at this stage there are 95 bull's-eyes in all. This scoreboard is what HRC is all about.

At the beginning of the 1982 racing season, Honda issued a manifesto outlining its forthcoming racing plans. In essence, that declaration stated quite clearly that Honda would compete in all facets of motorcycle sport, and that the company intended to pursue this venture with unprecedented brio.

Integral to Honda's master plan was the formation of HRC (Honda Racing Corporation) to replace the existing RSC (Racing Service Center) organization. At the time, the development of all Honda motorcycle products, including racing machines, was carried out by Honda R&D, a separate company within the parent Honda organization. All racing equipment was deployed, however, through RSC, yet another sibling company, headquartered at the Honda-owned Suzuka Circuit testing facility. Honda R&D already was heavily involved in racing, and there was little room for expansion within the bulging walls of its facility; so plans were made to phase out RSC entirely and build a separate new R&D center that could be devoted solely to competition. That would streamline the development of racing machinery and allow the company to focus its energies more sharply on the business of winning championships.

By September of 1982, HRC had been formed; and seven months later, the new racing R&D center, with a work force of 240, officially opened its doors in Niiza City, 20 miles northwest of Tokyo. Thus far, little is known and much has been speculated about the new operation because its doors open only to HRC employees and blood relatives of Soichiro Honda. For all others, entry is available when pigs learn to fly. Secrecy is, after all, a key element in mounting a successful frontal assault.

So how, then, did two representatives of the press,Technical Editor Steve Anderson and I, come to find ourselves in the belly of the beast? Good question. One for which, at that point, we had no answer. We had requested a visit to see what we could see and to hold counsel with the nimble minds behind Honda's front-line weaponry—fully expecting, of course, to be politely turned down. Much to our surprise, Honda agreed and threw in a guided tour to boot, so long as we left our cameras in the lobby—directly below a flock of hovering pigs.

Our tour of HRC began right in the lobby. Displayed like high-powered calling-cards were six intriguing motorcycles: the NS500 triple, upon which Freddie Spencer had won the 500cc World Championship; the oval-piston NR500 V-Four four-stroke, sporting a carbon-fiber composite frame, a gold-anodized engine and a bizarre tachometer that started at 10,000 rpm and dropped off at 24,000 rpm; the FWS V-Four, Mike Baldwin's 1000cc ticket to the 1981 AMA Formula One championship and Honda's best shot yet at terminating Yamaha's Daytona dominance; a freakish, 125cc, twin-cylinder two-stroke motocrosser with a twin-shock, RIBI-type articulating front end; a 250cc two-stroke twin MXer sporting single-shock RIBI links; and an RC500 motocrosser, the only normal bike of the bunch, which >

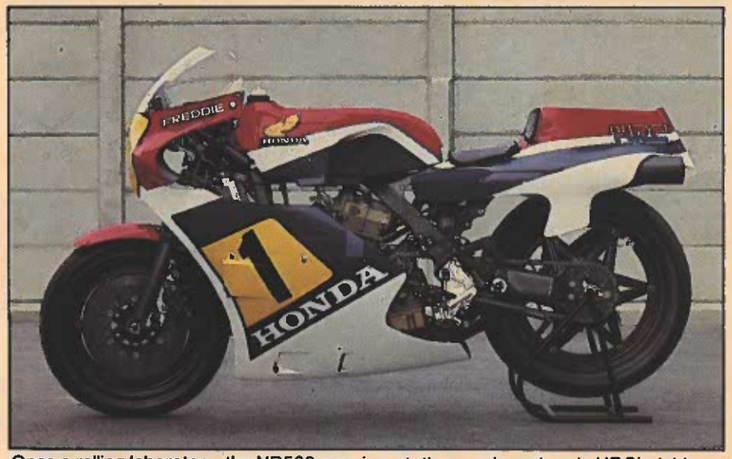
bore the Number One plate earned by Andre Malherbe in the '81 500cc motocross world championships.

Led by tour guides Yoshio Yamada, PR man, Yukinobu Terada, director of number-crunching, and Takeo Fukui, design director in command of all of Honda's grand prix racing efforts, we descended through antiseptic halls to the first floor where ideas are sculpted into working prototypes. We passed through a very complete machine shop, an immaculate inspection area, and into the dyno department, which houses seven Schenk engine dynos and two chassis dynos. The most interesting room contains the field analysis equipment, computers that transform data collected by various sensors attached to the racebikes into hard numbers and graphs. These sensors can monitor throttle position, ground speed, engine rpm, suspension stroke, axle acceleration, and even the slip-rate or wheelspin of the front and rear tires throughout the course of a lap. The slip-rate information has proven invaluable in the development of Honda's dirt-trackers, where the balance of power and wheelspin is the whole ballgame.

Most of HRC's technicians are young and fresh out of engineering schools in Japan. Natural selection hoists the most creative minds out of HRC's workshop trenches and into the design groups, which are headed by 10 experienced engineers. The idea is for the older hands to have a conservative influence on the radical ideas of the company's exuberant youth. There also is a constant roll-over of engineers at HRC, for each year, five percent of those eligible are moved to the prestigious design groups. They are the replacements for those who have graduated from racing to apply their racetrack technology to mass-produced machines.

Honda has used this system to nurture innovation ever since the company began racing decades ago. Shoichiro Irimajiri was a star pupil of the system, designing wonderfully bizarre machines that kept Honda at the forefront of GP roadracing throughout the Sixties. He went on to create the fabled CBX, and now heads Honda's manufacturing plant in Ohio.

With few exceptions, it takes about five years for a budding designer to leave the workshop behind, but there are exceptions. Mr. Kanazawa, the man responsible for the oval-piston NR500, is one such exception. He designed the NR practically before the ink was dry on his diploma, and is generally viewed by HRC management as the Irimajiri of the Eighties. His latest brainchild is a turbocharged 250cc four-stroke, with which Honda hopes to outgun the two-strokes for the 500cc roadracing world championship. The target date for this bold venture is the '86 season, when the FIM rules will permit the use of such machines; but realistically, the turbo NR250 probably won't debut until the 1987 racing season.



Once a rolling laboratory, the NR500 now is a stationary showpiece in HRC's lobby.

Honda's 125cc two-stroke twin made the wrong kind of motocross power.

NR500's oval-piston V-Four broke new ground for future four-stroke engines.

As we strolled through the machine shop, we spotted shelf upon shelf of oval pistons, displacement unknown. Mr. Fukui would reveal only that the new engine did indeed use oval pistons, and that the configuration was a V-Twin, using a single crank, with *at least* eight valves per cylinder and the turbocharger located in the cleft of the vee. With the exhaust ports leading into the center of the vee, the turbo unit benefits from the highest possible concentration of exhaust energy. And with a minimum of turbo plumbing to deal with, HRC engineers have made significant progress in minimizing turbo lag. To further reduce lag, Honda has produced its own turbo unit that uses a lightweight ceramic turbine/compressor assembly.

We also learned that Honda engineers have solved the sealing problems that bothered the Dykes-type rings used on the NR500's pistons. This has opened up vast areas of opportunity for the oval-piston engine, and Honda is wagering heavily on its potential for the future.

At this stage of development, however, HRC engineers are finding it difficult to extract enough power out of just 250cc to be competitive in GP racing. We suspect the horsepower target must be between 145 and 150 at the crankshaft. Dialing in more boost and raising the rpm ceiling has thus far resulted mostly in spectacular engine melt-downs. And when the engine does hold together, it gobbles fuel at such a furious rate that it couldn't finish a GP with the current fuel restrictions.

When and if the current problems are solved, Honda will still be faced with the weight penalty of a four-stroke engine. The engineers claim that fairly standard materials—standard in this case being aluminum, titanium and magnesium—will have to be used in this engine for the sake of durability, though experiments with ceramic valves have been underway for some time. Honda will no doubt try to offset the engine's weight through the use of ultra-lightweight chassis materials, probably carbon-fiber, possibly in a monocoque design using a honeycomb structure. Honda also plans to petition the FIM to bump four-stroke turbo displacement limits up to 375cc.

The NR250 turbo four-stroke project is really only the tip of the iceberg. Mr. Fukui and Mr. Terada made it clear that Honda views itself as a four-stroke company that will not be satisfied until it wins *all* of its championships with four-strokes. Of the seven engine dynos in use at HRC during our visit, the predominant sound piercing the insulated walls was that of poppet-valve engines. Engineers were hard at work on a 600cc four-stroke Single that eventually might be sold here in the U.S. for dirt-track use; and there were a number of dyno rooms that were dark but still warm from the recent running of . . . something.

That something could well have been a 500cc four-stroke motocross powerplant. That's right, fans, *motocross*. Honda plans to mount a serious assault on the 500cc MX world championship with a four-stroke, and will begin with race development in the Japanese Nationals next season, hopefully progressing to the GP circuit as early as 1986. If all goes well, Honda four-strokes might even find their way into the 125 and 250 classes. Specifics on these engines may depend on the success of the oval-piston NR250, but it's likely that Honda's first wave of four-stroke motocrossers will use conventional pistons.

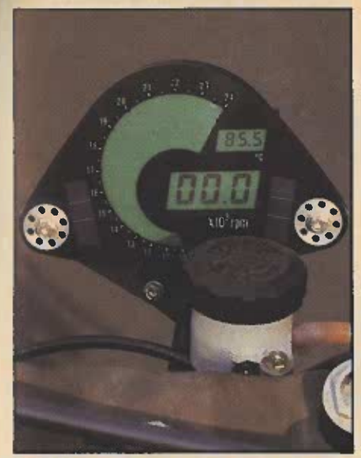
Realistically, the strategists at Honda know that the transition from two-stroke to four-stroke racing will not take place overnight. Which is why we might see HRC running two separate teams in the future, one on two-strokes and one using four-strokes. HRC has already made plans to field a 250cc grand prix roadracing effort next year with the NS250 two-stroke through its European importers.

All this boils down to one inescapable conclusion: Honda is dead-serious about four-strokes and views them as the company's One True Calling.

For HRC, there are many questions to be answered, most of them hinging on the success of Mr. Kanazawa's oval-piston engine. But for you and me, it is a question of how much of this racing technology will find its way into mass-production machines. While some motorcycle manufacturers race what they sell, Honda seems more likely to sell what it races. Witness the MVX250F two-stroke Triple and the NS250 two-stroke Twin sold in Japan and Europe, as well as the V-Four Interceptor series. All of these motorcycles directly reflect technology learned at the racetrack.

Considering the incalculable millions Honda has funneled into racing, could oval-piston motorcycles for the masses be far off? Already the Japanese press is rife with rumors of Honda preparing for the introduction of a high-revving, turbocharged, 250cc V-Twin four-stroke for the Japanese market. And the fact that Honda allowed two American motojournalists to poke around inside HRC's secret nerve center indicates that the company wants to start preparing the public for what's to come.

We've seen a few of Honda's new ideas. And in all likelihood, that is only the beginning.



NR500 won't ever see production, but its trick digital tachometer probably will.

HONDA IS DEAD-SERIOUS ABOUT FOUR-STROKES AND VIEWS THEM AS THE COMPANY'S ONE TRUE CALLING


Carbon-fiber frame on HRC's NR500 showbike is for looking, not riding.

RIBI-forked, twin-cylinder 125cc MXer is not scheduled for production.

Gallery

A COLLECTION OF 12 MORE MOTORCYCLES FROM JAPAN THAT HAVE NEVER BEEN SEEN IN THE U.S. WE DIDN'T RIDE THEM, BUT THEY'RE EXCITING AND INTERESTING.

Twenty-two-horsepower 125s like the Kawasaki AR125 are popular in Japan.

Steel-framed and unfaired, the Honda NS250F is cousin to the NS250R. Both use the same engine, but the F is $500 cheaper.

A frame-mounted fairing and a smaller engine distinguish Yamaha's RZ250R from the U.S. RZ350; expect the new fairing in this country soon.

Japan's best-selling 250 is Honda's VT250F, a four-stroke, 90-degree V-Twin. The latest version makes an amazing 40 horsepower at a sky-high 12,500 rpm.

Suzuki's RH250 is a street-legal motocrosser that borrows its "RH" designation from Suzuki's works MX bikes.

Scooters have taken a racy turn in Japan. The Honda Beat comes with Star Wars styling and an aluminum-can muffler.

Suzuki's GSX400FW, which shares its basic engine with the GSX-R, is sold as a more comfortable alternative to the higher-performance R-model.

Nostalgia is served by Honda's GB250 Single. What does GB stand for? Why, Great Britain, of course, the home of this motorcycle's styling.

Suzuki started the aluminum-framed, hot-rod 250 wars with the RG250 Gamma, which has become a common sight on Tokyo streets.

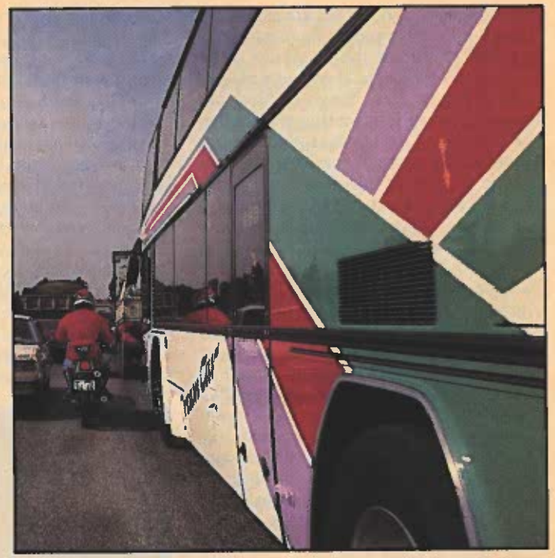
Honda builds two-stroke streetbikes for the very competitive Japanese market. This one is the MBX125, a 125cc Single that puts out more than 20 horsepower.

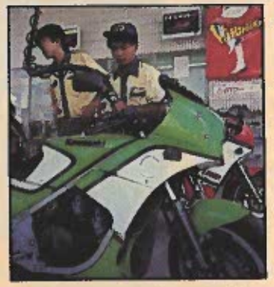
Light weight was a primary goal of Yamaha's SRX250, a four-stroke Single intended for the female market. It may soon have a big brother in the U.S. in an SRX600.

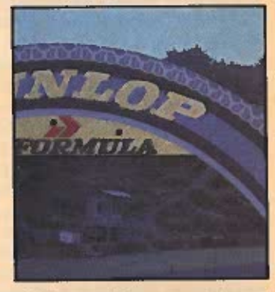
Enduro looks are offered by the Honda MTX200R, a liquid-cooled, ATAC-equipped dual-purpose bike. Despite the specs, it's more at home on the street than in the dirt.

the Tokyo Grand Prix

AN ABUSE OF COMMON SENSE IN THE NAME OF SCIENCE, SAKE AND SONIC ADVENTURE







Ask the average American rider how much he knows about Japanese motorcycles and you're liable to get a more detailed answer than you bargained for. But ask him how much he knows about Japanese motorcycle *riders*, and what you're most likely to get in return is silence.

There's good reason for that, and it has nothing to do with the intelligence of the person being asked the question. The problem is that while there has been enough written on the subject of Japanese motorcycles to cover those tiny islands to a depth of ten feet, not much has been committed to paper about the people in that country who ride. So all that most Americans could be expected to do if asked such a question would be to guess, to try to reach some conclusion about the average Japanese rider based on what they know about that country's motorcycles. And they'd probably conclude that Japanese riders are much like their bikes—sensible, efficient, highly refined, socially inoffensive, often dispassionate and sometimes bordering on the generic.

Apparently, then, Steve Anderson and I are recent graduates from from the ranks of average motorcyclists; because before our trip to Japan to test the seven bikes you've just finished reading about, we didn't know much about Japanese riders, either. But we wanted to learn. And we decided that the best way to do that would be to avoid mass-transportation and the usual tourist trappings whenever possible during our trip, and instead become an integral part of the Japanese motorcycling mainstream.

Thankfully, we had a lot of help in accomplishing that goal. For one thing, the people at *Cycle World* of Japan, our Tokyo-based brethren in the great CBS magazine family, had been kind enough to arrange the loan of the seven domestic bikes we wished to test-ride; they also contracted the interpreting services of Ken Frankel, an American journalist living in Tokyo who is fluent in Japanese. Having an interpreter while traveling in Japan is essential if you aren't hooked up with some sort of pre-packaged tour. Because if you think you've been frustrated when reading a roadmap written in English, try decifering one written in Japanese. It's a lot like trying to unravel the secrets of the universe by reading what your two-year-old daughter has scribbled on the bedroom wall.

Our experiences started in earnest right in metropolitan Tokyo, where, at last count, there are over 21 million people living. Tokyo is no doubt a wonderful place, combining the energy of New York and the neon glow of Las Vegas with a benevolence toward strangers found nowhere else in the world, but the city lacks elbow room like a phone booth full of college kids. And it didn't take long for us to discover that the laws gov- >

erning Tokyo traffic either are extremely liberal or largely ignored by most everyone. Either way, it didn't matter, since we couldn't have read them anyway.

To Western eyes, Tokyo traffic looks downright deadly, appearing to be a chaotic tangle of near-misses that always seems on the verge of crashing to a halt in one giant, flaming pile-up. Cars change lanes, leap away from stoplights and grind to a halt at a pace that would make Richard Petty a little nervous. So intense is Tokyo traffic that one company has introduced a video game, called Zippy Rider, that pits a lone motorcycle against a field of swerving traffic. The game is one of those sweaty-palm affairs that capture all of the sporting aspects of Tokyo traffic, in spirit if not in actuality.

Despite its dark-star density, though, Tokyo traffic flows steadily onward. Accidents are rare occurrences, mopeds and motorcycles are plentiful, and fists are seldom raised in anger. But only in Japan could all of this possibly work. Install American drivers in Tokyo traffic and try to move it at the same pace and you'd cause more destruction than another world war.

The catch to all this is that you have to be damn good at the controls to survive. The level of driving and riding competence in Tokyo is uncommonly high, partially because of strict licensing laws and partially because of Japanese penal code 211. To a certain extent, this one article controls the whole ballgame. It labels any motor vehicle operator as a professional; and under Japanese liability, any licensed professional who causes damage or injury as a result of negligence is subject to criminal prosecution. Hit somebody or force someone off the road and you could find yourself in the slammer.

There is also a "Last Chance" liability law, which states that you must do everything in your power to avoid an accident regardless of fault. If you don't, you might find yourself sharing a cell with the driver who rammed you. Worse still, serving jail time in Japan can get you and your entire family ostracized from the rest of society.

Despite its Big Brother overtones, this self-regulating, drive-at-your-own-risk system works. It awards driving skill and ingenuity, and practically guarantees that all women will put on their make-up before leaving home, that myopics and drunks will take a bus, train, subway or cab, and that motorcyclists have a fighting chance.

Lucky for us, we didn't know about Japanese liability when we rode into the crucible. If we had, we probably would have been so paranoid that we'd have gotten in everybody's way. As it was, we were a menace mostly to ourselves, bobbing and weaving through traffic and generally blundering across town in the wake of Ken Frankel.

Actually, the first thing we learned about riding in Tokyo was to forget about trying to keep up with Frankel. He is to Tokyo traffic what Freddie Spencer is to GP racing. Frankel owns 14 motorcycles and possess an ability to get through Tokyo traffic that has earned him folk-hero status with the locals. His Japanese friends refer to him simply as "Strange Foreigner," if not because of his penchant for eating creepy-crawlies that even the natives won't touch, then because of his frenzied Tokyo riding pace, and the fact that he once passed a speeding ambulance as it raced through downtown Tokyo.

Next, we discovered that lane-splitting is a way of life in Tokyo. Even the cars do

it. Adequate space between door handles and kneecaps is measured in millimeters, so that by comparison, Southern California lane-splitting is a yawn. Only woods-riding through tightly spaced trees even comes close.

On top of that, traffic signals are virtually impossible to spot against a background comprised of scores of brightly colored signs. Slots in traffic are where you make them, lanes are where you find them. As a result, Steve Anderson, a man who can keep a running balance of two checkbooks in his head while doing other calculations, like computing the specific density of Mars, suffered near-terminal sensory overload while blitzing through Tokyo traffic. At day's end, he'd simply collapse in an exhausted heap.

Then there is Tokyo's triple-threat to contend with: cabbies, truck drivers and fast-food delivery boys on mopeds. These people are *working*, and in the spirit of the great Japanese work ethic, they go at it with a vengence. Cab drivers and truck drivers don't give an inch. And beware of moped riders bearing noodles, for these delivery boys, with precarious-looking contraptions for carrying trays of hot lunches cantilevered above the rear wheels, will take you out before letting said lunches get cold.

In the trail of flying Frankel, we got the hang of riding on the wrong side of the road, passing on the right between oncoming traffic, riding in the middle with about an inch to spare on each side of the handlebars, and riding on the left between traffic and assorted obstacles such as curbs, parked cars, vending machines, storefronts and pedestrians.

Such behavior would have gotten us shot on sight anywhere else, but in Tokyo nobody even seemed upset by it. Most, in fact, didn't even appear to notice. And that, as much as anything else, is what stuck in our minds about riding in Japan—that the same tactics that would earn you a season pass into the local lockup on this side of the Pacific seemed almost to be a way of life on that side. Where else can you ride within a foot of pedestrians and not even get a rise out of them? Or dive between a car and a curb in the middle of a turn and be applauded by the driver for executing the maneuver so nicely? Or nearly get squashed between a truckload of pigs and a careening taxi full of Albanian diplomats while being passed by a 16-year-old girl riding a 10,000-rpm moped?

Indeed, one spirited ride through Tokyo on two wheels can net enough war stories to last an entire winter. And the city is a motorcyclist's nirvana from a hardware standpoint, as well, for there are hordes of bikes on the streets day and night. The machinery runs from the mundane (by Japanese standards), such as Honda VF250s, Suzuki RG250 Gammas, Yamaha RZs and Kawasaki KR250s, to the exotic, as in Ducatis, BMWs, Harley-Davidsons and even the occasional Bimota. And Tokyo riders not only possess the very slickest of motorcycles and exceptional riding skills, they have wardrobes to match, ranging from full leathers for sportbike riders to complete motocross attire for dual-purpose pilots. Best of all, if a rider strolls into a restaurant wearing his Freddie Spencer-replica leathers, nobody sneers at him, for a motorcycle-riding costume is no more out of place in public than a kimono or a jogging suit.

There is one group of riders, however, that fulfills the role of society's rejects. They're called the Boku-Zoku, or explosive riders, and that pretty much describes what they look like tearing away from a Tokyo stoplight in a pack of 30 at three a.m. They ride in large gangs, only come out at night and somehow manage to elude capture by the authorities. They don't rape or pillage or any of that, but they do ride around on big, powerful inline-Fours equipped with open megaphones and air-horns, honking wildly, revving their engines, running stoplights and generally being a public nuisance. Little is known about these hellions except that they all wear sandals—*ladies'* sandals, no less—when they ride. Nobody quite knows why.

After three days of dealing with Tokyo traffic, and one sleepless night courtesy of the Boku-Zoku, Anderson, Frankel and I saddled up a trio of our test bikes—the Yamaha RZV500 and FZ400R, and the Kawasaki KR250—and headed for Sugoland, a racing complex about five hours to the north. We rented a truck (with driver) to transport the other four. In the claustrophobic, densely populated confines of Tokyo, we had learned little of our seven bikes' performance potential, so we had to go someplace where the throttles could be held wide-open for a while, someplace where the sides of the tires could get a bit of scuffing.

Neither Anderson nor I had ever heard of Sugoland, so we expected it to be a nice little racetrack nestled in the woods, a primitive facility lacking all the usual creature comforts such as food, shelter and indoor plumbing. Instead, we came upon The Most Wonderful Place In The World. Despite being surrounded by very little other than miles of forest, Sugoland has creature comforts that include an 18-hole golf course, a driving range, tennis courts, an archery range, swimming pools, hiking trails, three restaurants, an extravagant hotel, two go-kart tracks, a motocross track, a trials course and an absolutely magnificent roadracing course complete with its own separate shelter and indoor plumbing.

Sugoland is owned by Yamaha, but the facility is open to the public and to any brand of motorcycle. On the weekends the place is packed with club roadracers, who line up for miles to get a crack at this fabulous racetrack. There's even a rider-training school at Sugo for aspiring Tokyo motorcycle policemen, all of whom ride white Honda 650 Nighthawk police bikes. We had a chance to watch them go through the part of their training program in which they rode real trials bikes on a nasty little trials course and piloted their Nighthawks on the roadracing course. These future moto-cops were good, even in the training stage, and in all likelihood might even have been able to keep up with Frankel in Tokyo traffic.

The level of riding skill achieved by those students isn't that far above average, however, because the tests that a Japanese rider must pass to be issued a motorcycle license are anything but a piece of cake. There are three separate licensing levels based on the size of motorcycle you wish to ride: 0-50cc, 50-400cc, and 400cc and over. The 400cc-and-over licensing test in particular is so tough that failing as many as a dozen times for minor infractions is not at all uncommon. And once you fail, you must wait at least two months before you can take the test again. It's not unusual for a rider to end up paying as much as $600 in exam fees before he gets a license to ride bikes bigger than 400cc. But once he succeeds, he joins Japan's motorcycling elite by becoming one of the few (two percent) qualified to ride the "big" bikes.

That helps explain why our RZV500 created so much excitement wherever we rode it. One rider in particular, who was dressed in full leathers and riding Suzuki's 400cc GSX-R, handed us his camera and asked that we take a picture of him astride the RZV. He had never seen one in the flesh and figured he probably wouldn't see another for some time, and he wanted to capture the moment for his scrapbook.

But if you think that's ironic, consider the riders who sidestep Japan's laws restricting domestic motorcycle sales to

bikes displacing 750cc or less. They have to pay a considerable premium to have Japanese-built export models of more than 750cc brought back into the country as "imported" motorcycles; and they spend a small fortune to bring large-displacement, foreign bikes (BMW, Harley-Davidson, etc.) into the country.

This displacement restriction, as well as the tri-level licensing structure, is designed to keep young bucks from wadding themsleves up into little balls by making it difficult for them to get their hands on machines too big for them to handle. Like Japan's mandatory helmet law, it's a case of necessity being the mother of intervention.

In addition, it is illegal in Japan to ride two-up on main roads. The problem, according to Ken Frankel, is that there are only two kinds of riders in Japan, the conservatives and the banzais; and the technique for being a proper banzai passenger is to flail your arms, kick your feet and hop up-and-down on the seat while the rider is going as fast as he can. The Japanese government grew weary of scraping "proper" banzai passengers off the road and simply made it illegal to carry passengers on main highways.

It's easy to understand, though, how any motorcyclist in Tokyo—rider or passenger—can get more than a little antsy for some sport-riding action. So it was, just a few days after our return to Tokyo from Sugo, that we yearned to get out of the city and scuff a few footpegs. Our Japanese hosts from *Cycle World* suggested a ride on the snaking mountain roads in Hakone, a famous resort area in the foothills of Mt. Fuji. And by all observations, Hakone is the place to go if you're a devoted sportbike rider with a need to escape the congestion of Tokyo. We came upon hundreds of would-be knee-draggers swarming the canyons on everything from Honda's British-bike-replica Clubmans to authentic Britbikes, from decidedly un-sporty machines like Harleys to hardcore sportbikes like Kawasaki Ninjas. Just about everyone rode rather conservatively, mostly because of heavy traffic but partly because the roads in Hakone cling to sheer cliffs, meaning that a miscalculation can put a rider into the canyon. But every once in a while a certifiable crazy would fly past at full song, footpeg and duct-taped knee defiantly grazing the asphalt.

We hadn't ridden on an unclogged stretch of asphalt since leaving Sugoland days earlier, however, so we were in need of at least one full-on, twisty-road encounter before heading back into the miasma of Tokyo. We left Hakone in late afternoon and motored to Kagosaka Pass, Frankel's favorite road, but it was jammed with slow-moving Sunday drivers. Frankel knew of another road nearby, a secret road. It was just what we were looking for—a sinuous little one-lane roller-coaster ride that twirled through dark forests and over suspended bridges. Traffic was unusually light and we took full advantage, giving the bikes their best workout since Sugo.

That little stretch of unoccupied asphalt took on greater significance as the cluttered streets of Tokyo closed in around us. In the U.S., we tend to take wide-open spaces for granted, and we forget that we can run belly-to-the-ground on big Superbikes just about any time we feel the urge. But Japanese riders can't even *buy* those machines, and even if they could, they'd have no place to ride them.

Once you understand that Japan is roughly the size of California but has a population approximately equal to that of the entire U.S., you begin to appreciate why the Japanese ride the kinds of bikes they do in the way that they do. There are precious few wide-open spaces and even fewer uncrowded roads. But this doesn't seem to dampen the spirits of Japanese riders. Their commitment to and enthusiasm for motorcycling is reinforced every time the opportunity arises, be it a few scant miles of relatively uncluttered highway or that rare deserted road—or even that tiniest of gaps in hectic downtown traffic. ◙