



INSTEAD OF JUST IMPROVING A TOURING BIKE, WE IMPROVED TOURING.

Until Venture, touring had changed a lot but touring bikes had changed little. New features were patched in or stuck on to the same old bike.

But Yamaha started fresh and built the ultimate touring machine from the ground up.

The Ventures have more power. They have a suspension unique in touring. They are faster, smoother, steadier, more manoeuvrable, better integrated... just more touring bike than anything else on the road.

And the most touring bike on the road today is



the Venture Royale. Its amenities are built in, not added on, and there are plenty of them.

Computer adjustable suspension.

AM/FM cassette with automatic volume control.

The first true cruise control on any bike in the world.

We could go on, but you get the idea. The only thing you don't get on a Venture is nostalgia.

For the way touring used to be.

YAMAHA
The way it should be.

YAMAHA RZ500: POWER ERUPTS

\$2.50

AUGUST
1984

CYCLE CANAD



BMW K100RS
A touring
classic

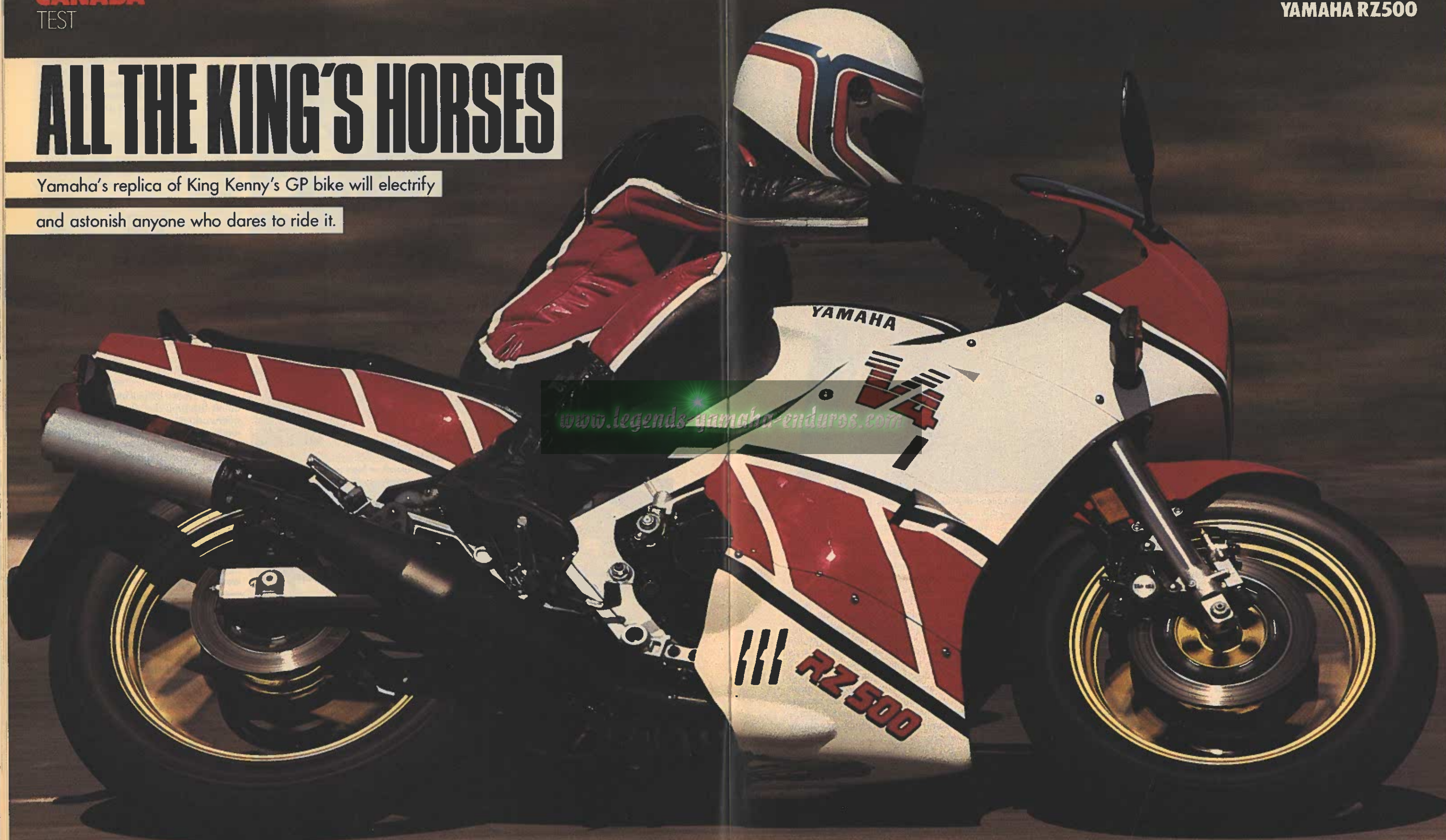
ASPENCADE
Rally round
the East



C363720P
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DEC 84/3306* #21/

ALL THE KING'S HORSES

Yamaha's replica of King Kenny's GP bike will electrify
and astonish anyone who dares to ride it.



The RZ500 is the most outrageous street bike ever.

It's the most exhilarating, the most racy, the most roisterous motorcycle Japan has dared produce.

It's also one of the most frightening.

Yamaha hasn't deviated much from its initial pronouncement that the RZ500 would be a replica of the bike that won six GPs in the hands of Kenny Roberts last year. Skeptics who doubted Yamaha's nerve in actually producing a road-going race bike can be quickly convinced otherwise. It takes but a twist of the throttle.

The RZ500 is time-zones quicker and faster than anything in its class. Our drag strip elapsed times and terminal speeds place it ahead of any 750 we've ridden at the strip.

At the same time the RZ is manageable almost to the point of docility when kept off the pipe. But to allow it to rev unharnessed through the gears is to experience sensations of exhilaration — or anxiety — unavailable with any other production street motorcycle. This bike accelerates so hard with such smoothness and handles so well that a rider can very quickly find himself travelling at race-track rates without benefit of a race track.

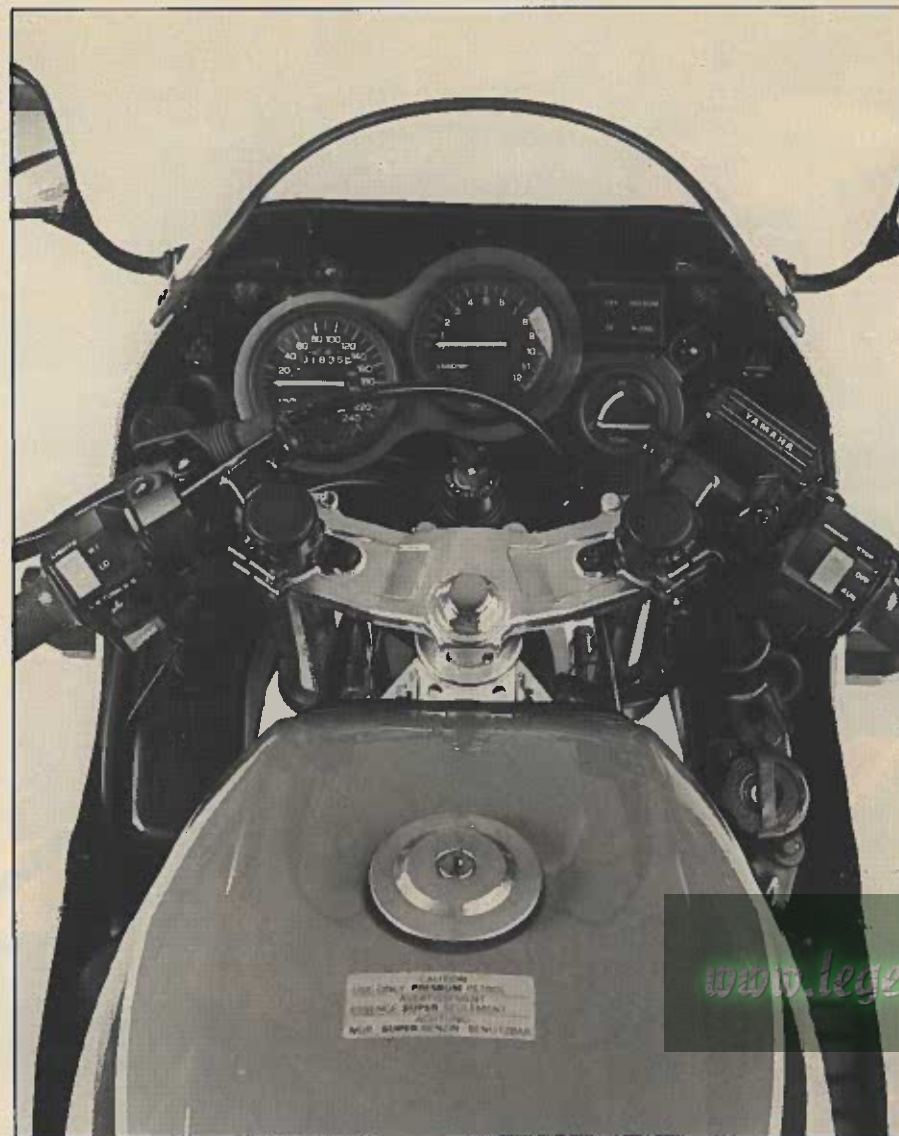
At the drag strip the RZ recorded a time of 11.77 seconds with a best terminal speed of 192.17 km/h (119.44 mph). Our previous best from a midsize bike was the 12.58 at 177.13 of the Yamaha FJ600 tested in July, while our best for a 750 was the 11.84 at 188 for the '83 Honda Interceptor. Dragstrip expert Jay Gleason recorded an 11.60 at 181.46 on the '83 Suzuki GS750 for us in California last year, but the best from a Cycle Canada staff member remains the 11.84 on the Interceptor.

That's an 11.77 for the RZ in spite of rich carburetor jetting and an extremely tall first gear that made launches difficult. And a speed of 192 with the engine still pulling and sixth gear waiting. Astounding, is what we're trying to say.

The engine responsible for all that excitement is a liquid-cooled, V4 two-stroke that is similar in layout to Yamaha's GP race bikes, and unlike anything ever produced for street riding.

The production V4 is almost unchanged from the prototype engine we stripped for the March '84 preview. There are numerous detail changes, and absent are the hand-wrought components of the prototype, but the major engine parts are the same.

The engine rests in the frame with its front two cylinders lying almost horizontal and the rear two canted backward 50 degrees, just like the GP bike. Each bank has separate cylinders spanned by a one-piece cylinder head and its own crankshaft. Bore and stroke are 56.4 x 50.0 mm for a displacement of 499 cc, again the same as the GP bike, which



Instruments are fairing mounted, along with coolant and injector reservoirs.

uses a 56.0 x 50.6 bore and stroke.

Where the RZ veers radically from both its GP heritage and traditional two-stroke practice is in the employment of different induction systems for each cylinder bank. The RZ's forward cylinders receive fuel mixture directly into the crankcase chambers through four-petal reed valves, whereas the rear cylinders use reed valves and piston ports. The front cylinders have five transfer ports while the rear set uses four transfers and a boost port.

Expansion chambers from the front cylinders exit normally under the engine and sweep up past the back of the rear wheel, where they're capped by aluminum silencers. Pipes from the rear bank of cylinders exit directly rearward, crossing each other under the seat and filling the ample bulges of the tail section, with their stingers peeking out on either side of the taillight.

The insides of the tail section and metal plates under the seat and gas tank are lined with an insulating material and then covered with foil to protect the rider from

the heat of the exhaust pipes. There's no bun-cooking blast, surprisingly, only mildly annoying heat that's most noticeable when stopped after a brisk ride.

Mikuni 26 mm carburetors are mounted in pairs on either side of the engine, with their manifolds curving at 90-degree angles and taking up much of the room between the V. The airbox with oiled-foam filter is located directly above the engine and under the gas tank, with large and bulbous extensions reaching down on either side of the engine to connect with the carb mouths. There are more detours in the intake system than recommended for good flow, but the RZ compensates somewhat with the large volume of the airbox.

The RZ's two pressed cranks rotate in the same direction and are geared to the clutch hub. A two-weight balancing shaft that reduces rocking-couple vibration is located between the two cranks and geared to the forward crank.

Each crank has a 180-degree firing order, with diagonally opposed cylinders firing together. The primary pinions on



the crank ends are straight cut rather than helical to lessen friction and thus increase horsepower. The tradeoff is more internal engine noise, though the RZ has split pinion gears to minimize the backlash that could cause vibration.

A split gear consists of two gears on the same axis with one gear having an extra tooth, thus taking up any clearance on the non-driven side when it meshes with another gear. A cupped washer between the two gears keeps them in tension and damps any sudden backlash.

The primary-drive pinions and output shaft are pressure-fed with gearbox oil by a trochoidal pump located on the left side of the engine, which also forces oil through both transmission shafts. The pump is necessary because the engine is stacked vertically, rather than having its cranks in a horizontal plane with the transmission shafts. Splash lubrication therefore could not dependably reach all components. This system also permits a small sump with a capacity of 1.6 litres.

The six-speed transmission is muscular looking for a 500. The entire unit can

be pulled from the engine without splitting the cases, and although we didn't try, it should be removable without taking the engine from the frame. The clutch uses seven friction plates and seven steel plates held together with six coil springs.

The clutch stood up well to hard use, on the street and at the race track and drag strip. It has a rather sudden engagement point — a real handicap for a bike with such a tall first gear — but pull at the lever is wonderfully light and it's fairly easy to modulate.

Toe effort required to work the transmission is, again, refreshingly light. The RZ's box works slickly and positively, with neutral an easy tap from first or second.

For crankcase and cylinder lubrication the RZ uses a more sophisticated version of its Autolube system which, in concert with the pressure-fed system in the lower end, should greatly enhance engine durability.

Rather than having the Autolube pump controlled by the throttle, as with the

Steering is surprisingly slow, and the bike needs effort to crank over hard in tight corners.

RZ350 and all RDs before it, the RZ500's pump is matched to engine rpm through the YPVS (Yamaha Power Valve System) servomotor. On the RZ350 the pump would decrease its flow of oil to the crankcase in direct response to a decrease in throttle opening, which in effect gave the same result as with a race bike using pre-mix gas and oil. The problem is that an engine can still be running at high revs with the throttle backed off completely, as when decelerating for a corner at the end of a long straight on a race bike or coasting downhill on a street bike.

On the RZ500, however, the Autolube pump is connected by a cable to a bell-crank that opens and closes the engine's exhaust-port power valves. Because the valves respond only to rpm — via a servomotor triggered by the ignition and located behind the engine — oil flow is ensured regardless of throttle opening. Less danger of seizure, less engine wear. Great idea.

YAMAHA RZ500

The CD ignition mounted on the left of the engine and driven by the forward crank has one pickup and two triggers, which results in all four spark plugs firing at the same time, even though two pistons will be near bottom dead centre. The ignition begins to advance at 2,000 rpm, reaches maximum advance of 28 degrees before 4,000 rpm, and then begins to retard until it returns to its initial setting of 19 degrees at 500 rpm before the 10,000 redline. The ignition retards further to 14 degrees BTDC at 10,000 rpm to discourage over-revving.

The compression ratio is a relatively mild 6.6:1, further suggesting a potentially long engine lifespan.

Access to the engine for repairs is certainly not as easy as with past RZs and RDs, because of the full fairing and the tight fit of everything on the bike. Spark plugs are easy to get to, though, and the abundance of Allen bolts on the engine and chassis will at least make repairs — once you get to them — less of a chore.

A thin radiator with a large frontal area — somewhat reminiscent of a racing TZ750's rad — works with a thermostat to help the RZ warm quickly yet stay well below the red zone on the temperature gauge, even in rush-hour traffic on a warm afternoon.

The coolant reservoir is tucked tightly inside the fairing, just under the right handlebar. On the other side of the fairing, again up high, is the Autolube oil tank. All this weight located high and forward combines with extremely tall overall gearing to make it almost impossible to wheelie the RZ, which is quite a departure from the sky-shot tendencies of its predecessors.

Yamaha apparently opted for tall gearing in part to eliminate that very characteristic; the bike is going to be controversial enough without having it seen unicycling through intersections across Canada. First gear demands a degree of clutch slippage that most closely resembles that of an all-out racing two-stroke; little chance to wheelie here. From a very tall first gear there's almost as big a jump to second as with the RZ350, but through third, fourth and fifth the ratios are tighter than with the little RZ. Only from fifth to sixth does the RZ500 have a bigger gap than the RZ350.

Fortunately, the V4 has enough power down low to make first-gear getaways painless, once you forget your four-stroke habit of simply dropping the clutch.

Power? You'll never go wanting with the RZ.

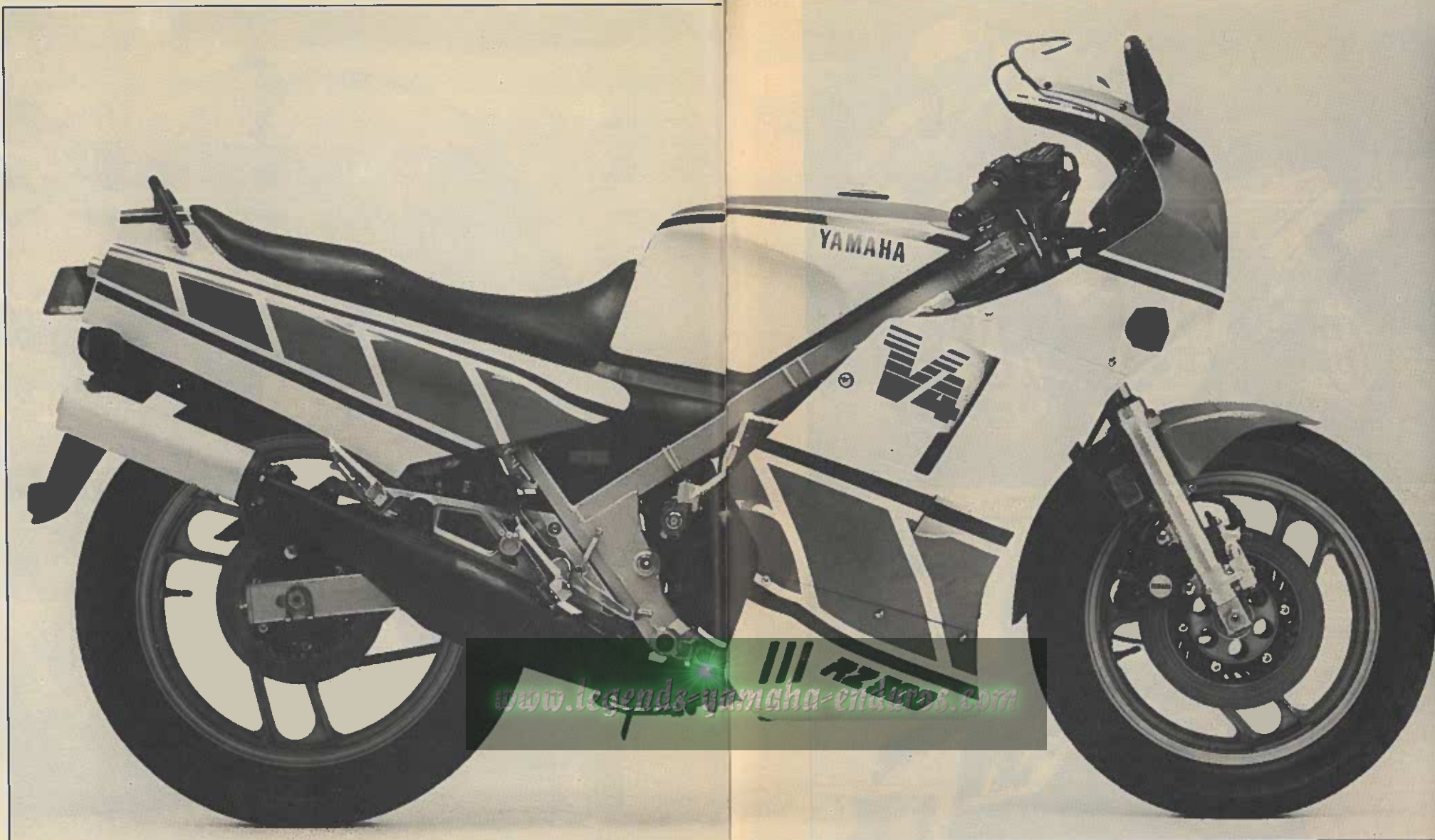
Yamaha isn't releasing an official figure, but one horsepower number being mentioned is 85. That's 30 more than the RZ350, 20 more than the GP250, and about even with the GP2750 and GS-

750. Initial reports of triple-figure horsepower being slashed for the sake of streetability could well be correct, judging by the robust construction of the engine and its midrange performance. But 85 suits us just fine, thanks.

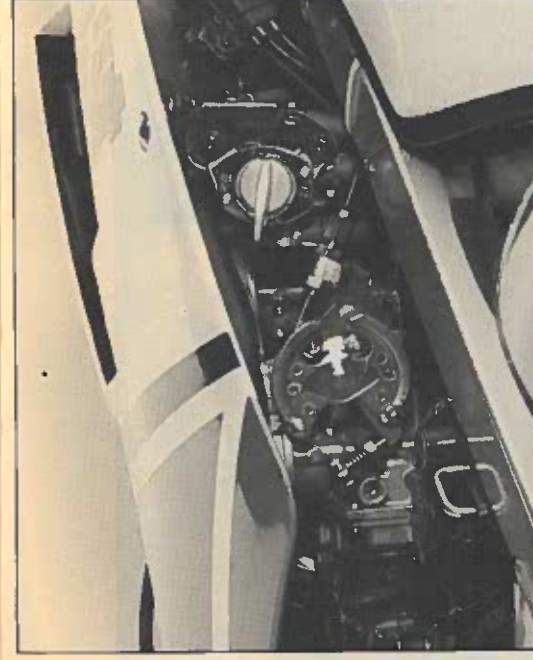
Power is adequate below 4,000 rpm in the first three gears, and things start to get exciting between 4,000 and 7,000. At 7,000 through to just under the 10,000 redline the acceleration is outrageously strong. The pull of this little 500 in low and middle gears while in the peak powerband is stunning, even when you've just hopped off an FJ1100 or GS1150. Pull up to an FJ600, our now-disposed mid-dleweight king, and wave goodbye.

The tall gearing means fourth is good for about 195 km/h and in fifth we've seen an indicated 220. We're talking big thrills here when you can be going 190 with the bike still pulling hard — and you've got two gears to go.

You can pass on the highway by just rolling on the throttle in top gear, but for real giggles the trick is to tap down two gears and hold on.



The air filter and rear cylinders can be reached by tilting back the hinged tank.



Carbs face outward from sides of engine, so intake boots bend sharply to reach filter.

Despite all that top-end energy the little V4 is surprisingly civil and tractable at lower revs. Flip up the choke lever located just above the petcock and carbs in the crowded left side of the fairing, and it kicks over usually with three easy stabs or less of the folding kickstarter (no electric starter, of course). It idles evenly, pulls competently through the midrange, and when it comes on the pipe it doesn't react viciously. The front wheel gets extremely light when accelerating hard in the first three gears, but it never feels as if it's about to topple over on the rider's head or begin to shake the front end.

The silencers do a competent job of muffling the two-stroke howl, and the rigidly mounted engine is reasonably smooth below 6,000 and vibrates only moderately in the higher ranges. It's not nearly as smooth or quiet as an RZ350, though.

The only annoying shaking occurs when backing off the throttle, most notably at about 7,000 rpm. There's a disconcerting chattering through the solid steel footpegs as a result of the inherent

intermittent combustion of a two-stroke not under load. The uneven firing results in a chattering of internal components, even with the anti-backlash design of the primary gears. It's a sensation evident on most two-strokes, but magnified on the RZ because of its four cylinders. You get used to it quickly.

While the RZ can be ridden comfortably in congested traffic, its natural place of business is the open road. The seating position is more race-like than any production bike, with pegs high, seat low and forward and non-adjustable clip-ons an easy reach down. The electronic tach, which responds to the YPVS control unit, is rubber mounted in the centre of the instrument cluster, flanked by the speedometer and water-temperature gauge. A small parcel of warning lights for high beam, neutral, Autolube oil-tank level and turn signals sits unobtrusively above the temperature gauge.

Anyone who has ridden a race bike will instantly find the RZ's ergonomics appealing, and it doesn't take long for a street rider to mould himself into a comfortable crouch. It's a tight fit, but even a six-foot rider can find room to work the bike. Whereas an Aspencade makes you want to lean back, stretch out and cruise smoothly to the next province, an RZ seems to demand that you go fast and corner hard. At high speeds the fairing and bar position work perfectly in unison to take just enough load off the rider's arms to make long trips less painful than expected, but the hard, sharp-cornered seat and tight quarters limit touring to about one-hour sprints.

Unlike the last real two-stroke hyperbike, the Kawasaki H2 triple, the RZ500 matches terrific engine performance with exemplary braking and handling.

We were somewhat concerned that a bike with so much power, a surprisingly hefty wet weight of 213 kg (470 lb), a shorter wheelbase (1,375 mm) than the RZ350, rake and trail slightly more radical than its predecessor, plus a 16-inch front wheel, would handle like a nitrous-oxide-injected unicycle. But Yamaha somehow got it almost dead right.

The substantial double-cradle frame is constructed of square-section steel tubing — not aluminum as on the prototype — and is widely spaced with hefty bracing at the steering head and swingarm pivot. The lower frame section on the right side unbolts to allow engine removal. The swingarm is box-section aluminum with enough clearance to accept a tire up to 150/80 in width.

The DeCarbon-type single rear shock mounts horizontally beneath the motor, to the frame at one end and to the bottom of an aluminum rocker arm at the other. The arm pivots in the middle and is attached at the top end to aluminum extensions from the front of the swingarm. The result is a compact design with rising-rate properties, 120 mm of sus-

YAMAHA RZ500

pension travel and both preload and rebound-damping adjustment. All the suspension pivots have grease nipples.

In Japan the RZ features full adjustability of the front fork, but the Canadian version is bare. The only adjustments to play with are on the hydraulic anti-dive units mounted on the forward faces of the fork sliders.

Fork stanchion tubes are 37 mm in diameter and allow 140 mm of travel. Rake is 26 degrees, which compares with the same figure for the RZ350 and the GPz550, 27.3 degrees for the GS550 and 24.5 for a TZ250 racing bike. The 500's trail is one mm shorter than the RZ350's, and the same 95 mm as the GPz550's.

All of which would point to an extremely quick-steering motorcycle, but such is not the case.

The RZ500 requires substantial rider input at the handlebars to initiate a turn, and responds best when the rider shifts his body weight to assist in leaning the bike into a corner. No hair-trigger steering here. After a few laps of the tight race course at Shannonville, Ont., a rider's arms became more fatigued than with any bike we've had at the track recently. The RZ500 is not a lightweight in its class the way the RZ350 is. In fact, Honda's 500 Interceptor is 11 kg (25 lb) lighter.

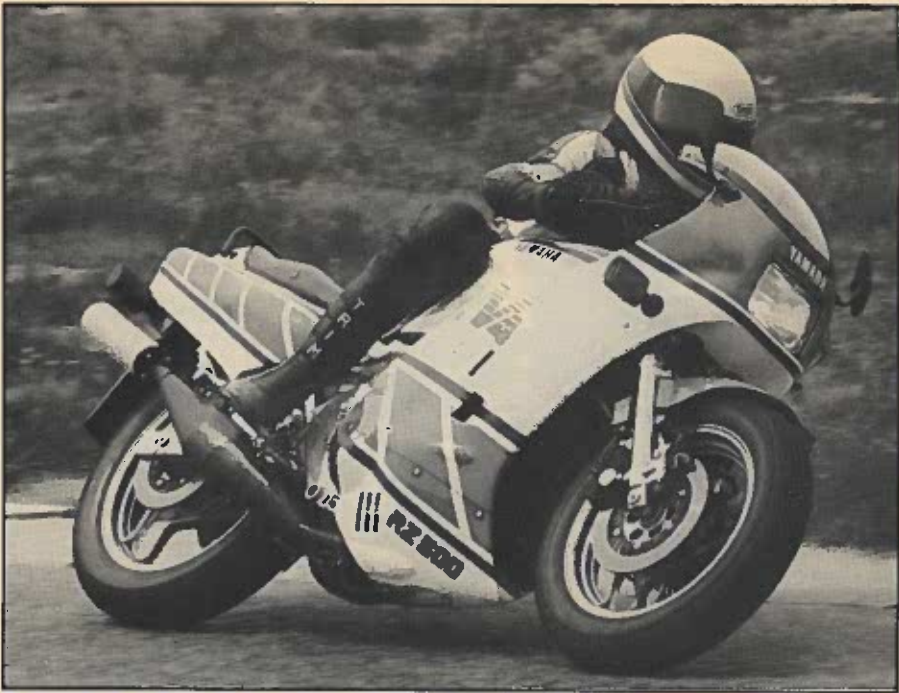
High-speed stability is faultless, and for most applications on the street its cornering manners are fine. The RZ can't, though, change lines in mid-corner or flit through tight esses with the ease of a GS550 or a 500 Interceptor.

One explanation for the RZ's relatively slow steering could be the massive 120/80 Yokohama front tire. The mass of the tire contributes to a gyroscopic effect of the front wheel that's greater than that of the 500 Interceptor, and about the same as the RZ350's, with its 18-inch front wheel.

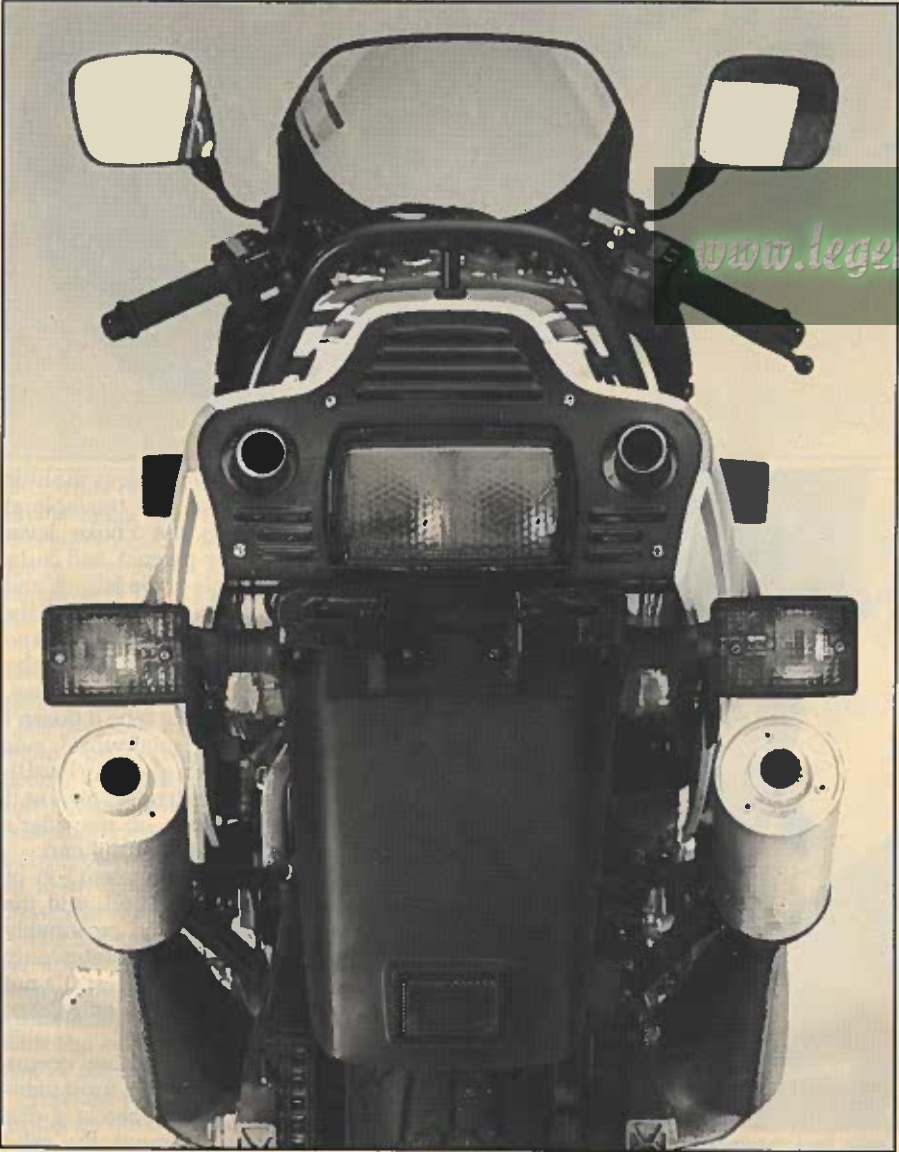
Another anomaly of the RZ's steering is a tendency to relatively severe head shakings when the front end hits a large bump while cornering, despite its usual stability. The front wheel returns to its centreline almost immediately, without benefit of a steering damper, but nonetheless the action can be startling.

The shaking is probably caused by a number of factors, predominantly the steep rake and the wide and short contact patch put down by the front tire, as opposed to the comparatively skinny and long patch of a narrower 18-inch tire. Another contributing factor could be the stiffness of the frame, which allows so little flexing that the only forward hinge in the system — the steering head — is forced to absorb most of the energy from the blow.

The shaking isn't caused by the front suspension, which works fabulously despite its lack of adjustment, smoothing over pavement seams on the highway yet



The RZ500 handles well, but horsepower puts it in a class of its own.



Get used to this view of the RZ500 if you're not riding one yourself.

SPECIFICATIONS

Model 1985 Yamaha RZ500N
Test distance 1,704 km
Price \$4,799

ENGINE

Type Liquid-cooled, two-stroke V4 with reed-valve induction and electronic power valves
Bore and stroke 56.4 x 50.0 mm
Compression ratio 6.6:1
Displacement 499 cc
Horsepower 85 (unofficial)
Torque N.A.
Carburetion Four Mikuni VM26SS
Oil capacity ... 1.6 litres transmission lubricant, 2.0 litres injector oil

ELECTRICAL

Ignition Electronic breakerless
Generator output N.A.
Battery capacity 12 V, 5.5 amp-hours
Headlight 60/55 watts

TRANSMISSION

Type Six-speed constant mesh, wet clutch
Primary drive Gear, 2.225:1
Internal ratios (1) 2.400 (2) 1.684 (3) 1.363 (4) 1.166 (5) 1.043 (6) 0.958
Final drive No. 530 O-ring chain, 2.533:1

CALCULATED DATA

Weight/power ratio 2.5 kg/hp
Specific output 770 hp/L
Piston speed at redline ... 16.6 m/sec at 10,000 rpm
RPM at 100 km/h 4,331 rpm
Speeds in gears at redline (1) 92

(2) 131 (3) 162 (4) 189 (5) 212 (6) 230 km/h

PERFORMANCE

Quarter mile 11.77 seconds
Terminal speed 190.04 km/h (118.11 mph)

FUEL

Fuel capacity 22 L
Reserve capacity 5 L
Consumption 7.5 L/100 km (37.4 mpg)
Range 293 km, 66 km reserve

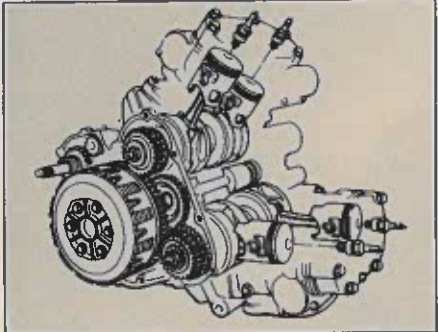
CHASSIS

Wheelbase 1,375 mm
Rake/trail 26 degrees/95 mm
Suspension Telescopic fork with 37 mm tubes, 140 mm travel, adjustable antitive; Single-shock Monocross rear with 120 mm travel, adjustable for spring preload and rebound damping
Brakes Dual front 267 mm ventilated discs, single rear 214 mm ventilated disc
Tires Yokohama 120/80V16 front, 130/80V18 rear
Wet weight 122 kg (470 lb) with full tank
Handlebar width 615 mm (24.2 in.)
Seat height 737 mm (29 in.) with 63 kg (140 lb) rider

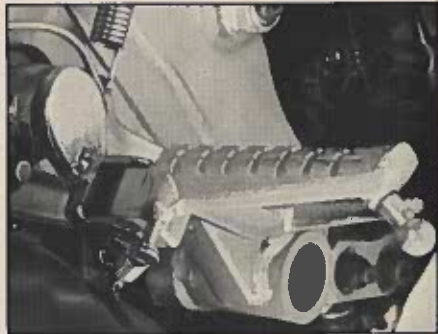
Distributed by Yamaha Motor Canada Ltd., 480 Gordon Baker Rd., Willowdale, Ont., M2H 3B4, (416) 498-1911.



Knobs on fork legs set anti-dive; the ventilated discs need surprisingly high lever effort.



Separate cranks are geared together; a balancer shaft helps reduce vibration.



No centrestand, high pegs and tucked-in pipes mean lots of cornering clearance.

at the same time keeping the front end in touch with the roughest pavement we could find.

For street use we found the best compromise setting on the rear shock was to set preload at about 5/8ths stiffness and rebound damping at the second of four clicks. For the track we cranked the preload up to maximum to eliminate a wallowing of the back end through long sweepers.

Despite its weight and short wheelbase, the RZ500 is one of the most stable and manageable sport bikes we've ridden.

Front and rear brakes use ventilated discs squeezed by opposed-piston calipers. The rear system is a momentous improvement over the RZ350's, which was oversensitive to the point of uselessness. The V4's rear brake is both strong and easily controllable; racers accustomed to using only the front stoppers will be cheating themselves if they don't also learn to use the back brake.

The front brakes are also extremely strong for the street, but under hard use at the race track it was necessary to use all four fingers to haul the bike down quickly. Hard braking doesn't cause excessive front-end dive on the RZ with the antitive on its stiffest setting.

The huge 130/80V18 and 120/80V16 Yokohama tires have a fashionably trick-looking tread pattern, but proved rather squirrelish on the street. All that power causes the rear end to break loose easily when cranked over and on the power, and at the track the front end would also slide with some prompting. After we sorted out tire pressures at the track and properly scrubbed in the tires, they began to work much better, but we would recommend stickier rubber.

The quality of finish of the RZ500 is superb, from the voluptuous side panels and faired front fender to the sculpted footpegs and the short and serrated handgrips. Everyone thought the styling was a success, and there's no doubt it will attract attention from onlookers and police cruisers alike. It looks even more racy with the addition of an optional (\$99.99) cowl that covers the passenger's section of the seat. Suggested list price for the bike is a comparatively expensive \$4,799.

The RZ is designed to work best at post-legal speed limits. Sure it's tractable in the city and comfortable enough to go from stoplight to stoplight or to drone along on the highway. But more than with any other street bike we've ridden, the V4 encourages fast and aggressive riding, a task it handles with remarkable efficiency.

In the possession of an experienced and cautious rider the RZ500 is the most competent and thrilling production street motorcycle available in Canada.

If you're capable of getting a grip on the explosion, be ready to hang on for a ride that you won't believe.

PHOTOGRAPHY BY JEAN PIERRE BELMONT, SCOTT EWEN AND CHRIS KNOWLES