

PHOTOGRAPHY GARY STUART



Three go mad in Wales,  
Cleethorpes,  
Battersea, Bognor . . .  
Anywhere you like in  
fact



The best is now the worst;  
the worst is still wonderful.  
We had all three and Tim  
Thompson nearly  
exploded

# go mad

*Whaa, whaaaa,  
whaaaaaaaaaaaa,  
whaaaaaaaaaeeeeeee,  
whaangading-whaangading-  
whaangading, skeeef (knee-  
slider, invariably imagined)  
whaaaaaa,  
whaaaaaaaaaaaa . . . clonk  
(stoppie).*

In other words, it's two-stroke 250 month here at *Bike* and we're all polishing-up our impressions; getting in the mood for a bit of GP fantasy banditry on three bikes that take you close, closer and closer-still to the real thing. This one is a Kawasaki KR-1 going into the Elephant and Castle, peeling off for a red light at Newington Butts. The Suzuki RG V's 90 degree vee-twin is neither so easy nor so evocative but otherwise it's a masterpiece. The TZR, well, you know what that sounds like - chances are one of those horrible Yamaha stinkwheels has whizzed past you at some point over the last two years. Perhaps you even wondered whether you might be missing something a bit wicked. You were - and this year will be much, much worse.

In their battle for quarter-litre supremacy the KR-1 and RG V have surpassed the TZR as it elbowed-out the then state-of-the-art RG250

Gamma. The Kawasaki runs off its 140mph speedo, the Suzuki possesses the most scintillating rolling chassis I have sat on. And yet, as roadbikes, they are almost as well-rounded as the Yamaha. I desperately want one and will have to buy: but green or blue? Despite the RGV's brilliance and beauty it's a close run contest, ring-a-ding-ding . . .



## RGV250

. . . a-ding-ding . . . clonk.' Well I'll be gobsmacked, that was the third best ride of my life. It shouldn't have been, the A5 doesn't spring to mind as a particularly whambamalala stretch of tarmac, but it was. Fact is, I've never been so intoxicated by a bike; or ridden so fast, so easily, so safely.

The RGV250 is built to go fast and stop quickly with a single-mindedness not seen this side of an OW01 or RC30. Its spartan elegance comes, not from intricately fussy design, but from components pared down to a GP-style minimum: unfinished, cobby, OD, functional. And light.

A few years ago, Tupperware master cylinders – secured with a strip of tin and

a cheesy crosshead, unlined fairings and unpainted motors were "naff" and the preserve of East German strokers. Now its chic – à la Yamaha works-250 (Suzuki forgot to make a GP bike to replicate). Detailing is superb (drilled footrest-guard, hollowed gear-shifter, sensuously curved radiator) but for anyone intending to ride their RGV all year, it will be a wonderful dream and a corrosive nightmare in one hit. Ours had been ridden through the worst of the winter and it showed: cap-screws, spindle-bolts, banjo-bolts, fork-legs, and disc-rotors were all suffering.

But at 20 paces it looks as horny as hell and as small and muscle-seizing as a YSR250. Dropping down into the 29 inch saddle I felt like I'd scratched from there for years. A de rigueur whirr of the powervalve means we're in business, a whiff of 'bar-mounted choke, a push on the kicker and ease out the bullet-proof clutch without troubling the 3000rpm-starting tachometer. Feet go where nature intended: onto high, very rearset pegs. Bodyweight is evenly spread over the bike – on the tank, on the token seat-foam, a little on the wrists. Peering down I see the *outside* of the screen. I'm not exactly comfortable – a fuel-breather consigns my tank-bag to my back – and in 110 miles I'll be climbing up the near-empty tank like a scolded cat up a greased flag-pole. Too many concessions, though, would compromise the RGV and put it back with also-rans like Bimotas.

On paper, it looks quick, producing a true 230bhp per litre which is a mere 105bhp more than a wimpy FZR1000. The Kawasaki KR-1 carries 11lb fewer and only just loses out in the top-end power struggle, but the RGV's 90



degree vee-twin carries its weight lower and is so compact that it takes on minuscule proportions.

At town speeds it sounds more like a sick Sinclair 5 than a bike. Outside Boots I'm asked if it's legal to ride on the road: not just legal but easy. Below 5000rpm the vee-twin is as tractable as the KR-1 and Yamaha TZR and is inherently smoother, right through the road rider's midrange from tickover to 8,500rpm – its AETC-powervalve-opening launch pad.

A momentary hesitation prior to the unleashing of 20bhp within 2500rpm merely adds to the sheer exhilaration every time you wind it on. In first gear I can think of nothing that offers such a blammo burst of head-lurching, wheelie-pulling, adrenalin-pumping acceleration. It's all over by 11,000rpm so you have to be quick on the gear change otherwise the RGV quickly becomes a very flat little 250.

Unfortunately, the cassette-type gearbox doesn't share the engine's crisp, razor-sharp characteristics. First, second and third all clonk and I found it impossible to get a smooth change up to or down from third. Adjusting the gear lever helped, as did a few squirts of chain-lube, but the graunch wouldn't go away. At lower revs it's worse and equally annoying since crackling through town below 5000rpm, feeling like Revin' Kevin rolling through the paddock, is as much about slick, well-timed changes as it is well-timed glances in shop windows.

At MIRA the teeny weeny slippery Suzuki was faster than the others – albeit inconclusively. While the TZR and KR-1 pluckily head-butted Hurricane Miranda, the RGV was out of action thanks to an errant bullet-connector. 48 hours later, and

in still air, it only just scraped home under the KR-1's 13.29 second ¼ mile time. Its tall gearing, notchy 'box and mini-power-trough prior to 8,500rpm-ecstasy made it the hardest to launch. And compared to the KR-1 it takes longer to fight back into the powerband once you've dropped out. It will sit happily, if essentially wasted, at a motorway-80mph and just under 8,000rpm in sixth. But could you? I couldn't and headed for the A5 and the centrally mounted tachometer's naughty bits.

Here we go then! Or rather we don't. Frantic but discreet deceleration is easy with the non-too-fierce twin-piston rear brake. The police Range Rover took an exit North. I went South and didn't use the pedal again all week. For the next 100 miles engine-speed rarely dropped below 8000rpm and at those revs the RGV defies its 250cc capacity. As high as fifth gear and 100mph, the bum-rest gives an eager nudge in the back on just a hint more throttle. With a following breeze the RGV pulls sixth gear to its 11,500rpm redline and an indicated 125mph. Quite amazing, though I would worry about that wonderful GP technology as decoke day approached.

After all, the RGV is very sophisticated and expensive for a 250 but is, as a bike-in-general, ludicrously cheap compared to its rivals: RC30s, Bimota YB4s etc. The way it drops-in, stands-up again and generally flirts with physical improbabilities is more akin to a Pitts Special biplane than a motorbike. And the first road rider to complain of fading brakes or flexing problems from the sledgehammer of an aluminium frame will either be a liar or our next 250cc World Champion. The four-pot calipers and floating discs typify the standards it sets and must be about the most powerful match in existence. Great, except you don't need them too often on the road. Come to that the RGV doesn't really need a rider much either. And this, I think, is why I went so fast on it.

All you have to do is aim and believe it will cope with the forthcoming off-camber, downhill, triple-apex, decreasing radius conundrum. Just sit there, pegs and fairing well-clear of the tarmac, dragging your knee with such ridiculous ease that scuffed sliders will now carry as much cred as scuffed visors. Stability and grip from the low-profile



Dunlop radials (running on slick-sized four inch and five inch rims) are superb. Without trying you can achieve lean angles normally reserved for that one balmy summer's day when everything comes together.

At first I rode it slowly: shifting my bodyweight too much, poncing about on the brakes, steering gently. I rode it as I would a normal bike in February. By the time it went back to Heron, I was sitting tighter in the saddle on all but corners I braked hard for, dancing round damp bends without a wiggle, and happily snapping the 'bars into a turn no matter how loaded the front end. The steering is blisteringly quick, though still slower than the KR-1's (10mm less wheelbase, one degree less rake, five mm more trail) but once the RGV has been thrown-in, it's as secure as any 750. The difference is that it can be picked-up or gunned hard mid-bend without effort or worry.

The Full Floater is a gem, and I left the shock's spring preload (C-spanner, seven-way adjustable) on a mid-setting – unflappable and transmitting heartwarmingly positive information on all bar the bumpiest of B roads. In town it's more compliant than it has a right to be but, as per KR-1, a decent East End pot hole still dumps you unceremoniously on the tank.

The 41mm front forks, though, are too soft. Paired to those brakes they take a dive on the merest speed-adjusting pull of the four-way adjustable lever. Hard braking for Pembrey's 20mph hairpin compressed the springs into submission while the KR-1 was still soaking up the rough stuff. Roland twiddled with the finger-adjustable preload on the fork-tops but only confused himself, made it worse, and then rode twice as quick.

With an inch more seat foam, a bit more fork and a little less gearbox, the RGV would be hard to fault as a road-bike. The mirrors are clear, the headlight is the most effective of the three and the finish is also the best – which isn't saying much. Access to the oil tank is easy; a key lifts the pillion-plank exposing enough room for a toolkit and an alarm should you want one.

Conflicts between track and road do crop-up here and there. Taking a short cut across Sloane Square I remembered the low slung expansion chamber just as it caught the pavement . . . If

Kevin Schwantz's screen is like the RGV's then he really is a Bendi Toy. Getting tucked in at MIRA I rolled my eyes upwards to peer through the screen and check I hadn't strayed into the path of a brake-testing Leyland bus: I got a clear view of my helmet lining. The fairing doesn't snag your fingers on full lock but as an implement for keeping the elements off: forget it. And forget the pillion seat too. A trip to Mitsui with Roland driving my knees into every other Volvo's wing mirror was painful and scary.

Still, the RGV's not bad. If you tend to commentate to yourself while leading the South Circular GP or if that trip to work is really a victory lap of Donington . . . this is your bike. Apparently, dealers have sold-out which is strange considering RGVs are ugly and crap.



### KR-1

A modern KH250? Very much so. Equally green, equally smoky, and equally naughty. If the RGV didn't exist it would be my bike of the year, but it does so it isn't – not quite.

On standard gearing, it's faster. Whazzing it the wrong way down MIRA's freshly abbreviated timing straight I glanced down at the speedo and covered an extra 300 yards as I did a double-take. Turning it around I trundled back to the timing hut muttering "250s do not go 142mph, 250's do not go . . ." And this one doesn't – its speedo's a compulsive fibber – but a true 135'ish isn't exactly rubbish. Mind you, my old Z250, now there's a machine, that could do 81mph.

The KR-1's character varied depending on which of the other two I'd last ridden. After the TZR it felt an all-out yob and should have been banished to the track. After the RGV it felt more road-



Very RGV, only less track-minded

mannered, like an updated TZR. In styling, too, it treads a centre line: racey seat, but a real fairing; a huge box-section frame, but in steel not aluminium . . . In reality it neither falls between two stools nor necessarily takes the best of TZR or RGV. The KR-1 is its own bike d'ya hear?

It's totally modern but gloriously uncivilised. And it can't shake off a few endearing KH triple nasties: open the throttle after a spell below the bloodline and it lays a sweet-smelling smokescreen; the finish on our tester (400 miles old when collected) was abysmal. The exhausts and discs were rusting, the alloy brackets were white with oxidation as were the painted, hollow spoked wheels. Its truly gruesome, white pillion-bum-number turns grey overnight – that and the equally dirt-friendly mirrors could be relics from a '70s parts-bin fitted in a ploy to woo a few Lionel Blair equipped punters back into the ring-a-ding fray.

Simply buying a red one which looks 200 per cent better would eradicate the saddle-eyesore, but not the bum-sore which comes on strong after the first 95 mile average tankful. Like the RGV, the KR-1's riding position slots you in the bike and into the mood. But, surprisingly, the marginally lower rearsets, higher and more gently raked 'bars don't combine to lower the pain threshold. All they do is place more weight on the old bott.

Naturally enough, I ended up doing a virtual tour of Southern England on it but we became good chums. The fairing is the most effective, being blessed with the highest screen and widest side-sections giving real weather protection (hands excepted). A larger

tank would add to the KR-1's Martini appeal but its range – best 110 miles, worst 87 – was approximately the same as my bum's. With a tankbag to lean on, though, 400 M4 miles breezed by and the 'bars, pegs, seat set-up, a halfway house between the Yam and Suzuki, suited Roland's lanky frame as well as it did mine. 85mph in fifth seems to suit on boring roads (sixth is really an econogear and can only hold onto its revs if the going's favourable) and keeps the engine spinning above its most tingly patch between 6000rpm and 7500rpm.

And it's so damn pretty that it's irresistible. It hasn't followed the RGV across to total-track styling but is instead a more angular, traditional looking bike. Kawasaki's press-blurb points out that the KR-1 keeps its capacity a closely guarded secret and lets its performance to the talking. Ignore the mighty-serious wheels and brakes and it could pass for a nifty-fifty, so talk to me baby, please!

Under 4000rpm it's all whining gears edged with a crisp, metallic crackle; up to 6500rpm it becomes a throaty GP250 and life looks up from there on in courtesy of a delicious banshee wail. Kawasaki are truly back in the balls-out game.

Their re-entry level parallel twin is a rough cut diamond though despite a balancer shaft (but no rubber-engine mounts as the engine is bolted in tight): my hands were still tingling at 9000rpm five minutes after a decent ride. It's thirst for lube is unquenchable and the oil-warning light panics you to a garage long before it will accept a litre bottle. Filling-up occurs under the seat which is handy if luggage is bunged to the pillion except that you

need an allen key which is under the pill . . . plug. I carried it in my pocket and – apologies-and-all-that-to whoever's riding it now – it's still there.

Like its four-stroke bros, the KR-1 pulls up an impressively straight power-curve. It has the midrange legs of the TZR with almost the top-end fireworks of the RGV. A twist of the demon-quick throttle below 500rpm slows the bike spectacularly but from 6,500rpm onwards response is instant and crisp enough to make the Yam feel woolly and coked. The punch between 9000rpm and peak power (54bhp) at 11,000rpm isn't as awesome as the RGV's, but its delivery is so smooth and instant that it's by far the easiest bike to ride quickly. All or nowt it ain't. I couldn't tell you if Kawasaki's constantly operative powervalve, KIPS, is doing the good work, but I do know that the sulky little servo doesn't even whirr at you first thing in the morning.

The Kawa is at its best on well-surfaced nadergy. If it's wet then so much the better as it will further embarrass everything and anything, coupling what amounts to incredibly sophisticated and relatively four-stroke delivery to a headbanging featherweight chassis. I don't know what happened to 16 inch wheels (the odd editorial Duke excepted) but the KR-1's 17/18 inch combination is razor. A 1365mm wheelbase means they're almost touching anyway and throwing the bike's anorxeic 271lb into a hairpin is thought rather than consciously executed. From here on in to the exit everything said about the RGV applies to the Kawasaki. Those 'bars become reassuringly taught, the rear Uni-Trak – perfect for my nine stone once I'd bumped up the preload – and superior, more progressively sprung 41mm forks are invincible. Fat (but relatively skinny) 100/70 and 130/60 Bridgestone radials give plenty of feel and don't seem to distinguish between wet and dry roads.

This bike will go like stink at hillclimbs. Launchin' at MIRA, at the lights, at Heston Services (where the KR was the undoubted star) was supremely easy and, back-to-back, should see off the RGV. The gearbox – like the Suzuki's, an easily accessible cassette job – is slick and quick and the best of the lot. Its ratios are well-matched and drop you bang in the action

	RGV250	KR1	TZR250
Price	£3299	£2999	£2949
Importer	Heron Suzuki (GB) Ltd, 46/62 Gatwick Road, Crawley	Kawasaki Motors (UK) Ltd, 748/749 Deal Avenue, Slough	Mitsui Machinery Sales, Oakcroft Road, Chessington
Warranty	12 months/unlimited mileage	12 months/unlimited mileage	12 months/unlimited mileage
Engine	Watercooled 2-stroke 90 degree vee-twin	Watercooled 2-stroke parallel twin	Watercooled 2-stroke parallel twin
Bore x stroke	56mm x 50.6mm	56mm x 50.6mm	56.4mm x 50mm
Capacity	249cc	249cc	249cc
Comp. ratio	7.5:1	7.4:1	5.9:1
Carburation	2 x 32mm Mikuni TM32SS	2 x 28mm Keihin PWK28	2 x 28mm Mikuni TM28SS
Gearbox	6-speed	6-speed	6-speed
Electrics	12V 3Ah battery; 60/55W headlight	12V 4Ah battery; 60/55W headlight	12V 4Ah battery; 60/55W headlamp

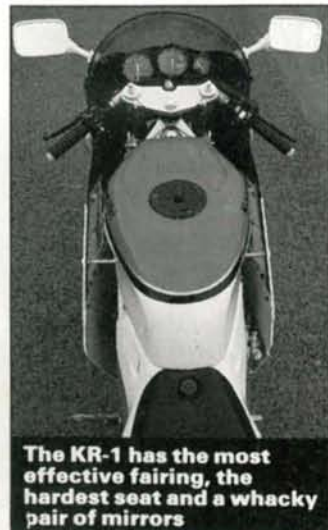
CYCLE PARTS			
Tyres	Dunlop Radial	Bridgestone Radial	Dunlop
Front	110/70R17	100/70R17	100/80H17
Rear	140/60R17	130/60R18	120/80H17
Brakes, front	2 x 290mm discs	2 x 280mm discs	320mm disc
Rear	210mm disc	190mm disc	210mm disc
Suspension, front	Telescopic, preload adjust	Telescopic, air-assist, preload adjust	Telescopic, preload adjust
Rear	Full Floater, preload adjust	Uni-Trak, air-assist, preload and rebound adjust	Monoshock, preload adjust
Rake/trail	25.6 degrees/98mm	24 degrees/93mm	26 degrees/96mm

DIMENSIONS			
Wheelbase	1375mm (54.1ins)	1365mm (53.7ins)	1375mm (54.1ins)
Dry Weight (claimed)	128kg (282lb)	123kg (271lb)	131kg (289lb)
Fuel capacity	17 litres (3.7gal)	16 litres (3.52gal)	16 litres (3.52gal)

	PERFORMANCE		
	(No gale, one way only)	(Into gale – see story)	(Also into gale)
Top speed in ½ mile, prone	116mph	108.1mph	102.5mph
Upright	111.9mph	104mph	99.8mph
Standing ¼ mile	13.25sec/103.2mph	13.29sec/102.4mph	14.16sec/93mph
¼ mile roll-on from 50mph	13.74sec/83.3mph	15.9sec/67.2mph	15.48sec/62mph
Top gear	10.25mph/1000rpm	12mph/1000rpm	11.3mph/1000rpm
Fuel consumption, overall	38mpg	35mpg	36mpg
Worst figure	35mpg	32mpg	34mpg
Speedo accuracy			
At ind 30mph	28.5mph	26.7mph	28.8mph
At ind 50mph	48.4mph	45.9mph	46mph
At ind 70mph	65.6mph	62.6mph	64.8mph

with each up-shift.

The dual-piston twin calipers bite on drilled semi-floating discs and aren't as sharp as the RGV's but have the best feel of all three. Two-finger operation became a hand- and-a-quick-prayer at Pembrey when they faded but a pump brought them back and that was the end of it.



The KR-1 has the most effective fairing, the hardest seat and a whacky pair of mirrors

Otherwise the KR-1 was constantly quickest up the straight and braking into the hairpin; forks, brakes, and front tyre a perfect match.

The downside of this unrivalled chuckability is a highly-strung manner on faster and rougher roads where the KR-1 doesn't inspire the all-round confidence the RGV does. If it's bumpy, the suspension needs winding right off as the combination of stiff springs and lightness bounces the KR-1 like a demented SpaceHopper.

By the end of the test, when the tyres were obviously past their best, the 'bars began to waggle at 90mph-plus. Into a headwind it became more pronounced and that supersonic steering and shortage of pounds conspired to give the KR-1 a more nervous gait in flat-out turns. A Pembrey-bump on the exit of a rapid right hander, hit while still bank-over, sums-up the three bikes quite nicely: it knocked the TZR out of its stride completely, it waggled

the KR-1 if I sat normally but hardly affected it if I sat forwards. The RGV flattened it.

The KR-1 is £300 or ten per cent cheaper than the RGV, which makes it a bargain as it's nowhere near ten per cent less brilliant.



## TZR250

Comfort, practicality, midrange, proven-reliability – sounds like a CG125 but is in fact the TZR, last year's King ring-a-ding. The Yamaha is unchanged for 1989 but the quarter-litre class isn't and has left it trailing in nearly all departments.

Any criticism is not so much a judgement of the two-year-old TZR, more a sign of how staggeringly good the others are. Sadly though, ours had come fresh from *MCN* and needed a serious tweak which didn't help its cause. Before throwing a leg over the RGV or KR-1 the legendary parallel-twin felt rougher and less rev-happy than usual. The gearbox was stiffer, the front disc brake lacking in feel.

At Pembrey I lost interest after its rear Dunlop began sliding the bike onto its footrest which probably looked the business but had me parked-up pretty quick. I knew if I took the same liberties, attacked bends in the manner as I did on the others I would crash. Equipped with some sporty rubber the TZR could have closed the gap and doubtless plenty of real headbangers will show RGVs and KR-1s the way home this season on stock TZRs, but they will have to work very hard.

From the off it feels tall and thin. Resident Pembrey specialist Christie O'Sullivan said it felt like a chopper – but he is Irish. The suspension, too, shows its age: there's little to pin down as such except a general vagueness compared to the others. Steering is slow, the brakes are wooden and the

YPVS mill's famed midrange couldn't help it as the others gunned effortlessly out of slow bends.

However, if we'd only taken the TZR to the Welsh circuit it would have come back in a blaze of glory. And on the roads separating Wales from the Metropolis it was still the bike I wanted to ride. On rough (ie 90 per cent of) roads the Yam's compliant and perfectly set-up suspension can scratch round the KR-1 and keep the RGV in sight; its steering is neutral and easy to learn; on the motorway it gives the best ride, has the only real saddle, as well the widest mirror-image.

So long as you don't ride the other two hooligans, it's great. The two-step power band is the most significant contribution to fun this century and it pulls wheelies and stoppies and all the stuff. I

also reckon it's my number one commuter. It copes with the motocross aspect, it pulls like a (very small) tractor whenever you turn the throttle, trickles smoothly at tickover, finds space like John Barnes, screams away from XR-3s and fires up second prod every morning. It's probably faster than your bike, too.

### CONCLUSION

Easy. I'll have RGV frame. Full Floater, brakes, wheels, tyres, looks and concept. I'll have the KR-1's engine (with the RGV's smoothness) and front fork. I'll take the TZR's comfort and reliability with an option on any bits off the 1989 spec TZR which will probably blow them all into the weeds. Crumbs. Please contact the office if you see a Suziwakama 250 down your way.



**Deltabox set the pace and prompted renewed 250 hostilities. Hooray**

### SECOND OPINION

Picking a winner from these three was never going to be easy, and if my choice seems more rash than rational it's because that's the type of motorcycle 250cc two-strokes are.

The TZR is undeniably fun, fast and furious but for me it falls between stools: lacking the all-round brilliance of Yamaha's RD350 F2 – still the ultimate stinkwheel? – but a narrow-tyred, off-the-pace old man's machine in this exalted, 1989-model company. After you've stepped off the RGV, the TZR's riding position feels more Peter Fonda than Fast Freddie (and to try and keep up with the other bikes round Pembrey was to invite a dose of Welsh ditch). To paraphrase another legend, who wants yesterday's racer?

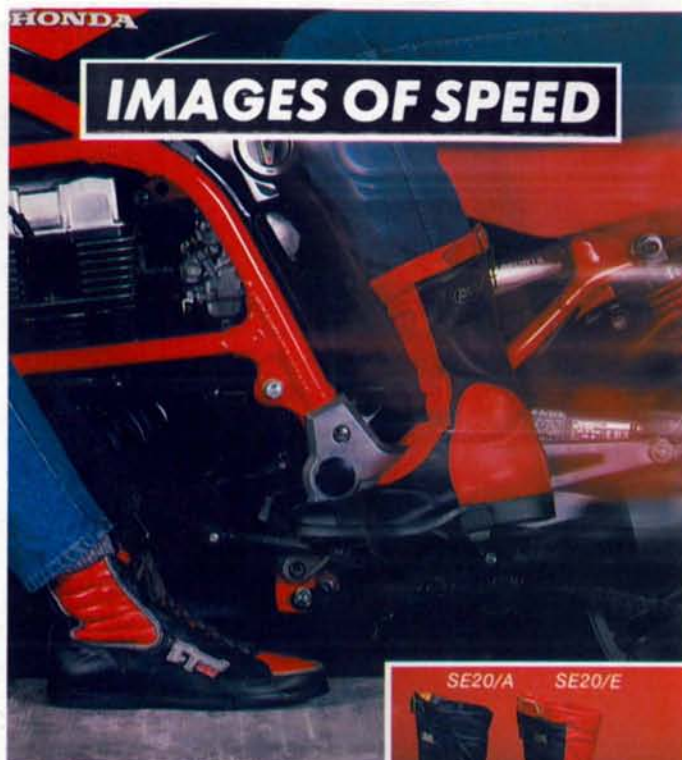
The KR1 is probably the best all-rounder of the three. As top-endy as the Suzuki, as torquey as the Yam, as nimble

as a bluebottle on acid yet as stable as the 9.05 out of King's Cross, it takes 250cc motorcycling to a new level.

But however competent, the conservatively-styled Kawasaki just doesn't excite me in the way the RGV does. The little Suzuki is peaky, thirsty and expensive, even by 250 stroker standards. It has the riding position and weather protection of a crashed pogo stick, and our bike came back from Pembrey in disgrace on the back of an RAC wagon.

I've forgiven it, because just looking at the RGV gets my adrenalin moving in a way that many bikes can't manage when they're being ridden – and the Suzuki is every bit as fun to ride as it looks. My head says choose the Kawa and my bank manager says choose the Yam. But these are bikes of the heart, and my heart says RGV250, no question.

*Roland Brown*



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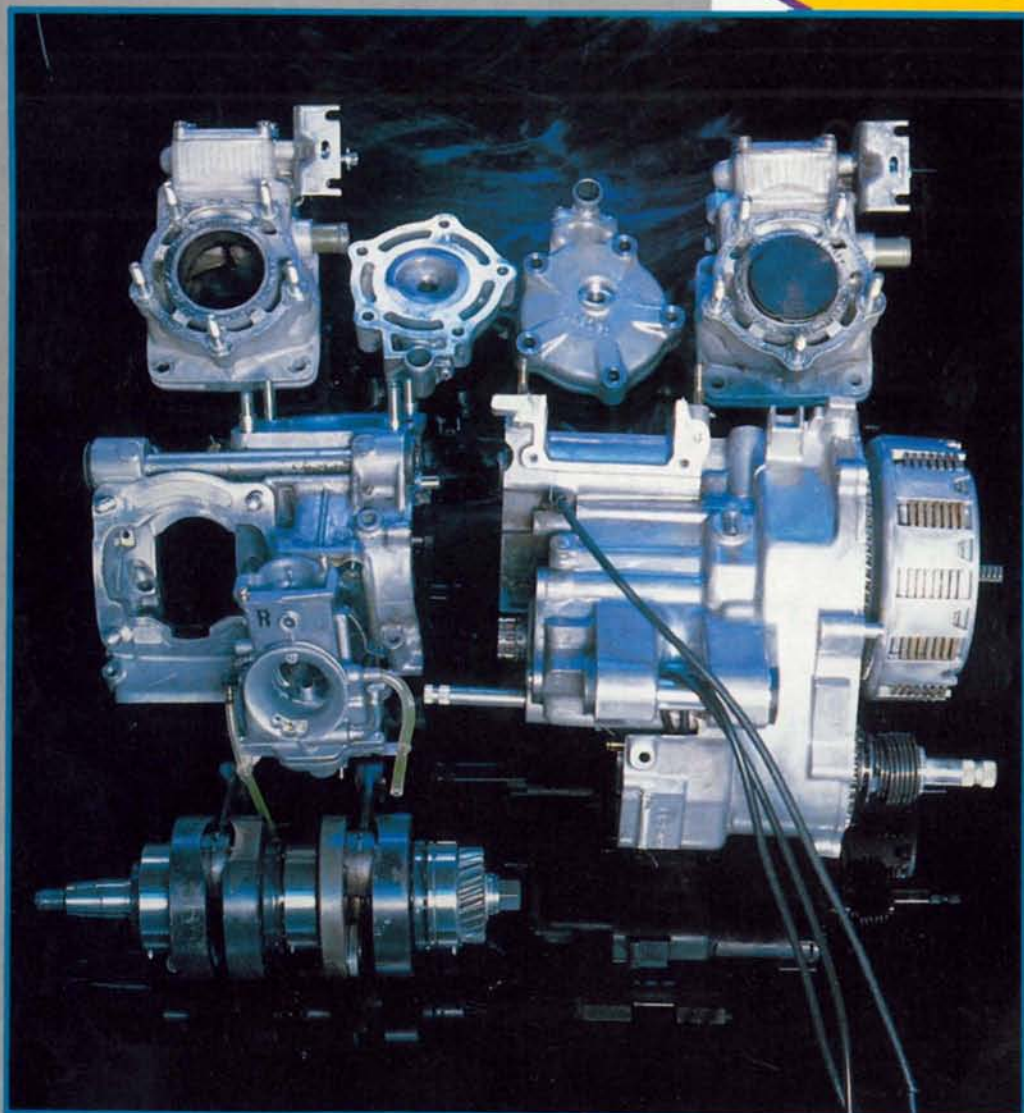


Huge RGV exhaust port needs a bridge too far, whilst fast-acting AETC guillotine could catch the unwary



# SKIMMED headbangers

How much more of a good thing can you get from a 250? McDiarmid surveyed the Stan Stephens Stroker Salon to find out

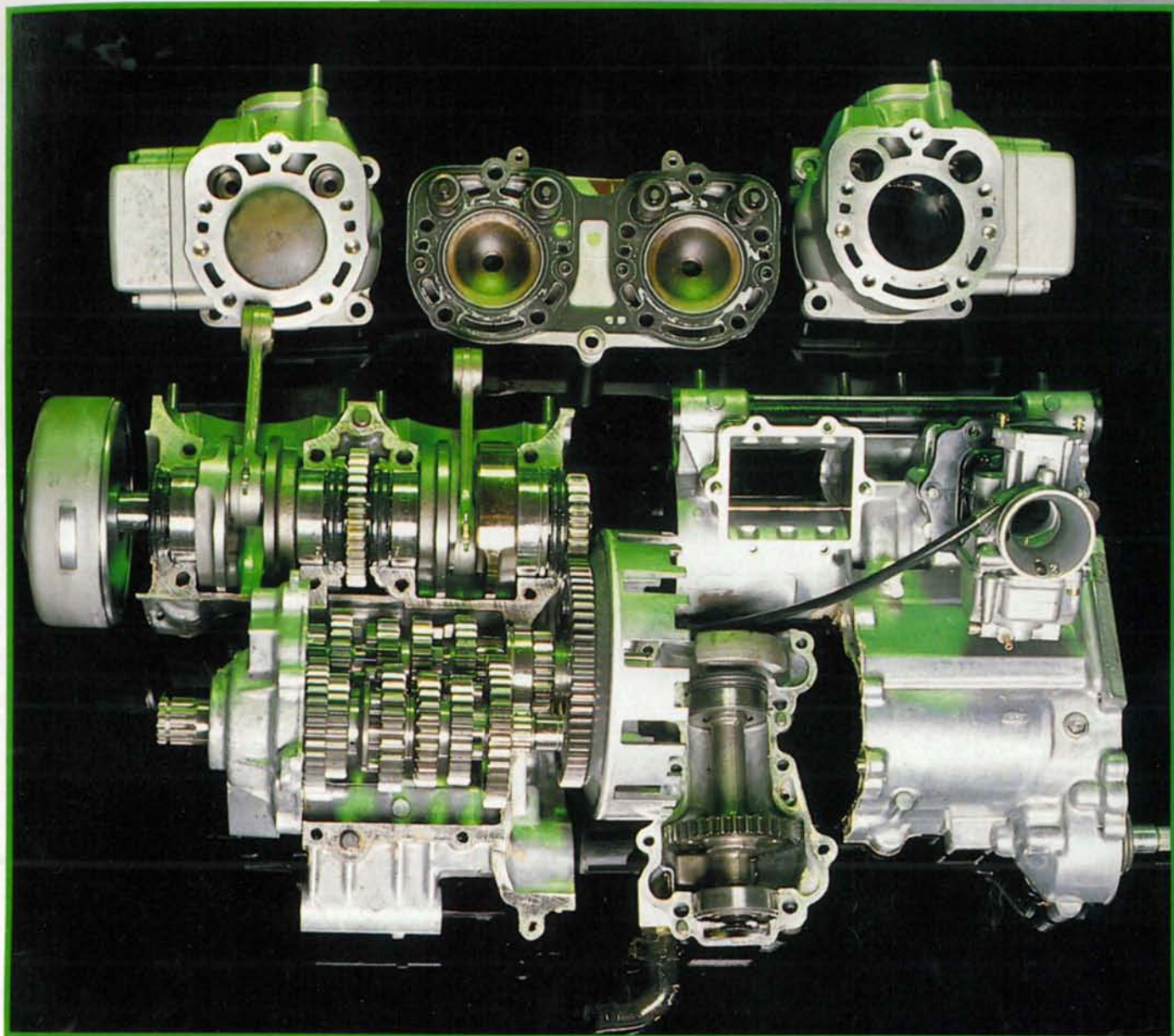


Side-loading RGV gearbox hides its considerable light under a bushel

**T**uning strokers is basically no different from fettling four strokes; you just have to persuade 'em to shift more gas and do something useful with it. If you can do this without recourse to higher rpm (ie greater volumetric efficiency = more torque), so much the better. The most obvious route to follow is bigger ports. Naturally this has disadvantages.

First off, nothing about the basic port timings of any of these 250s is at all radical; air-cooled strokers of the mid sixties had much the same timings, although their ports were much narrower and there were fewer of them. As to tuning potential, all three bikes already have barrels like Swiss cheeses. Any bigger holes are likely to further reduce their mechanical strength and increase heat distortion, especially around the exhaust port.

Secondly, the piston rings – which tend to bulge into the ports as they pass over them – have somehow to hurtle up and down at up to 3700 feet per minute without giving up the ghost. This places an upper limit of about 41mm on the width of any port in these

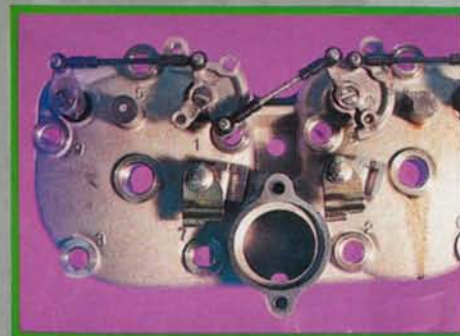


Exquisitely-crafted KR-1 is less coy; thingummy next to clutch basket is balance shaft, which bolts under bottom case

engines. And that, mind, is for racing motors which are regularly fed new rings.

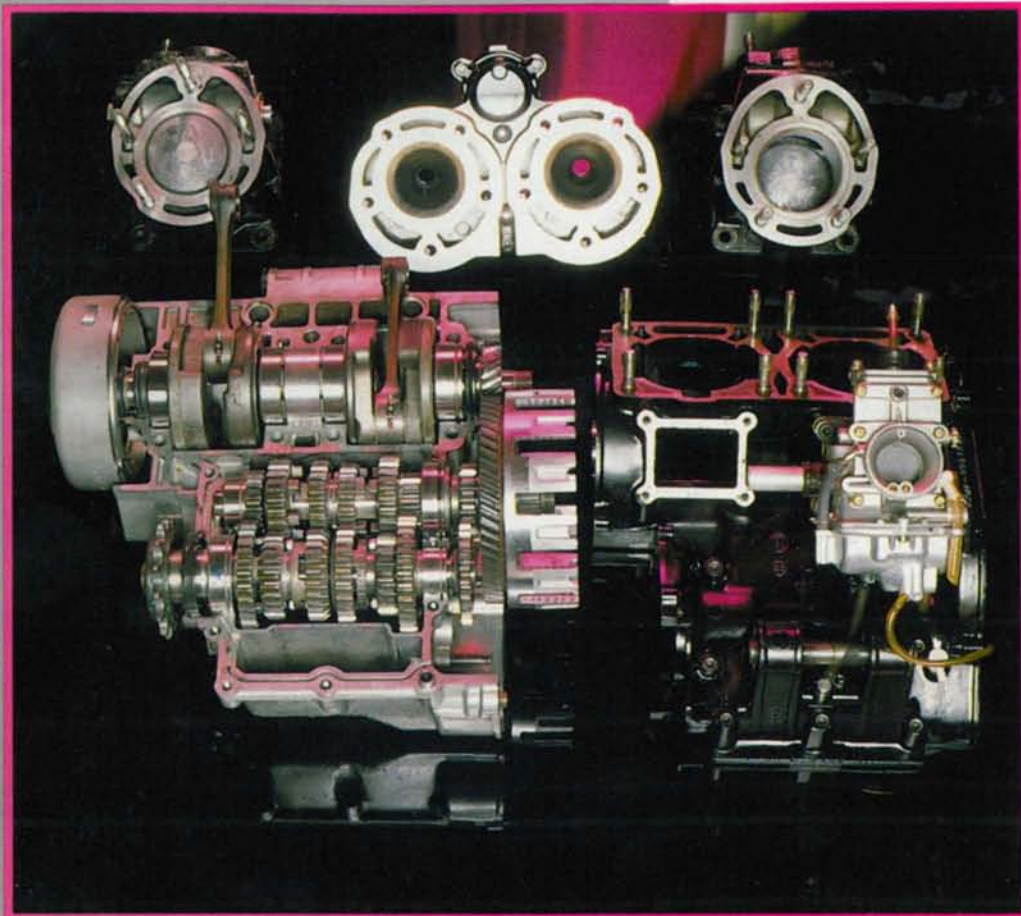
The height and width of ports have two quite different effects. Widening a port – assuming you don't run into ring problems – increases gas glow with little or no trade-off in tractability. Increasing the height of a port, on the other hand, always knocks off bottom-end power. This quest for wider ports is the principle reason that bores are now wider and strokes shorter than they often were a few years ago. But high-reving engines also need tall ports with long opening durations, because as the revs rise there's less and less time to shove gas through them. Life can be such a bitch at times. Power valves – all these bikes have one exhaust gizmo or another – are an attempt to have your cake and eat it; long exhaust durations at peak rpm, shorter ones lower down.

The exhaust port is the one with the major effect on where



KR-1 exhaust (above left) port runs out of breath, although KIPS port (left) does its best via linkages on heads (above)



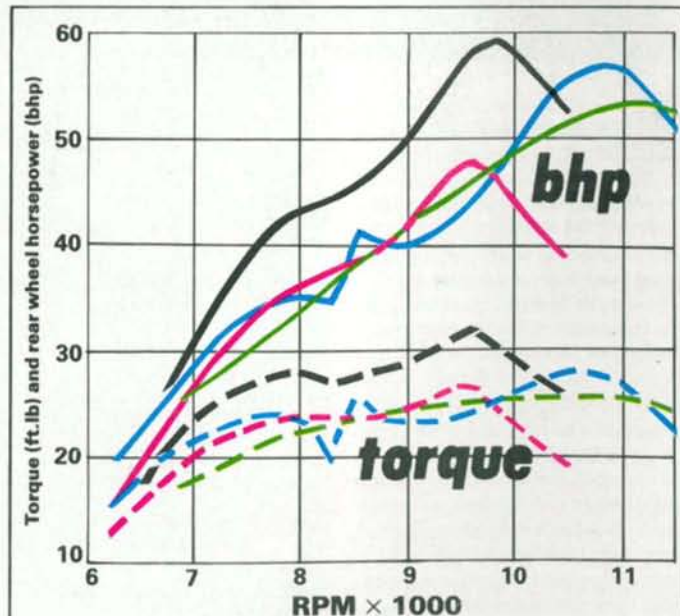


impressed with absolute top-end than a strong squirt out of the corners. In fact some of the stock dimensions are a little surprising, since the exhaust durations required for particular peak power rpm are fairly well known. (Although expansion chamber design also has a major effect and tends, along with the carb size, to put an upper limit on proddy tuning potential).

All other things being equal, you'd expect the TZR's 26mm/191° exhaust port height to deliver max horses at around 10,000rpm, which ain't far wrong; the RGV's 27mm/186° exhaust suggests a 9000rpm peak, so either the tacho's way out or it could lose 1.5mm off the top of the port (which just happens to be what Mick Grant has done to Heron Suzuki's Supersport 400 contender); as for the Kwacker, its 29mm/178° exhaust seems to be aimed at a miserly 7250rpm (although the extra KIPS ports whimper all the way to 8500rpm). If I were Stan Stephens I'd shave two or three mil off the KR1 before I even ran the thing in.

The transfers ports have the job of getting the mixture from the crankcase into the combustion chamber; as such, they're crucial to efficiency and power spread. Transfers have only the briefest of time to work – around 1/600 second at peak rpm – which is why modern two-stroke barrels are

peak power is developed. With the sort of bore/stroke ratios used by these 250s, the highest practical exhaust port for proddy racing would be about 25mm, one mm or so higher for really silly street use where your mates are more

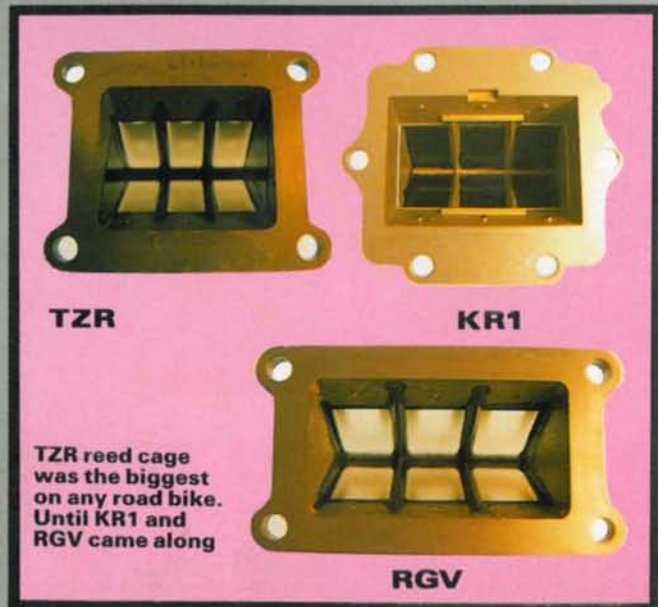


**Maximum horsepower:**  
 Suzuki RGV250 57.3bhp @ 10,700rpm  
 Kawasaki KR-1 54bhp @ 11,100rpm  
 Yamaha TZR250 48.2bhp @ 9600rpm  
 Yamaha TZR250 (tuned) 59.5bhp @ 9900rpm

**Maximum torque:**  
 Suzuki RGV250 28.4 ft. lb @ 10,500rpm  
 Kawasaki KR-1 25.6 ft. lb @ 11,000rpm  
 Yamaha TZR250 26.5 ft. lb @ 9500 rpm  
 Yamaha TZR25 (tuned) 31.9 ft. lb @ 9500rpm



TZR exhaust port sports the most radical timing, but last generation's inlet and transfers can't keep up



TZR

KR1

TZR reed cage was the biggest on any road bike. Until KR1 and RGV came along

RGV

absolutely peppered with them. It's also why crankcase induction motors score over those, such as LC Yams, which wore their inlet port on the back wall of the cylinder; the space such inlets took up is much better occupied by an extra transfer port, and reed-valve technology is now quite happy to have the carb stuck more-or-less anywhere on the crankcases. (Many outboard boat engines even have theirs *underneath!*).

The transfers' must also shift mixture in such a way that it's directed up, back, and away from the exhaust port, down which it'd otherwise cheerfully vanish without burning, thank you very much. This process – the Schnürle loop – relies, amongst other things, on a very accurate profile at the top of the main transfer ports, which is why home tuners find it easier to cock 'em up than get 'em right. They also require a separation of eight mm or so between exhaust and transfer ports to avoid charge loss; the RGV's four mmm looks a little dodgy in this respect.

Too-short transfer duration usually has the effect of making an engine very peaky. And, because the angular

movement of the crankshaft is much more pronounced near top and bottom dead centres, just a small increase in transfer port height makes a huge difference to timing. Consequently even lifting the transfers half a mil can make – or ruin – an engine. Because raising the roof of a transfer port is a devil of a job, even with the right tackle, far and away the easiest approach is to lift the whole barrel on a packing plate, then skim the barrel and adjust the exhaust port to suit. This is also a very good way to wreck a barrel – there's no going back if you get it wrong.

But before you get the Black and Decker out, be warned that cocking things up, apart from producing an unrideable dog, could hit you hard in the folding stuff. Lift a port too high, or skim too much off a barrel, and you're looking at high-tech scrap. Cylinders for the TZR, RGV and KR1 work out at £124.56, £177.29 and £199.49 respectively, plus a contribution to Mr VAT's Christmas box. At least the TZR runs steel liners, so you can resort to oversizes for bore wear or damage; the other two wear plated barrels for less

thermal distortion, better heat dissipation and wear qualities, but they're knackered once the plating's damaged and they're bastards to work on. Piston and rings will set you back £17.96/£13.06, £18.41/£12.89 and £19.60/£11.98 for the Yam, Suzy and Kawa respectively.

One way in which all production engines can be improved is by getting the squish clearances right. Squish – the action of the piston in swirling the combustion gases as it approaches top dead centre – inhibits detonation. It's essential in all performance two-strokes running high compression ratios. It's also something the factories never get right, presumably in an attempt to protect their engines from ham-fisted gorillas.

In order to be effective on engines such as these, the squish clearance – the minimum distance between piston and head – should be one mm at the very most. On the RGV it's about two mm, and comparably ineffectual on the other two. What this means in practice is that all three engines must run lower compression ratios than they could tolerate with an effective

squish band. There's about a three per cent power increase (even more at lower rpm) to be gained from just getting these things right.

## TZR

Up to its cylinder base gasket, the Yam is every inch your traditional Japanese two-cylinder two-stroke; horizontally-split cases laying bare neat ranks of crankshaft, layshaft, mainshaft and associated pump and tacho drives. Simple, elegant, and lovely to work on.

When it first arrived in 1987 the TZR's top-end was state-of-the-art, too; compact, water-cooled, crankcase reed induction and, for the first time on a roadster, a claimed 200bhp/litre.

Two years on the TZR is suddenly old hat, hence the recent introduction of the Mark II version into Japan's hyper-competitive 250 market. It's power handicap seems to lie partly in a much lower compression ratio, partly in relatively weedy inlet and transfer areas, and partly in the near right-angled corner the gases have to turn between reed block and transfers. (The vee of the RGV and the horizontal cylinders of the

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**Mki YPVS 350 STAGE II TUNE** – "129 mph, 13.3 secs, 105 mph standing ¼, 10000 rpm. A significant increase over stock at the top end whilst maintaining mid range tractability." Rupert Paul PB June 1986.

**RD400D STAGE III TUNE** – "126 mph, power! and plenty of it, remarkably flexible, and easy to drive." Dave Walker MCN September 30th 1981.

**RG250 MkiIII STAGE II TUNE** – "120 mph, 13.2 secs, 102 mph standing ¼ mile. Considerable power increase produced smoothly and predictably." Rupert Paul PB May 1986.

**RG250 Mki STAGE II TUNE** – "114 mph, 13.5 secs, 100 mph standing ¼ mile. 20% more power at the top end and improved mid range power." Malcolm Gough PB April 1986.

**350LC STAGE III TUNE** – "133 mph at MIRA, 7000-10000 rpm simply shrieks out brute horsepower." Superbike circa 1982. 11 secs, 120 mph standing ¼ mile, Santa Pod 1988. "LC Wizard" Road Racing May 1987. "LC Genius" Motorcycle 1983.

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KR1 pose no such obstacle).

Then there's the ignition's trick of drastically retarding the ignition at 10,000rpm or so – no amount of tuning will allow it to rev on. By comparison both the KR1 and RGV will rev until their pipes or porting run out of breath. The TZR's biggest asset is that it's well-known, well sorted and there are plenty of quick examples about. Thus, it won't need the shakedown period that the newer 250s are likely to need. But it won't take many Supersports 400 rounds before the RGV/KR1 headbangers' learning curve puts them up there with it.

#### KR1

The Kwacker is a lovely engine – easy to drop out, well-finished, and fairly simple to work on. Its gearbox is side-loading (so you can gut it with the engine *in situ*), but also exposes with the crankcases split like the more conventional TZR. (The RGV is strictly side-loading only, which is why you can't see the gearbox internals in the pix).

The Kawa's barrels are immediately striking for having nine ports to the mere six of their rivals. Two of these are KIPS ports; one – the lower 'boost' port – is a complete mystery. Transfers, you'll recall, pass gas from the crankcase to the combustion chamber when the piston's near *bottom* dead centre. Unfortunately the only time this port is open is when the piston's near *top* dead centre, and even then it doesn't communicate with anything else. Weird. Maybe you're expected to cut a hole in the piston to let it all happen – you can bet someone will try.

Even without this seemingly useless port, the KR1 has substantially more transfer area, and a touch more duration, than the Yam or Suzuki. Its piston also has small windows feeding from the secondary transfers – probably to cool the piston crown rather than move more mixture – plus two pairs of oil holes to provide extra lubrication between the exhaust and KIPS ports. Similar care extends to the gearbox, where a gallery feeds a gorgeously-crafted series of oilways to the shafts and gears.

KIPS – Kawasaki Integrated Power System – is the clever little howsyourfather which separates the KR-1 from the rest. Basically it uses a pair of secondary exhaust ports which open slightly earlier than the very conservative main port. At low and medium rpm these

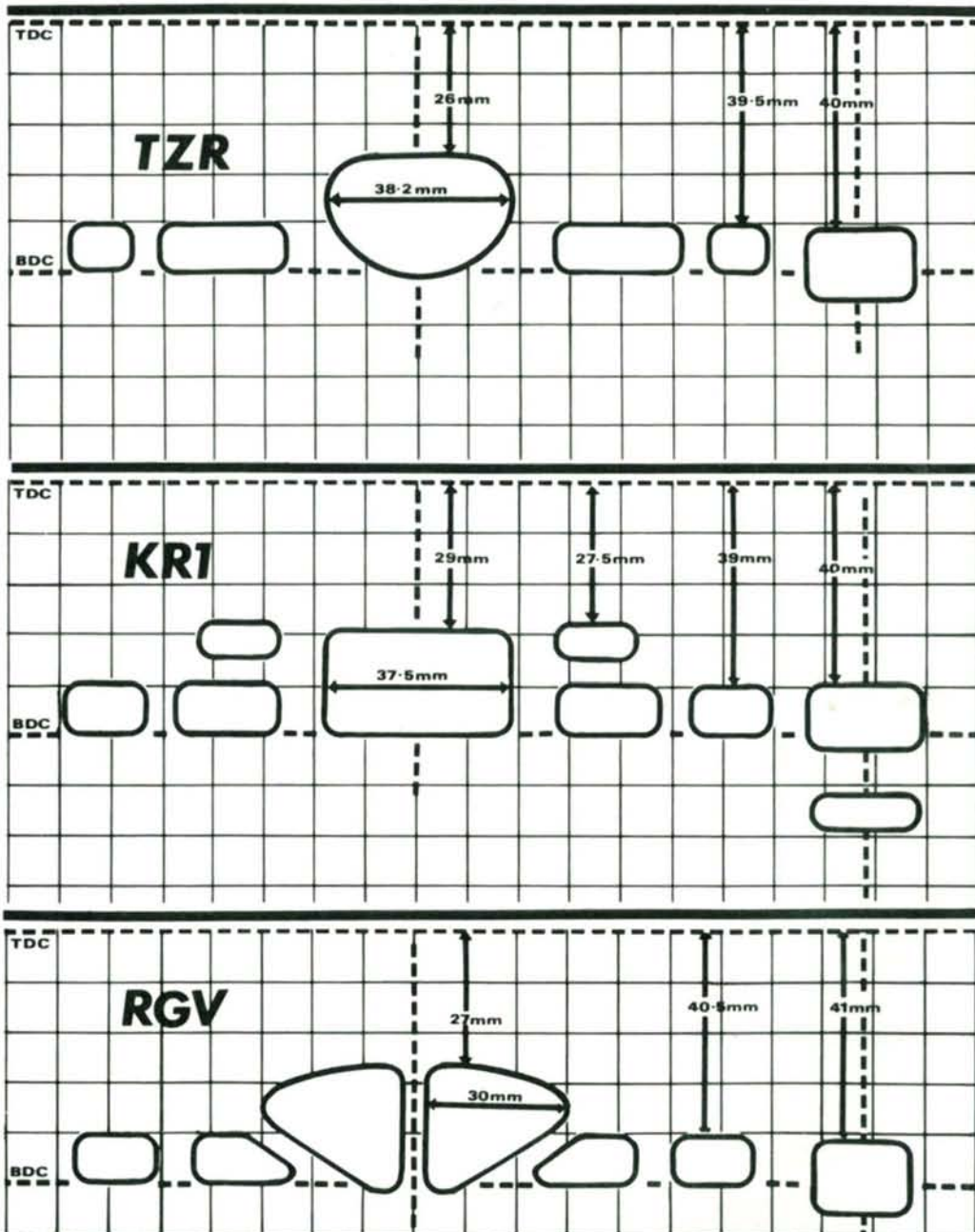
KIPS ports are blind. Then, at around 8000rpm, a window opens within the port. This communicates not only with the main exhaust port to give more area *and* duration, but it also feeds into a separate amplification chamber, like Honda's ATAC, to con the engine into thinking it's got a more balls-out exhaust than it really has. Clever.

For once none of this is a

gimmick. The KR1 has substantially better bottom-end than the Suzuki, and far and away the cleanest top-end delivery of the three. Its dyno trace suggested that it was maybe a little strangled at the top-end, and perhaps running too rich. (There's also a strong suspicion that the rev-counter's optimistic – Kawasaki claim peak power of 55bhp at 10,500rpm; if so, this

would have *understated* our torque figures at any given engine speed). You can almost bank on the KR1's delivering a lot more top-end with a judicious lump shaved off the top of exhaust port. When this was written in early February, Stan could scarcely wait to get the porting tools out.

**RGV**  
Suzuki's little nutter is most



obviously different in being a 90° vee twin (or not, if you think all vees should have a shared common crankpin, which no conventional crankpin, which no conventional two-stroke can). Such vees seem to be the fashion in 250 GP racing these days, largely because staggered cylinders take up less room than side-by-side ones, so the crank can be shorter and stiffer, the engine narrower, and there's more room for whopping carbs, reed blocks and transfers.

The first thing you'd notice in stripping the RGV is that getting the mill out of the frame is a bitch – about 1½ hours-worth, compared to about a third of that for the other two. When you finally get inside, you'll notice that the cylinder workmanship isn't a patch on the Kawasaki's. The port chamfers are particularly crude.

The next thing to hit you is the sheer size of that bridged exhaust port – about 15 per cent bigger than the Yam's, and 30 per cent bigger than the Kawasaki's main port. However, bridged ports flow only around 85 per cent as well as a single port, so the effect's probably comparable to the other two when you take the KR1's KIPS ports into account.

Bridged exhaust ports have one other disadvantage; because they're in the hottest part of the engine, the thin bridge between them is often prone to distortion. Suzuki appears to recognise this, because they've installed an oil bleed hole just below their exhaust bridge. Since this is fed directly by the oil pump, anyone ditching it in favour of petroil for racing could be in deep trouble (although reports from Japanese F3 racing suggest not).

The other striking thing about the RGV is its 32mm carbs – four mm bigger than either the Yam's or Kawa's. These shake hands with reed blocks which dwarf even those of TZ750s (which is a generation of hooligans grafted into RD400s and 350LCs). The Suzuki has the capacity to shovel an awful lot of mixture into its crankcases.

On unmitigated screamers such as these, gaining top-end at the expense of bottom-end is all part of the equation. In fact none of them have or need much mid-range, either, except compared to other peaky screamers. What they do need is good lower top-end – the 8000-9000rpm stuff which gets you out of corners quickly. In this respect the

RGV's hiccup is a serious disadvantage.

Suzuki's answer to YPVS and KIPS is AETC, about which the press kit quite fraudulently claims "superb torque" from idling to redline. AETC – Automatic Exhaust Timing Control – is broadly similar to the Yamaha powervalve, but probably not so similar as to irritate the patents office. That 8000rpm glitch seems to occur at the point the exhaust guillotine cracks open – with all the subtlety with which they took noble French heads off 200 years ago. That's not to say it's incurable, but it's an eyecore on the graph and could be a snag on the track.

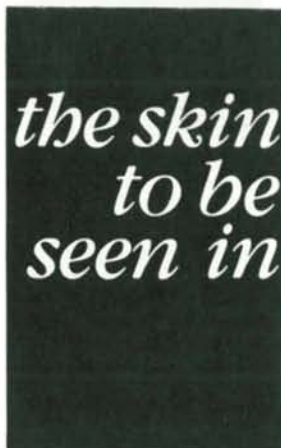
#### VERDICT

So which is head boyo amongst the headbangers? For my money the KR1 is the most technically attractive engine of the three, and the one with the most tuning potential for anyone with a free hand. But, despite such mouth-watering technology from all the combatants, it's possible that this year's new Supersport 400 class might be won or lost by fairly ordinary parts that cost the factories about three quid apiece: carbs. The RGV has 32mm gas-passers, the other two have 28s. It could all hinge on something that simple.

#### FAST 'N' EASY

It may come as some surprise to learn that tuned versions of even these hairy beasts aren't necessarily less practical on the road. My old RD350, after it graduated from the track to public road headbanging, was not only much pokier than stock, but also appreciably more tractable.

To find out whether this is still true two generations of stokers later, uncle Stan Stephens sent me out on one of his '89 spec proddy-tuned TZR250. Its miles quicker than stock, as you'd expect, but he's also ironed-out the 9000rpm flat spot which you see in the graph of both Stan's '88 tune, and the standard bike, and stretched the power band top and bottom. Unlike the crazed, two-stage delivery of cooking TZRs, the supposed hot one gave serious stomp all the way from 7000 to 11,000rpm. 95 quid for the barrel work, plus another £40 to clean up the 'cases represents about five per cent of the price of a new TZR; the result makes the engine at least 25 per cent better. Streuth, for that I'd even fork out the dosh myself. ■



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