JAPANESE 250MX COMPARISON

A WISE OLD motocrosser once said, "Nothing that remains the same for very long, remains for very long." And while it was certainly true when he said it, it is even more true in today's marketplace of blitz-like change and overnight sensationalism. The Europeans have brought much change to the sport of motocross, a sport they introduced to this country and which they still dominate whenever and wherever present. The Japanese had to play catch-up and they had to play it fast. The first Japanese "motocross" machine as we know them today was introduced in 1970 as the Yamaha DT1-MX. In six short years Japan has come from total anonymity in motocross competition to virtual equality with its more experienced but less highly financed European counterpart. Thus, in this small span of time, the four major Japanese firms have done what it has taken other corporations decades to do. They certainly have not remained the same, which has pretty much assured them that they *will* remain.

So, while Japan has been busy keeping pace with the rest of the motocross world, how has the competition faired between the country's own four top brands? That's just what we aimed to find out by initiating this four-way comparison of the Honda, Kawasaki, Suzuki and Yamaha 250 MXers.

ABOUT THE PROCEDURE

First, of course, the machines were called in from their various manufacturers. Yamaha International sent us its latest 250 YZ, American Honda the new red-framed CR250M2, and U.S. Suzuki uncrated a new RM250 for our pleasure. Kawaski Motor Corp. was unable to provide us with a test bike, so we obtained a new KX250 through the courtesy of Tom Orlando at Champion Motorcycles in Costa Mesa, Calif. Tom runs a tidy shop and can meet your needs for Kawasakis, as well as for several more exotic motorcycle lines such as BMW, Ducati, Laverda and MV Agusta.

Six spark plugs, 42 gallons of pre-mix, one master link, five blisters, two scabs, a sore toe and a wrenched knee later, we have a winner.

With the machines ready and waiting in the CYCLE WORLD shop, measurements were taken for the data panels. The bikes were also weighed and final prep was performed for a two-day outing at Indian Dunes.

Recent rains made the International course at Indian Dunes unridable, but the owners had already taken care of that by bulldozing a new track in the quarter-mile-wide sandwash area just behind it. Our first day was spent getting much photography done. . .doing bermshots, wheelies and powerslides all for the benefit of our shutter freaks. Then, toward the end of the day, we combined part of the new sand track with a ridable section of the International course and literally created our own virgin motocross track. By now, all three riders were familiar with the machines, so after a few warm-up laps to reacquaint themselves with the various mounts, lap times were taken.

An overnight stay at a local inn, then back out to the Dunes we went. Close inspection told us that the moist sand we had been running in had hardly affected the air filter elements, so we left them alone. The chains, however, received proper maintenance. With the chains doused in Bel-Ray chain lube, and liberal amounts of WD-40 applied >

Photography: Fernando Belair, Brian Blades, Steve Clark, D. Randy Riggs, Peter Schilleci

COMPARISON

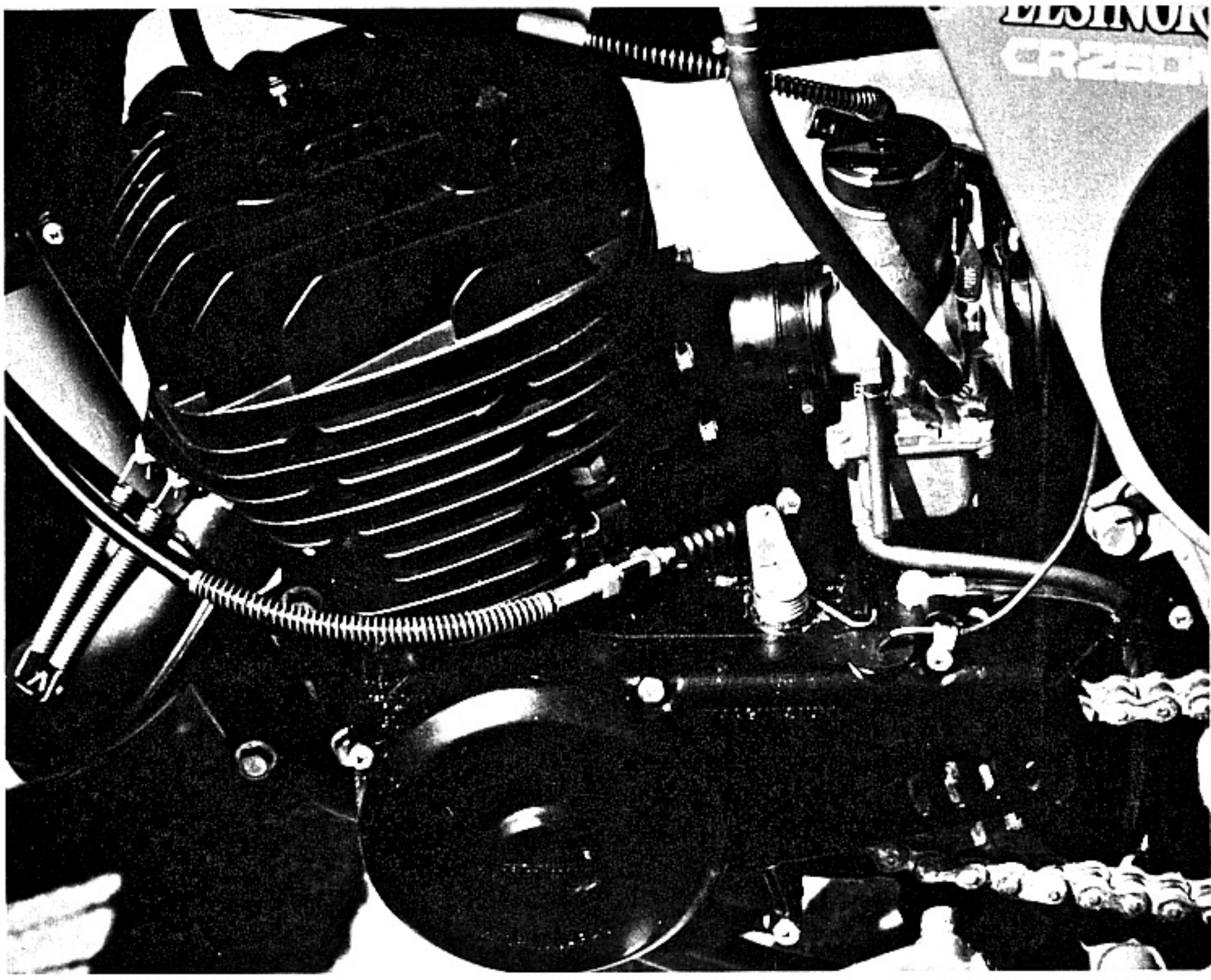
to all pivot areas—such as brake pedals, footpegs and kickstarters—the machines were ready to go. We topped the tanks off (all of the bikes were run on Bel-Ray MC-1 at 50:1, except for the Suzuki whose distributor insisted that we use only Castrol R mixed at 20:1) and out we went for more photography on the Shadow Glen track. Shadow Glen was in perfect condition. Here, recent rains had soaked deeply into the ground, leaving only a light film of mud on the track. The Indian Dunes grader whisked that off and we were left with almost picture-perfect loam.

After we tired the photographers out, lap times were again taken. While at the Dunes, it is usually our custom to time the bikes over a 100 to 150-yard-long section of whoop-de-doos, but the rains had obliterated them. The rains had, however, raised the stream at the Dunes to a relatively high level, and, while all of the machines crossed the stream several times without drowning out, it should be pointed out that after studying the location of the electrical components and airbox design, we feel that the Suzuki and Honda would be the most difficult of the four to drown.

A weekend passed, during which time the machines were thoroughly serviced. The next week we went out to both Saddleback and Escape Country, two tracks much nearer our Newport Beach offices than Indian Dunes had been. Here, we encountered problems. Weekend races had cut devastating foot-deep ruts in the softened track surfaces. Overnight winds had dried the clay surfaces rock hard, making traction non-existent at best. Corners had to be approached sitting down, with both feet raised in order to prevent ankle-tweaking snags in the deep ruts. In some corners, the footpegs were hanging up on the ruts. Useful lap times were impossible, but we rode these tracks anyway just to see what they were like; while we learned little about handling due to the heavily reduced speeds necessitated by the track conditions, we came away with some very interesting observations about engine tractability and line-holding capabilities of the various steering geometries represented.

Finally, the bikes were given a thorough going-over and trucked, first to Webco for a run on its sophisticated Schenck engine dyno, and then to Number One Products, where the suspension components were dyno-tested to help us better understand why they had performed as they did.

The following is a result of what we learned about the four Japanese 250 motocrossers! Which ones are good, which ones are better and which one is best.



CATEGORY ONE
MANUFACTURER'S SUGGESTED RETAIL PRICE (WEST COAST)

Kawasaki	$1216	4
Yamaha	1324	3
Honda	1325	3
Suzuki	1410	1

CATEGORY TWO
DRAG RACES

Yamaha	4
Suzuki	3
Honda	2
Kawasaki	1

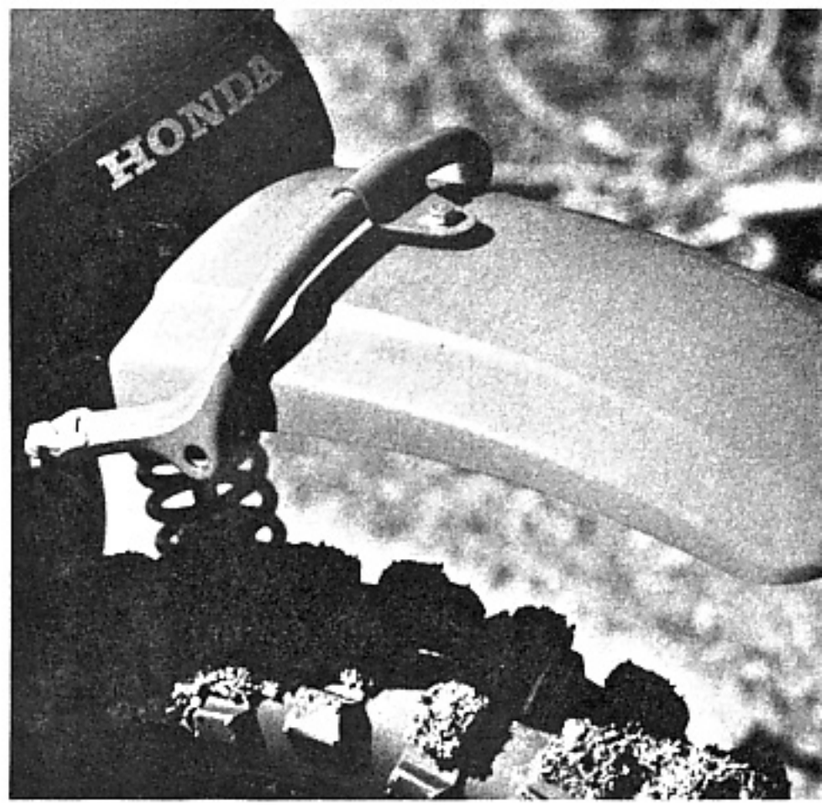
HONDA CR250M2

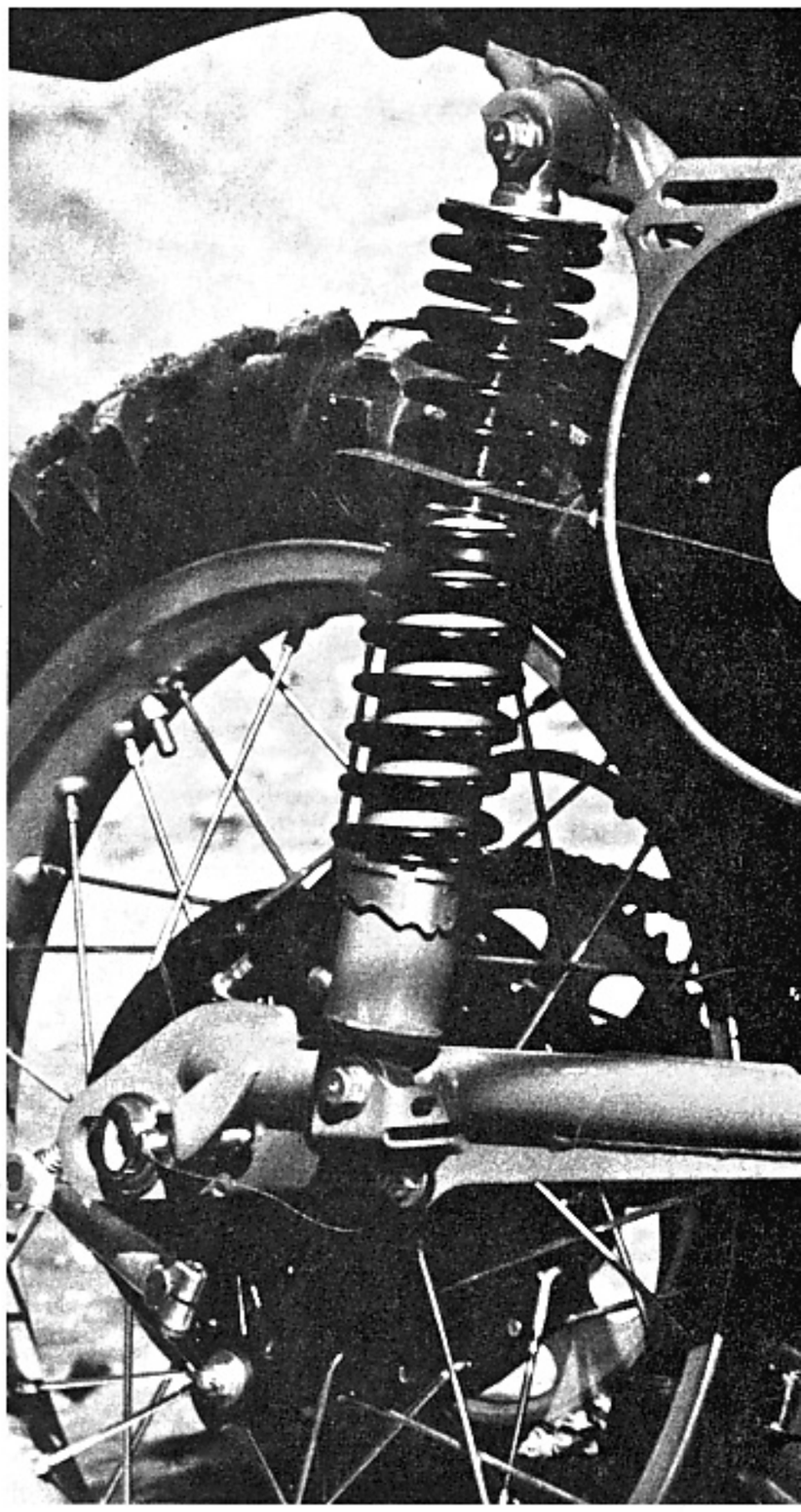
Attractively styled in Honda racing red with black trim, the CR250 wins our vote as the best looking of the machines tested. It is powered by a piston-port two-stroke engine much like the Kawasaki's. The Honda is unique among the test bikes in that it uses a Keihin carburetor instead of the more popular Mikuni. The Honda was, along with the Yamaha, perfectly jetted. We didn't have to mess at all with either machine.

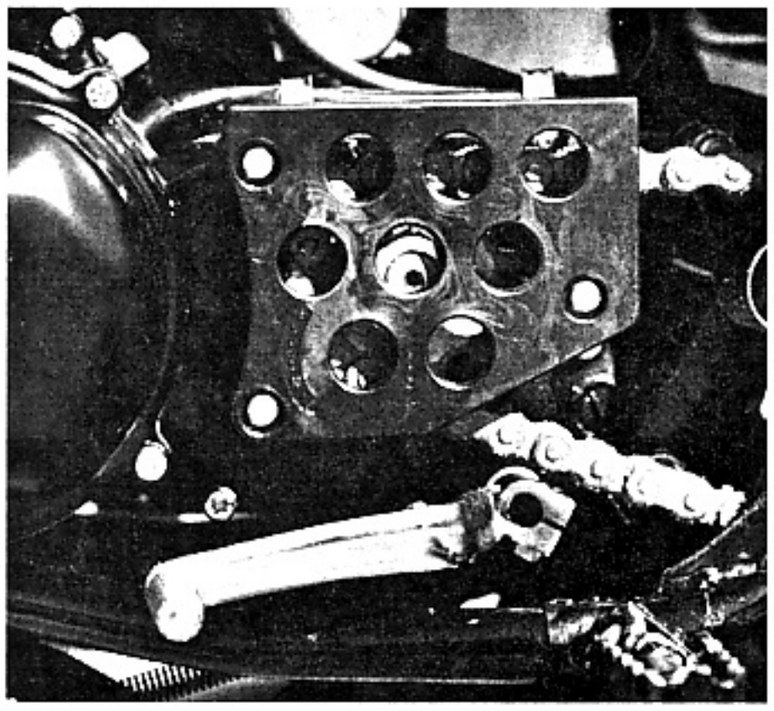
The chassis on the CR is a single-downtube chrome-moly unit. It proved to be quite strong throughout our testing. The swinging arm is also chrome-moly, but it did not display the rock steadiness of the frame. Whenever the limits of the forward-mounted Showa shock absorbers were reached, the swinging arm began absorbing the stress delivered by the race track. Since it could not release the built-up stress out the front end into the sturdy frame, it let it go back the way it came, making the rear end hop and pitch when track situations got severe.

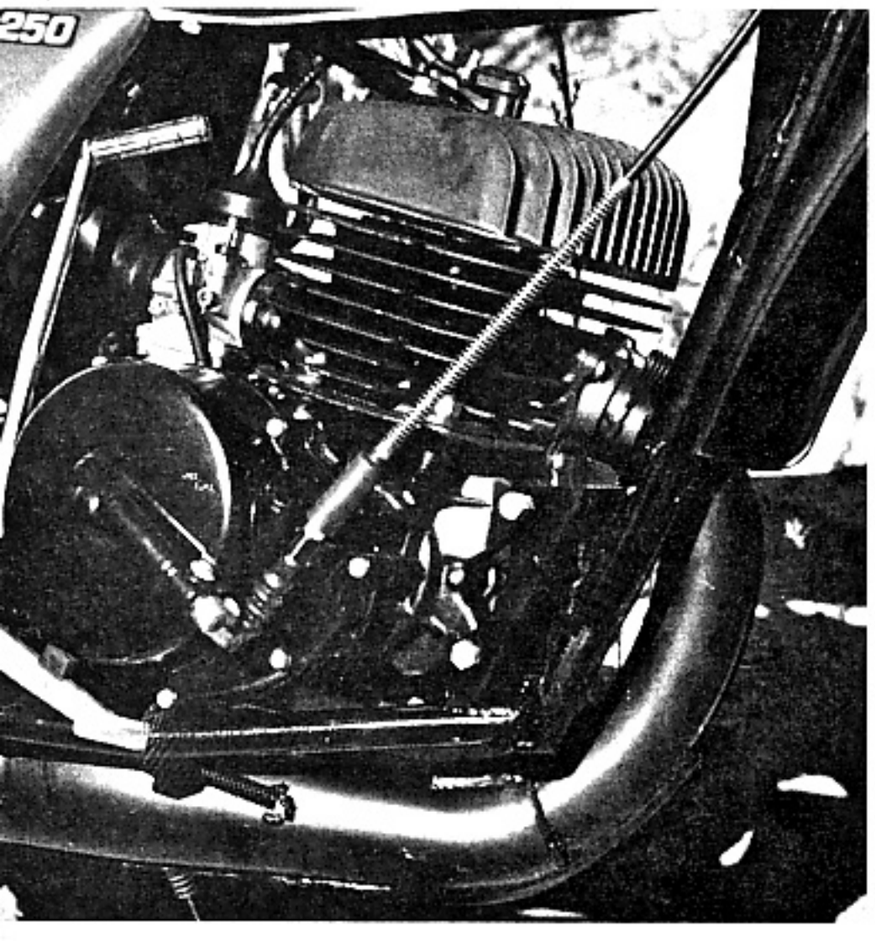
It is interesting to note that the Showa shock absorbers are of the gas-emulsion variety. Whereas most gas-pressurized shocks have a floating membrane to separate the oil from the gas, some units, like Girlings and the latest Bilsteins, depend on an emulsification of the oil and gas to provide their damping. It should be pointed out, however, that the Honda's shocks fell far short of the performance of both the Girlings and Bilsteins.

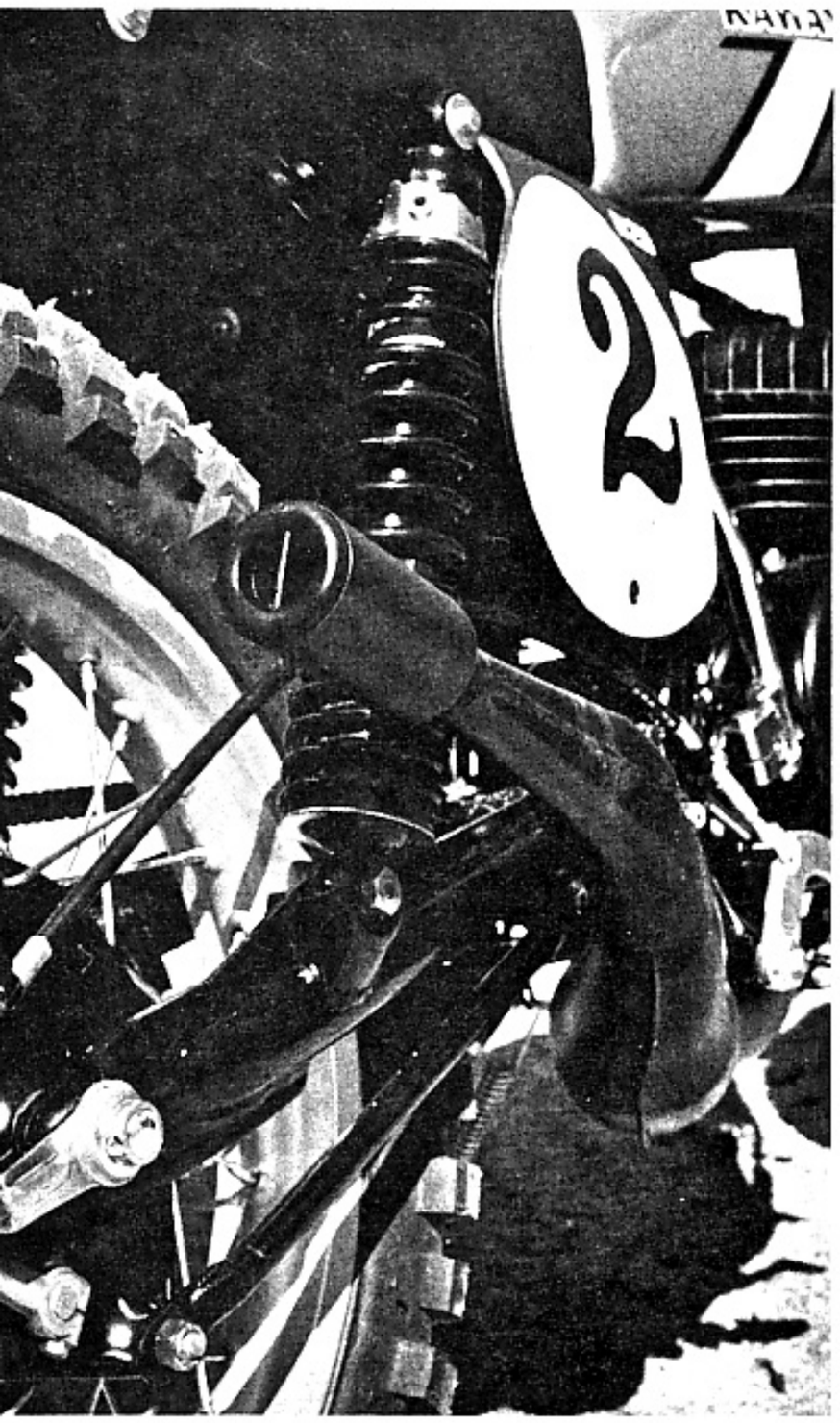
HONDA











KAWASAKI

CATEGORY THREE
TIMED MOTOCROSS LAPS
INDIAN DUNES
(SAND/INT'L TRACK)

Bob:	Honda	Kawasaki	Suzuki	Yamaha
	1:44.4	1:43.2	1:44.4	1:43.0
	1:43.2	1:43.4	1:43.4	1:44.2
	1:42.4	1:42.2	1:43.8	1:42.4
	1:43.33 avg.	1:42.93 avg.	1:43.87 avg.	1:43.20 avg.

Kawasaki 12
Yamaha 9
Honda 6
Suzuki 3

Randy:	Honda	Kawasaki	Suzuki	Yamaha
	1:43.4	1:43.2	1:43.0	1:43.8
	1:45.6	1:43.2	1:42.0	1:43.4
	1:44.0	1:43.2	1:42.3	1:44.2
	1:44.33 avg.	1:43.20 avg.	1:42.43 avg.	1:43.80 avg.

Suzuki 12
Kawasaki 9
Yamaha 6
Honda 3

Fernando:	Honda	Kawasaki	Suzuki	Yamaha
	1:39.9	1:41.8	1:41.0	1:42.3
	1:40.8	1:40.6	1:41.0	1:40.5
	1:40.2	1:40.2	1:40.6	1:40.5
	1:40.30 avg.	1:40.87 avg.	1:40.87 avg.	1:41.10 avg.

Honda 12
Kawasaki 9
Suzuki ..... 9 (Tie)
Yamaha 3

SAND/INT'L TRACK TOTALS
Kawasaki 30
Suzuki 24
Honda 21
Yamaha 18

COMPARISON

The CR brake hubs house the best brakes to be found among these bikes. They were powerful, easy to control and completely impervious to water. Laced to each hub is a D.I.D. rim, which we feel are just about the best thing going. Bridgestone tires are found on the red racer. . .3.00-21 up front and one of the new 4.50-18 variable pitch (see Honda CR125M2 test in last month's CW) knobbies in back. Bright red fenders, black anodized handlebars and a comfortable seat round out the package.

KAWASAKI KX250

The engine in the KX250 is possibly one of the most versatile Japanese motocross mills to be found. Fed by a 34mm Mikuni, the powerplant is housed in a single-downtube mild steel frame. Air filtration is by oil-wetted foam, as on all the other bikes. Kayaba gas/oil shocks are mounted in back in a half-cantilevered, half-forward-mount position.

The folks at the Big K have made an error, we feel, in the styling department. Last year's KX was done in traditional Kawasaki racing green with white fenders and accents. This year the bike is metal-flake green with black fenders. A set of white fenders might help the looks. But despite their color, the fenders on the KX are excellent and not the kind that you would normally discard.

Dunlop provides the tires on this one. The 3.00-21 front tire did not prove to be anywhere near as treacherous as it was on the Yamaha, and the 4.60-18 rear knobby worked best when the track had some moisture in it. Standard left-side shift engages and disengages the gears in the five-speed transmission. The KX's brakes are also very powerful, although not the equal of the Honda's. D.I.D. rims are used here also. The Kawasaki is the only one of the machines to come equipped with a down-pipe.

SUZUKI RM250

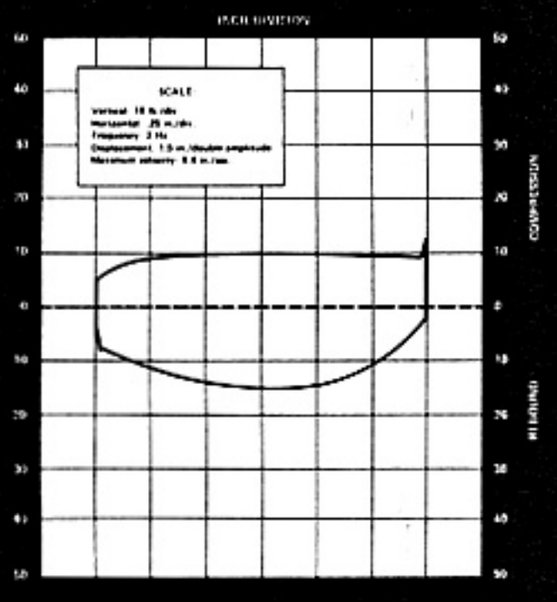
One of the most dramatic changes in the motocross world was Suzuki's move from TM-series motocrossers to the RM line. The new bikes are replicas of the Grand Prix Works bikes, with production considerations factored in. Unique in its use of case-reed induction, the RM250's engine is designed to yield greater power over a longer range than other types of two-stroke engines.

To keep things in line, Suzuki utilizes a chrome-moly frame and swinging arm, along with Kayaba gas/oil shocks built to Suzuki's specs and long-travel forks with an offset front axle. Paint styling easily identifies the machine as a >

HONDA

SUSPENSION DYNO TEST

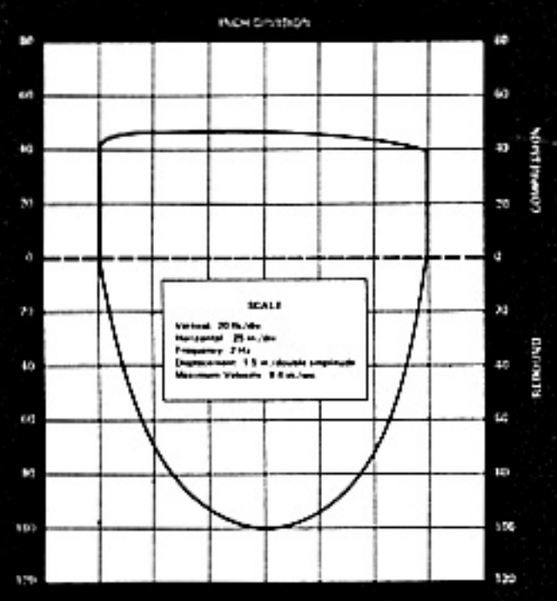
FRONT FORKS



Description: Honda CR fork with HD-315 oil
Fork travel, in.: 6.75
Engagement, in.: 4.75
Spring rate, lb./in.: 25/37 progressive
Compression damping force, lb.: 10
Rebound damping force, lb.: 15
Static seal friction, lb.: 10

REMARKS: Fork travel has not been increased over last year's model, and this really hurts the Honda's performance in the rough. Travel can be extended a maximum of 1 in. and we would recommend it. Compression damping is good, rebound is too light. Rebound damping should be 20-25 lb., minimum. Going to a 30-wt. oil will cure this, but heavier oil will also raise the compression damping rate. To restore compression damping it will be necessary to enlarge the compression damping holes in the damper rod. Drilling both CD holes out to .187 in. should do the trick. If ride is still harsh, enlarge the holes further to .219 in. If you want to increase travel, do not perform the damping modification, as you will have to replace the stock rod with a longer one. Number One Products has a kit for this, as does S&W.

REAR SHOCKS



Description: Gas-emulsion Showa with 215 psi pressure
Shock travel, in.: 3.5
Wheel travel, in.: 5.4
Spring rate, lb./in.: 100/120 progressive
Compression damping force, lb.: 43
Rebound damping force, lb.: 100

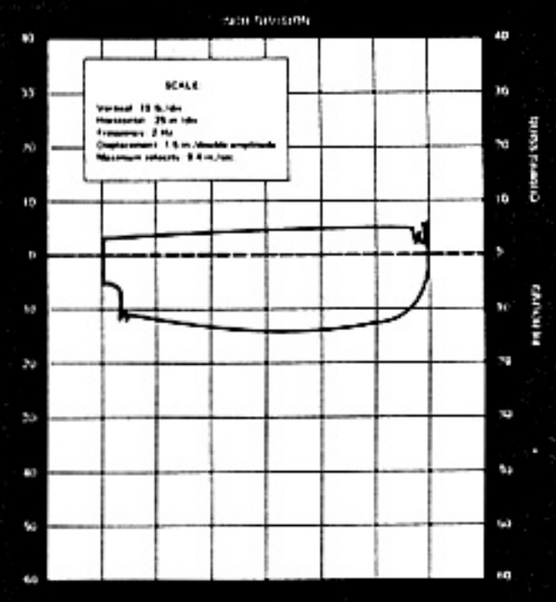
REMARKS: Honda has updated the rear suspension on the 250, but not enough. Shock travel remains at 3.5 in., the same as last year's. The swinging arm is new, but the shock mounting position is the same, so travel is identical to the '75 model's at 5.4 in. That's not enough. Compression damping has been increased to an appropriate amount for the mechanical advantage, but rebound remains marginally light. With the spring fitted, pitching and/or loss of traction in bumpy turns will result. Since damping is not perfect on the stock shock, and since shock travel is insufficient to give enough wheel movement, we suggest replacement. S&W has a new freon-charged shock designed specifically for this bike that will do the job.

Tests performed at Number One Products

KAWASAKI

SUSPENSION DYNO TEST

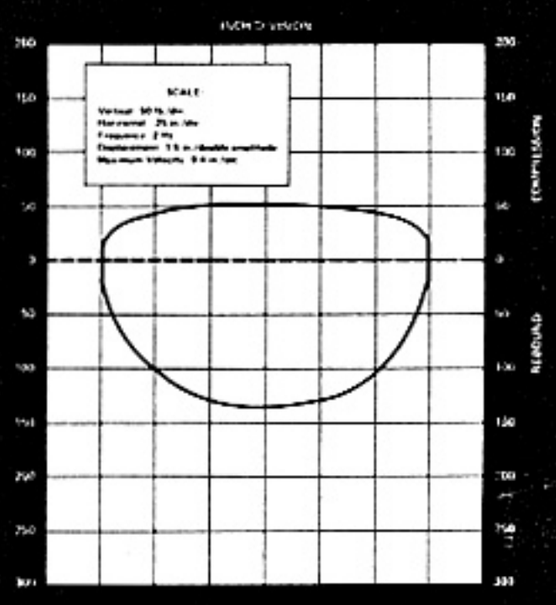
FRONT FORKS



Description: Kayaba/KX250 fork with HD-315 oil
Fork travel, in.: 7.5
Engagement, in.: 4.85
Spring rate, lb./in.: 18/32 progressive
Compression damping force, lb.: 5
Rebound damping force, lb.: 14
Static seal friction, lb.: 8

REMARKS: The forks bottom easily because compression damping is lacking. The ratio between compression and rebound damping, however, is correct, so going to a heavier oil, say 30-wt., will cure the damping problem. If you want more travel, installing an MTF 488 kit from Number One Products will provide an extra inch. We recommend this fork extension for racing applications.

REAR SHOCKS



Description: Kayaba gas/oil shock
Shock travel, in.: 3.75
Wheel travel, in.: 5.5
Spring rate, lb./in.: 75/94 progressive
Compression damping force, lb.: 50
Rebound damping force, lb.: 135

REMARKS: The Kayaba shocks fitted to the Kawasaki are identical in damping characteristics to the Kayabas fitted to the RM Suzuki. The only difference is in shock travel. The Kawasaki units have 3.75 in., while the ones on the Suzuki offer 4.6 in. of travel. The springs on the Kawasaki are too light. Bottoming occurs frequently, limiting both speed and control. A stiffer spring will help, but because of the mild mechanical advantage of 1.46:1, the spring would have to be progressive to prevent a bone-jarring ride. Something like 90/150 would do. More travel would help too. Here, there are two ways to go. You can lay the stock shocks down to increase the mechanical advantage. The shock will handle a mechanical advantage of 1.8:1, which would yield 6.75 in. of travel. This would require welding and a set of 90/200-lb. springs, however. An easier way to go is via the purchase of a set of Works Performance shocks. In the stock mounts these will yield 7.3 in. of travel without altering the geometry of the bike.

Tests performed at Number One Products

COMPARISON

Suzuki. Attractive yellow covers the tank, plastic fenders and side panels.

The RM is the only machine that does not come with D.I.D.s. Takasago provides the rims for this 250. While they are very light and do not have mud-collecting ridges, they do not have the strength of the others. Bridgestone tires are also found on the RM, although the variable pitch design is reserved only for the Honda.

Suzuki has fitted its latest motocrosser with a number of minute touches typical of details that only the Japanese look after. Rubber grit covers are found on the brake and clutch levers, as well as on the rear brake cable and the kickstart pivot point. The rear wheel can be removed, but the chain adjusters stay bolted in place to make refitting of the wheel much easier and readjustment of the chain unnecessary.

YAMAHA YZ250

Though the Yamaha is also styled in yellow, it is easily discerned from the Suzuki by its unique black accent stripe on the fuel tank. This year, Yamaha has used basically the same motor as last year, changing only the ignition for greater reliability and the exhaust for lower noise level. What makes the 1976 model faster than those that came before it is the suspension.

Up front, a pair of patented air forks, built by Kayaba, soak up punishment better than anything that Japan has ever offered. The forks are unique in that each leg has an accumulator bottle on top. Inside the bottle is a free-floating piston with air chambers both above and below it. The lower chamber compresses as the fork compresses and the oil rises within the fork leg. Since compressing air is not truly progressive, in a normal air fork (one with air caps only) the final few inches of movement can be virtually useless. While the first few inches may compress at a 25 lb./in. rate, the last few might require as much as 300 lb./in. What Yamaha's forks do then, is allow you to set each air chamber (upper and lower) to a different pressure. When the pressure in the lower chamber builds sufficiently during fork travel, the free-floating piston moves, volume in the fork leg is increased and fork action again becomes progressive. The forks are highly adjustable, but we recommend that you start with settings of 27-29 psi in the lower chamber and 52-54 psi up top. Oil level should be 175mm from the top of the fork leg at full extension. This converts to approximately 415cc per side.

In the rear, the Monoshock has received a new, longer shaft that increases measurable axle travel to a touch over seven inches. Oil volume is up by nearly >

CATEGORY FOUR
TIMED MOTOCROSS LAPS
INDIAN DUNES
(SHADOW GLEN TRACK)

Bob:	Honda	Kawasaki	Suzuki	Yamaha
	1:28.5	1:30.6	1:28.2	1:27.0
	1:28.4	1:29.0	1:27.1	1:27.1
	1:27.6	1:30.0	1:27.6	1:28.8
	1:28.17 avg.	1:29.87 avg.	1:27.63 avg.	1:27.63 avg.

Suzuki 12
Yamaha ..... 12 (Tie)
Honda 6
Kawasaki 3

Randy:	Honda	Kawasaki	Suzuki	Yamaha
	1:28.2	1:30.4	1:27.2	1:27.0
	1:28.8	1:30.2	1:28.2	1:27.8
	1:27.8	1:30.2	1:28.1	1:27.4
	1:28.27 avg.	1:30.27 avg.	1:27.83 avg.	1:27.40 avg.

Yamaha 12
Suzuki 9
Honda 6
Kawasaki 3

Fernando:	Honda	Kawasaki	Suzuki	Yamaha
	1:21.8	1:23.8	1:19.6	1:20.4
	1:21.1	1:22.6	1:19.2	1:21.0
	1:20.5	1:22.8	1:19.8	1:20.8
	1:21.13 avg.	1:23.07 avg.	1:19.62 avg.	1:20.73 avg.

Suzuki 12
Yamaha 9
Honda 6
Kawasaki 3

SHADOW GLEN TOTALS
Suzuki 33
Yamaha 33
Honda 18
Kawasaki 9

COMPARISON

10 percent, while gas pressure is down slightly, reducing some of the preload that made previous models hop mercilessly over smaller obstacles.

Brakes on the YZ are both half-width affairs, but different as night and day. The front anchor is almost legendary as one of the best around. It didn't let us down. The rear brake has a reputation for over-sensitivity that goes way back to the first DT1-MX. It didn't do anything to alter its reputation, either. Tires are by Dunlop and were Yamaha's downfall in this test.

SCORING

As has been our practice in the past, comparison tests are decided on the basis of points accumulated. Less significant features or performances, such as suggested retail price or drag race showings, are scored on a simple 4-3-2-1 from the best to the worst. Lap times, because they are, after all, much more important to a motocrosser's sole functions, are scored on a 12-9-6-3 basis. Bonus points are awarded for features on a machine that we feel are above-average. A quick example would be loose spokes. On new machines you expect that the spokes will loosen up a few times before they bed themselves in. We did not give any penalty points for loose spokes because such things are about par for new motocrossers. But the rear spokes on the Honda and Suzuki refused to loosen, regardless of the pounding dished out. This is above-average performance, deserving of bonus points.

Penalty points were handed out for sub-par features such as the Yamaha's soft handlebars or air filters that were troublesome to service or difficult to achieve a good seal with.

PERFORMANCE: HOW AND WHY

HONDA CR250M2

The Honda is in an unfortunate situation. While it came in third in our comparison test, changing a few of the bike's features would easily put it up near the first two machines. Suspension is the bike's weak link. Fork action is harsh. It loosens up after a while, much as our CR125M2's did last month, but it still doesn't come up to par with the Yamaha's or Suzuki's. Measurable fork travel is a lowly 6.75 in. Even the new 125 Honda has more travel than that. The front end on the 250 is seriously outdated. However, with 4.75 in. of

slider-to-stanchion engagement, a good fork kit can bring the travel close to eight inches without too much trouble. Number One Products makes such a kit, as does S&W.

Shock absorber performance is even worse. While in appearance the shocks may look identical to those on the new red 125 in last month's issue, their characteristics both on the track and at the shock dyno told us that they are nowhere near the same. Excessively harsh action in the rear not only makes for a jarring ride, but also induces swinging arm flex. Eventually the swinging arm bushings will have to be replaced, but we didn't have our machine long enough to wear the original set out. The pitching in the back end was caused by excessive compression resistance attributable to high spring preload and insufficient return damping for the strength of the spring. The Honda lost a lot of time getting into rough corners and going down heavily potholed straights. It lands stiffly but controllably off most jumps.

While it was no fun stuffing the CR into rough corners, it was an absolute gas through smooth ones. The best brakes by far were found on the Honda. And it steers like a Maico. As we raced around against each other and against anyone else who happened to be on the tracks at the time, it was easy to outbrake the competition into a corner and then beat them through it by taking the inside line and just laying it over and gassing it. The Bridgestone tires are super. Engine power is quick, but controllable.

If you go by feel, you might think that the Honda does not possess as much horsepower as the other three bikes, but the dyno shows us that that isn't so. What happens is that, after reaching maximum horsepower, the Honda shuts the door on the revs rather quickly, while the others will rev out farther, though not producing any more power. To go fast, you must shift the Honda immediately after reaching peak power. If you have to blast down a short 40-yard straight and the engine peaks after 30 yards, upshift for those last 10 yards or the CR will stop accelerating. When this occurs, the other three bikes will continue to rev past their power peaks and ease by the Honda. It means that you might have to shift the Honda a few more times per lap in order to go just as fast, but that's not a big hassle since the CR's tranny is very slick in operation and not tiring to use at all.

The easy cure for the Honda's sus- >

pension woes is a fork kit as mentioned, and shorter, slightly softer rear springs. The gas preload in the shocks is adjustable, but you need a dealer to work on them. You won't find many service stations that carry 225 psi in their air lines. If you decide that you want to slightly depressurize the shocks yourself, then turn them upside down and compress them a few times, then let them sit that way for a few minutes before you slowly bleed them. Bleeding the pressure out of the shocks while in the standard position will squirt a jet of oil halfway across town.

If you don't mind a little investment, then we suggest that you eliminate the stock rear dampers altogether. Works Performance shocks, gas Girlings, Bilsteins or the new freon S&Ws make a nice replacement. With just these few modifications, you can be ready to go hunting the hot RM Suzukis.

KAWASAKI KX250

The new KX suffers from suspension problems, just like the Honda does, but it also suffers from an insufficiently rigid frame that flexes from the pounding that the inadequate suspension delivers at racing speeds.

Suspension-wise, front end performance lacks both proper compression and rebound damping. The front wheel pogos over potholes and stutter bumps.

HONDA CR250

SPECIFICATIONS	
List price	$1325
Suspension, front	telescopic fork
Suspension, rear	swinging arm
Tire, front	3.00-21
Tire, rear	4.50-18
Engine, type	piston-port, two-stroke Single
Bore x stroke, in., mm	2.75 x 2.535; 70 x 64.4
Piston displacement, cu. in., cc	15.17; 248
Compression ratio	7.2:1
Claimed bhp @ rpm	N.A. (See dyno)
Claimed torque @ rmp lb.-ft.	N.A. (See dyno)
Piston speed @ rpm ft./min.	3380 @ 8000
Carburetion	34mm Keihin
Ignition	flywheel magneto
Oil system	oil mist, oil in fuel
Oil capacity, pt.	2.0
Fuel capacity, U.S. gal.	1.8
Recommended fuel	premium
Starting system	kick, folding crank
Air filtration	oil-wetted foam

POWER TRANSMISSION	
Clutch	wet, multi-disc
Primary drive	straight-cut gear
Final drive	single-row chain (5/8 x 1/4)
Gear ratios, overall:1	
5th	9.54
4th	11.49
3rd	13.84
2nd	17.40
1st	22.76

DIMENSIONS	
Wheelbase, in.	56.5
Seat height, in.	34.0
Seat width, in.	7.0
Handlebar width, in.	33.25
Footpeg height, in.	12.0
Ground clearance, in.	9.75
Front fork rake angle, degrees	32
Trail, in.	5.8
Curb weight (w/half-tank fuel), lb.	227.5
Weight bias, front/rear, percent	44.3/55.7

KAWASAKI KX250

SPECIFICATIONS	
List price	$1216
Suspension, front	telescopic fork
Suspension, rear	swinging arm
Tire, front	3.00-21
Tire, rear	4.60-18
Engine, type	piston-port, two-stroke Single
Bore x stroke, in., mm	2.94 x 2.56; 70 x 64.9
Piston displacement, cu. in., cc	15.33; 249
Compression ratio	7.9:1
Claimed bhp @ rpm	34 @8000
Claimed torque @ rpm lb.-ft.	23.6 @ 7000
Piston speed @ rpm ft./min.	3413 @ 8000
Carburetion	34mm Mikuni
Ignition	capacitor discharge
Oil system	oil mist, oil in fuel
Oil capacity, pt.	1.9
Fuel capacity, U.S. gal.	2.38
Recommended fuel	premium
Starting system	kick, folding crank
Air filtration	oil-wetted foam

POWER TRANSMISSION	
Clutch	wet, multi-disc
Primary drive	straight-cut gear
Final drive	single-row chain (5/8 x 1/4)
Gear ratios, overall:1	
5th	9.88
4th	11.47
3rd	13.94
2nd	17.10
1st	23.04

DIMENSIONS	
Wheelbase, in.	55.8
Seat height, in.	33.5
Seat width, in.	7.0
Handlebar width, in.	34.5
Footpeg height, in.	12.6
Ground clearance, in.	8.2
Front fork rake angle, degrees	31
Trail, in.	5.6
Curb weight (w/half-tank fuel), lb.	223.5
Weight bias, front/rear, percent	43.4/56.6

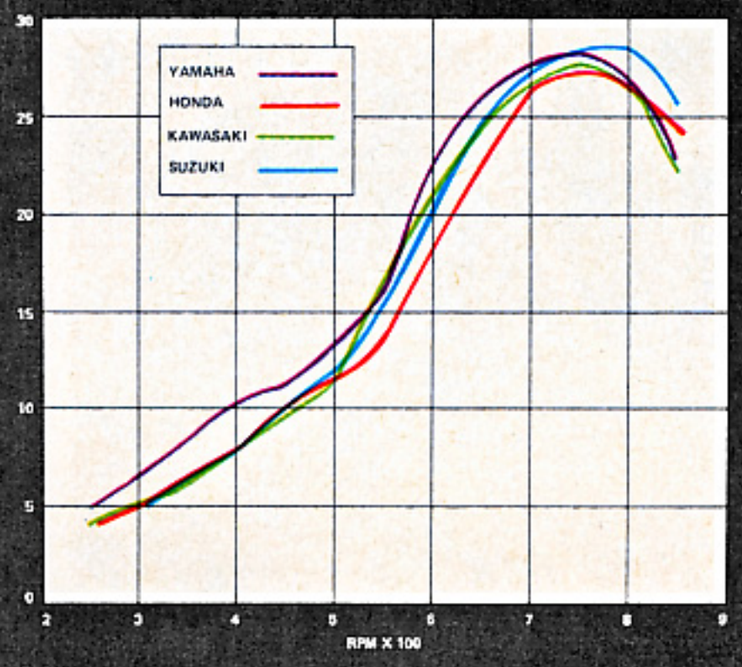
It also twitches from side to side. This is normally an indication of either fork or frame flex at the steering head. The forks on the KX are strong, so the frame is the culprit. Further gusseting of the steering head may cure the problem, or it may just send stress forces deeper into the frame until they find another weak point at which to relieve themselves. If the rest of the frame is up to snuff, then the problem will be cured with the gusseting. Of course, a proper fork kit would alleviate much of the stress being delivered to the frame, making a cure that much simpler.

Fork travel is good at 7.5 in. and could easily be increased another three-quarters of an inch without reducing engagement to a dangerous level. The Kayaba gas shocks in the rear travel only 3.75 in., but their position yields just over six inches of travel at the axle. On the dyno we found these shocks to have identical damping characteristics to the RM shocks and the Yamaha TT500 dampers. However, while the Suzuki's shocks are perfectly suited to their application, the Kawasaki's forward-mount is not as severe. With this lesser mechanical advantage, the compression damping proves to be too high. To top this off, the spring rate is too light. This totals up to a shock that kicks up in the back end, yet can be easily bottomed when the pressure to it is applied more slowly, such as on a run-out at the bottom of a hill or in a berm whose position demands that it be run through its entirety rather than smacked into.

Fixing the suspension requires about as much work as the Honda. Put a fork kit in the front end and either lay the rear shocks at a steeper angle to justify their high compression damping and then fit them with a stiffer spring (standard spring is 82 lb./in.), or replace the shocks with proper aftermarket units.

Power is not lacking in the KX engine. Though Webco's dyno shows it to be not much different from the other >

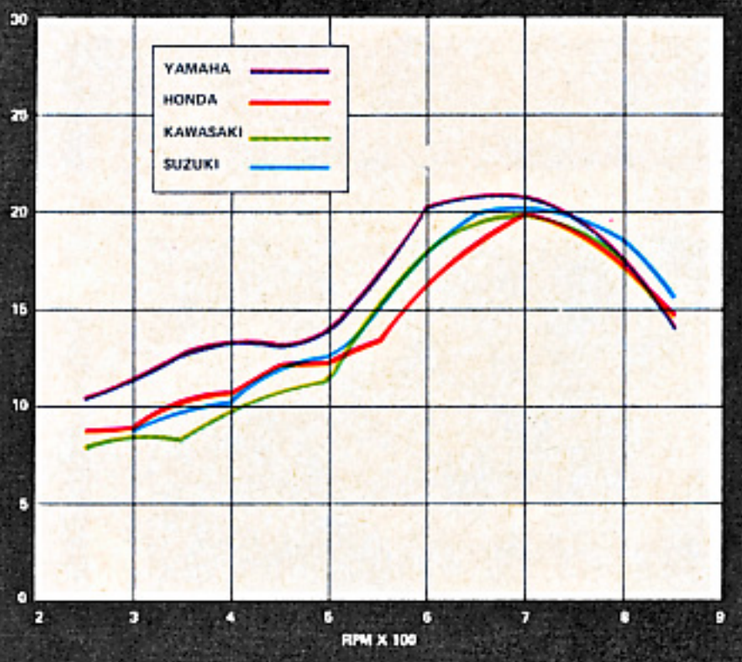
DYNAMOMETER TESTS: HORSEPOWER AND TORQUE



ENGINE SPEED	BHP Honda	Kawasaki	Suzuki	Yamaha
2500	4.17	3.75	--	4.96
3000	5.07	4.93	4.97	6.46
3500	6.76	5.61	6.47	8.43
4000	8.13	7.42	7.82	10.14
4500	10.40	9.36	10.23	11.22
5000	11.59	10.89	12.01	13.22
5500	13.91	16.02	15.49	15.97
6000	18.66	20.57	20.56	22.97
6500	22.43	24.09	24.63	25.86
7000	26.38	26.51	26.81	27.59
7500	27.22	27.65	28.15	28.23
8000	26.13	26.65	28.43	26.90
8500	23.95	22.24	25.40	22.66

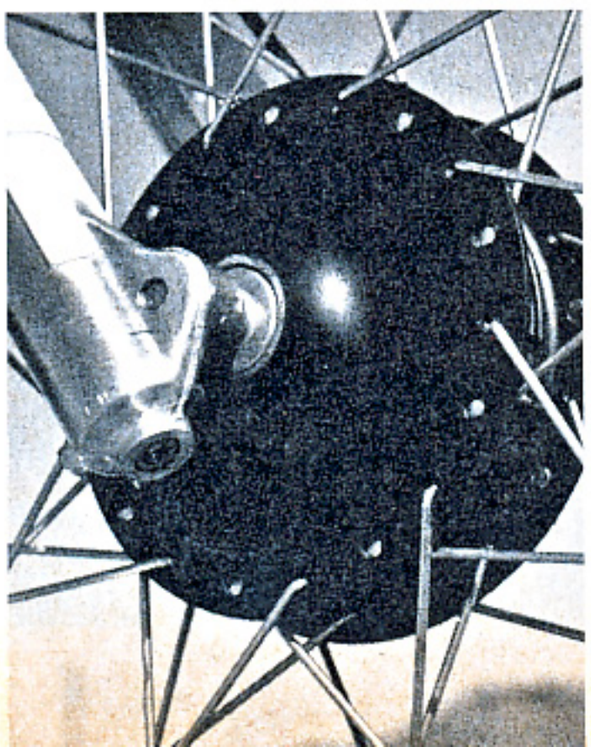
Test Conditions

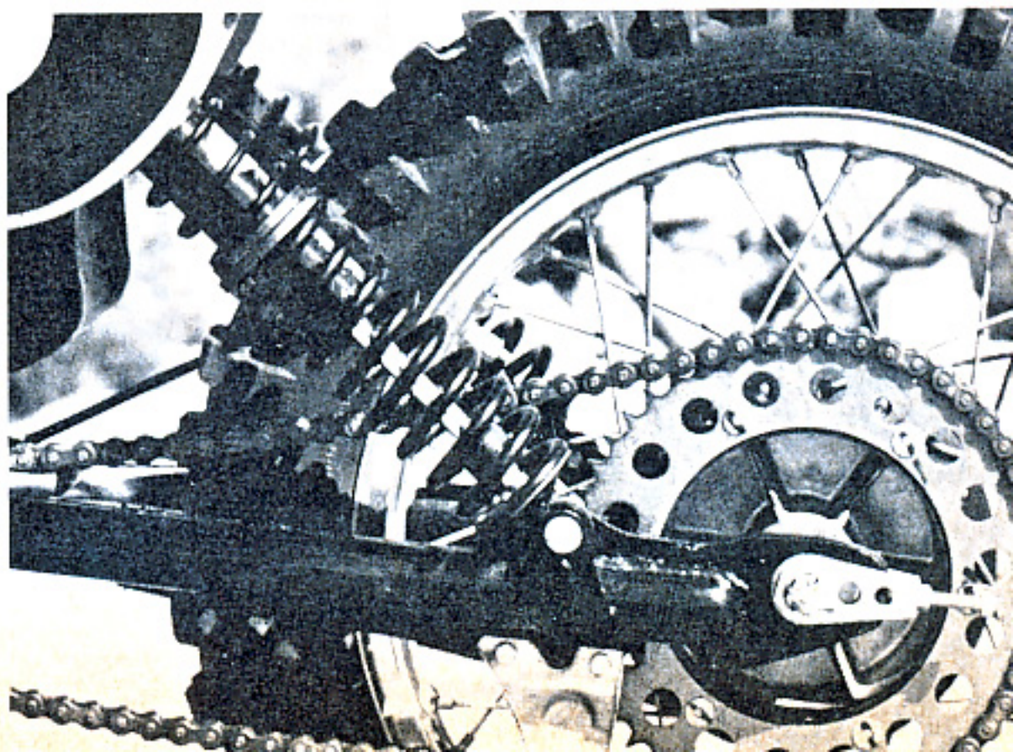
	Hon	Kaw	Suz	Yam
Barometer	30.08	29.98	30.06	30.00
Temperature: Dry	66f	72f	72f	71f
Wet	57f	58f	58f	60f
Correction factor	1.022	1.032	1.028	1.030

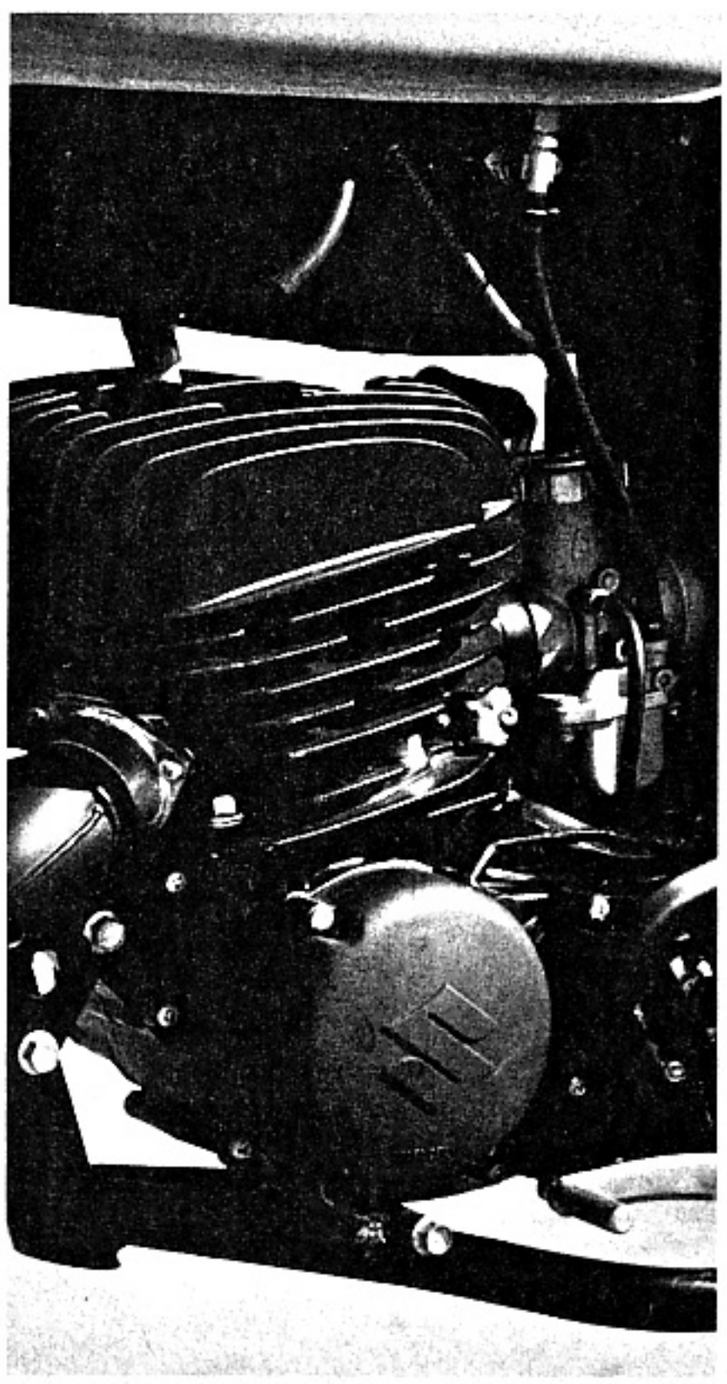


ENGINE SPEED	TORQUE Honda	Kawasaki	Suzuki	Yamaha
2500	8.78	7.90	--	10.43
3000	8.90	8.62	8.70	11.33
3500	10.14	8.42	9.71	12.65
4000	10.67	9.74	10.28	13.32
4500	12.14	10.92	11.94	13.11
5000	12.19	11.44	12.62	13.88
5500	13.29	15.30	14.79	16.77
6000	16.35	18.00	18.00	20.11
6500	18.12	19.47	19.90	20.88
7000	19.79	19.88	20.10	20.70
7500	19.07	19.37	19.71	19.77
8000	17.24	17.49	18.66	17.66
8500	14.79	13.74	15.69	14.00

SUZUKI







CATEGORY FIVE BONUS POINTS

YAMAHA—6

Externally adjustable forks	1
Quietest exhaust of four bikes	1
Rebuildable shocks	1
Chain tensioner	1
Skid plate	1
Adjustable brake pedal stop	1

HONDA—4

Rebuildable shocks	1
Rear spokes did not work loose	1
Carburetor has choke lever instead of clumsy push-pull pin	1
Adjustable gas preload in shocks	1

SUZUKI—3

Plastic fork protectors	1
Rear spokes did not work loose	1
Adjustable brake pedal stop	1

KAWASAKI—1

Extra large opening for fuel replenishment	1

COMPARISON

engines in this test, it is easily the most tractable. On the hard, slick tracks we encountered at Saddleback and Escape Country, both the Kawasaki and the Honda laid down some outstanding traction. . .the KX even more than the CR, which has a better tire.

Gearbox operation comes very close to rivaling Honda's as the smoothest, and is every bit as snickety-snick in operation as the RM Suzuki's. Brakes again come close to matching the Honda's and equalling the RM's.

In the Kawasaki's favor, it has an extremely low purchase price, good handling when used as a play bike, a powerband that is smoother than most without sacrificing competitive power and excellent brakes. While it may not be a great motocrosser in stock form, it is a good motocrosser with potential limited only to the amount of money an owner wishes to spend after purchase.

SUZUKI RM250

When we first began discussing this comparison test among ourselves, long before we ever acquired the bikes, we wondered by just how much the Suzuki would win. Of course, it is our job to be impartial and unbiased, but you can't ride as many different machines as we do or as often as we do and not have at least a general idea of how far down the list a particular machine will rate. We felt that the Suzuki was at the top of>

COMPARISON

the Japanese 250s. We were almost wrong. The Suzuki did win, but it didn't do so by much.

Suzuki's case-reed motor, which it refers to as "Power-Reed," delivers good, strong torque throughout the mid-range and very competitive horsepower on top end. But the engine is not Suzuki's forte. As the dyno chart shows, the Yamaha is more potent. Where the Suzuki does its best is in the rough. Its combination of excellent long-travel suspension and sticky tires gives it outstanding traction on a well-prepared track. In the dry, hard stuff, it doesn't couple up as well, though. The RM steers very well, although its relatively flat triple clamps and offset front axle do not give it the impeccable line-holding capabilities of a Maico, a marque which has relied on this particular geometry in motocross for over a decade. In fact, the Suzook doesn't even steer as well as the Honda, but it is much more stable at speed.

The improvements over the TM series motocrossers which preceded the RM are too numerous to name. In fact, the RM has nothing in common with the TM except for the brand name on the tank and brake cable housings that compress excessively, giving the binders a touch of mushiness. With stronger cable housings the RM's brakes could have been the best. They are strong and very progressive in application, but give >

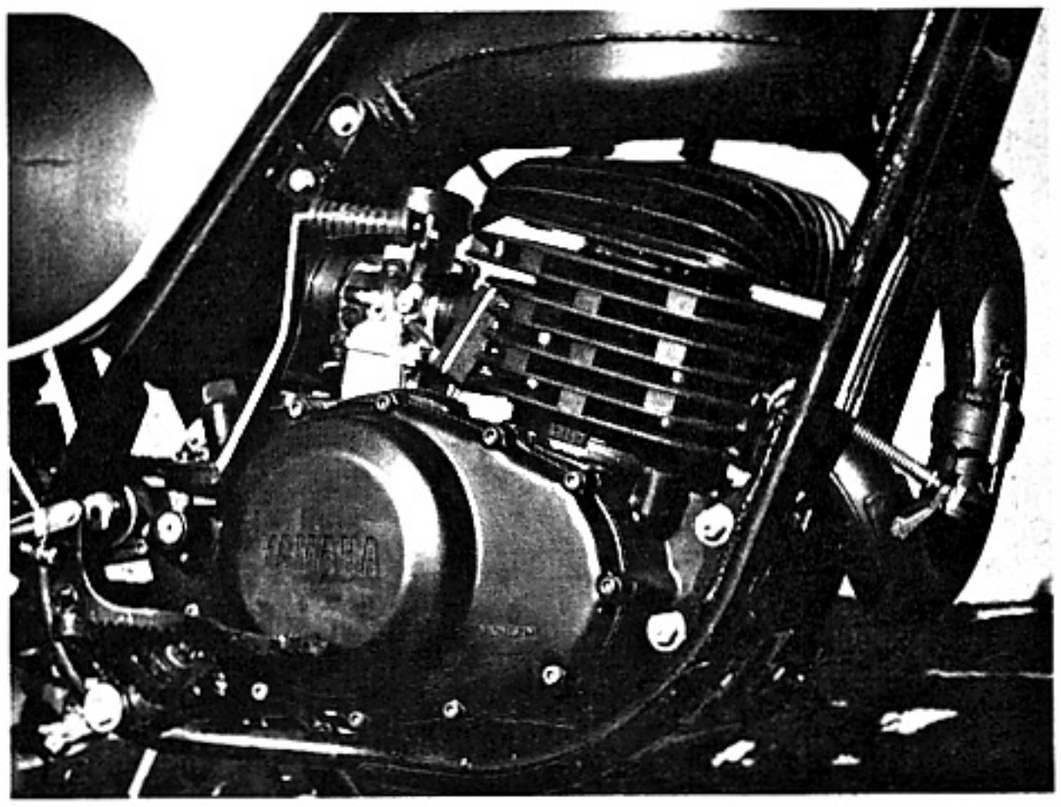
CATEGORY SIX PENALTY POINTS

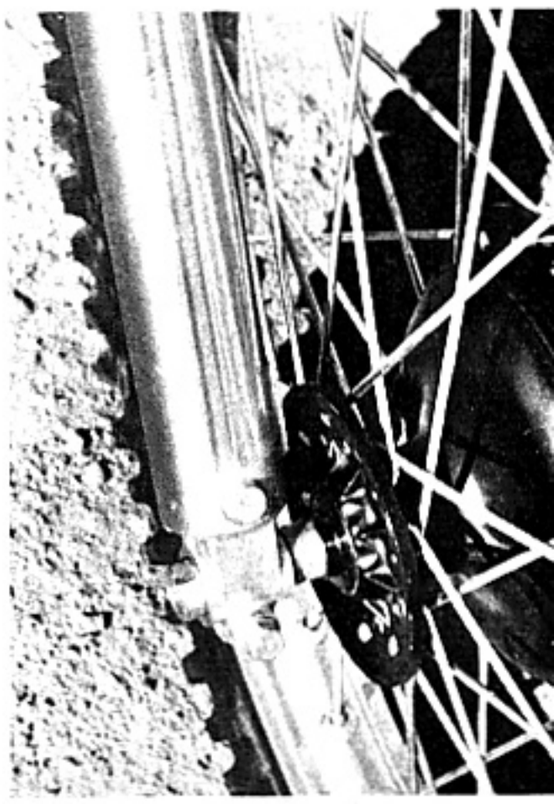
HONDA—1
Kickstarter difficult to use for more than one tromp at a time 1

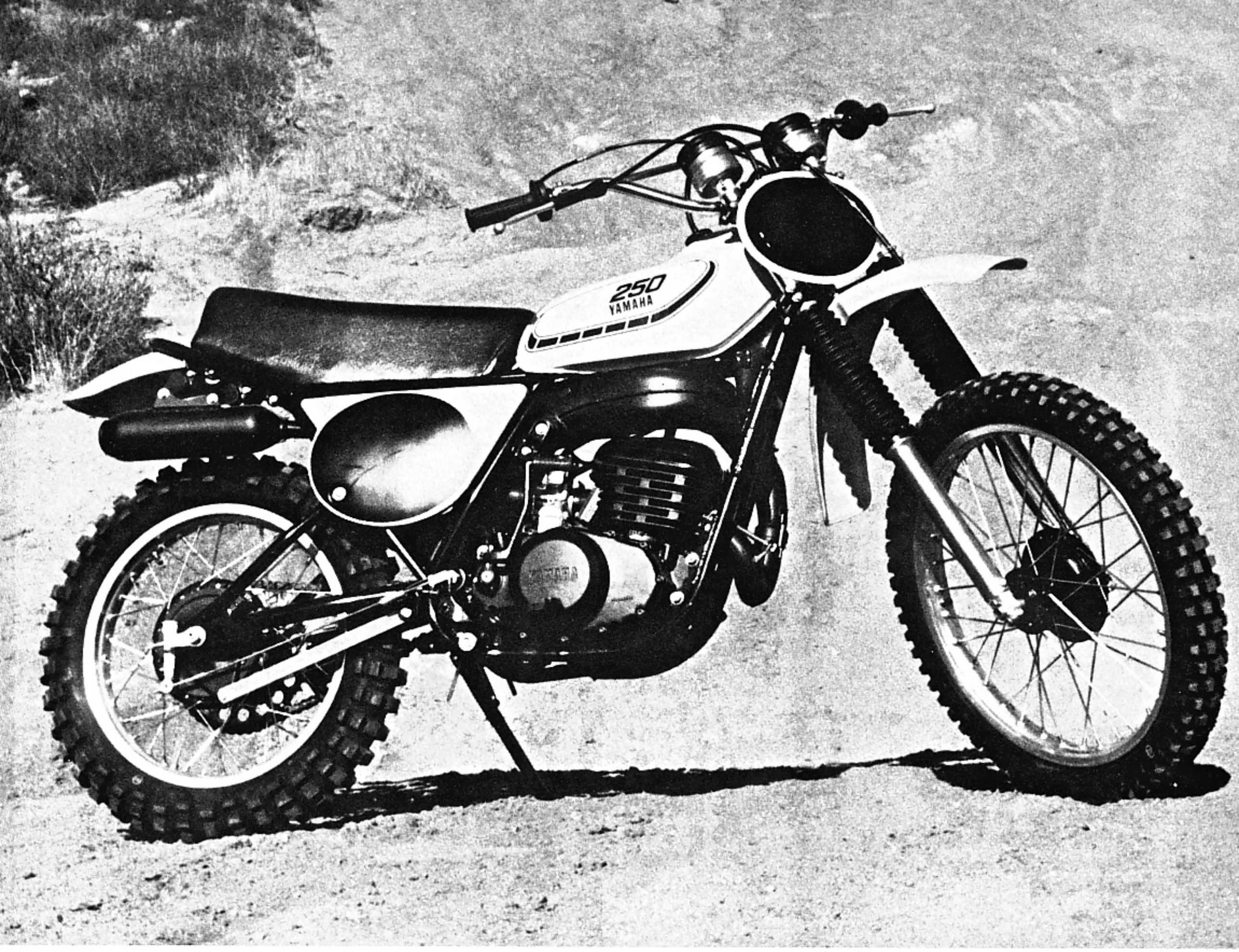
SUZUKI—1
Airbox designed so it's impossible to be sure of proper seal on filter 1

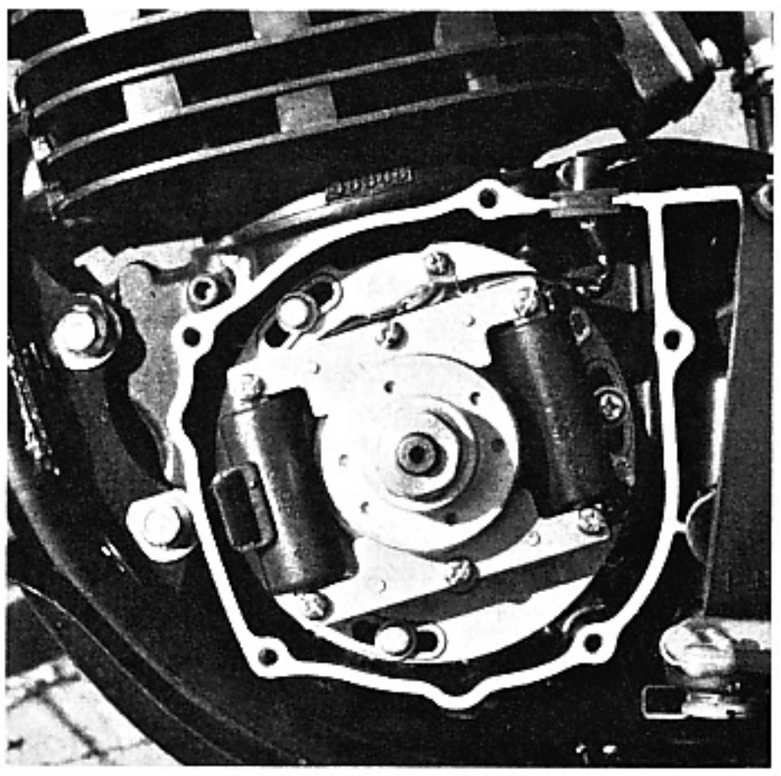
KAWASAKI—2
Right side panel forever coming loose 1
Kickstarter pivot constantly jammed with grit 1

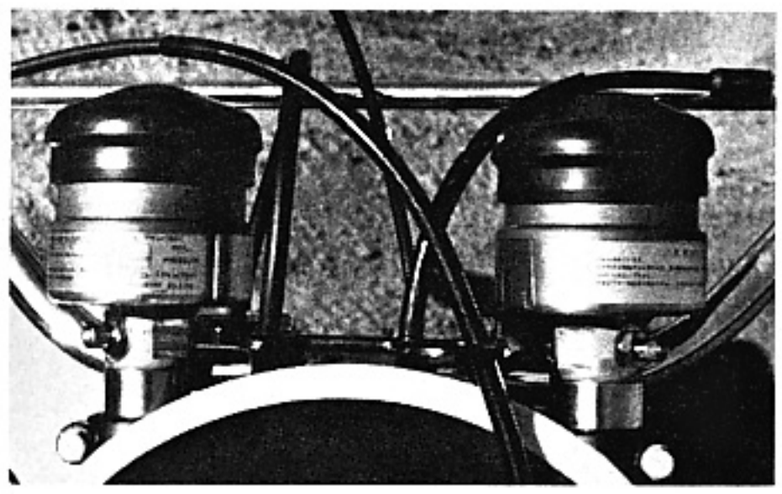
YAMAHA—5
Footpegs pack with mud 1
Air filter system complicated and difficult to service 1
Air forks leak pressure overnight. 1
Handlebars bend too easily 1
Excessive overall weight contributes to fatigue during long motos 1











YAMAHA

poor feedback when clamped on hard.

For a while we were puzzled. The RM370 we tested several months ago had a very rigid swinging arm. Since the 250 shares the same frame with the 370, we expected that the swinging arm would be just as sturdy, if not more so. Yet when landing slightly sideways from cross-up jumps, the rear end would swap a little, as though the swinging arm were flexing. Finally it dawned on us what was happening. The RM370 uses an IRC rear tire that has a low profile very much like that of the Dunlops found on two of our other three test bikes. But the Bridgestone on the RM, while providing good traction, is a very tall tire. It has a lot of sidewall. What we were getting was sidewall whip when we landed sideways.

The large tire sidewall would flex to the side as the tire compressed unevenly due to our landing position. Then as the pressure on the tire was alleviated, the displaced air inside the tire would rush back in to the compressed area and bring the tire back to its original shape. This caused the tire to whip the tail end of the machine to the opposite side. Since such whip is undamped by any shock absorbing device, it occurs in sequentially diminishing numbers until the initial load placed on the tire has been sufficiently alleviated. This is not a phenomenon particular to the Suzuki. It>

SUZUKI RM250

SPECIFICATIONS

List price	$1410
Suspension, front	telescopic fork
Suspension, rear	swinging arm
Tire, front	3.00-21
Tire, rear	4.50-18
Engine, type	case-reed, two-stroke Single
Bore x stroke, in., mm	2.76 x 2.52; 70 x 64
Piston displacement, cu. in., cc	15.01; 246
Compression ratio	7.0:1
Claimed bhp @ rpm	36 @ 8000
Claimed torque @ rpm lb.-ft.	25.2 @ 6500
Piston speed @ rpm ft./min.	3360 @ 8000
Carburetion	36mm Mikuni
Ignition	capacitor discharge
Oil system	oil mist, oil in fuel
Oil capacity, pt.	1.85
Fuel capacity, U.S. gal.	2.1
Recommended fuel	premium
Starting system	kick, folding crank
Air filtration	oil-wetted foam

POWER TRANSMISSION

Clutch	wet, multi-disc
Primary drive	straight-cut gear
Final drive	single-row chain (5/8 x 1/4)
Gear ratios, overall:1	
5th	9.57
4th	11.58
3rd	14.17
2nd	18.35
1st	21.77

DIMENSIONS

Wheelbase, in.	56.5
Seat height, in.	35.5
Seat width, in.	8.0
Handlebar width, in.	35.0
Footpeg height, in.	17.0
Ground clearance, in.	10
Front fork rake angle, degrees	30
Trail, in.	5.0
Curb weight (w/half-tank fuel), lb.	224
Weight bias, front/rear, percent	44/56

YAMAHA YZ250

SPECIFICATIONS

List price	$1324
Suspension, front	telescopic fork
Suspension, rear	Monoshock, swinging arm
Tire, front	3.00-21
Tire, rear	4.60-18
Engine, type	reed-valve, two-stroke Single
Bore x stroke, in., mm	2.76 x 2.52; 70 x 64
Piston displacement, cu. in., cc	15.01; 246
Compression ratio	7.69:1
Claimed bhp @ rpm	N.A. (See engine dyno)
Claimed torque @ rpm lb.-ft.	N.A. (See dyno)
Piston speed @ rpm ft./min.	3360 @ 8000
Carburetion	38mm Mikuni
Ignition	capacitor discharge
Oil system	oil mist, oil in fuel
Oil capacity, pt.	2.0
Fuel capacity, U.S. gal.	2.1
Recommended fuel	premium
Starting system	kick, folding crank
Air filtration	oil-wetted foam

POWER TRANSMISSION

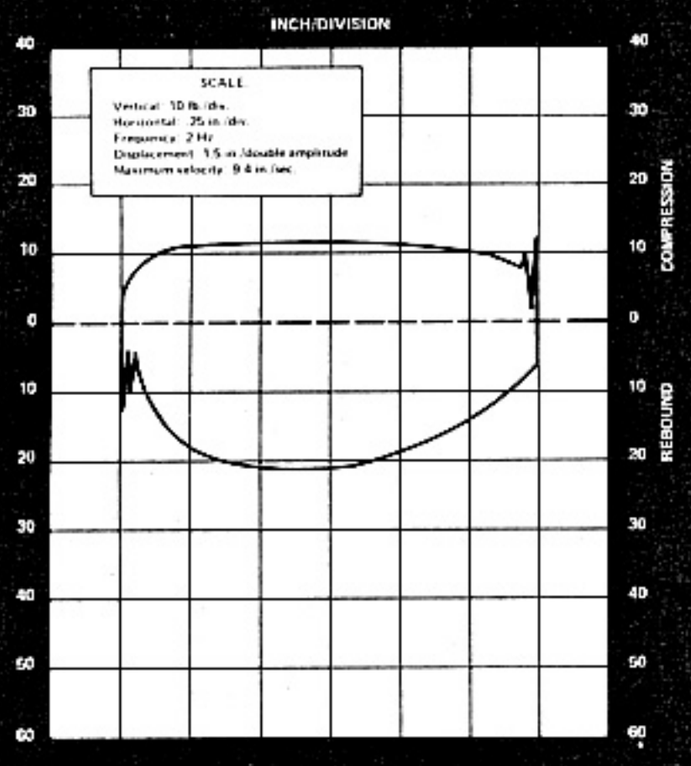
Clutch	wet, multi-disc
Primary drive	helical-cut gear
Final drive	single-row chain (5/8 x 1/4)
Gear ratios, overall:1	
5th	8.91
4th	10.39
3rd	12.12
2nd	14.65
1st	19.06

DIMENSIONS

Wheelbase, in.	56.25
Seat height, in.	34.75
Seat width, in.	8.0
Handlebar width, in.	35.5
Footpeg height, in.	12.25
Ground clearance, in.	9.5
Front fork rake angle, degrees	31.5
Trail, in.	5.42
Curb weight (w/half-tank fuel), lb.	239
Weight bias, front/rear, percent	43.9/56.1

SUZUKI

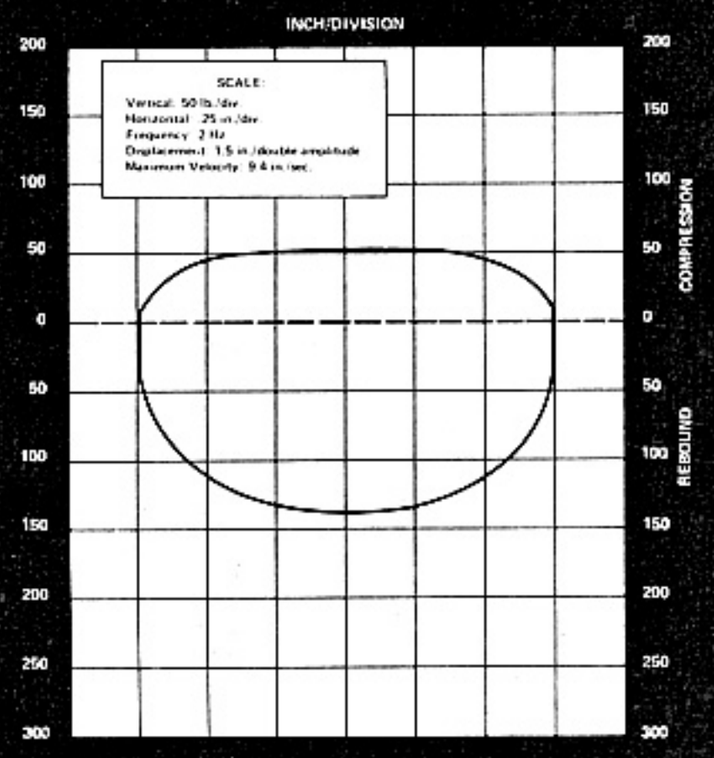
SUSPENSION DYNO TEST
FRONT FORKS



Description: Suzuki RM250 fork with HD-315 oil
Fork travel, in.: 8.5
Engagement, in.: 5.5
Spring rate, lb./in.: 20/25 progressive
Compression damping force, lb.: 11
Rebound damping force, lb.: 21
Static seal friction, lb.: 4

REMARKS: Front fork action is improved over that of the RM370 we tested in December, 1975. The reason is a change in fork springs. The new springs have a progressive wind that gets stiffer quicker than the originals'. With the new springs we had no trouble with bottoming, and fork action was smooth over braking bumps and shallow square holes. For motocross, we recommend no changes. For desert, it is possible to extend travel by 1.5 in. Because of the resulting geometry change, steering response would be slower. High-speed stability would be greater because of the increased rake, albeit at the expense of cornering.

REAR SHOCKS



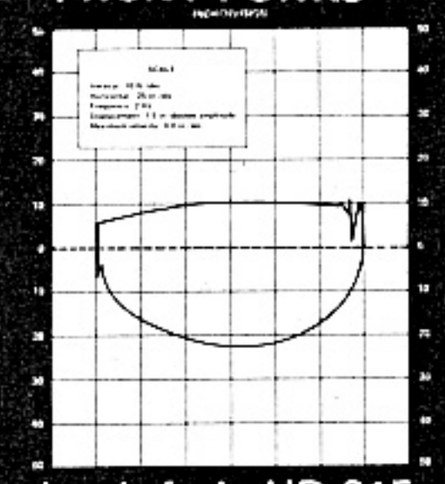
Description: Kayaba gas/oil shock
Shock travel, in.: 4.6
Wheel travel, in.: 8.3
Spring rate, lb./in.: 90/200 progressive
Compression damping force, lb.: 52
Rebound damping force, lb.: 134

REMARKS: Rear suspension offers a soft ride with excellent control and cannot be faulted for action. The system is different from the norm, however. Most manufacturers would achieve the soft ride by using a higher initial spring rate and less compression damping. The mechanical advantage of 1.81 to 1 is not excessive. Reliability should be excellent.

Tests performed at Number One Products

YAMAHA

SUSPENSION DYNO TEST
FRONT FORKS



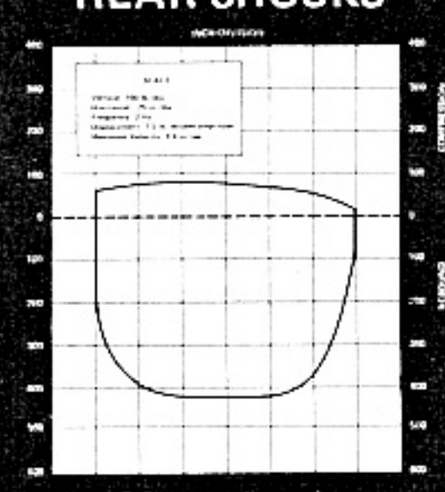
Description: Kayaba air fork, HD-315 oil, 29 psi lower chamber, 55 psi upper chamber
Fork travel, in.: 8.25
Engagement, in.: 4.5
Spring rate, lb./in.: variable (see explanation)
Compression damping force, lb.: 10
Rebound damping force, lb.: 22
Static seal friction, lb.: 10

REMARKS: In normal forks the spring rate is linear. It's usually in the vicinity of 20 pounds per inch, i.e., 20 lb. for the first inch and 140 lb. for seven inches. With most air forks the rate is not linear. Pressure that is 20 lb. for the first inch may be as high as 400 lb. at seven inches. High pressure eliminates bottoming, but if excessive reduces the amount of travel available. Yamaha has corrected this problem with the air canister. When the pressure in the fork tube demarks from the normal spring rate, the second diaphragm in the canister moves back, creating more volume in the tube. The increased volume effectively lowers the pressure and allows a more linear increase in rate.

With 29 psi in the lower chamber and 55 psi in the upper chamber, the Yamaha air system pretty closely approximates a 20-lb. spring. The rate can be altered to suit individual riders and/or track conditions by altering the pressure in the canister.

Damping is controlled by a conventional rod. The compression rate is perfect. Rebound is on the light side of optimum, but not far enough off to warrant modification. If there is a drawback at all, it is that the forks lose air overnight, making frequent adjustment necessary.

REAR SHOCKS



Description: Yamaha Monoshock
Shock travel, in. 4.45 (spring coil binds at this point)
Wheel travel, in.: 7.1
Spring rate, lb./in.: 212
Compression damping force, lb.: 79
Rebound damping force, lb.: 420

REMARKS: Figures on the monoshock look exceptionally high, but remember that Yamaha is using only one rear suspension component. To compare this unit with a conventional dual shock set-up, it is necessary to divide by two. The Yamaha, then, is comparable to a normal bike with 106-lb. springs, 39.5 lb. of compression damping, and 210 lb. of rebound in each shock. Or, to put it another way, the Yamaha is 7.5 percent heavier than the Suzuki, and has a mechanical shock advantage that is 7.5 percent less than the Suzuki's. Spring rate is 32 percent greater than the Suzuki's (on the average), but compression damping is 30 percent less. Rebound on the Yamaha is 36 percent more to control the heavier spring. The Yamaha relies more on the spring to control impact than the Suzuki does. Both systems, however, offer a smooth ride with excellent control.

Tests performed at Number One Products.

COMPARISON

happens on each and every motocrosser. However, due to the large sidewall area on this particular Bridgestone tire (which is easily double that of a Dunlop 4.60), it was strong enough to bring it to our attention.

YAMAHA YZ250

The first things we're going to tell you about the Yamaha are the things that are wrong with it. The tires have got to go. While the Kawasaki can get away with the Dunlop tires, the Yamaha, which has more power and greater steering rake, cannot. The rear tire is passable in most situations except the hard, dry stuff. The front tire isn't passable anywhere. It would probably wash out as the machine was being pushed off a dealer's showroom floor.

(Continued on page 96)

KAWASAKI KX250 (1976)

PARTS PRICING

Cylinder	$86.70
Cylinder Head	22.60
Piston	15.60
(1) Set Rings	14.20
Rear Shocks (each)	45.70
Front Hub	54.90
Rear Hub	85.30
Spokes (each)	.52
Wheel Rims (bare each)	45.70
Drive Chain (standard)	42.70
Front Fender	13.80
Rear Fender	24.70
Clutch & Brake Levers (each)	3.90
Clutch Cable	2.60
Throttle Cable	2.30
Brake Cables	7.40
Ignition Parts:	
Coil	16.00
Magneto Assembly	109.40
Sealed Unit Type	43.60
Carburetor	42.70
Crankshaft	78.10
Connecting Rod	22.30
Shift Lever	11.50
Brake Pedal	9.20

HONDA CR250M2 (1976)

PARTS PRICING

Cylinder	$109.60
Cylinder Head	27.40
Piston	14.80
(1) Set Rings	7.60
Rear Shocks (each)	52.00
Front Hub	48.30
Rear Hub	52.80
Spokes (each)	.45
Wheel Rims (bare each)	
front	56.60
rear	64.80
Drive Chain (standard)	37.50
Front Fender	20.40
Rear Fender	26.40
Clutch & Brake Levers (each)	2.81
Clutch Cable	5.00
Throttle Cable	5.80
Brake Cables	5.00
Ignition Parts:	
Coil	13.60
Magneto Assembly	97.50
Carburetor	51.00
Crankshaft	92.50
Connecting Rod	18.50
Shift Lever	13.90
Brake Pedal	22.60

SUZUKI RM250 (1976)

PARTS PRICING

Cylinder	$85.24
Cylinder Head	46.45
Piston	25.52
(1) Set Rings	13.00
Rear Shocks (each)	42.23
Front Hub	46.92
Rear Hub	63.93
Spokes (each)	.35
Wheel Rims (bare each)	
front	59.50
rear	64.20
Drive Chain (standard)	58.76
Front Fender	16.24
Rear Fender	13.92
Clutch & Brake Levers (each)	4.67
Clutch Cable	5.57
Throttle Cable	6.96
Brake Cables	5.57
Ignition Parts:	
Coil	32.48
Magneto Assembly	154.98
Sealed Unit Type	85.24
Carburetor	50.67
Crankshaft	143.36
Connecting Rod	20.88
Shift Lever	7.43
Brake Pedal	9.75

YAMAHA YZ250 (1976)

PARTS PRICING

Cylinder	$96.87
Cylinder Head	39.36
Piston	16.00
(1) Set Rings	5.30
Rear Shocks (each)	145.00
Front Hub	24.96
Rear Hub	39.04
Spokes (each)	.50
Wheel Rims (bare each)	
front	38.66
rear	41.06
Drive Chain (standard)	23.33
Front Fender	9.90
Rear Fender	12.68
Clutch & Brake Levers (each)	3.50
Clutch Cable	5.10
Thottle Cable	4.30
Brake Cables	5.00
Ignition Parts:	
Coil	15.64
Magneto Assembly	90.00
Sealed Unit Type	48.88
Carburetor (complete)	52.13
Crankshaft	102.89
Connecting Rod	17.60
Shift Lever	6.86
Brake Pedal	7.74

COMPARISON

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The 3.00-21 knobby has nothing resembling knobs anywhere near the sidewall. This makes it effectively narrower than other 3.00 cross-section tires. On the sand track it knifed in and made steering heavy; on the dry tracks it cornered like roller skates on an ice rink, like leather soles in the rain, like a pizza board on marbles. Get the picture? Good.

The other problem was with the rear brake. It is the same toggle-switch unit that has plagued Yamaha for the last five years. We put a Z-bend in the brake rod to desensitize it a bit, but it was still either on or off. So what we had to work with was a bike that got through berms okay, but went into each corner with the rear wheel locked up and cornered bermless turns like an ill-loaded wheelbarrow. Why then were the Yamaha's lap times so quick? Simple. The YZ250 is fast, bloody fast.

To begin with, it is geared taller than the other three machines. It would go through turns in second just as fast as the others would in third. It has the torque to pull the taller gearing. And not only pull it, but pull it harder than the others pull theirs. On dry tracks this meant a lot of wheelspin, something that a better tire would help cure. But when track conditions were right, it coupled up and blew out of corners like the Tokyo-Osaka Express.

None of the other bikes could touch it in the drag races. All of the bikes started in second gear. Had the YZ been geared like the CR, RM or KX, it probably could have taken off in third. When at speed, the suspension worked like a charm. Front fork action was better than the Suzuki's, but the RM's rear end is better behaved, sidewall whip aside. The Monoshock still has a tendency to hop a little coming into corners, a trait that wasn't aided in any way by the touchy rear brake.

Shifting the Yamaha tranny is mildly demanding. The shift lever is too short, reducing the leverage that the rider's foot applies. Our shift lever was improperly positioned when we received the bike, so we dropped it down one spline on the shaft. When you do this, it is necessary to completely remove the left footpeg. We found that the best way to ensure positive gear engagement was to roll back the throttle and clutch all upshifts. With a different shift lever, clutchless shifting would be much easier.

NOTES

The Suzuki's rear brake cable is difficult to adjust. In the future, we suggest that Suzuki move the

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adjustment from the backing plate to the forward cable stop. The RM suffered from severe detonation in the mid-range. This was cured by installing a Q6 needle jet. The new jet richened up the mid-range and added just enough to the top end so that we had to bring the main jet down from a 310 to a 300.

The Honda's grips, which were at one time admired as being very good, have stagnated themselves to the point that they are now the poorest of the lot. They aren't soft enough nor large enough for average size hands. Their small diameter increases the chances of forearm cramps. The KX's grips were almost as bad.

The Yamaha vibrates excessively at low engine speeds. We checked all of the motor mount bolts, but could find nothing loose.

All of the machines come equipped with Daido (D.I.D.) 520 chain. Stretch was totally uniform. The Yamaha's clutch gets hot and drags if kept pulled in for more than a minute while in gear on the starting line. The chain tensioner and skid plate are nice extras on the YZ. The Kawasaki has the only fuel tank opening large enough to peer down while filling. Everything else overflowed and got doused each time the tanks were topped off.

IN THE END

The Kawasaki and the Honda need help, mainly in the suspension department. We'd race either of them for fun at the Dunes or Escape Country, but wouldn't even think of throwing a leg over one at Carlsbad without the modifications mentioned.

The Yamaha and Suzuki are the two best. The YZ chased the RM throughout our test, waiting for it to make a mistake so it could slip past. The Suzook didn't bobble. The Yamaha could have won this test with a good rear brake and better tires. We're sure that Yamaha knows that its original-equipment rubber isn't up to snuff, but they're the ones who chose to install it. Tire and brake changes would probably also bring the cost up into the $1400+ category that the RM is in. But price didn't seem to bother the folks at Suzuki. They went out and they built right, from end to end. You have to pay a little more, but in the end, you get a little more.

OVERALL SCORES

SUZUKI RM250	**63**
YAMAHA YZ250	**59**
HONDA CR250	**47**
KAWASAKI KX250	**43**