ACTION PHOTOGRAPHY: ART FRIEDMAN

KAWASAKI KX400-A2

Kawasaki's hard-charging 400 not only can outdrag just about any other Open-class motocrosser, it easily can outrun the capabilities of its own chassis

Long, full-throttle, feet-up slides . . . spectacular comet-like roostertails . . . effortless wheelies . . . and the piercing two-stroke snarl of 45 horsepower on the loose . . .

That's the personality of an Open-class motocrosser. And in no other class of motocross bike is the balance between horsepower and handling so delicate, so important. Something magical happens when a thunderous, fire-breathing 400cc engine is dropped into a 250 chassis (which is exactly how Open-class motocrossers are built). If it's done right, the results spell excitement with a breath-taking capital E. If it's done wrong, the result is a brutal, unforgiving monster whose every minor 250cc flaw is magnified and exaggerated into an overwhelming 400cc defect.

Kawasaki missed the Excitement with its first try at an Open bike. The 450 was a savagely-powerful motocrosser, but the chassis couldn't convert the enthusiasm of the engine into anything rideable on a motocross track. And even though Jimmy Weinert won the 1974 American Motorcycle Association National Motocross Open Class Championship on a Kawasaki, his was not a production bike.

Kawasaki's engineers examined the 450, plugged in some semi-radical changes, and came up with the KX400 about a year ago. It had less displacement, less weight, better geometry, and better suspension. We didn't get a chance to test one of those '75 models, but the '76 version is nearly identical—and therein perhaps lies the first clue to the nature of the KX400: In this generation of rapidly-advancing motocross technology, can a motorcycle go virtually unchanged for two years and still be competitive? Was it even competitive in the first place?

THE BIKE: The KX400 has the same chassis as the KX250, but a larger, heavier, entirely different engine. The big single-cylinder two-stroke has an 82mm bore and long-legged 76mm stroke, which represent 401.3cc of piston displacement. At 6.5 to 1, the compression ratio is relatively mild.

A two-ring piston controls the opening and closing of a single intake port, four transfer ports, and one unbridged exhaust port. A 36mm Mikuni carb provides a fuel/air mixture to the engine, and a downswept expansion chamber gets rid of the spent gases after combustion.

Straight-cut primary gears deliver the power from the right end of the crankshaft to the clutch, and from there the power passes into a hefty five-speed gearbox. The left end of the crank spins an external flywheel which generates current for the magneto-type capacitive-discharge ignition. The KX400 uses only pre-mixed fuel and oil, so there's no need for an oil injection pump on the engine.

The rest of the 400 is absolutely identical to the KX250. The single-downtube frame and swingarm are constructed of a Japanese-made "chromoly-type" steel which is lighter and stronger in some respects than conventional mild steel, but not as light or strong as 4130 chromoly. Forward-mounted Kayaba gas shocks mount inversely at the rear, giving 5.8 inches of wheel travel. The front fork assembly provides 7.5 inches of front wheel travel.

DID shoulderless alloy rims are spoked to aluminum hubs front and rear, but the right-hand spoke flange of the front hub is steel. Cable-operated drum brakes provide the whoa-power at both ends, and the knobby rubber is by Dunlop of Japan in expected sizes: 4.60 x 18 at the rear, 3.00 x 21 on the front.

A "fuzzy-foam" air filter nestles in the roomy airbox beneath the seat, and most of the intake air is drawn in through the open top of the box. Some of the less-desirable elements—water, mud, and dirt—can also get through that large opening, and through another large opening behind the right plastic number plate.

The base of the seat and the 2.2-gallon gas tank are made of steel. The black fenders are unbreakable plastic, as are the number plates. The tank is painted a sedate dark metallic green, emblazoned with a large "lightning bolt" Kawasaki decal on both sides. The rest of the motorcycle is black except for the number plates and a few shiny alloy or plated pieces.

The KX400's looks aren't too impressive. The green tank is sort of stodgy-looking for an Open-class motocrosser, and the blackness of the rest of the bike gives it a drab image. The overall finish of the bike is very good, but it just doesn't look very exciting. As a small consolation, it doesn't cost all that much, having a suggested retail price of around $1200.

ENGINE AND GEARBOX: The KX400 always started with between one and five kicks. Surprisingly, it doesn't take a super-human effort to kick the engine through, thanks partly to a long kickstart lever, and partly to the moderate compression ratio.

Pulling out slowly from a dead stop requires no special tricks, because first gear is reasonably low and the engine has quite a bit of crankshaft inertia. But slow starts are never very smooth because the clutch is very grabby. When you intentionally slip the clutch to get rolling, it intermittently grabs and releases about three or four times a second, as if you were pumping the clutch lever. This isn't any hassle for motocrossing, because the clutch works nicely for fast starts and gear shifting. It's a bit of a pain if you're out cowtrailing or playriding, though, especially if you're trying to pull out on a steep uphill.

You won't have many qualms about the KX400's power output. It's stronger than most Open-class motocrossers. The bike accelerates best if you shift somewhere near the 6500-rpm torque peak, rather than at the 7000-rpm horsepower peak. The engine will rev freely past 8500 rpm, but you're better off keeping it down between 4500 and 8500 rpm, which is the most productive part of the power range.

If you ride the KX400 like a 125 or 250—that is, if you keep it buzzing near the peak horsepower rpm before you upshift—you'll get a lot of useless wheelspin and waste a little time getting out of turns. If you shift sooner and keep the revs down, the incredible mid-range torque of the 400 pulls the higher gear easily. So you'll get less wheelspin, and the bike will go faster in that higher gear. In many instances, we found that the KX could get from one turn to the next faster in one gear than it could if we shifted once, even though the engine *sounded* like it was getting us there quicker when we shifted.

Regardless of how you ride it, though, the 400 is sensationally fast. It is *always* able to fling a rock-throwing roostertail when you gas it hard; it is *always* capable of provoking the rear wheel into a hair-raising crossed-up slide; it is *always* able to snatch the front wheel into the air at will. It is brute power in one of its most spectacular forms.

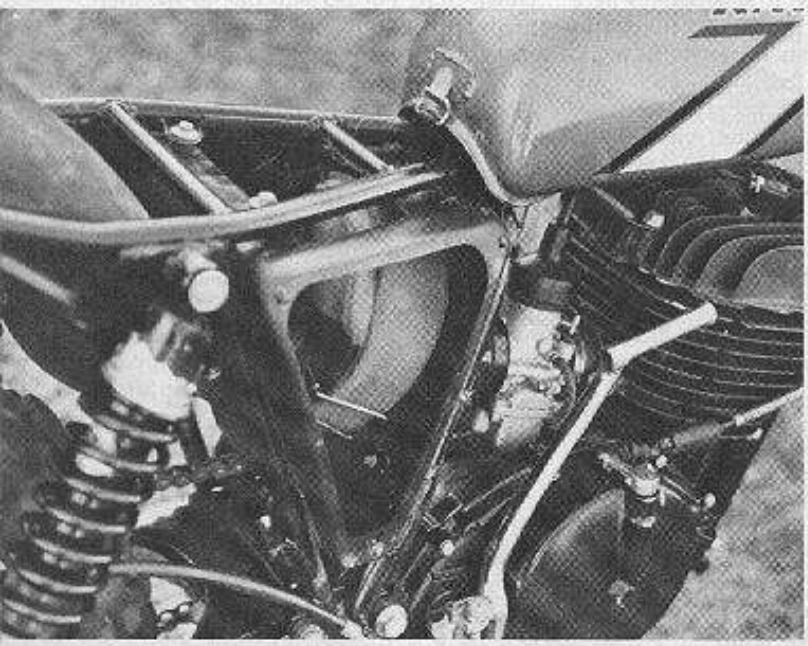
The gearbox ratios are well-spaced, but ratios are not so critical when the gears are coupled to an engine that has as wide a powerband as this one. As it is, there are no places in the 400's speed range where it hurts for more power or for another gear.

The gearbox on our test bike worked nicely, requiring only a short throw of the lever, and completing every shift perfectly. Our only gripe was that finding neutral with the engine running was always an uncertain proposition—not because of clutch drag, but perhaps due to the ineffectiveness of the neutral detent mechanism. And even though we didn't like the engagement characteristics of the clutch, disengaging it required only a gentle pull at the lever. And it was extremely durable, despite some intentional abuse.

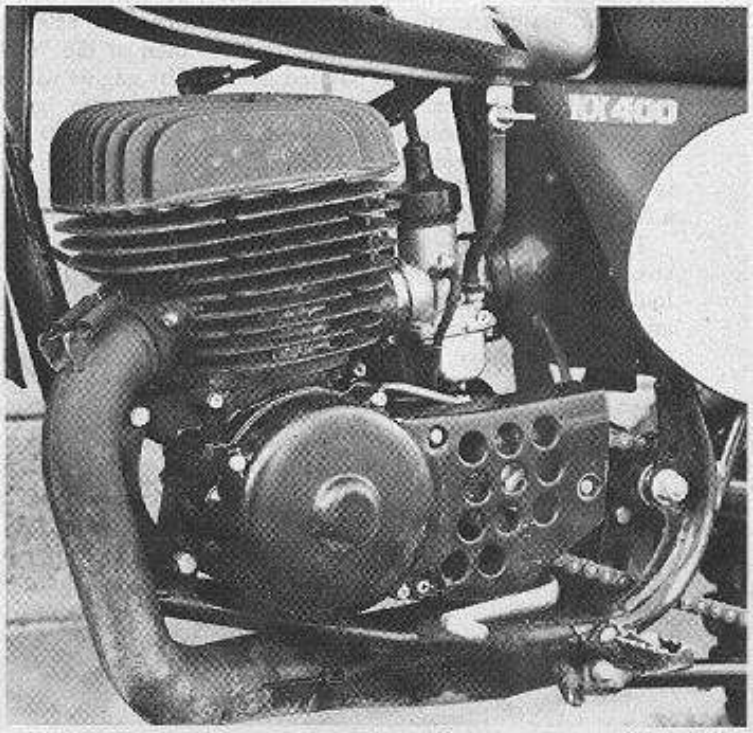
HANDLING: The KX400's geometry figures reflect current trends in motocross chassis design which call for a lot of everything—a lot of steering head rake (31 degrees), a lot of front wheel trail (5.6 inches), and a lot of wheelbase (56.6-inch average). The bike is not exceptionally light at 239 pounds, and the suspension strokes—5.8 inches at the rear wheel and 7.5 at the front—are barely average for contemporary motocross bikes.

Frankly, the Kawasaki doesn't handle all that well in a serious motocross situation, despite having all the "right" numbers. If the track is only mildly bumpy or TT-smooth, the 400 steers and skids pretty well, and the suspension behaves in a predictable manner. But when you go *really* fast—something the KX400's engine can easily do—on a *real* motocross track, the bike becomes very unpredictable and rather hard to ride. Big bumps cause the front end to jar the rider's arms sharply and the back end to pop up in the air. A few square-edged holes kicked the back of the bike so hard that the seat whacked our rider in the butt and knocked him into a white-knuckle handstand on the handlebars.

The suspension appears to be the major culprit, since the chassis behaves itself on reasonably smooth terrain. The front fork is fitted with some curious two-rate springs that are very soft during the first few inches of travel, but suddenly become very stiff when the softly-wound coils bottom about halfway through the fork stroke.



The airbox has two very large openings through which air, mud, water, and dirt can enter. Only the seat base shields the top hole, and only the right number plate covers the side opening.



The KX400 has one of the fastest, torquiest Open-class motocross engines ever built.

From then on, the springs are *too* stiff, so the front wheel can't use the rest of its travel freely. This is most noticeable when you're entering a corner over some big braking bumps. The front end compresses to a certain point because of the forward weight transfer caused by braking, and then will not compress further. As a result, the whole front of the bike more or less follows the profile of the bumps, and transfers the severe up-and-down jarring to the rider. If you're turning when this happens, the front wheel skitters to the outside of the turn and wanders off its intended line. Changing the fork oil from the recommended 10-weight to a high-quality 20-weight helped the fork action somewhat, but the problem lies more in the springing than in the damping.

At the rear, the Kayaba gas shocks appear either to have too much springing and damping, or else need to be mounted further forward. They respond fairly well to smaller bumps and ripples during acceleration, but during deceleration over the same bumps, they make the back end hop and skip. And bigger, more abrupt bumps bounce the rear end around during acceleration *and* deceleration. Like the front, we felt the rear suspension was adequate for hard running on smooth and not-too-bumpy tracks, but the rough, tough courses are more than it can handle on a competitive level.

When the going isn't too rough, the Kaw is very stable at high speeds and negotiates most turns gracefully. It does its best cornering if it has a berm to crash off of, but it is also reasonably adept at turning a corner flat-track style. The engine can break the rear wheel loose at almost any time, and can keep the wheel spinning long enough to maintain a controllable slide. There's a tendency to high-side, which is typical of most current motocross bikes, and the Kawasaki's inclination to sit up is just a little greater than average. The front wheel occasionally washes out on hard, slick corners, but we suspect that could be cured with a better front tire, or one more suited to the terrain.

The most curious thing about the KX400's handling was that it was noticeably less precise and predictable than the KX250 we tested in our September 1975 issue. Granted, the 400 engine is much heavier and more powerful than the 250 engine, but not enough to justify the great difference in handling. Since that particular 250 test unit was not available for comparison, we don't have any further explanation for the handling discrepancy, except that the suspension units on the 250 may have been more efficient than the ones on our 400.

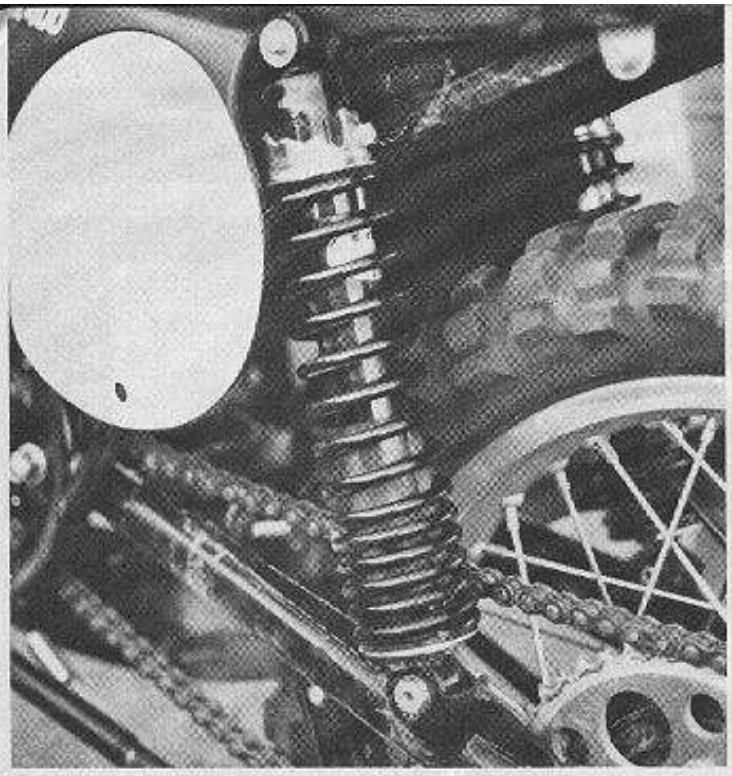
COMFORT AND RIDE: The KX400's comfort level depends heavily upon the type of surface you're riding on.

Design-wise, the layout of the parts that come in contact with a rider's body, both in the standing and sitting positions, is well-executed. The only negative factor, though, is *how hard* they come in contact with the body. Because of the harshness of the suspension units, a rider is often the recipient of some sizable jolts on a rough track. The front-wheel jouncing tires hands and forearms, and some of the rear-wheel concussions pass through the nicely-padded seat into a rider's back. If you stand up a lot, you protect your back from the pounding, but the rear wheel then skitters around much more easily.

The handlebars and handgrips pleased some of our testers and bugged others. Since those items are really a matter of individual taste, the only thing we can say, in all fairness, is that they're "okay."

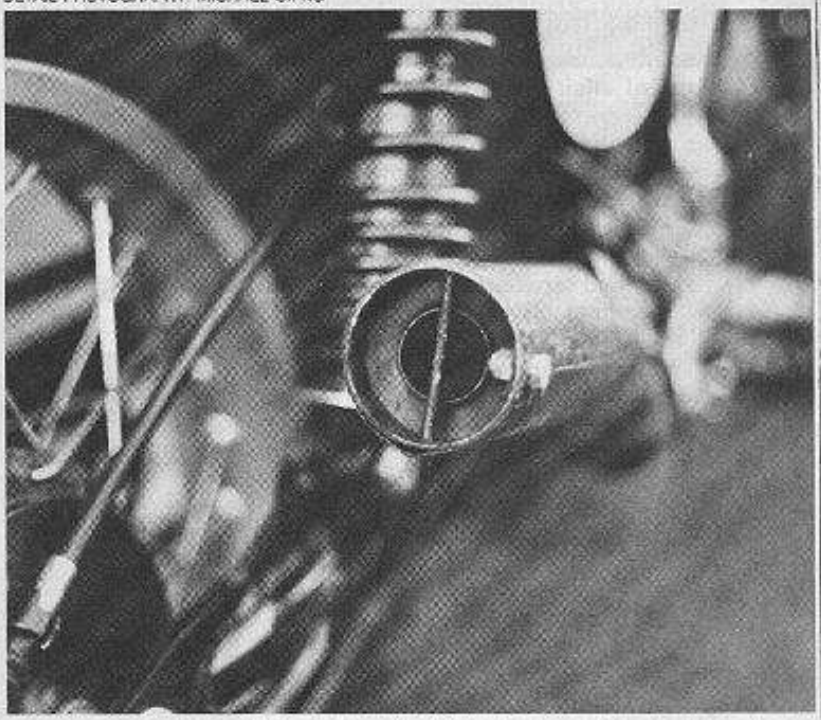
The big single vibrates considerably, but the low frequency of the vibrations affects the motorcycle more than the rider. The vibes caused several parts to loosen or fall off. And the intensity of the shaking was enough to cause a few testers' hands to numb during a long, hard ride.

The exhaust note is pretty loud, but it isn't as offensive as, say, some buzzy 125 or 250 two-strokes. Our sound level meter

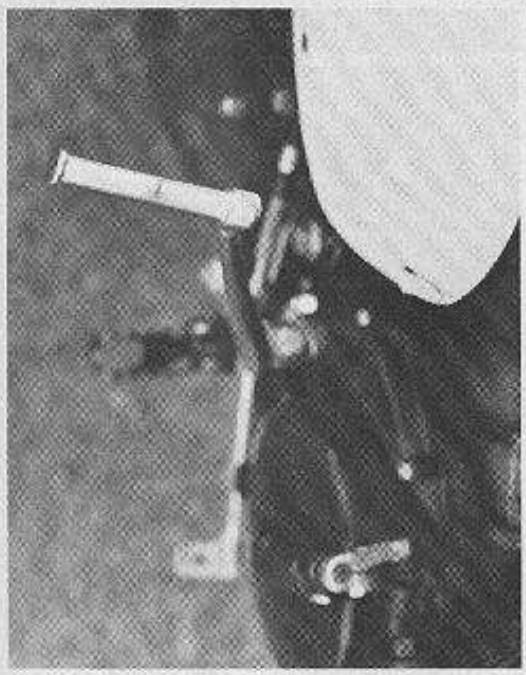


The Kayaba nitrogen-charged shocks provide too much damping and are fitted with too-stiff springs. Different springing and damping rates would help, as would mounting the shocks further forward.

DETAIL PHOTOGRAPHY: MICHAEL CIPKO



The baffle in the end of the expansion chamber didn't quiet the exhaust very efficiently, and it fell out during our third day of testing.



Every time we started the engine, the kickstart lever would bend about this far. We had to fold it back in and straighten it with another kick from the side.

clocked the 400 at 100.5 decibels during the noise testing, but the low, throaty bark of the exhaust didn't *seem* that loud to the ear.

Aside from the apparent differences in the operation of the suspension, the one thing that makes the KX400 more tiring to ride than the KX250 is its engine. When you open the throttle on the 400, you've got to hang on tenaciously just to cope with the ferocity of the acceleration.

BRAKING: The 400's brakes are one of its finer points. Both brakes are powerful enough to lock the wheels if you so desire, but they're progressive enough to keep you from doing so accidentally (even if you jump on them excitedly when you get into a turn a little deeper than anticipated). Their action was always consistent and predictable, never showing any signs of fade after hard use.

We also liked the rear brake's behavior on rough ground. Its efficiency was limited by how well the rear suspension could keep the wheel on the ground, but it very seldom chattered or caused rear wheel hop. Were the suspension better, the KX400's brakes would be perhaps the best we've encountered on a Japanese motocrosser.

RELIABILITY DURING TEST: No major failures were experienced while we had the KX400, but a few niggling annoyances cropped up occasionally. Our biggest beef was with the kickstart lever, which bent every time we started the bike. The lever is long, spindly, and evidently soft, so a 400cc-sized mash on the thing would tweak it about 10 or 15 degrees out of kilter. Fortunately, it can be bent back in place just as easily, so we'd fold it in and kick it with the heel of a boot to straighten it. If you don't bend the lever back every few kicks, it'll stick out far enough to hit your leg while you're riding. The lever is also quite loose and floppy, and it sometimes turns itself out to the kicking position while you're riding. A stiffer detent or a different type of swivel joint would help immensely.

The other little problems we had were caused by vibration. The expansion chamber, for instance, came loose on the first day of riding when the rear mounting bolt vibrated out. The two front engine mount bolts came loose twice, even though they use nylon lock nuts. And the baffle in the end of the expansion chamber fell out when its 6mm securing bolt did likewise.

The KX400 was otherwise quite reliable; it never leaked a drop of any kind of oil, and never fouled or overheated a spark plug. It didn't require any unusual attention except for the spokes, which needed tightening several times during the first day of hard riding. However, we would recommend a routine checking of

all the nuts and bolts after every ride to see if vibration loosened them.

Adjusting, cleaning, or inspecting the routine maintenance items is a straightforward affair on the KX400. In some cases, servicing is a wee bit harder than servicing other bikes, but in other cases, it's easier. Removing the front wheel, for example, requires that you also remove the axle clamps on the bottoms of both fork legs. On the other hand, you can remove and service the air filter element without any tools whatsoever.

SUMMARY: The Kawasaki KX400-A2 is an incredibly powerful Open-class motocrosser with engine performance second to none. It doesn't matter much whether you screech the engine in the upper rpm ranges or lug it in a higher gear; either way, it is a fast motorcycle.

The handling capabilities are not up to the capabilities of the engine, however, especially on rough race tracks. The 400 handles well on smooth terrain, but big, abrupt bumps hammer the wheels off the ground with unpardonable frequency, and give the rider more than his share of abuse. When you attempt to ride it at competitive race speeds on rough ground, unpredictability becomes the whole nature of the motorcycle's chassis. The comfort suffers accordingly, even though the designers have incorporated a likable, human-engineered seating and control layout into the motorcycle.

The 400 has a delightful set of cable-operated brakes. They work beautifully, refusing to be upset by the temperament of the chassis. And except for a spindly kick lever and a couple of lost bolts, the KX400 was as reliable as one could expect.

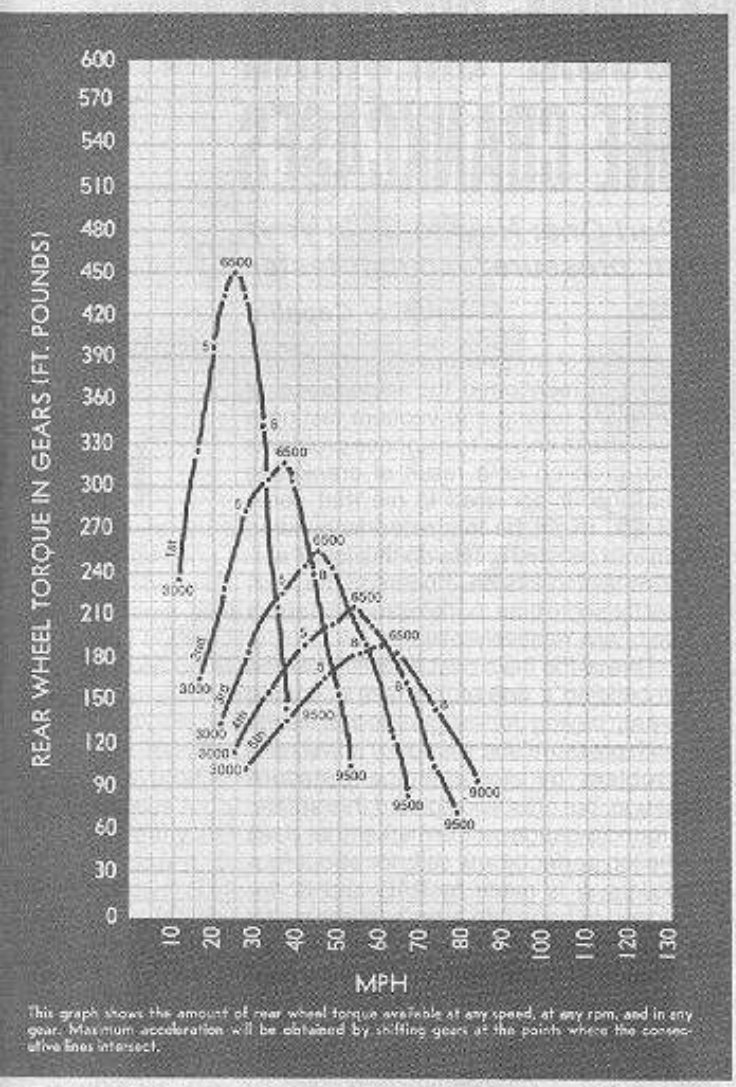
CONCLUSION: Kawasaki's engineers have never had any problems finding horsepower. From those early 350 A7 twins to the 500 Mach III triple to the 750 Mach IV triple to the eyeball-flattening 900 Z-1, horsepower was what Kawasakis were all about. But none of those almost-legendary bikes had almost-legendary handling—at least not almost-legendary *good* handling. The KX400 is yet another Kawasaki whose balance is decidedly tilted toward the horsepower side of the scale.

If you only want a smooth-track racer or an all-around playbike, the KX400 will fill the bill quite nicely. But if you take it into the Real World of motocross to butt heads with Maicos, Huskies, CZs, Bultacos, RM Suzukis, and monoshock Yamahas, it's a dead duck. *Those* motorcycles work. They may not have the untethered power of the KX400, but they put most of what they do have where it does the most good: On the ground. And at the same time, their frames and suspensions let those bikes go where riders aim them. When Kawasaki gets the KX400 to do likewise, when the bike's power is balanced with equal handling agility, then—and *only* then—will the potential of its engine be fully realized. ***CG***

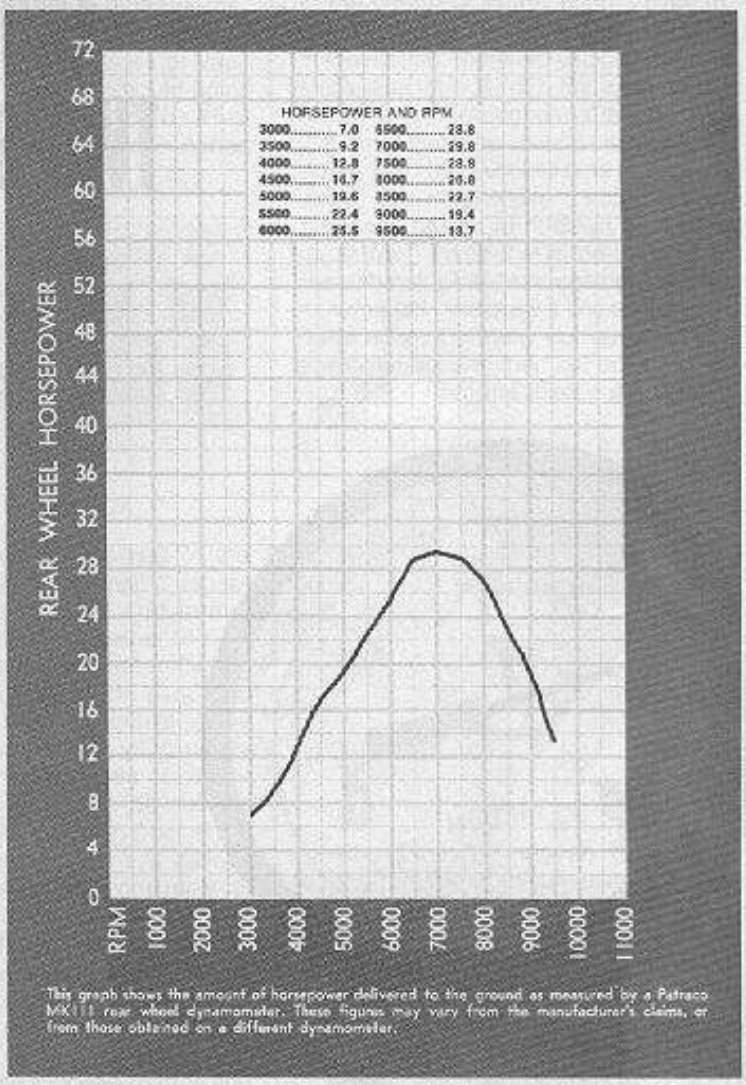
SPECIFICATIONS

Engine type	two-stroke
Cylinder arrangement	vertical single
Port arrangement	one piston-controlled intake, four transfers, one exhaust
Bore and stroke	82mm x 76mm
Displacement	401.3cc
Compression ratio	6.5:1
Ignition	magneto CDI
Charging system	none
Carburetion	one 36mm Mikuni slide/needle
Air filter	bristle-covered washable oiled foam element
Lubrication	pre-mixed fuel and oil
Primary drive	straight-cut gears, 2.52:1 ratio
Clutch	wet, 6 drive plates, 5 driven plates
Starting system	primary kick
Transmission	5-speed, left-foot shift
Overall drive ratios	(1) 19.34; (2) 13.69; (3) 10.83; (4) 9.20; (5) 8.20
Transmission sprocket	15-tooth
Rear wheel sprocket	46-tooth
Drive chain	⅝-in. pitch, ¼-in. width (#520)
Front fork	7.5 in. (190.5mm) travel
Rear shocks	Kayaba 5-way adjustable, 5.8 in. (147mm) rear wheel travel
Front brake	drum, single-leading shoe
Rear brake	drum, single-leading shoe, cable-operated
Front tire	3.00 x 21 Dunlop knobby
Rear tire	4.60 x 18 Dunlop knobby
Frame	tubular steel, single downtube
Steering head angle	31 degrees from vertical
Front wheel trail	5.6 in. (142mm)
Wheelbase	56.1 to 57.2 in. (142.5 to 145.3cm)
Length	82.9 in. (210.5cm)
Weight	239.16 (108.6 kg)
Weight distribution	44.6% front, 55.4% rear
Ground clearance	8.9 in. (226mm), at expansion chamber
Seat height	33.8 in. (858.5mm), unladen
Handlebar width	34.5 in. (876mm)
Handlebar grip height	44.1 in. (112cm)
Footpeg height	12.5 in. (317mm)
Instrumentation	none
Gas tank	steel, 2.2 gal. (9L)
Sound level per SAE XJ 331a	100.5 db(A)
Suggested retail price	approximately $1200

KAWASAKI KX400-A2



This graph shows the amount of rear wheel torque available at any speed, at any rpm, and in any gear. Maximum acceleration will be obtained by shifting gears at the points where the consecutive lines intersect.



This graph shows the amount of horsepower delivered to the ground as measured by a Petraco MK III rear wheel dynamometer. These figures may vary from the manufacturer's claims, or from those obtained on a different dynamometer.