MINI MANIA

So you think your bike is a technological masterpiece? How about tiny replicas that pack it all into machines fit only for four-foot-tall maniacs? By Buzz Buzzelli

I watch from a distance and know these are open-class bikes. They are high-speed, dirt-churning John Deere tractors. Four machines in succession, tracked by a *Cycle* photographer's heavy lens, corner against a berm. Their tires are hand grenades, exploding dirt along the front line. The pilots clear jumps with oceans of blue showing beneath their wheels.

All four riders, on red and yellow and green machinery, pull off the track, and for the first time I see the bikes up close. These are *minibikes*. The riders are *children*. As they return to the course, I stand stunned by their riding ability. A few minutes pass and I forget that these people riding so impressively are kids. These aren't 90-pound 12-year-olds. They can't be. When they stop and remove their helmets, I am, once again, amazed. These replica adults have children's faces and squeaky kindergarten voices. The bikes they ride are so small and perfectly proportioned that I feel embarrassed and out of place. I'm 10 feet tall.

I'm intimidated. I've been riding motorcycles twice as long as these imps have been alive, yet they could ride rings around my middle-aged spread. How did these riders get so good? When did their bikes become so advanced? How did this mini mania get so deadly serious?

These kids, you see, are not just playing sandbox. They've been signed by major manufacturers, complete with contracts, to ride the national mini-race circuit. On the start line, each focuses on his target, the first turn, with the eyes of a fighter pilot. This is no Pac Man game. Progress is measured in lap times, and the rewards for success are the real thing—factory support. The electricity flowing on mini-moto starting grids is enough to light computers in Japan. These riders may be toy-sized, but they have full-scale responsibilities and monstrous talent.

The miniature bikes they ride, too, are tools for serious work. Look at them and you'll see a capsule summary of 1982 technology—for adult bikes. They have all the latest and trickest features. Progressive-rate, adjustable single-shock rear suspension systems with gas-charged remote reservoirs; a foot of air space between their chrome-moly chassis and their wheels; the latest international moto-race look. Inside you'll find works-like wizardry in cylinder porting and ignition systems. They're clones of the fighting machines on which Barnett, Hannah, Hansen and Ward do battle.

When I was a kid, all I had was a rock and stick, and like most kids I wore out the rock and broke the stick. That was before new inventions had the benefit of accelerated advancement engineered by Japanese computers. These days there's no market for sticks and such, but for a motorcycle company there's potential profit in starting young motorcyclists early. The bean counters are hopeful that every victim of mini mania will later buy a 125, then an open-classer and maybe eventually a big street bike. By offering a motorcycle version of Little League, motorcycle companies can get mom and dad involved—along with their wallets. There's something to be gained by making a product fit a market.

PHOTOGRAPHY: DAVE HAWKINS

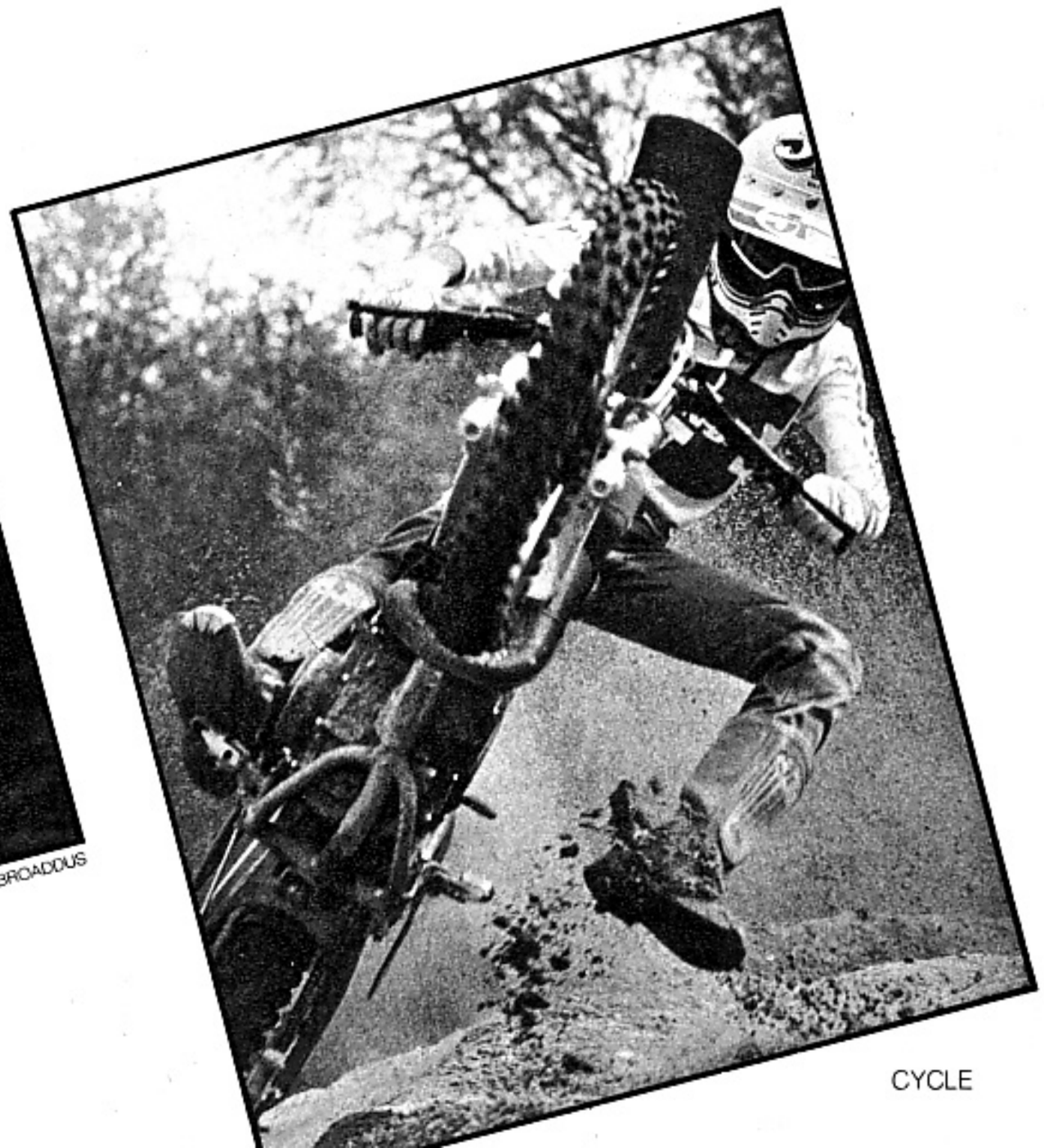
MINI MANIA

This year's clone crop is all new, with redesigned engines, new chassis and upgraded suspension components. The '82 bikes are tougher, faster and better handling than ever before. These dwarf-bikes are no longer beneficiaries of technological trickle-down; they form a leading flank of progress alongside their full-sized counterparts.

A decade ago manufacturers introduced child-sized imposters of adult machines. Those bikes differed from the fat-tired toys with lawn mower and go-cart engines many of us grew up with—but not by very much. Their down-sized anatomies simply disguised absolutely Neanderthal technology. Stone-age suspension, too-few gearbox ratios and power so insignificant it took a microscope to read the dyno charts were trademarks of early-'70s minibikes.

Yamaha's YZ version of its 80, introduced in 1974, sparked a new trend, a trend toward the production of mini-racers. The battle was on. Five speeds, CDI sparking, and leading-axle forks; then six-speeds, single-shock rear suspension systems and chrome-moly frames. The 1982 mini-racers include 1982 technology and features.

A trip to *Cycle's* dyno revealed the truth about these machines. Fifteen horsepower jammed into a 150-pound package gives a power-to-weight ratio, with a typical child aboard, equal to that of a Husqvarna 250 CR. With a heavier rider, of the 100-pound variety, the pounds-per-horsepower ratio is better than with most 175cc enduro bikes and riders. Homchick, one of our test riders, jumped aboard a Kawasaki KX175 while



PHOTOGRAPHY: DAVE HAWKINS, STEVE BROADDUS

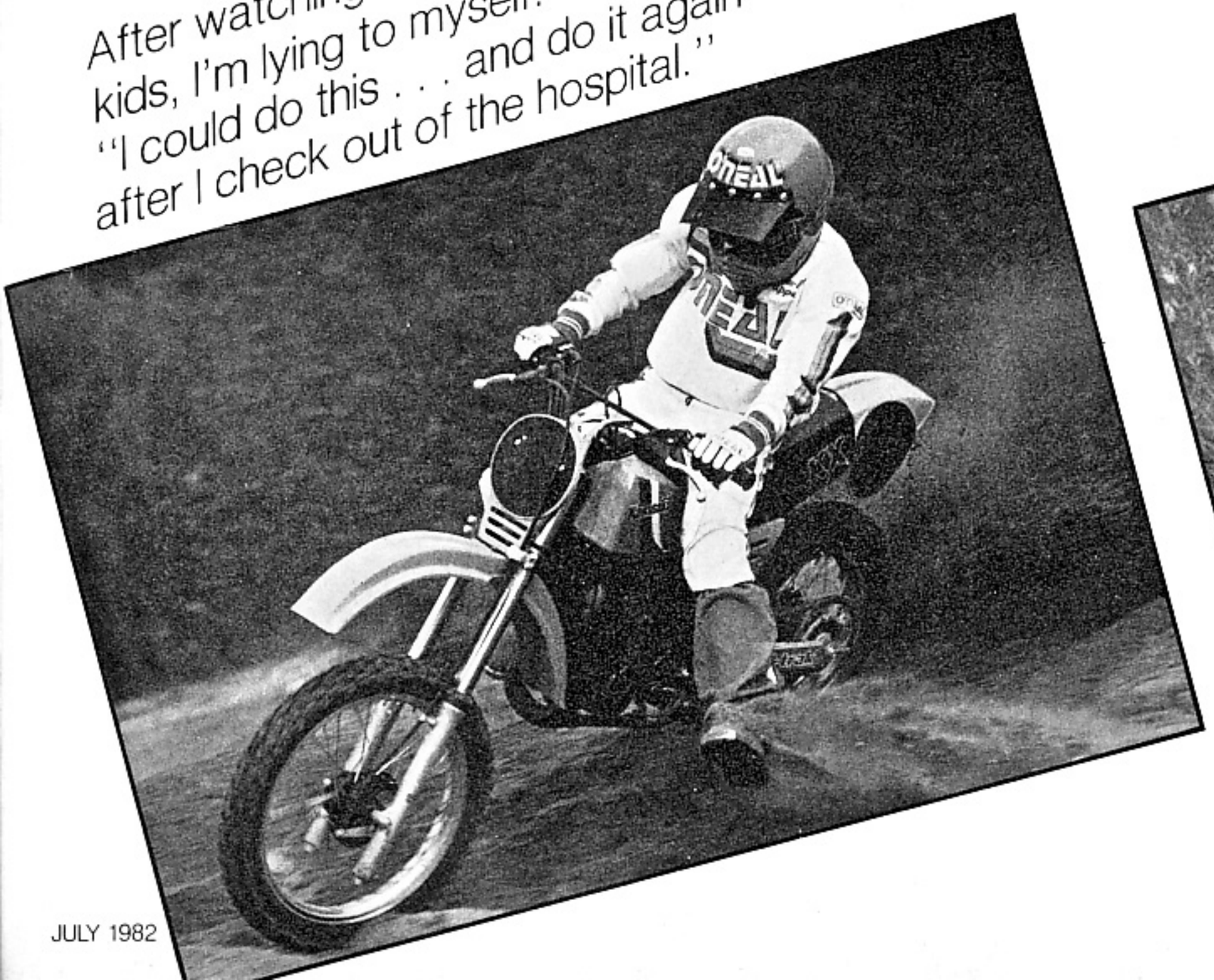
I raced the Honda CR80R alongside. Result: a dead tie. These aren't toys. Toys are games like Astro Smash and Rubik's Cubes.

Actual peak horsepower output was a photo finish on our dyno—only 0.35 horsepower separates the most from the least (2.5 percent). Manufacturing tolerances as well as setup and trackside fine tuning could easily make a bigger difference. More important is the power's spread. Suzuki's RM is a revver, pulling its 14.48-horsepower peak at 12,500 rpm. That's 2000 rpm higher than the Yamaha, which peaks at 10,500, producing 14.39. The curves of the Kawasaki KX and Honda CR weave through each other, almost splitting the space between the YZ and RM exactly. But the Honda curve has an unusual flat spot in the 9500-to-10,500-rpm range, which disrupts smooth delivery. The Kawasaki has the smoothest and longest curve of all.

The powerbands extend over a 4000-to-4500-rpm band. Yamaha's YZ begins life early, at 7500 rpm. The CR and KX power kicks in 1000 rpm later, and the RM starts another 500 rpm up the scale.

The torque bands show more noticeable differences—up to 14 percent. The YZ has more torque available throughout its rev range than any other bike. The RM, by contrast, has the least. Midway between the two, again, lie the KX and CR; the CR suffers a dip around 10,500 rpm, while the KX remains extremely strong over a wide-rpm range.

There are few similarities between former models' powerplants and this year's. Take the Honda CR80R for starters. It features new crankcase castings and a redesigned cylinder and head. It has a larger reed valve, a two-ring piston instead of the former one-ring type, a new

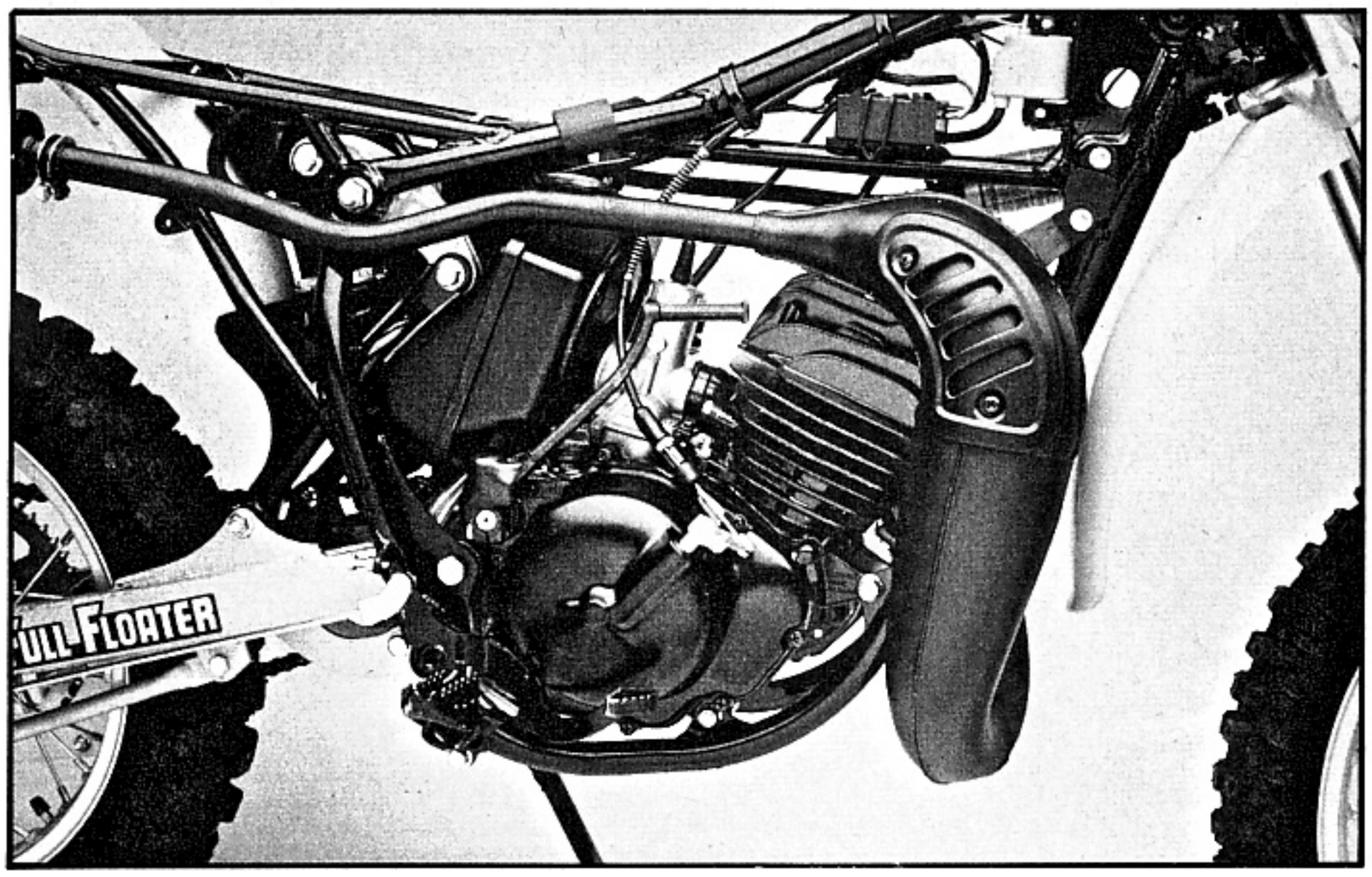


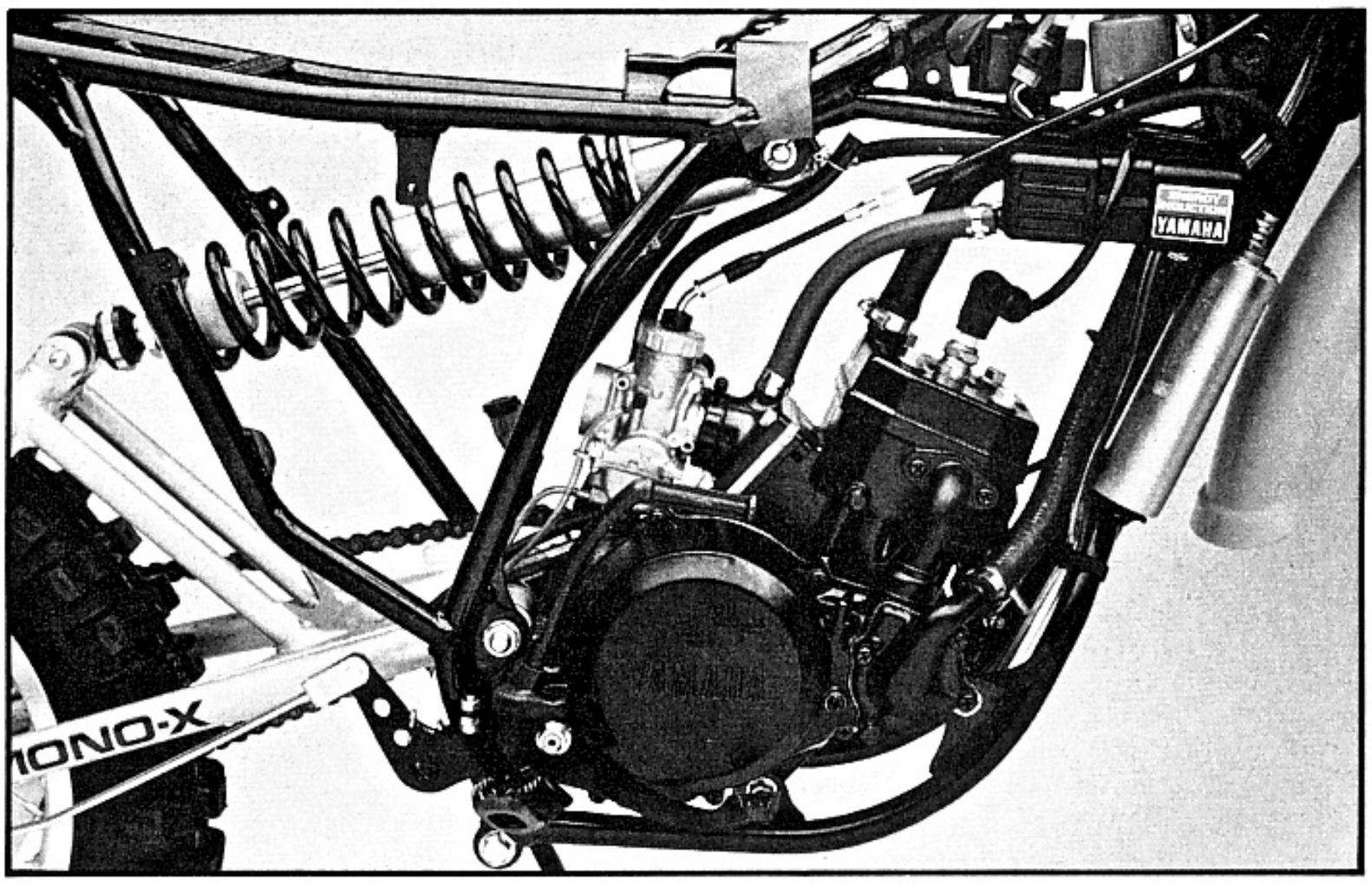
MINI MANIA

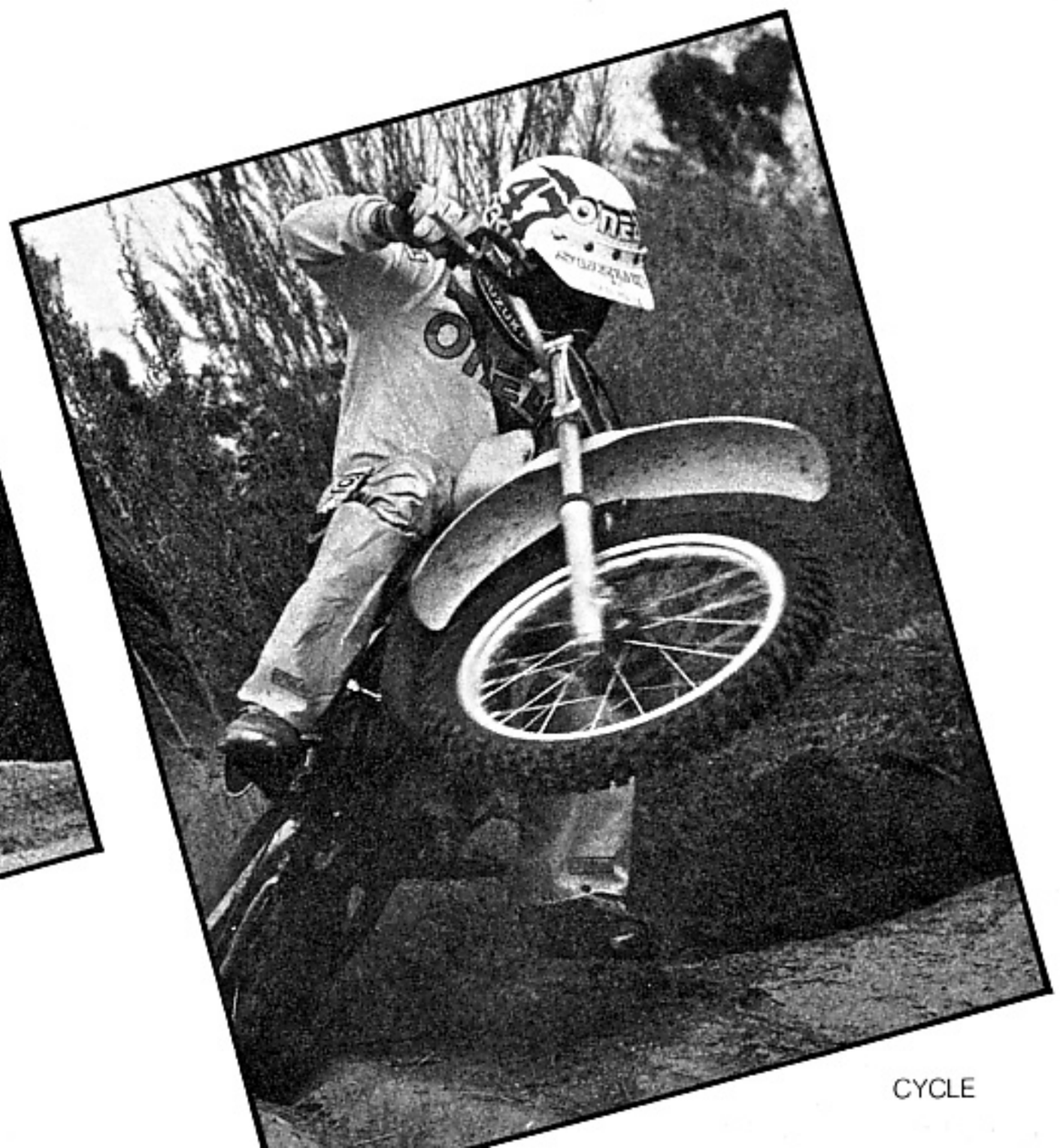
expansion chamber and ignition advance curve, and newly shaped cylinder ports with new port timing. Downstairs, the entire kick-start mechanism has been modified and relocated higher, and the crankcase in this area strengthened. Subtle changes to the transmission and clutch were made to improve reliability.

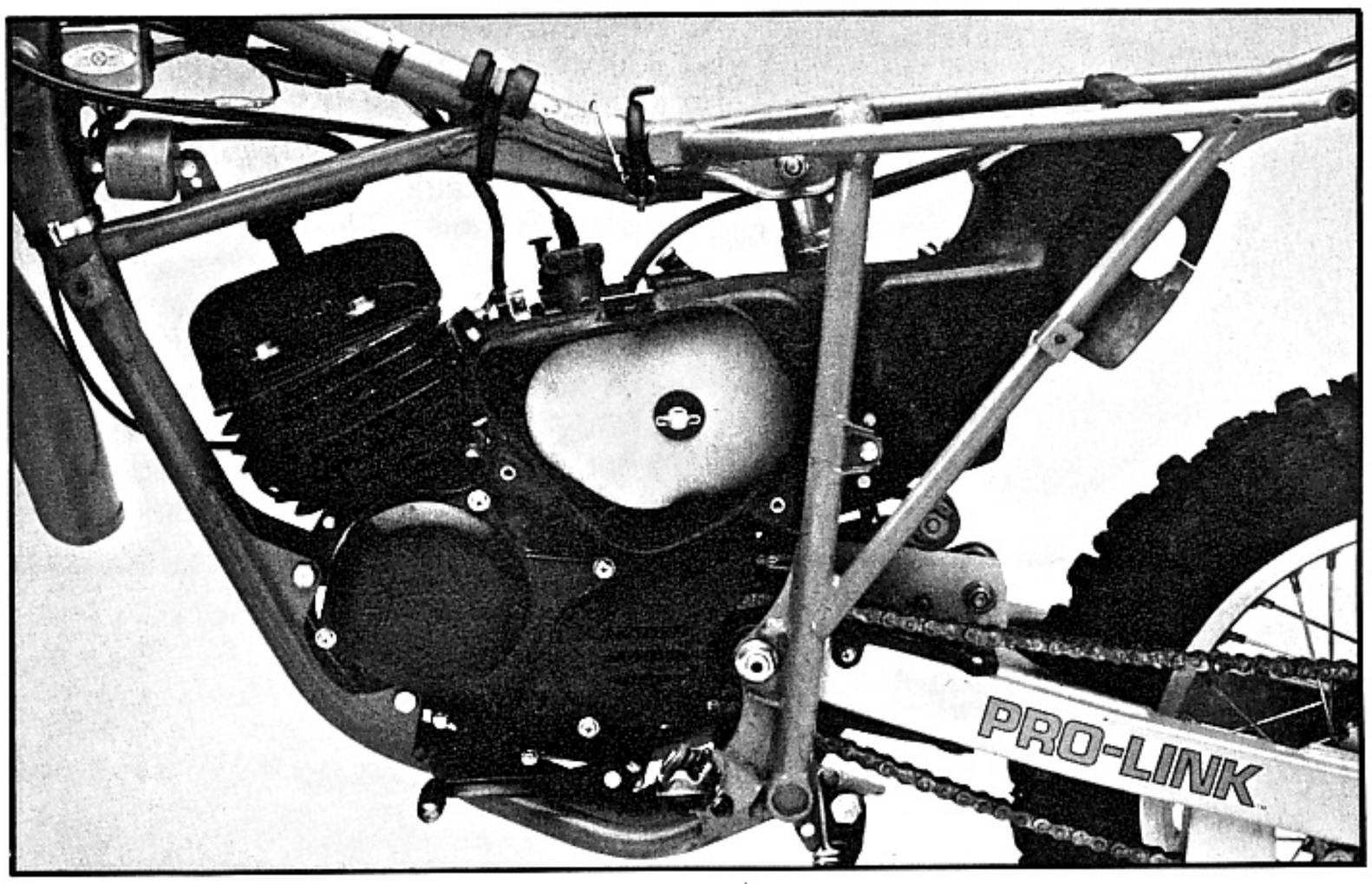
Overall, the Kawasaki KX80 has the least-changed engine, but numerous improvements have been made to upgrade performance. Boyesen epoxy-type reed valves replace the steel petals used previously, and the inlet port now features a central bridge. To aid inlet flow, the airbox cap and filter element have been changed for reduced flow resistance. The smaller, lighter crankshaft assembly offers decreased rotating mass, while the piston, rod bearing, clutch and transmission have been made more durable. Minor updates to the clutch actuating and shift mechanism help reduce lever pressures for lighter shifting.

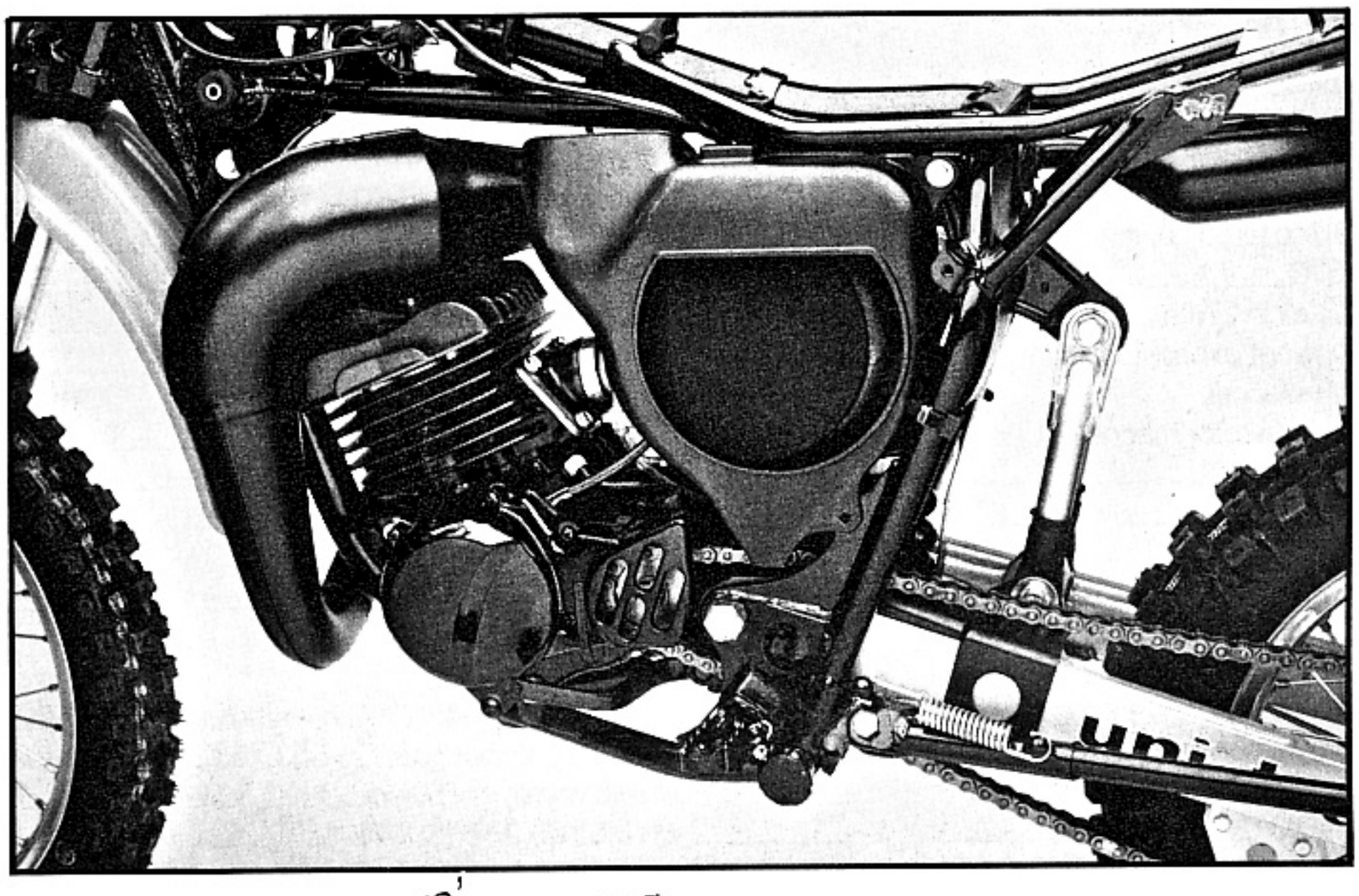
Suzuki's RM80Z shares the same bore and stroke as last year's X-model; little else remains the same. The connecting rod is five millimeters shorter and incorporates a special loose-roller bearing. This rod hooks to a smaller, lighter crankshaft. Straight-cut primary drive gears replace helical types, and these transfer drive to a new closer-ratio gearbox. Compression has been reduced in the new head, the cylinder port configuration now includes a center-port exhaust (the frame was changed to accommodate the new centrally located port), and the inlet and transfer ports have been opened up considerably. Leading to the larger inlet is a carburetor with the same 27mm ven-











turi as used last year, but smaller in overall size—one of many moves to reduce weight.

Visually, Yamaha's YZ80J powerplant appears the most dramatically changed, due mainly to its lack of cooling fins. Of course, water-cooling isn't new, but its presence in the 80 class demonstrates the intense efforts by factory engineers to squeeze the most from five cubic inches. Another addition is YEIS (Yamaha Energy Induction System) to smooth power delivery at lower engine speeds. Except for the changes necessary to incorporate liquid-cooling, the rest of the engine remains basically unchanged.

In contrast to the powerplant, which looks radically different, the chassis appears unchanged. Not so. According to Yamaha spokesmen, the chassis is stronger and lighter this year. At the rear is Yamaha's famous Mono-X suspension with triangulated swing arm. The YZ's single shock has a larger remote reservoir and one inch more travel than last year's. Spring preload is a screw-type, and a click-stop knob changes damping. The YZ and Honda are, by the way, the only minis with adjustable damping; the YZ's is the easier of the two to change. The Yamaha's 30mm air-assisted fork has—like all the minis—two separate air caps for pressure adjustments.

The Kawasaki frame is the only major component of all four bikes that has not changed for 1982. But don't think the bike hasn't been improved. The air-assisted fork now has 32mm legs, up two millimeters from last year's, and it has 20mm more travel. The Uni-Trak rear suspension's connecting links are 10 millimeters longer than last year's, providing 20mm more travel. The shock, with adjustable preload, now has a remote res-

"I imagine our racers' air force counterparts, slipping into mini-size F16 fighters. Their missions are the same."

MINI MANIA

ervoir. An unusual feature of the KX's wheels is the use of needle bearings rather than ball-types on the brake-hub side. According to Kawasaki spokesmen, this improves axle support and helps prevent axle bending.

Both Honda and Suzuki have introduced new chrome-moly frames to mount their own version of single-shock progressive-rate travel systems. The

Honda CR's Pro-Link has a remote-reservoir shock with preload and damping adjustments. Up front, a 31mm air-assisted fork has tubes which slide on Honda's Syntallic bushings. Spokes with increased diameter link the Honda's new rims and hubs.

The Full Floater system of Suzuki's RM80Z uses a remote-reservoir shock with five spring preload settings but no damping adjustment. Unlike other mini swing arms, which have welded-on flat plates at the rear-axle adjustment, the

Cycle SPECIFICATIONS

Make and model	Honda CR80R	Kawasaki KX80C2
Price, suggested retail (as of 3/1/82)	$798	$799
ENGINE		
Type	Two-stroke, reed-valve-inducted single cylinder; air-cooled	Two-stroke, reed-valve-inducted single cylinder; air-cooled
Bore and stroke	49.5 x 41.4mm (1.95 x 1.63 in.)	48.0 x 45.8mm (1.89 x 1.80 in.)
Piston displacement	79.7cc (4.88 cu. in.)	82cc (5.02 cu. in.)
Compression ratio	6.5:1	8.4:1
Carburetion	(1) Keihin 27mm round-slide	(1) Mikuni 29mm round-slide
Exhaust system	Upswept expansion chamber with silencer	Upswept expansion chamber with silencer
Ignition	External-rotor magneto; CDI	External-rotor magneto; CDI
Air filtration	Oiled foam	Oiled foam
Oil capacity	0.95 qt. (0.9 l)	0.58 qt. (0.55 l)
Bhp @ rpm	14.74 @ 11,500	14.46 @ 11,500
Torque @ rpm	6.95 @ 9500	6.95 @ 10,000 & 10,500
TRANSMISSION		
Type	Six-speed, constant-mesh, wet-clutch	Six-speed, constant-mesh, wet-clutch
Primary drive	Straight-cut gear; 4.117	Straight-cut spur gear; 3.083
Final drive	#428 chain; 14/47 sprockets; 3.36	#428 chain; 14/50 sprockets; 3.571
Gear ratios (transmission)	(1) 2.33 (2) 1.78 (3) 1.40 (4) 1.18 (5) 1.00 (6) 0.92	(1) 2.85 (2) 2.13 (3) 1.72 (4) 1.43 (5) 1.22 (6) 1.08
CHASSIS		
Type	Single-downtube, full-cradle, chrome-moly frame; box-section steel swing arm	Single-downtube, full-cradle, chrome-moly frame; box-section steel swing arm
Suspension, front	Leading-axle, air-assisted fork	Leading-axle, air-assisted fork
rear	(1) gas-charged, remote-reservoir shock absorber	(1) gas-charged, remote-reservoir shock absorber
Wheelbase	48.8 in. (1240mm)	47.8 in. (1215mm)
Rake/trail	26.3°/3.1 in. (78mm)	28°/3.54 in. (90mm)
Brake, front	Single-leading-shoe conical hub drum	Single-leading-shoe conical hub drum
rear	Single-leading-shoe conical hub drum, rod actuated	Single-leading-shoe conical hub drum, rod actuated
Wheel, front	1.40 x 17 DID aluminum alloy rim	1.40 x 17 Takasago aluminum alloy rim
rear	1.60 x 14 DID aluminum alloy rim	1.60 x 14 Takasago aluminum alloy rim
Tire, front	275 x 17 Motocross Z-Mark III	275 x 17 Dunlop Sports K490
rear	410 x 14 IRC Motocross Z-Mark II	410 x 14 Dunlop Sports K490
Seat height	30.6 in. (777mm)	32.3 in. (820mm)
Ground clearance	10.3 in. (262mm)	11.9 in. (302mm)
Footpeg ground clearance	12.5 in. (318mm)	13.1 in. (332mm)
Fuel capacity	1.3 gal. (5.0 l)	1.2 gal. (4.5. l)
Curb weight, full tank	152.0 lbs. (68.9 kg)	151.5 lbs. (68.7 kg)
CUSTOMER SERVICE	American Honda Motor Co. 100 W. Alondra Blvd. Gardena, CA 90247 (213) 321-8680	Kawasaki Motors Corp. 3630 Garry St. Santa Ana, CA 92704 (714) 540-1600

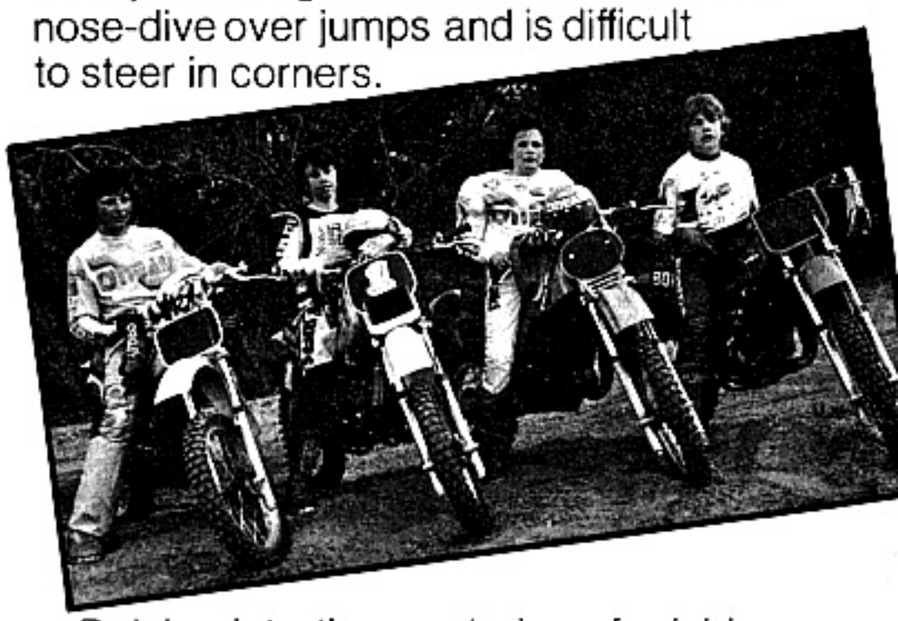
RM has a true box-section swing arm with internal adjusting blocks. This design, combined with such features as a new plastic gas tank (formerly steel), straight-pull spokes and smallish 30mm fork tubes, contributes to the bike's overall low weight.

At the official *Cycle* weigh-in, the RM proved lightest at exactly 141.0 pounds, with one gallon of fuel aboard. The other three, with a similar fuel load, pressed rubber about 10 pounds firmer to the ground: Honda, the heaviest (but not by much) at 152.0; Kawasaki, 151.5; Yamaha, 151.0. To a 90-pounder, this presents about the same motorcycle mass as a professional motocross machine does to a 160-pound rider.

My dealings with those infected with mini mania revealed a lot. I discovered how sophisticated the machinery is and how serious the riders are. By talking to the junior pilots—after each rode all four bikes—I found that the bikes have distinct power and handling characteristics, just like bikes of any size.

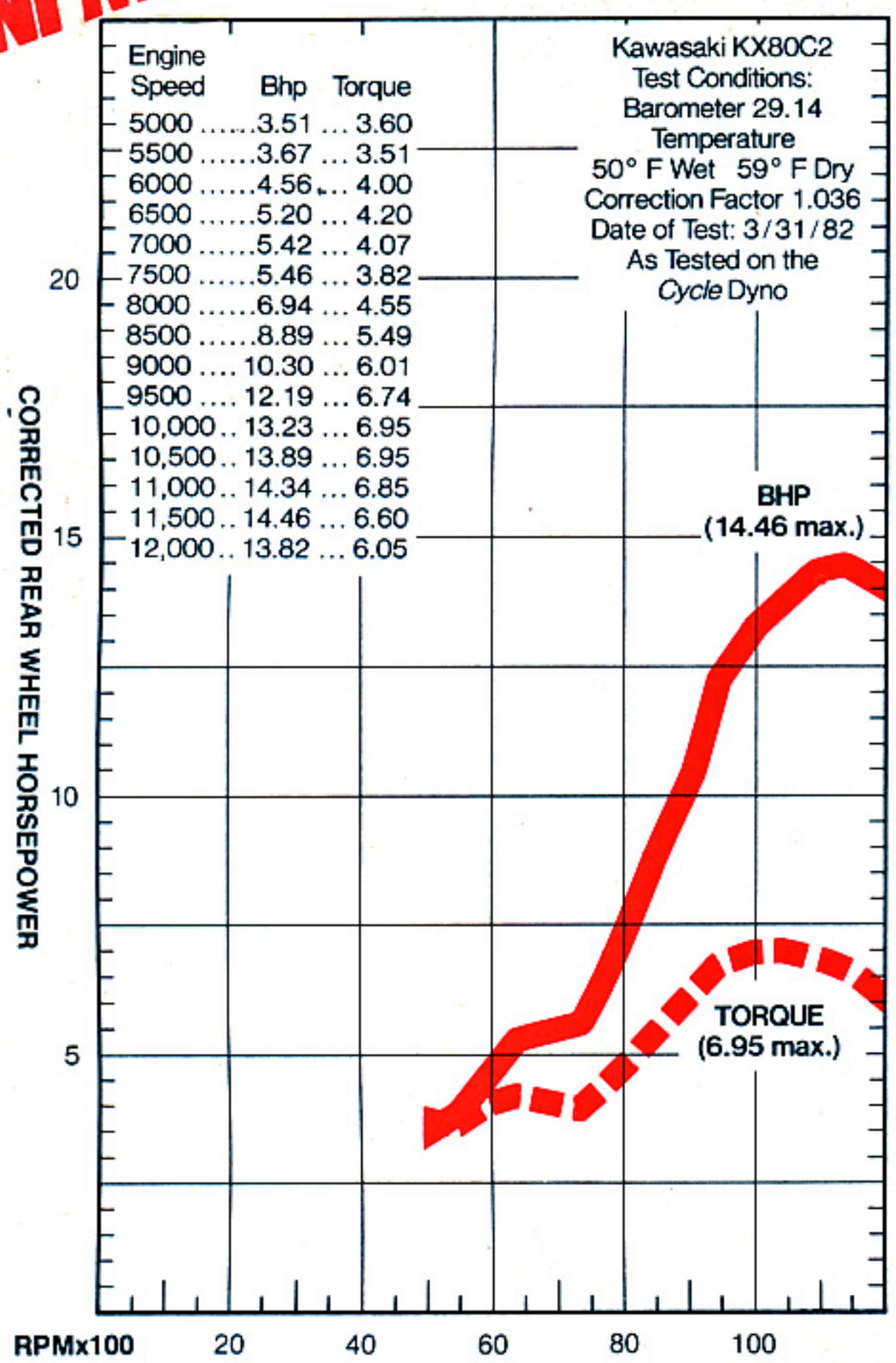
	Suzuki RM80Z	Yamaha YZ80J
	$829	$929
	Two-stroke, reed-valve-inducted single cylinder; air-cooled	Two-stroke, reed-valve-inducted single cylinder; liquid-cooled
	49.0 x 44.0mm (1.93 x 1.73 in.)	47.0 x 45.6mm (1.85 x 1.80 in.)
	83.0cc (5.08 cu. in.)	79.1cc (4.84 cu. in.)
	8.2:1	7.5:1
	(1) Mikuni 26mm round-slide	(1) Mikuni 26mm round-slide
	Upswept expansion chamber with silencer	Upswept expansion chamber with silencer
	Internal-rotor magneto; CDI	Internal-rotor magneto; CDI
	Oiled foam	Oiled foam
	0.69 qt. (0.65 l)	0.74 qt. (0.7 l)
	14.48 @ 12,500	14.39 @ 10,500
	6.51 @ 11,000	7.35 @ 9000
	Six-speed, constant-mesh, wet-clutch	Six-speed, constant-mesh, wet-clutch
	Straight cut spur gear; 3.555	Helical gear; 66/21; 3.14
	#428 chain; 13/52 sprockets; 4.00	#428 chain; 13/44 sprockets; 3.39
	(1) 2.57 (2) 1.89 (3) 1.50 (4) 1.25 (5) 1.08 (6) 0.96	(1) 2.77 (2) 2.06 (3) 1.63 (4) 1.33 (5) 1.15 (6) 1.04
	Single-downtube, full-cradle, mild-steel frame; box-section steel swing arm	Single-downtube, full-cradle frame; round-section steel swing arm
	Leading-axle, air-assisted fork	Leading-axle, air-assisted fork
	(1) gas-charged, remote-reservoir shock absorber	(1) gas-charged, remote-reservoir shock absorber
	48.0 in. (1220mm)	48.4 in. (1230mm)
	28.5°/3.4 in. (87mm)	26.0°/3.2 in. (80mm)
	Single-leading-shoe conical hub drum	Single-leading-shoe conical hub drum
	Single-leading-shoe conical hub drum	Single-leading-shoe conical hub drum
	1.40 x 17 Takasago aluminum alloy rim	1.40 x 17 DID aluminum alloy rim
	1.60 x 14 Takasago aluminum alloy rim	1.60 x 14 DID aluminum alloy rim
	275 x 17 Bridgestone M23	275 x 17 IRC Motocross Z Mark II
	410 IRC Motocross Z-Mark II	410 x 14 IRC Motocross Z-Mark II
	30.2 in. (767mm)	30.6 in. (777mm)
	10.0 in. (254mm)	11.3 in. (287mm)
	11.6 in. (295mm)	13.0 in. (330mm)
	1.5 gal. (5.6 l)	1.4 gal. (5.3 l)
	141.0 lbs. (63.9 kg)	151.0 lbs. (68.5 kg)
	U.S. Suzuki Motor Corp. P.O. Box 1100 3251 East Imperial Highway Brea, CA 92721 (714) 996-7040	Yamaha Motor Corporation P.O. Box 6555 6555 Katella Ave. Cypress, CA 90630 (714) 761-7300

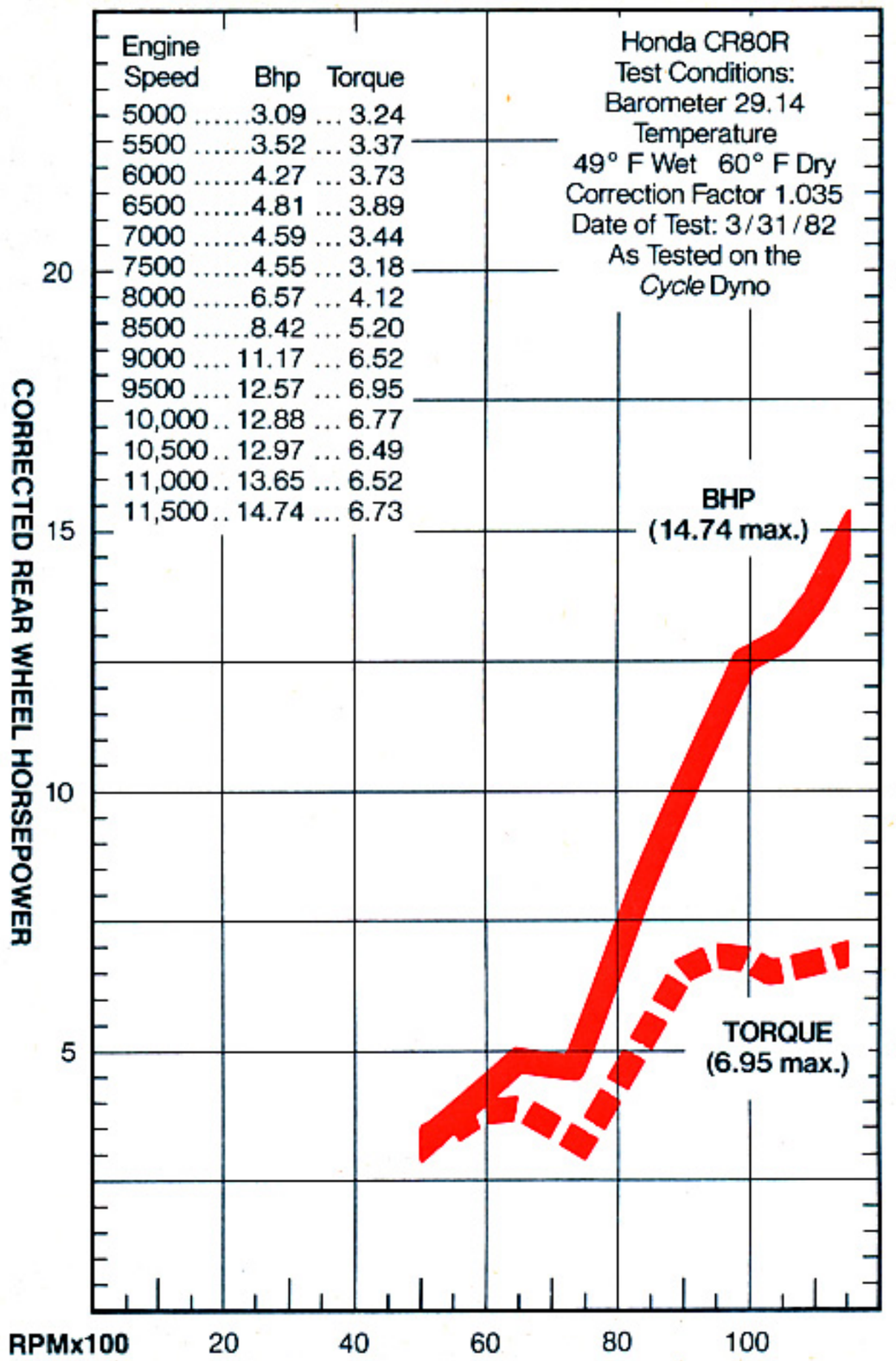
The riders all agreed that Kawasaki's KX80 has a nice blend of power and handling. The suspension is definitely improved from last year, and the wide, generous power delivery is usable in a variety of terrain, giving it good drive from corners and in deep sand. As a standard production machine, it's a nicely balanced piece. The Suzuki and Honda both handle well and skim competently across the worst bumps with ease. The Suzuki's light weight is an advantage in most terrains, but in deep sand its snappish power either spins the rear wheel or bogs down. The Honda just didn't have the power to get crisp drives from corners the way the Kawasaki and Yamaha did. The Yamaha's power was certainly usable and abundantly available, but nobody really liked its nose-heavy handling characteristics. It tries to nose-dive over jumps and is difficult to steer in corners.

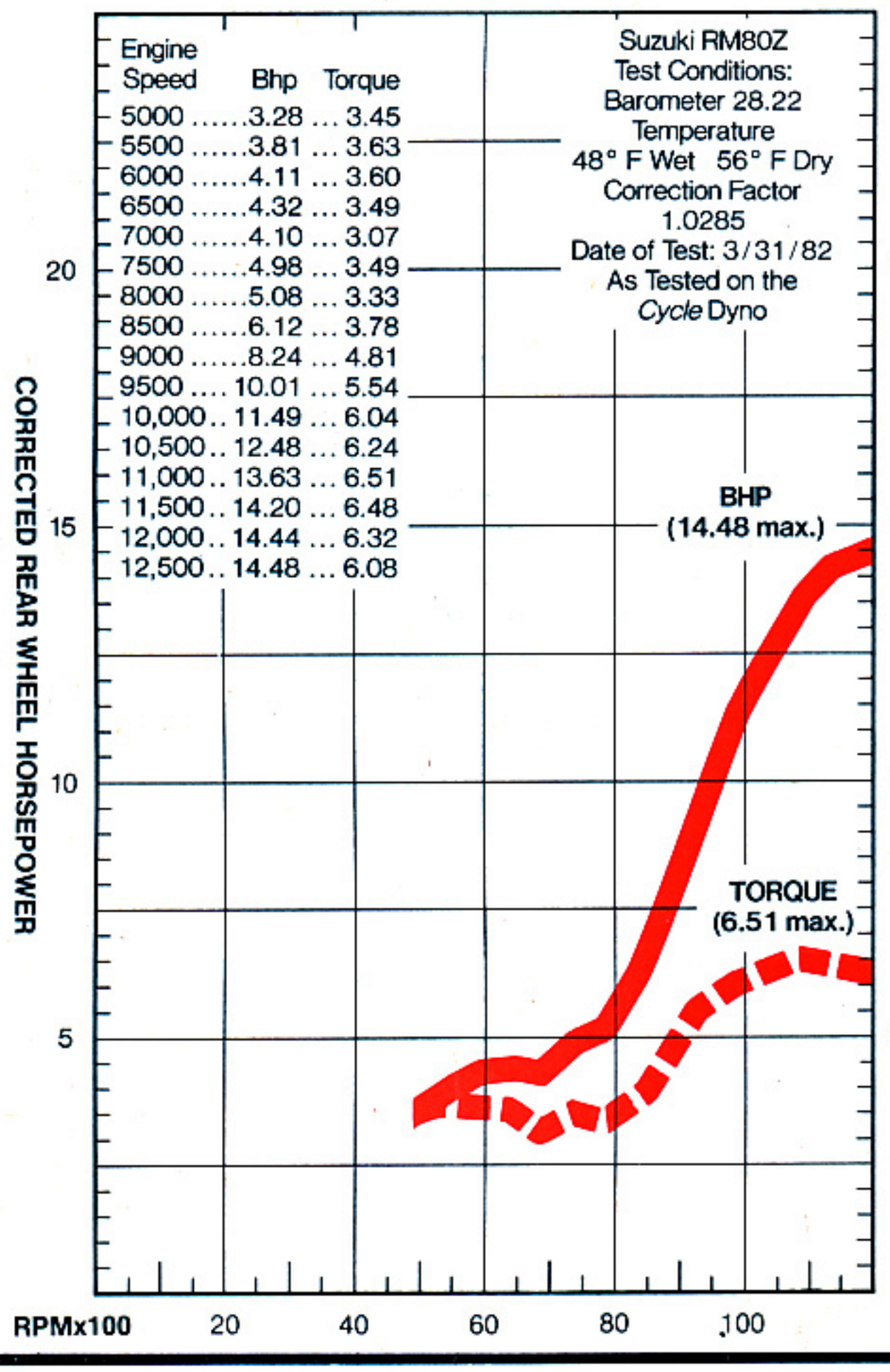


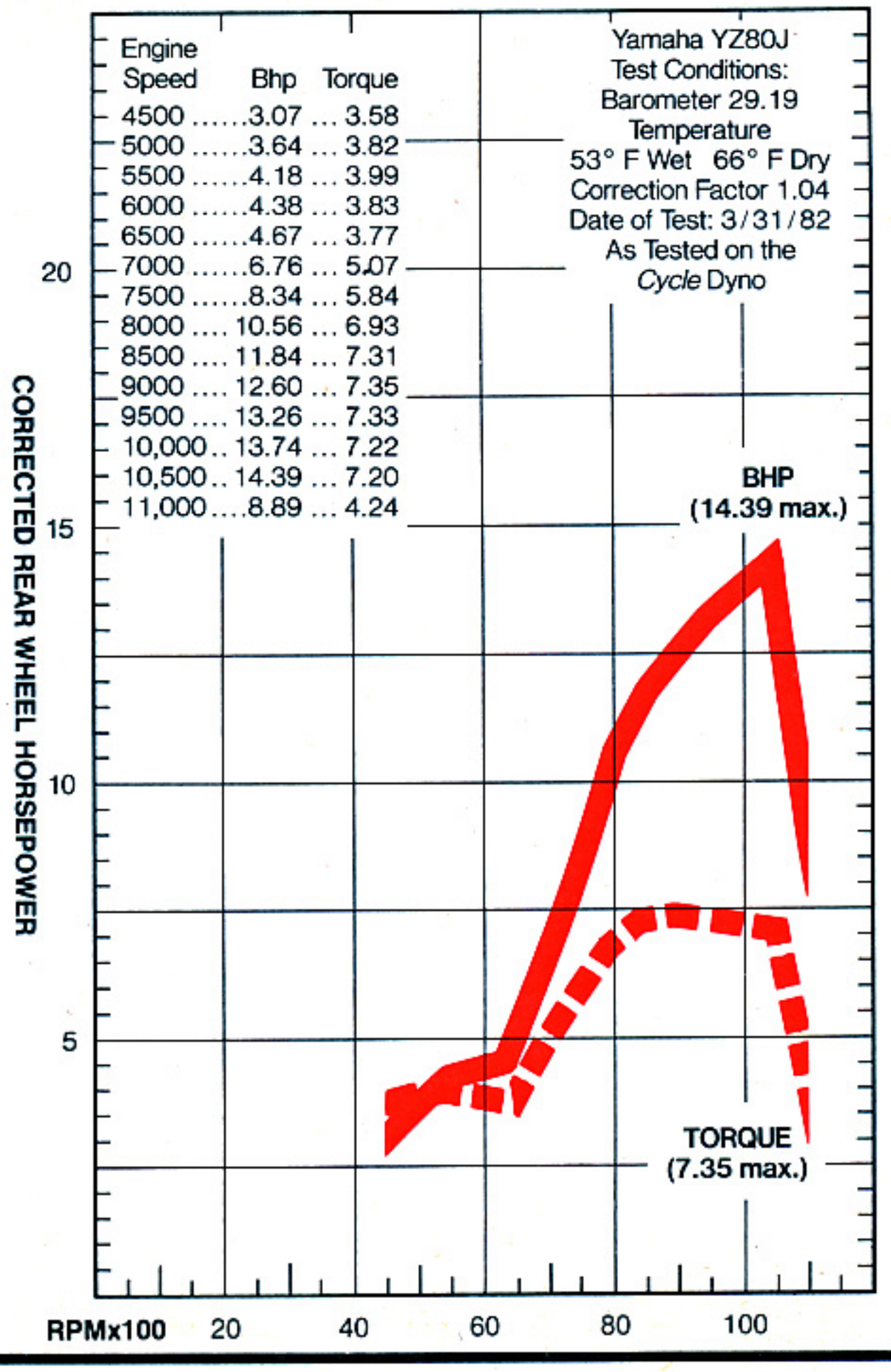
Delving into the mysteries of minidom has also solved a dilemma of mine. I've always liked tiny replicas of big things and I've never liked the kid on the corner who throws rocks at my fence every morning on his way to school and I've always wanted to try motocross racing. Now I can have it all: By putting the corner imp on one of these replica racers with a remote radio-controlled throttle, I'd have the thrill of racing without the agony of endos—all controlled from the comfort of my lawn chair in the pits. ◉

(Dyno charts, page 70)


Engine Speed Bhp Torque
5000 .....3.51 ... 3.60
5500 .....3.67 ... 3.51
6000 .....4.56 ... 4.00
6500 .....5.20 ... 4.20
7000 .....5.42 ... 4.07
7500 .....5.46 ... 3.82
8000 .....6.94 ... 4.55
8500 .....8.89 ... 5.49
9000 .... 10.30 ... 6.01
9500 .... 12.19 ... 6.74
10,000 .. 13.23 ... 6.95
10,500 .. 13.89 ... 6.95
11,000 .. 14.34 ... 6.85
11,500 .. 14.46 ... 6.60
12,000 .. 13.82 ... 6.05
Kawasaki KX80C2
Test Conditions:
Barometer 29.14
Temperature
50° F Wet 59° F Dry
Correction Factor 1.036
Date of Test: 3/31/82
As Tested on the
Cycle Dyno
BHP
(14.46 max.)
TORQUE
(6.95 max.)
CORRECTED REAR WHEEL HORSEPOWER
TORQUE IN FOOT POUNDS
RPMx100
20
40
60
80
100
5
10
15
20


Engine Speed Bhp Torque
5000 .....3.09 ... 3.24
5500 .....3.52 ... 3.37
6000 .....4.27 ... 3.73
6500 .....4.81 ... 3.89
7000 .....4.59 ... 3.44
7500 .....4.55 ... 3.18
8000 .....6.57 ... 4.12
8500 .....8.42 ... 5.20
9000 .... 11.17 ... 6.52
9500 .... 12.57 ... 6.95
10,000 .. 12.88 ... 6.77
10,500 .. 12.97 ... 6.49
11,000 .. 13.65 ... 6.52
11,500 .. 14.74 ... 6.73
Honda CR80R
Test Conditions:
Barometer 29.14
Temperature
49° F Wet 60° F Dry
Correction Factor 1.035
Date of Test: 3/31/82
As Tested on the
Cycle Dyno
BHP
(14.74 max.)
TORQUE
(6.95 max.)
CORRECTED REAR WHEEL HORSEPOWER
TORQUE IN FOOT POUNDS
RPMx100
20
40
60
80
100
5
10
15
20


Engine Speed Bhp Torque
5000 .....3.28 ... 3.45
5500 .....3.81 ... 3.63
6000 .....4.11 ... 3.60
6500 .....4.32 ... 3.49
7000 .....4.10 ... 3.07
7500 .....4.98 ... 3.49
8000 .....5.08 ... 3.33
8500 .....6.12 ... 3.78
9000 .....8.24 ... 4.81
9500 .... 10.01 ... 5.54
10,000 .. 11.49 ... 6.04
10,500 .. 12.48 ... 6.24
11,000 .. 13.63 ... 6.51
11,500 .. 14.20 ... 6.48
12,000 .. 14.44 ... 6.32
12,500 .. 14.48 ... 6.08
Suzuki RM80Z
Test Conditions:
Barometer 28.22
Temperature
48° F Wet 56° F Dry
Correction Factor
1.0285
Date of Test: 3/31/82
As Tested on the
Cycle Dyno
BHP
(14.48 max.)
TORQUE
(6.51 max.)
CORRECTED REAR WHEEL HORSEPOWER
TORQUE IN FOOT POUNDS
RPMx100
20
40
60
80
100
5
10
15
20


Engine Speed Bhp Torque
4500 .....3.07 ... 3.58
5000 .....3.64 ... 3.82
5500 .....4.18 ... 3.99
6000 .....4.38 ... 3.83
6500 .....4.67 ... 3.77
7000 .....6.76 ... 5.07
7500 .....8.34 ... 5.84
8000 .... 10.56 ... 6.93
8500 .... 11.84 ... 7.31
9000 .... 12.60 ... 7.35
9500 .... 13.26 ... 7.33
10,000 .. 13.74 ... 7.22
10,500 .. 14.39 ... 7.20
11,000 .... 8.89 ... 4.24
Yamaha YZ80J
Test Conditions:
Barometer 29.19
Temperature
53° F Wet 66° F Dry
Correction Factor 1.04
Date of Test: 3/31/82
As Tested on the
Cycle Dyno
BHP
(14.39 max.)
TORQUE
(7.35 max.)
CORRECTED REAR WHEEL HORSEPOWER
TORQUE IN FOOT POUNDS
RPMx100
20
40
60
80
100
5
10
15
20