



# HONDA CR250R

PHOTOGRAPHY: KEN LEE

*Honda worked long and hard on the 1982 CR250R to produce what last year's CR should have been: quick, reliable, and very easy to ride fast.*

● *CYCLE'S* TESTERS WERE IMPRESSED WITH the 1981 Honda CR250R. In addition to being the first liquid-cooled production motocrosser from a major manufacturer, the CR handled well, made the most horsepower in its class up to that time, and wasn't terribly expensive—all necessary ingredients for a successful and popular motocross bike.

But times change. As good as the CR

was, other 1981 bikes proved better. Suzuki, in fact, benefited from *not* being first to introduce its new model. Suzuki knew what Honda had produced, and as a result could play a better hand.

Nineteen-eighty-two, though, is a different matter. While Suzuki fine tuned the RM's chassis and switched to a liquid-cooled engine, Honda set about almost completely revamping the CR. Honda

also brought Roger DeCoster, and his well of information and expertise, to work for the R&D department of the parent company in Japan. Both moves worked perfectly for Honda: the 1982 CR250R is an excellent performer which can run with anything in its class.

The only parts interchangeable between the '81 and '82 CRs are the cylinder, water pump, rear fender, levers and

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tires. Virtually every part on the bike has been improved in one way or another, and the resulting CR is lighter than last year's, more dependable, faster and easier to ride.

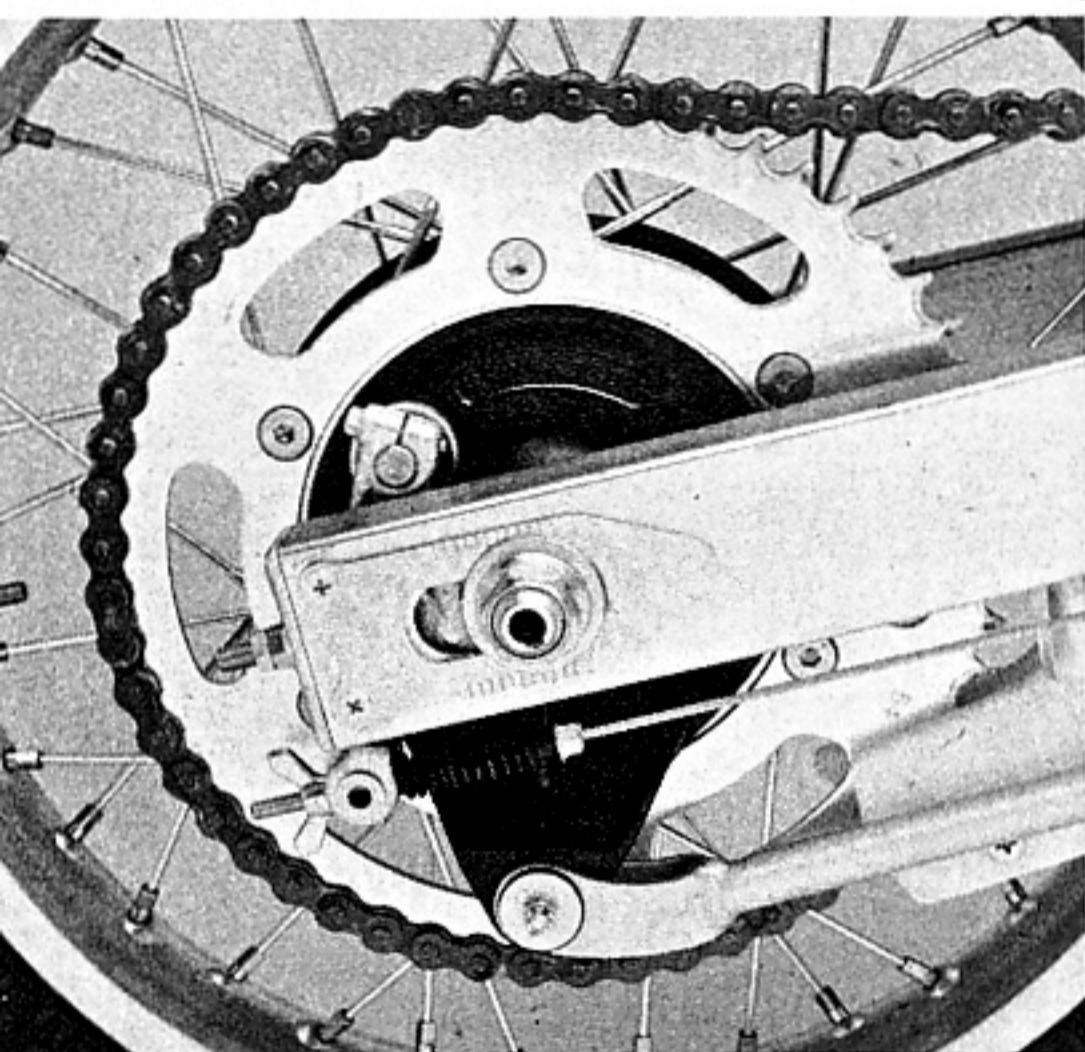
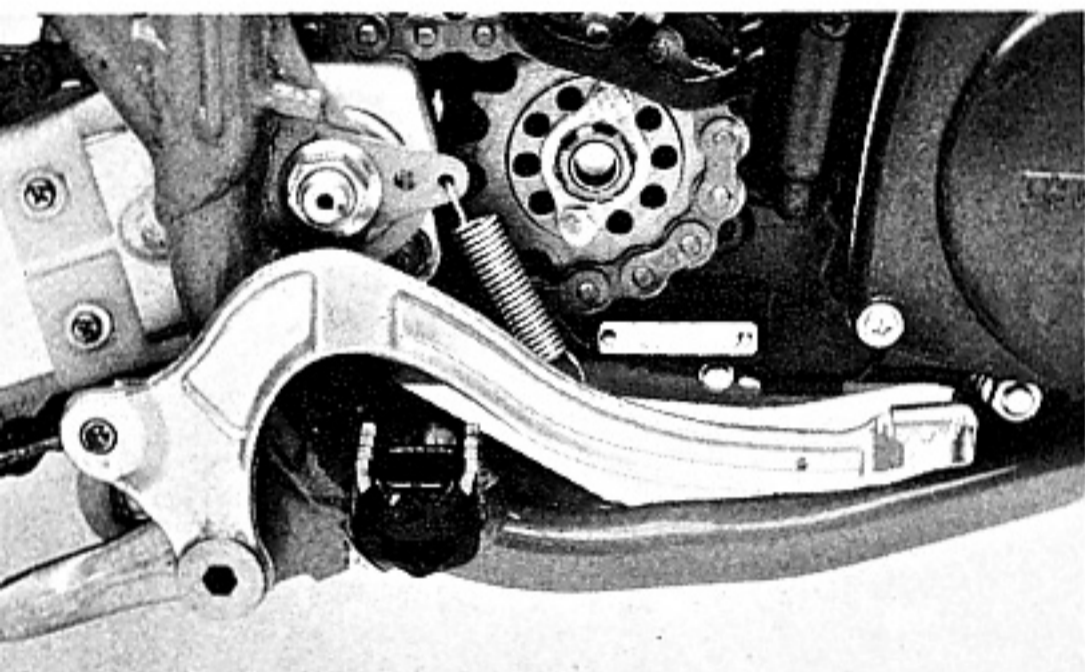
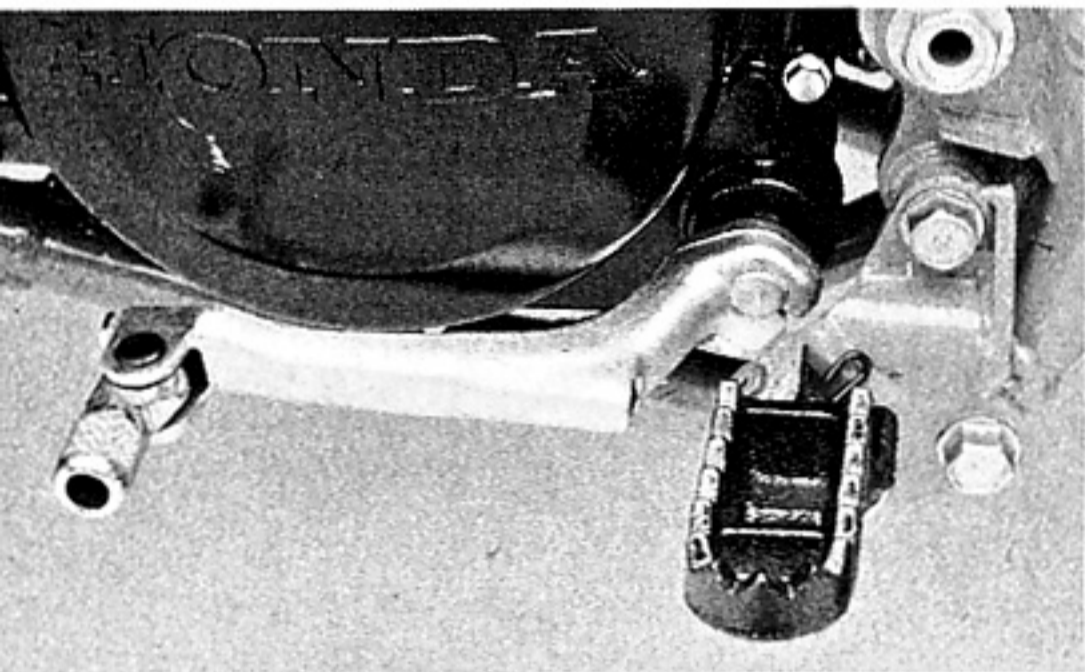
The major changes made to the 1982 CR250R center around the frame and suspension. Honda has changed the geometry considerably to give the CR more responsive handling and improved steering. The wheelbase is close to last year's; the '82 CR is 25 millimeters

longer, measured axle to axle. Though the wheelbase has changed little, the weight distribution has been altered greatly. Through frame and triple clamp modifications, Honda tucked in the rake and trail substantially. The 1982 250's dimensions are 27.5 degrees of rake and 4.3 inches of trail, compared with 1981's 29.5 degrees of rake and 4.8 inches of trail. Lengthening the swing arm 0.6 inches compensated for the wheelbase lost by bringing the front end closer to the frame. These changes move the engine's mass farther forward and increase

weight on the front end.

Engine location is vitally important to a motorcycle's handling and response. The '81 CR tended to push the front end, and the rear sometimes swung out when the rider least wanted it to, sending him for an instant where he hadn't planned to go. The '82 250, in contrast, is less free-spirited and has extremely stable handling.

Honda changed the fork assembly in a number of ways. Fork tube diameter jumped from 41mm to 43mm, which increases rigidity; the redesigned sliders



Refinements abound: contoured shift lever stays out of your boot's way, a new brake spring works well . . . the swing arm mounts the axle more solidly than before, and the brake arm is now aluminum.



*Although the horsepower figures line up closely with those from last year's bike, the '82 CR250R gets around the track faster with less strain thanks to its revised suspension and chassis geometry.*

have less overhang below the front axle (many top riders complained that their sliders dragged too much in berms); and the fork also has internal changes, chief among them being Honda's new damping adjustment system. Instead of the adjustable rebound damping found on the majority of motorcycles, Honda offers adjustable *compression* damping, with three settings for the fork.

Turning a slotted screw in the bottom of each fork slider changes fork compression damping. The screw rotates a sleeve valve located in a hollow bolt in

the bottom of the slider. The sleeve valve is indexed with orifices in the fork piston. Selecting the various sleeve valve settings produces differing degrees of misalignment of these oil orifices. Setting one gives perfect alignment and the least compression damping, two gives partial alignment, and three fully closes this part of the damping system, offering the greatest compression damping.

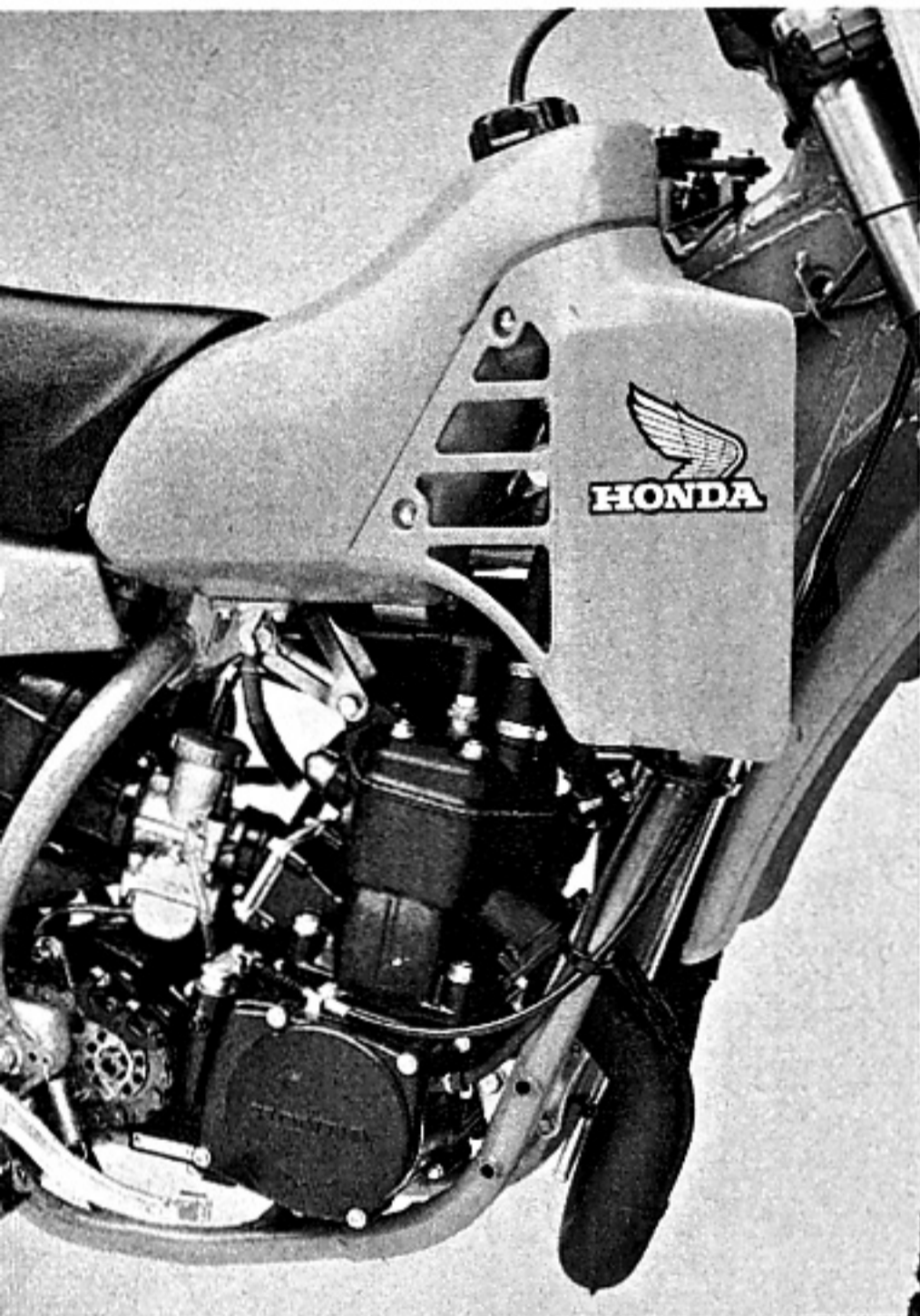
Fork travel is the same as on last year's CR, at 12 inches, but the increase in fork diameter has raised suggested oil capacity 20cc per leg. Although air caps are fitted at the top of each tube, Honda, like other manufacturers, suggests that owners use no air in the fork, instead raising or lowering the oil level to increase or decrease compression speed and rebound damping rates. Optional springs allow the fork to be fine-tuned to rider weight and ability. Three springs are available for the 250—17.6 pounds per inch (ppi), 18.5 ppi and 19.3 ppi.

The rear suspension also has undergone substantial changes. First among these is a new swing arm. Nineteen-eighty-one CR swing arms had a flat piece, which supported the axle, welded to the end of the arm. Field inspection revealed that some swing arms cracked from the axle boss upward, leaving bikes non-serviceable. Honda's newly designed box-section extruded aluminum swing arm cured the problem. The complete length of the arm is formed in a box section, and block-type adjusters sliding in and out of the end of the arm support

the axle. As a bonus, this design makes for more nearly perfect wheel alignment.

A more durable chain guide mounts below the new swing arm; it has a non-metal slider replacing the roller. The new slider is actually a two-piece block of Permalite, a tough, wear-resistant plastic. Honda says the Permalite unit should have a much longer service life than the '81 piece.

Honda has also substantially altered the Pro-Link and the shock. The link pieces now produce a little less abrupt rise in the rate of progressiveness. The



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'81 shock incorporated Honda's Variable Hydraulic Damping, or VHD, which utilized a spring-loaded sliding valve to control damping and offered four rates of rebound damping. Because its design caused too much internal friction, this shock was prone to overheating and fade. The 1982 CR uses a conventional piston-type shock with the oil passing washers of various thickness and diameter located on top of and below the shock piston; the design resembles that of the highly regarded Ohlins shock. Because this shock has fewer moving parts, friction and fade are reduced and damping is more consistent. Like the fork, the shock features selective compression

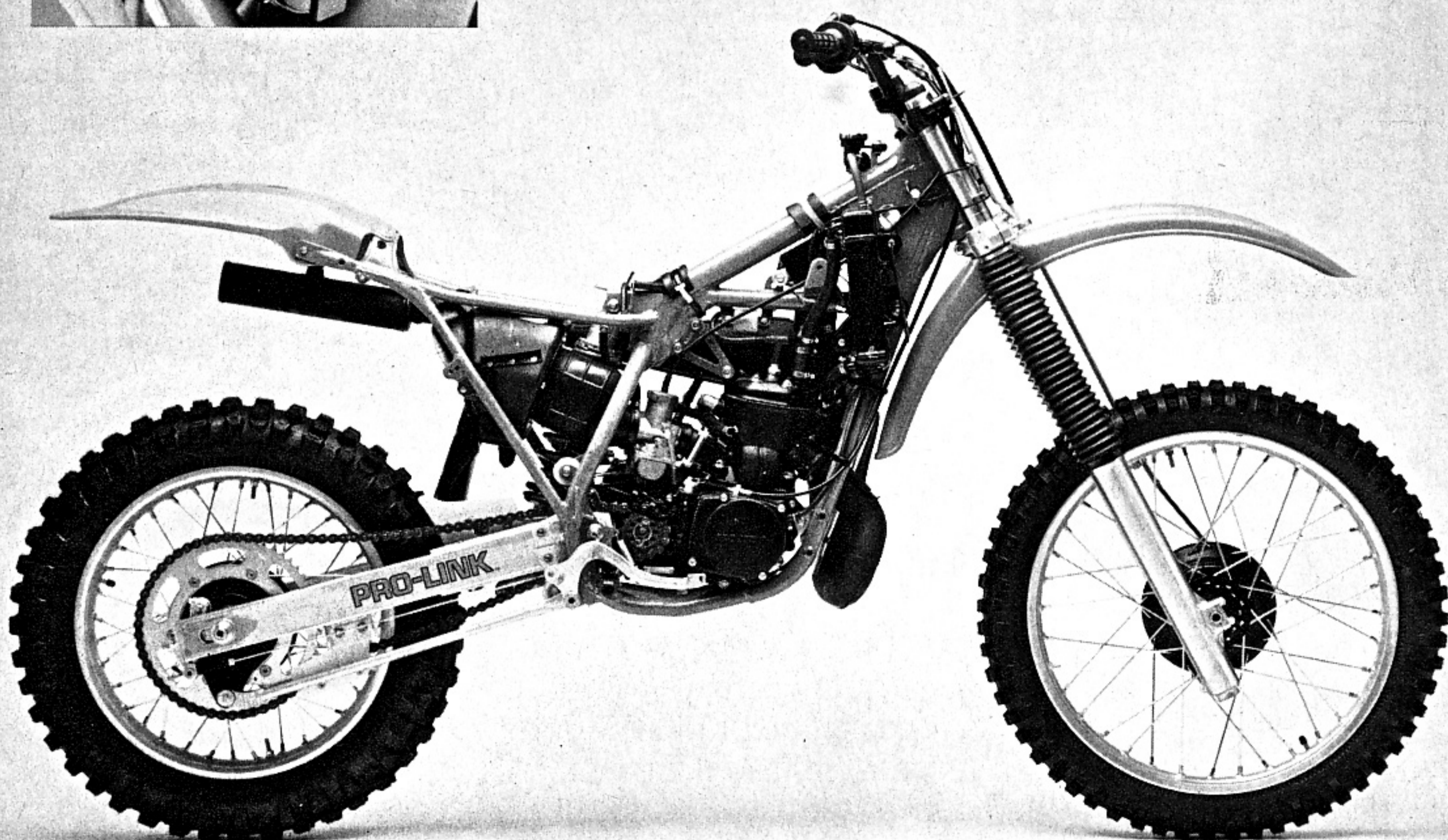
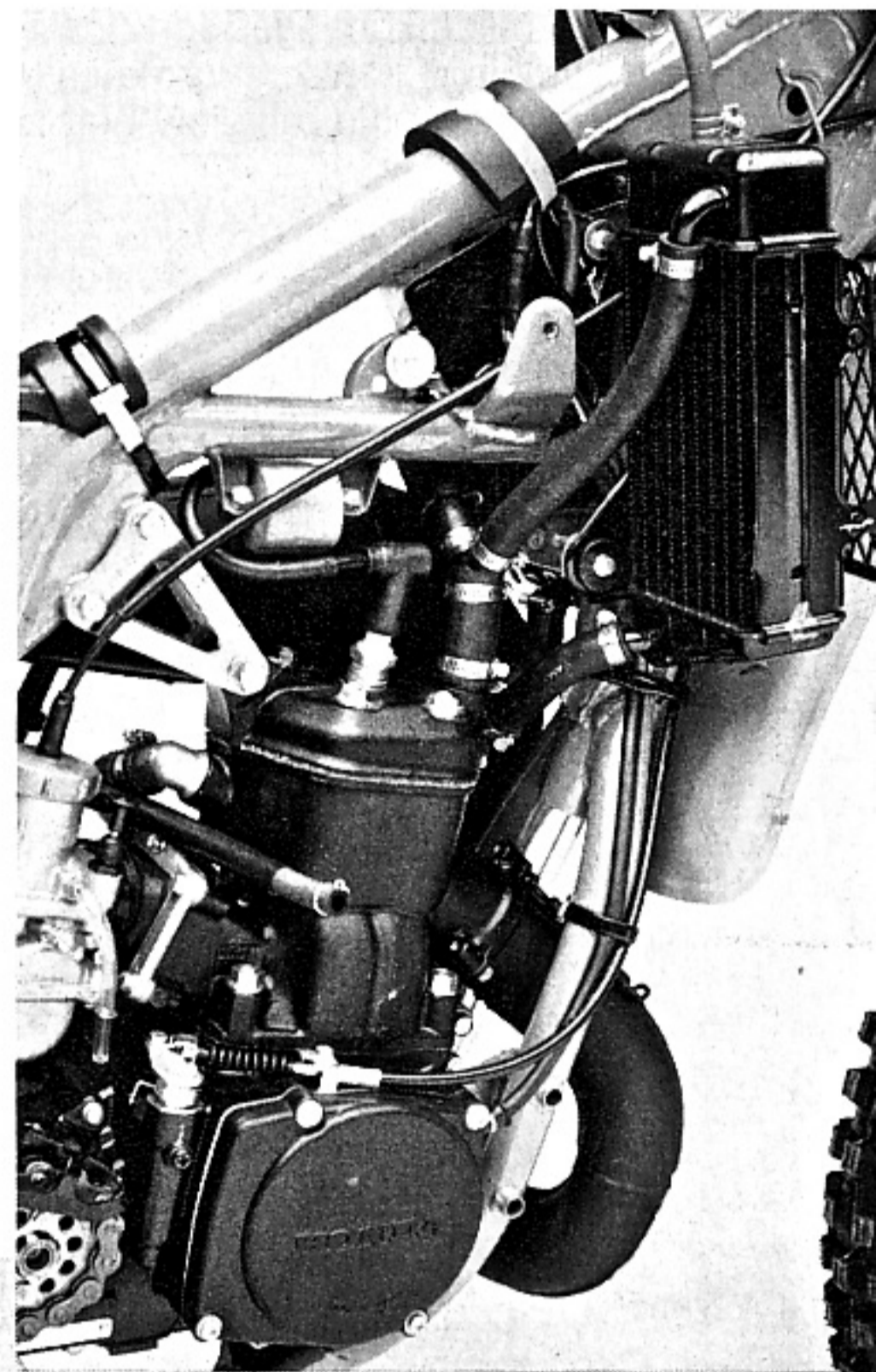
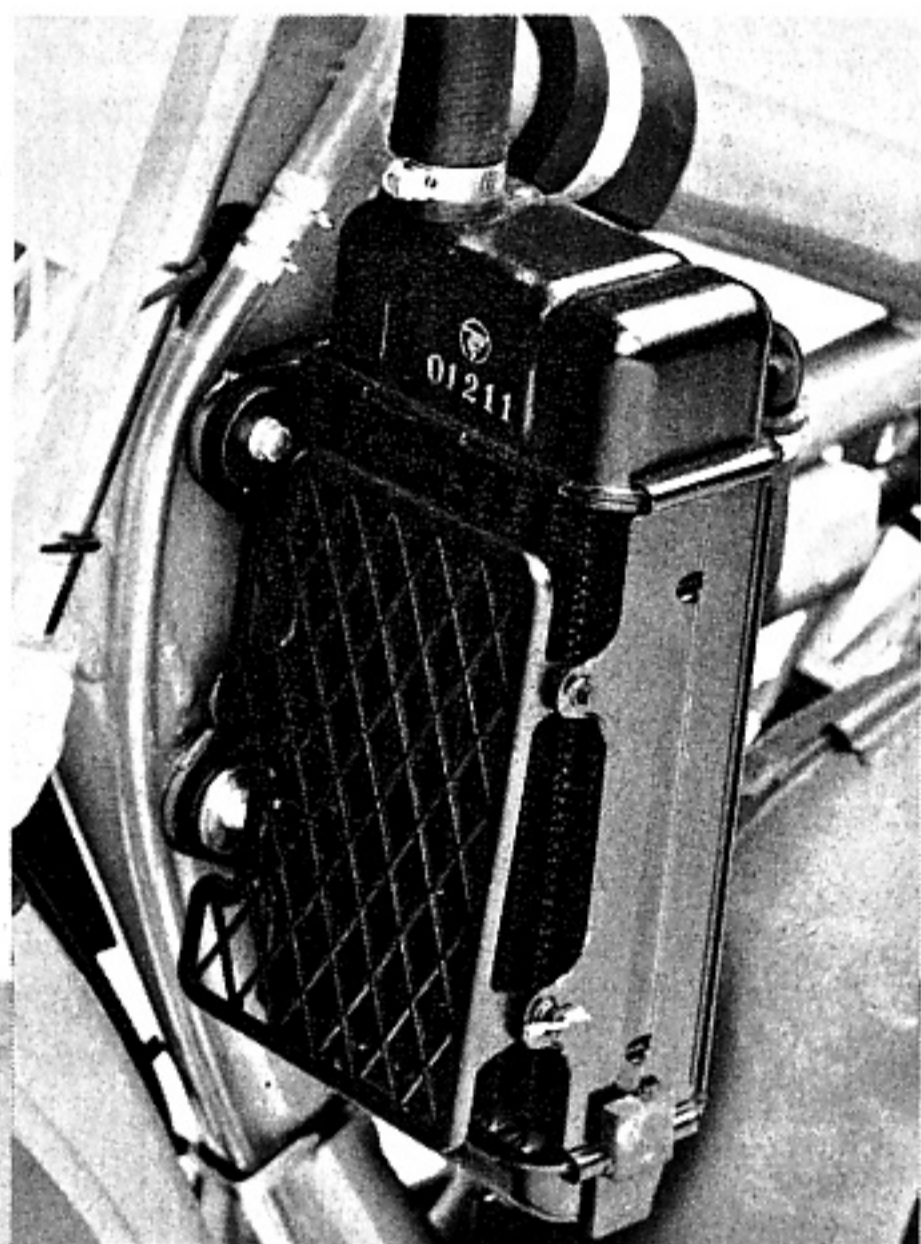
damping instead of rebound damping. The rebound damping rate built into the shock is similar to the number two setting of the 1981 model, the setting selected as best by the average-weight '81 CR rider.

By offering adjustable compression damping, Honda allows the rider to fine-tune the rear suspension's compression speed to suit rough or smooth tracks. Other systems typically force you to change the motorcycle's all-important ride height by altering spring preload to overcome frequent rear suspension bottoming. This new feature, however, isn't meant to replace proper spring-rate selection. Again like the fork, the shock has three springs available.

The many changes to the CR's engine

*Radiators are mounted 60 millimeters lower than they were last year. To remove pressure from the radiator cap, Honda devised the Dual-Flow cooling system: water is now pumped to the top of each radiator instead of across in series as before.*

are intended to improve reliability as well as power output. The cylinder casting is unchanged, but the exterior is now painted black, in keeping with the new color scheme. The deeper cylinder head offers a slightly lower compression ratio, which was required, say Honda spokesmen, by the poorer-than-anticipated quality of pump gas. A new ignition, with more advance over the entire rpm range,



takes advantage of the lower compression ratio.

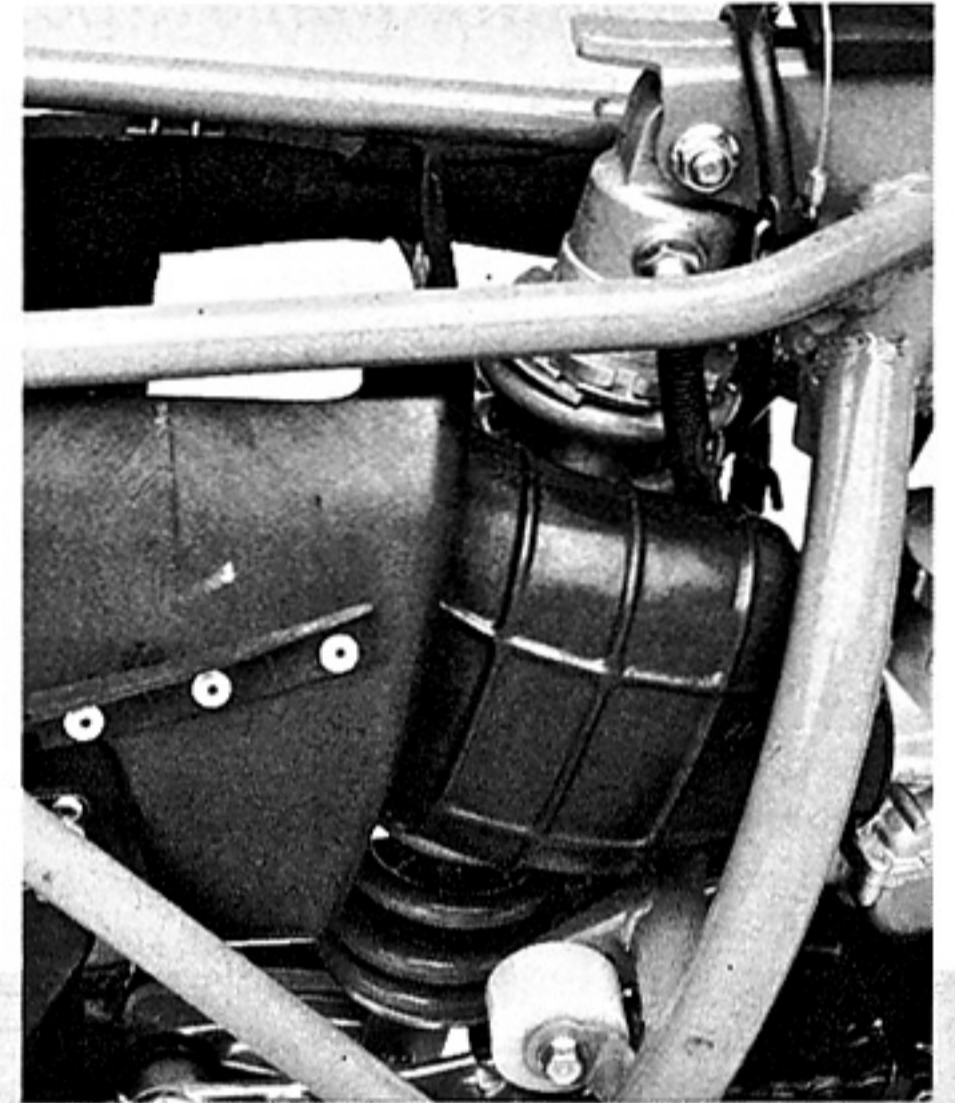
The modified expansion chamber produces a better power spread than last year's. It is now 113mm shorter and has a much larger mid-section, both in length and diameter. The bottom loop at the front of the pipe where it exits the cylinder is 40mm higher to prevent the pipe from bashing on the ground when the

suspension bottoms. Other performance-inspired changes include a lightened crank and a higher quality, enlarged airbox.

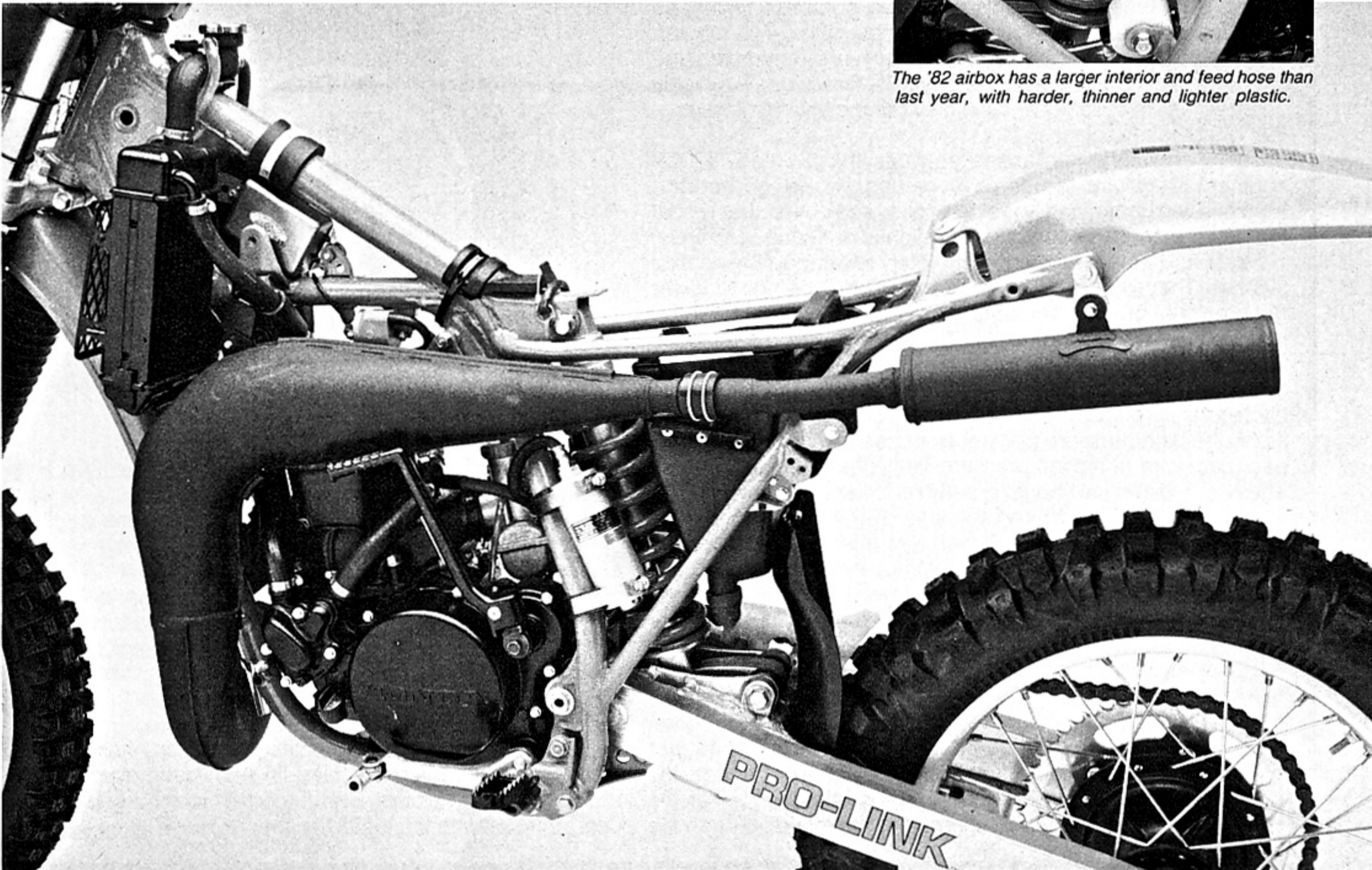
One look through the 1982 engine shows that Honda has strengthened many parts to alleviate old problems and prevent future ones. For years CR kick-start levers have followed common mounting methods: the externally splined

kick-start shaft has a groove cut around its circumference about half an inch from its outside end. The kick-start lever, internally splined where it fits over the shaft, has a bolt running through the side that fits across the groove on the shaft. When the bolt is tightened, it clamps the kick-start lever around the shaft and keeps the lever from sliding off the shaft. Occasionally, hefty kicking will cause the shaft to break at the groove. This year Honda fixed the problem by supplying a new shaft that doesn't have the groove and maintains a constant diameter to the end. Now a bolt that threads into the end of the shaft through its center secures the lever.

Honda also gave the clutch heavier springs and new friction discs. Instead of running straight out, the oil grooves that



*The '82 airbox has a larger interior and feed hose than last year, with harder, thinner and lighter plastic.*





*The CR tracks incredibly well in either hardpack or sand. The front end stays planted, allowing the rider to steer exactly where he wants to go.*

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are cut into the discs now run off the disc diagonally from the plate's center. By providing the oil an easier route off the plates, this redesign reduces the chance of clutch slip caused by oil buildup.

Enlarging the engagement slots for the gears' shifting dogs improved gear engagement. The '81 CRs' slots opened to 70 degrees of the gear face; this year they've been enlarged to 85 degrees. Better engagement should result in fewer missed shifts, because a reciprocal relationship causes missed shifts—that is, sloppy engagement wears the edges of the dogs, which in turn makes false neutrals more likely.

It's taken some fine detail work to cut weight from the CR. Reducing the weight while maintaining the durability of a ma-

chine that is subjected to as much abuse as a motocrosser takes a fine balancing act. A reduction in weight does lessen strain, so lighter parts, to a degree, need not be as strong as heavier ones—but it is a very subtle relationship. Honda has been able to get it right; that's apparent from one end of the CR to the other.

Three major pieces on the engine are considerably lighter than last year: the water pump cover is now a one-piece affair; the left case side cover is cast magnesium (and its width has been reduced by two millimeters); and the countershaft sprocket has several holes drilled in it to trim ounces.

Honda changed many key parts from steel to aluminum, among them the engine mounts, tank mounts, silencer mounts and the brake actuation arms. The only problem related to these

## **HONDA CR125R**

In motocross, nine-tenths is good, but usually not good enough. Such was the case last year with Honda's CR125R. It performed well, with excellent top-end power, very good steering and pretty decent suspension. Only trouble was, a couple of other bikes—the Suzuki and Yamaha—could stomp on the Honda to the tune of several seconds per lap. Close, Mr. Red Machine, but no banana.

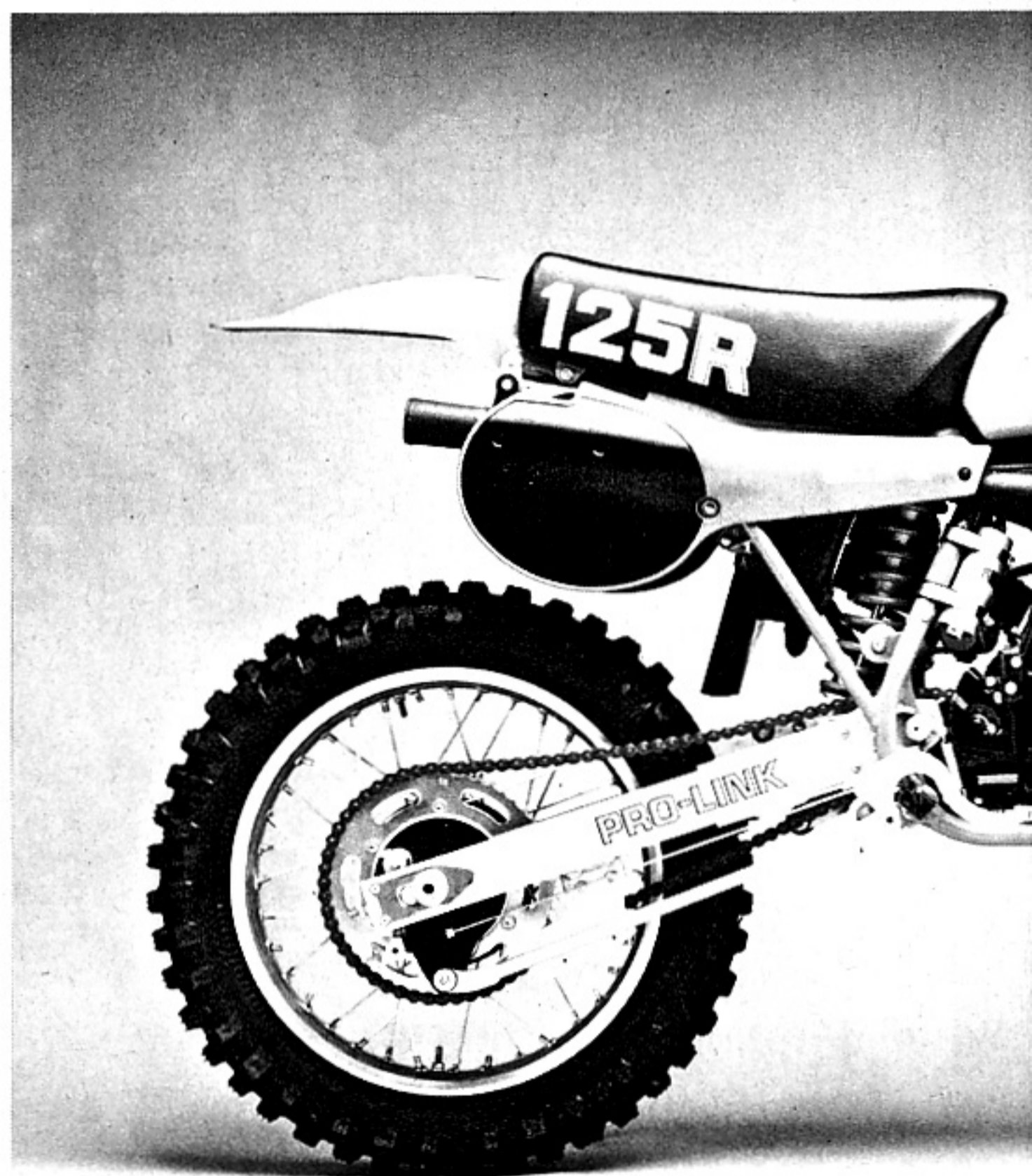
Things change. The people at Honda don't like losing, so they concentrated on the sub-par areas: mid-range power, and rear suspension. Just for good measure they also lightened the bike substantially. The result of their work is a highly competitive racer for the most highly competitive of classes—the 125 berserko class.

There are some similarities between the '81 and '82 CR engines. They use the same bore and stroke, carburetor, transmission gears, and left-side engine side cover. The rest of the powerplant has been updated slightly or changed entirely.

First off, Honda engineers completely revamped the cooling system. They dropped the radiators 60 millimeters to lower the center of gravity. Then they re-routed the coolant, directing an equal amount of the hot coolant to the top of each radiator at the same time, instead of in series as before when first one and then the other radiator dealt with the cooling chores. This reduces the load on the radiator cap because it stops the high pressure coolant from passing right below it. A new cap with a higher pressure limit has been fitted also. These modifications should greatly reduce coolant loss.

The folks at R&D figured the little 125 would also benefit from better cooling. The cylinder was fitted with a narrower water jacket that reduces the volume of coolant and, consequently, speeds up the coolant flow. The faster flow helps prevent steam bubbles from forming at the high temperature area around the exhaust port.

For all practical purposes, the Honda people tossed the old top end and designed a new head, cylinder, piston and crankcase. The head no longer has a squish-type combustion chamber; it's now an open-chamber type with slightly higher compression. The ignition timing is slightly retarded to help the engine live with the higher compression. The bottom of the intake port is 0.6 millimeter higher, and the intake skirt on the



piston is trimmed 2.4mm. Fuel passes to the intake port through a new plastic reed valve. The transfer area of the crankcase has been modified to create a smoother transfer of the intake charge from the cases to the transfer ports in the cylinder.

One of the most critical parts of a two-stroke is its expansion chamber. Honda refined the engine's power characteristics by welding up a new chamber, a shorter and fatter one, which helps spread the power. For those still dissatisfied with the powerband, Honda offers an alternative pipe, which is said to improve low- and mid-range power even more.

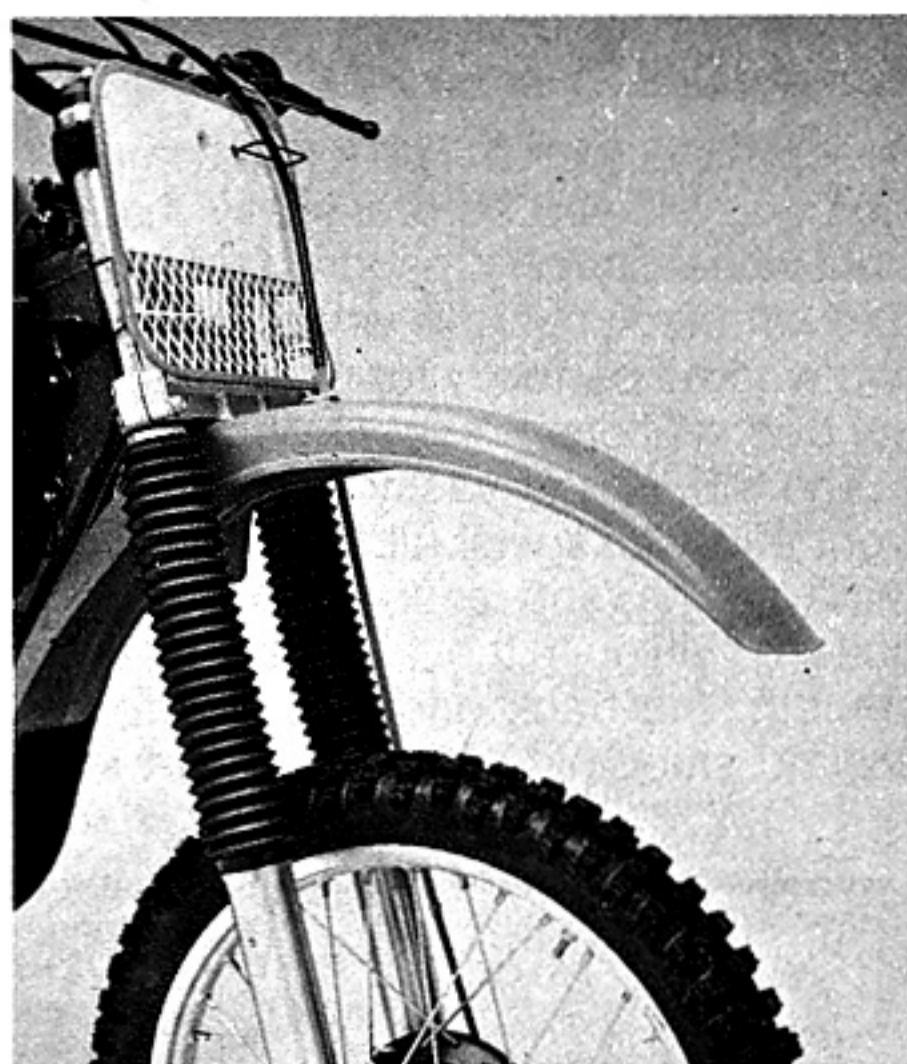
Honda cleverly removed weight from the crankshaft without disturbing the crankcase volume. A small plate is affixed to the crank where the weight was removed, which keeps the fuel charge from filling the added space.

changes involved the silencer mount. When our test CR fell on its left side, the mount failed. Aluminum will bend only so far before it breaks. A new part wasn't available for our test bike, so we attached a steel one from an '81 model. Note, though, that the bolt on the '82 CR is smaller; for the '81 part to fit properly we had to fit a small sleeve to the bolt hole on the mount. The next time the bike fell on that side, the mount bent, but we easily straightened it to its original position. Other weight-cutting areas include the rims, brakes and fuel tank.

And there are other notable modifications. Honda recontoured the shift lever to prevent a misplaced boot from shifting the bike, and gave the brake pedal a coil return spring to replace the hairpin-type spring, which clogged with mud and slowed the pedal's return.

If you think these changes might have altered the CR's performance, you're right. For the first time in years, Honda has offered a 250cc motocross machine that can set the standard. Riding the CR is a deceiving experience. It never feels as though it's near the edge until you get right to the balancing point between control and disaster. When you're on that fine line, the CR does nothing unexpected. No matter how you look at it, riding the Honda at your personal limit, whether you're a novice or pro, is an easy proposition. The CR makes your 110 percent feel like 85.

We found the CR worked best for 150-pound intermediate/experts with both front and rear compression damping adjusters set at their number two positions from full soft. At position one, both ends bottomed much too frequently. Number



The number plate was AMA legal last year, but hard to read; the updated plate is re-angled.



In another weight-saving bid, the engineers modified all the transmission shafts, which now have larger interior diameters. It's an expensive process to remove weight from the inside of shafts, but the reduction is substantial.

Honda made some other changes to the transmission, but with an aim to strengthening rather than lightening. The shift forks were refined modestly, and the clutch, which now uses seven plates rather than six, is more abuse resistant.

The final area of engine refinement concerned the airbox assembly. The '82 CR features a new air filter of higher quality than the '81 unit and a new airbox with better waterproofing. The air feed hose from the airbox to the carburetor is also larger than last year's, which helps increase the airflow to the engine.

As they did with their 250 and open-class bike, Honda

switched to a new adjustable damping system: all the bikes have three-way front and four-way rear compression damping adjustability. The 125's fork-tube diameter remains 38 millimeters.

Very importantly, the '82 CR features a fully updated rear suspension system. The fully extruded aluminum box-section swing arm is 0.6 inch longer than last year's, and the rear suspension offers a similar 0.6-inch increase in rear-wheel travel. The remote reservoir, aluminum-bodied shock has the same updated damping system as the other CR models.

Though the '81 CR handled very well, the '82 125's chassis nevertheless was thoroughly revamped. Frame geometry is radically changed. The '81 CR had rake and trail of 29.5 degrees and 4.8 inches and a 56.5-inch wheelbase. The new bike has a 26-degree rake, 3.9 inches of trail and a 56.1-inch wheelbase. The new numbers might make you think the '82 CR125R is skitterish. It isn't. It's very stable and has greatly improved handling.

The CR's wheels are both stronger and lighter. The rim material was improved, which allows Honda to use thinner, lighter, and yet stronger, hoops. The spokes are heavier gauge steel and have a shallower bend where they turn to meet the hub. This should also help the rims' overall durability and make it so the wheels require less maintenance. The rear axle diameter was increased from 17 to 20 millimeters, another modification to enhance reliability.

Don't think Honda forgot the chassis when they were thinking about trimming fat. Both front and rear brake backing plates are now cast magnesium, which is not only lighter but should also help the brakes resist water fade. Finally, last year's steel brake actuation rod is replaced by a cable, and the steel brake actuation levers are now aluminum.

Ergonomically, the '82 125 is more successful than last year's bike. The fuel tank is slimmer overall, and there's a new, very comfortable seat. The handlebar shape is similar, but the bar material is improved.

In racing, it's always a matter of refining proven designs to get into the winner's circle. That's what this year's CR125 is all about—refinement. For that reason you'll be seeing a fair share of red machinery in the winner's circle this year. ●

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three was too harsh. The fork's compression was slowed so drastically that the front wheel couldn't respond fast enough to even medium-sized whoops. Position two worked perfectly for us under a variety of conditions.

The steering is vastly improved. The front end sticks well all the time, something we haven't seen from Honda in quite a while. If the track is relatively smooth, the back end can be brought around smoothly when you want it to.

Berms are a snap—just pitch it in and turn; *boom*, and you're out on your way to the next one.

Power delivery is one of this year's CR250's strong points. It's lost none of its top-end punch—indeed, it's a horsepower up on the '81 bike above 6000 rpm—and paradoxically it feels stronger in the bottom-to-mid-range area. In fact, though, the '82 bike is down ever so slightly below 6000 rpm compared with last year's CR. The CR pulls incredibly well from down low anyway. The power never comes in unexpectedly, and when

it does, it is manageable. So good is the low end that we rarely had to fan the clutch to get things moving. Up top, the power drops off less suddenly than before, so you are penalized less for over-revving when there's no time to shift.

Yes, we like this Honda. It fits, stops well, has fine suspension, is reliable, reasonably light and steers terrifically. There are thousands of Honda dealers, so parts are readily available when you do need them. What's wrong? Well, the pipe mount did break after the CR fell on it. Nice work, Honda. ●

## Cycle TEST SPECIFICATIONS

Make and model ..... Honda CR250R  
Price, suggested retail (as of 6/8/82) ..... \$2048

### ENGINE

Type ..... Two-stroke, reed-valve-inducted, single cylinder; liquid-cooled  
Bore and stroke ..... 66.0 x 72.0mm (2.60 x 2.83 in.)  
Piston displacement ..... 249cc (15.2 cu. in.)  
Compression ratio ..... 7.4:1  
Carburetion ..... (1) Keihin 36mm round-slide  
Exhaust system ..... Upswept expansion chamber with silencer  
Ignition ..... Capacitor-discharge, external-rotor magneto  
Air filtration ..... Oiled foam  
Oil capacity ..... 0.8 qts. (0.8 l)  
Bhp @ rpm ..... 35.43 @ 8000  
Torque @ rpm ..... 25.30 @ 7000

### TRANSMISSION

Type ..... Six-speed, constant-mesh, wet clutch  
Primary drive ..... Straight-cut gears; 2.85:1  
Final drive ..... #520 chain, 14/54 sprockets; 3.86:1  
Gear ratios (transmission) ..... (1) 1.80 (2) 1.47 (3) 1.15 (4) 0.96 (5) 0.83

### CHASSIS

Type ..... Single-downtube, full-cradle, chrome-moly frame; box-section, aluminum swing arm  
Suspension, front ..... Leading-axle, air-assisted fork with 43mm tubes, three-way adjustable compression damping and 12.0 in. (305mm) of travel  
rear ..... (1) gas-charged, remote-reservoir shock absorber, adjustable for spring preload and compression damping, producing 11.7 in. (297mm) of rear-wheel travel  
Wheelbase ..... 58.7 in. (1491mm)  
Rake/trail ..... 27.5° / 4.3 in. (109mm)  
Brake, front ..... Cable-actuated, single-leading-shoe drum  
rear ..... Cable-actuated, single-leading-shoe drum  
Wheel, front ..... 1.60 x 21 aluminum alloy rim  
rear ..... 2.15 x 18 aluminum alloy rim  
Tire, front ..... 3.00 x 21 Bridgestone M21  
rear ..... 5.10 x 18 Bridgestone M22  
Seat height ..... 38.4 in. (975mm)

Ground clearance ..... 13.4 in. (340mm)  
Footpeg ground clearance ..... 16.7 in. (424mm)  
Fuel capacity ..... 2.0 gal. (7.8 l)  
Curb weight, with one gallon of gas ..... 235.0 lbs (106.6 kg)  
Test weight ..... 385.0 lbs (174.6 kg)

### CUSTOMER SERVICE CONTACT

American Honda Motor Co. Inc.  
100 W. Alondra Boulevard  
Gardena, CA 90247  
(213) 321-8680

