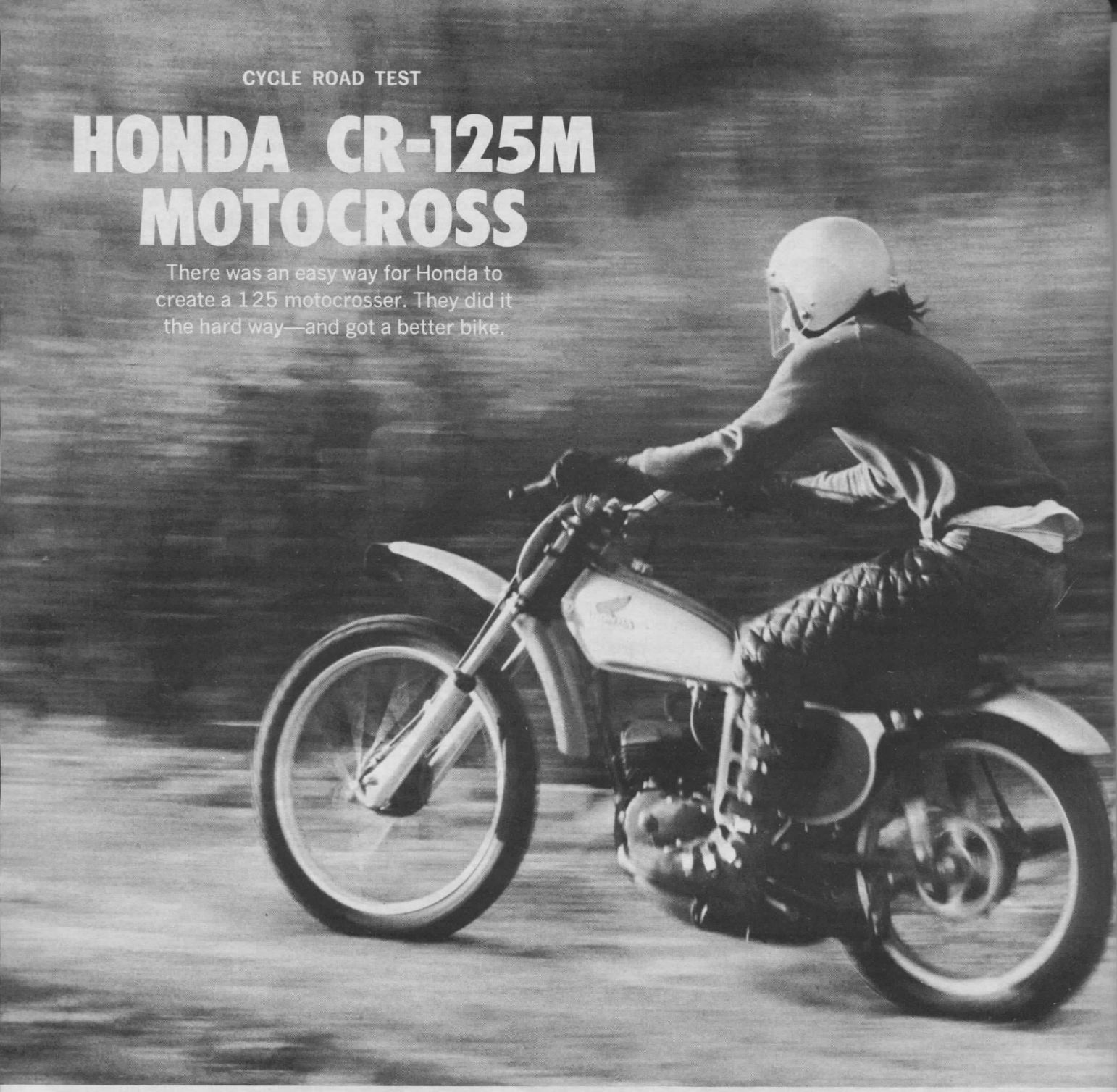
CYCLE ROAD TEST

HONDA CR-125M MOTOCROSS

There was an easy way for Honda to create a 125 motocrosser. They did it the hard way—and got a better bike.



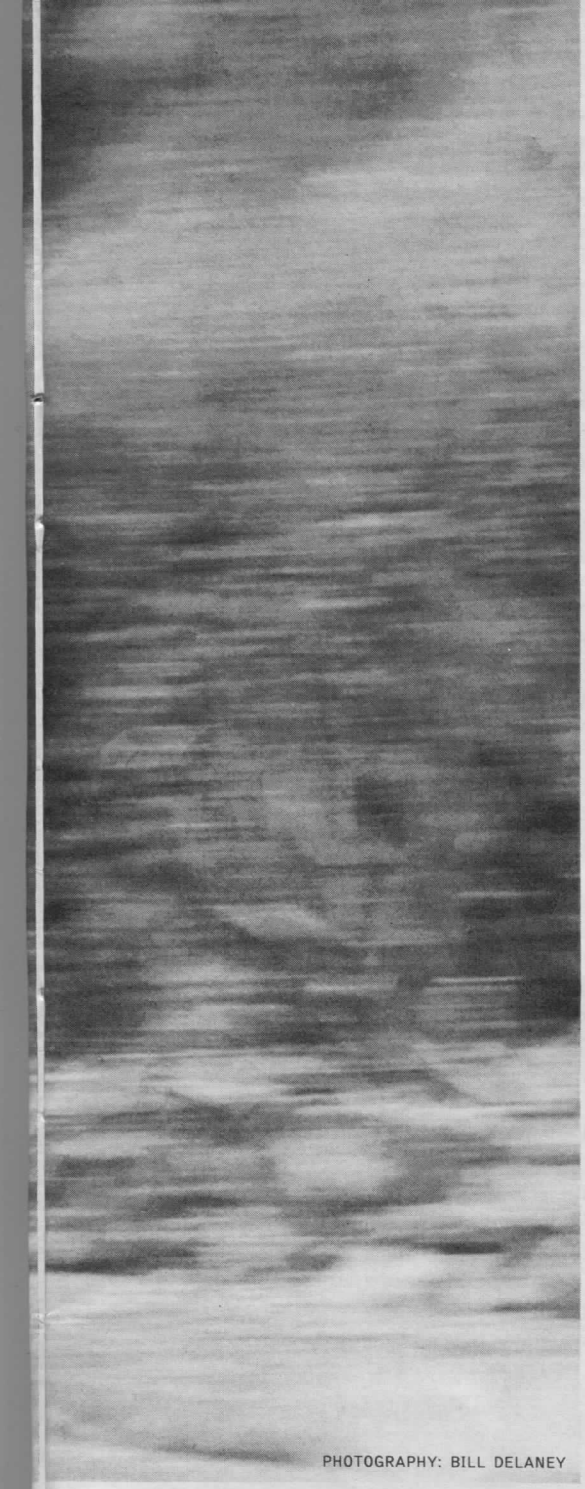
• When Honda designed their 125 motocrosser, they could simply have slipped a smaller cylinder on the 250 Elsinore. A lot of other manufacturers have done just that sort of thing. The result would have been an overweight and clumsy 125 with too many compromises in the power characteristics and gearbox.

Not long ago the status activity in amateur dirt racing was scrambles: the bigger the engine class, the greater the status. It cost manufacturers just as much to build a first-rate 125cc scrambler as it did to put together a 360, but the customers wouldn't pay as much. So the 125 class was made up of competitors who either bought and extensively modified the lightweight super-cheapies or shelled out for the ready-to-race models which were often the above-mentioned 250s with little cylinders. It all worked very well, though, for all competitors were in different but equally leaky boats. The homemade racers blew up a lot and on rough tracks the heavy ones beat their riders senseless. The advantage shifted drastically from track to track.

But now the big thing is motocross. Professionalism, with its money, has grafted greed to glamour and a motocross winner can live well on the fruit of this kind of labor. There is going to be a 125 class in the Motocross World Championships and motocross wins sell dirt bikes of all kinds. With such incentives, the 125cc motocrossers are going to become more highly specialized pieces of equipment. And the good ones are going to cost a lot of money.

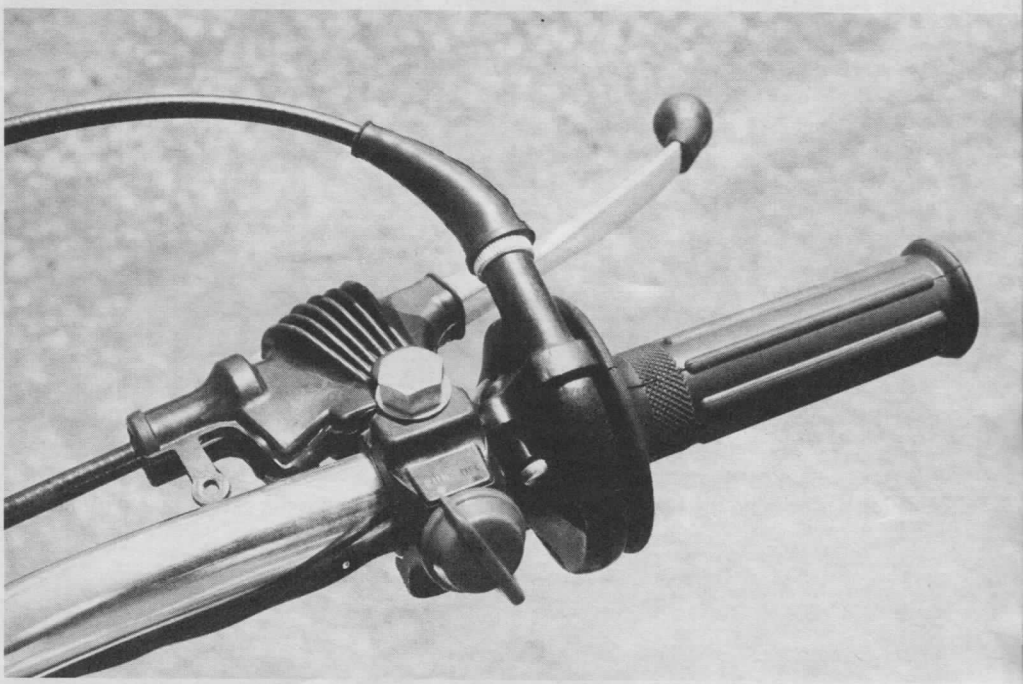
Honda is out to win races with the new CR-125M. After years of enduring the rather flabby image projected by their truly excellent but grey-flannel-souled street bikes, Honda has really bitten the bullet in bringing out these new motocrossers.

Like the 250 Elsinore, tested in the March issue, the 125 is a completely new bike. In no instance was a component used simply because it was available from some previous motorcycle.

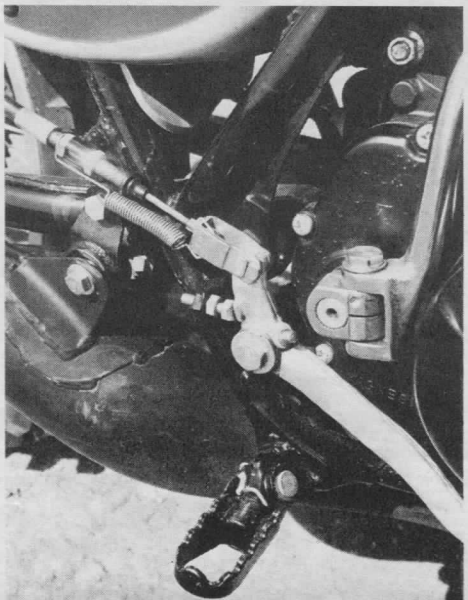


PHOTOGRAPHY: BILL DELANEY

The plastic number plates and rear fender form sides of air cleaner box. Rubber bands hold on the plates.



The frame is a collection of chromium-molybdenum steel tubes welded together, using the Metallic-Inert Gas process. Many engineering specifications are used to describe the properties of materials. When the specs for chrome-moly and a good quality carbon steel are compared, it is demonstrated that they will both bend the same distance when subjected to the same stress, but the chrome-moly will bend a lot farther and spring back to its original position where the carbon steel will remain bent. When chrome-moly is properly heat treated, it becomes incredibly more resilient. The Honda CR frames are not heat treated, but if they were, they would be virtually unbendable



The hand levers are formed out of very malleable alloy. We elbowed the brake lever and bent it right back.

Peg carriers are welded to the chrome-moly frame. Heavy peg damage would require careful rewelding.

and unbreakable. Someone is going to make a lot of money by building a furnace jig to heat-treat these frames.

The frame backbone tube, which largely determines steering head rigidity, is 38mm in diameter and has 2mm thick walls. A 32mm diameter downtube is massively gusseted to the bottom of the steering head and backbone. Both engine and swingarm are mounted in a cradle comprised of a pair of 19mm diameter tubes. The frame is a black-enameled work of art, ironmongery-wise.

Bridgestone introduces their new Motocross-6 (3.50 x 18) knobby tire on the rear aluminum alloy D.I.D. self-cleaning rim. One-eighth-inch diameter spokes with heavier butted ends lace the rim to a light weight cushionless hub which has the same brake diameter as the Honda 90s, 100s, and 125s have had for years, but are slightly wider. A nylon-lined cable connects the hub lever to the forged aluminum alloy foot pedal.

A pair of Showa model 360 shock absorbers with 4.1 inches of travel control rear wheel movement. The shocks have cooling fins cast into their bodies, control rod diameter is 10mm, mounting eye centers are 14.25 inches apart, and two separate springs with different load rates ride on four position adjusting rings. The damping assemblies can be maintained through simple screw-type cylinder tops.

Hollow tubing is used to fashion the rear axle in the interest of lightness, and the axle head is keyed to the swingarm so that it won't turn when the nut is loosened. Threaded axle adjusters with locknuts push back against the axle to make sure the assembly is secure.

Small 1/2x5/15 chain transfers power to the sprockets. Lightweight chain seems to function perfectly on the 125. The stock rear sprocket has 49 teeth and is steel. A substitution for an aluminum sprocket will probably be the only modification the purchaser of a CR-125M will make.

Plastic fenders of one specific polymer or another have been around for a few years, but most of them are actually fairly brittle. The rear fender on the CR-125M is the first bike we've seen which has a genuine Super Fender type material as standard equipment. Preston Petty makes this type fender for replacing stock fenders on other bikes. You can bend them double and they won't break. The fender's six-inch width catches most of the mud before it gets on the rider's back.

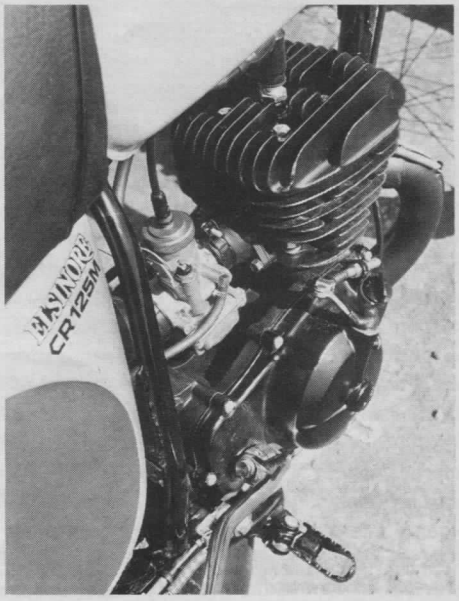
Four inches of rather stiff foam in the front of the seat tapers off to about two inches at the rear. The seat is extremely comfortable and its pebble-grain vinyl cover gives decent grip to leather pants in slicky old mud. The seat front is five inches wide so that it fits comfortably between the rider's legs and the seat/tank union is smooth.

Steel replaces the tough aluminum alloy used in the CR-250 tank, and the capacity is reduced by 0.2 gallons to 1.6 gallons. The tank is the same sleek shape, though there are no jagged edges anywhere to injure the rider on rough tracks. The filler cap is a smallish machined aluminum item which screws on well forward and offset to the right. The screw threads are quite coarse so that the cap tightens quickly and has little tendency to cross-thread. The filler hole diameter is $1^{3}/_{16}$-inch, if you remove the very sharp machining flash from the gasket surface. That means that the flexible spout on cheap gas cans has about $^{1}/_{8}$-inch clearance and the big flex spouts on the GI-type flat-sided cans will not fit. That's all just as well, though, for anyone would be out of his mind to fill the tank on a racing bike without using a wide-mouthed funnel with a fine screen for a filter. And the small cap prevents a lot of knee banging. The fuel valve is a very simple two-position device which is either all on or all off—none of that silly business of lining up the dots or figuring what *Zu* or *C* or *S* means in English when the race is about to start. Down is on and sideways is off. Removing three bolts with a 10mm wrench allows the tank to be removed in order to rinse it out or service the ignition components under the frame tube. Naturally, the tank is mounted in rubber shock absorbers to prevent vibration-induced leaks.

Completely new forks provide the front wheel with 7.1 inches of beautifully controlled travel. Stanchion-tube diameter is 4mm smaller than the 35mm O.D. ones used on the CR-250. And the hydraulic damping units are similar, but smaller Ceriani-types which use 160cc of Type A automatic transmission fluid in each leg. Top and bottom triple clamps are forged aluminum alloy, and the bottom one has double the clamping area of the top with two 8mm bolts at each side. The fork legs have relatively very little offset in front of the steering head: the necessary trail reduction being made by placing the wheel axle forward of the slider tube. This practice allows extra suspension travel without making the steering head too high. The fork rake is 30.5 degrees and the axle trail is set at 5.5 inches.

A Bridgestone Motocross-7 (2.75 x 21) knobby is mounted on a D.I.D. rim which has the same characteristics as the one on the rear. A single rim lock is used. The tiny hub and 12mm diameter axle complete the ultra light front end.

Chrome-moly is also used to form the handlebars. Serrations in the bars keep them



The CR-125M will dance over rough stuff; to really fly, you must use fully the six-speed gearbox because the 125 is only powerful within a narrow band.

from slipping in their mounts. The mounts are cast directly as one with the top triple clamp and this unfortunately places the bars directly over the tops of the fork tubes. Thus, the tubes cannot be raised in the triple clamp to change the steering geometry for fast courses with tight and flat turns. Forged very malleable aluminum alloy is used in the clutch and front brake controls. In a crash, we bent the brake lever down into a 90-degree kink and straightened it back with a box-end wrench. The bars never budged. An on/off safety switch is placed within easy reach of the throttle grip. The throttle grip itself is a special cast aluminum one which opens the slide completely in less than a quarter of a turn. The rider can completely control the throttle range within a normal amount of wrist movement.

The front fender is fashioned of the same super flexible plastic as the rear and has a wide rubber mud flap screwed to the front edge. A mud shield is available which fastens to the frame downtube to protect the cylinder fins on muddy courses.

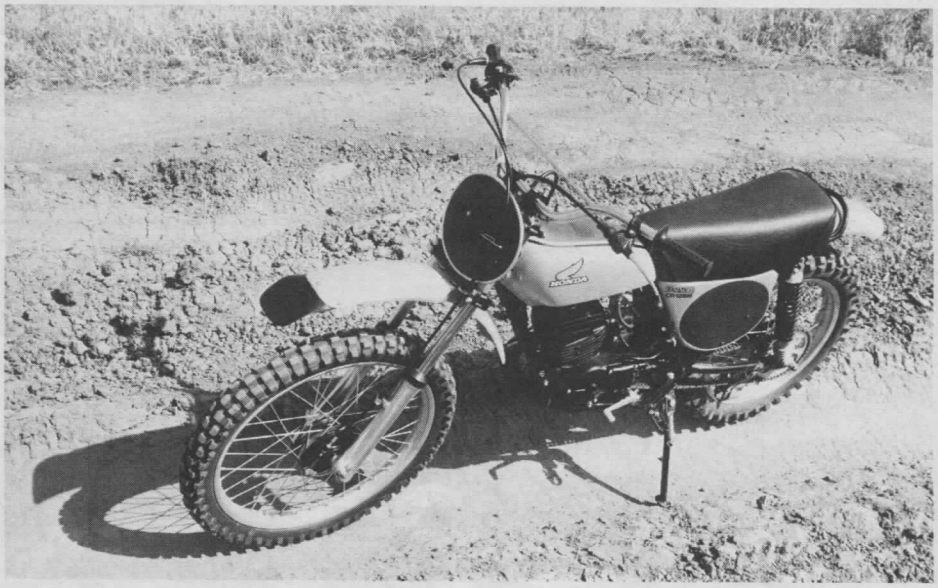
Full-folding spring-loaded footrests pivot back at the prescribed AMA angle and are of the open-bottomed variety so that they won't fill with mud. Unlike the pegs on the 250 Elsinore, the brackets on the 125 are welded directly to the frame. If a peg ever gets badly mangled, some welding and mending is going to be in order. Anyone having a chrome-moly frame welded should be sure that the welder knows that it's chrome-moly so he may select the correct type welding rod and then carefully stress-relieve the weld after it is finished. The pegs are placed relatively rearward so that it is very natural feeling to stand while crossing extremely rough sections.

For our first test session, we took the CR-125M to Muntz Motorcycle Park's motocross course. We try to take all our test bikes to a standard course, or stretch of road as the case may be, so that our perspective is as accurate as possible. Muntz's course had been changed this time, however. The long downhill plunge had been cut in half because too many novices were not successfully making the turn at the bottom. Despite the course alteration, we did get a good feel for the racer's nature and potential.

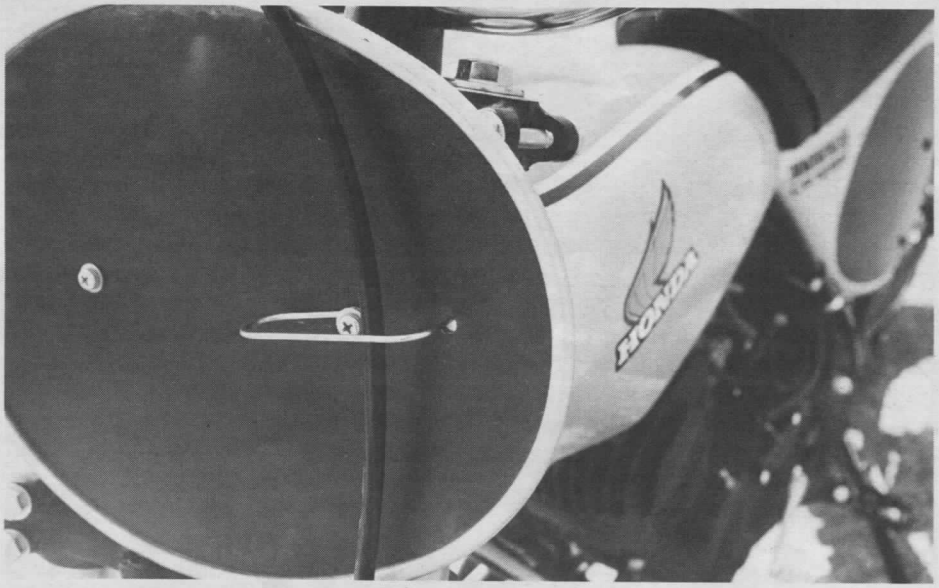
As with the 250 Elsinore, the 125 is easy to start. With the enriching device on the side of the carb pulled up, the second kick is all that's needed.

Clutch pull is extremely light and first gear is selected by pushing down on the left foot pedal. Clicking the throttle fully open and dumping the clutch produces a shower of clods out behind and you're under way in a great hurry. On level ground you must shift almost as fast as you can to keep the

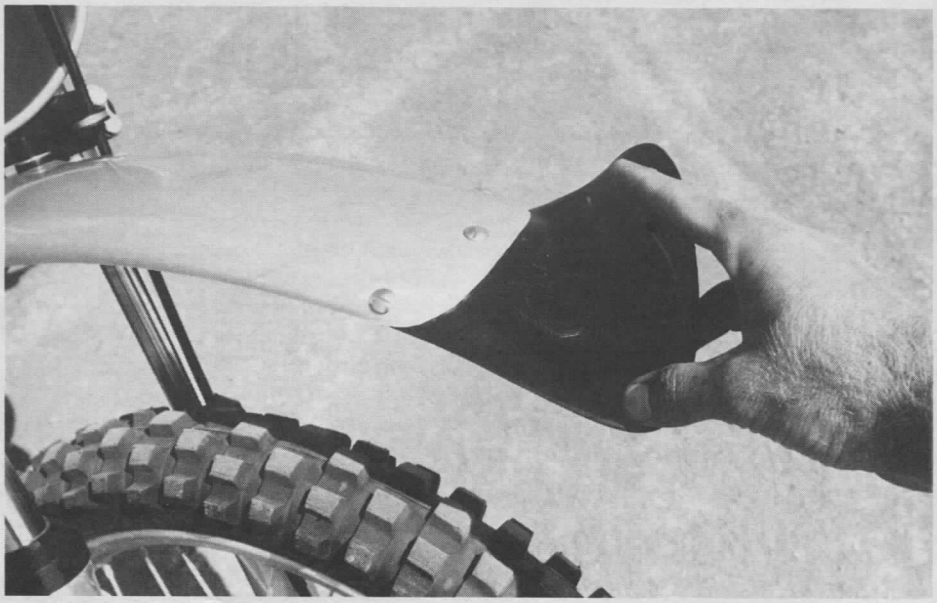
(Text cont'd. on p. 94; charts overleaf)



Honda has built a purposeful little racer which weighs 190 pounds and produces almost 17 hp.



The CR-125M is a complete racer, from number plates to cable stays to chrome-moly frame.



The CR-125 has Preston Petty type "Super Fenders" on the front and back; front carries wide rubber flap.

CR-125M *Continued from page 30*

engine from over-revving. The bike's weight is a mere 190 pounds, full of gas and ready to race, and the acceleration is deceptively quick. There is no tachometer, but the seat of your pants tells you exactly when it's time to shift. The bike felt extremely nimble and it seemed to ballet dance over some heavily rutted sections.

We wobbled around the track for about 15 minutes trying to get the knots worked out of our arms and get accustomed to the bike. It does not like to be ridden casually. We killed the engine a lot and fell off a couple of times before things started to feel natural. You have to get your blood hot and ride the CR-125M wide open at all times. It is a real professional racer and its engine is tuned as such. The bike is blindingly fast if you are in the right gear at the right time. As with all 125cc racers, there isn't a big fat powerband.

After we put several hours on the new engine, we lowered the carburetor needle from the standard second notch to the first (or top) notch. The engine then ran considerably cleaner when we were pulling out of a deep banked turn into a steep uphill climb. Before, the engine had tended to bog and now it would pull cleanly in second gear. There was not a hint of detonation from the engine. In fact, we later advanced the ignition timing from the setting of 1.5mm BTDC that was standard to a setting of 2mm BTDC. The engine ran more crisply yet and still without complaint. These settings were used to run the engine on the dynamometer and produced the figures on the data page. The only other change we would have tried would have been a slightly smaller main jet. A number 125 came in our bike and the spark plug looked slightly rich after a full throttle run. The components in the carburetor are different from any other we've seen and no alternate jets or needles were available when we tested the bike in early May. We figured that it would have been jetted perfectly with a 120 main jet.

As we started to say before, the CR-125M fairly dances over the track. Our tester weighs 160 pounds, suited up, and the rear shocks were just barely using their full four inches of travel with the preload adjuster set to the softest position. And the front forks seemed to just glide over the washboards. It was a new experience for us. With a suspension that good, and a bike that light, we were able to corner at considerably higher speeds than ever before on a motocross course. The limit for us on the new little Honda is somewhere yet to be found. It just seems to stick to the ground. Especially in tight corners, the bike's lightness allows it to turn the corner instead of sliding off the end of the track.

Back at the shop, the bike was cleaned thoroughly and we took the engine apart to check its construction and take a look at the maintenance procedures.

The two plastic number plates on the sides of the bike come off by unhooking rubber cords on their backsides. These plates and the rear fender form the sides of the air filter box. A single nut releases the filter element itself. The filter is a dual-material affair with normal open-cell polyurethane foam on the inside to catch the small particles and a peculiar orange fuzz on the outside to ward off the big chunks.

A rubber air horn connects the back of the filter to the Keihin racing carburetor. The instrument is machined from an aluminum alloy casting and it has a 28mm diameter venturi. Its slide is chrome-plated brass for prevention of corrosion and wear. The floats are made of a black closed-cell foam material which cannot spring leaks and a very elaborate shrouded well has been created around the main jet so that the fuel won't splash away from it when the wheels hit a rough section.

Another extremely flexible rubber stub connector couples the carb to the cylinder. Changing a jet, draining the float bowl, or adjusting the needle height requires only that the clamps on the ends of the carb be loosened and the carb body rotated a bit.

Upon removing the cylinder and head, we found that dowel bushings are used to locate them positively to each other and to the crankcase. This operation would cost you $50 in a machine shop and very few bikes already have it done. But the fulfillment of the purpose of the dowels is left up to the buyer of a CR-125M: the transfer port/crankcase match is quite poor and will require a few hours of patient hand labor to make right.

There is nothing really innovative about the cylinder porting itself. The exhaust port is bridged in the middle and its top portion, which is above the transfer ports, is widened to increase the area of the port which feels the main boost of the reflected wave from the expansion chamber. We first saw this system on a Bultaco roadracer cylinder in 1964. The iron liner is cast into the cylinder with a special bonding agent which creates a thermal bridge between the iron and aluminum. Though the port design is very accurately machined into the liner, a lot of aluminum residue from the process almost completely masks the painstakingly created channels. There's another two horsepower in that cylinder for someone to gain simply by a little careful matching and extending some obvious original design lines.

The transfer ports are the same general design and shape as the paired five-port system pioneered in Yamaha cylinders. There is no fancy inlet port directing as there was in the CR-250.

A special etched surface on the piston allows it to retain lubrication in the resulting microscopic pores. The piston rings have the tapered top surface as developed for Suzuki to utilize cylinder gas pressure for greater sealing at high rpm. The rings are actually quite heavy and we would say that they are operating at very near their maximum piston speed. This piston and

ring group is designed more for durability derived from heat resistance than for maximum power development.

A Kokusan magnetically-triggered capacitive discharge ignition system is mounted on the left end of the crankshaft. To check the timing, marks on the rotating magnet and stator are aligned and the piston position is measured with a dial indicator screwed into the spark plug hole. We used this method to adjust the timing as mentioned earlier in the test. When we inquired of Honda as to the timing specs, the telex from Japan said that the spark should occur at 18 crankshaft degrees BTDC at 6,000 rpm. It seems that there's an electronic spark advance in the system and that should be checked at the specified rpm. We couldn't get a tachometer rigged up, so we stuck with our method.

The crankcases come apart amazingly quick and easy. A rotor puller from our CB-350 tool kit was the only special tool we needed to completely strip the engine. And the only tricky part about disassembly was that the clutch actuating shaft and its lever must be withdrawn from the primary-drive cover before the cover can be taken off. With an air-powered impact wrench, the engine drive gear and clutch hub nuts come off without any holders. With the 13 Phillips-head screws removed which hold the cases together, the left side case half can be tapped off with a plastic mallet.

A very compact little crankshaft is only 87mm in diameter and it is supported by ball bearing assemblies having 62mm O.D.

The beautiful six speed gearbox is the same indirect type as all lightweight Hondas, with the clutch driving the mainshaft and the output sprocket mounted on the layshaft. But there are two selector forks controlling sliding dogs on the layshaft and one on the mainshaft.

There are two types of gear engagement used: one with meshing dogs and one with dogs entering slots in adjoining pinions. The latter type being employed on second, third, and fourth gears. The slots were rather chewed up at the edges on the second and third gear pinions and the fourth gear was only polished. Most people only ease off on the throttle and shift without the clutch in motocrossing. We do. New owners of CR-125s should keep an eye on these second and third gear pinions and replace them before they get worn enough to cause escaping. The engine went back together as easily as it came apart. Dial indicator testing of crankshaft runout showed that the crankshaft hadn't been tweeked during our unofficial-method teardown.

From a construction and maintenance standpoint, the CR-125M is a winner. It certainly looks like a winner and if our seat-of-the-pants impression of its performance is as good as we think it is, the little nimble screamer will win lots of races in the hands of capable riders. And at a projected West Coast price of $740, it is the racing bargain of the year. ◉