

● DO YOU REMEMBER THE INTRODUCTION OF Suzuki's PE250 in 1977? Did you look at that bike, or maybe ride one, and say that's nice, but I'll wait for the big-bore PE? Have the years slipped by while you watched Kawasaki introduce the KDX, Yamaha boost the IT's displacement, Honda develop the XR, Can-Am extract more and more power from the Qualifier? Did you sigh when Suzuki introduced the PE175 and wonder why they developed the little bike before the open-classer?

For those of you who waited faithfully, the big Suzuki is here at last. And guess what: It's worth the wait. The 400 is more competitive in its class than the 250 and 175 were against their rivals during their first years of production. It's logical. Suzuki has developed all three PEs from the RMs, so the newly designed 400 benefits from extra years of knowledge gained on the motocross circuit.

But more than that lies behind the 400's success. Team Suzuki has become one of The Powers That Be on the National Enduro circuit and at the ISDT, and

PHOTOGRAPHY: DAVE HAWKINS, ROBIN RIGGS

they are an integral part of Suzuki's R&D effort. They contributed to the 400's production in many ways. John Morgan, Manager of Team Suzuki, called for the simultaneous development of a 175 and a 400 in 1977, shortly after Suzuki introduced the 250. For sales considerations Suzuki produced the 175 first, and it was not until April of 1979 that Morgan and company began to work on a 400. They gave a set of recommendations to Suzuki in Japan, listing the features they believed a National-level enduro bike should incorporate. Suzuki assembled a prototype in Japan and gave it to Morgan. His riders trounced it through the woods, and then suggested refinements. In the relatively short span of one year, the testers completed their job and the factory rolled production units off the assembly line—bikes which benefited from Suzuki's motocross and enduro riders' knowledge and experience.

As with any successful effort to produce a state-of-the-art race bike, some happy coincidences occurred, the re-

sults of which favored the designers. For instance, Morgan adamantly requested that the PE400 have primary kick-starting. Considering that request to be a high-priority item, Suzuki more or less had no choice but to develop the PE400 engine from the RM250; the RM400 engine does not have primary kick-starting, and extensive changes are required to convert it, which made it technically and financially impractical to modify the 417cc motocross powerplant.

A more feasible course of action was to punch out the RM250 engine. Enlarging its bore to 85mm (from 67mm) and keeping the same stroke (70mm) yielded a displacement of 397cc and required only minor changes. Suzuki modified the 250 by installing larger main bearings, and a heavier connecting rod and rod pin to handle the 400's extra power, and then installed larger crank flywheels to provide the PE with more flywheel inertia. The 400 uses the new T-model six-transfer-port cylinder and an RM250 reed-valve assembly, and it was a snap for

# SUZUKI PE400T

Suzuki has played the mix-and-match game once again, this time combining PE and RM components to build the 400 enduro.



## SUZUKI PE400T TEST

Suzuki to build a suitable pipe for the hybrid engine.

Though it was relatively easy, technologically speaking, to convert the 250 to a 400, a big-bore, short-stroke engine has apparently been an anathema to Suzuki's two-stroke designers. Suzuki transformed the RM250 to a long-stroke configuration (67 x 70mm bore and stroke) in the B-model year, and it's remained such ever since; the PE250 has used those dimensions since its introduction. The open-class RM had a 77 x 80mm bore and stroke as a 370 (1976-77), square 80 x 80mm dimensions as a 400 (1978) and an 80 x 83mm bore and stroke as a 417 (1979-80).

Team Suzuki's request for primary kick starting forced the factory to leave their standard design by the wayside. And

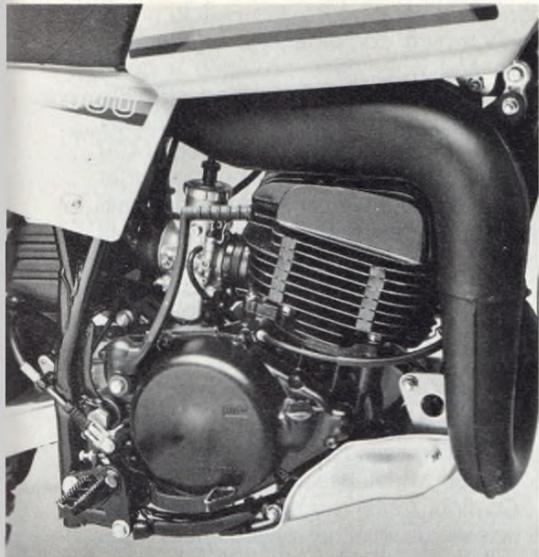
who could have foreseen the end result? Who would have guessed that Suzuki—when obliged to build a big-bore powerplant—would produce an engine superior to the long-stroker with which they have so much experience? The RM doesn't pull a full load on the dyno clearly below 3000 rpm, but the PE does, producing 4.43 and 8.30 horsepower at 2000 and 2500 rpm. From 3000 to 4500 rpm the two bikes develop about the same power. For a narrow part of the mid-range (4500 to 5000 rpm) the RM produces about 1.5 horsepower more than the enduro bike. From there to each bike's peak the PE runs away from the RM, pumping out 1.6 horsepower more at 5500 rpm up to 3.59 more at each bike's 7000 rpm peak.

Though the PE's maximum output is impressive, its power spread makes it a standout. The RM drops off after 7000

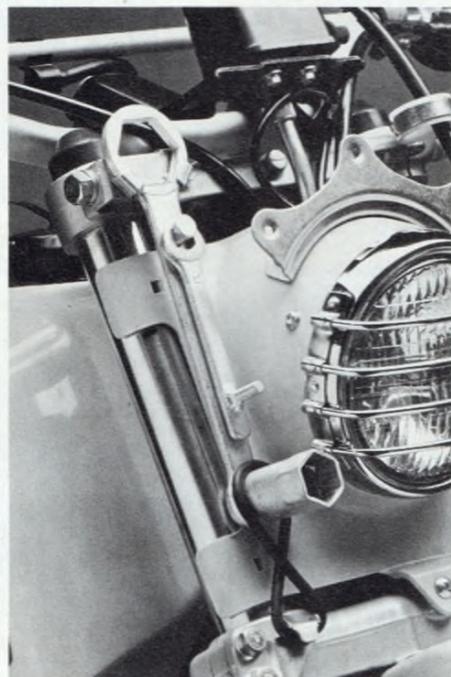
rpm—to 31 horsepower at 7500, 29 at 8000 and 24 at 8500. The PE hangs in there, producing 36, 37 and 32 horsepower at those rpm levels, which means the enduro bike generates well over 30 horsepower from 5500 to 8500 rpm. That makes the PE exceptionally easy to ride. Just twist the throttle and upshift a few times. The 400 rewards aggressiveness (it simply flies when you're in the heart of the powerband) but it doesn't penalize errors (shift early or late, or drop off the peak, and you're *still* flying).

In comparison to its class competition the PE fares just as well. It, the Kawasaki KDX400 and the Yamaha IT425G have nearly identical power outputs from 2000 to 6000 rpm, and none of them is a slouch. The Can-Am has significantly more mid-range poke than the PE (producing about three horsepower more between 4000 and 6000), but that's mainly





*Suzuki broke tradition with this big-bore, short-stroke engine. But the important thing is—it works.*



*With this tool you can change a plug, adjust the chain or bar, remove either wheel, the seat or tank.*

## SUZUKI PE400T TEST

because the Can-Am develops its best output at 6000 while the PE is still climbing toward its peak at that point. Indeed, the PE edges the Can-Am slightly in maximum output—37.69 to 37.33.

Again, though, it is the PE's broad power range and not its output at any one rpm level that makes it exceptional on paper and absolutely a ball on the trail. You can chug up to the bottom of a steep switch-back trail and slowly pick your path up it, or wind through first-gear forested trails without worrying about the engine faltering; the 400 pulls unhesitatingly from the bottom in either case. Along faster, two-track lanes, the 400 explodes from corner to corner. Anyone who loves wheelies will adore the 400's burst of upper-mid-range punch. On fast fireroads you can loft the front wheel in third or fourth gear and hold it up purely by virtue of power for hundreds of yards. Undoubtedly, the only people who will make purposeful use of the PE's top-end power are Two Day riders, and then only in Special Tests. For everyone else the 400 provides carnival-ride thrills, which are an equally valid justification for its existence.

To take advantage of the 400's powerband, Suzuki chose wide and tall gearing for the PE. Though the enduro bike uses

the RM's cases and general transmission design, it has its own primary, main-to-layshaft, and final-drive gear ratios. The primary and final-drive ratios are very high and more than offset the fairly low ratios in the five-speed gearbox. The PE's overall ratios produce a very wide speed spread in each gear and allow 90-mile-per-hour runs in fifth. You'll especially appreciate the power/gearing combination on tight trails which have only short straights connecting the corners. You can choose one of the middle gears, accelerate hard and gain 20 miles per hour, brake for the turn and do the same again, never bothering to shift.

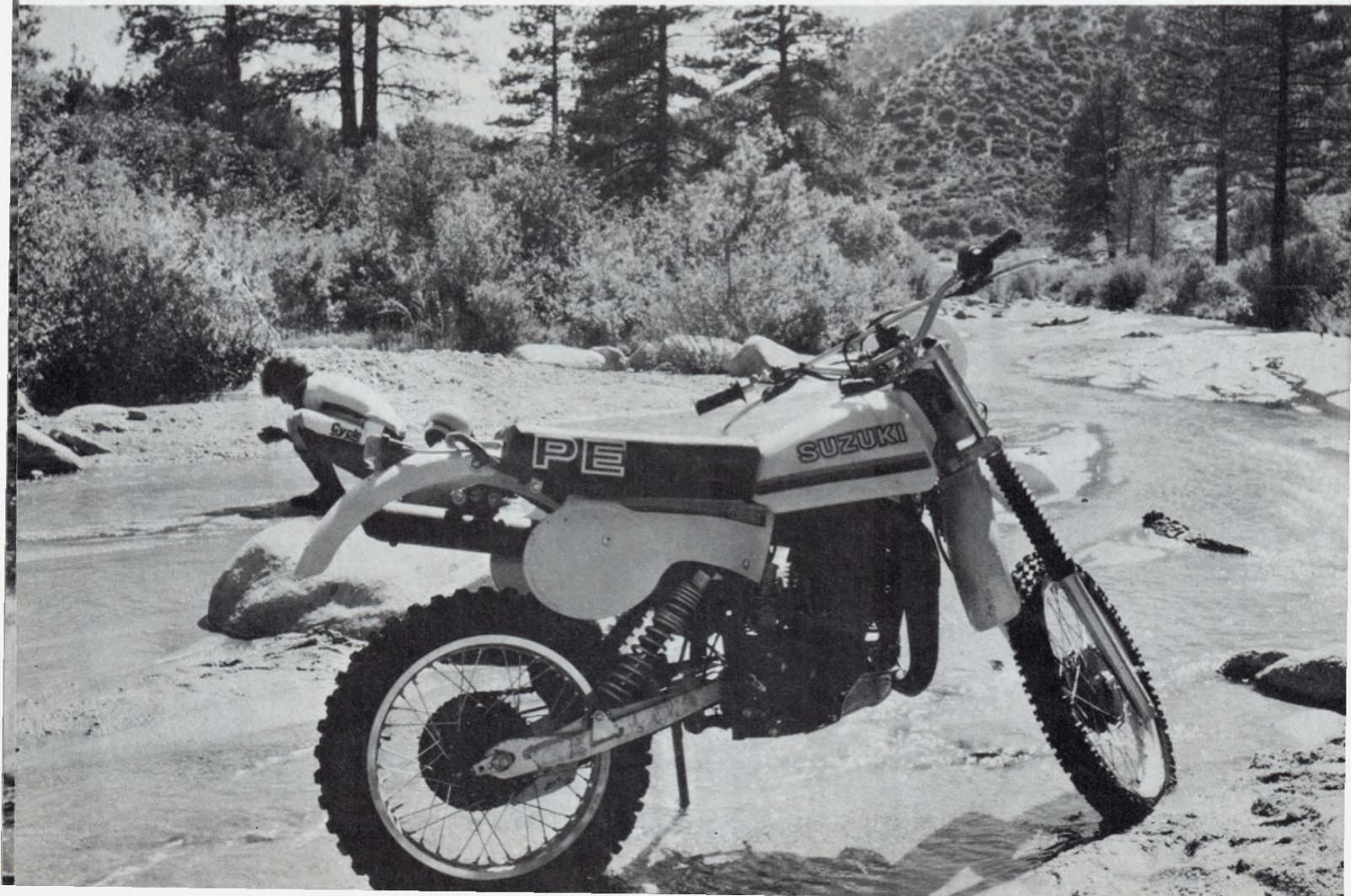
While good fortune may have played a part in Suzuki designing an excellent engine, the enduro team's trail-savvy alone contributed to their success with the chassis. On the basis of their experience with the PE250 (which closely resembles the 400), Team Suzuki offered the factory suggestions about frame geometry, suspension requirements and several highly functional detail items. In making their recommendations, the R&D-racers were in an enviable position: they could pick and choose from the latest technology developed by the factory for the RM motocrossers and utilize the latest refinements they had originated for the PE175 and 250.

Having modified PE250s for competi-

tion for several years, the Suzuki riders knew which combinations of steering rake and wheelbase provided a good balance between high-speed stability and steering precision. It wasn't entirely by coincidence that the RM250/400 frame produced just the dimensions that the enduro team recommended; after all, the R&D people responsible for the RMs look for the same balance in handling. Suzuki updated the RM frame substantially in the N-model year (1979) by reducing the rake to 29 degrees and by relocating the shock mounts. The PE uses that modified chrome-moly frame and a needle-bearing-mounted aluminum box-section swing arm, which produce a 57.5-inch wheelbase.

On tight trails you can steer the 400 precisely, using either a light touch on the handlebar or a little body English. In either case, the PE responds quickly but predictably, thanks to its fairly steep rake and neutral steering characteristics. On fast trails the chassis' stability and the engine's glut of power allow slides worthy of a half-miler. You can control your slide with the throttle while the rear end stays kicked out in perfect control.

Enduro riders do not need quite as much suspension travel as motocrossers do and they need lower seat heights, so Suzuki logically used PE250 suspension components rather than RM units for the



400. The PE fork has 36mm tubes in place of the RM's 38mm legs, and it produces about two inches less wheel travel, but like the RM it's air-assisted. Charged with 13 psi air and with 10-weight oil filled to 170mm below the top of the fork tubes, the front suspension provides a fairly comfortable low-speed ride and rarely bottoms at high speed. It does not function quite as fluidly as a Husqvarna or Can-Am fork at low speed (you definitely feel the small bumps through the bar), but that hardly affects your ability to maintain a 24 mph average.

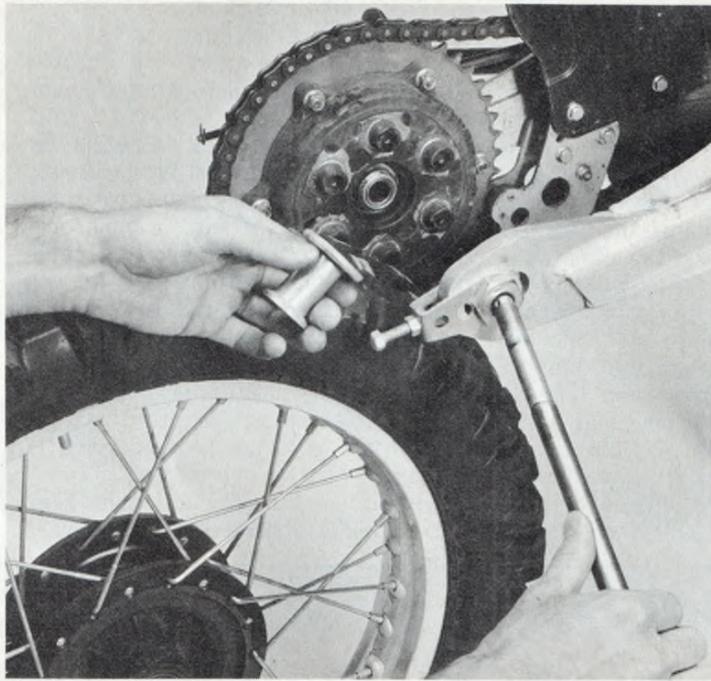
The 400 uses shocks very similar to the PE250's. While the 250 has dual-rate straight-wound springs, the 400 uses a straight-wound primary spring and a progressively wound secondary spring. You don't benefit much from the secondary spring, though, because it's only 2.9 inches long and it compresses about halfway just when you sit on the bike. When you're motoring along over fairly smooth trails, the rear suspension produces a ride of mediocre comfort—not nearly as smooth as a good system with progressive springing throughout the shocks' travel.

Though the springing is too stiff for truly comfortable low-speed work, it's just barely stiff enough overall to keep a 160-pound rider out of trouble when riding cross-country. Over high-speed whoops the rear suspension frequently but lightly bottoms; that indicates you're taking full advantage of the available wheel travel.

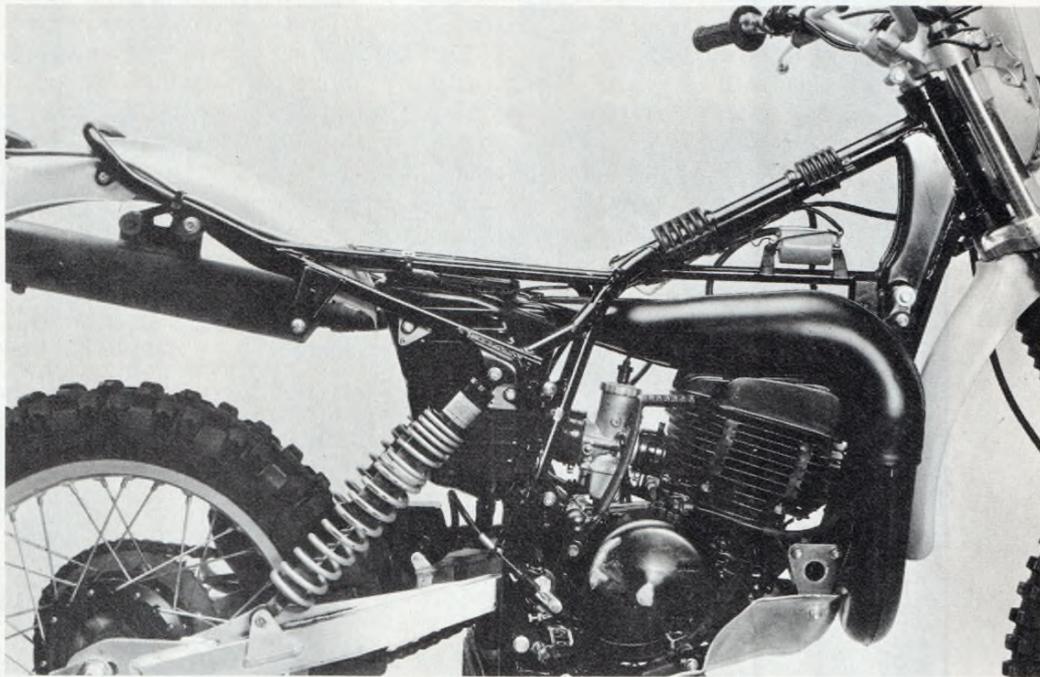
When the shocks are cold their damping complements the springing. As soon as they heat up, the damping—especially on the rebound—suffers. Over a lengthy set of whoops the shocks fade and the rear end feels spongy. Thankfully, the PE's inherent chassis stability saves it from any high-speed gyrations, even when the shocks are misbehaving. When the rear suspension bottoms, the PE continues on a straight path; similarly, even after the shocks have faded, the 400 refuses to side-hop.

The PE's stability is particularly noteworthy in light of its heavy weight—268 pounds. Heavy machines typically tend to bounce around a lot at high speed, particularly if their suspension isn't the best. The PE weighs very nearly the same as the Kawasaki and has comparable suspension, but it's more stable than the KDX over rough ground. Indeed, it's as rock-steady as the Yamaha IT (also 268 pounds) and the 255-pound Can-Am, which weighs a little less but which has much better suspension.

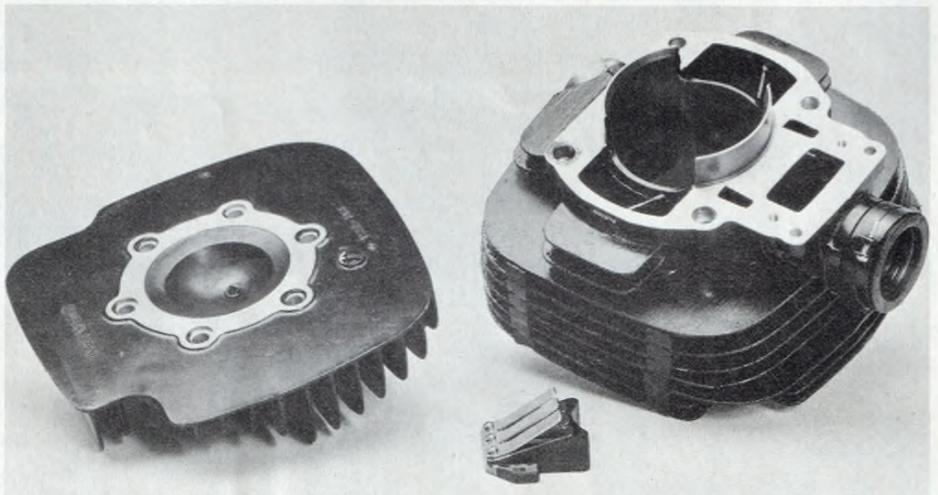
Suzuki naturally took advantage of some clever design touches developed by Team Suzuki in competition. The PE features the new quick-change rear wheel, which the 175 and 250 also use. Competition riders value the speed with which they can change a rear tire, and sport riders benefit from the convenience



*Simplicity: unscrew the axle, remove a one-piece spacer, and the wheel slides off.*



*The PE uses an RM frame modified slightly to accommodate such items as a skid plate, waterproof airbox.*



*Cylinder/head are standard except for a tiny four-mm port above the exhaust port which eases kick-starting.*

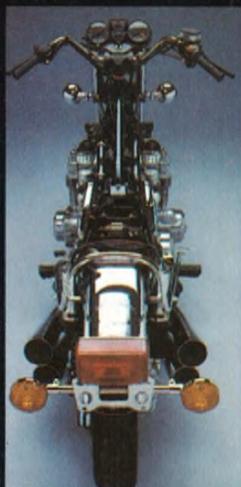




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*This Month's Cover:* Even before the winter snows of '80 begin to fly in Dorset, Vermont, and other places of tropical clime in New England, the 1981 model-year has arrived on the wheels of Honda's 16-valve, air-suspension, shaft-drive CB900 Custom. Meanwhile, back in California, Robin Riggs turned on his medium-sand desert-background wind before pulling this clicker. "I have only one thing to say," he goes / he goes (*sic*). "Tell everyone the test begins on page 28."