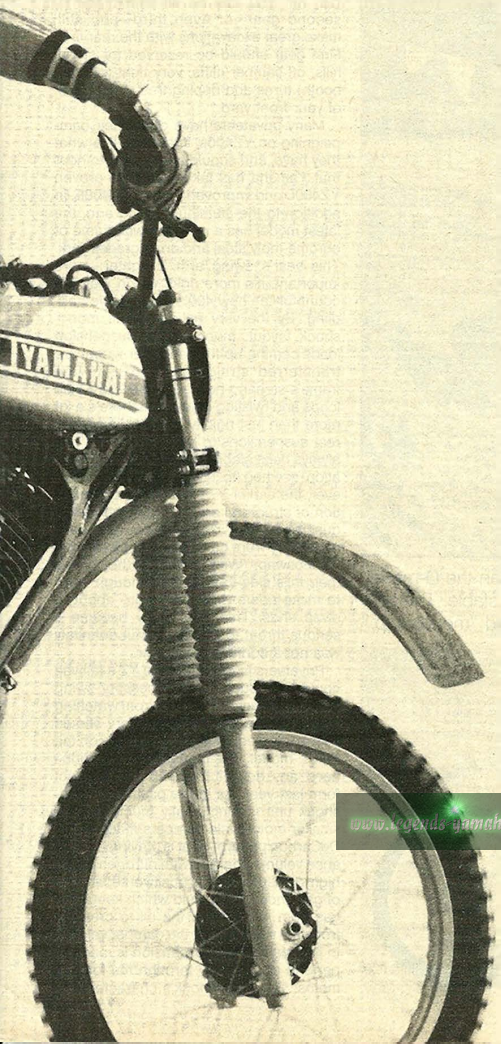
YAMAHA YZ400E

The D-model's thunderous power has been united with a reworked suspension. Result? The new YZ400E, an open class weapon that handles like a 250.



● AT YAMAHA, THE SUSPENSION REVOLUTION has come of age. Bob Hannah and Mike Bell raced in the 1977 Trans-AMA Series with stock YZ400E forks on their works bikes, and they wouldn't have done that unless the stock Yamaha fork had become a more or less State-of-the-Art item.

Now Yamaha's motocross models for 1978 have been introduced, and whatever impact they have in competition they'll deal a heavy blow to accessory dealers throughout America. How, for example, do you sell the new Yamaha owner one of those trick, box-section aluminum swing arms when it's a standard feature on the latest series 125, 250 and 400 YZs?

The Yamaha YZ-Es are an improvement, and that's saying something because last year's D-models proved to be race-winners even in completely stock trim. Hannah raced a production-line bike in some of the stadium events, dominated the motos, and then auctioned off his bike. And why not? There were plenty more where it came from, and it wasn't going to create any after-sale service problems—being just about the only bike used by a factory team that could be fixed with parts from a local dealer's shelves.

Remember that Motorcycle Olympiad held last September? That competition included road racing, drag racing, short track and TT events—all totally alien territory for a Yamaha motocross machine. Yet, Bell and Hannah chose to compete in this improbable decathlon on stock YZ400s and came away with overall third and fourth places, respectively. There was a cross-country event included in the competition, work much more to the YZ400's liking; Hannah was the winner with Bell third. Hannah won again in the motocross event, and in that one Bell was second. Admittedly, these men will win, place or show on anything that doesn't collapse under them, but the fact is they *chose* to race the stock 400 when they almost certainly could have wheedled some very trick machinery out of their sponsors. Yamaha's works-prepared motocross weapons are far from being stockers, of course, but this Olympiad demanded durability and versatility, which the standard YZ400 delivered.

Unlike all the previous open-class mo-

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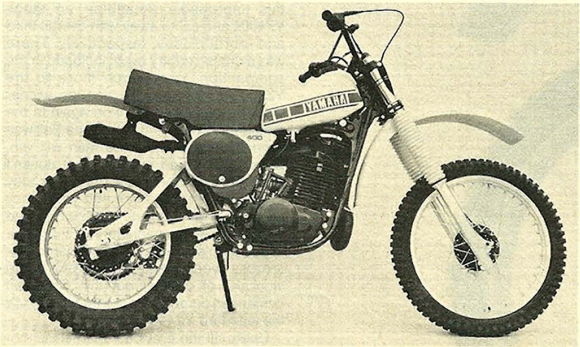
The fork has 20mm more tube/slider overlap than the D-model. This additional overlap makes the steering more stable. The new fork and swing arm has put an end to the old "monoswap."



tocross bikes we've encountered, the new Yamaha YZ400E actually is easy to ride. Big-bore machines we've ridden in the past have steered slowly, some even ponderously; all of them have just felt *huge*. That is not true of the YZ-E. You hop aboard this new 400, and nothing feels much different than it would on a good 250. At least the feel is the same when you and the bike are stationary; once you get under way there's no mistaking the engine size and no point in ignoring what it can do. You can do all your starts in second gear—or even third—and still make great excavations with the rear tire. First gear should be reserved for steep hills, off-camber cliffs, very tight (phone-booth) turns and ripping tree stumps out of your front yard.

Many privateers have done their campaigning on YZ400s, know and like what they have, and should be pleased to hear that Yamaha has taken the race-proven YZ400D and improved it into a YZ400E. In addition to the aluminum swing arm, the latest model has a new thin-wall frame of chrome-moly steel and an upgraded fork. This year's swing arm is lighter; more important, it's more rigid, which may account for the new 400's more stable handling. By the very nature of the mono-shock layout, much of the suspension loads coming up from the rear wheel are transferred straight forward into the frame's steering head. But there are side loads and twisting loads, and there's a lot more than just rigidity involved in getting rear suspensions to behave. The YZ has always been stable under power; acceleration seemed to steady the bike. However, the earlier YZs had some combination of structural and/or damping inadequacies in their rear suspensions; as a result they were cursed with the infamous "monoswap." With power off, they'd wag their tails side-to-side with enough vigor to make riders think they were about to swap ends. This wag rarely became a serious threat to stability, but it definitely was not a confidence-builder.

Privateers learned that the YZ's tailwag could be reduced with accessory swing arms, and Yamaha learned from watching the privateers that the accessory should be standard equipment—which it is on the new E-model. The monoshock unit didn't need any help; it reached near-perfect form last year. As in the past, the mono-shock unit is functionally much like the smaller motorcycle dampers made in the DeCarbon pattern—that is, having a clearance volume charged with nitrogen under high pressure, and a positive separation of gas and working fluid which keeps the gas from mixing with the oil to create a froth that would upset the damper valving. In this fashion the suspension is made to perform consistently through the longest motos. The monoshock's characteristics

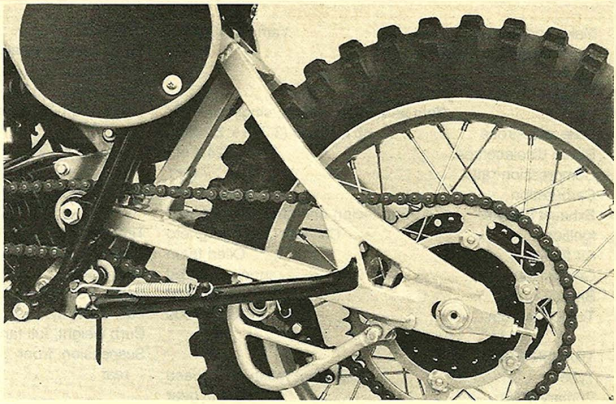
can be altered by changing the spring preload and also by adjusting the damping itself—the latter accomplished by turning a collar at the unit's forward end. You shouldn't have to do much adjusting after you've found settings agreeable with your riding style. Yamaha has added cooling fins around the monoshock body, and the damper valving has a thermostatic element to help keep the action constant at all working temperatures. The compensating thermostat was a feature developed for Yamaha's works bikes, and it is now being applied in the production version.

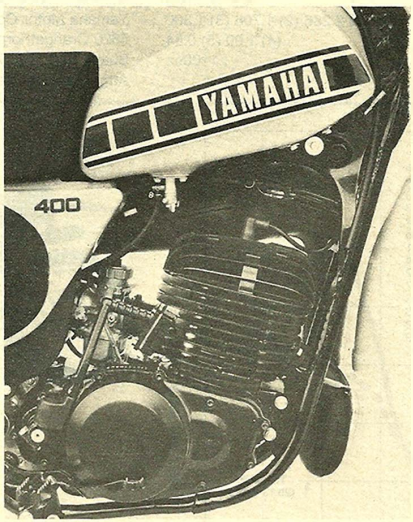
The monoshock's nitrogen charge, which acts as a helper spring, can be adjusted to different pressures (208.5 psi is recommended), but this work requires special tools. It is possible to disassemble the monoshock unit for a gas and oil change; if you find parts that need replacing while you're in there you may consider yourself out of luck. Yamaha doesn't stock these parts here in America, apparently feeling that no service beyond a cleaning and recharging should be required. They may be right: for the time we had our test bike the monoshock unit performed flawlessly, and we haven't heard many complaints from Yamaha's motocross customers.

A nice bonus benefit you get with the monoshock is that it makes the motorcycle's rear section narrower than the conventional suspension layout, whether the dual shocks are laid down or moved forward. Most of the other bikes on the market bulge at the side number plates to make room for the upper shock mounts; the Yamaha doesn't, and it doesn't ask its rider to have a cowboy's bowed legs before he can slide his weight back to take high-flier jumps.

For 1978, Yamaha has kept the same engine used in the D-model, which is fine with us. The big-bore Yamahas have not been what you'd call weaklings, and it was entirely proper that attention, and improvements, be directed at the bike's suspension. They still have a 38mm Mikuni carburetor feeding the big single through a six-petal reed valve, and the engine still starts and runs without fuss. The double-cradle frame that carries the engine looks the same as before, but now it has some chromium and molybdenum along with the steel in the frame tubes and in the large-diameter spine that encloses the monoshock unit.

Since the monoshock unit and its supports occupy the space above the engine, the YZ400E's expansion chamber cannot take the overhead, cross-over path followed by most other bikes' pipes. So the pipe has been tucked tightly in along the frame's left side, with a few dents and puckers to make it fit. These indentations are in theory a bad thing because they tend to confuse the waves rattling back and forth inside the chamber. In a 125, straining to deliver the ultimate inch-





The YZ400E has a new box-section swing arm and a tubular chain guide. The rear structure is stiffer and lighter than the D-type. The engine has remained the same but is still strong enough to win.

PHOTOGRAPHY: DAVE HAWKINS

Make and model	Yamaha YZ400E
Price, suggested retail	$1599

ENGINE

Type	Two stroke, air cooled, single cylinder
Bore and stroke	85 x 70mm (3.346 x 2.76 in.)
Piston displacement	397cc (24.2 in.)
Compression ratio	7.59:1
Carburetion	1; 36mm Mikuni
Exhaust system	Expansion chamber with silencer
Ignition	CDI Mitsubishi magneto
Air filtration	Oiled foam
Oil filtration	none required
Bhp @ rpm	41.03 @ 7500
Torque @ rpm	29.13 @ 7000

TRANSMISSION

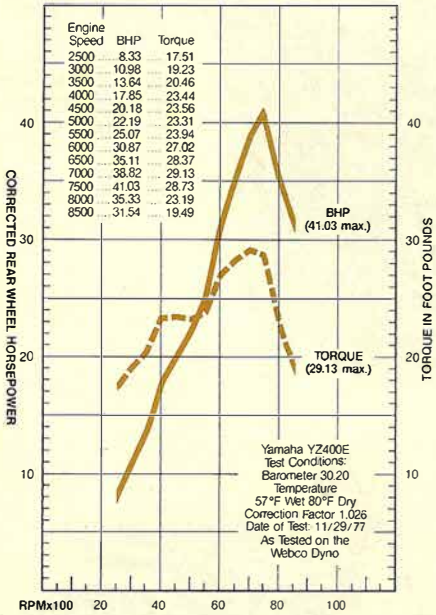
Type	Constant mesh, five speed
Primary drive	Helical gear
Final drive	⅝ x ¼ chain
Gear ratios, overall	(1) 2.286 (2) 1.706 (3) 1.300 (4) 1.00 (5) 0.84
Oil Capacity	1100cc

CHASSIS

Type: Tubular steel, double cradle

Wheelbase	1454.15 (57.25 in.)
Rake/Trail	30.5°/134mm (5.28 in.)
Brake and hub, front	Drum, conical, double shoe (leading/trailing)
rear	Drum, conical, double shoe (leading/trailing)
Wheel, front	DID shoulderless 160 x 21
rear	DID shoulderless 215 x 18
Tire, front	3.00 x 21 IRC motocross
rear	4.50 x 18 IRC motocross
Seat height	950mm (37.25 in.)
Ground clearance	304.8mm (2 in.)
Fuel capacity	7.6 lit (2 gal)
Curb weight, full tank	110 kg (242 lbs)
Suspension, front	telescopic air fork
rear	monoshock

Customer Service Contact
Yamaha Motor Corp., U.S.A.
6620 Orangethorpe Ave.
Buena Park, CA 90620
Attn: Customer Service



Responsive handling, a rigid frame and a narrow profile make the YZ a delight to fly—all 242 pounds of it.

ounce of torque, those dents would be a handicap. The YZ400E clearly can afford the slight loss of efficiency: the power it has, dents and all, is about as much as anyone can stand.

Even with the use of thinner chrome-moly stock in the frame, and a lot of light plastic in places like the ignition cover and air-box, the YZ400E weighs in at a portly 242 pounds. The main weight problem is the frame and monoshock unit. The frame backbone has holes punched in it, but it still has to be big enough to house the monoshock strut. Yamaha has made the whole structure sturdy enough so that the customer should not be forced into any mid-season welding. Don't plan to make your YZ400E, if you buy one, a lot lighter than it is: the bike may be a little hefty, but Yamaha hasn't been sloppy and left lumps of surplus material here and there. The bike is strong everywhere, and to get it lighter you probably would have to acid-etch the whole thing.

The YZ400E's seat is the deepest of any on the bikes we've ridden; the word for it is "plush." One complaint we heard about the YZ400D was that its seat broke down after some hard use. Our test bike's seat was soft when we got the bike and wasn't any different when we finished our testing, which may mean that a problem has been corrected or that we just didn't ride it far enough to collapse the seat. Anyway, we liked the seat, and we liked the way the tank and seat joined. The bike is nice and narrow there at the seat/tank juncture, which lets you slide forward to negotiate turns without getting snagged (ouch!) on sharp edges. The seat is long and broad enough to hold anyone; the tank holds slightly more than two gallons of fuel.

The YZ400E has basically the same air fork as last year's model, but with small improvements. The oil-damped fork is air pressurized and has rubber caps shrouding the air valves. If you want to keep these caps on the bike, instead of leaving them behind to become part of the track surface, you should tape them in place because they fall off easily. The mostly-invisible improvements in the fork make the YZ400E's front wheel stick better in turns, and with a little effort the bike can be made to corner as fast as any open-class machine. The E-model's fork has an additional 20mm of bearing surface between the fork tubes and the sliders. The extra length makes the fork stronger and keeps the sliders from becoming wobbly when the suspension is at full extension. Or so the theory goes, and there must be something in it because the Yamaha's fork does soak up all the nastiness common to motocross terrain.

Yamaha has fitted the YZ400E with IRC tires having the same knob pattern as Metzelers. Every section of the United States has its own traction problems, and its own optimum tires, but the IRC tires should work fairly well almost everywhere. They did the job on Southern California's slick, sun-baked adobe.

The YZ400E, like too many of its open-class counterparts, has a very stiff clutch lever. It's so rigid, in fact, that most riders will simply ignore the clutch and make shifts without it. We know of a simple, transmission-saving remedy: take off the clutch throw-out arm, saw it in half, and heli-arc into place a half-inch extension piece. The lengthened arm provides more leverage, and it softens the grip required up at the clutch lever enough to make this part of the YZ400 feel like a 125.

Another control in need of more leverage is the gear selector arm. The stubby forged-aluminum lever that's standard on the bike makes the shift action stiffer than it should be, and it asks the rider to make deliberate, forceful efforts when changing gears. Fortunately, the slightly longer shift arm from Yamaha's TT500 will bolt right on the YZ-E, and it does provide enough leverage to take all the hesitation out of shifting. This, and the lengthened clutch-actuating arm, are inexpensive modifications that make the YZ400 *much* nicer.

For us, the new YZ400E is really appealing—taken as a total package, and understanding that its small glitches are easily corrected. Racers can look at it as one of the few machines fast enough, in stock condition, to win. Novices, and people who just want a fast playtime motorcycle, will like the new YZ400E for being muscular but not hairy. You can take it to the local motocross track, and you could even use it as a trail bike. Certainly, given the YZ400's power, you'd be the King of the Cow-trailers. And the YZ400's durability has been proven in the California desert, which means it will run for miles flat-out and eat a ton of dust without immediately giving up the ghost. In short, it will do what you ask of it even if what you're asking is a share of the prize money in a motorcycle Olympiad. ◉