UP ON TWO WHEELS

YAMAHA SECA 750

Photos: Pat Brollier, Dale Boller

A U.S. product planning manager for Yamaha was in Japan last year putting the finishing touches on the Seca 750. He knew that this bike would be competing in the toughest street class in America—head-to-head against the swoopy Honda CB750F, the venerable Suzuki GS750 and the cat-quick Kawasaki 750. These bikes had established reputations the Yamaha would have to crack, and the planning manager knew there was only one sure way to do that in the eyes of enthusiasts—with performance. One more time he asked Mr. Morinaga, Director of Engineering on the Seca/Maxim engine series, if the Seca 750 would be fast enough. With typical restraint, Mr. Morinaga smiled faintly and said, "Don't worry about power. It will be No. 1."

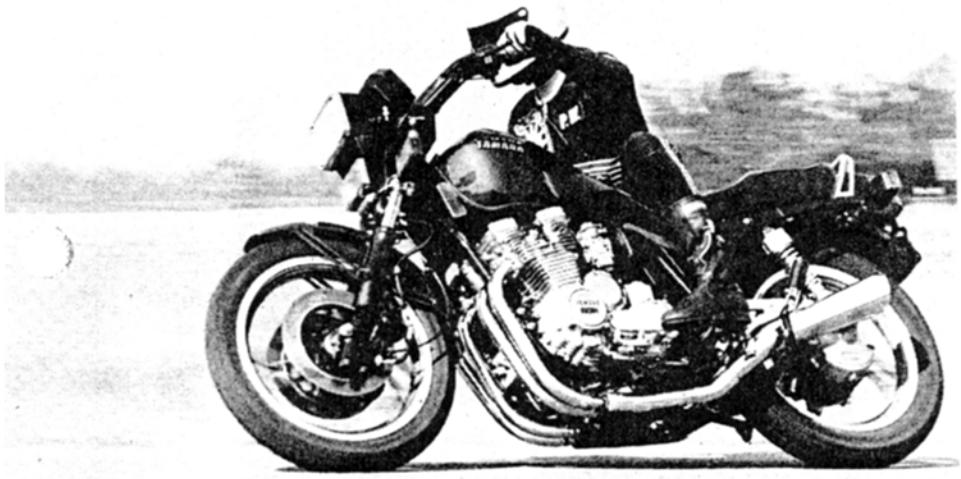
The engineer could have grinned broadly and tossed out some reassuring numbers, but he preferred to let the Americans find out for themselves just how fast the new Yamaha was. And find out we did at Orange County International Raceway, where our Seca ran a blistering *11.97 e.t.* to become the first production 750 to crack the elevens in the quarter-mile, and at the incredible trap speed of 111.24 mph to boot. When the other 750s are turning mid-twelves at 103-104 mph, a Yamaha in the elevens (both e.t. and mph) is doubly impressive, especially since the Seca has a power-robbing shaft drive as opposed to the highly efficient chain drives of the other 750s. Motorcycles first cracked 11 seconds only three years ago when a giant 1015cc Kawasaki Z1-R ran 11.95@110.25 mph—about the same as the 750 Seca in 1981.

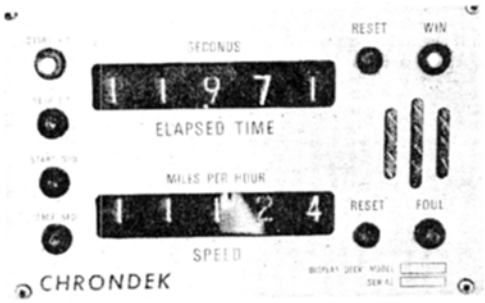
Suddenly everything else on the Seca becomes more significant because it's backed up with the best performance in the class. And there are plenty of other things to examine. Yamaha risked a lot of innovation and technology on the Seca. It's got an on-board computer, anti-dive braking, a radical new intake system and boldly untraditional styling. Some purists might rebel, claiming simpler is better. Critics might find fault in some of the systems. But these experiments will gain greater acceptance and respect attached to a motorcycle which delivers a strong set of basics: speed, power, handling and reliability. The Seca doesn't depend on its innovations to be successful; they merely add appeal, intrigue, status and, in the language of its computer, a big *byte* of the future.

The Seca's character is deceptive from the very beginning. It doesn't look light. But with a large five-gallon tank brimming, the scale tips just 518 pounds. Only the Kawasaki is lighter, and the Honda weighs 37 pounds more. The Seca doesn't look fast, but it easily tachs 9000 revs in 5th gear—about 125 mph, and the Chrondeks proved it has plenty of muscle. Again because of the shaft drive, it doesn't appear to be a handler. But because of neutral steering, good suspension, enough ground clearance, a rigid frame and fine tires, an experienced rider can keep up with any other 750 on a twisty road. However, he'll have to concentrate on maintaining a smooth rhythm to keep the shaft under control. No shafty will ever handle as well as an equivalent chain drive because of the shaft's rise-and-fall effect on the rear end. But Yamaha has managed to reduce this effect on the Seca so it handles within five to seven percent of any 750, and that makes it darn good.

Once on board there are more surprises. The Seca's unique lines and the upturned seat immediately raised eyebrows—had style once again compromised comfort? Not this time—the seating position feels entirely natural, with the saddle providing both comfort and room for maneuverability. The same applies for riding double. Once rolling, the Seca feels heavier than its 518 pounds . . . not bulky or ungainly, but there's no mistaking it for a 650.

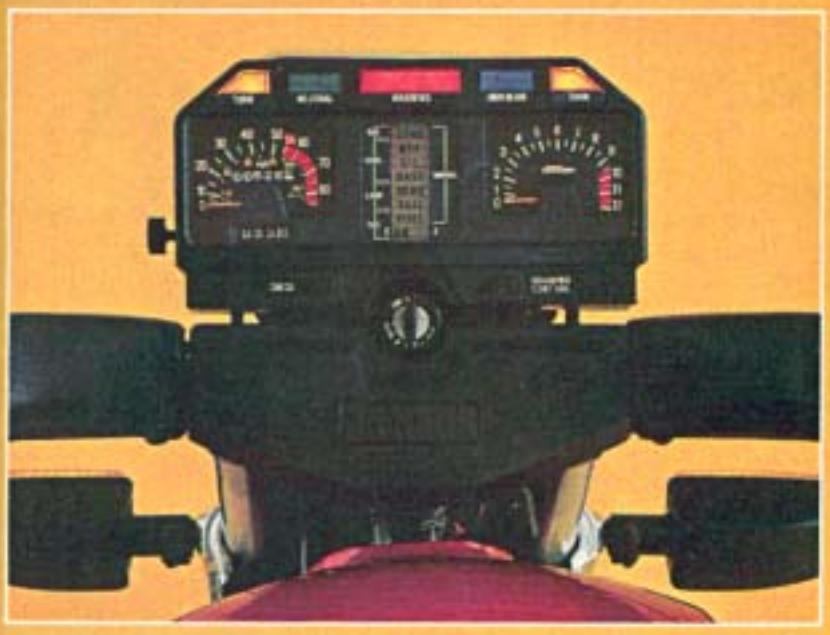
The engine runs smoothly and sounds



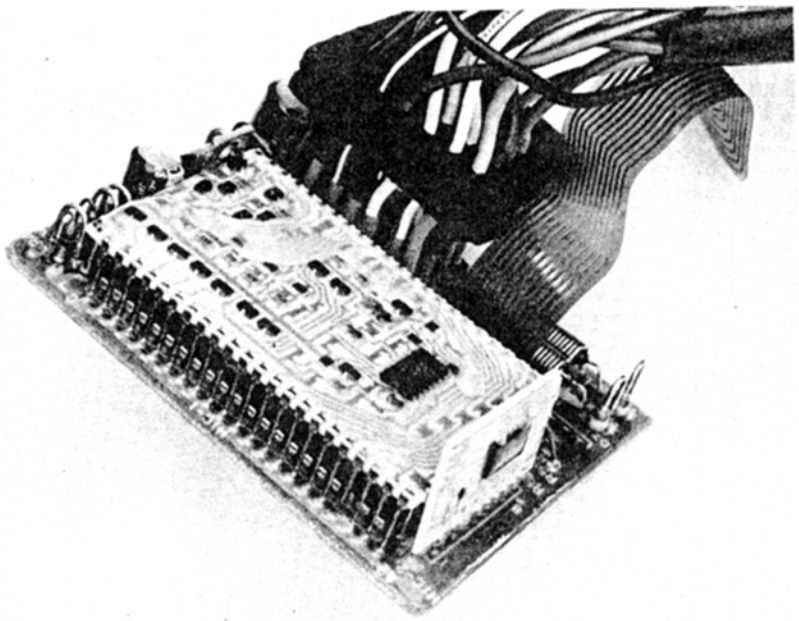


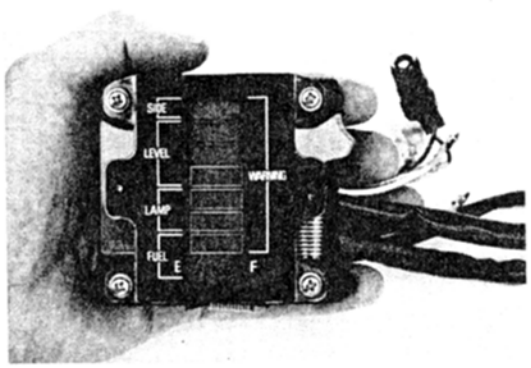
Named for the famous Laguna Seca roadrace course in California, Yamaha's hottest new model sports a microcomputer tucked neatly between the instruments. In a record performance at the drag strip, seven of the Seca's eight runs topped 110 mph. All eight clocked 12.1 or better. Fresh and daring looks merge custom styling with a standard riding position.

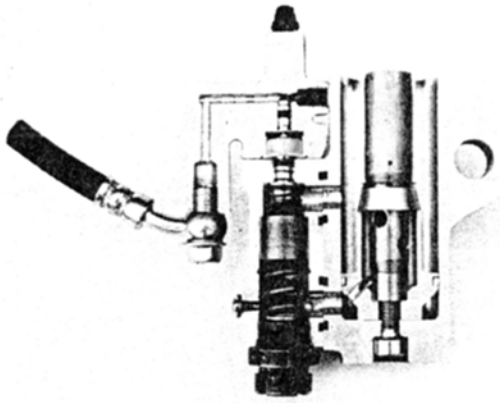
The Quickest 750 in Quarter-Mile History




YAMAHA







Most electrics on Japanese motorcycles are designed by outside companies, but four years ago, Yamaha started work on this computer and designed it totally in-house. The computer alerts the rider if critical components fail, so he can take quick action that may prevent bigger problems down the road. This important safety breakthrough is a Seca exclusive. So is the anti-dive front brake system (see cutaway) which reduces fork compression during heavy braking. However, we noticed only a minor difference in feel.

YAMAHA 750

throaty enough to warm your blood, but the powerband seemingly takes forever to ignite. The power that burns an 11.97 quarter-mile doesn't cut in until 7000 revs. In reality, the Seca pulls as hard on the bottom as any 750, but the powerband is so smooth that a strong sensation of acceleration is missing. Our Seca grew noticeably stronger in the midrange as break-in mileage accumulated. Above 7000 revs the Seca feels like a big-bore superbike—cocky, scrappy and ready for business.

On the open road it devours miles with eagerness and comfort. The engine is snoozing along at 4500 revs at 55 mph as the suspension routinely soaks up bumps. Freeway seams rock the Seca and potholes thump the rider, especially in back where there's extra unsprung weight from the shaft, but in general the open-road ride is excellent. It can be custom tailored softer or firmer with air forks in front and multi-position damping and preload on the shocks. If vibration seeps through from the solid-mount engine, a 2-3-mph change in road speed usually eliminates it. Both brakes deliver satisfactory feel and stopping power, and the rear drum has several advantages over a disc: it's lighter, less complicated and more effective in wet weather. The Seca can reel off a thousand miles a day with one eye shut—just the ticket for a fast weekend. Or add a fairing and saddlebags for elegant middleweight touring.

Our only serious complaint concerns drivetrain lash. Slack between the crankshaft and rear wheel (primarily in the gear dogs and driveline dampers) makes the Seca jerk forward when the throttle is turned on and bump against its own compression when the throttle is rolled off. Small flywheels, the abrupt response of CV carbs and the rise and fall of the shaft compound this effect, so it requires a deliberate effort to keep the Seca smooth in traffic. Other Seca flaws include too short handgrips, too few bungee cord hooks, non-coupled air caps and a rear gas tank mount that nearly defies reinstallation.

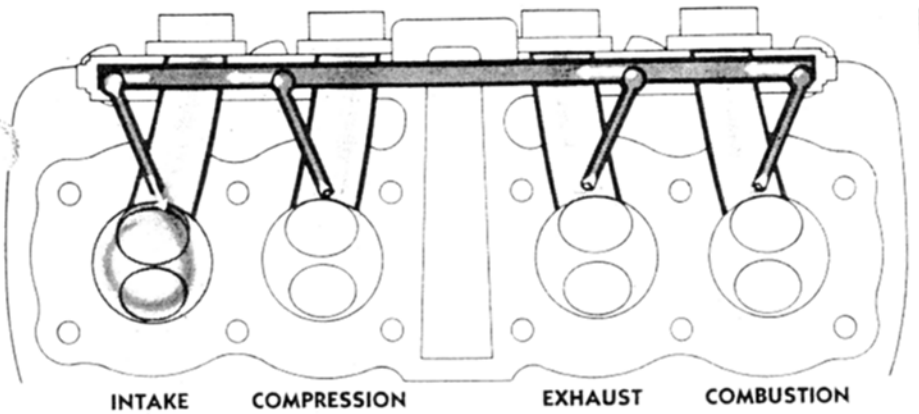
This new family of Yamaha engines debuted on the Maxim cruiser last year and features several tricks to reduce size and weight. For narrowness, the alternator spins behind the cylinder block, not on the end of the crank; the cam bearings are located more inboard; and the width of one crank cheek is saved by adding that weight to the primary-drive takeoff gear. For less length, Yamaha stacked the two transmission shafts and incorporated the shaft-drive transfer gear in the main engine cases, thus eliminating an entire jackshaft. The compact engine allows a shorter wheelbase, shorter seat height and concentrates the center of gravity lower, all of which aid handling. Yamaha claims 75 horsepower from this twin-cam 45-cubic-inch four that goes 125 mph and turns 11-second quarter-miles. All this with less displacement than one cylinder on a 400-cubic-inch V8!

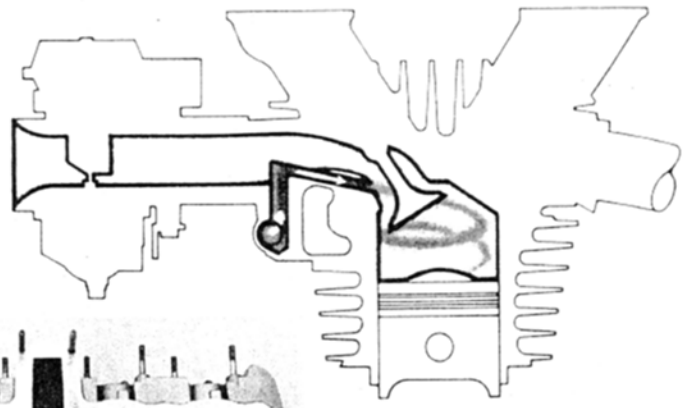
The Seca sports several chassis innovations as well. A NASA-designed computer analyzed stress points on the frame and pinpointed the proper location for strengthening gussets and engine mounts. The Seca's scimitar wheels got a similar analysis to ensure the strength of what was primarily a stylistic design. The result is fine mountain-road handling, limited slightly by the shaft and, for a few real chargers, by dragging undercarriage parts on the left.

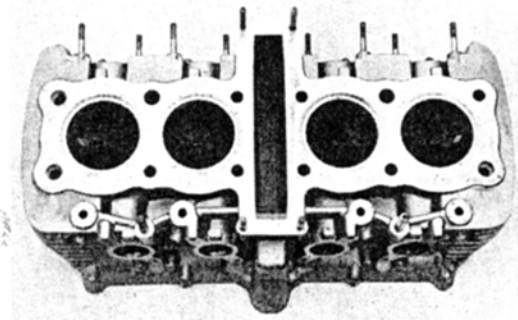
What about the Seca's breakthrough innovations? Well, there are several, beginning with the on-board computer. What it does from its location between the tach and speedo is monitor seven areas of the machine: the sidestand, brake fluid level, engine oil level, battery fluid level, headlight and taillight function and fuel level. If a change occurs in any of these areas, a red warning light begins flashing and a liquid crystal display spells out the area effected. For instance, if the taillight burns out, the computer senses a reduced current flow and activates the warning light. The computer scans the motorcycle constantly and is also programmed to check itself. The rider can call for a readout at any time simply by pushing a button.

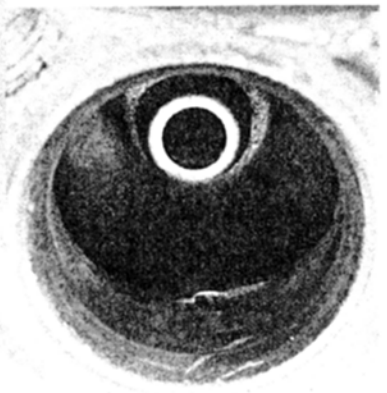
Right now this system is the beginning of much more sophisticated motorcycle computers. Someday microelectronics will prevent brake lock-up, blend the fuel mixture, administer the choke and even analyze a bump hit by the front fork and then properly prepare the shocks for hitting that bump a split second later.

The Seca's computer is intended to









The Yamaha Intake Control System consists of intricate passages die-cast into the cylinder and ending with a tiny subport just above the normal port's valve seat. The subport is angled to swirl the mixture and promote efficient burning, i.e. better mileage.

YAMAHA 750

keep the rider aware of his machine's condition and forewarn him of impending problems. It was developed by the Yamaha factory at U.S. request and consists of a microcomputer, integrated circuit board and liquid crystal display board. Yamaha achieved minor miracles in lighting the LCD board and making the circuitry impervious to temperature changes and weather. Most computers only have to operate indoors.

The Yamaha Computerized Monitor System adds expense, considerable complication, two pounds of weight—and a lot of class to the Seca. Alone, it makes this bike the most technically sophisticated motorcycle in the world. Our computer performed flawlessly in 1000 miles of tough riding and dozens of demonstrations for fascinated onlookers. The computer grows on you. We like it.

Yamaha's anti-dive suspension uses hydraulics to reduce the compression of the forks while braking. World Road-racing Champion Kenny Roberts has a similar system on his Yamaha TZ, but this is the first application on a street bike. When the forks dive during braking, there are several bad consequences: wheelbase shortens, steering geometry changes and the tire contact patch gets a stiff jolt—all at a time when stability is extremely important. For years, manufacturers have used stiff fork springs to combat dive, but this reduces suspension compliance and results in a poor ride. Yamaha's anti-dive labyrinth of passages and valves on the lower fork leg is activated by the front brake, which closes a valve and generates hydraulic compression to resist dive. A bump will override the process so full travel is available during braking on rough surfaces. The amount of override is even adjustable to the rider's preference.

Yamaha's claimed benefits are less

(continued overleaf)

YAMAHA 750

dive and more compliant suspension since hydraulic compression control allows the use of lighter springs. In practice, the system is only marginally successful. First, it is overcomplicated and adds unsprung weight. Second, it seems to control only the last 20-30 percent of dive, so many of the adverse effects still remain. Last, the Seca's front suspension is very good, but not significantly better than normal state-of-the-art Japanese forks. The present anti-dive is definitely helpful, but it represents more of a first step than a cure.

YICS is the Yamaha Induction Control System, a second intake port which generates a swirling of the charge so it mixes better, fills the cylinder more evenly and therefore burns more thoroughly and efficiently. With a better burning mixture, the rider will theoretically use less throttle and the carburetors can run leaner, thus improving mileage (up to 10 percent) and satisfying EPA emissions standards. There is no direct power payoff claimed for YICS, but with a cleaner burning charge, Yamaha can use cam timing which helps produce an 11-second quarter-mile and still meet EPA regs.

The tiny subintake port, smaller in diameter than a pencil, enters the main port just above the intake valve seat and is angled to swirl its charge around the cylinder walls. The subintake ports for all four cylinders are interconnected, so each subport draws from the other three carburetors and subintake ports. On the intake stroke, suction draws charge through both the main and subports, but the laws of physics dictate that the velocity in the smaller port is greater (about four times faster in this case), so the subport's charge swirls through the main charge, causing the turbulence which results in a more efficient burn.

YICS is patented, clever and has no moving parts. It certainly seems to influence power, if only indirectly. As for increased mileage, we averaged 45.2 mpg over 1000 miles of hard riding, which is no better than the other 750s. Yamaha reports 50 mpg, no doubt obtained with less heavy-handed testers. They also admit that YICS has its greatest effect on mileage at a steady 50-60 mph. Still, the system is unquestionably a breakthrough. Its only disadvantage is that you have to buy a special tool to synchronize the carburetors.

In an era when so many Japanese bikes look alike, the Seca's styling is unique and unmistakable. About 50 percent of our roadside critics liked it immediately, and a few hated it. Everyone loved the Porsche-type wrap-around taillight. Enclosed handlebars also met with mixed reaction. The sole purpose of the rubberized covers is to clean up the look of the bars by hiding various cables and wires. BMW motorcycles have had similar covers, but this is another Yamaha first for Japanese machines. The only disadvantage is that tie-downs can't be hooked on the bars to secure the Seca to a truck or trailer.

The final innovation is a fog light. Mounted beneath the excellent quartz headlight, the yellow fog lamp can be switched on manually to get the attention of other drivers or to help penetrate fog, although it's mounted too high for real effectiveness in thick pea soup.

Several superior features are worth mentioning: You can adjust the throttle cable without tools; dual snail-type horns will penetrate a Peterbilt; the choke is as convenient as your left thumb; the turn signals self-cancel; the tubeless Bridgestone tires stick beautifully; the engine sidecovers have clever rubber baffles to suppress noise; Yamaha provides a chain located just above the swing arm for locking your Seca; the overall finish and assembly gets an A rating; and finally, the highly practical tank holds a full five gallons for more than 200 miles of range.

There have only been a handful of truly revolutionary motorcycles in the last 15 years—the Kawasaki 500 triple, the Honda 750 four, Suzuki's rotary, Ducati's Desmo, the Kawasaki Z-1, Honda's Gold Wing. By combining superior performance, gutsy styling and enough new technology to dazzle an astronaut, the Seca becomes the first breakthrough motorcycle of the '80s. **HR**

HOT ROD MAGAZINE'S BIKE SPECIFICATIONS 1981 Yamaha Seca 750

PRICE:	
Suggested Retail	$3199
ENGINE:	
Type	Four-stroke DOHC four
Displacement	748cc
Bore/Stroke	65 x 56.4mm
Compression Ratio	9.2:1
Claimed Horsepower	75 @ 9000 rpm
Claimed Torque	N.A.
Carburetion	(4) 32mm Hitachi CV
Ignition	Transistorized pointless
DRIVE TRAIN:	
Primary Drive	Spur gear
Transmission	Five speed, wet clutch
Final Drive	Shaft
CHASSIS:	
Wheelbase	57 inches
Seat Height	30.5 inches
Ground Clearance	5.7 inches
Wet Weight	518 pounds
Fuel Capacity	5.0 gallons
Brakes	Twin front discs, rear drum
Fork	Air/Spring Showa, 5.9-inch travel
Shocks	Damping adj. Show 3.8-inch travel
Colors	Brilliant Red, Yamaha Black
PERFORMANCE:	
Quarter-Mile	11.97 @ 111.24 mph
Average Fuel Consumption	45.2 mpg
Approx. Touring Range	200 miles