CYCLE WORLD

ON YAMAHA Street Bikes

1970-1974



Road Tests • Specifications • Racing • 80GT1
XS-650 • RS-350 • 200-CS3B • CS5 • 100-LS2
RZ201 W'kel • TX500 & 750 • RD250A • RD350
TA125 Road Racer • RD350B • XS2 • XS650B

YAMAHA TX750

Smooth, Fast, Easy Riding. This Is The Twin That Runs Like A Four.



Cycle World Road Test

■ WITH ALL the recent excitement about the many multi-cylinder motorcycles that are generally available today, the tried and true standby of many motorcycle fans has fallen into a back seat position. We're speaking, of course, about the vertical Twin, one of the most popular mounts for the sporting motorcyclist of just a few years ago. The vertical Twin combined many of the attributes sought after by the true enthusiast: sleek styling, light weight and spirited performance.

But the vertical Twin had some faults, too, that just couldn't be tolerated by some motorcyclists. A vertical Twin has its pistons in one of two configurations: a 360-deg. crankshaft arrangement with the pistons rising and falling together, or the 180-deg. crank (made popular by Honda) with the pistons opposed in motion. Regardless of the layout, the vertical Twin has always suffered from a high level of vibration stemming from the engine design.

Heavy counterbalancing is required in a 360-deg. crankshaft layout because the pistons rise and fall together. But the damping of vibration is left primarily to heavy counterbalancing of the flywheel assembly which is only partially successful. The 180-deg. crankshaft arrangement is difficult to make smooth because of eccentric vibration patterns created by the design and because of the unequal firing impulses. Engine mounting methods and positions in the frame also influence the level of vibration to a great extent.

Until the emergence of the Yamaha TX750 the rider had to suffer varying degrees of vibration in a vertical Twin. A notable exception to this is the Norton Commando's "Isolastic" engine/transmission mounting method, which isolates the vibration from the frame. Own any other vertical Twin, and you just sit there and put up with it.

But even though the multi-cylinder mania appears to be taking over, there are many motorcyclists who know and appreciate the relative mechanical simplicity of a vertical Twin, the smaller number of moving parts to wear out and give trouble, and who just plain enjoy the aura of riding a Twin. Yamaha has been primarily thought of as a manufacturer of two-cycle motorcycles, but the introduction of the XS-series ohc vertical Twins showed that its expertise wasn't limited to the two-cycle engine. The XS-series machines suffered from many of the ailments of any four-stroke machine of that design, too, but they've been getting better.

Rather than redesign its XS-series machine into a multi-cylinder arrangement, Yamaha went a step farther in the design and refinement of the vertical Twin. And in most respects it has been enormously successful. The sporting character of the Twin is still there, but refinements such as electric starting, mechanical silence and a comfortable ride with almost no vibration make the bike much easier to live with for the less hardy sportsman or the long distance touring rider.

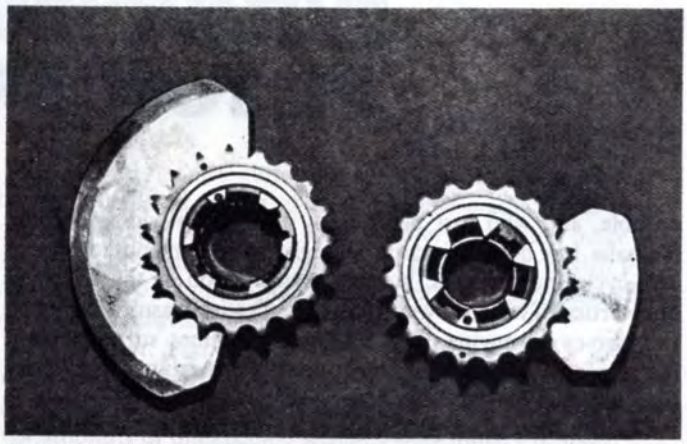
The TX750 engine is similar to most Italian and Japanese four-stroke Twins in that it employs a horizontally-split crankcase assembly. With this design there are fewer joints through which oil can leak; and transmission servicing, should it be required, is much more easily accomplished. Four main bearings support the crankshaft and the two short and strong connecting rods ride on plain bearings at the crank journals for silent running and high load carrying capabilities. An endless, single-row chain runs from the center of the crankshaft over a series of rollers and dampers to drive the single overhead camshaft. Four short, finger-type rocker arms transmit the motion of the cam lobes to the valves in an extremely quiet and efficient manner.

Conventional three-ring pistons cram the fuel/air mixture into relatively shallow combustion chambers which are curiously sculptured to permit the most efficient burning possible. But even with efficient burning, there is some gas which is blown by the piston rings, polluting the oil in the crankcase. This blow-by is also discharged into the atmosphere. To fight the phenomenon, an automotive-type PCV valve using a reed valve and the engine's air cleaner is utilized successfully, although the amount of unburned HC is nowhere near that of an automobile. The vapors from the crankcase are then directed back into the carburetor inlets to be more completely burned.

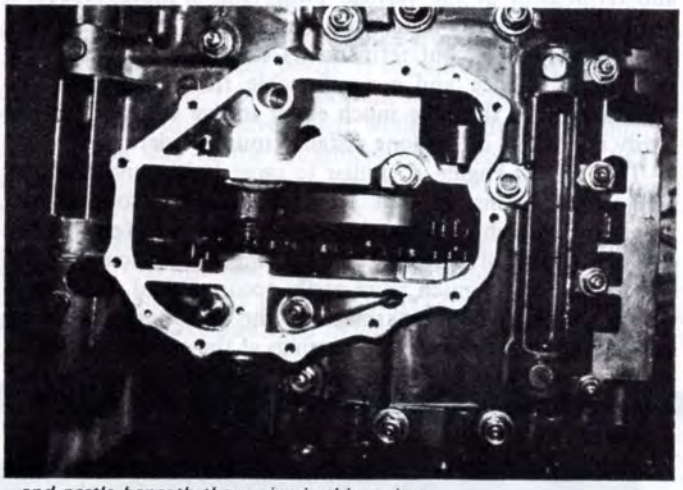
But the most interesting aspect of the TX750's engine is the "omni-phase" balancer which nestles in a cavity beneath and slightly to the rear of the crankshaft. This balancer consists of two counter-rotating weights which are driven by a single chain from the crankshaft. One weight resembles a T-shaped flywheel, and the other is much smaller and passes very close to the "open" part of the T-shaped wheel, although it is rotating in the opposite direction. The smaller flywheel is used to obviate the turning force (moment) of the larger one.

The "omni-phase" balancer almost makes the need for more cylinders to balance out vibration superfluous, as its amplitude matches the amplitude of the main crankshaft and theoretically they cancel each other out. As with any mechanical device there is some vibration, but the almost total

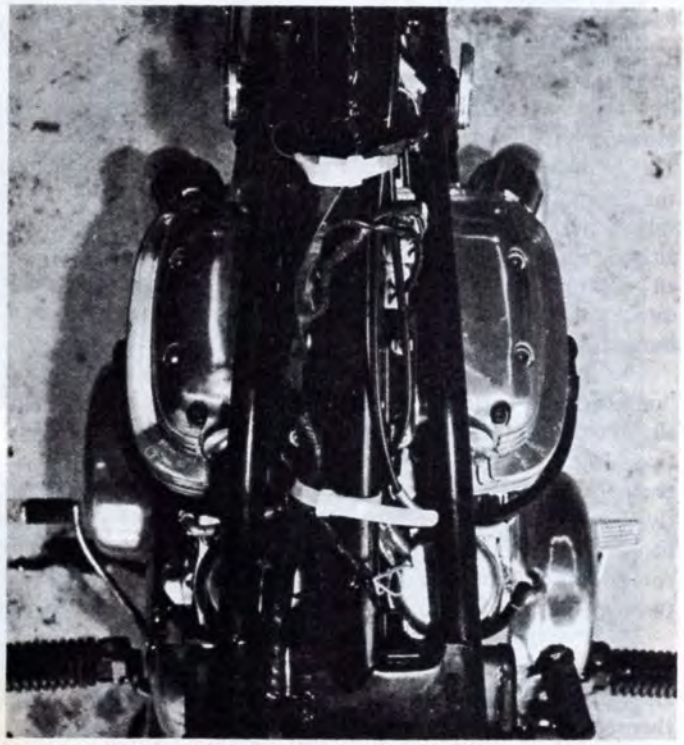
YAMAHA



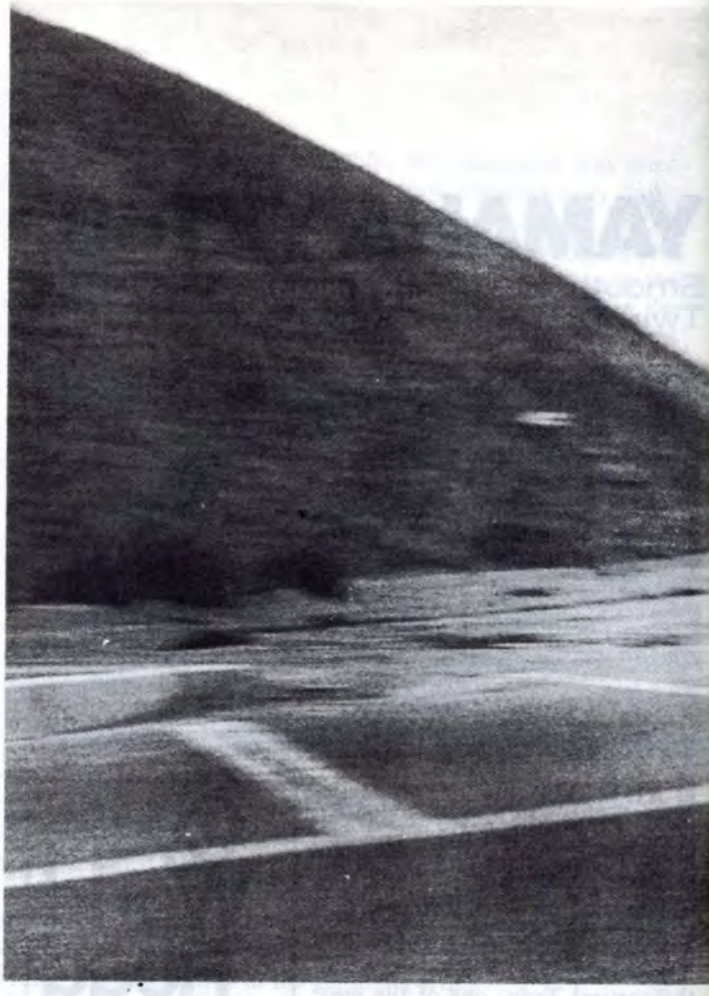
"Omni-phase" balancer weights are chain driven from the crankshaft...

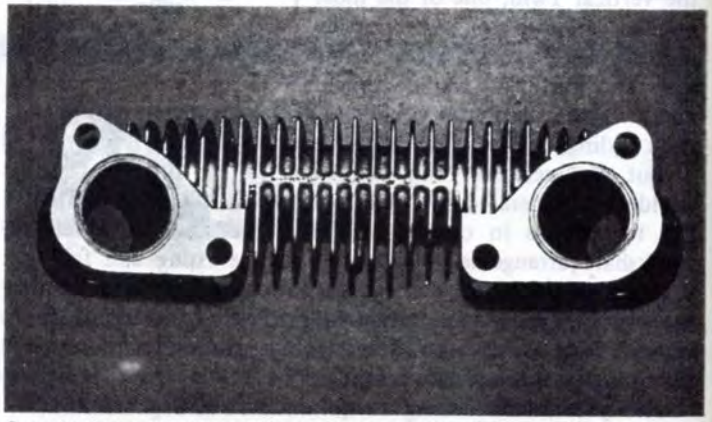


...and nestle beneath the engine in this cavity.

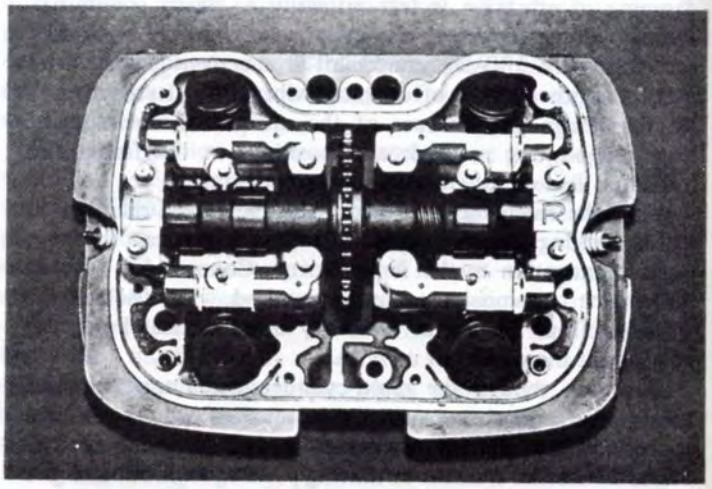


In spite of the large displacement engine, the TX750 is reasonably narrow.

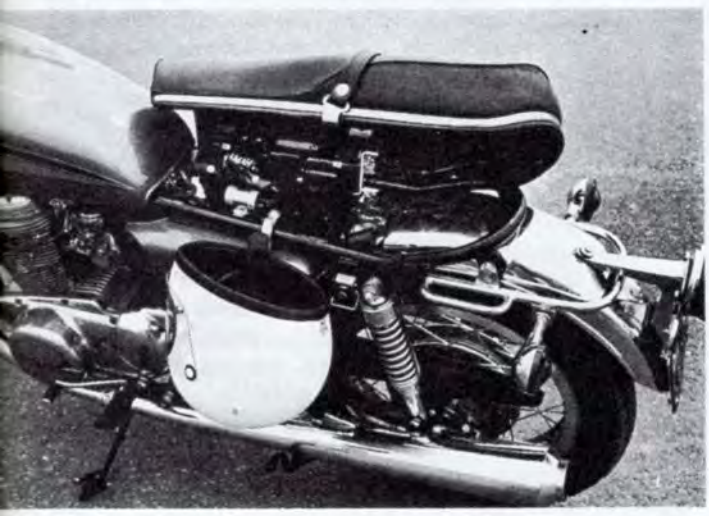




Cast aluminum exhaust manifold features a built-in balance tube.









lack of it makes the rider think he is riding a four-stroke Four. And there are no lateral effects like a horizontally opposed Twin when the throttle is blipped open, either.

The use of chains inside the power producing part of the engine also contributes to the relative mechanical silence of the TX750. There is little more than the burble of the exhaust and even fainter ticking of the tappets to hint that the big Twin is running.

In harmony with the low mechanical noise is the mellow, pleasing tone of the twin megaphone-shaped mufflers and the low carburetor inlet noise level. Only at really large throttle openings does the TX750 begin to bellow, but not objectionally.

The TX750 transmission has been borrowed *in toto* from the highly successful XS-2 model and needs little criticism. All-indirect ratio gears are slid back and forth along the mainshaft and layshaft by three girdling shifter forks, and usually provided the rider with crisp, positive gear changes. When the engine was hot, shifting was a little unsure in feel, but this condition should cure itself when the machine is completely broken in.

With a rather low (high numerically) overall gear ratio of 5.09:1 the five-speed transmission seemed like frosting on a cake instead of a necessity. A whopping 56.6 lb.-ft. of torque is available at 6000 rpm, but the curve feels almost ruler flat from as low as 2000 rpm, making it unnecessary to row the gear lever back and forth to keep the engine rpm up.

The one point in the drive train which seems to need attention is the clutch. When hot the clutch would drag slightly, making it impossible to select neutral after stopping for a traffic light. Many experienced riders merely snick the machine into neutral just before stopping to prevent the clutch from heating up while stopped. This technique worked well in this case, but it shouldn't be necessary. However, there was very little clutch slip at the drag strip and clean shifts were the rule if you pressed firmly on the gear pedal. Clutch lever pressure is a little on the harsh side, but that's the price one pays for no slippage.

Even though the teeth on the crankshaft and on the clutch wheel are of the spur (straight-cut) variety, they don't seem to add any noise to the engine. Spur gears are generally noisy, but are slightly more efficient in operation than helical cut gears. Springs inside the clutch hub smooth out the power impulses from the crankshaft at low rpm before they reach the transmission, and lessen the strain put on the gears and the rear chain. At low rpm there was a hint of drive train roughness, due mostly to the widely spaced firing intervals of a four-stroke Twin.

The Yamaha TX750 is just what Yamaha designed it to be—a lush touring machine, not a "stoplight-to-stoplight" racer's delight, in spite of some rather good quarter-mile acceleration times. The physical largeness and weight of the machine have helped the designers come up with a really comfortable package for the tourer. Wide, comfortably shaped handlebars, a wide, soft seat (which is a bit harder at the extreme forward point) and just the right distance between them and the footpegs contribute to a very comfortable ride. Control location was deemed excellent by all our staff members, and the rear passenger seating position was acclaimed by all (birds) who sampled it.

There are some shortcomings in the panel of idiot lights just below the speedometer and tachometer dials. The oil pressure warning is on the left, a new light which warns when the rear brake lining reaches a specified thickness is in the center, and what we feel is a completely useless one is located on the right. This latter one is a stoplight warning light which comes on





every time you activate the brakes.

This is in reverse to the standard logic of a warning system. A person usually associates a red light with some sort of trouble, and having this light come on frequently in traffic, when everything is OK, is distinctly annoying.

The real fireworks are reserved for when the stoplight filiment burns out, at which time the corresponding idiot light begins flashing on and off relentlessly until you get things fixed. Or until you get wise and disconnect the idiot light.

Annoying, yes, but an introduction to Yamaha's new orientation to riding safety. Both the stoplight and brake lining wear indicators are provocative moves on Yamaha's part. We hope in coming years that the concepts implied in these gadgets mature into a technician-oriented diagnostic system, rather than becoming a gleam in a Federal bureaucrat's eye.

The TX750 shows Yamaha's concern in providing the heavy machine with brakes to match its performance. Physically small, the front brake caliper is an efficient double acting unit which requires very little pressure from the adjustable lever to give safe, sure stops. The adjustment on the lever allows the rider to vary the point where the front brake begins working, a boon to riders with short fingers. As with most disc brake setups, there was not a hint of fade.

The rear brake is somewhat less certain in feel, but boasts a drum diameter of nearly 8 in. and a brake lining width of 1.85 in. Hauling a heavy motorcycle down from high speeds repeatedly is a difficult job, but stopping the TX750 was easy and safe.

Aside from the weight, which comes from such extras as electric starting and beefy structural components, the main complaint we had about the Yamaha was in the handling department. Ride smoothness is very good, but this smoothness comes at the expense of inhibited cornering characteristics. Front fork travel is good and the forks themselves do a good job of soaking up the bumps, but they are too soft for really precise steering at high speeds in turns. The same goes for the rear units, which exhibit too little rebound damping and make the machine "pogo" in fast, bumpy turns.

The TX750 is really not a sporting rider's machine like most vertical Twins, it's a luxurious tourer. General overall finish is what we've come to expect from Yamaha, with the traditional unevenness of welding on the frame adding the only sore spot. Bright, chrome-plated fenders, evenly applied paintwork and brightly polished aluminum set off the machine. Aluminum alloy wheel rims, manufactured by Dido in Japan, also add a touch of class and marginally reduce unsprung weight.

Electrical components are first rate and lighting controls are within easy reach. All wiring is neatly routed and tucked in to avoid damage, and the lights are more than adequate for high speed touring at night.

Some of the features we liked about the TX750 were the locking gas tank cap which is unlocked with the ignition key; the large, easy-to-read instruments, and the cast aluminum exhaust manifold which contains a balance tube. A vane-type steering damper nestles neatly beneath the lower triple-clamp and the cover surrounding the oil tank is vented to allow additional cooling of the oil supply on fast runs on a hot day. The TX750 also has a bracket to firmly lock your helmet strap under the seat.

In general, the TX750 is a real gem. The engine is the most original design of its configuration in decades, and it pays off in superlative smoothness at any speed. Yet it retains the simplicity and ease of maintenance of two cylinders.

If you are a man of the highways, take a good look at this one.

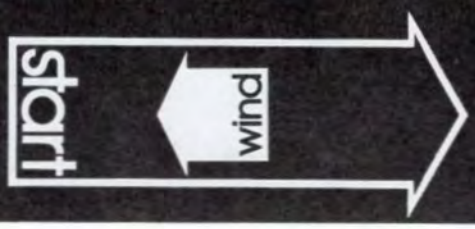
YAMAHA TX750

SPECIFICATIONS

List price	N.A.
Suspension, front	telescopic fork
Suspension, rear	swinging arm
Tire, front	3.50-19
Tire, rear	4.00-18
Brake, front, diameter x width, in.	(2)11.5 x 1.75
Brake, rear, diameter x width, in.	7.8 x 1.85
Total brake swept area, sq. in.	104
Brake loading, lb./sq. in. (with 160-lb. load)	6.7
Engine, type	sohc vertical Twin
Bore x stroke, in., mm	3.15 x 2.91, 80 x 74
Piston displacement, cu. in., cc	45.4, 743
Compression ratio	8.4:1
Claimed bhp @ rpm	63 @ 6500
Claimed torque @ rpm, lb.-ft.,	56.6 @ 6000
Carburetion	(2) 38mm Solex CV
Ignition	battery & coil
Oil system	dry sump, twin pumps
Oil capacity, pt.	6.0
Fuel capacity, U.S. gal.	3.7
Recommended fuel	premium
Starting system	electric; kick, folding crank
Lighting system	12V alternator
Air filtration	dry foam
Clutch	multi-disc, wet
Primary drive	spur gear
Final drive	single-row chain
Gear ratios, overall:1	
5th	5.09
4th	5.83
3rd	6.92
2nd	8.45
1st	13.10
Wheelbase, in.	58
Seat height, in.	32
Seat width, in.	11
Handlebar width, in.	31
Footpeg height, in.	12.5
Ground clearance, in.	6
Curb weight (w/half-tank fuel), lb.	514
Weight bias, front/rear, percent	46/54
Test weight (fuel and rider), lb.	664

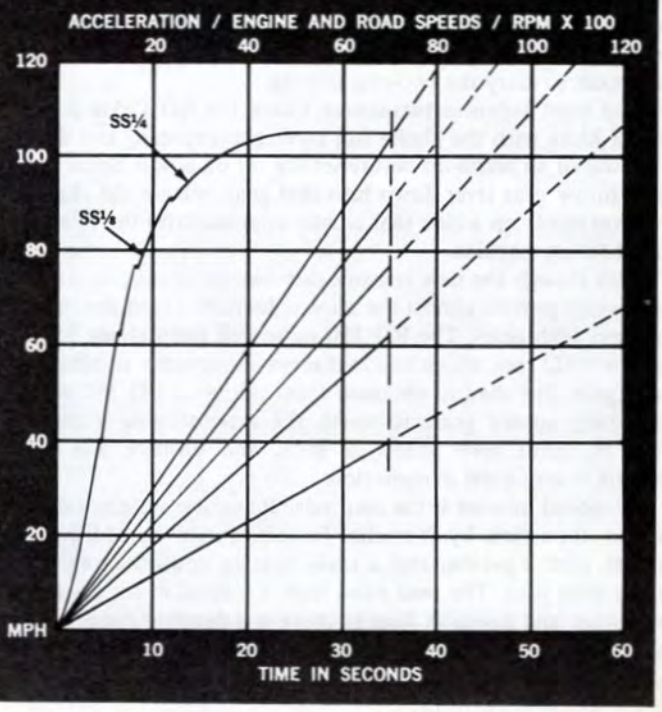
TEST CONDITIONS

Air temperature, degrees F	86
Humidity, percent	51
Barometric pressure, in. hg.	30.23
Altitude above mean sea level, ft.	50
Wind velocity, mph	12-15
Strip alignment, relative wind:	



PERFORMANCE

Top speed (actual @ 7067 rpm), mph	105
Computed top speed in gears (@ 7000 rpm), mph:	
5th	104
4th	91
3rd	77
2nd	63
1st	40
Mph/1000 rpm, top gear	14.87
Engine revolutions/mile, top gear	4035
Piston speed (@ 7000 rpm), ft./min.	3395
Lb./hp (160-lb. load)	10.70
Fuel consumption, mpg	40
Speedometer error:	
50 mph indicated, actually	45
60 mph indicated, actually	56
70 mph indicated, actually	65
Braking distance:	
from 30 mph, ft.	34
from 60 mph, ft.	144
Acceleration, zero to:	
30 mph, sec.	3.7
40 mph, sec.	4.3
50 mph, sec.	5.2
60 mph, sec.	6.0
70 mph, sec.	7.2
80 mph, sec.	8.9
90 mph, sec.	11.4
100 mph, sec.	16.9
Standing one-eighth mile, sec.	8.62
terminal speed, mph	79.36
Standing one-quarter mile, sec.	13.78
terminal speed, mph	94.33



5	Yamaha XS650 Road Test	*Cycle World*	March	1970
11	Yamaha R5 350 Road Test	*Cycle World*	June	1970
15	Yamaha 200 CS3B Road Test	*Cycle World*	June	1971
19	Yamaha XS2 Road Test	*Cycle World*	Nov.	1971
23	Yamaha 200CS5 and 100LS2 Road Test	*Cycle World*	April	1972
26	Yamaha TX750	*Cycle World*	Oct.	1972
31	Yamaha TX750 Road Test	*Cycle World*	Dec.	1972
36	Yamaha RD350 Road Test	*Cycle World*	Feb.	1973
40	Yamaha RZ201 Wankel	*Cycle World*	Feb.	1973
42	A Different Approach	*Cycle World*	May	1973
45	Yamaha TX500 Road Test	*Cycle World*	Sept.	1973
50	Yamaha Street and Trail Minis Road Test	*Cycle World*	Sept.	1973
54	Yamaha RD250A Road Test	*Cycle World*	Dec.	1973
58	Yamaha TA125 Road Racer	*Cycle World*	March	1974
62	An Over-the-Counter Cafe Racer	*Cycle World*	June	1974
64	Yamaha RD350B Road Test	*Cycle World*	Nov.	1974
69	Yamaha RD350: A Step Further	*Cycle World*	Nov.	1974
76	Yamaha XS650B Road Test	*Cycle World*	Dec.	1974

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