



CYCLE WORLD ROAD TEST

YAMAHA 250 SINGLE

THE ALL-ROUND off-the-road motorcycle — the everyman's bike — is a machine particularly peculiar to the United States, at present the world's most lucrative market. There are many good reasons for Americans' somewhat strange taste in dirt motorcycles; vast areas of woods, trails or desert are available for sport, and most of the people who buy motorcycles for non-paved travel are just ordinary folk, not the least interested in serious racing, who simply wish to escape the everyday hustle and bustle.

In Europe and Japan, where nearly all the motorcycles that Americans ride are built, there is an entirely different situation. Land is scarce, and almost all dirt riding is done in organized competition. Few Japanese or Europeans ever have gone off riding into the woods. Thus they cannot understand Americans' enthusiasm for the tremendous freedom of a day in the wilds with a good motorcycle.

Imagine the thoughts of manufacturers as U.S. distributors insisted that the majority of Americans do not desire motocross racing machines that wave the front wheel in the air most of the time. Rather, distributors said, Americans for the most part require motorcycles with comfortable seats, long wheelbases, and fat front tires. These motorcycles, at the same time, must perform well

enough for U.S. riders to enter them in Sportsman competition. "It's madness," said the foreign manufacturers. "If a person buys an off-the-road motorcycle, it must be a racing machine." That was the status quo for as long as was necessary for U.S. distributors to plead the American enthusiasts' case to overseas builders.

Gradually, Europeans were won over, with England and Spain, particularly, tooling up to satisfy these U.S. requirements.

Now a Japanese manufacturer has built a motorcycle — from drawing board to finished product — with only one customer in mind, the U.S. off-road citizen. Yamaha's new DT1 is as American as Coca Cola. The fact that it can be ridden on the street is an added bonus. Very efficient lighting and silencing make the DT1 a most pleasurable mount for going to the market. Or, if called upon, to make a highway jaunt. The 5-speed transmission allows 60 mph at a modest 6000 rpm, while bottom is low enough for plonking through the woods.

Probably the most outstanding feature of the new Yamaha is the unusually wide power band. The engine is smooth from idle to maximum rpm and throttle response is predictable and progressive throughout the range. Credit for this highly desirable characteristic must go to the 5-port cylinder which permits highly efficient breathing,



A Sweet Streetster With Plenty of GYT-Up-An'-Go!

while maintaining relatively mild port timing. Mild port timing in a two-stroke can be compared to mild street cams in four-stroke engines, which results in favorable low end power. And, good low end "torque" delivery is highly desirable for the rather tame riding that most of the buying public will require for jaunts through the woods.

Unfortunately, if greater peak power is necessary, to impress the not-so-tame set, ports will have to be made bigger to allow greater amounts of fuel/air mixture through the engine. There is a limit on how wide the ports can be before the piston ring tends to force its way into the opening, so usually the ports are heightened to produce larger area. Also, the overlap relationship between transfer and exhaust ports is increased so that the fresh charge coming into the cylinder can help push all of the spent charge out through the exhaust port. If full advantage is taken of this overlap period, there will be considerable fresh mixture passing through the exhaust port, and gasoline mileage will be affected at a rather alarming rate.

Yamaha's 5-port principle, introduced on the 1967 Daytona racers, permits normal transfer port height and overlap period for an acceptable power band. Two rather small ports are added, between the space required for crankcase inlet and the conservatively proportioned transfer ports. The purpose of these additional ports is to help

the scavenge cycle, or the process of forcing the burned gasses from the cylinder.

For racing purposes, where fuel economy does not matter, everything can be made quite large, but for an everyday machine, the extra "helper" ports direct a small portion of the fresh charge to the scavenging task, while the major transfer charge is directed to the combustion chamber for burning. The end result is that peak power output is improved because of improved breathing, and low end power is maintained, the result of mild port timing.

Apart from the 5-port layout, the Yamaha Single is quite orthodox in design — no magic, no frills, simply functional practicality. Of course, Autolube has been fitted to eliminate the need to pre-mix gasoline and oil, and to insure proper lubrication throughout the operating range. Yamaha no longer considers Autolube a bonus or an extra, but an essential part of a two-stroke engine. As proof, it is almost taken for granted on the new DT1.

Little remains to be said about the engine/power train unit, except possibly for the 5-speed transmission. The DT1 is not the world's fastest 5-speed dirt machine, although it may very well be the world's first truly dual purpose motorcycle with this unique, practical innovation. At no time during the test was a lower first gear required. Also, after a short distance, riders started to ignore the

clutch during gear changing. So close are the ratios, and so positive is the shift, that it soon became a tedious chore to bother with the hand lever.

The best of the DT1, however, will not be found in the engine, or gearbox, but in its capabilities as a true dirt machine. Whether in deep sand, rocks, mud, or just plain fast hard riding, the handling and general mannerisms are very difficult to fault. The front fork, like GP road racers, is very Ceriani in appearance, and proved more than the magic 6-in. travel. Damping is excellent, and at no time during almost 200 miles in the rough was there any indication of bottoming or topping. The rear suspension is similar in that it seemed to be always soft, but well damped, never bottoming. A most interesting feature of the rear spring/damper units is the dual purpose plastic sleeve inside the springs above the damper body. Not only does the sleeve keep the spring in alignment during severe compression, but also the all-important damper actuating rod is protected from dirt and abrasive particles.

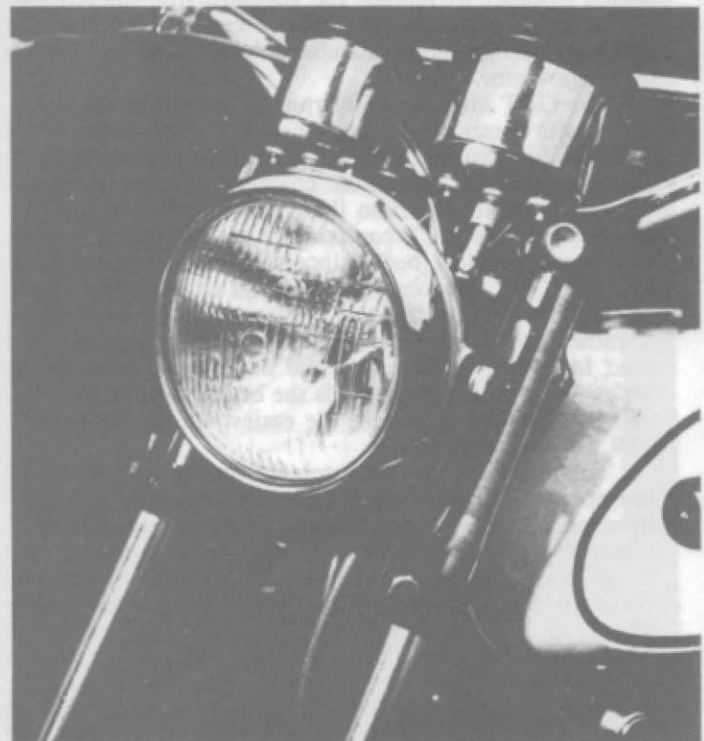
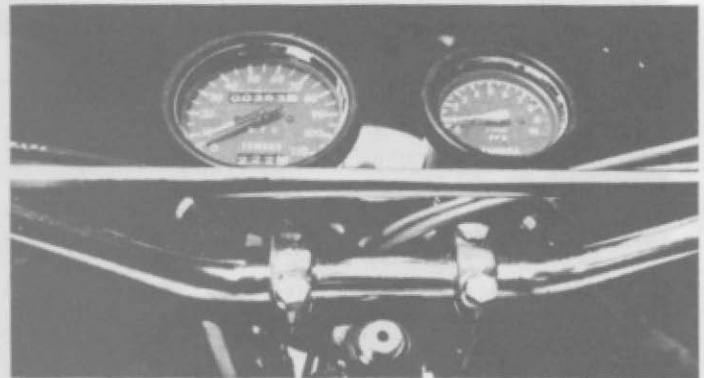
Undoubtedly most of the credit for good handling must go to the strong frame/swinging arm layout. The main cradle is classic double loop, but with a generously proportioned single top tube. The rear members of the main cradle, just behind the transmission, are spaced to permit the swinging arm to be fitted between the down tubes. In fact, the swinging arm pivot point is the widest part of the main cradle. The swinging arm is constructed from extremely rigid rectangular section tubing with hardened rear spindle lugs welded to the outer ends. All frame members are constructed from chrome moly steel.

Lack of frame flexure and good suspension make the DT1 one of the finest tracking machines in mud and soft sand, especially at rather high speeds. In very rough going, the front wheel can be lofted with little effort, though it must be an intentional act, rather than an aviating front wheel every time the throttle is opened. Steering is accurate and precise, and can be adjusted with the friction steering damper. The prototype model was fitted with a hydraulic damper which caused too much lag, and was discarded in favor of the more versatile friction unit. In a desert test section, the DT1 was ridden with varying amounts of steering damper adjustment. The terrain, unusually rough, makes all but the very best dirt machines tend to appear ill-suited to the task. Even with no steering damper effect the DT1 ripped through the rough country without wagging its front end. Damper adjustment was a case of rider preference, rather than a necessity.

Although the folding footpegs will make some granddad in Columbus happy, and win AMA approval for the bike, they are unequivocally the best production spring loaded footpegs built. But what a drag it is trying to ride a proper dirt machine with fat ugly lumps where pegs should be. The serious riders will find a way around the problem, despite Columbus.

Comfortwise, the remainder of the machine has obviously been tailored for the laziest people on earth. The tuck-and-roll seat induces sleep almost immediately, and the standard bars are positioned so as not to interrupt the slumber period. The high level exhaust pipe is tucked in, well out of the way in any sort of going. And the kick starter, oft the cause of numerous curses, fits into the tuck in the pipe with no difficulty whatsoever.

Anticipating some preference for the now obsolete shift right, brake left, Yamaha has put the foot controls in the proper place, and provided a straight through gear shaft so that it is possible to convert the DT1 for the "old way." Rear brake feel is excellent. The brake itself is proportioned so as to meet the demands of street use, while it does not present a hazard when trying to apply small amounts in the dirt. Much the same can be said for the forward anchor. Hard braking during road riding does not result



in fade. Situations where more brake was needed were never encountered, yet the action is gentle to the point that it can be used in the rough without fear of locking up when delicate applications are required.

Yamaha, in keeping with the theory that the DT1 should be a dirt machine first, a street machine second, will fit trials-pattern tires as standard. While these do not give the best tread possible for the street, it will eliminate piles of slightly used street tires in dealerships across the country. Also, for those people who want to go all the way for serious dirt competition, there will be a 21-in. front wheel and special fender available. The rear fender has been made very wide to keep to a minimum the amount of mud thrown on the rider.

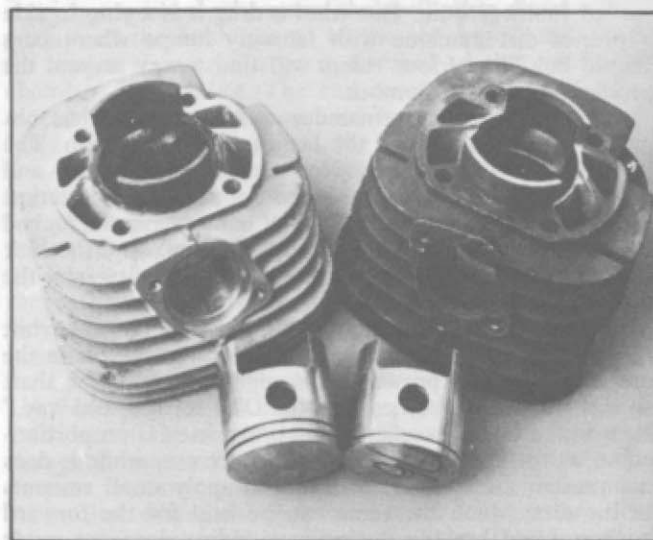
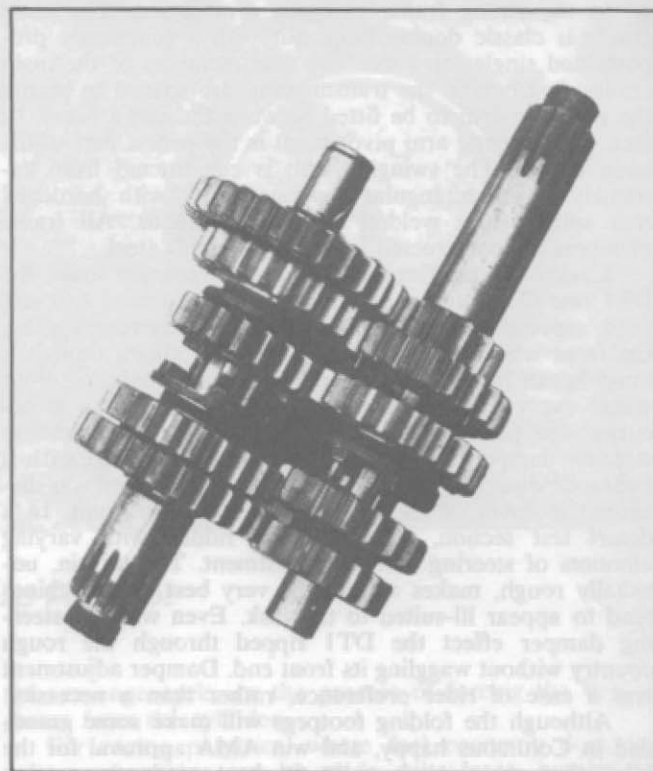
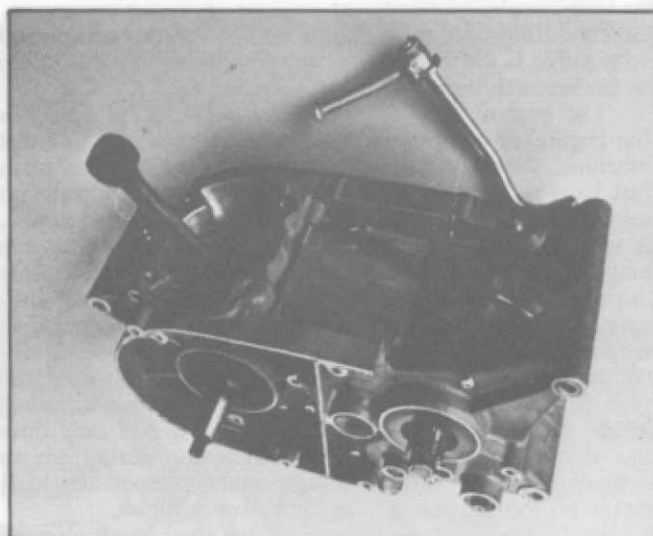
The small dual instrument bracket is easily detachable, and features shock mounted speedometer and tachometer. The speedometer has a total mileage odometer and a trip odometer which can be reset for enduros. Both instruments proved accurate, especially the speedometer.

Lighting is complete, up to every task. The 12 VAC generating system supplies energy to a battery, to which the lights are connected. Thus the DT1 will comply with California's new regulations which stipulate that lights must work without the engine running. While the majority of machines meet this requirement, some basically off-the-road motorcycles carry direct systems which eliminate the storage batteries. All lighting equipment can be removed without tools, and the wiring harness features quickly detachable connectors so that lights can be easily demounted for competition.

And competition has been one of the important requirements during design and development of the DT1. Yamaha currently has a most competitive road racer in the TD1 which the private owner can buy. The DT1 will give Yamaha, the firm hopes, a dirt machine not just for the casual rider, but for the most serious race enthusiast as well. In order to achieve the power necessary to compete in today's 250-cc racing, a GYT (Genuine Yamaha Tuning) kit has been engineered right along with total machine development. The kit will include a piston with a single thin ring to replace the lower compression two-ring standard part; a chrome-on-aluminum, generously ported cylinder to replace the standard iron-sleeved barrel; a racing expansion chamber; a central plug head for optimum combustion chamber shape; and a 30-mm bore carburetor.

The GYT kit adds 1500 rpm to the top of the range. Thus, with identical gearing, a useful 15 mph is gained. It must be emphasized, however, that these are racing components, and an expansion chamber exhaust is highly illegal for street use. Also there is a sacrifice in low end power when the GYT components are fitted; not a hardship in competition, but an inconvenience for general riding. The GYT kit does what Yamaha engineers set out to accomplish. It transforms a pleasant, docile engine into a rather feisty screamer. Separate generating coils are used for ignition voltage, so the battery can be removed for racing. Starting probably is the best feature of the DT1 and it is, without question, the easiest starting two-stroke 250 we have ever tested.

Yamaha is to be congratulated on the honesty of its horsepower claims for the DT1 in both standard and GYT trim, of 22 and 30 respectively. Some manufacturers of machines in this category have really been getting carried away, and it is refreshing to see someone with enough nerve to tell the truth. And, while they have concentrated on handsome lines and overall cleanliness, such convenience items as the new Mikuni carburetor with a side mounted main jet, eliminating the need to remove the carburetor to change jetting, indicates Yamaha's desire to make things easier for the rider. ■



250 YAMAHA DT1

SPECIFICATIONS

List Price	N A
Suspension, front	telescopic
Suspension, rear	swinging arm
Tire, front	3.25-19
Tire, rear	4.00-18
Brake, front, diameter x width, in.	5.9 x 1.6
Brake, rear, diameter x width, in.	5.9 x 1.6
Total brake swept area, sq.-in.	59.4
Brake loading (test weight/swept area) lb./sq.-in.	6.7
Engine type	2-stroke single
Bore and stroke (inches-millimeters)	2.77 x 2.36, 70 x 60
Displacement (inches ³ -centimeters ³)	15,246
Compression ratio	6.7:1
Carburetion	26mm Mikuni
Ignition	magneto and coil
Claimed bph @ rpm	22 @ 6,000
Oil system	oil injection
Oil capacity, pts.	3
Fuel capacity, gal.	2.38
Starting system	kick, folding crank
Lighting system	12 V, battery
Air filtration	washable foam
Clutch	multi-disc, wet plate
Primary drive	helical gear
Final drive	single-row chain
Gear ratios, overall:1	
5th	7.5
4th	9.1
3rd	11.1
2nd	14.7
1st	20.1
Wheelbase, in.	53.8
Seat height, in.	29.8
Seat width, in.	
Foot-peg height, in.	11.6
Ground clearance, in.	9.4
Curb weight (w/half-tank fuel), lb.	235
Test weight (fuel and rider), lb.	395

PERFORMANCE

Top speed (actual)	71
Calculated top speed in gears (@ 7000 rpm)	
5th	71
4th	58
3rd	48
2nd	36
1st	26
Mph per 1000 rpm, top gear	10.1
Speedometer error	
30 mph indicated, actually	29.8
50	49.9
70	70.1
ACCELERATION, ZERO TO -	
30 mph, sec.	3.5
40	5.2
50	8.4
60	11.1
70	16.7
Standing 1/8-mile, sec.	10.7
terminal speed	58.16
Standing 1/4-mile, sec.	19.2
terminal speed	70.03

ACCELERATION AND ENGINE / ROAD SPEED
RPM X 100

