



● The TS400L Apache is not just a revamp of Suzuki's previous big-bore dual purpose machine. It's also a radical departure from accepted enduro bike design principles. The "L" model is wider, higher, stouter, guttier, quieter and faster than before. While up-dating the Apache Suzuki didn't just shuffle paint schemes around and change model designations. The L-model has an all new frame, fork assembly, cylinder, head, muffler, carburetion and intake systems and different transmission gears. All of these changes have given the Apache an entirely new personality—different than its predecessors, different than its competitors.

The previous two Apache models, though not extraordinary machines, were darn good combination street and trail motorcycles. They were very dependable ("... 100% reliable" said *Cycle's* road

test of the J-model), easy to operate and strong running. What these Apaches lacked were good off-road manners and decent suspension units. The present major changes should make the new Apache a better dirt bike—hence a better street machine.

With their virtually untapped experience and knowledge of building world championship motocrossers, Suzuki should be able to make the Apache a better dirt bike with little effort. Any company that can acquire *six* world championship motocross crowns, 34 grand prix race wins and FIM manufacturers championships with their works machines has an edge designing and building exceptional production dirt bikes.

The new frame is an interesting exercise in design philosophy. While all new in structure, the frame retains the same ge-

## SUZUKI TS-400L APACHE

The all-new Apache has been thoroughly re-designed to better compete in the limited big-bore enduro field. Somehow though, it completely misses the mark.



ometry as the old one. At 27½ pounds the mild tubular steel frame is no lightweight, but it is strong. The old frame was a single downtube assembly while the new is a double cradle chassis. Both have 30° head angles and the same engine location. The near-56 inch wheelbase has not changed; the swing arm retains the same basic dimensions as the old swing arm.

With the double downtube chassis design came a completely new cylinder, head and exhaust pipe. Use of a split, double downtube frame made it necessary to place the exhaust port in the center of the cylinder (rather than offset) to permit the exhaust pipe to pass directly between the chassis members. The cylinderhead has been given a smaller combustion area to raise compression from 6.8:1 to 7.3:1. Additionally, there's more finning on both the cylinder and head to increase the cooling area.

The new exhaust pipe is not only reshaped but has a different baffling system. The baffles are designed to reduce combustion explosion inside the sheet metal muffler. The spark arrester holds one new baffle inside the main body of the pipe while retaining the other baffle within the huge tail/stinger section. The old spark arrester has been replaced by a cast two-piece spiral catch unit.

Inside the big-bore two-stroke more changes have been made. All three versions of the Apache (J, K & L) have different crankcases, though the differences in the aluminum castings remain virtually invisible. Larger bosses, bigger reinforcing ribs, relocated holes and other improvements are not apparent to untutored eye.

Another internal alteration has been made to the top end. Rather than retaining a *floating rod* crankshaft Suzuki has fixed the lateral movement of the beam by placing thrust-type shims on either side of the small end of the connecting rod. This fixes the rod's side play by locating it on the wrist pin. This system may reduce needle-bearing clatter as the rod walks side-to-side.

The gear driven primary has remained untouched. Using straight cut gears, the huge oil-bathed, 14-plate clutch (seven cork, seven metal) revolves once for every 2.96 engine crankshaft revolutions. The clutch hub rotates on the transmission mainshaft end and spins on a caged double-needle bearing. Both transmission shafts turn in caged roller bearings. Other near-invisible changes have occurred in the gearbox. First and fifth gears have been lowered. First is now 2.285:1 and top is .807:1 in the "L" model compared with 2.066:1 and .840:1 respectively.

The new first and fifth gear-ratio changes were made to improve low speed trailing. But the speed differences between the old J and K models compared to the new L version are minute. We couldn't feel the difference when riding. At a constant 4000 rpm the J and K models went



*Under the saddle is a maze of paraphrenalia: wires, plugs, air cleaner, oil tank, and magic box.*



*The engine is a marvel in torque output over a broad span. Carb and pipe are mis-matched.*

50.3 mph in fifth and 17.6 in first. The L version does 49.9 and 19.5 mph in the same gears—a reduction of 0.4 and 1.9 mph respectively.

Elsewhere, the Apache displays the legal electrical equipment to fulfill its dual purpose street and trail features. The electrics are all 12-volt with power coming from the CDI flywheel generator. The seven-inch Stanley headlamp is joined by a large taillight, turn signals, lighted instruments—all of which operate with the engine not running.

Starting the Apache requires deliberate effort by the rider on the lengthy right-side kick arm. In order to ease starting, the big bore single has a relief passage which runs from the top of the cylinder bore to the exhaust port. It reduces compression pressure by acting as a minute high exhaust port which allows excessive pressure to run directly into the exhaust system. This passageway (in place of an external compression release) directs excess fuel into the exhaust system rather than on the engine's exterior. The best starting technique requires the rider to stand on the foot pegs with the side stand down and then kick the engine through.

With the gas and choke on, the engine always starts with three healthy kicks. Engine operating noise is fairly well muted by the rubber buffers in the cylinder fins. Still, the Apache has the two-stroke noises inherent with a big-bore engine. The piston rattles sporadically and loudly, and the drive train has a constant whir which relieved only slightly when the clutch is disengaged.

Whereas most all two-strokes perform like two-strokes, the Apache produces power like a four-stroke. Its flat torque curve is unmatched in two-stroke dirt bike engines. The trail rider's dream engine, the XL350 Honda, has been out done by the TS400L. The Apache develops 18.27 ft/lbs torque at 2500 rpm and a near identical 18.77 ft/lbs at 6500 rpm with only a 10 per cent rise in between. The Apache produces slightly more maximum torque than the 350 Honda four-stroke single, has an equally flat power curve and a broader power band.

When comparing the horsepower curves of the Apache and XL350 we again found remarkable parallels. The Apache produces one-half horsepower more than the XL350 at the same 6500 rpm. The power



*New muffler is heavy, with an unpleasant sound. The rear wheel slips and hops in the dirt.*

*On twisty roads the Apache is fun to ride while accelerating but staggers in mid-range.*

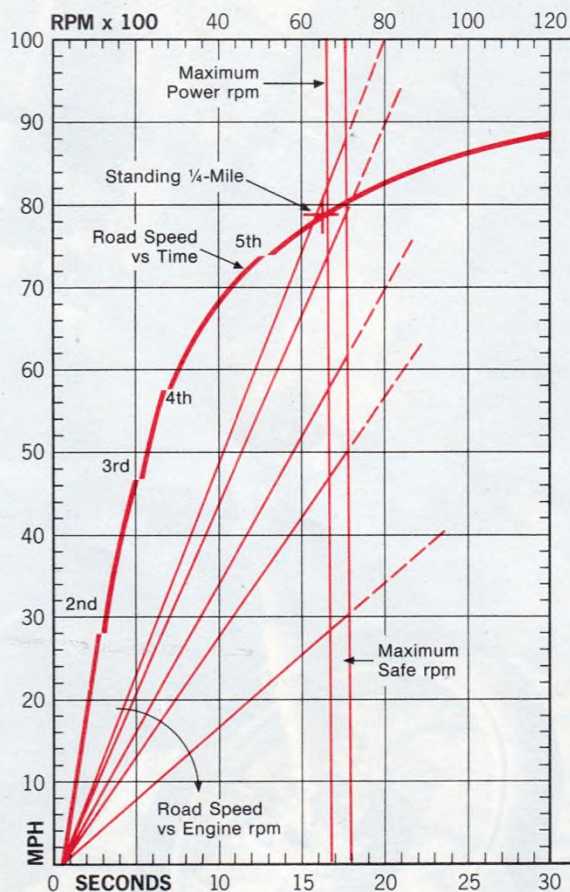
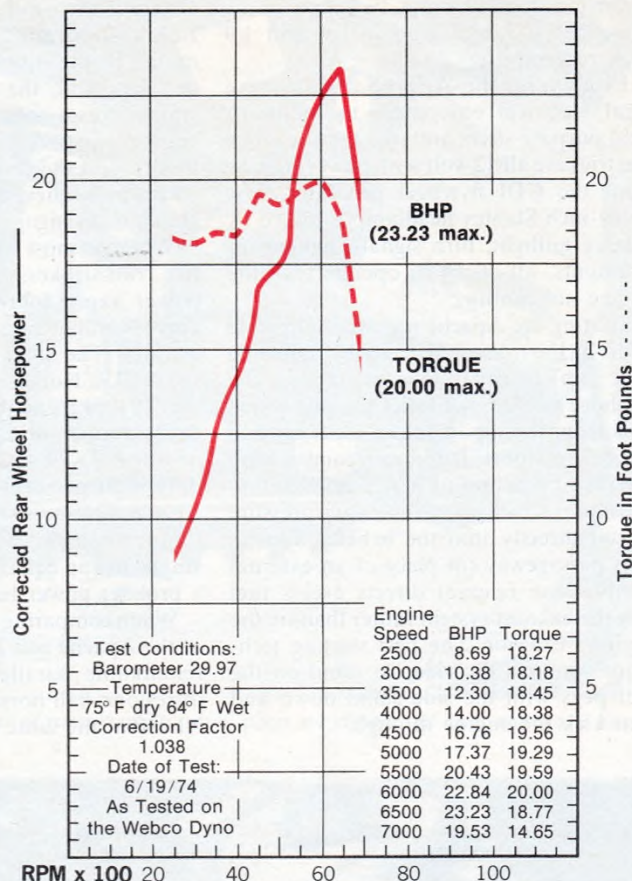






### SUZUKI TS400L APACHE

Price, suggested retail.....	\$1220
Tire, front .....	3.00 x 21 IRC Trials
rear .....	4.00 x 18 IRC Trials
Brake, front.....	4.9 x 1.18 in. (124.5 x 30.0mm)
rear .....	4.9 x 1.18 in. (124.5 x 30.0mm)
Brake swept area .....	36.33 sq. in. (234.7 sq. cm)
Specific brake loading.....	14.12 lbs./sq. in.
Engine type .....	Piston port two-stroke single
Bore and stroke .....	3.23 x 2.95 in. (82 x 75mm)
Piston displacement.....	24.2 cu. in. (396cc)
Compression ratio .....	7.3:1
Carburetion.....	1-32mm Mikuni
Air filtration.....	Polyurethane foam
Ignition .....	CDI
Bhp @ rpm.....	23.23 @ 6500
Torque @ rpm .....	20.00 @ 6000
Rake/Trail.....	30°/5.6 in.
Mph/1000 rpm, top gear.....	12.47
Fuel capacity .....	2.4 gal. (9 liter)
Oil capacity.....	2.5 pt. (1.2 liter)
Transmission oil capacity .....	1.25 qt. (1200cc)
Electrical power .....	Flywheel ac generator
Battery.....	12v-5ah
Gear ratios, overall .....	(1) 16.886 (2) 10.501
	(3) 8.395 (4) 7.080 (5) 5.964
Primary transmission .....	Spur gear 2.956
Secondary transmission .....	1/2 x 1/4 # 525 D.I.D.
	chain 2.5
Wheelbase .....	56 3/8 in.
Seat height .....	32 1/2 in.
Ground clearance .....	9 1/2 in.
Curb weight .....	313 lbs.
Test weight .....	513 lbs.
Instruments.....	Tachometer, speedometer
Sound level (California Standard) .....	82.5 db(A)
Standing start 1/4-mile .....	16.154 seconds,
	77.78 mph
Average fuel consumption .....	25.23 mpg
Speedometer error.....	Ind. 30 mph = 26.33
	Ind. 60 mph = 53.92





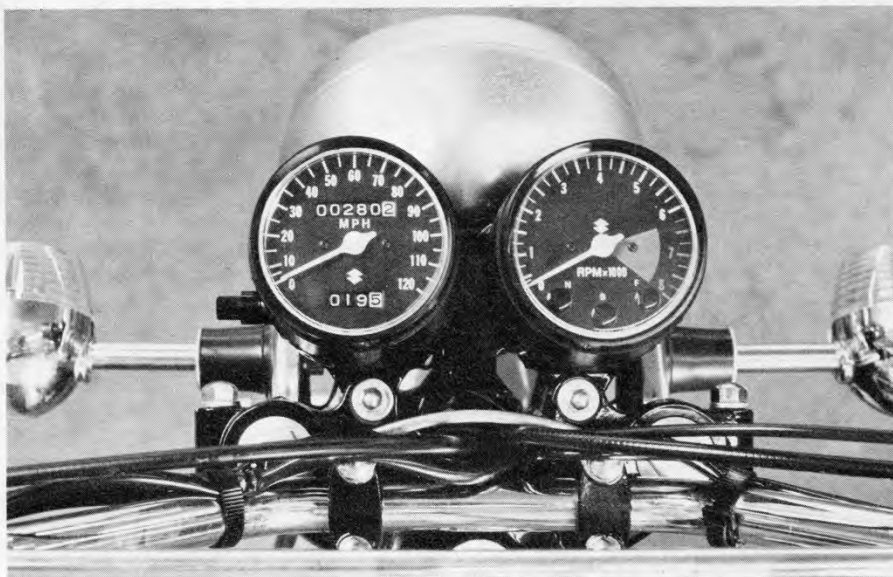
curves could almost be duplicates with the XL revving higher and the Apache pulling down lower. Other interesting similarities show themselves on *Cycle's* specification charts. At 317 pounds (wet), the Apache weighs in at a mere two less than the XL350. Quarter-mile times are very close. The XL is only .37 seconds slower and has the same 77-plus mph terminal speed.

The gutty performance of the Apache makes it an outstanding trail bike engine. With all of the get-to-the ground muscle of a four-stroke, the TS400L is unquestionably the nicest and most civilized off-road engine in the big-bore street/trail machine field. With a moderate 23.23 horsepower the Apache can't match ponies with the Maico 400 Qualifier's 31.42. But then the Apache wasn't built up from a motocrosser. Rather it's been developed as a piece of street oriented equipment. The Apache performs with complacent civility—very appealing to the tyro big single rider. There's no sudden power surge or explosive, front wheel lifting reaction when the throttle is dialed wide open. The engine pulls like a locomotive. It's totally predictable and exceptionally smooth under load. The Apache pulled Webco's dyno with greater smoothness (absent chain lash and bucking) than any over-250 two-stroke to date.

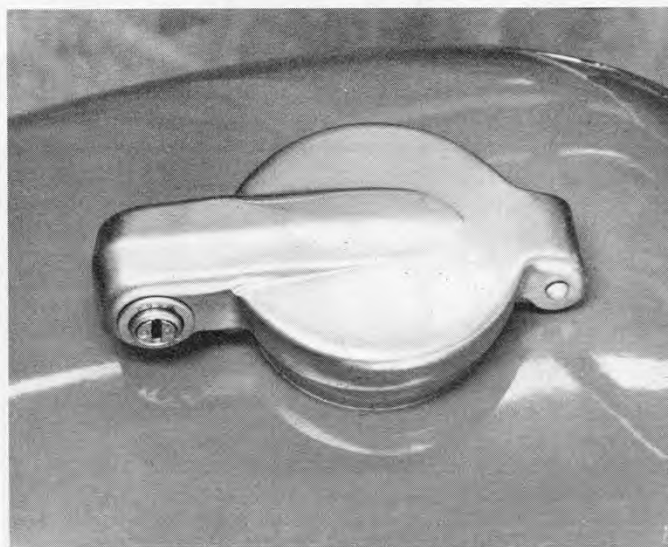
In the dirt this type of smooth and predictable acceleration invites the rider into climbing, uphill sandwashes and goop-filled bogs. Fire roading with the Apache's engine torque is very enjoyable. Downshifting just one cog going into turns gives the rider full power control through a corner while still delivering surprise-free acceleration coming out into the straightaway. It's easy to manipulate engine performance. For the rider who's just getting onto his first really big dirt bike the TS400L Apache engine is perfect.

The gearbox and clutch are tremendously strong units. It would be difficult to imagine anyone being able to need more clutch in any dirt bike engine. The transmission, with its two new gear ratios, is still too closely spaced between cogs. With a near-flat 4000-rpm torque band, the higher gears could be stretched out further and the lower cogs brought down some without appreciably harming power loss between shifts. As is, first gear, with stock secondary sprockets (10/16 T), is far too tall for anything but level dirt roads and street riding. A smaller 15-tooth countershaft sprocket would aid low speed plonking. At 55-plus highway speeds the gutsy engine is spinning 4400 rpm and could easily pull along just as easily if turning much slower—say 3500 rpm.

Operation of the controls is easy and straightforward. All of the light switches are located within thumbs reach. The horn and kill buttons are matching left and right controls that also function at the flick of a thumb. The key switch is in a clumsy location under the gas tank; it could have been more conveniently placed in the



*Vibration shakes the instruments. Far too much front end weight ruins already poor dirt stability.*



*The locking gas cap doesn't leak. Riding range is only 60 miles.*

console center. The clutch and gearbox operate with minimal effort.

The strong 12-volt electrical system produces the best lighting of any dual-purpose bike made. The huge headlamp and bright turn lamps equal the output of any street bike. The re-designed tail light has a shamefully dim running light although the brake lamp is quite bright. The ignition spark is very strong and assures foul-free running at low speeds.

Here the good aspects, all of which are exceptional, of the new TS400L Apache end. In their redesign Suzuki engineers have somehow failed to build a good dual purpose, street/trail, on-off road enduro bike. They re-engineered the old 400 Apache (a really good dual purpose, street-trail machine) into something far less.

The change to the double cradle chassis has not improved either the street or dirt manners of the Apache. In fact both are noticeably worse. The old Apache's forte

*(Continued on page 98)*

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**SUZUKI APACHE** *Continued from page 59*

was asphalt scratching on tight secondary roads. It would hold a precise line, wouldn't wiggle and was virtually unpassable on really demanding, twisty roads. The new L-model, however, tends to oversteer in turns, it wants to dive and hunt on certain road cambers. The chassis or suspension (or both) let the bike squirm more often than the old model. The block pattern compromise tires certainly are not ideal for asphalt; nevertheless the new Apache doesn't handle as well on the street as other enduro bikes shod with similar tires.

The new Apache's handling in the dirt is markedly worse than the street. Known dirt roads with good traction and minimal hazards can be traversed at a moderate pace with some sense of security. Once the terrain becomes slippery or marbly the Apache's top-heaviness (more than the tall XL350 Honda with its high center of gravity) gives the rider the feeling that the tires will squirt out from under him at any time.



In off-road handling and comfort, Suzuki has gone backwards in several areas of design with TS400L. The frame cradles the large engine far higher than is necessary. With the rise of the engine comes increased foot peg and saddle heights which lessen stability at cross-country speeds. The newest motocross-type front forks are longer than previous models and the 21-inch front wheel has a 1.25-inch larger radius than the old Apache. These two changes raise the front of the motorcycle nearly two inches. Even with a downswept exhaust the TS400L has a whopping 9.5 inches of ground clearance at the bottom of the muffler. All of this unnecessary height gives the bike a scary, teetering feeling when trying to ride quickly over rough terrain.

Use of the motocross forks on the new Apache would seem to be a good decision, but that's not the case. *Cycle's* fork com-

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parison (July, 1974) revealed that Japanese forks generally lack good suspension damping. The TS fork suffers from over-damping; so great is the hydraulic rebound restriction, the fork won't return as quickly as it is compressed. In a series of bumps or dips the fork continues to dive, or fails to return to full extension in each successive depression. Finally, you can end up on your nose before you know it.

The spring tension front and rear seems to be well in line of compromise standards. Most riders, light or heavy, have all the tension they need without getting a bone-jarring ride. The rear shocks, inverse of the forks, have very gentle damping that fades away when hot.

Further deterioration of steering control comes from mounting a great deal of street equipment on the fork assembly. Rather than using a smaller diameter headlight and lighter plastic housing, Suzuki has attached a very heavy chrome steel unit on the Apache. It is too heavy, and it lacks the pliability of plastic. The bright chrome produces constant reflective glare into the rider's eyes. The instruments are mounted on a steel plate and shake vigorously as the engine trembles.

With the bug-eyed headlamp projecting eight inches in front of the steering stem center, and the bulk of the turn signals jutting out to the sides, there is considerable pendulum effect on the steering. It's like hanging a five pound weight out on the end of the front fender. This effect makes straight-line stability on dirt down hills a breath-holding experience—even for veteran riders. On slopes and level ground, soft terrain seems to invite the front wheel to drive for the side and slam the fork assembly to its lock.

The saddle and foot peg locations are in normal relationship to most torsos. The saddle is three-quarters length and has a hand strap for passenger security. Buddy pegs are also included. At 21 inches long it's shorter than the little 185 Suzuki trail bikes while being a full one-foot wide at the rear. It's too short for two up and too wide for passenger comfort. Solo riding makes the hand strap roll over and wind up like a large rope to wear harshly on your bottom side. In the dirt the forward slope of the vinyl-covered seat continually drives the rider up on the gas tank. You are constantly pushing yourself back with both arms and legs—very fatiguing.

Getting astride the machine requires a different approach even for long legged riders. You must stand back far enough to clear the right rear turn signal as you swing your leg over the saddle. Half the time we forgot (habit) and cracked our shin. But then we evened it up by catching our right Achilles tendon on the high tail light each time we dismounted. If you trail ride often enough the problem with getting on the Apache will solve itself. The first time you slide out or fall on either side the turn signals will snap off.

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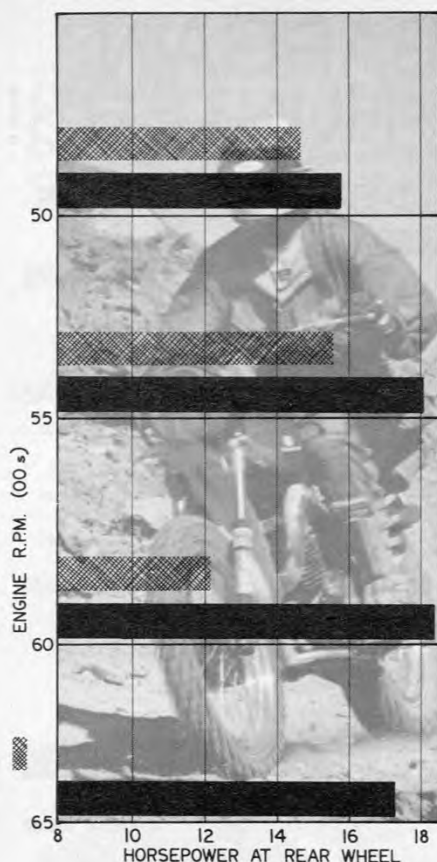
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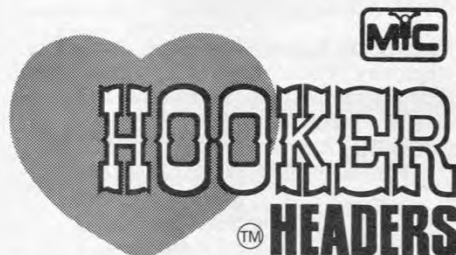
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OCTOBER 1974

The best gas mileage we got was on the road (below 50 mph) was 32 mpg. We averaged in the mid-twenties. Full up with gas this gives the Apache a limited 60-plus mile range; that's far less than adequate. Finer tuning and a bigger gas tank would be absolutely necessary before making any out-of-town jaunts. Everything from handling to gas mileage will discourage a rider from using the L-model off-road. Other than the torque characteristics of the engine, there's nothing to recommend the Apache as a dirt bike.

An electrical failure caused our first test bike to be exchanged for another. The first TS400L smoked profusely (using Suzuki's own CCI oil) while the second bike didn't. The oil pump on the Apache is not adjustable for flow rate (as are other types) so we can't explain the differences.

The all-new air-intake design attempts to reduce induction drone. The air box is located under the seat and the small foam element is readily removed for servicing. The square foam element sits on the intake orifice like a hat. When removed the filter will dump loose dirt into the carburetor mouth.

On the street the TS400L is noisy, smokey and not particularly pleasing to ride. Even with all its torque we had to rev the engine when leaving a stop light to assure that it didn't suddenly cough and stop. The vibration is tolerable but not appealing.

Both engines refused to run smoothly under steady throttle at any speed. There seemed to be a mis-match of carburetion, port timing and exhaust. On the asphalt the engines bucked and belched at uneven intervals. As operating temperatures rose and fell the engine would detonate with irregular loud pings and then let the piston rattle furiously.

Suzuki calls the 400L an *enduro* bike but it falls short of those requirements except for the engine's tremendous torque band. It's less at home in the dirt than the XL350 Honda, 360 Yamaha Enduro, or even the Kawasaki 350 F-9 Bighorn. Where the old Apache could really give any bike a hard time on the tight secondary roads, the new TS400L is a follower, not a leader.

Suzuki changed the Apache because marketing research and buyers' surveys told Suzuki that enduro bikes spend most of their life on the street, not the trail. Consequently they responded by attempting to make the Apache enduro more streetable while retaining appealing off-road handling, comfort and performance. Their effort missed.

Had Suzuki made the Apache more dirtable by using just a dash of their world championship motocross experience they would have had a tremendous big-bore enduro bike. But they went in the other direction and made the TS400L a mediocre street machine and as well as an unacceptable dirt bike. In the process we lost an old friend.

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