



ISAAC NEWTON would have approved. It was Sir Isaac's Second Law of Motion: Force = Mass x Acceleration, that first explained the relationship between an object's weight and how that would affect its dynamic behavior. In fact, you could call Newton the godfather of Power/Weight Ratio-based performance, and Lotus' Colin Chapman his greatest disciple. And no street-legal motorcycle illustrates the physics better than the DR-Z400SM.

Based on the highly regarded DR-Z400S dual-sport, obsessive calorie counting has resulted in a full-up wet weight of just 318.5 lbs, pushed by 33.4 horsepower measured at the back wheel. It doesn't sound like enough to be exciting, but it most certainly is.

The SM designation stands for Super-Moto, the latest competition craze, wherein lightweight four-stroke motocross bikes are modified with big brakes and 17-inch wheels to race on combination dirt and asphalt race courses. The concept goes back to the "Superbikers" a made-for-TV event that ran on ABC's Wide World Of Sports from 1979 to 1985, which pitted talented motorcyclists from all disciplines against one another on individually modified, run-what-ya-brung bikes. The idea appeared to die out when the TV series expired, but was resurrected by the French a few years ago, and has since proved very popular in Europe with a growing following in America. Although serious competition machines have been produced for the class by KTM, Husqvarna and others, the new Suzuki is the first Japanese super-moto to be sold in America, and is completely street legal as delivered, unlike some of the European models. Its arrival in Suzuki's US warehouses has been largely unheralded, as if the company wanted to test the waters before committing serious advertising dollars. But we're here to tell you that if you like minimalist machines, you'll really like the Suzuki DR-Z400SM.

It's not necessary to think of the SMs just a competition bike with lights, because as the Europeans have found, the supermoto also makes a perfect urban assault vehicle, probably quicker from point A to point B in densely populated cities than just about any other motorcycle, as well as a terrific sportbike where rougher and poorly kept roads predominate.

THE MOTOR

If you were disappointed that the latest 450cc MX engine wasn't chosen to power the bike, consider that all the state-of-the-art four-stroke motocross engines are very highly stressed and maintenance intensive. They also weren't designed to pass emissions or the dura-

bility cycles required for compliance. The DR400S motor was. And it's no slouch either. With a bore of stroke of 90mm x 62.6mm, it will rev much higher than larger displacement singles, hitting the rev limiter at 9750 rpm. Remember that an engine's rev range is an under-appreciated measure of its true performance. When two engines make the same horsepower, but one revs 50% higher, the area under the power curve is much larger for the higher-revving motor, and quarter-mile times back up the significance of the difference.

Counterbalanced so that it is very smooth running, it won't try to shed nuts and bolts at high revs or tire the rider. To achieve 33.4 hp from 24.3 cubic inches (398cc) the engine uses dual overhead cams to operate four very large valves; pairs of 36mm intakes and 29mm exhausts, surrounding a centrally located spark plug for quick, efficient combustion. The piston is a forged slipper type, to reduce reciprocating weight by at least 10% over a more conventional cast slug. The piston's top ring is an expensive L-section Dykes-type, which reduces emissions by reducing trapped fuel while it improves sealing efficiency. The aluminum cylinder uses no iron liner, but instead is plated with Suzuki's proprietary nickel-silicon-phosphorus-carbide (SECM) material to improve heat transfer and reduce engine weight. And finally, the fuel enters via a big 36mm Mikuni CV carb. Although it could no doubt be tuned to make even more power, as delivered it gives a broad torque curve that makes a harmonious match for the machine's weight and five-speed transmission. The overall effect is a smooth steady flow that's easy to modulate.

Liquid-cooled for efficiency, a thermostatically controlled fan will engage in slow traffic to maintain airflow. Otherwise, the big air-scoops, sized for slower going on dirt, will direct plenty of airflow over the slim radiators on either side.

The transmission shifts easily and the ratio spread has been worked out to optimize pull between gears. Although we would have welcomed a sixth gear, we were satisfied with five. (Note that the motocross four-strokes often have only four gears.) The clutch is cable operated, the pull is light and the engagement range is wide enough to make it easy to slip precisely.

Fuel efficiency is another benefit obtained from Newton's Second Law, and we achieved nearly 45 mpg on average, riding enthusiastically. Although we never tried riding for fuel efficiency, we'd guess 50 mpg would have been possible.

An electric starter is fitted and the engine features an automatic decompression device to ease starting effort. A choke button is fitted to the side of the carb and is necessary whenever the engine's even moderately cold. After a minute or so, it will be warm enough to run without the extra enrichment.

ROLLING CHASSIS

Similar in design to Suzuki's motocross bikes, the SM's chassis is a lightweight chromoly steel construction with the engine oil contained in the backbone and front downtube, so that the engine can be a dry-sump design, in order to keep the engine's weight low in the frame. A bash plate protects the crankcase, but with nearly a foot of ground clearance, it shouldn't get scratched on pavement or even dirt roads.

The lightweight plastic side panels are attached with D-ring Dzus fasteners, so that you have fast access to the air filter or battery. Incidentally, the battery is a compact 12V/10Amp/Hr unit and resides under the left number panel opposite the muffler, where it is

fitted into a heavily ribbed rubber case, to better withstand impacts. However, as a dirt-bike at heart, the alternator is not sized to support the draw of many electrical accessories, so be warned.

Suspension components are top notch. The massive inverted cartridge forks were lifted from the RM-250 motocross bike's and have gold-anodized stanchions that have been artfully tapered to reduce unnecessary weight and treated sliders to reduce friction. Adjustments include compression and rebound damping as well as bleed screws on top to eliminate trapped air pressure. Travel is 10.2", for off-road-racer levels of bump absorption. However, no preload provision is provided, as the handlebars ride so close to the tops of the forks they don't allow room for adjusters. This arrangement is identical to most motocross bikes, where it is expected that any quibble with the strength of the fork springs will be resolved by fitting new springs. Unfortunately, this was the one area where we felt the stock suspension could be improved. The springs were considered perhaps 10-15% too soft by all our testers. We were tempted to install short PVC spacers to compensate, but were warned that travel can then be restricted as well. However, if you don't weigh over 150 lbs., you might be happy with the stock fork springs.



The rear shock is the first on the street in our experience to offer both high and low-speed compression damping, something you typically only find on high-end motocross equipment or expensive road-racing shocks. A remote reservoir type for fade resistance, it is also rebound and preload adjustable. The rear travel is 10.9".

However, even with the slightly soft front springs, this is exceptional suspension and the ride is terrific, Barcalounger plush yet with great control and feedback, again thanks to the machine's light weight. Other than the non-adjustable front preload, we couldn't think of any way to improve it.

Brakes are an area where super-motos depart sharply from their dirt-bike counterparts and the equipment on the SM is again unique. The front disc is a big 310mm unit that's both thin in radial section and heavily drilled to reduce its weight further. Even a few holes in a brake disc increases its efficiency, as the gasses that otherwise build up between the pad and disc can be evacuated and any debris that might tend to get caught and score the disc or pads can usually exit before doing damage. The front caliper is a two-piston, single-action type, lighter than a four-piston unit would be. Together they create powerful stopping force but are never grabby, making them ideal for good control on slippery surfaces as well as good pavement.

The rear brake is another Swiss-cheesed disc, this one of 240mm, slowed by a single piston caliper. We were impressed with the rear brake's slowing power as well as how easy it was to avoid sliding the rear tire.

The wheels are what really identify a super-moto. The enduro bike's lightweight hubs are laced to wide 17-inch black-anodized aluminum hoops in 3.50 and 4.50 widths front and back. And the tires are special, too, H-rated Dunlop Sportmax 208-compound radi-

als in 120/70 front and 140/70 rear sizes. The pressures specified are just 25 psi front and 29 back (solo, or 33 psi rear with a passenger). These things get noticeably hot and tacky in normal use and stick like glue to the turns. If they weren't fitted to a bike like the SM, they probably wouldn't last very long.

RIDING IMPRESSION

Initially, the bike feels impossibly tall and short, and we wondered how it could handle securely with such an extreme layout. It took a while to adjust, but adjust we did. The first thing we learned was to be as smooth as possible. In fact, so little body movement is necessary, unless speeds were very high, we'd just lean the bike under us, like you would a dirt bike. Of course, there was never a need to conserve lean angle with the high ground clearance and narrow footpegs. If the bike felt blown around too much on the freeway, we'd just hug the tank with our knees, so that we would be less likely to over-control the handlebars. The way the bike can be balanced with the rider's weight is another rare treat. Sitting in the center of the bike, you could easily influence which end got more grip as you shifted the weight of your torso front and back.

On twisty roads, the bike's bottomless suspension insures that tires stay in constant contact with the road, and even on really rough ground that would get any other bike airborne, the SM stayed securely planted. Even better is the exquisite accuracy of the steering, enabling you to place the bike precisely where you want for maximum traction. During testing, the only limit to our tested stopping distances was the tendency to nose-stand (stoppie), which was aggravated by the softish fork springs and high Center of Gravity.

The carbureted engine is a model of smooth control, never abrupt, and provides surprisingly adequate performance. Only in high-speed passing could we have asked for more horsepower. (However, all the aftermarket goodies created for the popular DR-Z400S enduro will bolt right on.)

INSTRUMENT/CONTROLS

Like the enduro model, the SM gets a trick digital instrument cluster with a bright speedo, dual trips, odometer, clock and even a stopwatch. Subtraction functions are available on the trips and stopwatch as well. However, there is no tachometer, and you'd probably be freaked if there were. The little engine wails to keep your pace high, turning 6170 rpm (calculated) @ 65 mph and 7595 @ 80 mph in top gear, but doesn't protest. In fact, the valve adjustment interval, 14,500 miles, suggests it will rev like this all day without frequent maintenance. Also, both the shifter and brake pedal have folding tips, a neat feature for hard-core use and the handlebars are braced for good measure.

However, the sore spot in the package, the seat, will make you think the SM stands for sado-masochism. A towel over a two-by-four would be as soft. Worse, the top of the seat is so narrow that it fits between the bony rails of the pelvis, like some perverse wedge. If you didn't have hemorrhoids before, you will if you don't fix it. Thankfully, we have an Air-Hawk pad stashed for such occasions. Without it, 50 miles would have been too far, with it, we had an ugly seat we could ride all day. At least upholstery is a cheap fix, as fixes go. What were they thinking?

BOTTOM LINE

To give Suzuki credit, not only are they the first Japanese company in the game stateside, but their machine is perhaps a purer expression of the concept than the street-legal 650cc supermotos that are available overseas from Honda and Yamaha. The SM's motor makes more power per cubic inch and is in a much lighter chassis than the bigger-bore machines. There won't be a lot to go around, so, if you want one, don't wait. And when you're grinning from ear-to-ear, don't forget to thank Isaac Newton for the brilliant idea. 🍌