

Coming Attractions

THE EVOLVING TECHNOLOGY of motorcycling: Kawasaki's new ZX-14 is the second hypersport in a month to combine unbelievable power in a perfectly docile package. Suzuki's GSX-R1000 was the first. Although they might look like "Star Wars" props, which is only fair, given the Jekyll and Hyde extremes of their personalities, both are ridiculously easy to manage, even at bumper-to-bumper traffic speeds, with rheostat-like throttles that serve up precise quantities of horsepower from idle to redline. None of the old, fluffy off-idle throttle response, deep holes in the powerband, or sudden surges of power to catch you off-guard that used to be standard fare on engines with big mixers and high-lift, long overlap cams. Nope, these new engines not only produce unheard-of levels of performance, but they have been so well tamed that even those of us who don't hold FIA superlicenses can enjoy them.

My sense of how they've done it suggests the technology filtered down from Formula One, through Moto GP and finally to the street. (Isn't it great when racing really does improve the breed?)

As one who pores over the minutiae of factory press kits every month, such impeccable drivability from such highly tuned engines began with 32-bit engine management, because it can be mapped so finely and consider so many variables: Like gear position and road speed, in addition to throttle position and a plethora of sensors designed to specify the precise combustibility of the mixture in the cylinders, as well as ascertain the accuracy of the mapped predictions and correct for deviation.

Double-butterfly throttle bodies, where the rider's twistgrip actuates one butterfly, which is placed below a master butterfly controlled by the engine management computer, appeared at the same time. Your hand signals the computer your intention, but ultimately, the level of airflow allowed is predetermined to prevent such a vacuum drop that the engine stalls rather than accelerates.

Anyone who's ridden big four-stroke singles fitted with throttle-slide carburetors knows the extent of the problem. If you'd open the throttle too quickly from low speeds, venturi vacuum would drop suddenly, killing the signal to deliver more fuel through the carburetor jets. Because the carb couldn't respond properly, the engine would bog, or even stall-out completely at very low rpm. Lesson: Twist slower.

An accelerator pump, which was standard on certain Dellorto "pumper" models, prevented this problem, but perhaps for reasons of cost, few of the engines that needed



them ever got them in stock form. Now, fuel injection performs the accelerator pump functions, but there is still a limit as to how quickly an engine can be given air.

If it occurred to you to wonder why you'd even need the lower butterfly if it's essentially only making suggestions, the answer apparently lies in computing power. In the next wave, we'll see more of Yamaha's new "fly-by-wire" system. The YZF-R6 has only one butterfly, and the rider's input goes straight to the computer, where it does not create an obstruction to airflow the way a brass butterfly valve and its shaft do. But, even a single 32-bit processor appears inadequate to handle the complexity of this additional task, and the R6 uses a pair working in tandem. Its drivability is flawless.

Another factor: I was a fan of Yamaha's EXUP backpressure control valve from the very beginning, as I knew first-hand how more backpressure could allow a high-strung engine to regain clean lower-rpm pulling power. My good friend John Brady had purchased an old Lotus 7 autocross car, and he let me check it out, hoping to find solutions to a couple of issues. Correcting the toe-out that worked for autocross made the car much more stable on the street, and on a test ride through the Santa Barbara mountains, I rode shotgun on the left side, where the Lotus' barely muffled exhaust exited next to my hip. The highly tuned engine was nearly gutless at low rpm, and having seen what a change just mufflers could create, I experimented with using a leather-bound map book I found on the floor of the car to close and pressurize the 4-inch outlet as John powered out of corners. The improvement was tremendous, sug-

gesting that even some simple form of spring-loaded trap door, like you see on the tall exhaust stacks of diesel trucks, would work effectively.

Yamaha's patent on the idea has obviously expired and several complicated variations over the years were obviously a way to invent around their claims. Suzuki kept it simple, a basic butterfly valve in the exhaust, like a choke valve in a carburetor, and it works very well. I was surprised that the new ZX-14 didn't have any backpressure control valve, relying on ample displacement for its mid-range punch apparently. But the 14's bottom end actually felt a touch softer than the Suzuki GSX-R1000's we tested last month, which says they still make a big difference.

Four-piston, four-pad calipers are the other coming attraction. Why we waited for years to see their more widespread use puzzled me, as I'd been very impressed ever since first trying them on a Ducati 749S at a challenging wet racetrack in Spain. But this month, KTM's 950SM wears them (again they are "awesome," to quote Walt Fulton) and so does the ZX-14 Ninja. Coming soon to a dealer near you...

I had a chat with Bruce Stjernstrom, Kawasaki's Marketing Manager, as we both waited in the Las Vegas airport for flights home, and he explained, to the best of his ability to someone who never took economics, why we can't always have it all; that is, every trick goodie we just know would make a bike better.

Any parts that are not actually produced by a motorcycle manufacturer (for instance Kawasaki builds its own frames and engines, but buys suspension and brakes, etc.) are expensive by comparison. And the manufacturer must make a profit when selling to its American subsidiary, who must make a profit when sells to its dealers, who must make a profit from you, the customer. All the levels of mark up are what drive the cost of let's say cartridge forks, from a few bucks to a situation where their marketing advantage must be weighed against the pricing of competitive models, so that trade-offs, of this feature for that, keeping an eye on the target demographic, result in the content of the models we buy.

Of course, as new technology inevitably comes down in price, the features we first see on premium models will become more common. Cool!

DAVE SEARLE

—Dave Searle
Editor