

Open Road

Formula MPG

RACING MOTORCYCLES HAVE given US many of the developments that have become standard equipment on street bikes. Things like electronic traction control, fly-by-wire throttles, and radial-mount monobloc brake calipers are just a few of the most recent crossovers. But racing rules are not necessarily designed just to advance the state of the art. Just as often they are designed to reduce complexity, cost or speeds as a way to increase competition or improve safety.

Prior to WWII, supercharging was almost universal on both two- and four-stroke race bikes. But after the war, it was banned as a necessary austerity measure, to get more entrants on the grid. Since then, the rules have restricted entrants to “normally aspirated” engines. However, automobiles have realized much greater fuel efficiency with turbocharging.

When the “Japanese Invasion” of Grand Prix road racing started in the late Fifties, the number of cylinders as well as the number of transmission ratios quickly multiplied as a way to obtain the most useable power from high-rpm engines (over 20,000 rpm on the sixes). But by 1968, the pace of the development race had become so expensive that, of the Japanese, only Yamaha remained. We now get no more than six-speed transmissions on our street bikes primarily because that’s all race bikes were allowed by new rules that attempted to control costs. But consider that the latest automatic transmissions in cars have eight speeds in an effort to provide high performance with maximum fuel mileage.

Aerodynamic developments reached their heyday in racing in the Fifties as well, when so-called “dustbin fairings” that encapsulated the front wheel resulted in a torpedo-like shape that revealed how much speed could be obtained by streamlining. We’ve no doubt all heard that side-wind susceptibility doomed this avenue, and dustbin fairings were banned in 1957 after several fatal accidents. But apparently not all dustbin-faired motorcycles were equally affected. Moto Guzzi, for instance, had its own wind tunnel, and it has been reported that its bikes were not as vulnerable to this aero instability as others. Were all of them banned as a way to eliminate the “unfair advantage” of superior resources, or were they, as we have been led to conclude, patently unsafe? Motorcycles currently have some of the worst aerodynamics on the road, and even SUVs have better coefficients of drag. What could we accomplish if bikes were as slippery as automobiles?



And while racing has always been about the fastest lap times and highest speeds, what can it teach us about fuel efficiency? What if there were a recognized class for high-mileage motorcycles? Like the Index of Efficiency class at Le Mans? Nothing breeds improvement faster than competition. If we were to include a 100 mpg minimum rule on the class, imagine what we might see.

Gasoline is ever more expensive, and we currently import between 64%–65% of our oil. Creating efficient motorcycles that are both fun to ride and thrifty with fuel should be a source of national pride.

And they don’t need to be electric. With the lesson of the automotive X Prize as a precedent, I believe liquid-fueled engines will outperform electrics if given a similar effort at efficiency rather than simply pursuing high performance. The top X Prize-winning car was powered by a Yamaha 250cc four-valve single fitted with a turbocharger. It was much lighter than its battery powered competition, creating major benefits to its braking, handling and acceleration (all of which are also fun factors).

What if motorcycle-friendly insurance companies backed such a class for street bikes by giving reduced premiums for a period of five years as an incentive? Don’t forget that insurance breaks given to motorcycles with sidecars in Britain became the impetus behind the development of several clever alternative three-wheelers.

Imagine a way to encourage their development without corporate average fuel economy requirements, mandates, or taxpayer funded rebates, which are inevitably unfair, while technical dictates are always resented and handled with less than

complete enthusiasm by those who must implement them.

Let’s say 40 mpg is close to the industry average fuel economy. Craig Vetter suggests we eliminate our dependence on foreign oil by efficiency alone, so we shoot for 120 mpg. How much would that save you in fuel costs per month compared to what you are riding or driving now?

What form would such vehicles take? Somewhere around 200cc is probably close to optimum, and it’s interesting to note that several of the original Craig Vetter fuel economy contests were won by 185cc thumpers.

It’s clear from the state of automotive design that we would want more transmission ratios than six, so the engine could deliver no more rpm than necessary to produce the power needed to attain freeway speeds. And excellent aerodynamics will reduce this power demand to a minimum. Could recumbents like Dan Gurney’s Alligators be the low-drag solution?

High-tech diesels would be advantageous too. Already fuel efficient with high torque outputs, they could be good in a motorcycle application. The most modern diesels use turbochargers to recycle the energy of the waste exhaust gas to boost intake pressure and power. An intercooler reduces the temperature of the air flowing from the hot impeller to improve thermodynamic efficiency. Direct fuel injection further improves efficiency by reducing heat losses and optimizing the moment of fuel introduction. It’s all used on many “car-of-the-year” diesel automobiles, as well as diesel-engined endurance racing cars, which use their great fuel economy advantage over gasoline-engined cars to save precious time on pit stops.

While the final Vetter event winner in 1985 was a compact streamliner that achieved 470 mpg from a relatively conventional four-stroke engine, with more modern technology, we should be able to provide 120 mpg economy and exciting performance at the same time.

Vetter himself has decided it’s time to reprise the contests. He organized his first fuel economy challenge of 2011 at the May Quail Motorcycle Gathering in Carmel, and the second at the July AMA Vintage Days in Lexington.

Maybe our next project bike should test high-mileage methods. What do you think?

DAVE SEARLE

—Dave Searle
Editor