This is not the place to be performing testing for calibration work. The controlled environment of a dyno cell is a much safer and more consistent setting. Testing on the street should be limited to final drivability critiquing.

when adding that last couple degrees of spark advance during the power pulls. Even though the engine may pull clean and strong on the dynamometer with lower load, it's not uncommon to see the same engine self destruct at the 1,000-foot mark of the drag strip where aerodynamic and thermal forces have aligned against an overly aggressive tune. That extra 20 rwhp from the hot tune-up are of little condolence when staring at an expensive rebuild.

At lower loads, an inertial dynamometer is still a handicap. Since the inertial dynamometer works fundamentally upon Newton's second law (F=ma), any increase in the force provided by the engine results in some acceleration of the dynamometer. This makes it impossible to hold a constant load at anything other than light loads equal to the friction of the dynamometer and driveline. At best, the result is a series of sweep tests dynamically through the speed range that still does not yield valuable steady state calibration data for the base maps. In short, an inertial dynamometer is the wrong tool for tuning speed density systems where it is critical to get a wide range of stable readings at specific speed-load points.

While a loaded dynamometer certainly makes for a more flexible and precise tuning experience, it still doesn't define the entire range of tests necessary for truly optimized engine calibration. The load-bearing dyno should be used as a tool to develop the steady state maps and controlled sweep rate tests at WOT in a safe environment. After these objectives have been met, it's preferable to actually drive the vehicle in a free environment to experience as many possible operational conditions as possible. A quick test drive after an initial dynamometer tune may help the calibrator zero in on a specific speed-load point in a particular gear where something does not feel right. This allows the calibrator to return to the dynamometer with the more specific task of fixing either fuel or spark trims in a narrower range of cells that may not have been completely optimized the first time around. Driving on the street also exercises the transmission, driveline, and brakes differently than on a dyno. The addition of new forces may open up the calibrator's eyes to some other area of the software that may need additional attention such as dashpot or coastdown airflow control. It is strongly encouraged to test drive the vehicle after tuning is completed whenever possible.

Trusting Marginal Measurement Equipment

The high-performance aftermarket is rife with affordable tuning aids these days. Test equipment is one of the areas where the old adage, "You get what you pay for," still holds true. Everything from chassis dynamometers to wideband oxygen sensors is available to the public in a surprising amount of