

confusion from transient fuel delivery as previously mentioned.

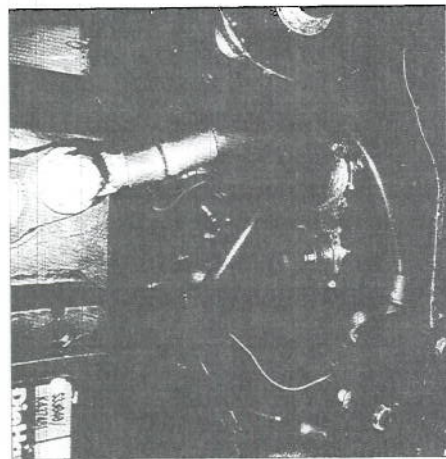
The simple fact here is that a skilled calibrator can get more work done on a proper load bearing dyno than most "tuners" can do in weeks on the road. Getting the fundamental steady state tables correctly calibrated on a dynamometer can save endless hours and gallons of fuel during road testing. When done correctly, dynamometer calibration makes the overall tuning process faster, more accurate, and more enjoyable. It's just as important to recognize that tuning usually doesn't end with the last dyno pull.

Tuning Only on the Dyno

Just as there are those who swear by "real world" tuning only on road

surfaces, there are those who insist that their dynamometer is the only method by which calibration can and should be done. Certainly, dyno tuning is an excellent start to any complete calibration procedure. The trick is to recognize that the engine does not live in a steady state world. Even steps on the dynamometer do not precisely replicate the transients seen as a vehicle shifts through the gears on the street or track.

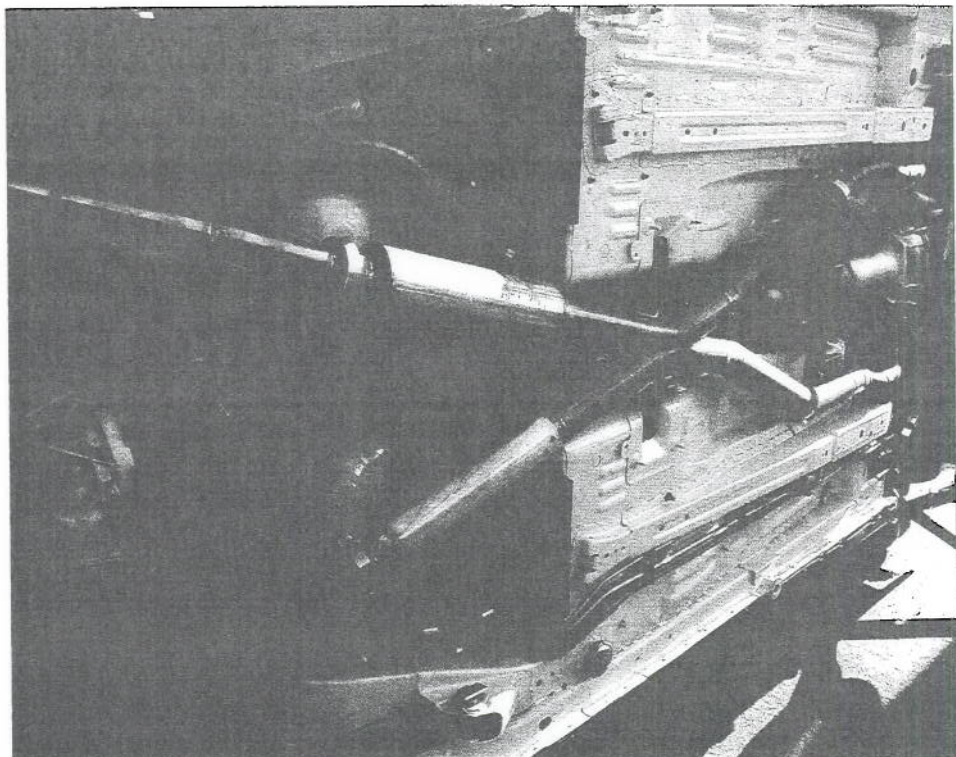
Worse yet, many paid tuning professionals swear by testing on an unloaded dynamometer as the only necessary approach. At WOT, the sweep rate of an unloaded or inertial dynamometer can be much faster than the vehicle sees in the outside world. This allows less time for combustion temperatures to stabilize, perhaps giving a false sense of security



Robust electrical connections can prevent loads of frustration, both during the tuning process and later on as the vehicle is subjected to vibration and a harsh environment. This military spec bulkhead connection is about as good as it gets for connection security.

looking for and tune these steady state tables in fairly short order.

At the OEM level, all ECU calibrations start out on the dynamometer before ever seeing a vehicle. The engine's efforts on a load bearing dynamometer can be both above and below those seen when driving down the road. What's important is that each breakpoint of the reference tables be individually optimized so that any time the engine is between two of them, an accurate interpolation can be made. Driving on the road can make it very difficult to hold the engine precisely at each cell in the table if the available load breakpoints don't line up with easily achievable loads seen in the various gears. Even more importantly, it's just about impossible for anyone in an urban area to find a road long enough with zero traffic to safely perform the necessary steady state measurements. Skipping the steady state measurements only opens the door for more



Before beginning any tuning session, it's a good idea to look the vehicle over for fluid leaks or other mechanical issues. All fluid lines should be routed away from hot exhaust components, as a failure on the dyno can be very dangerous in a confined space.