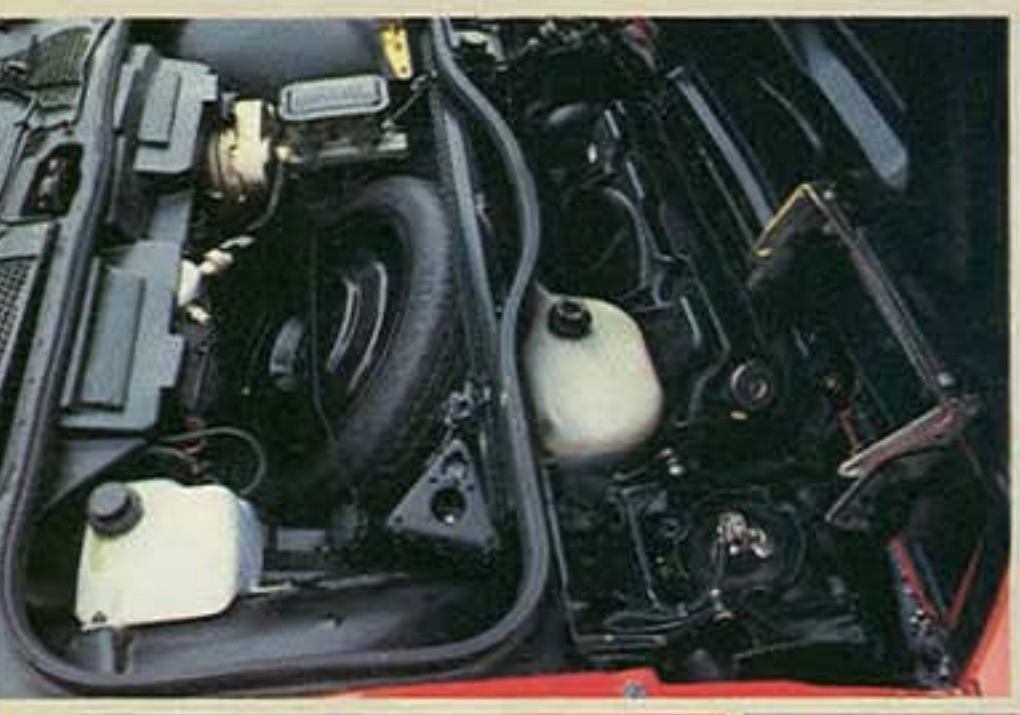
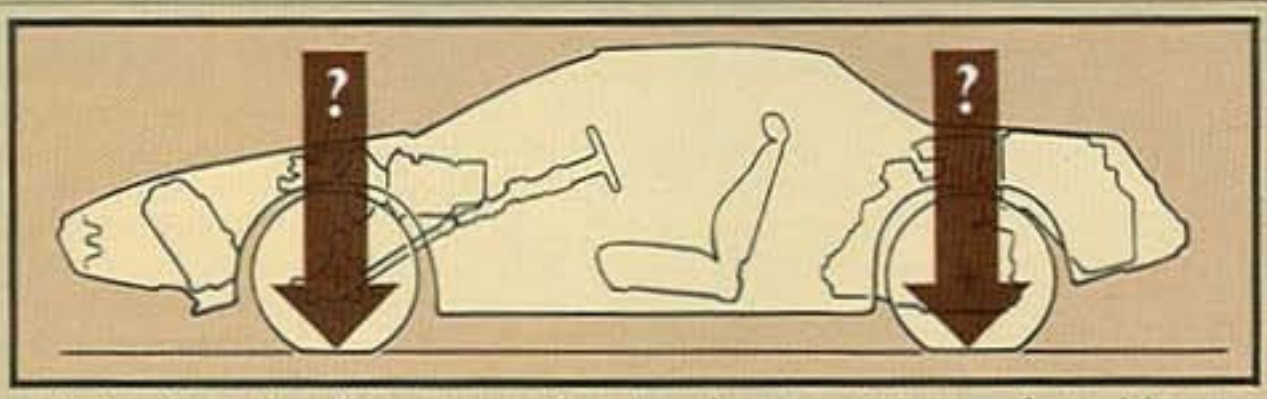


the Fiero's price, gas mileage, handling, and pure sex appeal should carry Pontiac's assault on road boredom to success beyond the General's wildest prognostications. That will set the stage for phase two, when massive horsepower injections will put some fire into the Fiero. So don your Nomex and man the extinguishers: Pontiac's incendiary bomb is aimed squarely at the Japanese, at Porsche, and at the Corvette.

—Don Sherman

Technical Highlights

• Although the mid-engine configuration with its attendant rear weight bias is universally accepted as optimal for race cars, a 50/50 weight distribution still has the magic ring when it comes to high-performance street machines. Pontiac has chosen the racing layout for the new Fiero, so it's appropriate to take a hard look at the conventional wisdom.



Since overall performance in any car is dependent on the forces that can be exerted on the pavement, an examination of any aspect of vehicle dynamics must center on the tires and their loading. The simplest case is acceleration. Hard acceleration depends on traction, and traction is a result of vertical forces pressing the tires to the pavement. Obviously, rear-heavy, rear-drive cars and front-heavy, front-drive cars have the advantage. But rear drive holds the edge once the car is in motion, because load transfer during acceleration increases the vertical force on the driving wheels. Conversely, front-drivers lose vertical loading and traction with acceleration.

During braking, optimal traction—and therefore the shortest stopping distances—result from equal loading of all four tires. Although 50/50 seems like the obvious solution, dynamic load transfer must also be taken into account. In the case of the Fiero, with its 93.4-inch wheelbase and 19.5-inch-high center of gravity, about seventeen percent of the total vertical tire load is transferred from the rear to the front tires during a hard (0.8 g) stop. Thus vertical loading changes the weight distribution from the static 43.5 percent front/56.5 percent rear to 60.5/39.5 percent. Although this transfer results in far from equal loading, it's much better than the 67/33 distribution a 50/50 car would have under the same circumstances. Obviously, a nose-heavy, front-drive car would suffer even more. All other parameters being equal, a rear-heavy car has far greater stopping potential.

An extensive General Motors study has shown that 50/50 distribution is best for steady-state cornering in a rear-drive car, although slight variances from perfect balance (say, 51/49 to 49/51 F/R) were not found to be significant. Front-drivers, of course, do not fall within this narrow window, since packaging necessities place too much weight up front.

Most cornering is not done at steady speeds, however, but is combined with acceleration or braking. The result is far more complicated vehicle dynamics. According to the handling experts