Vehicle Mismatch: A Critical New Safety Defect Issue

by Byron Bloch, Auto Safety Expert

Auto Safety Design, Inc.
7731 Tuckerman Lane, Potomac, Maryland 20854
www.AutoSafetyExpert.com
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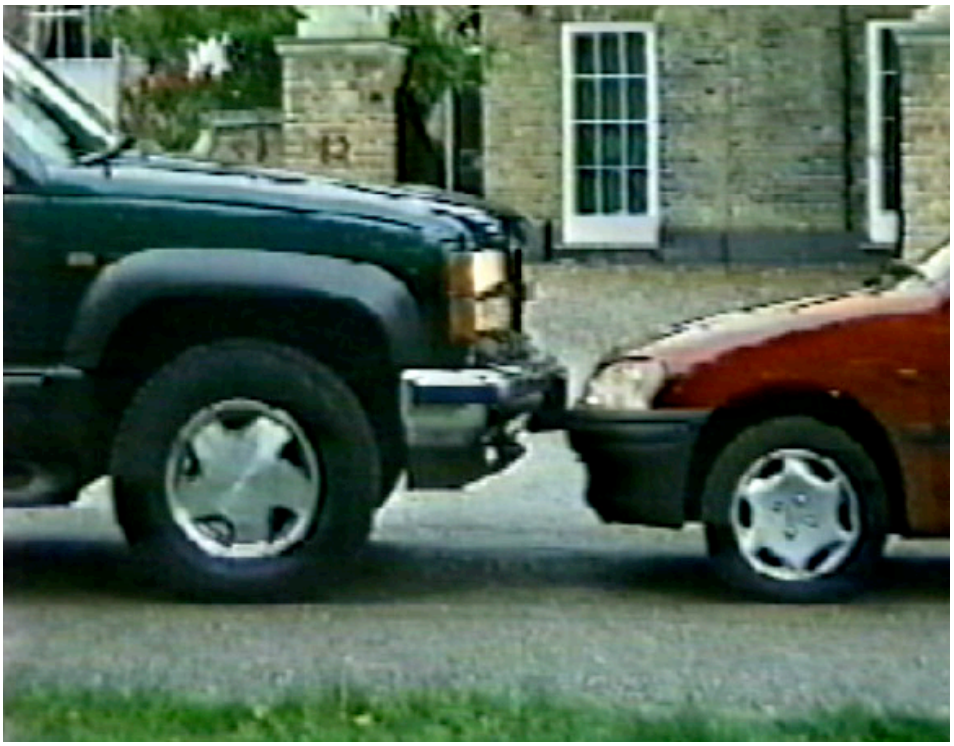


THE LETHAL MISMATCH OF LARGE, HEAVY SUV'S *VERSUS* CARS

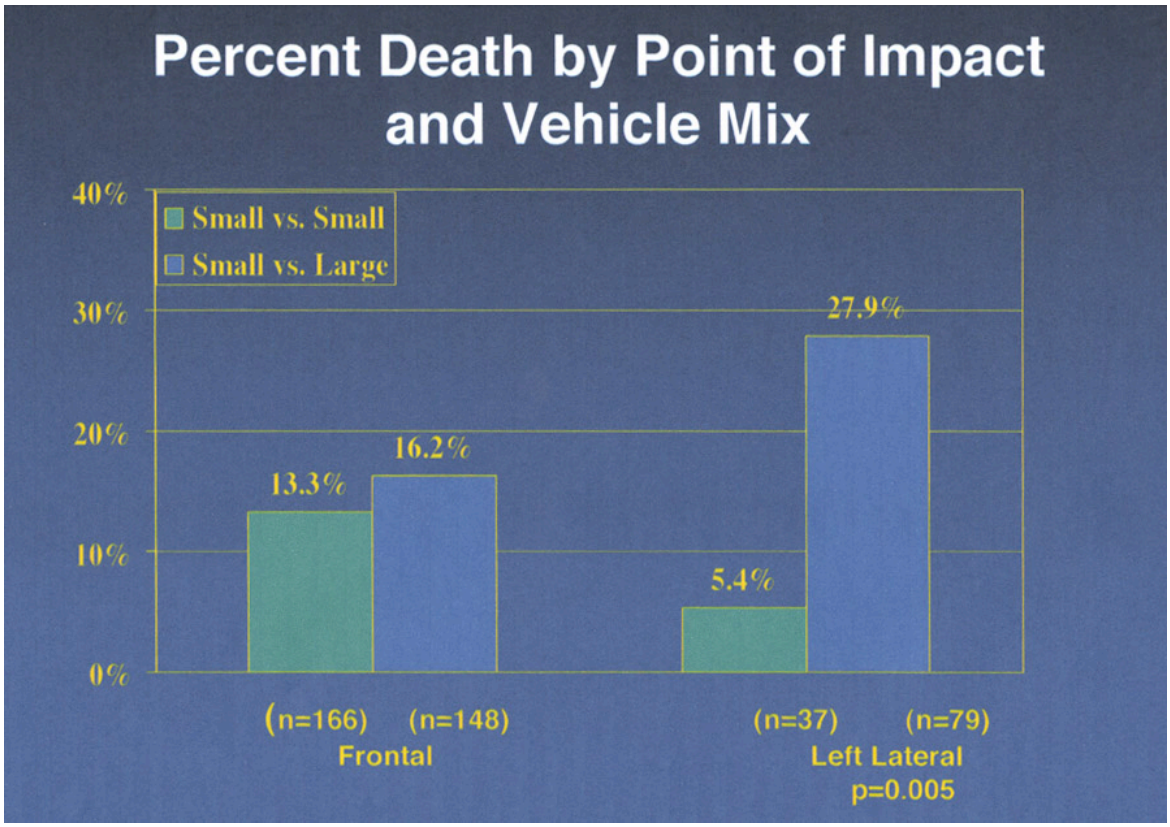
We all are aware of the giant SUVs (Sport Utility Vehicles) and enormous tractor-trailer rigs on the streets and highways across our Nation, and we may have moments of anxiety when we think of what may happen if one of those larger, heavier vehicles crashes into our car or mini-van. Is it just a matter of size, with nothing that a vehicle manufacturer can do to better protect us, or are there safety issues and compromises that needlessly increase the odds of severe to fatal injuries in such *vehicle mismatch* collision accidents ?

Most automakers design and market a diverse mix of vehicle types and sizes. Ford makes the small 2,600 lbs. Focus, the standard-size 3,400 lbs. Taurus, and the giant 7,270 lbs. Excursion and 5,900 lbs. Expedition SUVs. Chrysler makes the small Neon, the standard-size Intrepid, and the 5,300 lbs. Dodge Durango SUV and Ram pickup. GM makes the small Cavalier, the standard-size Lumina, and the giant 5,500 lbs. Chevy

Suburban and GMC Yukon SUVs. Toyota makes the smaller Prius, the standard-size Camry, and the giant 5,400 Land Cruiser SUV. SUVs and pickups and full-size vans are classified as "LTVs", which stands for Light Trucks and Vans… and many are based on the automaker's light truck chassis.

If a smaller vehicle collides with a larger, heavier vehicle… whether by the same manufacturer or not… is there a potential issue of *"defective design"* for the automaker's failure to include sufficient protection or *"crashworthiness"* for the occupants of the smaller vehicle in such *forseeable* collision accidents ? And what about the larger, heavier vehicle… should it have been designed to somehow minimize any adverse effects on smaller vehicles that it may crash into ?

It has long been recognized that there are vehicle mismatches in everyday traffic. When the so-called "subcompacts" first entered the market in the 1960's and early-1970's, there was concern that a small car placed its occupants at greater risk of severe to fatal injury than would be the case for occupants of a larger, heavier car. Some would say it's a simple matter of physics, that a larger, heavier object will inflict more damage in a collision with a smaller, lighter object. Okay, let's assume that basic premise, but then ask if the automakers should therefore have an extra responsibility to include safety technology that can somehow equalize the mismatch, and help prevent needless death and injury.



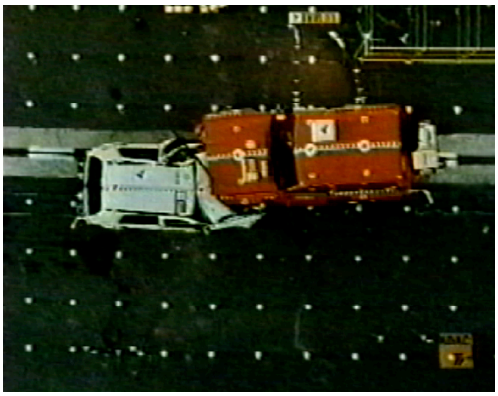
VEHICLE MISMATCH DEFECTS: TRUCK UNDERRIDE AS AN ANALOGY

When a passenger vehicle crashes into and penetrates beneath, or *"underrides"* the rear or side of a large truck or trailer, the truck's penetration into the car's *"survival space"* directly causes the severe to fatal injuries, often including decapitation. In the rear underride cases, the focus is usually on the inadequate design of the rear guard device being too high above the road, too narrow across the rear of the trailer, or too weak. In the side underride cases, the focus is usually on the lack of any side guard of the subject American-made trailer. ***(See accompanying photos.)***

In a notable side underride case that went to trial in 2000 in Texas, I showed the jury that European trailers have utilized such side guards for many years. The jury found that the accident trailer without any side guard was therefore *unreasonably dangerous*, and that the manufacturer had acted *with malice* in failing to have any kind of side guard protection at all.

I believe there is a direct "vehicle mismatch" defective design analogy between a large trailer without any side guard to prevent the trailer's penetration directly into the passenger car's *survival space*, to a large SUV without any design features to minimize the excessive penetration of the SUV directly into the *survival space* of the passenger car. Both situations involve *vehicle mismatch*, and both involve whether or not the larger vehicle utilizes adequate design features *to minimize the collision risk* to the occupants of smaller vehicles.

CRASH TESTS AND ACCIDENTS CONFIRM THE MISMATCH HAZARDS



In 1971, the Insurance Institute for Highway Safety (IIHS) conducted a series of head-on crash tests involving small cars versus standard-size cars, with each traveling between 40 and 50 miles per hour. Examples included a small Ford Pinto versus a standard Ford Galaxie, and a small Chevy Vega versus a standard Chevy Impala. The smaller car weighed around 2,300 lbs., and the larger car about 4,000 lbs. The smaller cars had partial subframes, while the larger cars had strong, full-length perimeter frames.

The smaller cars were demolished in the crash, with the larger car penetrating into the smaller car's *"survival space"* and causing direct and lethal impact to the occupant's head and chest. And the mismatch was not even as great as what was to follow… as giant-size, heavy SUVs entered the scene in greatly-increasing numbers.

Over the years, from the mid-1970's through the present, the Highway Loss Data Institute (HLDI) has published *"Injury and Collision Loss Experience"* for vehicles of all types, by makes and models. The data shows that particular vehicles are notably less crashworthy, and their occupants fare much worse in collision accidents. As the percentage of SUVs and pickups increased from the early-1980's through the late-1990's, the numbers of fatalities that occurred each year when these SUVs and pickups collided with cars, increased from around 3,200 to about 5,500.

Dr. Jeffrey Runge, Administrator of the National Highway Traffic Safety Administration (NHTSA), in his testimony at a 2003 U.S. Senate Hearing, pointed out the serious injury consequences of the mismatch hazard when large SUVs and pickups collide into the side of a smaller or standard size car. Dr. Runge noted that *"while light trucks and vans (LTVs) account for 38 percent of all registered vehicles, they are involved in approximately half of all fatal two-vehicle crashes involving passenger cars. In these collisions, about 80 percent of the fatalities are passenger car occupants."* ***(See accompanying charts.)***

GEOMETRIC AGGRESSIVENESS OF LARGE SUV'S AND PICKUPS

Automakers are well aware of the mismatch dangers. A 1998 internal study at Ford Motor Company estimated that collisions between cars and light trucks kill 1,000 more car occupants per year than can be explained by their weight differences alone. The higher frontal structures and geometric shape of SUVs and pickups and large vans also make them more aggressive in collisions with passenger cars.

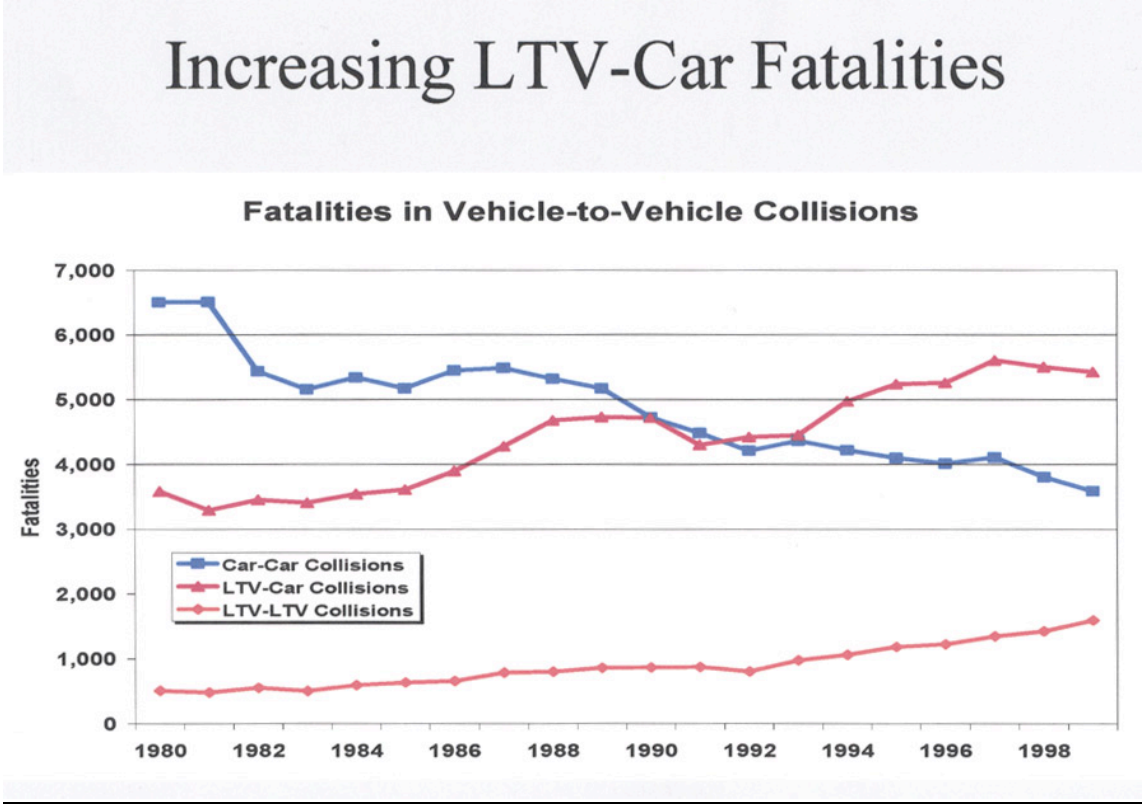
A 1986 NHTSA study entitled *"Striking Vehicle Aggressiveness Factors for Side Impacts"* noted that a lower hood profile of LTVs would reduce the likelihood of severe injury to the car's occupants from 97 percent down to 11 percent. Yet, rather than reduce these too-high aggressive profiles, many of the recent and current SUVs and pickups by GM, Ford, and DaimlerChrysler feature extraordinarily tall and bold and aggressively-designed grilles and hoods that emulate gigantic tractor-trailer rigs. Streamlining and aerodynamic efficiency have been wilfully discarded, even with these low-mileage behemoths that should use every tactic to gain better fuel efficiency.

WHAT ARE THE SAFETY DEFECT ISSUES ?

Automakers are clearly aware of the increased dangers of mismatch collisions between their large, heavy SUVS and pickups and vans *versus* the smaller and standard-size cars and minivans they crash into. As the SUV or pickup crushes into and penetrates the car's *"survival space"*, the occupants of the cars and minivans are much more likely to be severely injured or killed. Yet, various mitigation factors are typically

not implemented in the design of the either the SUVs and pickups to make them less aggressive, nor in the cars and minivans to make them more crashworthy and protective of their occupants. Here are some basic factors that could be considered within a *"defective design"* context:

- **Large SUVs and pickups should incorporate more crushable frontal structures** to reduce the aggressivity of these huge vehicles when they crash into the front or side of a smaller passenger car or minivan. Many large SUVs and pickups utilize excessively strong, stiff frame rails that act as battering rams or harpoons, rather than more deformable "crush zone" frontal structures.
- **Large SUVs and pickups have front structures that are so tall** that they overwhelm and ride over the front and side of the passenger car or minivan or smaller SUV. The designs need to ensure a safer, lower match-up of bumper heights (as Ford has begun to do with "blocker beams" that are intended to lower the frontal contact points when these larger SUVs impact a car).
- **Cars and minivans should include much stronger side impact protection structures**, such as tubular lateral members at the floorpan and roof level, and multiple door beams and reinforced rocker sill sections, that would significantly stiffen the vehicle side from being crushed inward.
- **The use of internal baffles and rigid foam within the tubular members**, with reinforcing gussets, can triple the compressive and bending strength (as demonstrated by GM and Toyota in the International ESV Program in the 1970's).
- **The adoption of side curtain airbags and glass-plastic laminate side windows** which can significantly improve head protection in side impacts. Some automakers, such as Honda, are now rushing to incorporate this safer technology as standard in all their vehicles.



BASING A DEFECTIVE DESIGN ISSUE ON THE TOO-HIGH FRONT OF THE SUV AND LACK OF ADEQUATE SIDE IMPACT PROTECTION OF THE CAR

Assume that a large, tall Ford Excursion SUV crashed into the side of a Ford Escort or Taurus, penetrating deeply into the interior and killing its occupants. This is a *vehicle mismatch* situation that is remarkably analogous to a truck underride case, in which the defect issue typically focuses on the lack of an adequate rear guard or lack of any side guard, which would have prevented the truck's taller structures from penetrating into the *"survival space"* of the car.

The SUV-versus-car mismatch case would focus on two main defect issues:
(a) The SUV's excessive frontal height and stiffness, and the lack of frontal bumper structures that would have been low enough to engage the side structures of the smaller car. **(b)** The lack of the Escort or Taurus having stronger side structures, akin to a full perimeter frame, including the car's abbreviated subframe members that left a weak zone or gap in the mid-body region where the passengers were located.

Whether singularly or in combination, these defects caused the needless severity of injuries or death of the car's occupants. But for these defects, the car's occupants would have survived with reduced injuries. Both defect issues relate to the *vehicle mismatch* issue, concerning the too-tall front and stiffness of a large SUV (or pickup truck) which is not compatible with the lower, minimalist, softer side structures of a standard car.

There has been ample knowledge and notice to the auto industry for many years about the vehicle mismatch hazards, and the feasible means to help mitigate or reduce the injury-causing dangers to passenger vehicle occupants in collision accidents. Yet, many vehicle manufacturers have failed to adequately address this lethal mismatch issue, including automakers who make the larger SUVs and pickups, and the smaller and standard size cars and minivans as well. The *"defective design"* issues can be presented with ample support and validity, and the safer alternative designs have been well known and feasible. Yet the mismatch collisions with needlessly severe injuries and deaths will sadly continue to occur. The first few *"SUV-into-car mismatch"* product liability cases and trials are certain to occur, to seek justice for the needlessly injured victims, and also to serve as a stimulus for critically-needed safer designs.

BYRON BLOCH, AUTO SAFETY EXPERT

Byron Bloch is a national auto safety expert with 35 years of experience in analyzing how and why occupants of motor vehicles are severely injured in collision accidents, and the significance of crashworthiness in vehicle design. He has testified in many leading auto defect product liability cases, and at Congressional Hearings on auto safety issues. Mr. Bloch has appeared on many tv programs such as *"20/20"* and *"Primetime Live"* and *"Nightline"* to bring auto safety information directly to the public. In 2001, he received the first *Lifetime Achievement Award* from the annual World Traffic Safety Symposium for his long record of stimulating auto safety improvements. We invited Mr. Bloch to submit his thoughts about any potential new liability issues of defective design arising from *"vehicle mismatch"* concerns.

Auto Safety Design

7731 Tuckerman Lane
Potomac, Maryland 20854
Phone & FAX: **(301) 299-1800**

Website: **www.AutoSafetyExpert.com**