

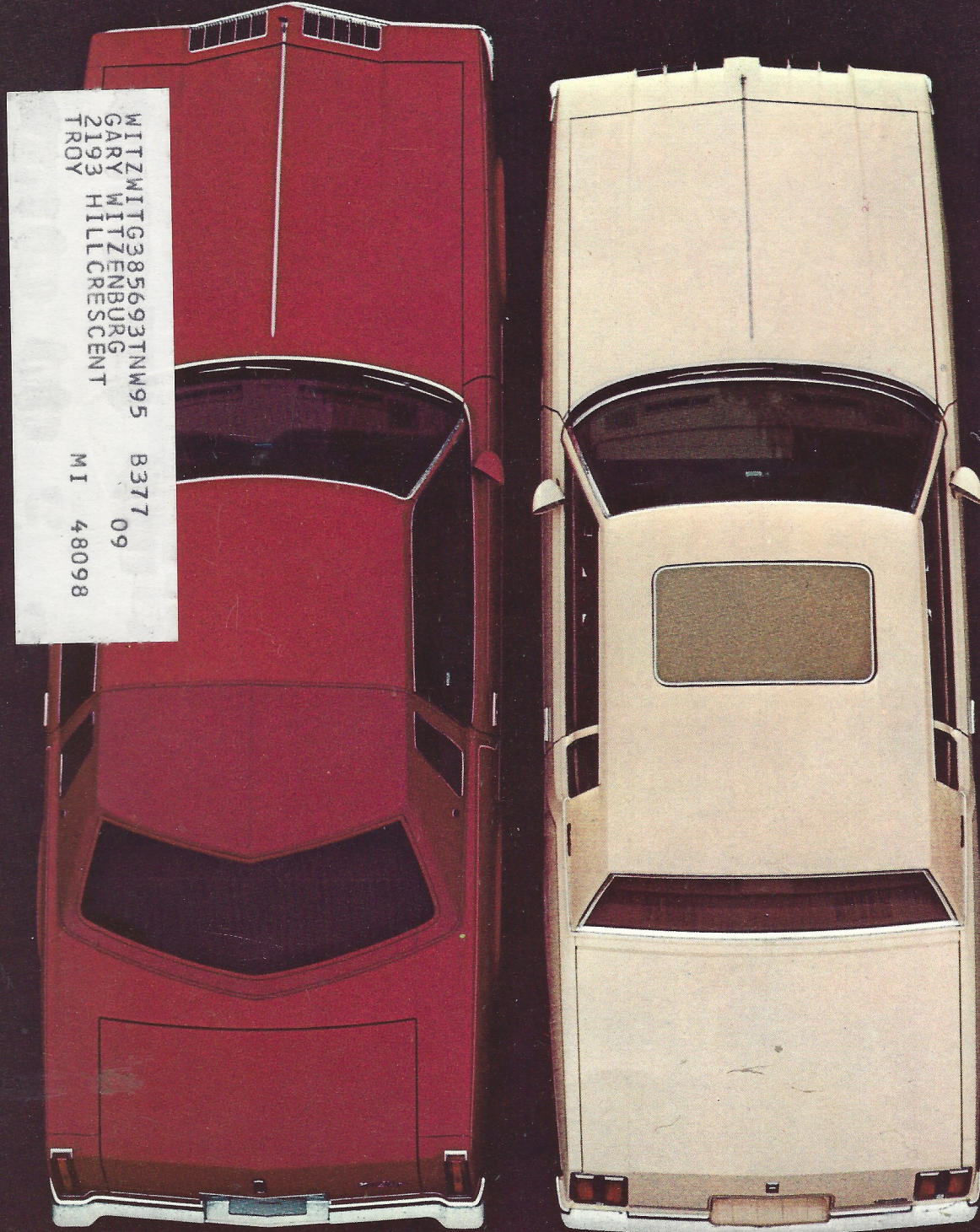
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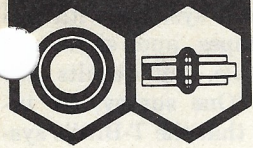
AUTO WORLD SEPTEMBER 1977/\$1.50

MATERIALS IN THE '78S

Detroit's Disappearing Act

*Red '77 Olds Cutlass Supreme Coupe Weighs 692 Lbs.
More, is 15" Longer, 5" Wider Than Beige '78 Counterpart*





Amidst Air Bag Controversy, Let's Look Again at Belts

by Gary L. Witzenburg

With all the rhetoric and controversy swirling around air bags and passive restraints, one point seems to be overlooked: every car built today already comes with an *active* restraint system that, if properly used, stands a far better chance of saving its user's life than any known *passive* system.

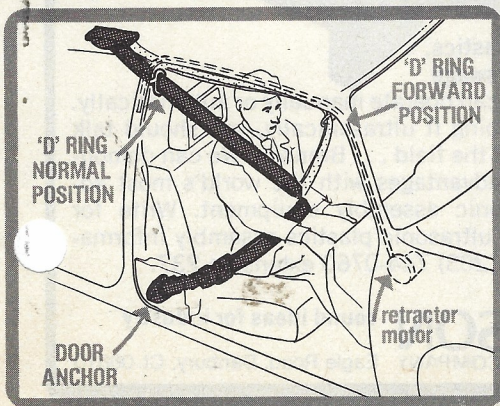
Seldom acknowledged by air bag enthusiasts is the fact that their wondrous device (and the much ballyhooed VW passive belt) also needs a lap belt for true effectiveness equivalent to today's OE harness systems. And it would take at least 10 years before most cars on the road could be equipped with bags if they started going into new cars tomorrow.

Yet as good as current systems are, there's still room for improvement—especially in terms of comfort and convenience to those 70% of drivers who don't use them. Many talented people continue working toward making these systems better and more acceptable every year.

Ask any safety engineer why a certain restraint system is designed the way it is; why the anchors are mounted where they are; why a certain kind of retractor is used; why there is or isn't a guide loop on the headrest to keep the harness off your neck, and he'll give you tons of answers: surveys; tests; more surveys; ninety-fifth percentile men and sixth percentile women; more tests and more surveys.

Everyone knows what a restraint system is supposed to do. It protects its wearer in a crash by holding him

Chrysler/Calspan belt system.



or her firmly down to the seat while simultaneously preventing the upper body from jackknifing forward on impact. Thus it prevents a lot of painful facial cuts, broken noses and lost teeth in low-speed bumps, not to mention saving heads, legs, chests and lives in more serious crashes.

Designing a system to do this effectively is no major problem. Cars are crashed, anthropomorphic dummies are sacrificed on the altar of safety, data is recorded and analyzed, and designs are perfected. Making it work is the easy part.

Even avid belt-wearers are hard-pressed to endure systems with buckles that are hard to find, self-locking retractors that lock up prematurely and refuse to budge until completely retracted, harnesses that try to choke them or rub holes in their necks, webbing that twists and jams in its guides and other such annoying deficiencies. Yet the design of a system and its subsequent acceptance are so completely subjective that engineers usually have found themselves in "damned if you do, damned if you don't" sorts of positions.

People come in a wide variety of shapes and sizes, and with a broad range of preferences. If the system fits the fat persons, it annoys the skinny ones; if it works for the short ones, it rubs the tall ones wrong. Some people prefer the male end ("D-ring") located on the floor between the door and the seat. Others prefer it high on the B-pillar near the shoulder. Many won't wear the harness if there's any tension at all, but some like a bit of tension for the feeling of security it gives. Some like to grab male and female buckles, one in each hand, and join them together. Others want the convenience of one-handed buckling.

Generally people who are used to wearing belts and appreciate their effectiveness (mostly younger people and drivers of smaller cars, particularly imports) want their lap belts tight to hold them securely in position and they don't mind a bit of tension in the shoulder belt. Conversely, irregular users don't want to know the system is there. "Borderline persons," says Ford

Motor Co. Safety Planning Manager Webster C. McDonald, "must almost have it fall into place, and if it annoys them at all they won't use it."

Many recent improvements in the basic systems have resulted from government edicts. Besides the infamous starter interlock feature, '74 model restraints were required to have shoulder harnesses with inertia reels (rather than fixed-length), and they had to be permanently attached to the lap belts. Lap belts also had to be self-tightening with buckle positions at least 6 ins. to the inside of the wearer's abdomen centerline to keep the shoulder harness from pulling the lap belt up too high, which could result in the occupant "submarining" under the belts on impact.

The answer in most American cars since then has been a "self-locking" type lap belt reel located on the floor combined with a vehicle-sensitive inertia reel for the shoulder belt which has been mounted either high on the B-pillar or in the roof area, depending upon the application.

European carmakers, meanwhile, primarily have used the simpler, lighter and cheaper "continuous-loop" design with a single reel and often a sliding D-ring which can travel to wherever the wearer wants it for the best comfort and security. This system seems to be preferred by habitual belt people, but occasional wearers have objected to pressure from the shoulder harness and some difficulty in locating the D-ring.

To accommodate those marginal users and hopefully increase acceptability and usage rate, the domestic automakers have been working hard to adapt continuous-loop restraints to our more casual, convenience-minded American tastes. In general, this means tension relievers or tension reducers on shoulder belts, plus fixed D-rings that always "park" in the same location. Continuous-loop systems also eliminate the annoyance of self-locking lap belts that lock up before they're buckled or "cinch" themselves tighter as you drive.

Chris M. Kennedy, Chrysler Corp.
continued next page

TECHNICAL TAKEOUT continued

manager of safety relations, says the usage rate of post-'74 model restraint systems (excluding those with starter interlocks) is estimated as high as 40%, compared to 20% to 25% for the entire car population. "We are encouraged by that," Mr. Kennedy remarks, "and we expect usage to continue to improve as our systems get better. They've been vastly improved from '74 on, but there's a lot that still can be done. The next generation of belts is intended to prevent the complaints we have now. However, while it's generally understood what has to be done, it's not quite as easy to do it."

Like Chrysler, General Motors Corp. is going to continuous-loop systems with "window-shade"-type tension relievers in most cars. Starting with the Chevette minicar two years ago, this design has since spread to GM's downsized B-body cars and will appear in the new A-body intermediates to be unveiled this month.

"The major problem," says GM's Jack G. Haviland, a staff project engineer with the vehicle interior group, "is deciding how best to do something. What's good for occupant pro-

tection is not always good for comfort; and, conversely, if we do something to improve the system's performance, we have to ask: can we get people to wear it?"

Self-locking lap belt retractors will be replaced by vehicle-sensitive inertia reels in '78 GM pickups and Suburban trucks, and if they are well accepted they may later appear in those cars which still have two-reel systems as well. Future products may have restraints mounted in the doors instead of in the body structure, because "that gets the belts out of the way when the door is opened and makes them easier to convert to passive systems," Mr. Haviland tells WAW.

Ford also has moved to continuous loop designs in recent years, beginning with its smallest cars in '76 and extending through the Granada/Monarch/Versailles at present. The Ford system does not yet include a tension reliever, "but we have made a continuous effort to reduce shoulder harness pressure," says Mr. McDonald. "We have tested and surveyed tension relievers, tension reducers and full-tension types," the Ford executive adds, "but no one can agree which is best.

There's a wide range of preference on that."

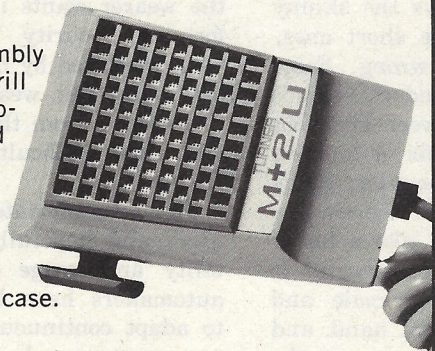
The company regularly conducts surveys on restraint systems with employees of all shapes and sizes and with outside people, but results are often confusing. "One survey, for instance, concluded that the T-Bird's system was best and the Cougar's worst of the line," Mr. McDonald says. "Yet while the seats in those two cars may have been different, the restraints were exactly the same."

Even though the National Highway Traffic Safety Administration seems likely to force some sort of passive restraints down the public's throat, the agency meantime remains interested in improving active restraints. A number of proposed requirements include both male and female ends that move with the seat, shoulder belts that are guided (to eliminate neck contact problems) and with maximum tension specifications and automatic stowage upon release.

Perhaps as systems improve and people become better educated in their proper use, acceptance and usage rates might improve enough to deflate the air bag fanatics' sails. □

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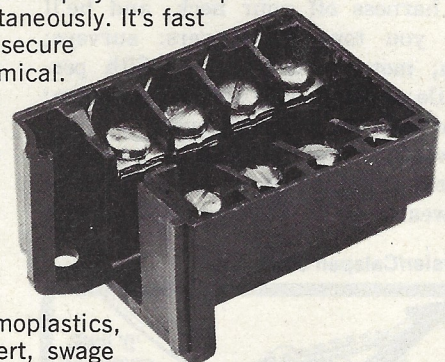


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