Air Bag Safety – Air Bag Risk by Barbara Tabachnick, Client Service Manager
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Air bags have given emotional comfort to safety-hungry car buyers since the 1980’s. Air bags have also been the darling of car manufacturers for whom the adage “safety sells” is a marketing truth. But recent media attention in USA Today, U.S. News and World Report, the Wall Street Journal, and on CNN has snapped the public out of its air bag reverie. Jarring reports of the deaths of children and small adults caused by air bags has opened up the safety device to severe public criticism, and has placed car manufacturers and safety regulatory agencies under serious scrutiny.

Air bags have never had a clean bill of health. In a 1974 report entitled “An Investigation of the Noise and Overpressure Generated by the Safety Air Cushion,” the Society of Automotive Engineers states that “noise resulting from the deployment of [air bags] in automobiles has been of concern since the use of [them] was envisaged. Coupled with the inherently loud noise of the inflator system is the sudden increase in pressure (called overpressure) in a closed passenger compartment.” Their tests with human volunteers showed that single air cushion deployment could constitute a hazard to human hearing. Multiple air bags increase the hazard.

We first heard about the connection between air bags and ears from Janet Garman. On August 1, 1992, Janet Garman was a passenger in an automobile that was struck from behind and forced into a concrete median strip. Both she and the driver were wearing seat belt restraints, which held them in place. The accident caused the car’s only air bag - on the driver's side - to deploy. Although Garman was not hit by the bag, and received only a minor shoulder injury from the accident, her physician believes that the explosive sound and sudden increase in air pressure caused by the deploying bag were responsible for her immediate ear pain, muffled hearing, and severe tinnitus. Hyperacusis set in the next day.

Garman's post-accident tinnitus and extreme sound sensitivity were so debilitating to her that she could no longer work. She became reclusive in her need to avoid noisy environments, and began to fill her days by doing research on air bags - the device she unequivocally blames for the hearing damage she sustained and the drastic lifestyle changes she has been forced to make as a consequence. The more data Garman uncovered, the angrier she grew. In her research, she found the previously mentioned 1974 government report, which detailed a warning about the physical injuries (to ears and more) that air bags could cause. She found two U.S. patents, one dating back to 1979, for devices that vent the increased air pressure in vehicles caused by air bag explosions. Both patents cite injuries to the hearing mechanism as aftereffects of air bag deployment.

Garman's research turned up more: She learned that the angle of the bag's trajectory is nearly constant, aimed at the chest of a belted and upright person who is at least 5’9” and 165 pounds. (Shorter passengers would take the brunt of the impact at head level.) She learned that the driver's hands must be positioned at “9 and 3 o'clock” on the steering wheel to avoid arm injuries. She learned that damage to ears is not included in government air bag injury statistics.

Garman has since filed suit against the auto manufacturer for its failure to incorporate a device to reduce or eliminate the increased atmospheric pressure caused by the deploying air bag, for its failure to warn consumers that air bag deployment has the propensity to cause serious hearing impairment, and for
the air bag design itself that creates a combination of noise and pressure of sufficient magnitude to damage hearing. Her case is still pending.

Jim Heitz’s tinnitus is not air bag-related. But his concern about the effects of air bag noise on tinnitus and healthy ears too caused him to mount a campaign to alert people about the device and its potential hazard to human hearing. He began by calling the National Highway Traffic Safety Administration (NHTSA), then *USA Today* after they featured an article about children whose deaths were caused by exploding passenger-side air bags. Remarkably he persuaded them to talk to each other, to Janet Garman, to Dr. Pawel Jastreboff, to Dr. Jack Vernon, and to ATA. (*USA Today’s* first article discussing the connection between tinnitus and air bag exposure appeared on September 30, 1996.)

Heitz then heard that NHTSA was about to make its recommendation to the Dept. of Transportation that all new U.S.-made cars must be equipped with driver and passenger-side air bags by 1998. He also heard that there was a small window of time - just days at that point - during which NHTSA would consider additional points of view. Heitz called us immediately.

We contacted NHTSA to make them aware of the hazard posed to the auditory system by excessive noise - dangers not only to the millions in this country who have tinnitus and sound sensitivity, but to everyone. At the same time, ATA’s board chairman Phil Morton wrote a personal letter to NHTSA asking the agency to develop quieter safety devices, and in the interim to allow installation of air bag on/off switches for people with medical conditions like tinnitus that might be worsened by excessive noise exposure.

Other ATA members have been vocal on this issue as well. Joseph Wall has written to his congressman, his newspaper, and to NHTSA asking for the development of quieter and properly vented air bags. Judi Lane is a short woman who, because of her height, falls into a higher risk category for air bag injuries. She has written to NHTSA and to President Clinton demanding that she be given a choice. Susan Seidel, an audiologist at the Greater Baltimore Medical Center, has seen three new patients whose tinnitus and hearing loss immediately followed exposure to air bag explosions. I asked Susan how someone could determine that the tinnitus resulted from air bag deployment and not from head trauma as a result of the accident. “You can’t tell,” she said. “All you can do is listen to the patients.” One of the “accidents” was a five-mile per hour bump into a concrete parking beam that triggered the dual bags to deploy. The other two accidents were also minor Each patient was referred to Seidel by a physician who determined that the ear damage and other injuries (abrasions of face and chest, etc.) were the result of air bag impact, noise, and pressure change, but not from the accident. “We need to look at the obvious pattern as a means of proof,” says Seidel.

In 1995 James E. Saunders, M.D. published the study, “Automobile Airbag Impulse Noise: Otologic Symptoms in Six Patients.” The patients followed in this study all developed tinnitus, hearing loss, and/or disequilibrium as a result of air bag explosions. Dr. Saunders still suspects that the overall number of air bag-caused ear injuries is small compared to the 96,000 air bags that have deployed since 1986. (Actual ear injury statistics are not available.) Saunders writes, “We believe that the benefit [of air bags] in reducing fatalities and serious injuries from motor vehicle accidents exceeds the potential risk to hearing.”

William Smock, M.D., head of the Department of Emergency Medicine at the University of Louisville, is outspoken on the other side of this issue. He feels that air bags are “bombs at the fingertips” of drivers. Smock and his medical team treat one air bag injury per month.

**How loud?** The decibel level of an exploding air bag is estimated to be 160dB at its center; 130dB at adult head level.

**Why are air bags so loud?** In the early 1970’s, new federal regulation required U.S. car manufacturers to devise ignition systems that started only when vehicle seat belts were fastened. The public vigorously opposed it and congress repealed the legislation in 1973. Since that time, U.S. car manufacturers have been required to build air bags that are powerful enough to protect unbelted passengers (who account for 30% of the population). These high-powered devices are loud by default.
How long does the sound last? The American Automobile Manufacturers Association states that the deployment and inflation of an air bag takes approximately 0.03 seconds. Vann Wilber, the AAMAs director claims that the sound of a deploying air bag for that short a period of time has not been identified as harmful to human ears.

How fast? The bag’s velocity at the time of the explosion is estimated to be 200mph.

How Safe? NHTSA reports that air bags have saved 1136 lives in the past 10 years. The passenger-side air bag is said to have saved 60 of those lives.

How dangerous? To date, approximately 30 children, 19 small adults (16 of whom were women), and one fetus have been killed as a result of air bag deployment. NHTSA admits that because children are often put in the front seat, twice as many children are killed than are saved by air bags. (The distance from the passenger-side dashboard air bag housing to the front passenger is greater than the distance from the steering wheel air bag housing to the driver. Therefore the larger passenger-side bag must deploy with more force to cover more ground.)

NHTSA concurs that air bags cause at least as many injuries as they prevent. Air bag injuries have included broken arms, necks, facial bones; chest abrasions and punctures; eye ruptures; and ear damage (tinnitus, hearing loss, hyperacusis, and dizziness).

When do air bags deploy? Air bags in General Motors vehicles have been standardized to inflate if the vehicle hits a stationary object at 14 mph. Ford's standard is 13 mph; Chrysler's standard: 11mph. NHTSA recently reported that five spontaneous air bag explosions have occurred in GM cars. The auto manufacturer and NHTSA are investigating the cause, and a car recall is possible.

What about side bags? Because these safety features are not required by law, their design is not regulated. Car manufacturers are consequently producing side bags that are more “benign.” These devices are standard equipment in a few 1997 cars. The decibel level of a deploying side bag was not available from GM.

What can car owners do? It is against federal law for car dealer or auto shop personnel to disconnect air bags, or for that matter to disconnect any vehicle safety device, according to attorney Ed Glancy of the U.S. Dept. of Transportation. But federal law does not regulate what individuals do to their own cars. It is problematic, though. Air bag wiring is often hidden to thwart disabling. Some people have been injured by exploding air bags while attempting to tamper with the apparatus. Janet Garman and her husband were able to locate and disconnect their car's air bag fuse without triggering the device.

Glancy suggests that people with medical limitations should write to NHTSA and ask for an exemption that would allow for the professional disconnection of air bags. The agency has exempted a few medical conditions so far, but tinnitus and hyperacusis have not been among them. (Glancy points out that even if exemption is granted, state motor vehicle laws might still require existing safety devices to be operative.)

Properly seat-belted passengers are at less risk from air bag impact than are unbelted passengers. Children under 13 years of age, and all small people, are safest in the back seat of the vehicle. Those who want to avoid exposure to air bag deployment altogether might be obliged to buy or keep older, pre-air bag era cars.

What are car manufacturers doing to help? “Smart air bags” are in the development stage. This safety system is being designed to sense an occupant's weight and position in the vehicle, and determine which bag to deploy, when to deploy it, and with what amount of force. This sophisticated technology could be available in three years. Creating a venting system to relieve the overpressurization is “technically feasible,” according to GM's spokesman Kyle Johnson.

What is the government doing to help? NHTSA is at this moment re-examining its entire air bag policy based heavily on the number and nature of grievances it received. For now, it is considering “emergency air bag action” which would mean distributing warning labels that tell parents...
to seat children in the back seats. Installation of on/off switches is being considered (although it's heavily opposed within that agency). Other changes in vehicle safety regulations are being considered too, one which would allow U.S. car manufacturers to install “depowered” bags (bags that inflate with 30% less force) like those used in Canada. The American National Standards Institute (ANSI) in conjunction with the International Standards Association is considering the formation of an expert panel to study the subject of air bags.

To the casual observer, a vehicle safety system that unavoidably harms or kills some people is a flawed system. But do the advantages outweigh the risks? Should we have the right to choose? Should engineers be working to perfect seat harnesses, for example, instead of smarter air bags that will still pack a decibel punch?

It's true that ATA has no official “position” on this controversial issue. ATA also does not advise anyone to disconnect or discontinue use of any vehicle safety device. Were we to suggest anything, it would be that you write to your elected officials, to NHTSA, to ANSI. Would these agencies have stopped to give this matter a second thought without the letters and persistent calls? I doubt it. Is it too late to add your voice to the deliberations? I doubt that too.

If you have an opinion, express it. There are some mountains to move.

Special thanks to Janet Garman and Jim Heitz who were indispensable in the preparation of this article.

“Never doubt that a small group of committed citizens can change the world. Indeed it's the only thing that ever has.”
Margaret Mead

**Resources**

*American Auto Manufacturers Assoc.*
1401 H St. NW #900
Washington, D.C. 20005
202/326-5500
202/326-5567 FAX

*American National Standards Institute (ANSI)*
11 W 42nd St
New York, NY 10036
212/642-4900
212/398-0023 FAX

*Auto Safety Hotline* (U.S. Dept. of Transportation)
Washington, D.C.
800/424-9393
Ricardo Martinez, M.D., Director
National Highway Traffic Safety Administration (NHTSA)
400 7th St SW
Washington D.C. 20590
Re: Docket # 74-14, Notice # 100
Federal Motor Vehicle Safety Standard #208
202/366-1836
202/366-2106 FAX
202/366-7800 TDD

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