

The danger of air bags and the essay

[Environment](#), [Air](#)



The Danger of Air Bags and the Proposed Improvements including Advanced Air Bag Systems

Introduction to Air Bags

In today's fast paced world, the amount of automobile travel increases more and more each year. With this increase in travel, there has been a much larger demand for safety in automobiles, and this includes air bags and other restraint systems. To put the use of airbags in perspective, since their mandate in the late 1980's until now, 2. 25 million driver-side air bags have deployed saving approximately 3, 000 drivers. ([www. nhtsa. dot. gov/airbags/](http://www.nhtsa.dot.gov/airbags/)). This number was calculated by a mathematical analysis of real-world fatality experience of vehicles with air bags in comparison to those that do not have air bags. Based upon the same report, passenger side air bags have saved approximately 500 lives in 344, 000 deployments. This report had a total figure of 3, 448 lives saved (965 belted, 2, 483 unbelted). ([www. nhtsa. dot. gov/airbags/](http://www.nhtsa.dot.gov/airbags/)) Another report by the Insurance Institute for Highway Safety reported some slightly higher numbers than that of the National Highway Travel Safety Association. This report goes on to say that driver airbags have been deployed in over 3. 3 million automobile crashes and more than 660, 000 passenger airbags have deployed while the front seat was occupied ([www. highwaysafety. org/safety_facts/airbags/stats. html](http://www.highwaysafety.org/safety_facts/airbags/stats.html)).

Air Bag Death Statistics

Based on a NHTSA report from September 1st, 1998, 53. 0 million cars, or about 42 percent of all cars on the road, are equipped with some form of air bag protection. With the amount of cars on the road with air bags, the NHTSA reports only 113 confirmed air bag deaths. ([www. nhtsa. dot. gov/airbags/](http://www.nhtsa.dot.gov/airbags/)). This number seems to be a tad “ sugar-coated” if you will considering that the number given by the Insurance Institute for

Highway Safety lists 141 deaths since 1990 alone. These numbers are still not a great indicator of the danger of air bags because many times these deaths are considered not air bag related deaths but instead based upon the accident itself and the role of the air bag in the fatality is not quite known. This is a very frequent, and undeterminable scenario, so the true effect of air bags in fatalities cannot be known for sure ([www. highwaysafety. org/safety_facts/airbags/stats. html](http://www.highwaysafety.org/safety_facts/airbags/stats.html)).

Overview of Current Air Bag ProblemsAs the numbers indicate, air bags have saved thousands of lives, but unfortunately this engineering feat did not come without its unforeseen detrimental consequences. One problem with air bags is that in the speed of a crash, they don't have very much time to react and fully inflate to protect the passenger. Due to this need for a quick inflation, the air bag will come out of the in-dash holding area at up to two hundred miles per hour. This impact is amplified as shorter people sit nearer to the dash, reducing the distance the air bag travels before impact with the person in the seat, making the amount of the force much more than it normally would be to someone of " normal" size. In some cases, such as this, speed of deployment can seriously injure the passenger, especially if the passenger is a small female or child in the front seat closer to the dash. This phenomenon is responsible for the majority of air bag related deaths, and is the most difficult problem to solve. Another problem with current airbag systems is the situations in which it deploys. There is a very distinct problem in determining the speed of impact that should warrant an air bag deployment, and this is not an exact science either as air bag deployment parts will malfunction or prematurely deploy. It seems to be a " tug-of-war"

between setting it low enough to protect passengers and setting it high enough to prevent needless deployment and injury. We have all heard horror stories of automobile crashes taking place at speeds as low as nine miles per hour, and in these cases the air bag causes up to five times more injury than the crash would have without air bag deployment. The risk of the unjustified deployment of an air bag has remained the same, near 8 percent; although the number of air bag equipped vehicles over the same time period has multiplied by a factor of five since the first commercial trials of air bags in 1977. This is an extremely good track record, but the room for improvement is still ever-present. ([www. highwaysafety. org/safety_facts/airbags](http://www.highwaysafety.org/safety_facts/airbags))

Overview of Public Concern

With the mass media surrounding automobile safety and air bag reform, this is an issue that has taken to the forefront, and therefore warranting legislation. The bulk of this legislation is written in accordance with or is suggested by the NHTSA. Although in the large picture this practice of air bag usage is extremely successful based upon percentages, it is a constant worry among driving Americans. Based on a report by the U. S. Department of Transportation in 1996, 72 percent of the public would prefer their next vehicle have an air bag protection system, but 62 percent of all surveyed Americans had safety concerns about air bags. The majority, 58 percent of this concern lay with the protection of their children, the highest risk group of air bag deaths in America. (Boyle; Sharp)

To put this in prospective, when a large group of Americans were surveyed and asked the question “ Based on what you know or have heard, how likely is it that a(n) adult/small child sitting in the front seat would be injured by an air bag when it opens normally?” The results of this question produced a 54 percent return

saying that it is very likely that a child would be injured. (Boyle; Sharp)

Needless to say, a substantial portion of the public is concerned about the safety of their children when an air bag deploys. The national government along with automobile manufacturers have spent millions dollars in finding an answer to these concerns, and they think they may have found a couple of options. Options for reduced-risk in air bag equipped vehicles. There are four major types of action that can take place in order to reduce air bag injury/fatality risk: 1) Deactivation of Air Bag systems using an on/off switch mechanism, 2) Proper use of other restraining systems such as seat belts and car seats, 3) De-powering of air bag systems to reduce amount of deployment force, 4) Development and production of an advanced air bag system. I will individually address each of these three options individually.

On/Off Switch One of the hottest, most controversial issues in today's news is the installation of an On/Off switch mechanism in new vehicles to disable air bag systems. This has been a public concern since the NHTSA first mandated that air bag restraint systems be placed in new vehicles, and with the total number of deaths increasing year by year, this is an option that many Americans have considered and carried-through. The basis for this theory is that Americans should be able to choose whether they desire the protection of an air bag or not, especially if they are in a vehicle type with no back seat and children must ride in the front. This has become a standard feature on most vehicles that have no back seat such as standard trucks and sports cars, but in order to install such a mechanism in a vehicle with a back seat, you must obtain a permit that states you fully understand the risk of the deactivation. ([www. highwaysafety. org/safety_facts/airbags/stats. html](http://www.highwaysafety.org/safety_facts/airbags/stats.html)).

This option has proven to be hassle some and not to mention costly, and is a practice that most manufacturers and government officials are adamantly opposed to. Despite lengthy reading and forms to acquire permission to get an on/off switch and the expense and hassle of having one put in a vehicle, the NHTSA has (as of 8/1/99) 66, 805 on record of gaining permission and having a manufacturer's switch installed. This is an option, but it also disables the ability of the air bag to protect you in a collision, so it shows itself to be an ineffective way of saving lives in the long-term picture. (St. Edmunds; Eisentein) Proper use of other passive restraints such as seat belts and car seats When airbags were being designed in the late 1970's through the early 1980's, one major stumbling block for engineers was that they were instructed to design a system that would protect passengers and drivers under the assumption that they were not wearing a safety belt. This sounds like a good theory, but in reality it makes the process of saving the lives of passengers much more difficult to accomplish. The fundamental problem with this is that a passenger unbelted will be propelled forward without restraint towards the dash from which the air bag is being deployed. It takes much more speed to have the bag out in time to save the passenger, which means it must come out at a faster rate with more force, which could severely injure passengers, especially those smaller passengers such as some females and small children. (Reed, Donald) This situation gets multiplied with those passengers that are out of a normal position, because then you have no idea of where they are and where to keep the greatest amount of force. (Boyle; Sharp) One way of preventing this problem is by being properly restrained with the restraints that are already in place, such

as a seat belt. It has been shown through study that the use of a standard seat belt with a shoulder strap, as most cars come with now, can reduce your risk of serious head/neck injury by up to 81 percent. ([www. highwaysafety. org/safety_facts/airbags/stats. html](http://www.highwaysafety.org/safety_facts/airbags/stats.html)).

Another aspect of proper use is child restraint in a car-seat/ restraint harness. It is extremely important that children be restrained in a harness, but it is equally important that the apparatus be used properly to ensure safety. Based on NHTSA numbers, there have been 66 children killed (as of 9/1/98) due to air bag related injuries. According to this report, 51 of these 66 children killed were not properly restrained, that is approximately 77 percent of all the children killed. ([www. nhtsa. dot. gov/airbags/](http://www.nhtsa.dot.gov/airbags/)) In many of these cases, if the children were properly restrained, the child would have escaped with only minor injuries. The proper use of a child restraint system has an impeccable record, and it would reduce the number of fatalities in this case as well. De-powering of air bag deploymentA third option is to reduce the amount of speed and force of the air bag when it deploys, but this theory has its evident flaws as well.. One reason that the air bag comes out with the force it does is in order to be in position when an unbelted occupant flies forward in an accident. If you de-power the deployment of the air bag systems, they lose reaction time which could result in more lost lives due to late protection. This option does reduce the risk of injury by an air bag to the driver or passenger, but increases the risk in a collision due to late reaction of a restraint. (Glover, Maurice)This is not a cure for the problem, but a diversion of one problem to another that is less controllable. This option, though potentially effective for air bag injuries, has the potential to

increase the amount and severity of injury in a collision. Most NHTSA officials and automobile manufacturers are using this option as a last resort due to its lack of total effectiveness. (U. S. Department of Transportation)Development and production of Advanced Air Bag SystemsThe NHTSA has come up with what seems to be the most logical plan yet; if you can't improve the situation, improve the air bag. There is legislation intact now in the NHTSA Reauthorization Act of 1998, stating that automobile manufacturers must insert the most advanced, feasible air bag for new cars, but the NHTSA has decided to take this one step further. The NHTSA has two main objectives that should result in the minimizing of risk of air bags; " 1) air bag deployment must be suppressed in situations that are risky to occupants, or 2) the air bag must be designed to deploy in such a way that it does not present significant risk of serious injury to out-of-position occupants". (www. nhtsa. dot. gov/airbag/proposed/advbag. html)There are many variables that go into designing an advanced air bag system, but most include a type of sensor under the passenger seat and driver seats that indicate the position of the occupant and a type of deploying that will vary in strength based upon the occupant. This is an extremely difficult process to develop, but based on new NHTSA legislation, these so-called advanced air bags should be in place in 25 percent of all new vehicles in 2001 with eventually 100 percent of all vehicles in the model year 2006 beginning on October 1, 2005.(www. nhtsa. dot. gov/airbag/proposed/advbag. htm)These new air bags are targeted to better protect the two highest risk groups of air bag injury, small females and children. Another difference between these air bag systems and the ones of the past is that the testing for these is much more stringent testing

with more emphasis put on more protection of properly restrained occupants. In this proposal, there is also a new section for the study and protection of out-of-position passengers, something that has been left off in earlier systems. (Fitzpatrick, M) The last proposed amendment supplies automobile companies with incentives, money, and the permission to rampantly pursue new air bag technologies. This attitude for progress along with today's technology is a good sign for the future. Example of Advanced Air Bag System: The 2000 Ford Taurus In January of 1999, Ford announced that it's 2000 model Taurus would be the one of the first passenger vehicles equipped with an advanced air bag system; the Ford Advanced Restraint System (ARS). The ARS is a dual-stage driver and passenger system that integrates improved seat belts with sensors and optional side-mounted air bags. This system has a central unit behind the grill of the car that processes all the information from seat belts, seat-track positioning, and the force of the crash. This central unit then takes this information and deploys in a high or low energy deployment speed of the bag. This smart airbag, in essence, takes each crash and each passenger into account before it determines the speed and power of deployment, and this in-turn should reduce the amount of risk placed on each passenger individually. (Brooke, Lindsay) This is the type of system that the NHTSA is proposing be in place in all new vehicles by October 1, 2005. In extremely rigid tests, these airbags have proven to be as or more effective than current systems with less injury to vehicle occupants. Based on a study by Ford, this system reduced the amount of chest injuries to the highest two risk groups by 50 percent, and reducing the neck and head injuries for the same risk groups up to 65 percent. In excess to this,

Ford plans for, at minimum, 35 to 40 percent of these new systems that will include the option for side impact bags, which will reduce the risk even further. (Brooke, Lindsay)

Advantages and Disadvantages to Advanced Air Bag Systems

With all the news of improvements to our protection systems, the future looks good. Unfortunately, like all engineering processes, it does come with its down sides. One problem with advanced air bag systems is purely economic; the more money that is spent developing and producing these systems in passenger cars, the more it will cost us to purchase these cars. Unfortunately, like most automobile improvements, the cost of the innovation goes directly to the consumer. The more advance parts and labor they put into these systems, the higher the production costs, which results in higher prices for consumers. (Lypon, John)

Another problem with Advanced Air Bag Systems

is that with the more parts and much more technological processes involved, the chances of a mal-function are much higher. Especially with new technology, the production of these concepts is so quick that the testing for the technology is usually not what it should be which can and sometimes does lead to mal-function. (Carr, R. W.)

Conclusion

In today's world, the risks we are exposed to are some of the lowest risks in history, but they are some of the most debated and addressed issues as well. With current and future technology, we strive for a goal that is not obtainable, absolutely no risk. To think that we can fully eliminate all conditions that could be potentially hazardous is foolish; risk will always exist in all we do, especially with the function of an automobile. The idea of all this new legislation and technology is not to eliminate this risk, but to reduce it.

In history there has been a significant group of automobile owners/drivers or passengers killed by air bags, but this number is extremely small in comparison to the number of lives these same air bag systems save per year. The more we strive to reduce, instead of eliminate risk, the better we will be off we will be and the more progress we will make. The idea of advanced air bags is not to eliminate all risk from driving, this is something you will never be able to do. The idea and concept behind the advanced air bag system is to study the risks that we are taking, evaluate which of those we can control, and try to reduce the amount of risk in those areas. The current system has produced amazing results, and these new systems plan on taking the principles of safety established by these air bags and trying to reduce the negative consequences as much as possible. This is the reason that advanced air bag systems are not a replacement to a bad system, but instead a good addition to a well-proven system, and have the great potential to be extremely successful. Air bags, by design, will always bring risk involved with them, but if we truly evaluate their success and the potential success of the new systems, I think we will find that it is a worthwhile process that does not need to be disabled, but changed in order to limit, as much as possible, the negative effects. Complete Reference Notation Glover, Maurice Striking a blow for Safety Automotive-Engineer v. 24 no7 July/August 1990 p. 39-40 NHTSA Air Bag Main Page <http://www.nhtsa.dot.gov/airbag/proposed/advbag.html> National Highway Traffic Safety Administration Safety Fact Page http://www.highwaysafety.org/safety_facts/safety.html Insurance Institute for Highway Safety St. Edmunds, Bury; Eisenstein, Paul Airbags learn some supplemental

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