Delayed reaction

Nobody said it was easy inventing life-saving technologies, but the least we can do once they're developed is get them out to the general public more quickly. Here's how we can speed things up

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This GM-produced 1973 Chevy Impala is the world's first production car with airbags for the driver and also the front passengers. This vehicle is owned by the author, Byron Bloch, who used the historic Airbag Chevy in his continuing battle for airbags to become mandatory in all vehicles

Why does it often take about 20 to 30 years for a vehicle safety feature to go from feasibility to actual mass production? And what factors stimulate getting a new safety technology into production sooner so that it can help save lives? By looking back at how some vehicle safety technologies emerged from prototype to production in the USA, maybe we can learn from their journeys of delay and progress…

Looking back

Airbags: Airbags began prototype development with Eaton Corporation in the 1960s, prompting interest by GM and Ford to conduct crash tests. GM then mass-produced its Air Cushion Restraint System (ACRS) in 1,000 Chevrolet sedans in 1973, and subsequently offered airbags briefly as an optional extra. But GM and Ford top executives persuaded President Nixon to cancel US Safety Standard 208, which would have phased in airbags by the late 1970s.

Mercedes and Volvo offered airbags in the 1980s, followed by a Ford Tempo fleet in the USA, leading to the media reporting the life-saving merits of airbags in crashes. Chrysler then adopted airbags for all of its US cars as a sales stimulus. However, although proven feasible in 1973, the NHTSA mandate for full adoption took until 1998. The delay was largely due to lobbying pressures by Ford-GM top executives, and anti-regulatory political administrations. Competition ultimately forced mass adoption of frontal airbags and more recently side-curtain airbags.
Seatbelt pretensioners: Seatbelt pretensioners were first described at the International Experimental Safety Vehicle (ESV) Conferences in the 1970s. In the 1980s, Volvo, Saab and Mercedes included pretensioners in some models. Spurred on by criticism of slack-inducing seatbelts – and lawsuits on behalf of belted occupants severely injured in crashes, plus competitive vehicles with pretensioners – they've finally now become standard or optional on most vehicles sold in the USA. That said, it took about 30 years from feasibility to mass acceptance.
Laminated side-window glass: US cars in the 1950s used laminated glass for side windows, then replaced them with cheaper tempered glass in the 1960s through the 1990s. Laminated glass is now being phased back in for some vehicles and marketed as a soundproofing and security feature, although preventing occupant ejection and roof strengthening are also reasons to encourage laminated glass. Presentations are currently being made at SAE and other seminars.
Stronger roof structures: Stronger box-section roof headers were in some vehicles in the 1960-1970 era, but not used in many US and Japanese cars with weaker open-section designs for about

30 years. GM also tried double-panel roofs, while reinforcement techniques were shown in the ESV Conferences during the 1970s. But for decades (1970-2000), too many roofs easily buckled and crushed down, but nevertheless still complied with the much-too-weak Federal Motor Vehicle Safety Standard 216.

Spurred on by media stories of roll-over accidents with roof crush – and litigation cases by the victims, and a directive by Congress – in 2009, after 35 years, NHTSA was finally forced to upgrade the weak, obsolete 1974 safety standard. However, it will now only require a minimal strength-to-weight ratio (SWR) of 3.0, while many current vehicles already exceed 4.0. To get toward the goals of Vision Zero – to eliminate deaths and quadriplegics in roll-over accidents – roof strength should be at least 5.0 SWR and validated with a dynamic roll-over test at more than 50mph.[1]

Learning curve

So what can be learned from these examples? And how can improved safety measures be expedited into the vast majority of our vehicles and for traffic safety improvements? Here are some basic tactics that have proven to work.

The motivated 'mom': Arising from a terrible accident that severely injures or kills their child, parents have been motivated to fight for safer vehicles to prevent others from the same fate. Grieving parents have prompted media stories and encouraged Congressional Hearings, with resulting remedial legislation and directives to NHTSA to correct the problem. One example is the adoption of trunk escape releases to prevent the entrapment deaths of children. Energized citizens *can* make a difference.

Getting your message on television and the internet: The mass media alerts the public to a major safety issue, prompting public demands that something be done. Many fiery accidents focused attention on unsafe fuel tanks, such as the Ford Pinto in the 1970s and GM pickups in the 1990s. Extensive media coverage brought pressure on automakers to abandon vulnerable fuel tanks and adopt safer designs. Concern about Firestone tire defects and Ford Explorer SUV roll-over propensity was prompted by television news reports, and Congressional interest and remedial actions followed. Soon all SUVs will have electronic stability control (ESC) to reduce the roll-over risk. The message here is to alert the media about safety issues and the feasibility of safer technologies.

Car crash litigation cases: In a vehicle accident, there may be severe injury or death allegedly due to something unsafe or defectively designed in the vehicle at issue. In the USA, these 'product liability' cases often reveal that the automaker was aware of

Way ahead with this advanced technology, GM's 1973 Airbag Chevy was equipped with a driver airbag, and a dual-pressure airbag system for the centre and right-front occupants

a hazardous design, but produced those vehicles anyway, ignoring safer alternative designs. Jury verdicts of multi-millions of dollars serve as a stimulus for automakers to change to a safer technology to correct the unsafe design and thereby avoid future liability risks, litigation costs, and jury verdicts… and can harm the automaker's reputation in the marketplace.

US Congressional Hearings: A member of Congress can request a Hearing to examine a safety issue and potential solutions. Over the years, there have been Congressional Hearings on seatbelts with too much slack, unsafe fuel tanks, the need for airbags, stronger roofs for roll-over protection, safer tires, and better guards for truck underride prevention. Congress has then directed NHTSA to investigate, conduct research, and mandate the appropriate safety standard upgrade. Making your case directly to members of Congress – or submitting a petition directly to NHTSA – are also options. It's important to continuously upgrade the Safety Standards to higher levels of required performance, which will thereby force safer designs.

Insurance Institute for Highway Safety: The Insurance Institute for Highway Safety (IIHS) in the USA regularly conducts crash tests and releases the results publicly. IIHS tests are run at higher speeds (40mph) than required by the Federal Motor Vehicle Safety Standards (30 or 35mph), and include offset frontal crashes, vehicle-to-vehicle side impacts, and static-load tests of roofs. Results of IIHS crash tests are featured on television news, the internet, and newspapers across the USA. Automakers respect the marketing value of getting good IIHS ratings and avoiding bad ratings. The Institute thus exerts a strong influence on automakers to improve safety.

Published articles and conferences: By publishing articles and making presentations at conferences, vehicle safety and traffic safety professionals and companies can inform the general public, government, and automakers of feasible technology for advancing safety. Some relevant magazines include *SAE Automotive Engineering*, *Vision Zero International*, *Crash Test Technology International*, *Automotive Testing Technology International*, and *FIA In Safety*. Conferences include the Global Road Safety Forums, SAE TopTechs, NHTSA Government-Industry Meetings, ESV Conferences, Stapp Car Crash Conferences, and Crash Test Expo. Such events help to show feasible technology has been adopted by at least one major agency or automaker, helping to stimulate competitive automakers to adopt that same technology.

(Top) Photo of a Ford Pinto on fire; (Above) Perhaps the most famous jury verdict headline in auto safety history – the 1978 case that involved a Ford Pinto rear-impact fuel tank fire

Conclusion

With over 1.3 million motor vehicle fatalities worldwide a year, the urgency to improve traffic and vehicle safety requires that technology developers, government agencies, and manufacturers use all of the strategies outlined above. Produce videos/DVDs, use the internet, publish articles, present at conferences, demonstrate at exhibitions, alert the TV and newspaper media, communicate with government officials. Use all of these routes as continuous catalysts to reduce that onerous 20- to 30-year gap between feasibility and mass production.

Imagine if the various safety technologies discussed had been implemented closer to when they were first feasible, think of all the lives that would have been saved over these past 30-plus years. The compassionate vision of zero fatalities demands that all avenues be vigorously pursued. ‹

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(Above) Byron Bloch testifying at the 1991 US Congressional Hearing on Auto Safety and (left) the 1999 Toyota RAV4 of the Scott versus Toyota case, at which Bloch testified about roll-over roof crush and safer designs

• *Byron Bloch has been a US auto safety expert in design and crashworthiness for about 40 years, advocating the adoption of airbags, fuel tanks forward-of-axle, integrated seats, stronger roofs for roll-over protection, truck underride guards, and other crashworthiness technologies. He inspects accident vehicles, lectures, writes, appears on TV, testifies in court on behalf of severely injured crash victims, demonstrates exemplar designs that are safer, and produces documentaries analysing car crash accidents and vehicle safety. Why not check out his website at www.AutoSafetyExpert.com*

References

[1] *www.vimeo.com/1381213*