

Safety and Security in Automobile and Its History

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ABSTRACT

This paper aims at giving an overview his paper aims at giving an overview of implementing safety and security systems in automobiles for today and future development. The perception of safety and security problems on the part of those parties involved in the operation of public transportation. This perception is used as a base to develop an improvement agenda for the particular context of developing countries. The rank of importance for each factor is analyzed by applying the factor analysis. Analysis shows that the user is the most important party involved. The understanding and awareness of the user (including the driver) is the most important variable to imove the condition.

KEYWORDS: *Automobile, Safety, Security, Public Pransportation.*

INTRODUCTION

Automobile safety is the study and practice of design, construction, equipment and regulation to minimize the occurrence and consequences of traffic collisions. Road traffic safety more broadly includes roadway design. One of the first formal academic studies into improving vehicle safety was by Cornell Aeronautical Laboratory of Buffalo, New York. The main conclusion of their extensive report is the crucial importance of seat belts and padded dashboards.^[1] Improvements in roadway and automobile designs have steadily reduced injury and death rates in all first world countries. Nevertheless, auto collisions are the leading cause of injury-related deaths, an estimated total of 1.2 million in 2004, or 25% of the total from all causes. Of those killed by autos, nearly two-thirds are pedestrians.^[2] Risk compensation theory has been used in arguments against safety devices, regulations and modifications of vehicles despite the efficacy of saving lives.^[3] Globally car companies Spend nearly \$36 billion annually for influencing new TECHNOLOGIES into their cars. Some of the big advancement in Automotive Industry in last 10 years have come in a area of SAFETY.

HISTORY

18th century-19th century

Automobile safety may have become an issue almost from the beginning of mechanised road vehicle development. The second steam-powered "Fardier" (artillery tractor), created by Nicolas-Joseph Cugnot in 1771, is reported by some to have crashed into a wall during its demonstration run. However, according to Georges Ageon,^[4] the earliest mention of this occurrence dates from 1801 and it does not feature in contemporary accounts. One of the earliest recorded automobile fatalities was Mary Ward, on August 31, 1869 in Parsonstown, Ireland.^[5]

1920s and 1930s

In 1922, the Duesenburg Model A became the first car to have four-wheel hydraulic brakes.^[6]

In 1930, safety glass became standard on all Ford cars.^[7] In the 1930s, plastic surgeon Claire L. Straith and physician C. J. Strickland advocated the use of seat belts and padded dashboards. Strickland founded the Automobile Safety League of America.^{[8][9]}

1960s and 1980s

Effective on new passenger cars sold in the United States after January 1, 1964. front outboard lap belts were required.

In 1967, equipment specifications by such major fleet purchasers as the City and County of Los Angeles, California encouraged the voluntary installation in most new cars sold in the US of safety devices, systems, and design features including:

- Elimination of protruding knobs and controls in passenger compartment
- Additional padding on the instrument panel and other interior surfaces
- Mounting points for front outboard shoulder belts
- Four-way hazard flashers
- A uniform P-R-N-D-L gear sequence for automatic transmission gear selectors
- Dual-circuit brake hydraulic systems

In 1968, the precursor agency to the US National Highway Traffic Safety Administration's first Federal Motor Vehicle Safety Standards took effect. These required shoulder belts for left and right front-seat vehicle occupants, side marker lights, collapsible steering columns, and other safety features. 1969 saw the addition of head restraints for front outboard passengers, addressing the problem of whiplash in rear-end collisions. These safety requirements did not apply to vehicles classified as "commercial," such as light-duty pickup trucks. Thus manufacturers did not always include such hardware in these vehicles, even though many did passenger-car duty. Volvo developed the first rear-facing child seat in 1964 and introduced its own booster seat in 1978.

In 1984 New York State passed the first U.S. law requiring seat belt use in passenger cars. Seat belt laws have since been adopted by 49 states.^[10] NHTSA estimates the resulting increased seat belt use saves 10,000 per year in the United States.^[11]

In 1986 the central 3rd brake light was mandated in North America with most of the world following with similar standards in automotive lighting.

In 1989, companies in Israel implemented Advanced Brake Warning systems, where the driver would be alerted as to how hard the driver in front of them was pressing on their brakes. This has yet to be implemented into mainstream Europe or America.

Airbags were first installed in production vehicles in the 1980s as standard equipment instead of an option as was done in the mid 1970s (such as the Oldsmobile Toronado in 1974^{[12][13][14]}). In 1981, airbags were an available option on the Mercedes-Benz W126 (S-Class). In 1987, the Porsche 944 Turbo became the first car to have driver and passenger airbags as standard equipment, and airbags were offered as an available option on the 944 and 944S. The first airbag was also installed in a Japanese car, the Honda Legend, in 1987.^[15] In 1988, Chrysler was the first United States company to install standard driver's side air bags, in six of its passenger models.^[16] In 1989, Chrysler became the first U.S. auto manufacturer to install driver-side air bags in all its domestic-built automobiles.^[17]

2000s And Onwards

In 2000 the NHTSA released a regulation making trunk releases mandatory for new cars by September of the following year due, in part, to the lobbying efforts of Janette Fennell.^[18]

In 2003 the IIHS began conducting side impact crash tests. In 2004 NHTSA released new tests designed to test the rollover risk of new cars and SUVs. Only the Mazda RX-8 got a 5-star rating.

In 2009 Citroën became the first manufacturer to feature "Snowmotion", an Intelligent Anti Skid system developed in conjunction with Bosch, which gives drivers a level of control in extreme ice or snow conditions similar to a 4x4^[19]

In 2009 NHTSA upgraded its roof-crush standard for vehicles weighing 6000 pounds or less. The new standard increased the crush load requirement from 1.5 to 3 times the vehicle's curb weight.^{[20][21]}

Starting in 2012, all cars under 10,000 lbs. sold in the USA are required to have Electronic Stability Control.^[22]

In 2015, recognizing that safer roads are a shared responsibility, Together for Safer Roads (TSR) was formally launched to align the private sector's road safety efforts with the United Nations Decade of Action for Road Safety.^[23]

ROAD ACCIDENT STATISTICS IN INDIA



Over 1,37,000 people were killed in road accidents in 2013 alone, that is more than the number of people killed in all our wars put together.

One serious road accident in the country occurs every minute and 16 die on Indian roads every hour.

1214 road crashes occur every day in India.

Two wheelers account for 25% of total road crash deaths.

20 children under the age of 14 die every day due to road crashes in in the country.

377 people die every day, equivalent to a jumbo jet crashing every day.

Two people die every hour in Uttar Pradesh – State with maximum number of road crash deaths.

Tamil Nadu is the state with the maximum number of road crash injuries

TOP 10 CITIES WITH THE HIGHEST NUMBER OF ROAD CRASH DEATHS (RANK –WISE):

Delhi (City),Chennai,Jaipur,Bengaluru,Mumbai,Kanpur,Lucknow,Agra,Hyderabad,Pune

INTERNATIONAL

Government-collected data, such as that from the U.S. Fatality Analysis Reporting System, show other countries achieving safety performance improvements over time greater than those achieved in the U.S.

	<i>1979 Fatalities</i>	<i>2002 Fatalities</i>	<i>Percent Change</i>
United States	51,093	42,815	-16.2%
United Kingdom	6,352	3,431	-46.0%
Canada	5,863	2,936	-49.9%
Australia	3,508	1,715	-51.1%

INCREASING COMFORT, SAFETY AND SECURITY OF AUTOMOBILES

Products For Smarter Automobiles

Continental Automotive Group, one of the world's leading automotive industry suppliers, develops a variety of in-vehicle electronic systems. Its Body & Security business unit specialises in body control units, LED light control, power closing, seat comfort systems, battery and energy management, antenna modules, tyre monitoring, and access control systems. The Body & Security unit works closely with automotive manufacturers worldwide to help them equip today's automobiles with new and innovative features, making them safer and more secure, with enhanced comfort and reduced environmental impact; in other words "making them smart". Remote keyless entry and ignition systems developed by the Continental Body & Security business unit are good examples of how the combination of mechanics, sensor technology, electronic hardware and embedded software can create "smarter automobiles". Within the latest generation of remote keyless entry and ignition systems, also known as passive start and entry systems (PASE), the key works without actually having to be held. The automobile "knows" when the key comes close and can automatically unlock the door if the driver touches the handle. Bidirectional keys with inbuilt displays provide additional information about the current vehicle status - whether it is locked or unlocked, whether the lights are on or off, what the fuel level is, and much more. Further, with this key the driver can remotely control in-vehicle systems like heaters and air-conditioning or the sun-roof, by making use of the latest wireless technology for data transmission.

Pregnant women

When pregnant, women should continue to use seatbelts and airbags properly. A University of Michigan study found that "unrestrained or improperly restrained pregnant women are 5.7 times more likely to have an adverse fetal outcome than properly restrained pregnant women".^[24] If seatbelts are not long enough, extensions are available from the car manufacturer or an aftermarket supplier.

Infants and children

Children present significant challenges in engineering and producing safe vehicles, because most children are significantly smaller and lighter than most adults. Additionally, children far from being just scaled down adults, still have an undeveloped skeletal system. This means that vehicle restraint systems such as airbags and seat belts, far from being effective, are hazardous if used to restrain young children. In recognition of this, many medical professionals and jurisdictions recommend or require that children under a particular age, height, and/or weight ride in a child seat and/or in the back seat, as applicable.

Within Europe ECE Regulation R44 dictates that children below 150 cm must travel in a child restraint that is appropriate for their weight. Each country have their own adaptations of this Regulation. For instance, in the United Kingdom, children must travel in a child restraint until they are 135 cm tall or reach 12 years of age, whichever comes soonest. As another example in Austria the driver of passenger vehicles is responsible for people shorter than 150 cm and below 14 years to be seated in an adequate child safety seat. Moreover, it is not allowed for children below the age of 3 to ride in a passenger vehicle without "security system" (which in practice means the vehicle is not equipped with any seat belts or technical systems like Isofix), whereas children between 3 and 14 years have to ride in the back seat.^[25]

Sweden specify that a child or an adult shorter than 140 cm is legally forbidden to ride in a place with an active airbag in front of it.

The majority of medical professionals and biomechanical engineers agree that children below the age of two year old are much safer if they travel in a rearward facing child restraint.^[26]

Child safety locks and driver-controlled power window lockout controls prevent children from opening doors and windows from inside the vehicle.

Infants left in cars

Very young children can perish from heat or cold if left unattended in a parked car, whether deliberately or through absentmindedness.^[27] In 2004 the U.S. NHTSA estimated 25 fatalities per year among children left in hot cars.^[28]

Teenage drivers

In the UK, a full driving licence can be had at age 17, and most areas in the United States will issue a full driver's license at the age of 16, and all within a range between 14 and 18.^[29] In addition to being relatively inexperienced, teen drivers are also cognitively immature, compared to other drivers.^[30] This combination leads to a relatively high crash rate among this demographic.^[31]

In some areas, new drivers' vehicles must bear a warning sign to alert other drivers that the vehicle is being driven by an inexperienced and learning driver, giving them opportunity to be more cautious and to encourage other drivers to give novices more leeway.^[32] In the U.S. New Jersey has Kyleigh's Law citing that teen drivers must have a decal on their vehicle.^[33]

Some countries, such as Australia, the United States, Canada and New Zealand, have graduated levels of driver's licence, with special rules.^[34] By 2010, all US states required a graduated driver's licence for drivers under age 18. In Italy, the maximum speed and power of vehicles driven by new drivers is restricted. In Romania, the maximum speed of vehicles driven by new drivers (less than one year in experience) is 20 km/h lower than the national standard (except villages, towns and cities). Many U.S. states allow 18-year-olds to skip some requirements that younger drivers would face, which statistics show may be causing higher crash rates among new drivers. New Jersey has the same requirements for new drivers up to the age of 21, which may obviate this problem.^[35]

Medical conditions

According to a study^[36] published in 2017 in the Mayo Clinic Proceedings, although most drivers with medical conditions were safe drivers, drivers with psychiatric conditions or substance abuse were particularly at higher risks of unsafe driving. The study also reported that drivers with neurological conditions were the majority of the entire study population (Belgium) who were referred for a driving evaluation, but they were not the most unsafe drivers.

Elderly

Insurance statistics in the United States indicate a 30% increase in the number of elderly killed, comparing 1975 to 2000.^[37] Several states require additional testing for elderly drivers. On a per-driver basis, the number of fatal and overall crashes decreases with age, with some exceptions for drivers over 75.^[38] The overall trend may be due to greater experience and avoiding driving in adverse conditions.^[37] However, on a per-miles-travelled basis,^[39] drivers younger than 25-30 and older than 65-70 have significantly higher crash rates. Survivability of crashes decreases monotonically with the age of the victim.^[39]

CONCLUSION

A common problem for the elderly is the question of when a medical condition or biological aging presents a serious enough problem that one should stop driving. In some cases, this means giving up some personal independence, but in urban areas often means relying more on public transportation. Automobile design is constantly evolving to adapt to different environments and the safety concerns they present. Particularly in the last forty years, there have been many new design features on vehicles with a focus on safety, drastically reducing the amount of fatalities and serious injuries occurring from car accidents. Automobile design has come a long way since its beginning, and shows no signs of slowing down. Newer models of Automobile are being installed with reversing cameras and systems designed to brake before a human can react in the event of danger. Who knows what new safety features will be developed in the next forty years to minimise human error.

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