

ROAD SAFETY OF AUTOMOBILES IN DEVELOPING NATIONS –FOCUS ON SAFETY OF INDIAN CARS

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“If anything is sacred, the human body is sacred”

- Whalt Whitman

Abstract: India is the country where most number road traffic accidents and most number of road fatalities took place every year. During the year 2011, 136384 people lost their life in Road Traffic Accidents. This may be due to so many reasons. Unsafe vehicles are one among them. The total number of Car sold in the year 2011-12 alone is 20, 16,115 .But in the most of the top selling Indian cars the safety features that are most important which can well save or reduce the number of fatalities are not provided. It is also regret to note that though all the International Manufacturers like Honda, Toyota, Renault, Volkswagen, Nissan and Skoda entered in the Indian Car market and fighting to make their presence felt in the quantity of car sales and thus want to make money are neglecting the basic safety features required for a passenger car. The automobiles to be specific cars in India do not have safety features as in that of European Countries and America. Everyone does have their own reasons to substantiate their stands. Here the visions of each of them and the necessary action to be initiated for making these features as mandatory are discussed in detail.

Key Words: Active and Passive Safety features, Crash Worthiness, Driver Assistance, Anti Lemon Law

I. INTRODUCTION

World Health Organization's, first ever Global Status Report on Road Safety reveals that 90% of deaths on the world's roads occur in low and middle-income countries (21.5 and 19.5 per lakh of population, respectively) though they have just 48% of all registered vehicles. What is worse, without increased efforts and new initiatives, the total number of road traffic deaths worldwide and injuries was forecast to rise by some 65% between 2000 and 2020 and in low-income and middle-income countries deaths are expected to increase by as much as 80%.

India is becoming one of the fastest growing car markets in the world. There are 40 lakh cars on Indian

roads already where almost 4 lakh accidents take place every year. So how safe are our cars? According to a government report, road crashes in India killed 136384 people in 2011 (an average of 375 a day), compared with 37,261 fatalities in the U.S.

Traffic accidents cost the nation about 3 percent of its gross domestic product every year, according to Indian government data. As Indians grow more affluent and buy more cars, road safety is increasingly an issue. Fatalities in India exceed that in China or the U.S.

Does this reflect the true picture? Are the automobiles in developing nations in our case Indian automobiles are as safe as the one in Western Countries or U.S.A? There is a lot of debate on this. Everyone has their own views. But it is utmost necessary at present circumstances to provide necessary safety features in all the cars.

II.OBJECTIVE

Road accidents have earned India a dubious distinction, with over 1, 35,000 deaths annually, the country had overtaken China and now India has the worst road traffic accident rate worldwide. At present India's congested roads are the deadliest in the world. The automobile tragedy is one of the most serious of these man made assaults on the human body.

Western countries and U.S.A have safety features and preventive steps are available to ordinary vehicle users. But it is not so in India? Is this the main reason for the higher percentage of road accidents in India? The main objective of this paper is to analyse the lack of safety features, lack of stringent laws for making these features as mandatory and the attitude of Indian public towards the safety features.

III. SAFETY FEATURES

The cars manufactured in Western Europe and North America come equipped, mandatorily, with various active and passive safety features unlike Indian cars.

A. Active and passive safety

The terms "active" and "passive" are simple but important terms in the world of automotive safety. "Active safety" is used to refer to technology assisting in the prevention of a crash and "passive safety" to components of the vehicle (primarily airbags, seatbelts and the physical structure of the vehicle) that help to protect occupants during a crash. Active safety features, like anti-lock braking systems, traction control and electronic brake distribution, are meant to avoid an accident. Passive safety features, like in-built crumple zones in the monologue body shell which deform in a head-on collision to absorb the energy of the oncoming vehicle, are being to protect the driver and passengers inside the vehicle when an accident occurs despite the functioning of the various active safety systems. Airbags, side impact beams in the doors and collapsible steering columns are other examples of passive safety systems.

B. Crash avoidance systems

Crash avoidance systems and devices help the driver — and, increasingly, help the vehicle itself — to avoid a collision. This category includes:

- The vehicle's head lamps, reflectors and other lights and signals.
- The vehicles mirrors
- The vehicles brakes, steering and suspensions systems.

C. Driver assistance systems

A subset of crash avoidance is *driver assistance* systems, which help the driver to detect ordinarily-hidden obstacles and to control the vehicle. Driver assistance systems include:

- Automatic Braking system to prevent or reduce the severity of collision.
- Infra red night vision systems to increase seeing distance beyond head lamp range.
- Adaptive high beam which automatically and continuously adapts the headlamp range to the distance of vehicles ahead or which are oncoming
- Adaptive head lamps swivels headlamps around corners
- Reverse back up sensors ,which alert drivers to difficult-to-see objects in their path when reversing
- Back up camera
- Adaptive cruise control which maintains a safe distance from the vehicle in front
- Lane departure warning systems to alert the driver of an unintended departure from the intended lane of travel
- Tire pressure monitoring systems or Deflation Detection Systems
- Traction Control Systems which restore traction if driven wheels begin to spin

- Electronic Stability Control, which intervenes to avert an impending loss of control
- Anti-lock braking systems (ABS)
- Electronic Brake force distribution systems
- Emergency brake assist systems
- Cornering Brake Control systems
- Pre crash System
- Automated parking system

D. Crashworthiness

Crash worthy systems and devices prevent or reduce the severity of injuries when a crash is imminent or actually happening.

- Seat belts limit the forward motion of an occupant, stretch to slow down the occupant's deceleration in a crash, and prevent occupants being ejected from the vehicle.
- Airbags inflate to cushion the impact of a vehicle occupant with various parts of the vehicle's interior.
- Laminated windshields remain in one piece when impacted, preventing penetration of unbelted occupants' heads and maintaining a minimal but adequate transparency for control of the car immediately following a collision. Tempered glass side and rear windows break into granules with minimally sharp edges, rather than splintering into jagged fragments as ordinary glass does.
- Crumple zones absorb and dissipate the force of a collision, displacing and diverting it away from the passenger compartment and reducing the impact force on the vehicle occupants. Vehicles will include a front, rear and maybe side crumple zones (like Volvo SIPS) too.
- Side impact protection beams.
- Collapsible universally jointed steering columns, (with the steering system mounted behind the front axle - not in the front crumple zone), reduce the risk and severity of driver impalement on the column in a frontal crash.
- Pedestrian protection systems
- Padding of the instrument panel and other interior parts of the vehicle likely to be struck by the occupants during a crash.

E. Effect of Safety Features

Lives Saved in 2010 by Restraint Use and Minimum Drinking Age Laws.

Study conducted in United States of America in 2010, reveals that the use of seat belts in passenger vehicles saved an estimated 12,546 lives. Seat belts have saved over 69,000 lives during the 5-year period from 2006 to 2010. These annual lives saved counts, shown in Table 1, have been produced by NHTSA's National Center for Statistics and Analysis since 1975. The counts are estimates that are calculated using the effectiveness of each device or law that is mentioned. More information on the methodology of lives saved estimates is available in two NHTSA publications: Lives Saved FAQs (DOT HS 811 105), which answers 30 common lives saved questions and includes references to many other reports on

lives saved; and Lives Saved Calculations for Seat Belts and Frontal Air Bags (DOT HS 811 206), which describes in detail the methodology of estimating lives saved by seat belts and frontal air bags.

In addition to the 12,546 lives saved in 2010 by seat belts (occupants age 5 and older), 2,306 lives were saved by frontal air bags (occupants 13 and older), 1,550 lives were saved by motorcycle helmets, 550 lives were saved by 21-year-old-minimum-drinking-age laws, and 303 lives (age 4 and younger) were saved by child restraints (child safety seats and lap/shoulder belts). An additional 3,341 lives would have been saved in 2010 if all unrestrained passenger vehicle occupants 5 and older involved in fatal crashes had worn their seat belts; and if all motorcyclists had been helmeted, then an additional 706 lives would have been saved.

Table 1 shows that the number of lives saved by seat belts among occupants 5 and older declined from 12,763 in 2009 to 12,546 in 2010. The number of lives saved by child restraints, frontal air bags, and the minimum legal drinking age also declined from 2009 to 2010. The number of lives saved by motorcycle helmets increased from 1,486 in 2009 to 1,550 in 2010.

Table 1: Lives Saved by Restraint Use, and 21-Year-Old-Minimum-Drinking-Age Laws, and Additional Lives That Would Have Been Saved at 100-Percent Seat Belt and Motorcycle Helmet Use, 2006 -2010

Year	Lives Saved, Age 4 & Younger	Lives Saved, Age 5 & Older	Lives Saved, Age 13 & Older	Lives Saved, All Ages	Lives Saved	Additional Lives That Would Have Been Saved at 100 Percent Use	
	Child Restraints	Seat Belts	Frontal Air Bags	Motorcycle Helmets	Minimum Drinking Age Law	Seat Belts	Motorcycle Helmets
2006	427	15,458	2,824	1,667	888	5,468	756
2007	388	15,223	2,800	1,788	831	5,048	805
2008	286	13,312	2,557	1,836	716	4,171	827
2009	307	12,763	2,387	1,486	626	3,700	733
2010	303	12,546	2,306	1,550	550	3,341	706

Source: 2006-2009 FARS Final Files and FARS 2010 Annual Report File

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F. Safety Features – Indian Scenario

Countries in Western Europe and North America have stringent legislations making it mandatory for the automobile manufacturers to test the crash-worthiness of their products before being made road legal. In a crash test in developed countries, cars are slammed into each other at high speeds. Every new car model abroad has to undergo crash test before it hits the roads. Airbags, brakes and crumple zones on the car body are tested to find out if they can keep the passengers safe or not when an accident takes place. Surprisingly, such tests aren't compulsory in India. Indian motor vehicle act demands only basic safety features like seat belts, rear view mirrors, head rests and bumpers auto experts, say.

In modern India, most of the world's leading manufacturers have a presence. Does our existing homologation and type approval rule stipulate crash-worthiness? If yes, where in India do such test facilities exist? If no, is there any move by the Govt. of India to implement a compulsory safety testing and rating system for automobiles in the near future?

When technologically advanced countries have safety features and preventive steps available to ordinary

vehicle users, why is that Indian Government is dithering on setting up an institution for vehicle safety testing?

This is the safety feature details of the top selling Indian cars.

TABLE 2

Sl.No.	Brand/Model	Sales in Nos	Variant Base/Top End	Cost Rs.in Lakhs (Ex Show room)	ABS	Air Bag
		June 2012				
1	Maruthi Alto	21645	Std	2.46	Nil	Nil
			Vxi K10	3.34	Nil	Nil
2	Maruthi Swift	15682	Lxi	4.53	Nil	Nil
			Vxi ABS	4.94	Yes	O*
3	Maruthi Swift Dezire	13741	Lxi	4.86	Nil	Nil
			Vxi	5.40	Yes	Yes
4	Maruthi Wagon R	9983	Lxi	3.60	Nil	Nil
			Vxi	4.39	Yes	O*
5	Mahindra Bolero	9514	DI AC	5.57	Nil	Nil
			Zlx	7.29	Nil	Nil
6	Hyundai i20	7676	Era	4.81	Nil	Nil
			Magna opt	5.36	Nil	Nil
7	Toyota Innova	6785	2.5E Diesel	9.12	Nil	Nil
			2.5 Gx Diesel	11.64	Nil	Nil
8	Hyundai Eon	6550	DLite	2.79	Nil	Nil
			Sportz	3.76	Nil	Yes
9	Maruthi Omni	6300	8 Seater	2.57	Nil	Nil
			LPG	2.68	Nil	Nil
10	Hyundai i10	6177	Era	4.06	Nil	Nil
			Asta	5.48	Yes	Nil

“Car makers’ lack of accountability coupled with the Government’s apathy has led to a situation where the basic safety measures are equated with luxury. It is pathetic that the car makers charge a heavy premium for airbags and ABS/EBD etc which are basic safety devices. The Government should make it mandatory to have these in all models. The European and American car makers comply with these rules then why not here? It will probably never happen as the auto lobby will campaign against it.

V. SAFETY FEATURES- MANUFACTURERS’ PERSPECTIVE

The car makers' appeals are emotional. They seek to inspire excitement, aesthetic pleasure and the association of glistening model in its provocative setting with the prospects most far reaching personal visions and wish fulfilment.

One thing today is that we have more cars than we have names. May be public doesn't want all these kinds, but competition makes it necessary. Newness is almost entirely stylistic in content and that engineering innovation is restricted to a decidedly secondary role in product development. Industry holds the view that "Seeing is selling". This is the greatest act of industrial irresponsibility. This leads to struggle for safety.

Manufacturers business includes styling as a very necessary thing. Today's bumpers are not playing a major role in the total job of absorbing collision energy when these collisions are of greater magnitude than simply parking. But there is always a great potential in safer bumper for the significant energy absorption of impact forces.

The industry has persisted in declaring that it merely "gives the customer what he wants". Industry's long practice of not introducing safety feature as standard equipment unless there is compulsion or threat of legislation or regulation. Once in one interview when asked about providing safety features for all cars, GM Marketing at Maruti Suzuki said that "Technology wise we can provide, but it's a very price sensitive market. Customers want very price regulated vehicles that's why we don't provide".

The trouble is most carmakers in India have equated airbags and ABS to luxury features and offer them mostly only in their top end variants. While there is a move to make airbags and anti-lock braking mandatory, they will also hike vehicle prices beyond what many customers would be willing to pay. None of the Car maker who produces car less than Rs.10lakhs other than Honda (Honda Jazz) provides safety features such as Air bag and ABS right from the base variant.

ACTIONS TO BE INITIATED

The manufacturers should divert money from style to safety, function and appearance entirely on an objective basis. And manufacturers should take more responsibility when it comes to customer safety and make these features as standard on all their models. Fundamental automobile safety is not a matter of attachable device and feature offered as optional extra cost equipment, safer design into the car. It is the responsibility of the manufacturers to spend considerable amount of money in Research and Development to improve the Safety of the vehicles at a lower cost.

VI. SAFETY FEATURES CONSUMERS PERSPECTIVE

While buying a new car, a normal Indian treat safety a last priority thing. We mind paying extra money for those additional safety features that manufacturers are offering as of now. We will have to come out of our economical mindset and will have to accept that life is more important than a few thousand rupees. The public should have a greater sense of personal responsibility for making decisions in favour of safety equipment in buying

a car, rather than confining attention to wheel cover styling or audio system etc.,

Since the Indian consumer is so price-sensitive, though, many made-in-India cars don't have safety features common to other markets, according to a recent government report on highway safety.

Even most of the well educated people do not give due importance to the important basic safety features, rather they concentrate on decorative and comfort features like Air-Condition, Audio System. Agreed, one of the primary reasons for not picking cars with these features is cost. This mindset has to change.

ACTION TO BE INITIATED

All buyers out there should make an informed decision when it comes to buying vehicles, safety features like ABS and airbags should not be considered as luxuries and ignored just for saving some initial cost and insurance premiums. The small amount you save out of not opting for safety features may lead to a big loss in future with regards to your life. Hence, it is also the responsibility of the buyer not to prefer buying cars without safety features which will in turn lead the manufacturers to produce cars only with necessary safety features. Safety ratings may be introduced in every car. Without these safety ratings, even drivers who are concerned with safety issues and willing to pay for safer cars lack the reliable information for comparing safety between models. Insurers usually take into account the overall safety of the car in setting the premium. They also try to provide information regarding cars' safety.

VII. SAFETY FEATURES- GOVERNMENT'S PERSPECTIVE

The Government is concentrating on highway design rather than vehicle design. From an engineering stand point, when an accident injury occurs, it is a result of failure of the technological components of the vehicle and the highway to adapt adequately to the drivers' capacities and limitations. This feature is, above all, a challenge to professional engineering, which in its finest work should not hesitate to aim for total safety. Road traffic injuries constitute a major public health and development crisis, and are predicted to increase if road safety is not addressed adequately.

Our country should have anti-lemon laws and a federal watchdog like the National Highway Traffic Safety Administration in U.S.A (formed in 1966) which keeps a watch on the quality of manufacturing and after sales service provided by the manufacturers so that any recalls for the most minute of defects are announced to keep the vehicle in safe and perfectly running condition. After the formation of the National Traffic and Motor Vehicle Safety Act in 1966 more than 300 million cars, trucks, bikes etc., as well as 46 million tyres, 66 million pieces of motor vehicle equipments and 42 million child safety seats have been recalled in U.S.A. But an automobile company whose vehicles which was declared unsafe in U.K and U.S.A because of potential hazard, marketed the same in India under a different name due to lack of strict laws and thus playing with the life of Indian people due to lack of stringent laws here.

ACTIONS TO BE INITIATED

If a revolution, through legislation, took place with a focus on automobile safety then I am sure the accident rate would drop drastically resulting in fewer injuries, maims and deaths on the roads. Indian consumers are not paying special attention towards safety. This is because of the negligence and different kind of mentality when compared with Europe or America. Is the value of human life more in these countries?

The vehicles with necessary safety devices like airbags, ABS with Electronic Brake Distribution (EBS) and other active and passive safety features shall be given reduction in premium. The Government should insist insurance companies to give considerable discounts in premium for the above of type of vehicles. According to the Insurance Institute for Highway Safety, Electronic stability control (ESC) could prevent nearly one-third of all fatal crashes. One study estimates the ESC's benefit-cost as ranging from 4.1 in France up to 8.0 in Germany. Though many insurers do grant lower premiums for safer cars and discounts for safety equipment. However, it is plausible that the current level of discounts offered today by insurers is lower than is socially optimal. Granting lower premiums and discounts for safer cars and safety devices would probably increase consumer demand to these products, and thus the level of research and development of new safety products would rise.

VIII. Conclusion

The roots of the unsafe vehicle problem are so entrenched that the situation can be improved only by forging of new instruments of citizen action. A great problem of contemporary life is how to control the power of economic interests which ignore the harmful effects of their applied science and technology. Safety ratings may be introduced to cars by which the consumer will know the level of safety in the cars. Safety measures like built-in maximal speed limit in new cars: not more than the maximal speed allowed in the country. This is a technologically feasible and cheap measure that could simply make extreme speeding practically impossible.

The buyers should give more importance to the safety aspects first. If they avoid buying unsafe cars manufacturers for sure will provide the necessary safety features in all variants and all model of the cars.

There can be a system wherein cars with higher safety rating pay less annual road tax and insurance can also be put in place. There are strict laws available about emission control in car engines, if a similar revolution, through legislation, took place with a focus on automobile safety then it is sure the accident rate would drop drastically resulting in fewer injuries, maims and deaths on the roads. This would benefit both society as well as the economy of the country. There should be Strong enforcement of strong laws.

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